

Hitachi Semiconductor Package Data Book

HITACHI

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Semiconductor & Integrated Circuits Hitachi, Ltd.

Introduction

Thank you for using Hitachi's semiconductor devices.

The growing market for electronic equipment requires mounting semiconductor devices with higher functional capacity and higher density and developing packages for housing them.

As we deal with the contradictory aims of enlarging chip sizes and making packages smaller, the concerted efforts of the entire company are focused on advances being made in development of packaging materials, stress analysis simulation and development of mounting technology.

As the packages we develop are used throughout the world, we have pursued international standardization through package outline and materials standardization organizations in Japan and abroad.

Our catalog of packages was first published in Japan in 1984. There have since been twelveth editions. During this period, they were carefully evaluated from various aspects. From this point on, the format is being changed to a data book format and the contents have been made more substantial. We hope you will use it on a regular basis when using our semiconductor devices. In addition, we would appreciate your comments.

These descriptions attempt to make accurate and clear explanations and to include the most recent information. However, there may be points that have not been thoroughly presented. If you notice any such points, please send us your comments.

This data book is concerned primarily with general topics. Please consult with our Semiconductor & Integrated Circuits for details about individual data.

September 2002
Semiconductor & Integrated Circuits
Hitachi, Ltd.

<p>The contents recorded in this document consist of technological information concerning semiconductor packages. Although we believe the data are accurate, there are restrictions in respect to such legal aspects as patents, contracts and guarantees.</p>
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Section 1 Introduction of Packages

1.1 Types of Packages and Advantages

1.1.1 Types of Packages

The packages are classified as indicated in figure 1.1 through figure 1.7 on the basis of their mounting characteristics on printed wiring boards and their shapes.

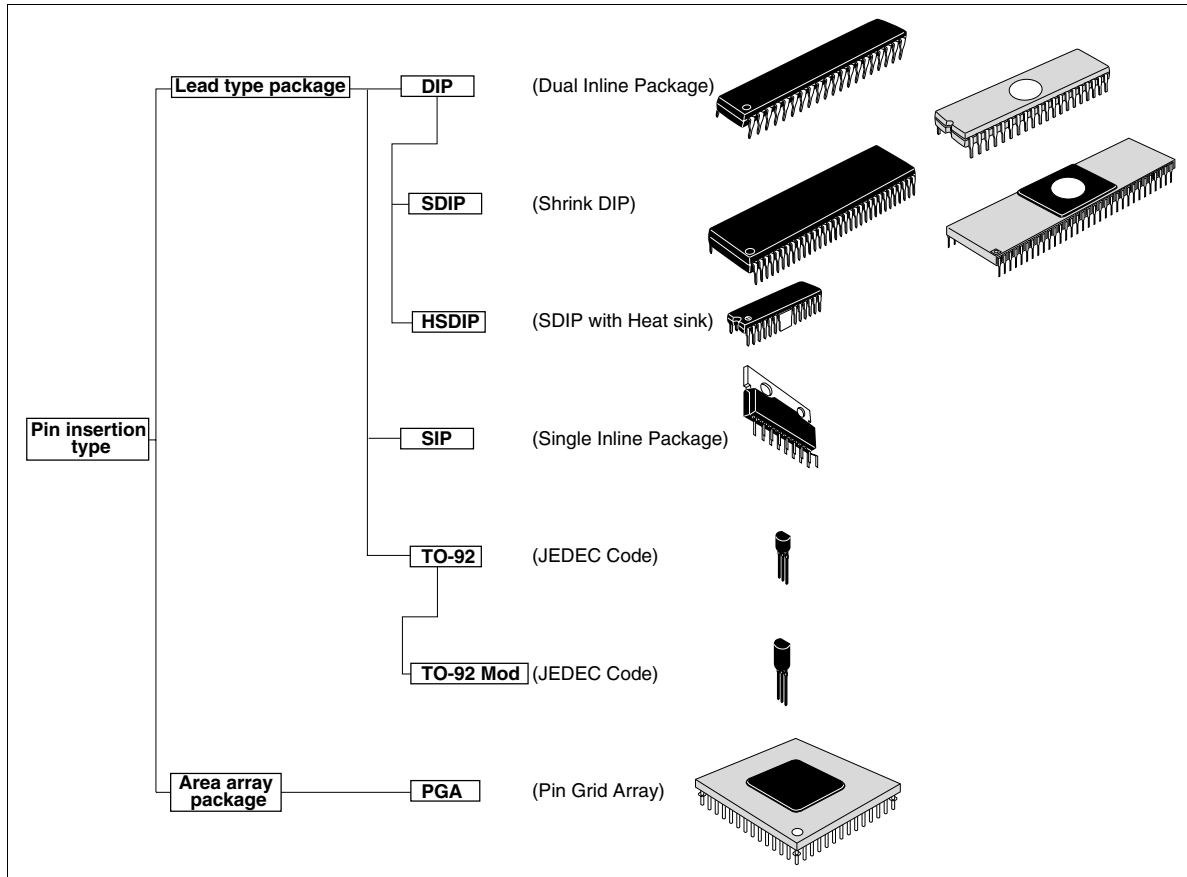


Figure 1.1 Classification of IC Packages

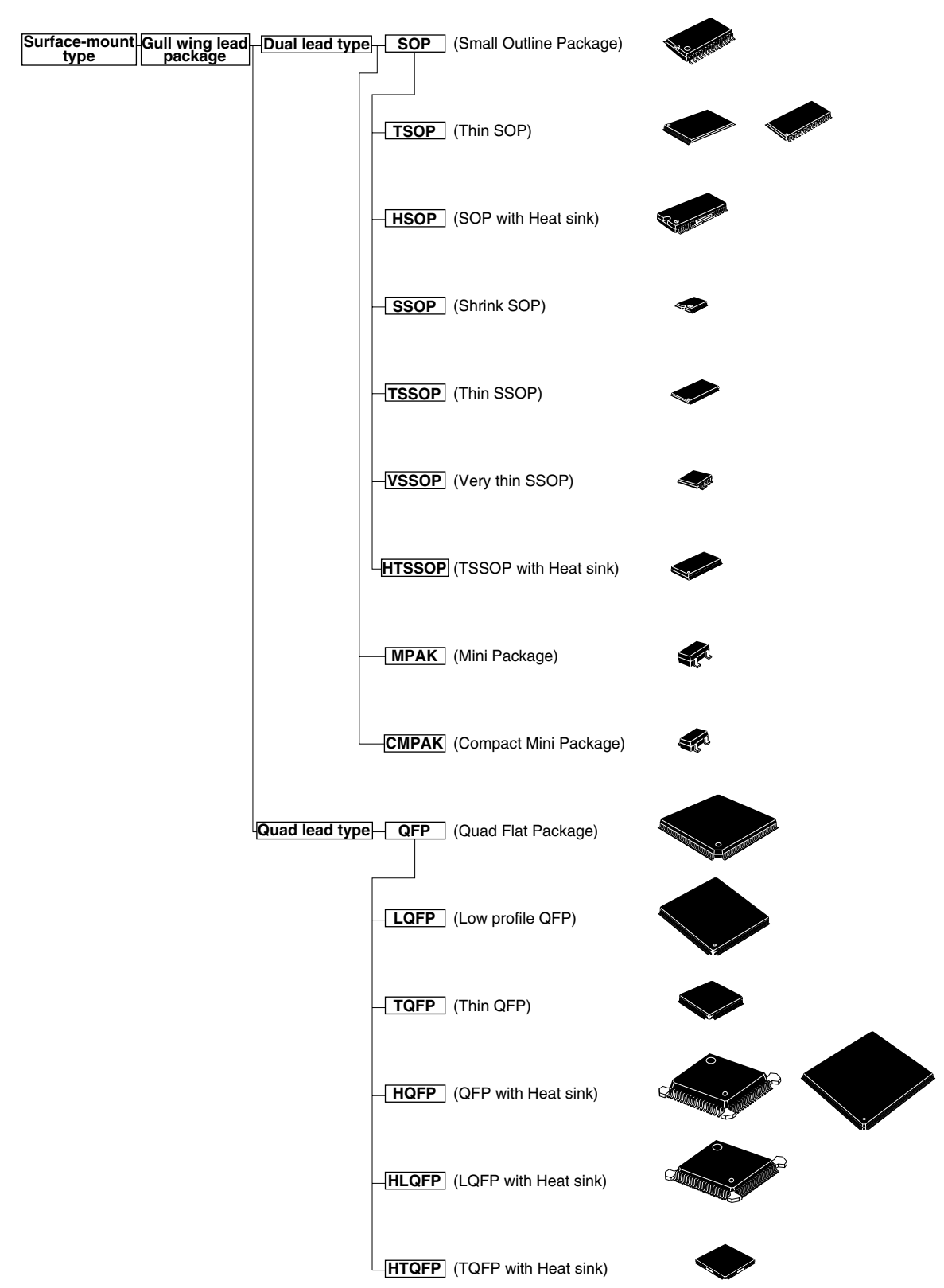


Figure 1.1 Classification of IC Packages (Cont)

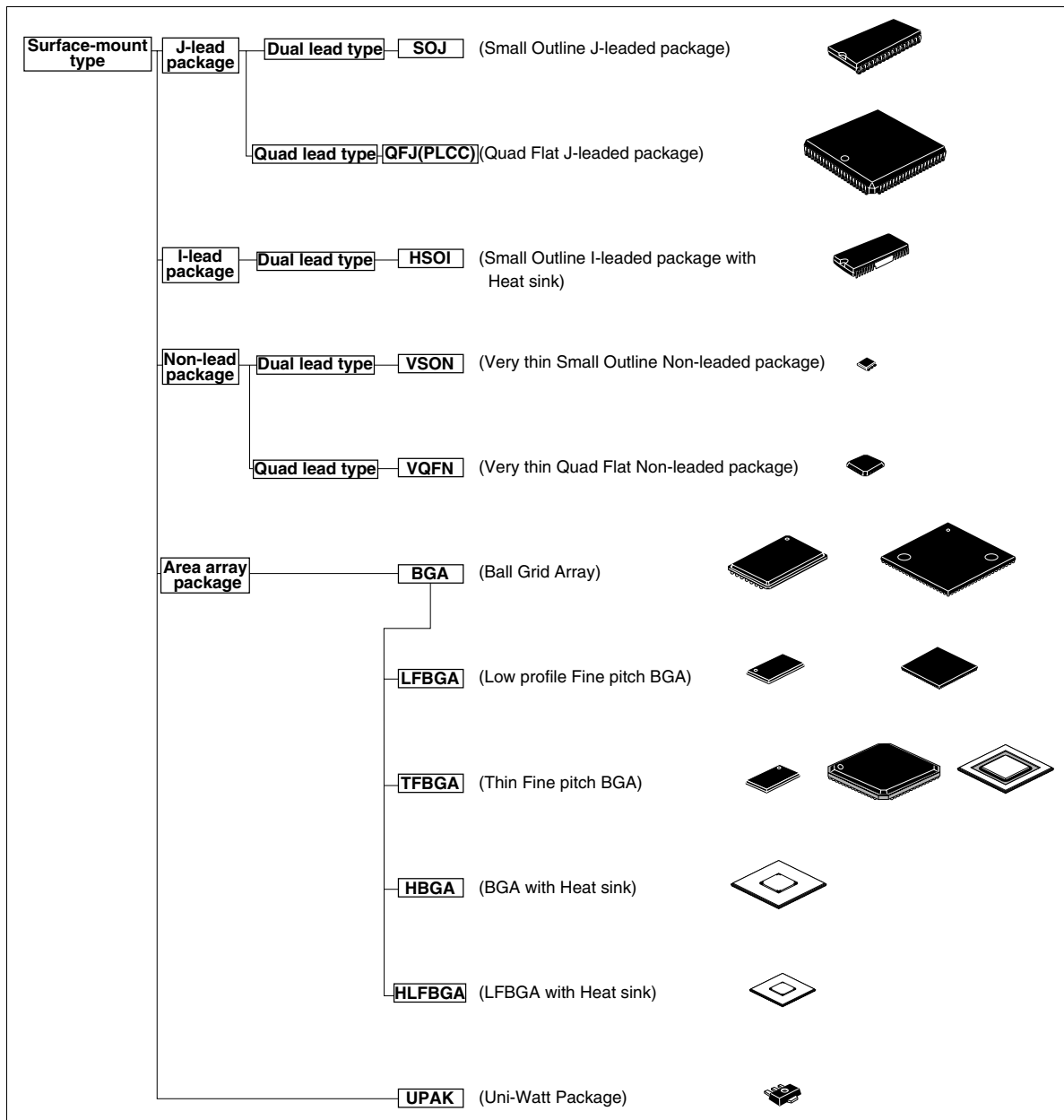


Figure 1.1 Classification of IC Packages (Cont)

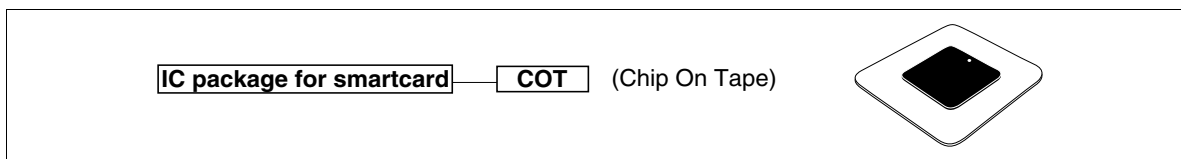


Figure 1.2 Classification of IC Package for Smartcard

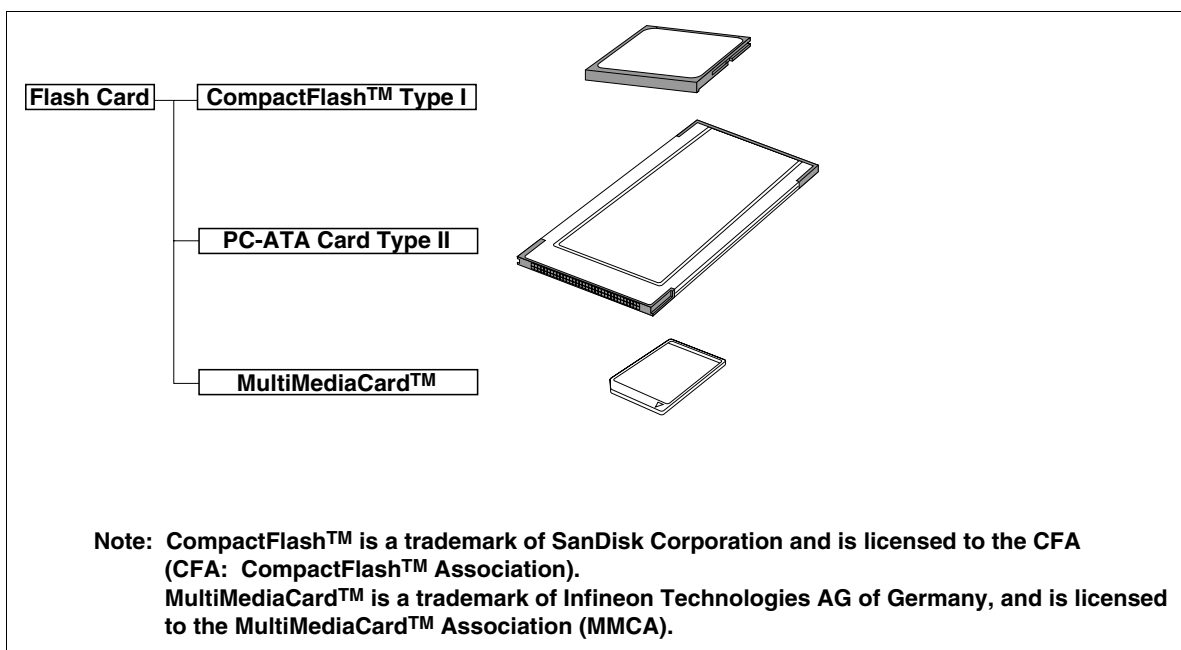


Figure 1.3 Classification of Flash Card

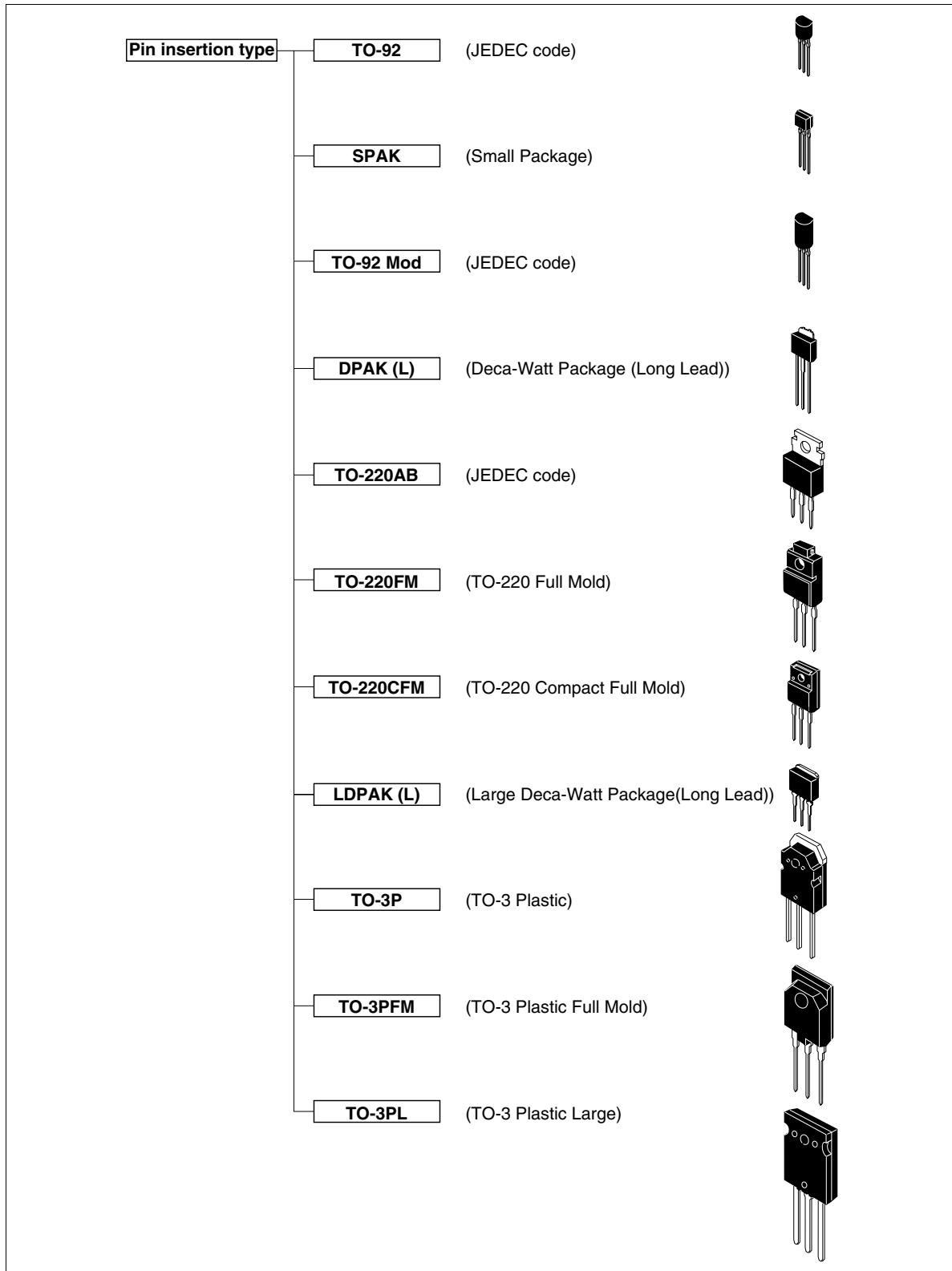


Figure 1.4 Classification of Transistor Package

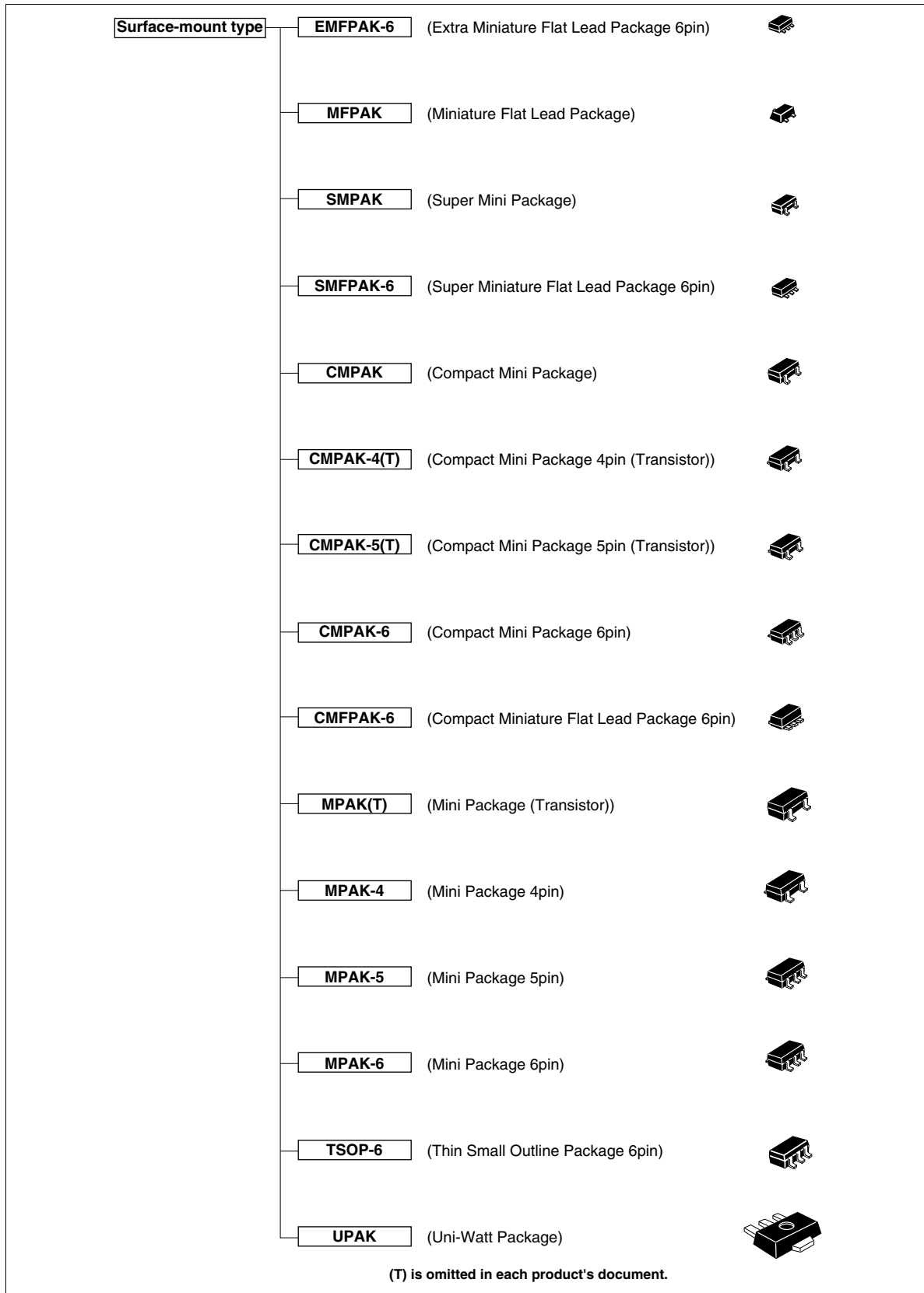


Figure 1.4 Classification of Transistor Package (Cont)

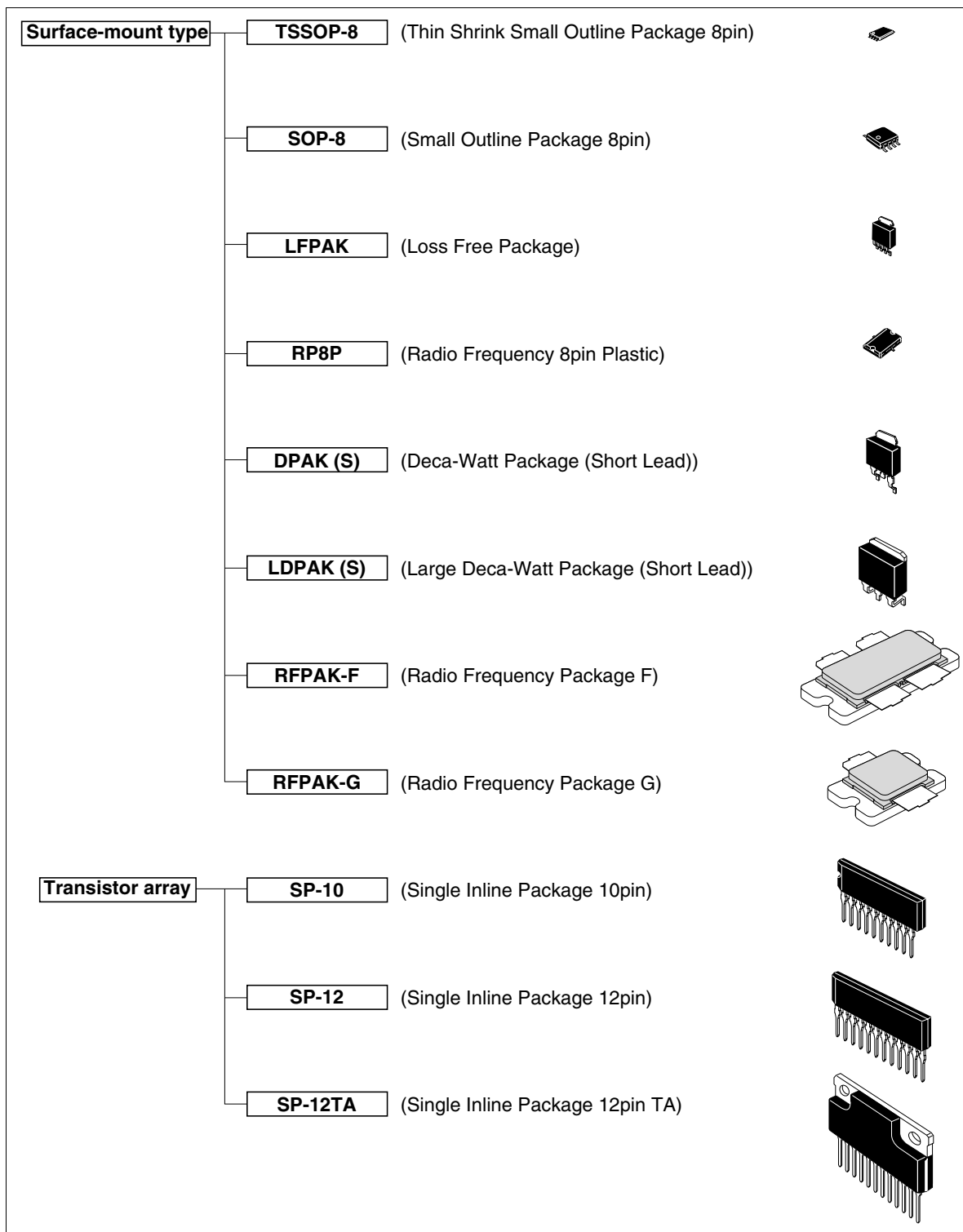


Figure 1.4 Classification of Transistor Package (Cont)

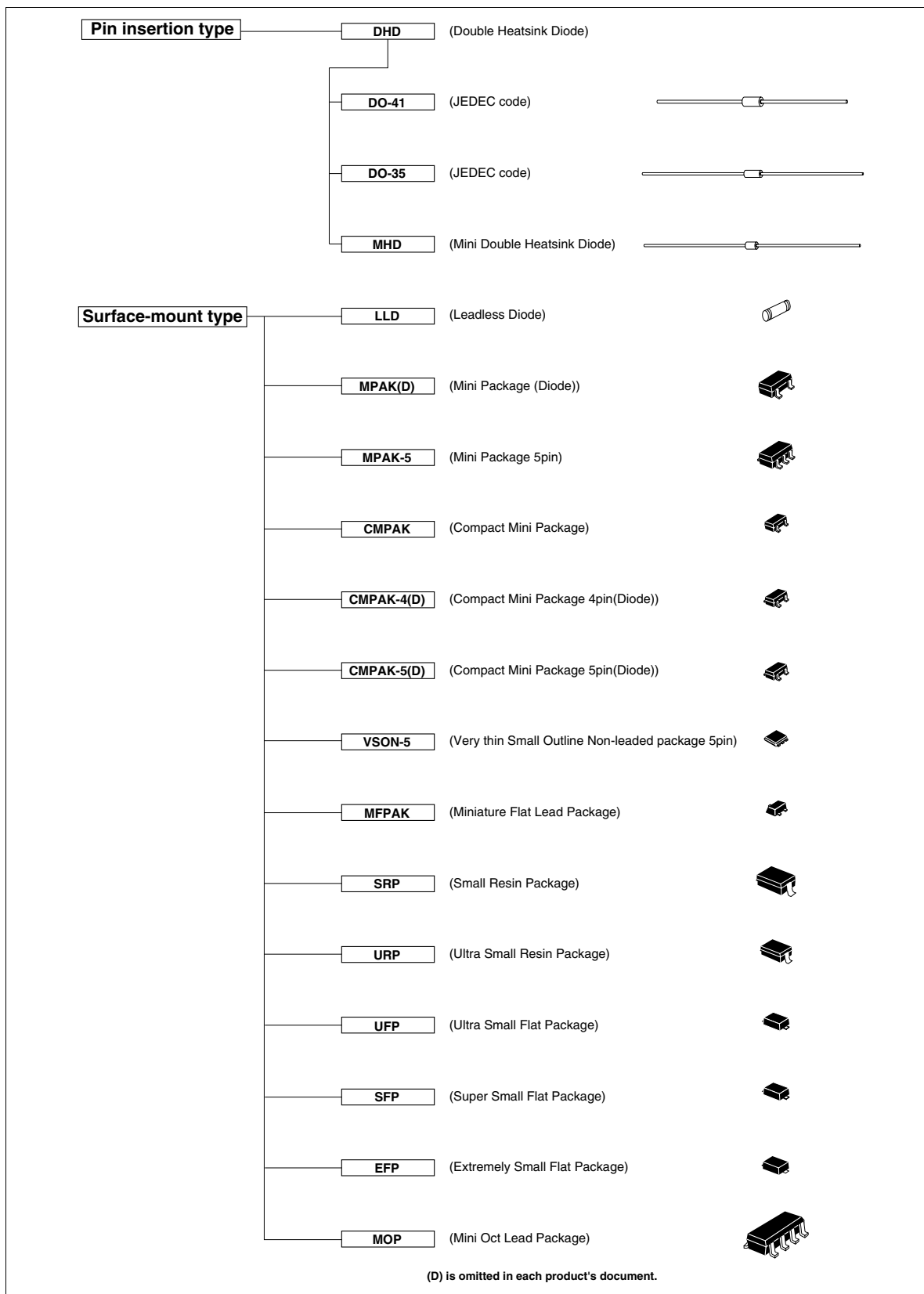


Figure 1.5 Classification of Diode Package

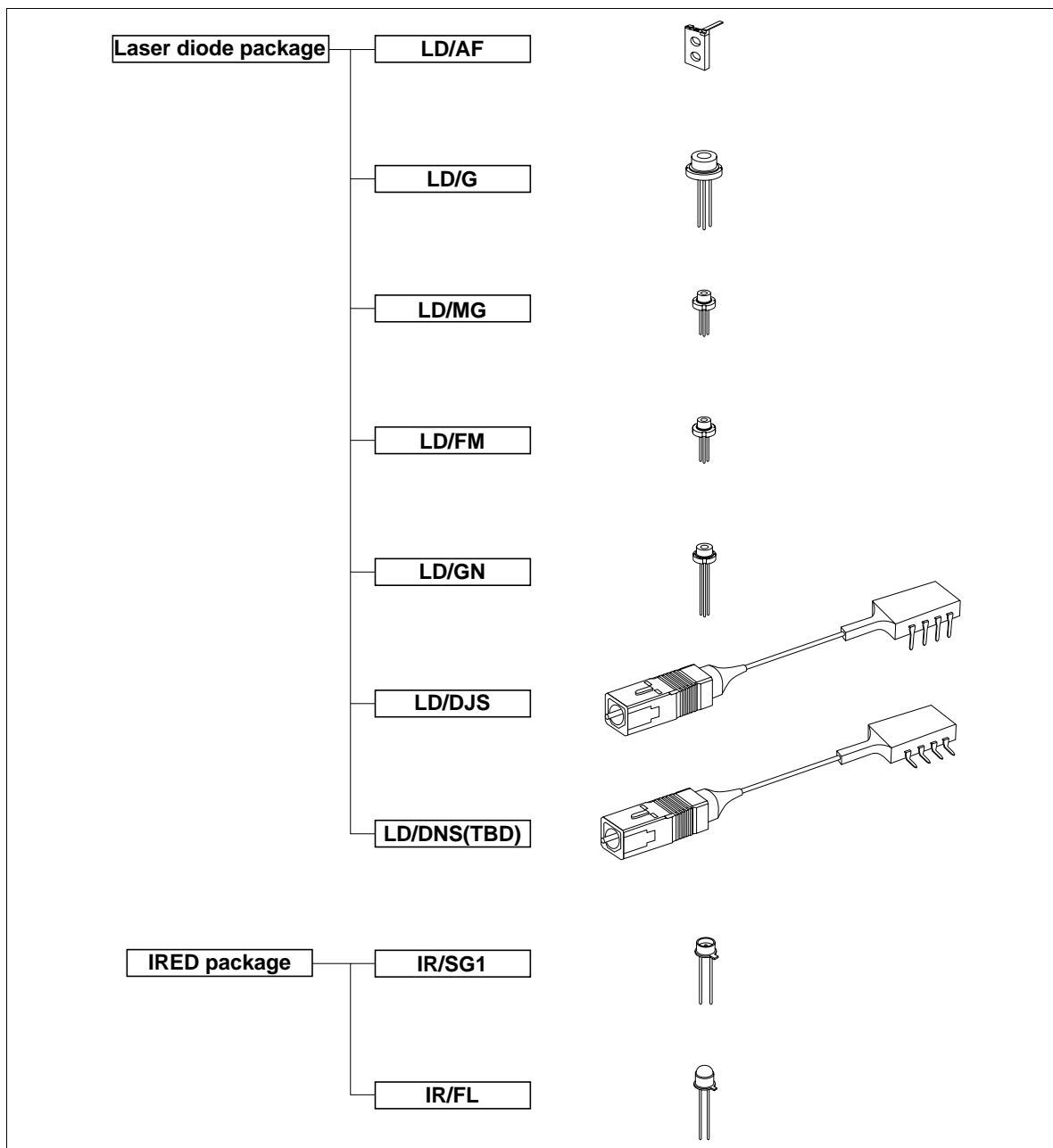


Figure 1.6 Classification of Optodevices

Note: The Opto-Device Division is being transferred to OpNext, Inc. as of October 1, 2002. For any inquiries on the optoelectronic devices, please contact the Hitachi sales office as same as before.

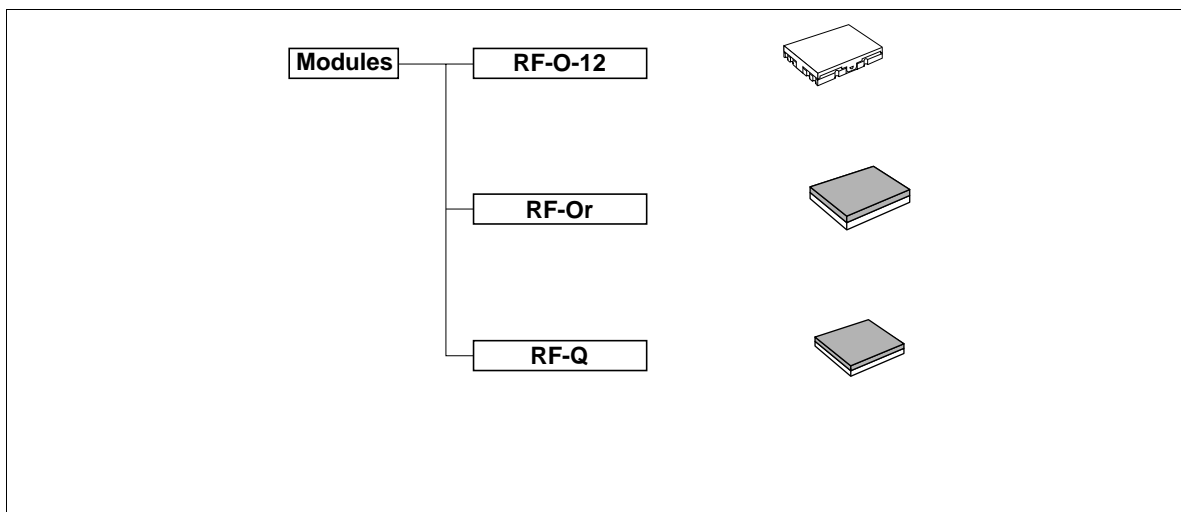


Figure 1.7 Classification of Modules

1.1.2 Package Structures

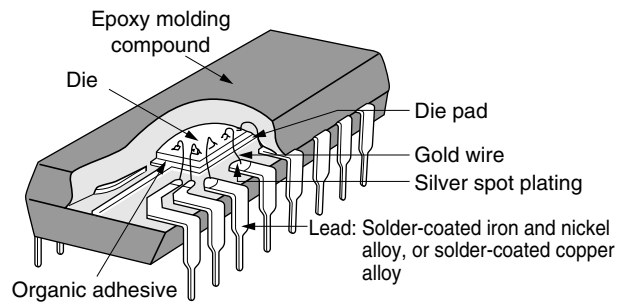
The standard structure and feature of representatives of each type of package is shown below.

1. Structure and Features of Representative Pin Insertion Type Packages

DIP (Dual Inline Package) **SDIP (Shrink DIP)**

Features

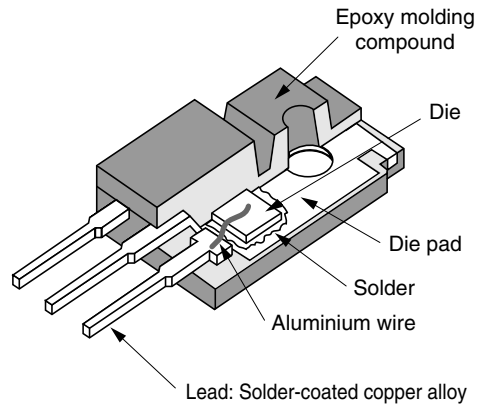
- Pin insertion type package with leads which emerge in two directions
- Flow soldering is applicable
- Easily handled because of high lead strength



TO-220FM (TO-220 Full Mold)

Features

- Insulated type in which surface resin molding is attached to the conventional TO-220AB heat-radiation fin
- When the heat sink is installed, an insulator (spacer, washer, etc.) is not necessary



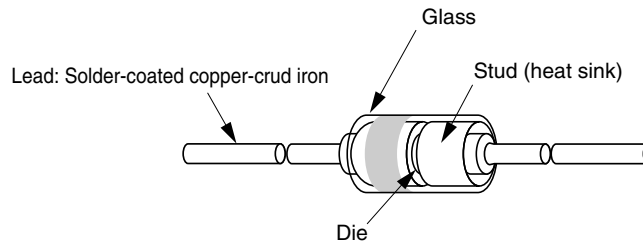
DO-41 (JEDEC code)

DO-35 (JEDEC code)

MHD (Mini Double Heatsink Diode)

Features

- High reliability because of glass sealed package

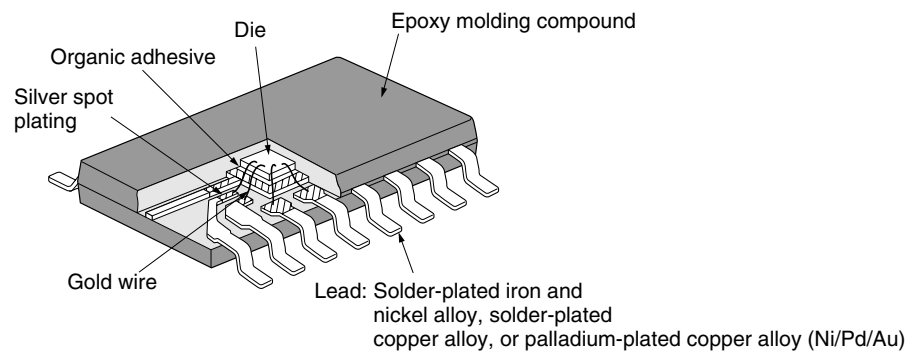


2. Structure and Features of Representative Surface Mount Type Packages

SOP (Small Outline Package)

Features

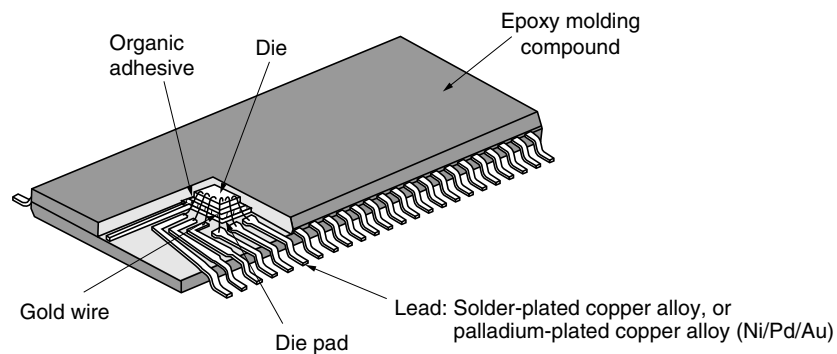
- Package with leads which emerge in two directions and are formed in gull-wing shape
- Easily handled



TSSOP (Thin Shrink Small Outline Package)

Features

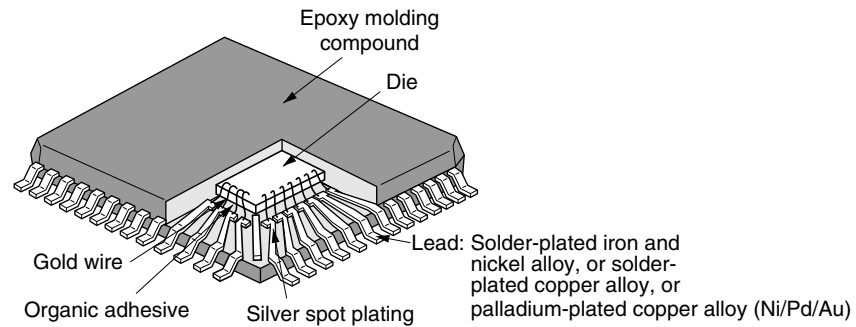
- Thin SOP with a mounting height of 1.20 mm or less
- Leads are on the longer side of the package body
- Lead pitch: 0.65, 0.50, 0.40 mm



QFP (Quad Flat Package) **LQFP (Low profile QFP)** **TQFP (Thin QFP)**

Features

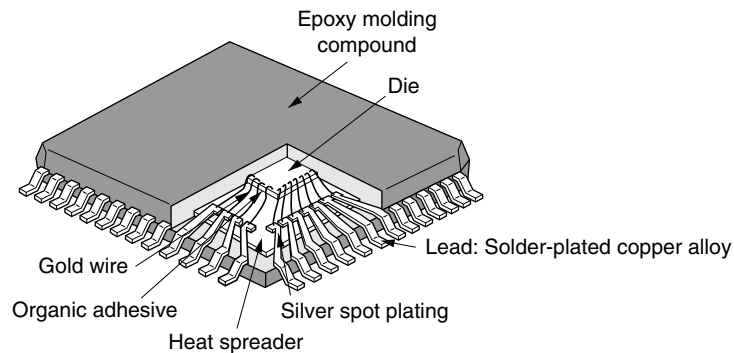
- Ideal for advanced-function and high-I/O-count LSIs because of high pin count
- Small size allows high-density mounting
- Easy visual inspection of solder joints
- QFP with a mounting height of 1.70 mm or less is LQFP
- QFP with a mounting height of 1.20 mm or less is TQFP



HQFP (Quad Flat Package with Heat sink)

Features

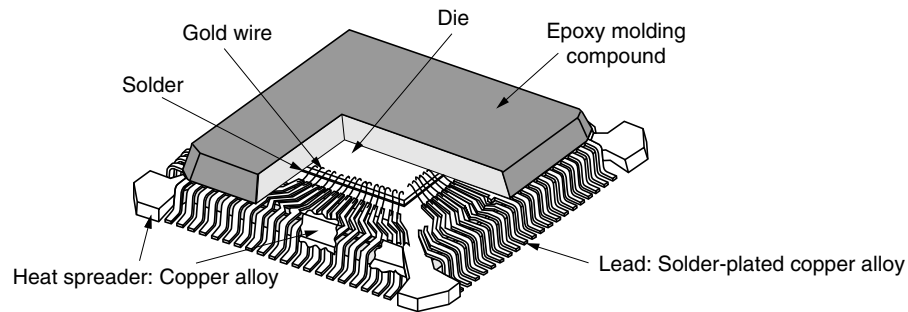
- Ideal for advanced-function and high-I/O-count LSIs because of high pin count
- Small size allows high-density mounting
- Easy visual inspection of solder joints
- High heat-radiation package with installation of heat sink inside body



HQFP (Quad Flat Package with Heat sink) **HLQFP (Low profile Quad Flat Package with Heat sink)** **heat spreader Exposed type**

Features

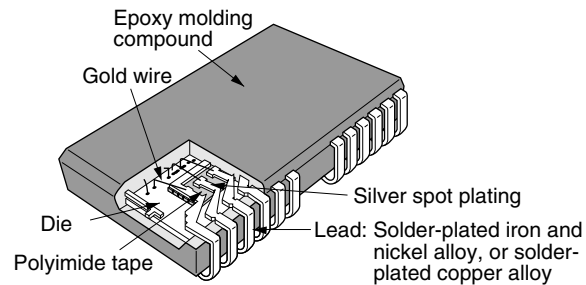
- Improved heat-radiation by exposing and soldering the heat spreader
- Improved outer-lead dimensional accuracy by projecting the corner of the heat spreader
- Easy visual inspection of soldered corner of the heat spreader



SOJ (Small Outline J-leaded package)

Features

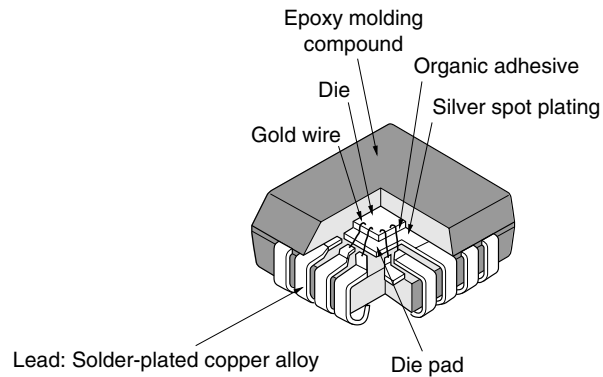
- Package with leads which emerge in two directions and are formed in J-shape
- Easily mounted because leads are protected by the package body and are not easily deformed



QFJ (Quad Flat J-leaded package)

Features

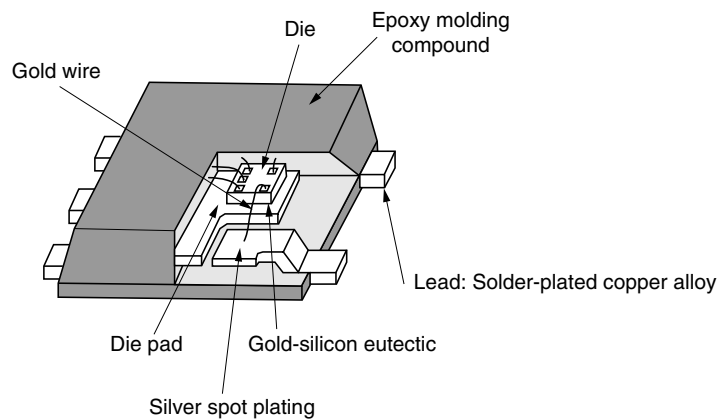
- Package with leads which emerge in four directions and are formed in J-shape
- Package body shape is square or rectangular
- Lead pitch: 1.27 mm
- Easily handled because leads are protected by the package body



P-VSON (Plastic Very thin Small Outline Non-leaded package)

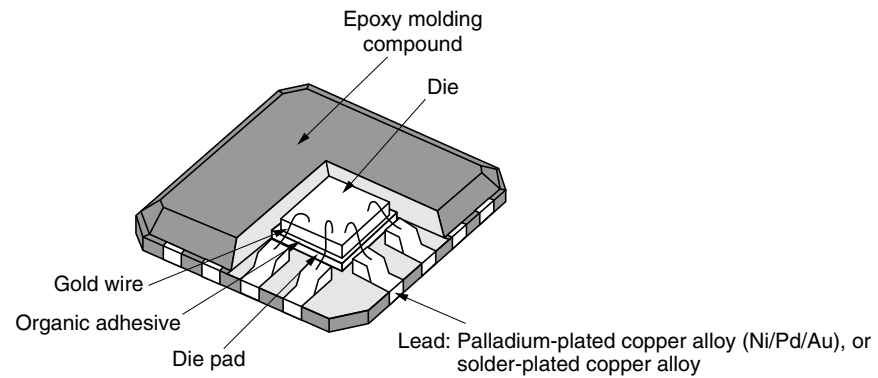
Features

- Small size allows high-density mounting
- Thin package with a mounting height of 0.6 mm or less
- Low thermal resistance and low lead inductance



P-VQFN (Plastic Very thin Quad Flat Non-leaded package)

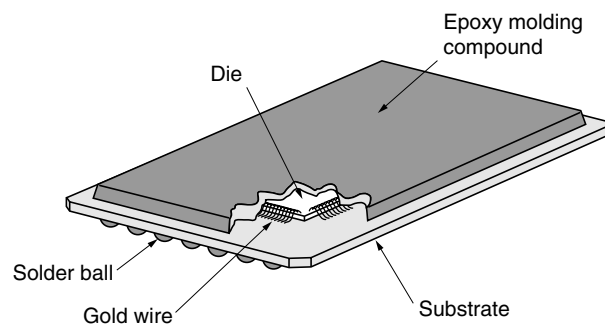
- Small size allows high-density mounting
- Thin package with a mounting height of 1.0 mm or less
- Low lead inductance



BGA (Ball Grid Array) **For memory**

Features

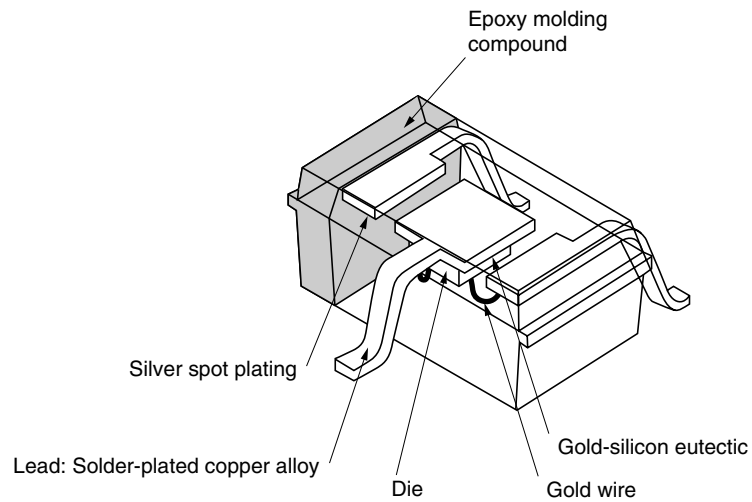
- Easy to achieve high pin count
- High heat-radiation
- Good electrical performance



SMPAK (Super Mini Package)

Features

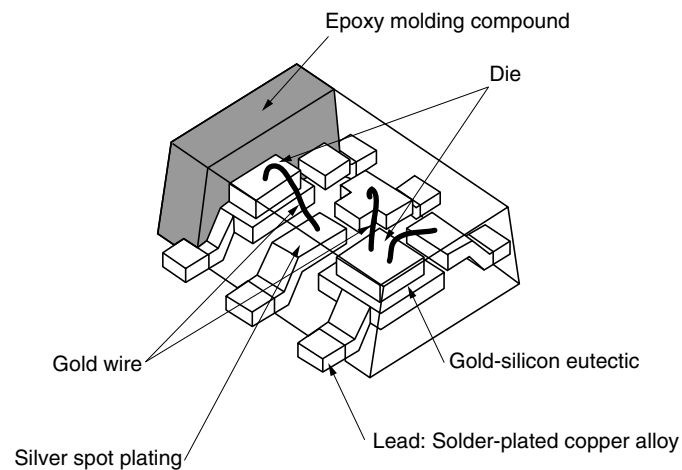
- Smaller transistor than the conventional MPAK and CMPAK



SMFPAK-6 (Super Miniature Flat Lead Package 6 pin)

Features

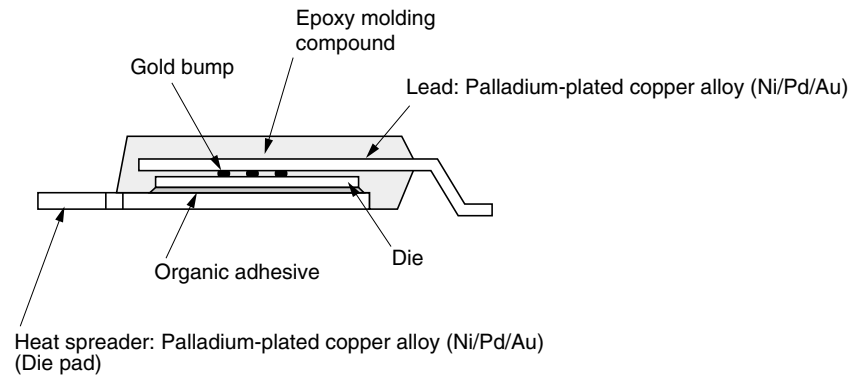
- Small size and two die mounting allow high-density mounting
- Thin package with a mounting height of 0.6 mm or less
- Low thermal resistance and low lead inductance



LFPAK (Loss Free Package)

Features

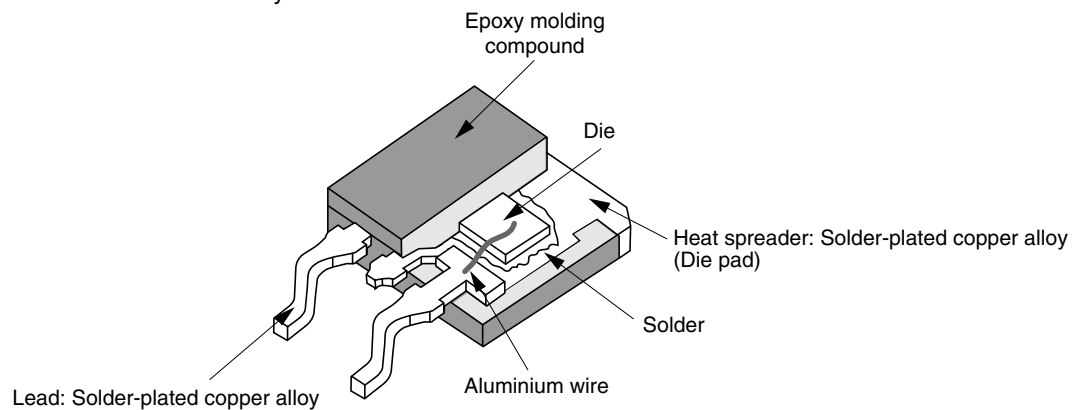
- Low package resistance and inductance because of the bump connecting structure
- Improved thermal resistance with the exposed heat spreader



LDPAK(S) (Large Deca-Watt Package (Short Lead))

Features

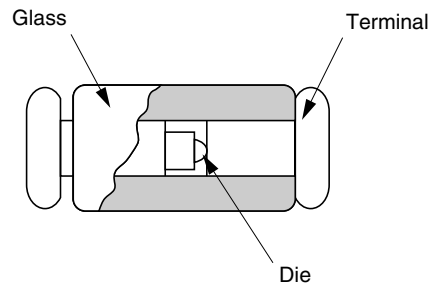
- Large surface-mount type package that assures characteristics equal to those of a TO-220AB resin power transistor
- Surface-mounting allows high density mounting and automatic assembly



LLD (Leadless Diode)

Features

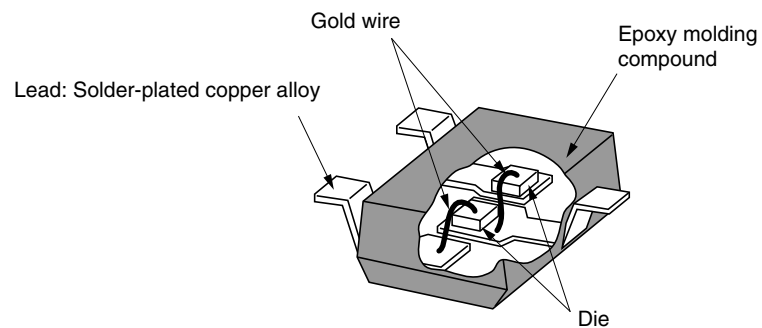
- High reliability because of glass sealed package
- Surface-mounting allows high-density mounting



MPAK(D) (Mini Package (Diode))

Features

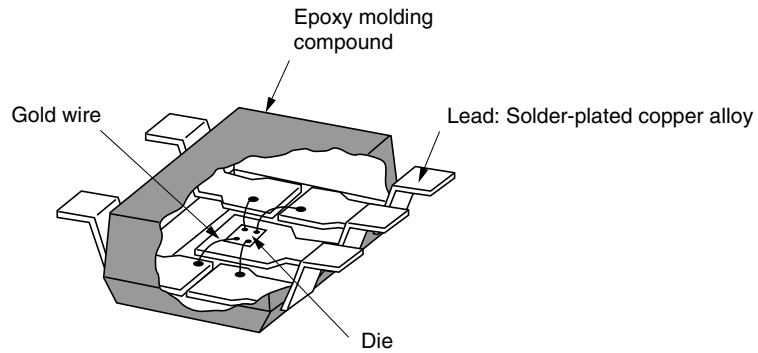
- Small size and surface-mounting allow high-density mounting



MPAK-5(D) (Mini Package 5 pin (Diode))

Features

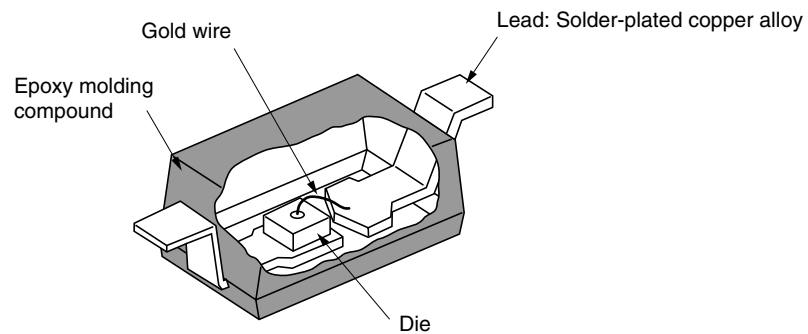
- Small size and surface-mounting allow high-density mounting



SRP (Small Resin Package) **URP (Ultra Small Resin Package)**

Features

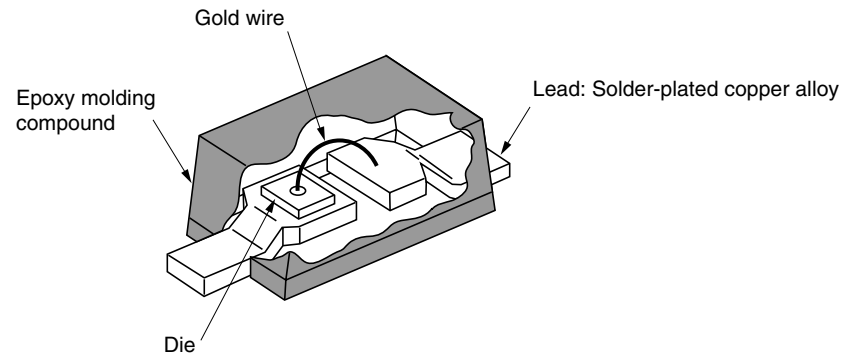
- Super small size and surface-mounting allow high-density mounting



UFP (Ultra Small Flat Package)
SFP (Super Small Flat Package)
EFP (Extremely Small Flat Package)

Features

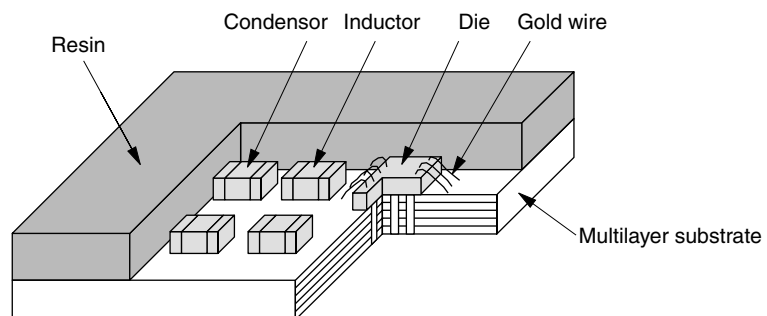
- Ultra small size and surface-mounting allow high-density mounting



RF-Or
RF-Q

Features

- Small size and leadless surface-mounting package
- Reflow-mounting available



1.2 IC Package Name and Code Indication

This data book uses the Hitachi original package code. The details are shown in table 1.1.

Table 1.1 Details of the IC package codes

Code indication	(T) (Code 1)	F (Code 2)	P (Code 3)	–	32 (Code 4)	(D) (Code 5)	(A) (Code 6)	(R) (Code 7)	(V) (Code 8)
Code 1	Indicates Package mounting height T: 0.6 mm or more to 1.20 mm or less Blank: Higher than 1.20 mm								
Code 2	Indicates the type of package terminals D: Insertion type (Dual Inline) S: Insertion type (Single Inline) Z: Insertion type (Zigzag Inline) P: Insertion type (Area array) F: Surface-mount type (Gull wing) C: Surface-mount type (J lead) M: Surface-mount type (I lead) B: Surface-mount type (Area array) N: Surface-mount type (Non lead)								
Code 3	Indicates package material P: Plastic G: Glass sealed ceramic C: Ceramic T: Tape S: Silicon								
Code 4	Indicates the number of terminals However, when SOP, TSOP (I), TSOP (II), and SOJ have unconnected terminals, this code is represented by “the number of fully assigned terminals/the number of actual terminals”. e.g.: CP-26/20D								
Code 5	Additional outline code D: Dual lead type T: Fin, header exposed type S: Shrink type N: Skinny type P: Piggy back type Blank: Other than above (1) “D” applies to only surface-mount types (2) “S” applies to only SDIPs and SSOPs. (3) “N” applies to only DIPs, SDIPs, SOPs, SOJs. (4) When one package has multiple outline types, multiple codes are used for the package. e.g.: CP-28DN								
Code 6	Represents a revision after minor change However, the letters used in code 5, “V” and “R” are not used. Blank, A, B, C, E, F								
Code 7	Remarks R: Reverse bend. This is applied to only TSOP (I) and TSOP (II). e.g.: TFP-32DAR								
Code 8	Indicates Lead Free Terminal* V: Lead Free Terminal.								
Exceptions	(1) For only TSOP (II) and TSSOP, code 2 is “T”. e.g.: TTP-32D (2) For C-QFN, code 2 and code 3 are “C” and “G”, respectively. e.g.: CG-84 (3) For G-QFJ, code 3 is “C”. e.g.: CC-44 (4) For COT for Smartcard, code1 is space, code2 is “K” and code3 is “P”. e.g.: KP-8								

* The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

However, V is not added to the end of the package code for some packages in which lead-free pins were originally used. (Examples: G-DIP, C-SDIP, C-QFP, Some packages of TFBGA)

1.3 Method of Indicating IC Package Dimensions

The outline drawings recorded in this data book have been prepared by reference to the standards issued by domestic and overseas standardization organizations. The major standards relating to the packages are listed below (as of May, 2002).

- JEITA standard (Previous EIAJ standard)

Standards specifying package outlines, characteristics, ratings, and test methods for systems, equipment, and components that have been established and issued by the Japan Electronics and Information Technology Industries Association (previous the Electronic Industries Association of Japan). The standards for the package outline of semiconductors are as follows:

Standard No.	Title	Established (Revised)	Remarks
ED-7300	Recommended practice on standard for the preparation of outline drawings of semiconductor packages	August, 1997	Previous ED-7401A is modified
ED-7301	Manual for the standard of integrated circuits package	December, 1996	
ED-7302	Manual for integrated circuits package design guideline	April, 1997	Previous ED-7401-1 is modified
ED-7303A	Name and code for integrated circuits package	June, 1998 (March, 2001)	Previous ED-7303 is modified
ED-7304	Measuring Method for Package Dimensions of Ball Grid Array (BGA)	May, 1997	
ED-7304-1	Measuring Method for Package Dimensions of Small Outline Package (SOP)	March, 1997	
ED-7304-2	Measuring Method for Package Dimensions of Small Outline J-leaded Package (SOJ)	April, 1998	
ED-7305	Unit Design Guide for the Preparation of Package Outline Drawing of Integrated Circuits (Gullwing-Lead)	April, 1997	
ED-7311	Standard of integrated circuits package (QFP)	May, 1997	
ED-7311-1	Standard of integrated circuits package [TSOP(1)]	August, 1997	
ED-7311-2	Standard of integrated circuits package [TSOP(2)]	August, 1997	
ED-7311-3A	Standard of integrated circuits package [Tape Ball Grid Array 1.0 mm pitch (T-BGA)]	August, 1997 (April, 1999)	Previous ED-7311-3 is modified
ED-7311-4A	Standard of integrated circuits package [Tape Ball Grid Array 1.27 mm pitch (T-BGA)]	August, 1997 (April, 1999)	Previous ED-7311-4 is modified
ED-7311-5A	Standard of integrated circuits package [SRAM/Flash Fine-pitch Ball Grid Array (FBGA)]	April, 1998 (February, 2000)	Previous ED-7311-5 is modified
ED-7311-6	Standard of integrated circuits package [60/90 pins Fine-pitch Ball Grid Array (FBGA)]	April, 1998	
ED-7311-7	Standard of integrated circuits package [Plastic Fine pitch Ball Grid Array 0.5 mm pitch (P-FBGA)]	May, 1998	
ED-7311-8	Standard of integrated circuits package [Plastic Fine pitch Ball Grid Array 0.8 mm pitch (P-FBGA)]	May, 1998	
ED-7311-9A	Standard of integrated circuits package [P-BGA (cavity up type)]	March, 1998 (November, 1998)	Previous ED-7311-9 is modified

Standard No.	Title	Established (Revised)	Remarks
ED-7311-10A	Standard of integrated circuits package [P-BGA (cavity down type)]	March,1998 (November, 1998)	Previous ED-7311-10 is modified
ED-7311-11A	Standard of integrated circuits package (119/153 pin P-BGA)	March,1998 (November, 1998)	Previous ED-7311-11 is modified
ED-7311-12	Standard of integrated circuits package (52 pins 64 pins 80 pins and 100 pins Low-profile Quad Flat Package with Exposed Heatsink)	August,1998	
ED-7311-13	Standard of integrated circuits package (P-VSON)	January, 1999	
ED-7311-14	Standard of integrated circuits package [Ceramic Thin profile Land Grid Array 1.0mm pitch (C-TLGA)]	June,2000	
ED-7311-15	Standard of integrated circuits package [Ceramic Thin profile Fine pitch Land Grid Array 0.8mm pitch (C-TFLGA)]	June,2000	
ED-7311-16	Standard of integrated circuits package [Ceramic Thin profile Fine pitch Land Grid Array 0.65mm pitch (C-TFLGA)]	June,2000	
ED-7311-17	Standard of integrated circuits package (P-ZIP)	June,2001	
ED-7311-19	Standard of integrated circuits package (P-SOP)	January,2002	
ED-7311-20	Standard of integrated circuits package (P-SSOP)	January,2002	
ED-7401-4	Method of Measuring Semiconductor Device Package Dimensions (Integrated Circuits)	May,1995	
ED-7406A	General Rules for the Preparation of Outline Drawings of Integrated Circuits Small Outline J-Lead Packages (SOJ)	May,1988 (May,1995)	Previous ED-7406 is modified
ED-7408A	General Rules for the Preparation of Outline Drawings of Integrated Circuits Pin Grid Array Packages (PGA)	October, 1988 (February, 1994)	Previous ED-7408 is modified
ED-7431A	General Rules for the Preparation of Outline Drawings of Integrated Circuits Quad Tape Carrier Packages (QTP)	April,1993 (October, 1994)	
ED-7432	General Rules for the Preparation of Outline Drawings of Integrated Circuits Dual Tape Carrier Packages (Type I) (DTP (I))	December, 1993	
ED-7433	General Rules for the Preparation of Outline Drawings of Integrated Circuits Dual Tape Carrier Packages (Type II) (DTP (II))	December, 1993	
ED-7441B	Standards for the packages of universal memory devices	December, 1991 (March, 1998)	Previous ED-7441A is modified
EDX-7316	Design guideline of integrated circuits for Fine-pitch Ball Grid Array and Fine-pitch Land Grid Array (Apply to type of rectangular package)	October,2000	

Standard No.	Title	Established (Revised)	Remarks
EDR-7311	Design guideline of integrated circuits for Quad Flat Package (QFP)	April, 1996	Previous ED-7404A is modified
EDR-7312	Design guideline of integrated circuits for Thin Small Outline Package (Type I) (TSOP (I))	April, 1996	Previous ED-7402-3 is modified
EDR-7313	Design guideline of integrated circuits for Thin Small Outline Package (Type II) (TSOP (II))	April, 1996	Previous ED-7402-4A is modified
EDR-7314A	Design guideline of integrated circuits for Plastic Shrink Small Outline Package (P-SSOP)	August, 1996 (January, 2002)	Previous ED-7402-2A and EDR-7314 are modified
EDR-7315A	Design guideline of integrated circuits for Ball Grid Array (BGA)	May, 1997 (November, 1998)	Previous EDR-7315 is modified
EDR-7316	Design guideline of integrated circuits for Fine-pitch Ball Grid Array and Fine-pitch Land Grid Array (FBGA/FLGA)	May, 1998	
EDR-7317	Design guideline of integrated circuits for Surface Vertical Package (SVP)	May, 1998	Previous ED-7424 is modified
EDR-7318	Design guideline of integrated circuits for Plastic Very Thin Small Outline Non-Leaded Package (P-VSON)	November, 1998	
EDR-7319	Design guideline of integrated circuits for Quad Flat J-Lead Packages (QFJ)	December, 1998	Previous ED-7407 is modified
EDR-7320	Design guideline of integrated circuits for Small Outline Packages (SOP)	December, 1998	Previous ED-7402-1 is modified
EDR-7321	Design guideline of integrated circuits for Quad Flat I-lead packages (QFI)	February, 1999	Previous ED-7409 is modified
EDR-7322	Design guideline of integrated circuits for Plastic Dual Inline Package (DIP)	April, 1999	Previous ED-7403-1 is modified
EDR-7323	Design guideline of integrated circuits for Shrink-pitch Pin Grid Array (SPGA)	May, 1999	
EDR-7324	Design guideline of integrated circuits for Plastic Very thin Quad Flat Non-leaded package (P-VQFN)	May, 1999	
EDR-7325	Design guideline of integrated circuits for Quad Flat Non-leaded packages (QFN)	May, 1999	Previous ED-7412 is modified
EDR-7326	Design guideline of integrated circuits for Small Outline Package with Heat sink (HSOP)	December, 1999	Previous ED-7415 is modified
EDR-7327	Design guideline of integrated circuits for Single Inline Package (SIP)	January, 2001	Previous ED-7413 is modified
EDR-7328	Design guideline of integrated circuits for Plastic Zigzag Inline Package (P-ZIP)	September, 2001	Previous ED-7405 and ED-7405-1 are modified

- IEC Standards (International Electrotechnical Commission Standards)

Designations of recommended standards or published documents regarding equipment, systems and components that are set by the International Electrotechnical Commission.

Standard No.	Title
IEC-Publication-60748	Semiconductor devices -Integrated circuits-
IEC-Publication-60191	Mechanical standardization of semiconductor devices
IEC-Publication-60747	Semiconductor devices
IEC-Publication-60286	Packaging of components for automatic handling

- JEDEC Standards (Joint Electron Device Engineering Council Standards)

Package outline given package names by the Joint Electron Device Engineering Council (JEDEC), which is a subsidiary of the Electronic Industries Association (EIA).

Standard No.	Title
Publication No. 95	Registered and Standard Outlines for Solid State and Related Products

1.3.1 Definitions of Package Dimension Reference Characters

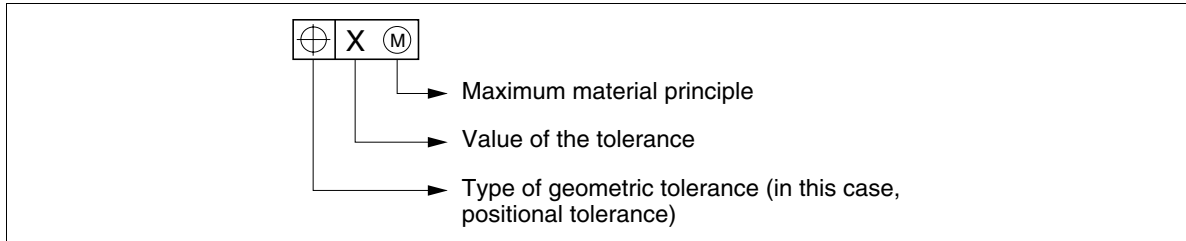
1. Except DIP, SOP, SSOP, TSOP (I), TSOP (II), QFP, SOJ, QFJ (PLCC), P-VQFN and BGA, refer to item 2 through 8.

A. Dimensions

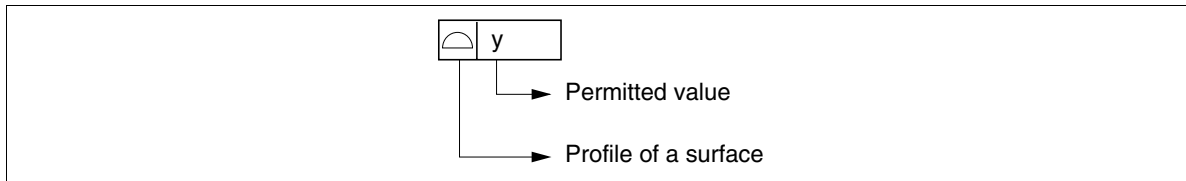
Reference character	Terminology	Definition
—	Mounting surface (seating plane)	The face that is determined when the IC is placed on the mount pad of a printed board.
A	Seated height	Height from the seating plane to the highest point of the package
A ₁	Stand-off height	Distance from the seating plane to the base plane
A ₂	Package height	Distance from the base plane to the highest point of the package
b	Terminal width	Terminal width
b ₁ , b ₂	Terminal widths	Largest dimensions of terminal width (excluding cut remnant of the tie bar)
c	Terminal thickness	Terminal thickness
D	Package length	Largest dimension of the package length excluding terminals (including burrs)
D ₁	Package length	Largest dimension of the package length excluding terminals (excluding burrs)
E	Package width	Largest dimension of the package width excluding terminals (including burrs)
E ₁	Package width	Largest dimension of the package width excluding terminals (excluding burrs)
\bar{e}	Terminal pitch	Linear pitching between true positions of terminal centers
H _D	Overall length	Overall dimension, including package length and peripheral terminals in the length direction
H _E	Overall width	Overall dimension, including package width and peripheral terminals in the width direction
L	Terminal length	<ul style="list-style-type: none"> Pin insertion packages; length of an inserted portion of terminal from a seating plane Surface-mount packages with gull wing leads; effective projection length of a flat portion of a terminal Surface-mount packages with J-leads; overall lengthwise length of a terminal
θ	Terminal angular	Angle between the terminal and a line perpendicular to the seating plane
y	Terminal precision (coplanarity)	Uniformity of the bottom-most surface of the terminal relative to the seating plane
Z	Package overhang	Distance from a true position of an outer-most terminal to an package edge

B. Indication example of geometric tolerance

- Indication of terminal center position



- Indication of terminal precision



2. DIP

A. Dimensions

Reference character	Terminology	Definition
E	Package width	Largest dimension of the package width excluding terminals (excluding burrs)
D	Package length	Largest dimension of the package length (including burrs)
D ₁	Package length	Largest dimension of the package length (excluding burrs)
n	Number of terminal	—
A	Seated height	Height from the mounting plane to the highest point of the package (including package warp)
A ₁	Stand-off height	Distance from the mounting plane to the base plane
A ₂	Package height	Package height (including package warp)
\boxed{e}	Terminal pitch	Terminal pitch. This represents theoretical reference dimension
L	Terminal length	Length of an inserted portion of terminal from a mounting plane
b	Terminal width	Width of terminal with plating
b ₂	Terminal end width	Width of terminal end with plating
b ₃ , b ₄	Terminal shoulder width	Width of terminal shoulder with plating
b ₁	Terminal width	Width of terminal before plating
c	Terminal thickness	Thickness of terminal with plating
c ₁	Terminal thickness	Thickness of terminal before plating
x	Tolerance of terminal center position	Tolerance of the terminal center position defined by datum \boxed{C} , \boxed{A} , and \boxed{B}
$\boxed{e1}$	Terminal in-line interval	Terminal in-line interval. This represents theoretical reference dimension
θ	Terminal angle	Terminal angle
Z	Package overhang (Direction of length)	Distance from a true position of an outer-most terminal to a package edge (including burrs)

Reference character	Terminology	Definition
Z ₁	Package overhang (Direction of length)	Distance from a true position of an outer-most terminal to a package edge (excluding burrs)

B. Datum

Reference character	Definition
\boxed{A} , \boxed{B} , and \boxed{C}	A reference surface which defines the dimensional tolerance of a package

3. SOP, SSOP and TSOP (II)

A. Dimensions

Reference character	Terminology	Definition
\boxed{E}	Package width	Largest dimension of the package width excluding terminals (excluding burrs)
\boxed{D}	Package length	Largest dimension of the package length excluding terminals (excluding burrs)
f	Tolerance of package edge	Tolerance of a package edge defined by datum \boxed{S} , \boxed{A} , and \boxed{B}
A ₂	Package height	Package height (including package warp)
$\boxed{H_E}$	Overall width	Width from the tip of the terminal to another tip of the terminal on the opposite side
A	Seated height	Height from the seating plane to the highest point of the package (including package warp)
A ₁	Stand-off height	Distance from the seating plane to the base plane
$\boxed{A_3}$	Standard height of soldered points	Height from the seating plane, which prescribes a terminal projection length
L _p	Length of soldered part	Effective projection length effective for mounting terminals
b	Terminal width	Width of terminal with plating
b ₁	Terminal width	Width of terminal before plating
c	Terminal thickness	Thickness of terminal with plating
c ₁	Terminal thickness	Thickness of terminal before plating
θ	Angle of terminal flat portions	Angle between terminal flat portion and the seating plane
\boxed{e}	Terminal pitch	Terminal pitch. This represents theoretical reference dimension
x	Tolerance of terminal center position	Tolerance of the terminal center position defined by datum \boxed{S} and \boxed{A}
y	Coplanarity	Uniformity of the bottom-most surface of the terminal relative to the seating plane
t	Positional tolerance of terminal tips	Positional tolerance of terminal tips defined by datum \boxed{S} , \boxed{A} , and \boxed{B}
n	Number of terminal	—
G _{1E}	Width between first bent part of terminal	Width from the first bent part of terminal to another first bent part of terminal on the opposite side

Reference character	Terminology	Definition
\overline{Z}	Package overhang	Distance from a true position of an outer-most terminal to a package edge
L	Length of flat part of terminal	Projection length of flat part of terminal
L_1	Terminal length	Projection length of terminal

B. Datum

Reference character	Definition
$\textcircled{A1}$ and $\textcircled{A2}$	Datum target
\boxed{A} and \boxed{B}	A reference surface which defines the dimensional tolerance of a terminal and a package
\boxed{S}	A reference surface which defines a seating plane

4. TSOP(I)

A. Dimensions

Reference character	Terminology	Definition
\overline{E}	Package width	Largest dimension of the package width excluding terminals (excluding burrs)
\overline{D}	Package length	Largest dimension of the package length excluding terminals (excluding burrs)
f	Tolerance of package edge	Tolerance of a package edge defined by datum \boxed{S} , \boxed{A} , and \boxed{B}
A_2	Package height	Package height (including package warp)
$\overline{H_D}$	Overall length	Length from the tip of the terminal to another tip of the terminal on the opposite side
A	Seated height	Height from the seating plane to the highest point of the package (including package warp)
A_1	Stand-off height	Distance from the seating plane to the base plane
$\overline{A_3}$	Standard height of soldered points	Height from the seating plane, which prescribes a terminal projection length
L_p	Length of soldered part	Effective projection length effective for mounting terminals
b	Terminal width	Width of terminal with plating
b_1	Terminal width	Width of terminal before plating
c	Terminal thickness	Thickness of terminal with plating
c_1	Terminal thickness	Thickness of terminal before plating
θ	Angle of terminal flat portions	Angle between terminal flat portion and the seating plane
\overline{e}	Terminal pitch	Terminal pitch. This represents theoretical reference dimension
x	Tolerance of terminal center position	Tolerance of the terminal center position defined by datum \boxed{S} , \boxed{A} , and \boxed{B}
y	Coplanarity	Uniformity of the bottom-most surface of the terminal relative to the seating plane

Reference character	Terminology	Definition
t	Positional tolerance of terminal tips	Positional tolerance of terminal tips defined by datum \boxed{S} , \boxed{A} , and \boxed{B}
n	Number of terminal	—
G_{1D}	Length between the first bent part of terminal	Length from the first bent part of terminal to another first bent part of terminal on the opposite side
\boxed{Z}	Package overhang	Distance from a true position of an outer-most terminal to a package edge
L	Length of flat part of terminal	Projection length of flat part of terminal
L_1	Terminal length	Projection length of terminal

B. Datum

Reference character	Definition
$\textcircled{A1}$ and $\textcircled{A2}$	Datum target
\boxed{A} and \boxed{B}	A reference surface which defines the dimensional tolerance of a terminal and a package
\boxed{S}	A reference surface which defines a seating plane

5. QFP

A. Dimensions

Reference character	Terminology	Definition
\boxed{E}	Package width	Largest dimension of the package width excluding terminals (excluding burrs)
\boxed{D}	Package length	Largest dimension of the package length excluding terminals (excluding burrs)
f	Tolerance of package edge	Tolerance of a package edge defined by datum \boxed{S} , \boxed{A} , \boxed{B} , and \boxed{C}
A_2	Package height	Package height (including package warp)
$\boxed{H_D}$	Overall length	Length from the tip of the terminal to another tip of the terminal on the opposite side
$\boxed{H_E}$	Overall width	Width from the tip of the terminal to another tip of the terminal on the opposite side
A	Seated height	Height from the seating plane to the highest point of the package (including package warp)
A_1	Stand-off height	Distance from the seating plane to the base plane
$\boxed{A_3}$	Standard height of soldered points	Height from the seating plane, which prescribes a terminal projection length
L_p	Length of soldered part	Effective projection length effective for mounting terminals
b	Terminal width	Width of terminal with plating
b_1	Terminal width	Width of terminal before plating
c	Terminal thickness	Thickness of terminal with plating

Reference character	Terminology	Definition
c_1	Terminal thickness	Thickness of terminal before plating
θ	Angle of terminal flat portions	Angle between terminal flat portion and the seating plane
\boxed{e}	Terminal pitch	Terminal pitch. This represents theoretical reference dimension
x	Tolerance of terminal center position	Tolerance of the terminal center position defined by datum \boxed{S} , $\boxed{A_1}$, and $\boxed{C_1}$
y	Coplanarity	Uniformity of the bottom-most surface of the terminal relative to the seating plane
t	Positional tolerance of terminal tips	Positional tolerance of terminal tips defined by datum \boxed{S} , \boxed{A} , \boxed{B} , and \boxed{C}
n	Number of terminal positions	—
G_{1D}	Length between the first bent part of terminal	Length from the first bent part of terminal to another first bent part of terminal on the opposite side
G_{1E}	Width between the first bent part of terminal	Width from the first bent part of terminal to another first bent part of terminal on the opposite side
$\boxed{Z_D}$	Package overhang (Direction of length)	Distance from a true position of an outer-most terminal to a package edge
$\boxed{Z_E}$	Package overhang (Direction of width)	
L	Length of flat part of terminal	Projection length of flat part of terminal
L_1	Terminal length	Projection length of terminal

B. Datum

Reference character	Definition
D	Datum target
\boxed{A} , \boxed{B} , and \boxed{C}	A reference surface which defines the dimensional tolerance of a package
\boxed{S}	A reference surface which defines a seating plane
$\boxed{A_1}$ and $\boxed{C_1}$	A reference surface which defines the dimensional tolerance of a terminal

6. SOJ

A. Dimensions

Reference character	Terminology	Definition
E	Package width	Largest dimension of the package width excluding terminals (excluding burrs)
D	Package length	Largest dimension of the package length (including burrs)
D ₁	Package length	Largest dimension of the package length (excluding burrs)
n	Number of terminal	—
A	Seated height	Height from the seating plane to the highest point of the package (including package warp)
A ₁	Stand-off height	Distance from the seating plane to the base plane
A ₂	Package height	Package height (including package warp)
$\overline{A_3}$	Standard height of soldered points	Height from the seating plane, which prescribes a terminal projection length
\overline{e}	Terminal pitch	Terminal pitch. This represents theoretical reference dimension
L	Terminal length	Overall lengthwise length of a terminal
L _p	Length of soldered part	Effective projection length effective for mounting terminals
b, b ₂	Terminal width	Width of terminal with plating
b ₁	Terminal width	Width of terminal before plating
c	Terminal thickness	Thickness of terminal with plating
c ₁	Terminal thickness	Thickness of terminal before plating
x	Tolerance of terminal center position	Tolerance of the terminal center position defined by datum \overline{S} , \overline{A} , and \overline{B}
y	Coplanarity	Uniformity of the bottom-most surface of the terminal relative to the seating plane
H _E	Overall width	Width from the tip of the terminal to another tip of the terminal on the opposite side
e ₁	Terminal row interval	Terminal row interval. This represents theoretical reference dimension
Z	Package overhang (Direction of length)	Distance from a true position of an outer-most terminal to a package edge (including burrs)
Z ₁	Package overhang (Direction of length)	Distance from a true position of an outer-most terminal to a package edge (excluding burrs)

B. Datum

Reference character	Definition
D	Datum target
\overline{A} and \overline{B}	A reference surface which defines the dimensional tolerance of a package
\overline{S}	A reference surface which defines a seating plane

7. QFJ (PLCC)

A. Dimensions

Reference character	Terminology	Definition
E	Package width	Largest dimension of the package width excluding terminals (excluding burrs)
D	Package length	Largest dimension of the package length excluding terminals (excluding burrs)
f	Tolerance of package edge	Tolerance of a package edge defined by datum S , A , and B
H_D	Overall length	Length from the tip of the terminal to another tip of the terminal on the opposite side
H_E	Overall width	Width from the tip of the terminal to another tip of the terminal on the opposite side
A	Seated height	Height from the seating plane to the highest point of the package (including package warp)
A_1	Stand-off height	Distance from the seating plane to the base plane
A_2	Package height	Package height (including package warp)
A_3	Standard height of soldered points	Height from the seating plane, which prescribes a terminal projection length
b, b_2	Terminal width	Width of terminal with plating
b_1	Terminal width	Width of terminal before plating
c	Terminal thickness	Thickness of terminal with plating
c_1	Terminal thickness	Thickness of terminal before plating
e	Terminal pitch	Terminal pitch. This represents theoretical reference dimension
x	Tolerance of terminal center position	Tolerance of the terminal center position defined by datum S , A , and B
y	Coplanarity	Uniformity of the bottom-most surface of the terminal relative to the seating plane
t	Positional tolerance of terminal tips	Positional tolerance of terminal tips defined by datum S , A , and B
v	Tolerance of terminal row interval	Tolerance of the terminal row interval defined by datum S , A , and B
L_p	Length of soldered part	Effective projection length effective for mounting terminals
n	Number of terminal position	—
L	Terminal length	Overall lengthwise length of a terminal
Z_D	Package overhang (Direction of length)	Distance from a true position of an outer-most terminal to a package edge
Z_E	Package overhang (Direction of width)	

Reference character	Terminology	Definition
e_{1D}	Terminal row interval (Direction of length)	Terminal row interval. This represents theoretical reference dimension
e_{1E}	Terminal row interval (Direction of width)	

B. Datum

Reference character	Definition
D	Datum target
A and B	A reference surface which defines the dimensional tolerance of a package
S	A reference surface which defines a seating plane

8. P-VQFN

A. Dimensions

Reference character	Terminology	Definition
\boxed{E}	Package width	Largest dimension of the package width excluding terminals (excluding burrs)
\boxed{D}	Package length	Largest dimension of the package length excluding terminals (excluding burrs)
f	Tolerance of package edge	Tolerance of a package edge defined by datum \boxed{S} , \boxed{A} , and \boxed{B}
$\boxed{H_D}$	Overall length	Length from the tip of the terminal to another tip of the terminal on the opposite side
$\boxed{H_E}$	Overall width	Width from the tip of the terminal to another tip of the terminal on the opposite side
A	Seated height	Height from the seating plane to the highest point of the package (including package warp)
A_1	Stand-off height	Distance from the seating plane to the base plane
A_2	Package height	Package height (including package warp)
b	Terminal width	Width of terminal with plating
b_1	Terminal width	Width of terminal before plating
c_2	Terminal thickness	Thickness of terminal with plating
c_1	Terminal thickness	Thickness of terminal before plating
\boxed{e}	Terminal pitch	Terminal pitch. This represents theoretical reference dimension
x	Tolerance of terminal center position	Tolerance of the terminal center position defined by datum \boxed{S} , \boxed{A} , and \boxed{B}
y	Coplanarity	Uniformity of the bottom-most surface of the terminal relative to the seating plane
t	Positional tolerance of terminal tips	Positional tolerance of terminal tips defined by datum \boxed{S} , \boxed{A} , and \boxed{B}
L_p	Length of soldered part	Effective projection length effective for mounting terminals
n	Number of terminal position	—
L_1	Terminal length	—
$\boxed{Z_D}$	Package overhang (Direction of length)	Distance from a true position of an outer-most terminal to a package edge
$\boxed{Z_E}$	Package overhang (Direction of width)	

B. Datum

Reference character	Definition
D	Datum target
\boxed{A} , \boxed{B} and \boxed{C}	A reference surface which defines the dimensional tolerance of a package
\boxed{S}	A reference surface which defines a seating plane

9. BGA

A. Dimensions

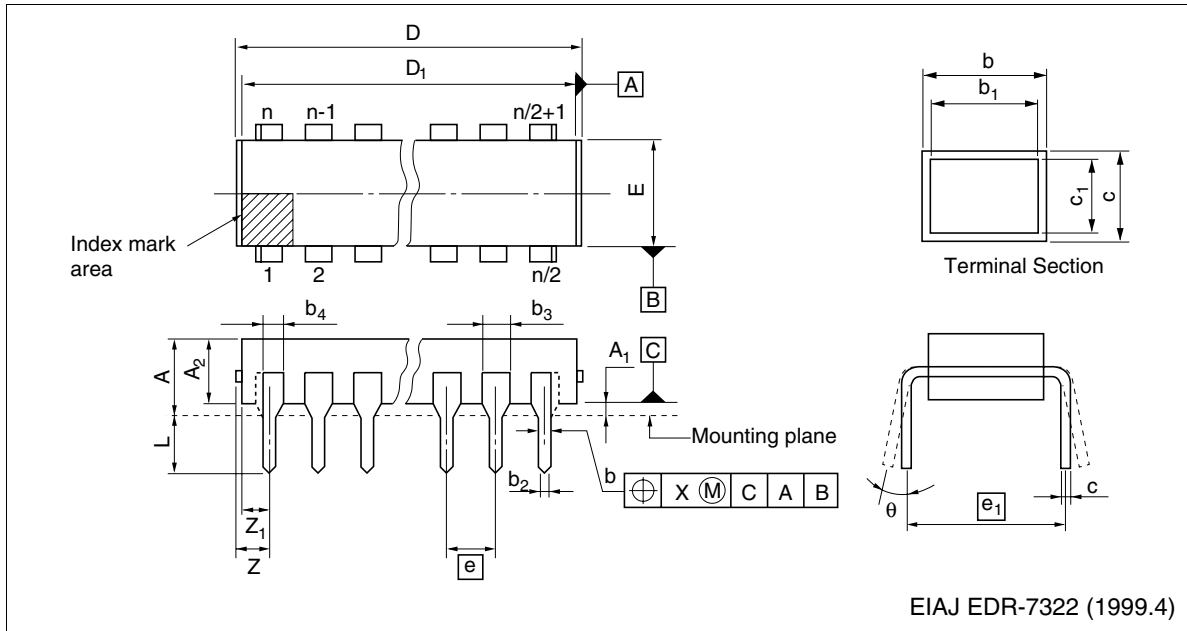
Reference character	Terminology	Definition
\boxed{E}	Package width	Largest dimension of the package width excluding terminals (excluding burrs)
\boxed{D}	Package length	Largest dimension of the package length excluding terminals (excluding burrs)
v	Tolerance of package lateral profile	—
w	Package center offset	Tolerance of package center offset defined by datum \boxed{S} , \boxed{A} , and \boxed{B}
A	Mounting height	Height from the seating plane to the highest point of the package (including package warp)
A_1	Stand-off height	Distance from the seating plane to the base plane
\boxed{e}	Terminal pitch	Terminal pitch. This represents theoretical reference dimension
b	Terminal diameter	—
x	Tolerance of terminal center	Tolerance of the terminal center position defined by datum \boxed{S} , \boxed{A} , and \boxed{B}
y	Terminal coplanarity	Uniformity of the bottom-most surface of the terminal relative to the seating plane
y_1	Parallelism of package top surface	Parallelism of package top surface relative to the seating plane
n	Number of terminal	—
$\boxed{Z_D}$	Overhang in body direction D	Distance from a true position of an outer-most terminal to a package edge
$\boxed{Z_E}$	Overhang in body direction E	Distance from a true position of an outer-most terminal to a package edge
$\boxed{S_D}$	Center terminal position in D-direction	Position of the closest terminal with respect to datum line \boxed{A}
$\boxed{S_E}$	Center terminal position in E-direction	Position of the closest terminal with respect to datum line \boxed{B}

B. Datum

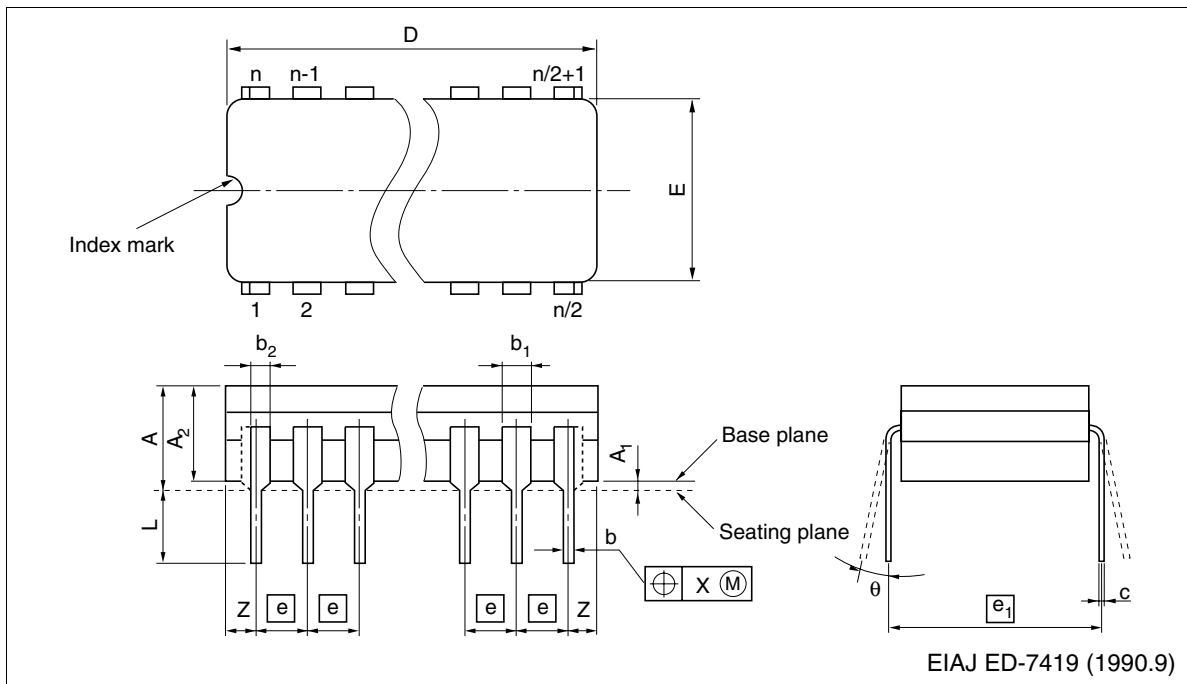
Reference character	Definition
A and B	A reference surface which defines the dimensional tolerance of a terminal and a package
S	A reference surface which defines a seating plane

1.3.2 Examples of Indications of Dimensions in Terms of External

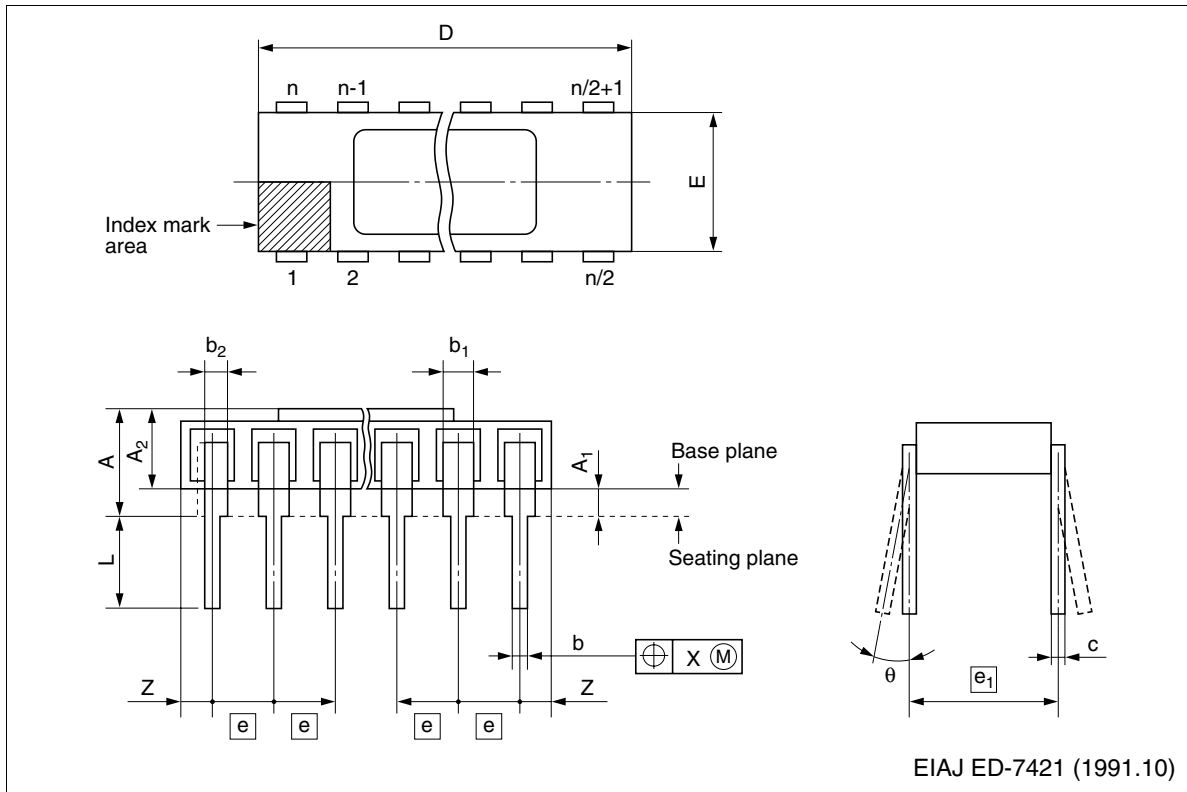
1. DIP



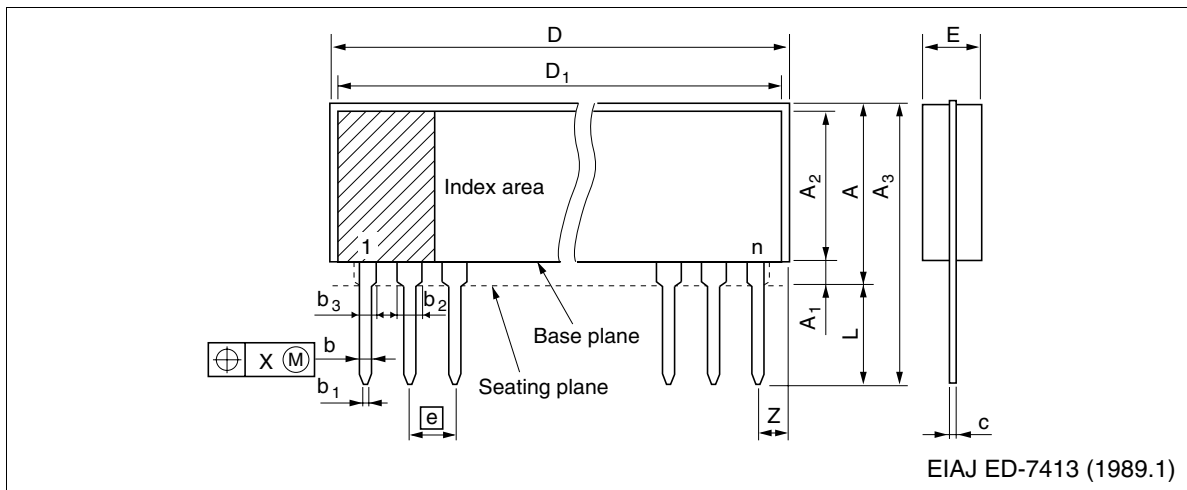
2. G-DIP



3. C-DIP

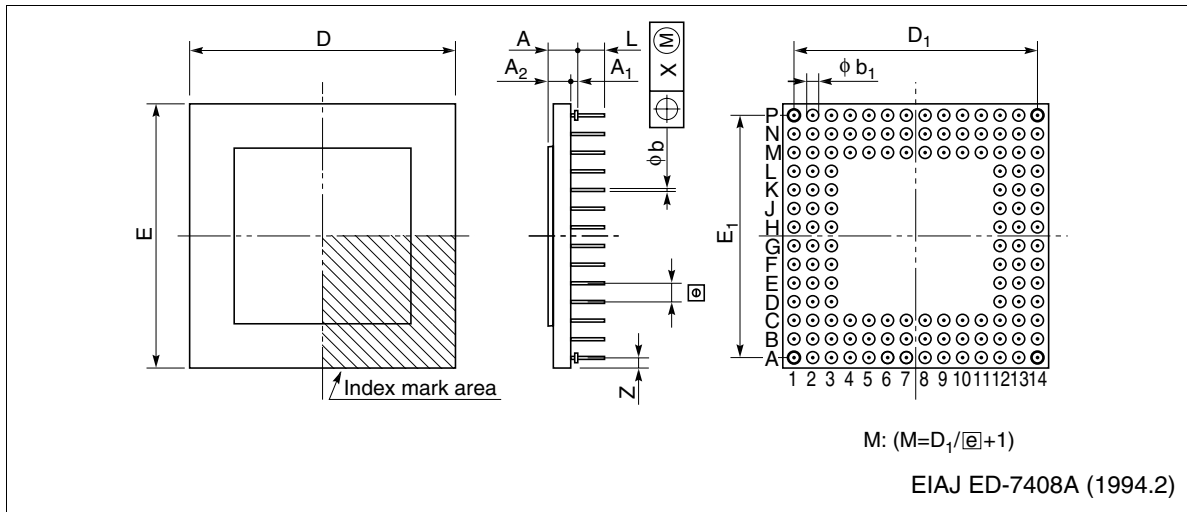


4. SIP

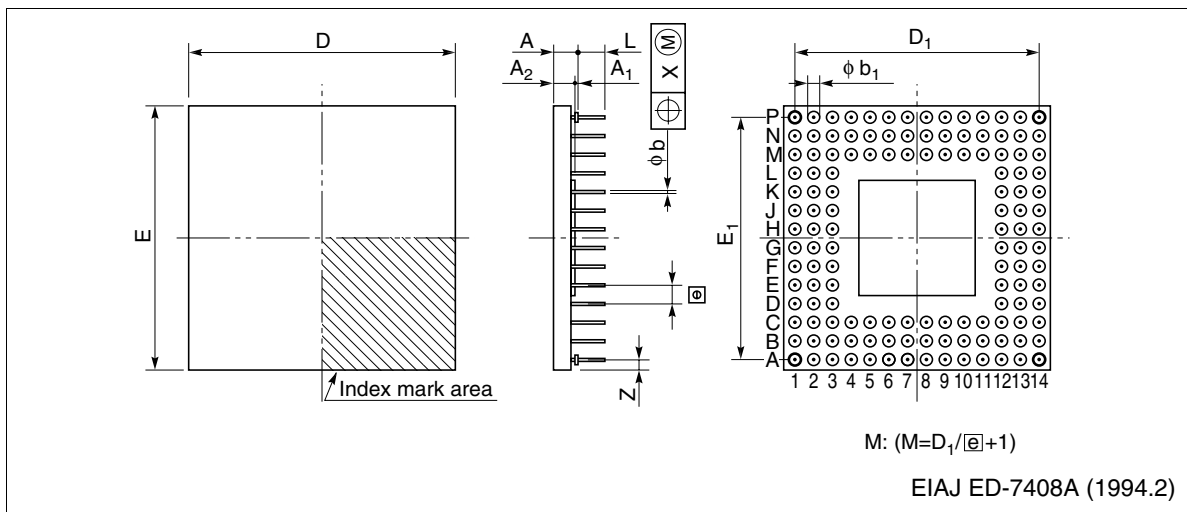


5. PGA

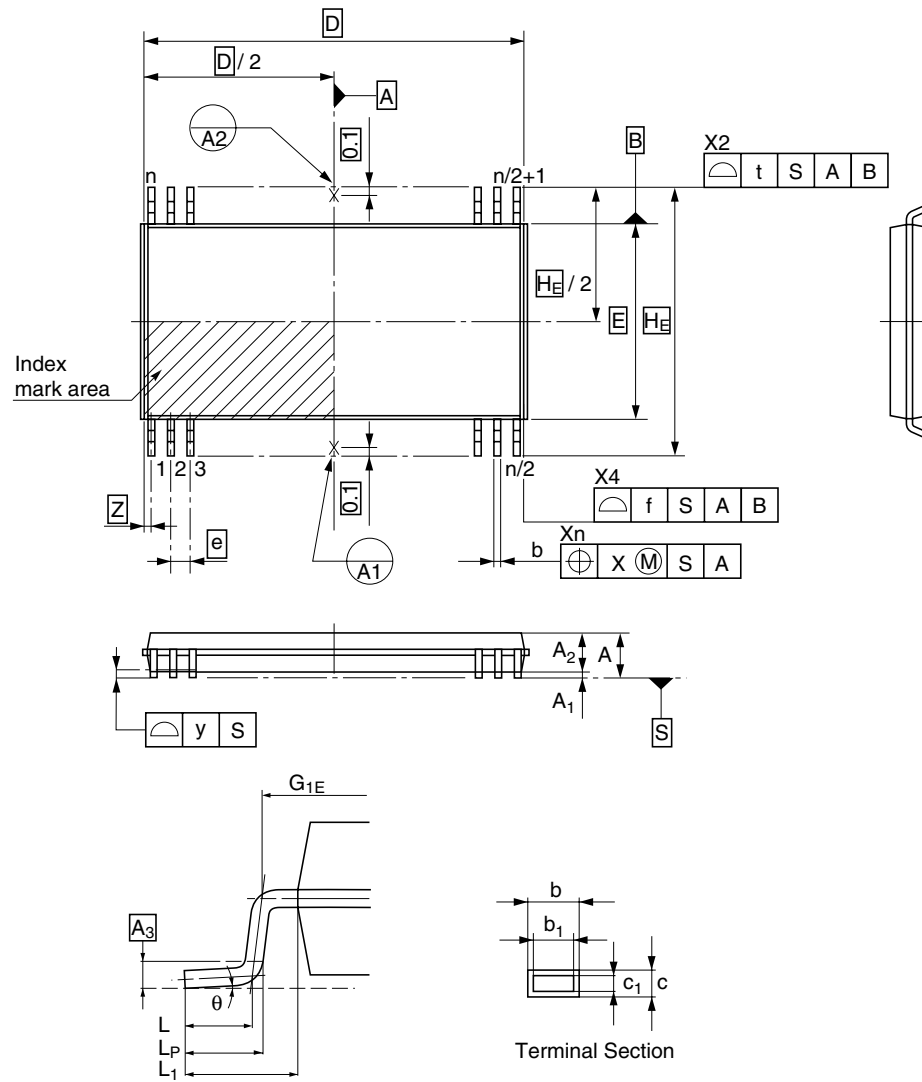
A. Cavity up type



B. Cavity down type

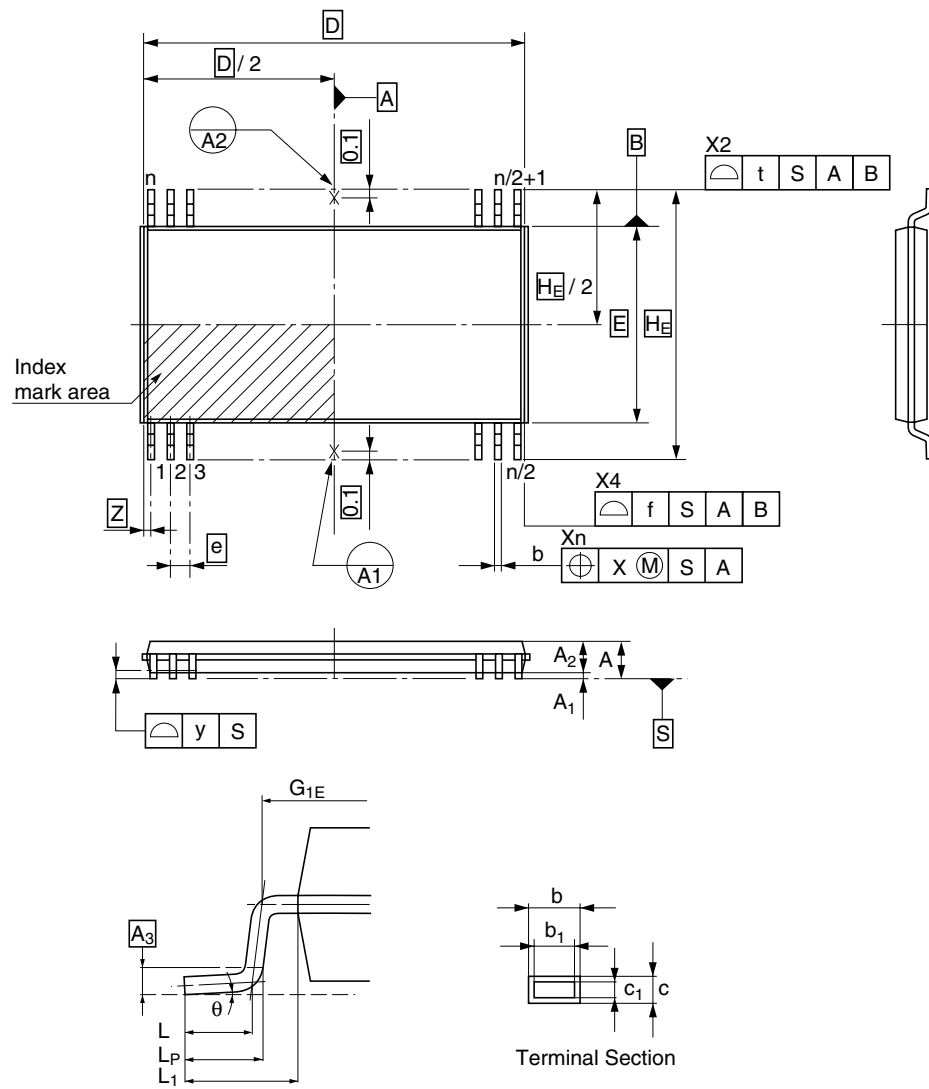


6. SOP



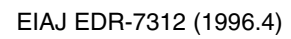
EIAJ EDR-7320 (1998.12)

7. SSOP

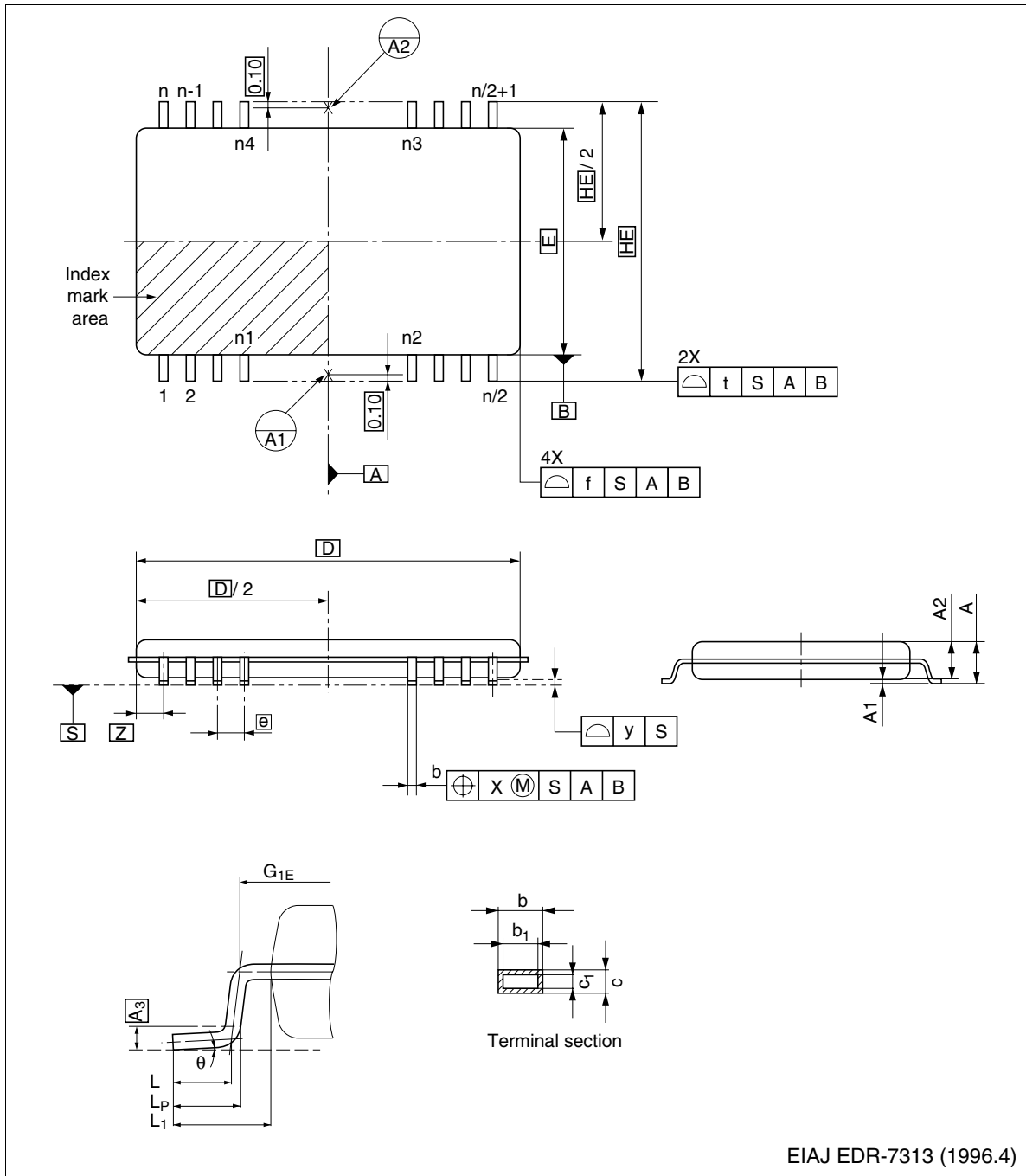


EIAJ EDR-7314 (1996.8)

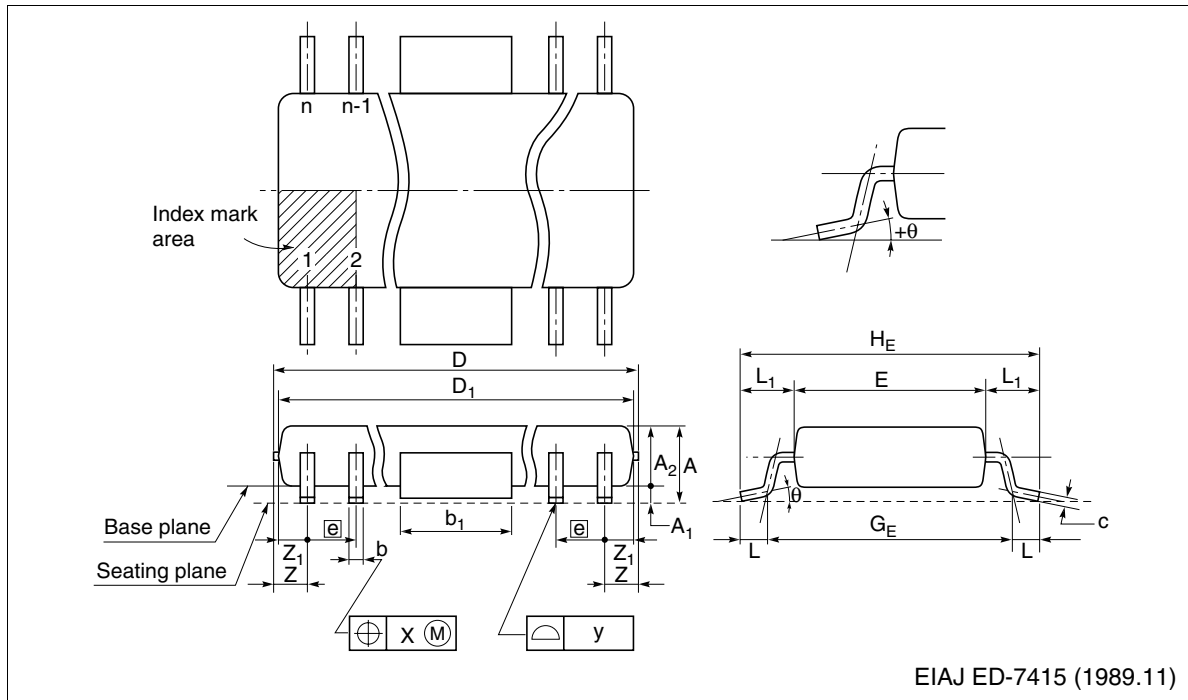
8. TSOP (I)



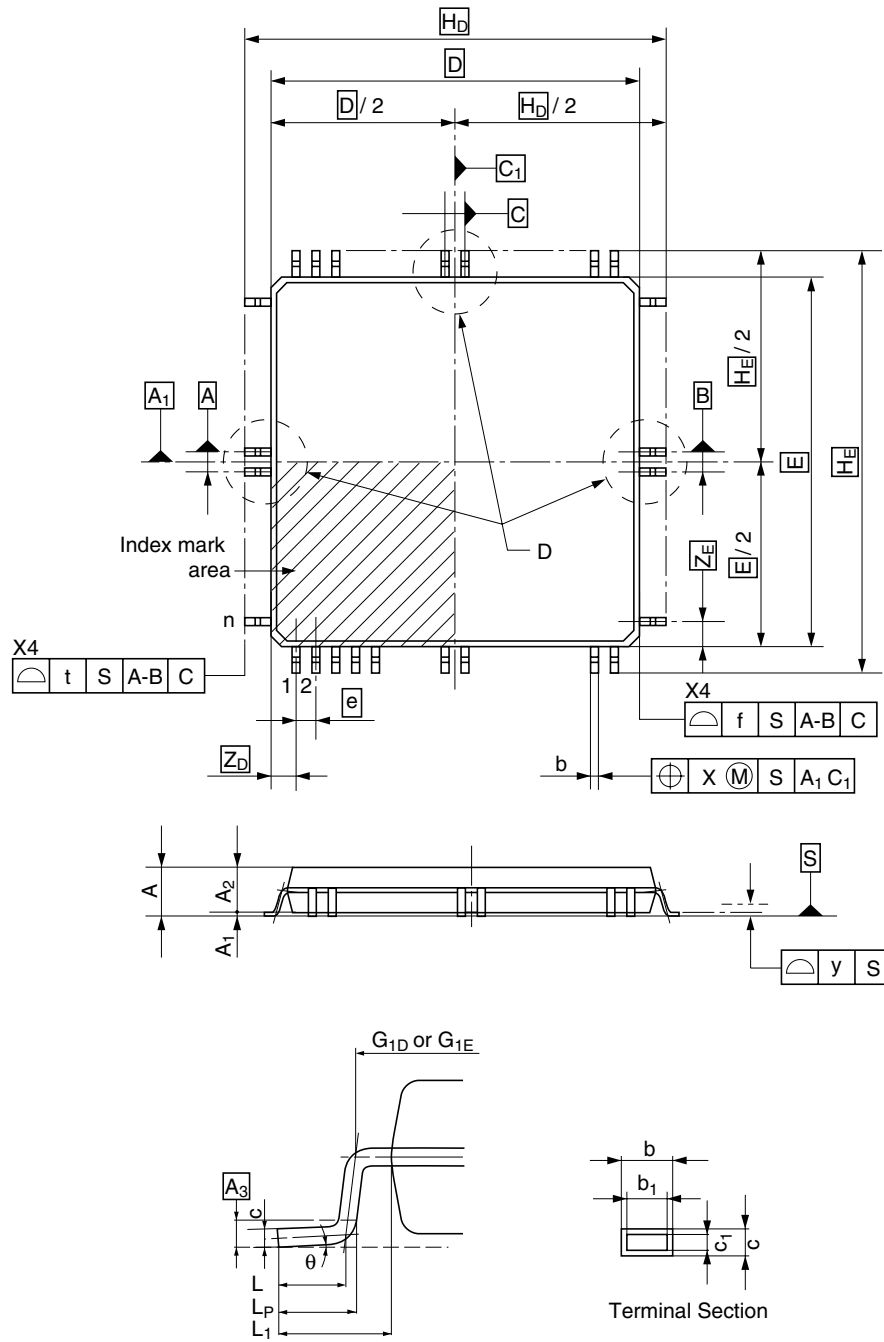
9. TSOP (II)



10. HSOP

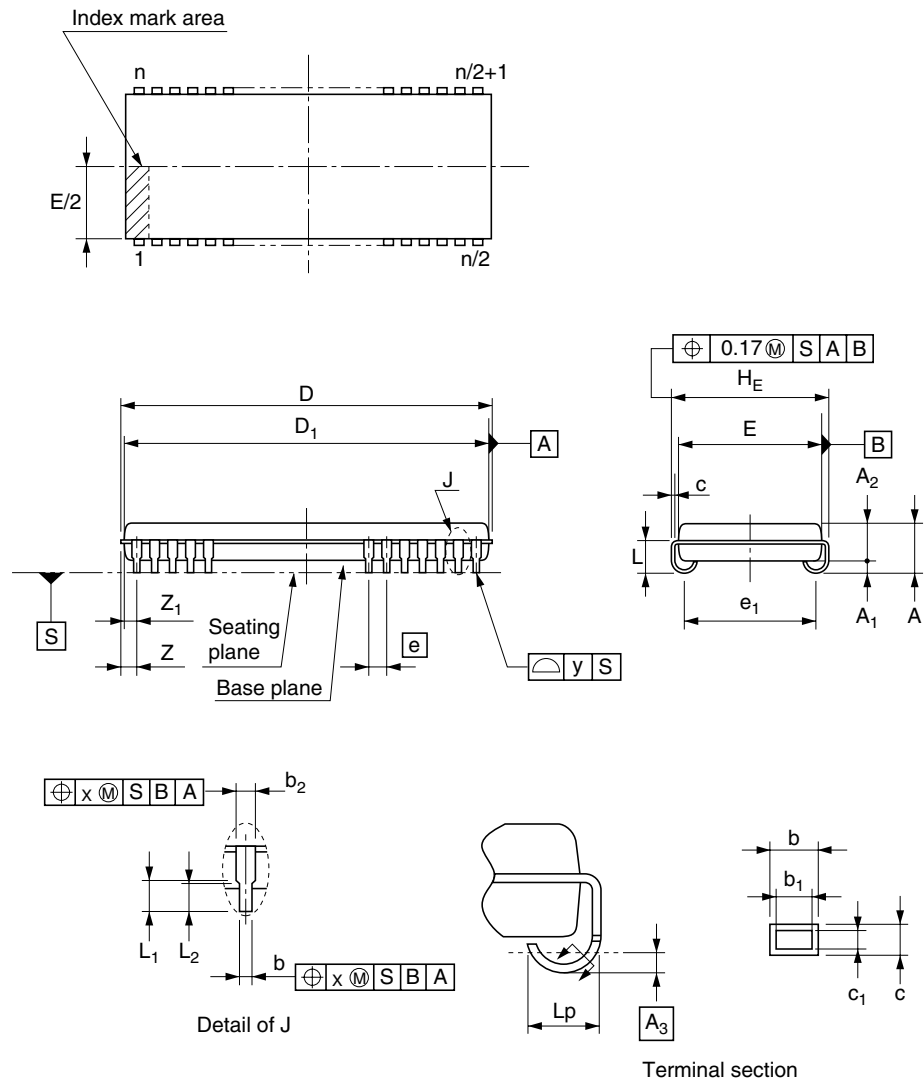


11. QFP



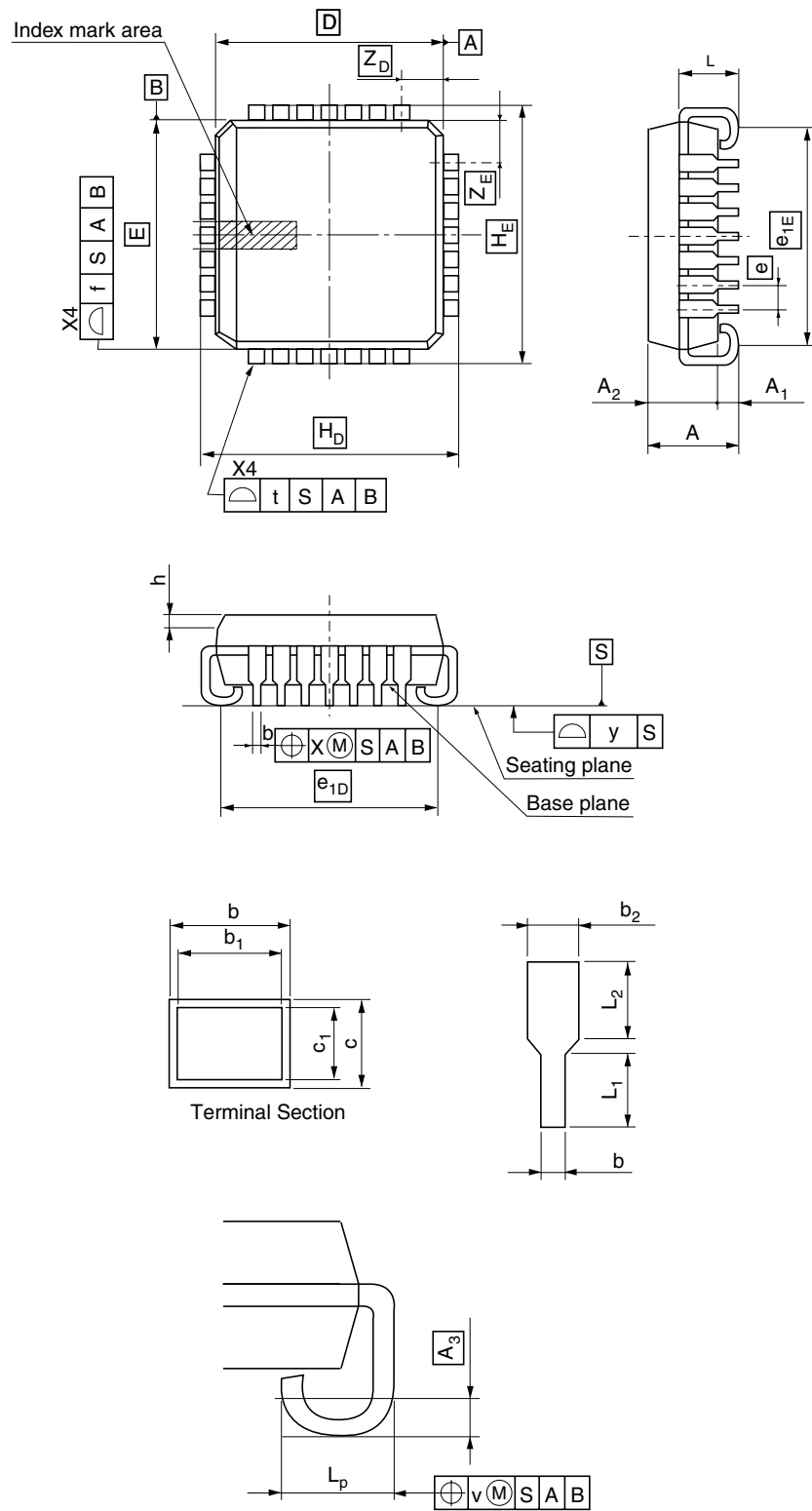
EIAJ EDR-7311 (1996.4)

12. SOJ



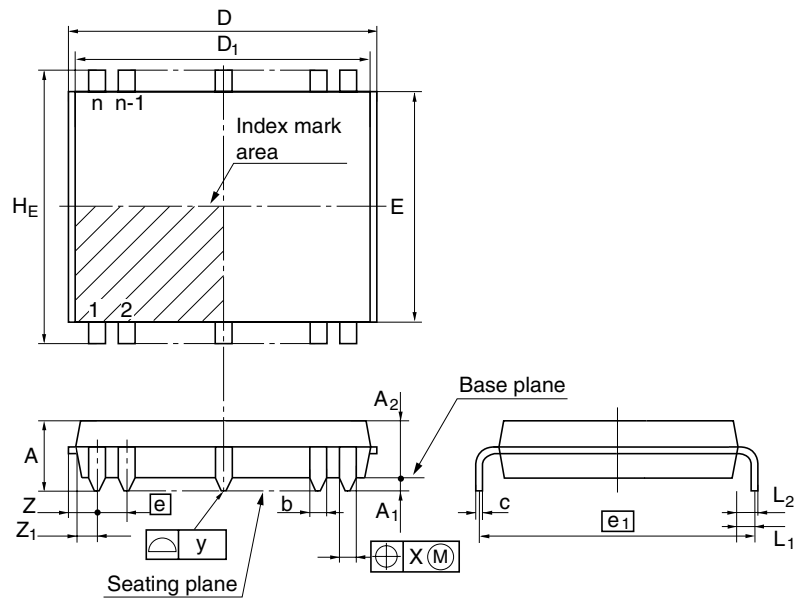
EIAJ ED-7406A (1995.5)

13. QFJ (PLCC)



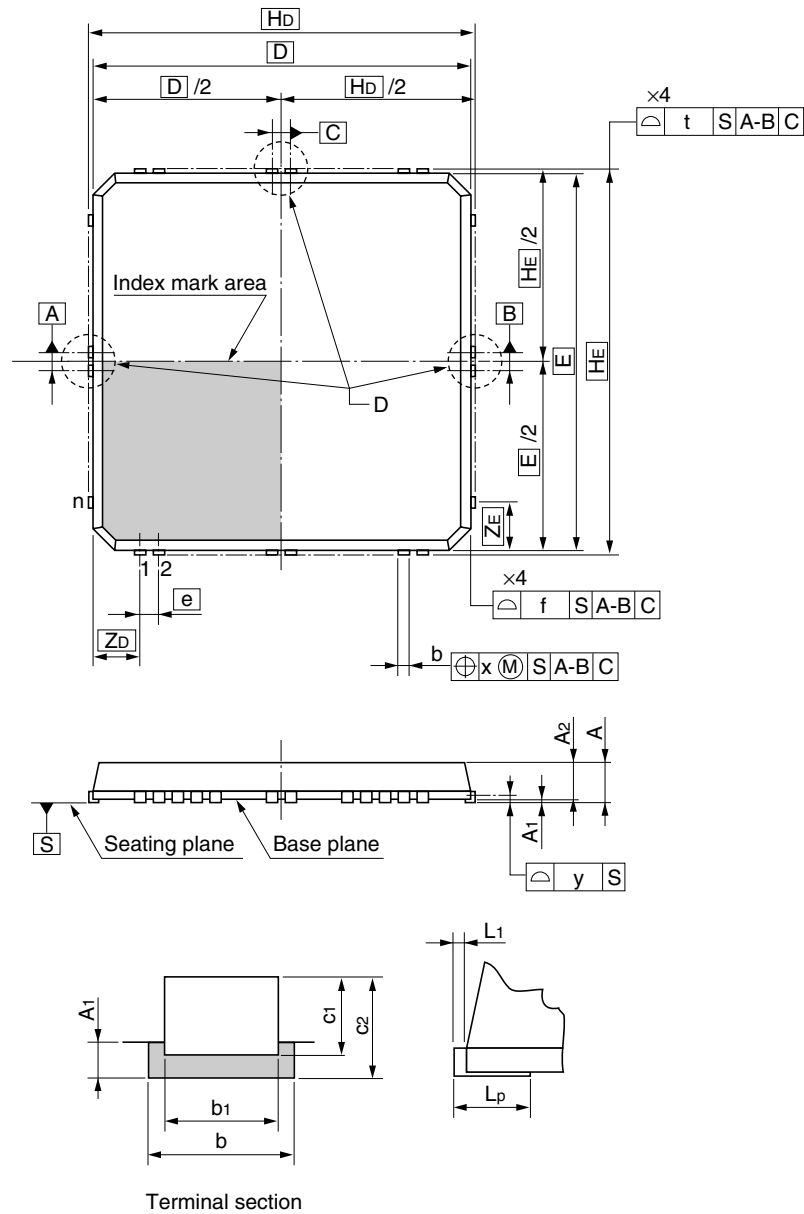
EIAJ EDR-7319 (1998.12)

14. SOI



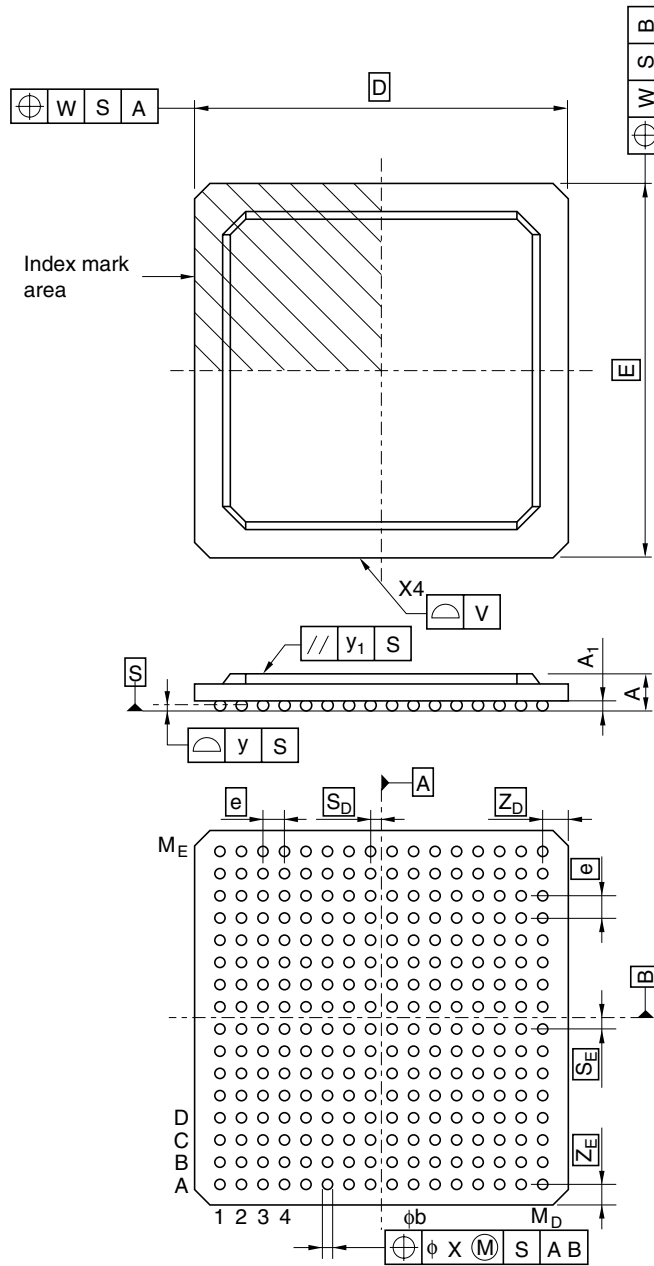
EIAJ ED-7410 (1988.6)

15. P-VQFN



EIAJ EDR-7324 (1999.5)

16. BGA



EIAJ EDR-7315A (1998.11)

1.4 Lineups in Terms of Shapes and Materials

1.4.1 IC Package

●: In mass production

○: Under development

△: Under development (Please ask for the details)

1. Plastic DIP

As of July, 2002

Package name	Nominal dimensions mm (mil)	Mounting height (Max.) mm	Terminal pitch mm	Terminal count															
				7	8	14	16	20	22	24	28	30	32	40	42	48	56	64	90
DIP	7.62 (300)	5.06	2.54	●	●	●	●												
		5.08						●		●									
	15.24 (600)	5.06												●	●				
		5.08											●						
		5.10														●			
		5.70								●	●								
	22.86 (900)	5.10																●	
SDIP	7.62 (300)	5.06	1.78					●											
	10.16 (400)	5.06										●							
		5.10									●								
	15.24 (600)	5.06															●		
		5.10													●				
	19.05 (750)	5.08																●	
HSDIP	10.16 (400)	5.06	1.78							●									●

2. Cerdip

As of July, 2002

Package name	Nominal dimensions mm (mil)	Mounting height (Max.) mm	Terminal pitch mm	Terminal count		
				28	32	40
G-DIP	15.24 (600)	5.89	2.54	●	●	
		6.30				●

3. Ceramic DIP

As of July, 2002

Package name	Nominal dimensions mm (mil)	Mounting height (Max.) mm	Terminal pitch mm	Terminal count
				64
C-SDIP	19.05 (750)	5.60	1.78	●

4. SIP

As of July, 2002

Package name	Nominal dimensions mm	Mounting height (Max.) mm	Terminal pitch mm	Terminal count							
				3	5	7	15	16	23	28	
SIP	14.2 × 30.0	3.8	1.27						●		
	6.3 × 24.5	8.5	1.5					●			
	6.3 × 19.2	9.2	2.54			●					
	14.2 × 30.0	17.0	1.778					●			
	14.3 × 20.0	17	1.27				●				
	14.2 × 30.0	17.3							●		
	17.5 × 30.18	20.82							●		
		20.97	1.0							●	
	15.0 × 10.0	21.75	1.7		●						
	15.0 × 10.2	22	2.5	●							

5. Ceramic PGA

As of July, 2002

Package name	Cavity direction	Nominal dimensions	Mounting height (Max.) mm	Terminal pitch mm	Terminal count	
					68	135
PGA	Cavity-up	10	5.10	2.54	●	
		14	4.95			●

6. SOP

As of July, 2002

Package name	Nominal dimensions mm (mil)	Mounting height (Max.) mm	Terminal pitch mm	Terminal count															
				8	10	14	16	20	24	26	28	30	32	40	44	48	56	64	80
SOP	3.81 (150)* ¹	1.75	1.27	●		●	●												
	5.72 (225)	1.73		●															
		2.03		●															
	5.65 × 8.10	1.73		●															
	7.62 (300)	2.20				●	●	●											
	7.62 (300)* ¹	2.65						●											
	11.43 (450)	2.50							●		●								
	12.70 (500)	1.65	1.60		●														
	13.34 (525)	3.00	1.27										●	●					
HSOP	5.5 × 10.06	2.20	1.27				●												
	5.5 × 12.6							●											
	8.3 × 18.4	3.0	0.80							●									
	11.0 × 14.1	3.6	1.27					Δ											
SSOP	5.30 × 8.20	2.10	0.65						○										
	8.0 × 11.0	2.00										●							
TSSOP	4.40 × 3.00	1.10	0.65	●															
	4.40 × 5.00					●	●												
	4.40 × 6.50							●											
	4.40 × 7.80								●										
	4.40 × 9.70	1.20	0.40													○			
	4.40 × 11.3																●		
	6.10 × 12.5		0.50													●			
	6.10 × 14.0																●		
	6.10 × 17.0	0.40	0.40															●	
																			●
HTSSOP	6.10 × 14.0	1.20	0.50														●		
VSSOP	2.3 × 2.0	0.9	0.5	●															
TSOP(I)	8 × 13.4	1.20	0.55								●								
			0.50										●						
	8 × 14		0.50										●						
	12 × 20		0.50													●			
TSOP(II)	10.16 (400)	1.20	1.27										●						
			0.80												●				
	12.70 (500)		0.80													●			

Note: 1. JEDEC

7. QFP

As of July, 2002

Package name	Nominal dimensions mm	Mounting height (Max.) mm	Terminal pitch mm	Terminal count																											
				28	40	44	48	52	54	56	60	64	80	88	100	112	120	128	136	144	160	168	176	208	216	240	256	296			
QFP	10 × 10	2.50	0.5									●																			
		2.54	0.65							●																					
	14 × 14	3.00	0.5											○																	
		3.05	0.8			●						●																			
			0.65										●																		
			0.5												●																
	14 × 20	3.05	0.8										●																		
		3.10	1.0					●			●	●																			
			0.8										●																		
			0.65												●																
			3.15	0.5															●												
	20 × 20	3.05	0.8										●																		
			0.65												●																
			0.5																												
	28 × 28	3.56	0.8																●												
			0.65																		●	●									
			0.5																					●							
		3.95	0.4																								●				
	28 × 40	3.56	0.5																								●				
	32 × 32	3.95	0.5																							●					
			0.4																								●				
LQFP	7 × 7	1.70	0.65		●																										
			0.5				●																								
	10 × 10		0.65				○																								
			0.5								●																				
	14 × 20	1.60	0.65												△																
	20 × 20	1.70	0.5																●												
			0.4																			●									
	24 × 24		0.5																			●									
			0.4																					●							
	28 × 28	0.5																				●									
		0.4																								○					

Package name	Nominal dimensions mm	Mounting height (Max.) mm	Terminal pitch mm	Terminal count																											
				28	40	44	48	52	54	56	60	64	80	88	100	112	120	128	136	144	160	168	176	208	216	240	256	296			
HQFP	10 × 10	2.54	0.65							●																					
	14 × 14	3.00	0.5													○															
		3.05	0.65				●					●																			
		3.15	0.65								●																				
	14 × 20	3.05	0.8									●																			
			0.65										●																		
	20 × 20	3.05	0.65														●														
	28 × 28	3.56	0.65																	●											
			0.5																				●								
		3.95	0.4																							●					
	32 × 32	3.95	0.5																						●						
			0.4																								●				
HLQFP	7 × 7	1.70	0.65	●	●																										
	12 × 12		0.5								●																				
	14 × 14		0.5									●		△																	
HTQFP	10 × 10	1.1	0.5				●																								
		1.20	0.5							●																					
	14 × 14	1.20	0.5							●			●																		
TQFP	7.4 × 7.4	1.20	0.5							○																					
	10 × 10		0.5								●																				
			0.5									●																			
	14 × 14		0.4										●																		
			0.65										●																		
			0.5											●																	
			0.4												●																
	16 × 16		0.4												●				●												

8. SOJ

As of July, 2002

Package name	Nominal dimensions mm (mil)	Mounting height (Max.) mm	Terminal pitch mm	Terminal count				
				24	28	32	36	44
SOJ	7.62 (300)	3.76	1.27	●	●			
	10.16 (400)					●	●	●

9. QFJ (PLCC)

As of July, 2002

Package name	Nominal dimensions mm	Mounting height (Max.) mm	Terminal pitch mm	Terminal count				
				18	44	52	68	84
QFJ	7.34 × 12.45	3.56	1.27	●				
	16.58	4.60			●			
	19.12					●		
	24.20						●	
	29.28							●

10. HSOI

As of July, 2002

Package name	Nominal dimensions mm (mil)	Mounting height (Max.) mm	Terminal pitch mm	Terminal count
				26
HSOI	9.53 (375)	3.00	0.80	●

11. Plastic VSON

As of July, 2002

Package name	Nominal dimensions mm	Mounting height (Max.) mm	Terminal pitch mm	Terminal count
				5
P-VSON	1.2 × 1.6	0.6	0.5	●

12. Plastic VQFN

As of July, 2002

Package name	Nominal dimensions mm	Mounting height (Max.) mm	Terminal pitch mm	Terminal count		
				14	16	24
P-VQFN	3 × 3	0.80	0.50		●	
	3.4 × 3.6	0.95	0.4	○		
	4 × 5	0.80	0.5			●

13. Ceramic QFP

As of July, 2002

Package name	Nominal dimensions mm	Mounting height (Max.) mm	Terminal pitch mm	Terminal count
				256
C-QFP	36 × 36	10.5	0.50	○

14. BGA

As of July, 2002

Package name	Nominal dimensions mm	Mounting height (Max.) mm	Terminal pitch mm	Terminal count																					
				48	54	65	71	72	90	108	112	119	176	184	208	216	240	256	264	336	352	400	479	480	600
BGA	14 × 22	2.24	1.27									●													
		2.35								●		●													
	27 × 27	2.5																●							
LFBGA	7 × 11	1.4	0.80					●																	
	9 × 11						Δ																		
	10 × 10	1.40									○														
	10 × 11	1.4						○																	
	11 × 11	1.40	0.50															○							
	10 × 13		0.8					●																	
	13 × 13		0.65														●								
	15 × 15		0.80																●						
	17 × 17																			●					
		1.7	0.8															●							
HBGA	40 × 40	2.4	1.27																				Δ		
	47.5 × 47.5																							Δ	
	31 × 31	2.0	1.0																			●		●	
HLFBGA	23 × 23	1.45	0.8																		●				
TFBGA	6.5 × 6.5	1.2	0.75	●																					
	7 × 9		0.80				Δ																		
	6.5 × 9.8		0.75	●																					
	8 × 9.5			Δ																					
	10 × 10		0.8								●														
	12 × 12	1.20	0.65											●											
	13 × 13	1.2	0.8										●												
	10 × 11	1.00	0.80 × 1.00		○																				
	13 × 13		0.50											●											
	15 × 15															●									
	18 × 18	1.20	0.80													●									
		1.00	0.50																●						
	21 × 21	1.20	0.80																○						

15. Others

As of July, 2002

Package name	Nominal dimensions mm (mil)	Mounting height (Max.) mm	Terminal pitch mm	Terminal count			
				3	4	5	6
TO-92	—	—	1.27	●			
TO-92Mod	—	—	1.27	●			
CMPAK	—	1.1	0.65			●	●
MPAK	—	1.4	0.95	●		●	
UPAK	—	1.6	1.5	●			

16. Nominal Dimensions

Typical dimensions among outline dimensions that are important in the mounting design and optimal for representing the package size

Package	Definition
DIP SDIP HSDIP G-DIP C-SDIP HSOI	Terminal in-line interval
SIP	(Package height) × (Package length)
PGA	Number of pins in one pin row or column of the pin matrix of the package arranged according to the pin arrangement rule (including latent pins)
SOP	Package width (The spacing between centers of the mounting pad which the package is to be mounted on)
HSOP SSOP TSSOP HTSSOP VSSOP QFP LQFP HQFP HLQFP HTQFP TQFP P-VSON P-VQFN C-QFP BGA LFBGA HBGA HLFBGA TFBGA	(Package width) × (Package length)
TSOP (II) SOJ	(Package width)
TSOP (I)	(Package width) × (Overall length)
QFJ	Rectangular type: (Package width) × (Package length) Square type: (Package width) or (Package length)

1.5 Package List

1.5.1 IC Package

Package name	Package material	Nominal dimensions mm (mil)	Mounting height (Max.) mm	Terminal pitch mm	Terminal count	Package code	Terminal material		Ref. page	
							Base	Surface treatment		
DIP	Plastic	7.62 (300)	5.06	2.54	7	DP-7	Cu alloy	Sn-Pb	81	
					8	DP-8	Cu alloy	Sn-Pb	82	
						DP-8B	Cu alloy	Sn-Pb	82	
					14	DP-14	Cu alloy	Sn-Pb	83	
					16	DP-16	Cu alloy	Sn-Pb	83	
						DP-16C	Cu alloy	Sn-Pb	84	
						DP-16E	Cu alloy	Sn-Pb	84	
			5.08		20	DP-20N	Fe-Ni alloy	Sn-Pb	85	
			24		DP-24N	Cu alloy	Sn-Pb	86		
					DP-24NC	Cu alloy	Sn-Pb	87		
		15.24 (600)	5.06		40	DP-40	Fe-Ni alloy/ Cu alloy	Sn-Pb	90	
					42	DP-42	Fe-Ni alloy/ Cu alloy	Sn-Pb	90	
			5.08		32	DP-32	Cu alloy	Sn-Pb	89	
			5.10		48	DP-48	Fe-Ni alloy	Sn-Pb	92	
			5.70		24	DP-24	Fe-Ni alloy	Sn-Pb	86	
					28	DP-28	Fe-Ni alloy	Sn-Pb	88	
					64	DP-64	Fe-Ni alloy	Sn-Pb	93	
			22.86 (900)		5.10					
SDIP	Plastic	7.62 (300)	5.06	1.78	22	DP-22NS	Cu alloy	Sn-Pb	85	
		10.16 (400)			30	DP-30S	Cu alloy	Sn-Pb	89	
			5.10		28	DP-28S	Fe-Ni alloy	Sn-Pb	88	
		15.24 (600)	5.06		56	DP-56SA	Cu alloy	Sn-Pb	92	
			5.10		42	DP-42S	Fe-Ni alloy	Sn-Pb	91	
			DP-42SA			Cu alloy	Sn-Pb	91		
		19.05 (750)	5.08		64	DP-64S	Fe-Ni alloy	Sn-Pb	94	
		22.86 (900)			90	DP-90S	Fe-Ni alloy	Sn-Pb	95	
HSDIP	Plastic	10.16 (400)	5.06	1.78	24	DP-24TS	Cu alloy	Sn-Pb	87	
G-DIP	Ceramic	15.24 (600)	5.89	2.54	28	DG-28	Fe-Ni alloy	Sn	96	
					32	DG-32	Fe-Ni alloy	Sn	97	
						DG-32A	Fe-Ni alloy	Sn	97	
		6.30			40	DG-40A	Fe-Ni alloy	Sn	98	

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office. However, for the DG-28, DG-32, DG-32A and DG-40A in which lead-free pins were originally used, V is not added to the end of the package code.

Package name	Package material	Nominal dimensions mm (mil)	Mounting height (Max.) mm	Terminal pitch mm	Terminal count	Package code	Terminal material		Ref. page
							Base	Surface treatment	
C-SDIP	Ceramic	19.05 (750)	5.60	1.78	64	DC-64S	Fe-Ni alloy	Au	99
SIP	Plastic	14.2 × 30.0	3.8	1.27	23	SP-23TA	Cu alloy	Sn-Pb	105
						SP-23TD	Cu alloy	Sn-Pb	107
		6.3 × 24.5	8.5	1.5	16	SP-16	Cu alloy	Sn-Pb	103
		6.3 × 19.2	9.2	2.54	7	SP-7	Cu alloy	Sn-Pb	102
		14.2 × 30.0	17.0	1.778	16	SP-16TA	Cu alloy	Sn-Pb	104
		14.3 × 20.0	17	1.27	15	SP-15TA	Cu alloy	Sn-Pb	102
						SP-15TF	Cu alloy	Sn-Pb	103
		14.2 × 30.0	17.3	23	SP-23TB	Cu alloy	Sn-Pb	106	
		17.5 × 30.18	20.82		SP-23TE	Cu alloy	Sn-Pb	108	
			20.97	1.0	28	SP-28TA	Cu alloy	Sn-Pb	109
		15.0 × 10.0	21.75	1.7	5	SP-5TB	Cu alloy	Sn-Pb	101
		15.0 × 10.2	22	2.5	3	SP-3T	Cu alloy	Sn-Pb	100
PGA	Ceramic	10* ¹	5.10	2.54	68	PC-68	Fe-Ni-Co alloy/ Fe-Ni alloy	Sn-Pb	110
		14* ¹	4.95		135	PC-135	Fe-Ni-Co alloy/ Fe-Ni alloy	Sn-Pb	111
SOP	Plastic	3.81 (150)* ²	1.75	1.27	8	FP-8DC	Cu alloy	Sn-Pb	115
					14	FP-14DNV	Cu alloy	Ni/Pd/Au	118
					16	FP-16DNV	Cu alloy	Ni/Pd/Au	120
		5.72 (225)	1.73		8	FP-8DB	Cu alloy	Sn-Pb	115
						FP-8D	Cu alloy	Sn-Pb	114
						FP-8DF	Cu alloy	Sn-Pb	116
		5.65 × 8.10	1.73		14	FP-14DA	Cu alloy	Sn-Pb	117
						FP-14DAV	Cu alloy	Ni/Pd/Au	117
						16	FP-16DA	Cu alloy	Sn-Pb
		FP-16DAV	Cu alloy		Ni/Pd/Au		119		
		7.62 (300)	2.20		20	FP-20DA	Cu alloy	Sn-Pb	120
						FP-20DAV	Cu alloy	Ni/Pd/Au	121
						FP-20DBV	Cu alloy	Ni/Pd/Au	121
		7.62 (300)* ²	2.65		24	FP-24D	Fe-Ni alloy	Sn-Pb	124
		11.43 (450)	2.50			FP-24DB	Cu alloy	Sn-Pb	124
						28	FP-28D	Fe-Ni alloy	Sn-Pb
		12.70 (500)	1.65	1.60	10	FP-10D	Fe-Ni alloy	Sn-Pb	116
		13.34 (525)	3.00	1.27	32	FP-32D	Fe-Ni alloy/ Cu alloy	Sn-Pb	127
					40	FP-40D	Fe-Ni alloy	Sn-Pb	128

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office. However, for the DC-64S in which lead-free pins were originally used, V is not added to the end of the package code.

Package name	Package material	Nominal dimensions mm (mil)	Mounting height (Max.) mm	Terminal pitch mm	Terminal count	Package code	Terminal material		Ref. page
							Base	Surface treatment	
HSOP	Plastic	5.5 × 10.06	2.20	1.27	16	FP-16DC	Cu alloy	Sn-Pb	119
		5.5 × 12.6			20	FP-20DE	Cu alloy	Sn-Pb	122
		8.3 × 18.4	3.0	0.80	26	FP-26DT	Cu alloy	Sn-Pb	125
						FP-26DTA	Cu alloy	Sn-Pb	126
		11.0 × 14.1	3.6	1.27	20	FP-20DT	Cu alloy	Sn-Pb	123
SSOP	Plastic	5.30 × 8.20	2.10	0.65	24	FP-24DSA	Cu alloy	Sn-Pb	125
		8.0 × 11.0	2.00		30	FP-30D	Fe-Ni alloy	Sn-Pb	127
TSSOP	Plastic	4.40 × 3.00	1.10	0.65	8	TTP-8DA	Cu alloy	Sn-Pb	130
		4.40 × 5.00			14	TTP-14D	Cu alloy	Sn-Pb	131
						TTP-14DV	Cu alloy	Ni/Pd/Au	132
					16	TTP-16DA	Cu alloy	Sn-Pb	132
		TTP-16DAV				Cu alloy	Ni/Pd/Au	133	
		4.40 × 6.50			20	TTP-20DA	Cu alloy	Sn-Pb	133
						TTP-20DAV	Cu alloy	Ni/Pd/Au	134
		4.40 × 7.80			24	TTP-24DB	Cu alloy	Sn-Pb	134
						TTP-24DBV	Cu alloy	Ni/Pd/Au	135
		4.40 × 9.70	1.20	0.40	48	TTP-48DEV	Cu alloy	Ni/Pd/Au	139
		56			TTP-56DBV	Cu alloy	Ni/Pd/Au	140	
		6.10 × 12.5		0.50	48	TTP-48DB	Cu alloy	Sn-Pb	138
						TTP-48DBV	Cu alloy	Ni/Pd/Au	138
		6.10 × 14.0			56	TTP-56DA	Cu alloy	Sn-Pb	139
						TTP-56DAV	Cu alloy	Ni/Pd/Au	140
		6.10 × 17.0			64	TTP-64DV	Cu alloy	Ni/Pd/Au	141
						80	TTP-80DV	Cu alloy	Ni/Pd/Au
HTSSOP	Plastic	6.10 × 14.0	1.20	0.50	56	TTP-56DT	Cu alloy	Sn-Pb	141
VSSOP	Plastic	2.3 × 2.0	0.9	0.5	8	TTP-8DB	Cu alloy	Sn-Pb	131
TSOP (I)	Plastic	8 × 13.4	1.20	0.55	28	TFP-28DB	Cu alloy	Sn-Pb	128
				0.50	32	TFP-32DC	Cu alloy	Sn-Pb	129
		8 × 14				TFP-32DA	Fe-Ni alloy	Sn-Pb	129
		12 × 20		48	TFP-48DA	Fe-Ni alloy	Sn-Pb	130	
TSOP (II)	Plastic	10.16 (400)	1.20	1.27	32	TTP-32D	Fe-Ni alloy	Sn-Pb	135
						TTP-32DR	Fe-Ni alloy	Sn-Pb	136
				0.80	44	TTP-44DB	Fe-Ni alloy	Sn-Pb	136
						TTP-44DE	Fe-Ni alloy	Sn-Pb	137

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Package name	Package material	Nominal dimensions mm (mil)	Mounting height (Max.) mm	Terminal pitch mm	Terminal count	Package code	Terminal material		Ref. page
							Base	Surface treatment	
TSOP (II)	Plastic	12.70 (500)	1.20	0.80	48	TTP-48/40DA	Fe-Ni alloy	Sn-Pb	137
QFP	Plastic	10 × 10	2.50	0.5	64	FP-64C	Cu alloy	Sn-Pb	154
			2.54	0.65	56	FP-56	Cu alloy	Sn-Pb	150
						FP-56A	Cu alloy	Sn-Pb	150
		14 × 14	3.00	0.5	100	FP-100F	Cu alloy	Sn-Pb	166
			3.05	0.8	44	FP-44A	Fe-Ni alloy	Sn-Pb	145
					64	FP-64A	Fe-Ni alloy	Sn-Pb	153
						FP-64H	Cu alloy	Sn-Pb	155
				0.65	80	FP-80A	Fe-Ni alloy	Sn-Pb	157
						FP-80E	Cu alloy	Sn-Pb	159
						FP-80H	Cu alloy	Sn-Pb	160
						FP-80Q	Cu alloy	Sn-Pb	162
				0.5	100	FP-100B	Fe-Ni alloy	Sn-Pb	165
						FP-100M	Cu alloy	Sn-Pb	168
		14 × 20	3.10	0.8	80	FP-80C	Cu alloy	Sn-Pb	158
				0.8	54	FP-54	Fe-Ni alloy	Sn-Pb	149
						FP-54A	Fe-Ni alloy	Sn-Pb	149
					60	FP-60	Fe-Ni alloy	Sn-Pb	152
						FP-60A	Fe-Ni alloy	Sn-Pb	152
				0.8	64	FP-64	Fe-Ni alloy	Sn-Pb	153
						FP-64B	Fe-Ni alloy	Sn-Pb	154
				0.8	80	FP-80	Fe-Ni alloy	Sn-Pb	157
						FP-80B	Fe-Ni alloy	Sn-Pb	158
				0.65	100	FP-100	Fe-Ni alloy	Sn-Pb	164
						FP-100A	Fe-Ni alloy	Sn-Pb	165
			3.15	0.5	128	FP-128	Fe-Ni alloy	Sn-Pb	172
						FP-128B	Fe-Ni alloy	Sn-Pb	172
		20 × 20	3.05	0.8	88	FP-88	Fe-Ni alloy	Sn-Pb	164
				0.65	112	FP-112	Fe-Ni alloy	Sn-Pb	169
						FP-112B	Cu alloy	Sn-Pb	170
				0.5	144	FP-144G	Cu alloy	Sn-Pb	174
						FP-144J	Fe-Ni alloy	Sn-Pb	175
		28 × 28	3.56	0.8	136	FP-136	Fe-Ni alloy	Sn-Pb	173
				0.65	160	FP-160H	Cu alloy	Sn-Pb	176
					168	FP-168	Fe-Ni alloy	Sn-Pb	177
						FP-168B	Cu alloy	Sn-Pb	178

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Package name	Package material	Nominal dimensions mm (mil)	Mounting height (Max.) mm	Terminal pitch mm	Terminal count	Package code	Terminal material		Ref. page		
							Base	Surface treatment			
QFP	Plastic	28 × 28	3.56	0.5	208	FP-208	Fe-Ni alloy	Sn-Pb	180		
						FP-208A	Cu alloy	Sn-Pb	180		
				3.95	0.4	256	FP-256F	Cu alloy	Sn-Pb	186	
		28 × 40	3.56	0.5		FP-256	Fe-Ni alloy	Sn-Pb	185		
						FP-256H	Cu alloy	Sn-Pb	187		
		32 × 32	3.95		240	FP-240	Cu alloy	Sn-Pb	183		
				0.4	296	FP-296	Cu alloy	Sn-Pb	188		
		LQFP	Plastic	7 × 7	1.70	0.65	40	FP-40	Cu alloy	Sn-Pb	144
	FP-40B						Cu alloy	Sn-Pb	145		
	0.5					48	FP-48B	Fe-Ni alloy	Sn-Pb	146	
						FP-48C	Cu alloy	Sn-Pb	146		
10 × 10	0.65						FP-48F	Fe-Ni alloy	Sn-Pb	147	
				0.5	64	FP-64E	Fe-Ni alloy	Sn-Pb	155		
14 × 20	1.60			0.65	100	FP-100H	Cu alloy	Sn-Pb	166		
20 × 20	1.70			0.5	144	FP-144F	Cu alloy	Sn-Pb	174		
						FP-144H	Fe-Ni alloy	Sn-Pb	175		
				0.4	176	FP-176A	Cu alloy	Sn-Pb	179		
					FP-176	Fe-Ni alloy	Sn-Pb	178			
24 × 24				0.5		FP-176C	Cu alloy	Sn-Pb	179		
	0.4				216	FP-216	Cu alloy	Sn-Pb	182		
28 × 28	0.5			208	FP-208C	Cu alloy	Sn-Pb	181			
				0.4	256	FP-256B	Cu alloy	Sn-Pb	185		
HQFP	Plastic			10 × 10	2.54	0.65	56	FP-56B	Cu alloy	Sn-Pb	151
								FP-56C	Cu alloy	Sn-Pb	151
		14 × 14	3.00	0.5	100	FP-100K	Cu alloy	Sn-Pb	167		
					48	FP-48TB	Cu alloy	Sn-Pb	148		
						80	FP-80K	Cu alloy	Sn-Pb	160	
				FP-80N	Cu alloy	Sn-Pb	161				
			3.15		64	FP-64TA	Cu alloy	Sn-Pb	156		
		14 × 20	3.05	0.8	80	FP-80M	Cu alloy	Sn-Pb	161		
					100	FP-100L	Cu alloy	Sn-Pb	167		
						FP-100Q	Cu alloy	Sn-Pb	168		
		20 × 20	3.56	0.65	120	FP-120A	Cu alloy	Sn-Pb	171		
					160	FP-160J	Cu alloy	Sn-Pb	176		
						FP-160K	Cu alloy	Sn-Pb	177		
		28 × 28				0.5	208	FP-208E	Cu alloy	Sn-Pb	182

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Package name	Package material	Nominal dimensions mm (mil)	Mounting height (Max.) mm	Terminal pitch mm	Terminal count	Package code	Terminal material		Ref. page
							Base	Surface treatment	
HQFP	Plastic	28 × 28	3.95	0.4	256	FP-256G	Cu alloy	Sn-Pb	186
		32 × 32		0.5	240	FP-240B	Cu alloy	Sn-Pb	184
		0.4		296	FP-296B	Cu alloy	Sn-Pb	189	
HLQFP	Plastic	7 × 7	1.70	0.65	28	FP-28TB	Cu alloy	Sn-Pb	143
				40	FP-40A	Cu alloy	Sn-Pb	144	
		12 × 12		0.5	80	FP-80F	Cu alloy	Sn-Pb	159
		14 × 14				FP-80TA	Cu alloy	Sn-Pb	163
HTQFP	Plastic	10 × 10	1.1	0.5	52	TFP-52T	Cu alloy	Sn-Pb	190
			1.20		64	TFP-64TA	Cu alloy	Sn-Pb	194
		14 × 14				TFP-64T	Cu alloy	Sn-Pb	193
			100		TFP-100F	Cu alloy	Sn-Pb	197	
TQFP	Plastic	7.4 × 7.4	1.20	0.5	56	TFP-56A	Cu alloy	Sn-Pb	190
		10 × 10		64	TFP-64B	Cu alloy	Sn-Pb	191	
					TFP-64C	Cu alloy	Sn-Pb	191	
					TFP-64E	Fe-Ni alloy	Sn-Pb	192	
					TFP-64FV	Cu alloy	Ni/Pd/Au	192	
		12 × 12		80	TFP-80C	Fe-Ni alloy	Sn-Pb	195	
		14 × 14		0.4	100	TFP-100G	Fe-Ni alloy	Sn-Pb	198
				0.65	80	TFP-80	Fe-Ni alloy	Sn-Pb	195
						TFP-80F	Fe-Ni alloy	Sn-Pb	196
				0.5	100	TFP-100B	Fe-Ni alloy	Sn-Pb	196
					TFP-100C	Cu alloy	Sn-Pb	197	
				TFP-100JV	Cu alloy	Ni/Pd/Au	198		
SOJ	Plastic	7.62 (300)	3.76	1.27	24	CP-24D	Cu alloy	Sn-Pb	200
				28	CP-28DN	Cu alloy	Sn-Pb	201	
QFJ	Plastic	10.16 (400)			32	CP-32DB	Fe-Ni alloy	Sn-Pb	201
				36	CP-36D	Fe-Ni alloy	Sn-Pb	202	
				44	CP-44D	Fe-Ni alloy	Sn-Pb	202	
		7.34 × 12.45	3.56	1.27	18	CP-18	Cu alloy	Sn-Pb	203
		16.58	4.60		44	CP-44	Cu alloy	Sn-Pb	204
HSOI	Plastic	9.53 (375)	3.00	0.80	26	MP-26DT	Cu alloy	Sn-Pb	208
					52	CP-52	Cu alloy	Sn-Pb	205
					68	CP-68	Cu alloy	Sn-Pb	206
					84	CP-84	Cu alloy	Sn-Pb	207

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Package name	Package material	Nominal dimensions mm (mil)	Mounting height (Max.) mm	Terminal pitch mm	Terminal count	Package code	Terminal material		Ref. page
							Base	Surface treatment	
P-VSON	Plastic	1.2 × 1.6	0.6	0.5	5	TNP-5D	Cu alloy	Sn-Pb	209
P-VQFN	Plastic	3 × 3	0.80	0.50	16	TNP-16AV	Cu alloy	Ni/Pd/Au	211
		3.4 × 3.6	0.95	0.4	14	TNP-14	Cu alloy	Sn-Pb	210
		4 × 5	0.80	0.5	24	TNP-24AV	Cu alloy	Ni/Pd/Au	211
C-QFP	Ceramic	36 × 36	10.5	0.50	256	FC-256T	Fe-Ni-Co alloy	Sn	212
BGA	Plastic	14 × 22	2.24	1.27	119	BP-119C	Sn-Pb	—	219
			2.35		108	BP-108	Sn-Pb	—	216
					119	BP-119A	Sn-Pb	—	218
		27 × 27	2.5	256	BP-256	Sn-Pb	—	222	
					BP-256A	Sn-Pb	—	223	
LFBGA	Plastic	7 × 11	1.4	0.80	72	BP-72A	Sn-Pb	—	213
		10 × 10	1.40		112	BP-112	Sn-Pb	—	217
		10 × 11	1.4		72	BP-72B	Sn-Pb	—	214
		11 × 11	1.40	0.50	256	BP-256C	Sn-Pb	—	225
		10 × 13		0.8	90	BP-90A	Sn-Pb	—	215
		13 × 13		0.65	240	BP-240A	Sn-Pb	—	221
		15 × 15		0.80	264	BP-264	Sn-Pb	—	226
		17 × 17			336	BP-336	Sn-Pb	—	227
			1.7	0.8	256	BP-256B	Sn-Pb	—	224
HBGA	Tape	31 × 31	2.0	1.0	400	BT-400T	Sn-Pb	—	236
					480	BT-480T	Sn-Pb	—	237
HLFBGA	Tape	23 × 23	1.45	0.8	352	BT-352T	Sn-Pb	—	235
TFBGA	Plastic	6.5 × 6.5	1.2	0.75	48	TBP-48	Sn-Pb	—	228
		7 × 9		0.80	65	TBP-65	Sn-Pb	—	231
		6.5 × 9.8		0.75	48	TBP-48A	Sn-Pb	—	229
		8 × 9.5				TBP-48F	Sn-Pb	—	230
		10 × 10		0.8	112	TBP-112	Sn-Pb	—	232
		12 × 12	1.20	0.65	208	TBP-208A	Sn-Pb	—	234
		13 × 13	1.2	0.8	176	TBP-176	Sn-Pb	—	233
	Tape	10 × 11	1.00	0.80 × 1.00	54	TBT-54	Sn-Pb	—	238
						TBT-54R	Sn-Pb	—	239
TBT-54A						Sn-Pb	—	240	
TBT-54AR						Sn-Pb	—	241	
	13 × 13		0.50	184	TBT-184A	Sn-Ag-Cu	—	242	

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office. However, for the FC-256T and TBT-184A in which lead-free pins were originally used, V is not added to the end of the package code.

Package name	Package material	Nominal dimensions mm (mil)	Mounting height (Max.) mm	Terminal pitch mm	Terminal count	Package code	Terminal material		Ref. page
							Base	Surface treatment	
TFBGA	Tape	15 × 15	1.00	0.50	216	TBT-216B	Sn-Ag-Cu	—	244
		18 × 18	1.20	0.80		TBT-216A	Sn-Pb	—	243
			21 × 21	1.00	0.50	264	TBT-264B	Sn-Ag-Cu	—
		1.20		0.80	TBT-264A		Sn-Pb	—	245
TO-92	Plastic	—	—	1.27	3	TO-92(1)	Cu alloy	Sn-Pb	112
TO-92Mod		—	—	1.27	3	TO-92Mod	Cu alloy	Sn-Pb	113
CMPAK		—	1.1	0.65	5	CMPAK-5	Cu alloy	Sn-Pb	247
					6	CMPAK-6	Cu alloy	Sn-Pb	248
MPAK		—	1.4	0.95	3	MPAK	Cu alloy	Sn-Pb	248
					5	MPAK-5	Cu alloy	Sn-Pb	249
UPAK	—	1.6	1.5	3	UPAK	Cu alloy	Sn-Pb	249	

Notes: 1. Number of pins in one pin row or column of the pin matrix of the package arranged according to the pin arrangement rule (including latent pins)

2. JEDEC

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office. However, for the TBT-216B and TBT-264B in which lead-free pins were originally used, V is not added to the end of the package code.

1.5.2 IC Package for Smartcard

Package classification	Package material	Package code	Ref. page
COT for smartcard	Plastic	KP-8	250

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

1.5.3 Flash Card

Name	Ref. page
CompactFlash™ Type I	251
PC-ATA Card Type II	252
MultiMediaCard™	253

Note: CompactFlash™ is a trademark of SanDisk Corporation and is licensed royalty-free to the CFA which in turn will license it royalty-free to CFA members.

MultiMediaCard™ is a trademark of Siemens AG.

1.5.4 Transistor Package

Package classification	Package material	Package code	Terminal material		Ref. page
			Base	Surface treatment	
Pin insertion type	Plastic	TO-3P	Cu alloy	Sn-Pb	254
		TO-3PFM	Cu alloy	Sn-Pb	255
		TO-3PL	Cu alloy	Sn-Pb	256
		SPAK	Fe	Sn-Pb	256
		TO-92 (1)	Fe/Cu alloy	Sn-Pb	257
		TO-92 (2)	Fe/Cu alloy	Sn-Pb	258
		TO-92 Mod	Cu alloy	Sn-Pb	259
		TO-220AB	Cu alloy	Sn-Pb	260
		TO-220FM	Cu alloy	Sn-Pb	261
		TO-220CFM	Cu alloy	Sn-Pb	261
		LDBAK (L)	Cu alloy	Sn-Pb	262
		DBAK (L)-(1)	Cu alloy	Sn-Pb	262
		DBAK (L)-(2)	Cu alloy	Sn-Pb	263
		SP-10	Cu alloy	Sn-Pb	263
		SP-12	Cu alloy	Sn-Pb	264
		SP-12TA	Cu alloy	Sn-Pb	265
Surface mount type	Plastic	EMFPAK-6	Cu alloy	Sn-Pb	266
		MFPAK	Cu alloy	Sn-Pb	267
		SMPAK	Cu alloy	Sn-Pb	267
		SMFPAK-6	Cu alloy	Sn-Pb	268
		CMPAK	Cu alloy	Sn-Pb	268
		CMPAK-4(T)	Cu alloy	Sn-Pb	269
		CMPAK-5(T)	Cu alloy	Sn-Pb	269
		CMPAK-6	Cu alloy	Sn-Pb	270
		CMFPAK-6	Cu alloy	Sn-Pb	270
		MPAK(T)	Fe-Ni alloy/Cu alloy	Sn-Pb	271
		MPAK-4	Fe-Ni alloy/Cu alloy	Sn-Pb	271
		MPAK-5	Cu alloy	Sn-Pb	272
		MPAK-6	Cu alloy	Sn-Pb	272
		TSOP-6	Fe-Ni alloy	Sn-Pb	273
		UPAK	Cu alloy	Sn-Pb	273

Note: '(T)' in CMPAK-4(T), CMPAK-5(T), MPAK(T) indicates transistor packages.
However, '(T)' is omitted in each product's document.

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Package classification	Package material	Package code	Terminal material		Ref. page
			Base	Surface treatment	
Surface mount type	Plastic	LDBAK(S)-(1)	Cu alloy	Sn-Pb	274
		LDBAK(S)-(2)	Cu alloy	Sn-Pb	274
		DBAK(S)	Cu alloy	Sn-Pb	275
		FP-8DA	Cu alloy	Sn-Pb	275
		TTP-8D	Cu alloy	Sn-Pb	276
		LFPBK	Cu alloy	Ni/Pd/Au	277
		RP8P	Fe-Ni alloy	Sn-Pb	278
	Ceramic	RFPBK-F	Fe-Ni alloy	Au	279
		RFPBK-G	Fe-Ni alloy	Au	280

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office. However, for the LFPBK, RFPBK-F and RFPBK-G in which lead-free pins were originally used, V is not added to the end of the package code.

1.5.5 Diode Package

Package classification	Package material	Package code	Terminal material		Ref. page
			Base	Surface treatment	
Pin insertion type	Glass	DO-41	Cu-crud Fe	Sn-Pb	282
		DO-35	Cu-crud Fe	Sn-Pb	281
		MHD	Cu-crud Fe	Sn-Pb	281
Surface mount type	Plastic	MPAK(D)	Cu alloy	Sn-Pb	287
		MPAK-5	Cu alloy	Sn-Pb	287
		CMPAK	Cu alloy	Sn-Pb	288
		CMPAK-4(D)	Cu alloy	Sn-Pb	288
		CMPAK-5(D)	Cu alloy	Sn-Pb	289
		VSON-5	Cu alloy	Sn-Pb	289
		MFPAK	Cu alloy	Sn-Pb	290
		MOP	Cu alloy	Sn-Pb	286
		SRP	Cu alloy	Sn-Pb	283
		URP	Cu alloy	Sn-Pb	283
		UFP	Cu alloy	Sn-Pb	284
		SFP	Cu alloy	Sn-Pb	284
		EFP	Cu alloy	Sn-Pb	285
	Glass	LLD	Cu-crud Fe-Ni alloy	Sn-Pb	282

Note: '(D)' in MPAK(D), CMPAK-4(D), CMPAK-5(D) indicates diode packages.

However, '(D)' is omitted in each product's document.

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

1.5.6 Optodevice Package

Package classification	Package material	Package code	Terminal material		Ref. page
			Base	Surface treatment	
Laser diode package	Metal	LD/AF	Cu	Au	291
	Can	LD/G1	Fe-Ni alloy	Au	292
		LD/G2	Fe-Ni alloy	Au	293
		LD/MG	Fe-Ni alloy	Au	294
		LD/FM	Fe-Ni alloy	Au	295
		LD/GN	Fe-Ni alloy	Au	296
	Plastic	LD/DJS	Fe-Ni alloy	Au	297
		LD/DNS (TBD)	Fe-Ni alloy	Au	298
IRED package	Can	IR/SG1	Fe-Ni-Co alloy	Au	299
		IR/FL	Fe-Ni-Co alloy	Au	300

Note: The Opto-Device Division is being transferred to OpNext, Inc. as of October 1, 2002. For any inquiries on the optoelectronic devices, please contact the Hitachi sales office as same as before.

1.5.7 Module

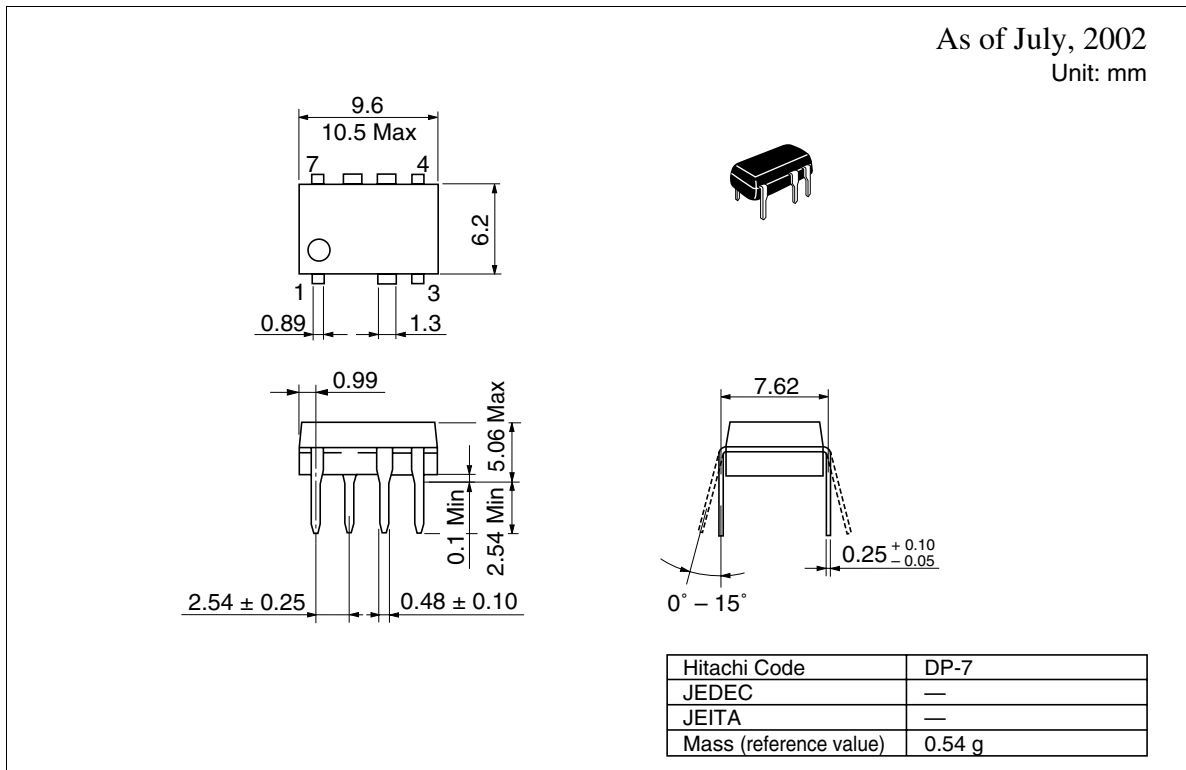
Package classification	Package material	Package code	Terminal material		Ref. page
			Base	Surface treatment	
Modules	Metal cap	RF-O-12	—	Au	301
	Plastic	RF-Or	—	Au	302
		RF-Q	—	Au	303

Section 2 Package Outline Dimensions

2.1 IC Packages

2.1.1 Pin Insertion Packages

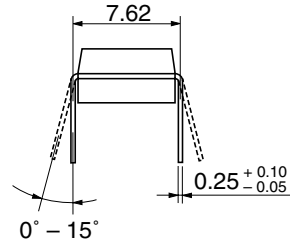
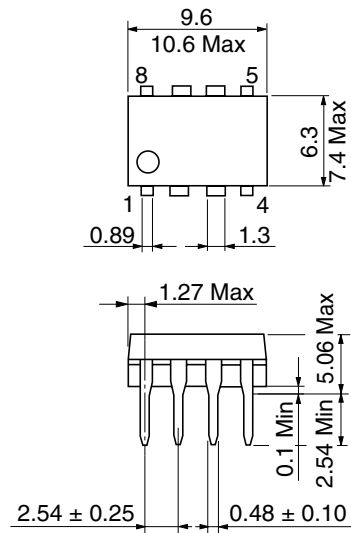
1. Plastic DIP



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002

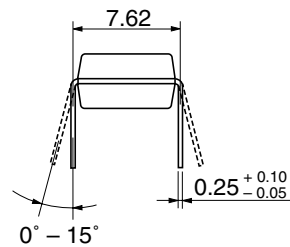
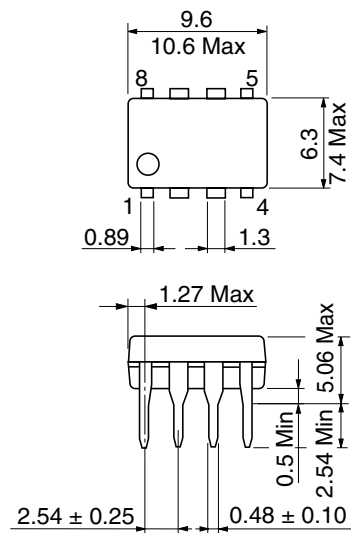
Unit: mm



Hitachi Code	DP-8
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	0.54 g

As of July, 2002

Unit: mm

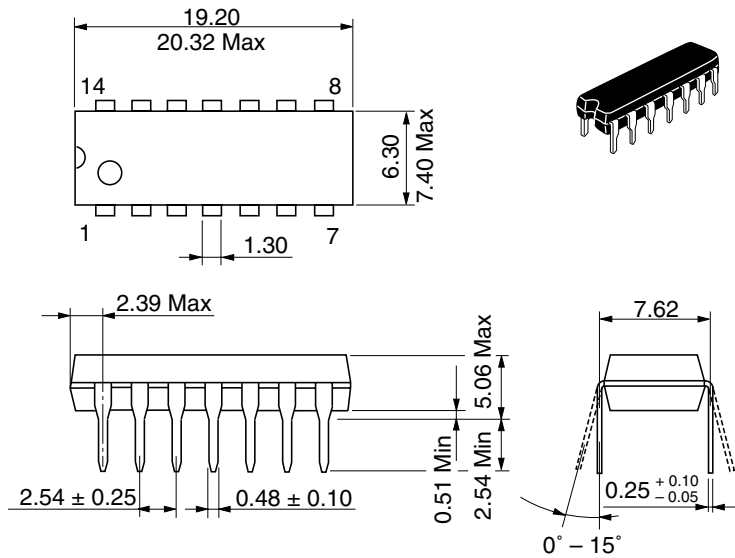


Hitachi Code	DP-8B
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	0.51 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002

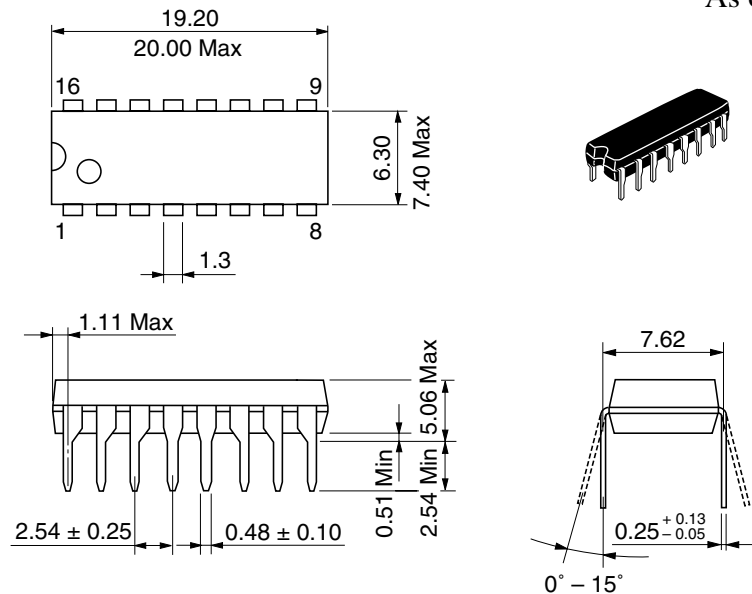
Unit: mm



Hitachi Code	DP-14
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	0.97 g

As of July, 2002

Unit: mm

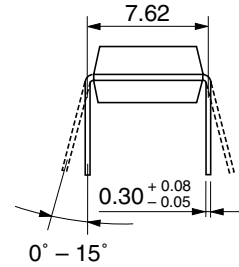
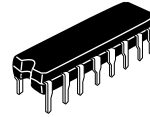
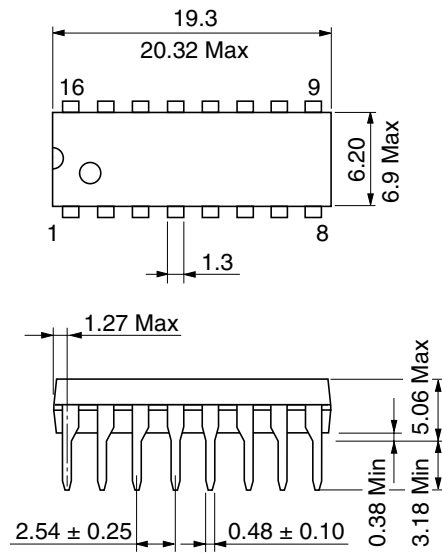


Hitachi Code	DP-16
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	1.07 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002

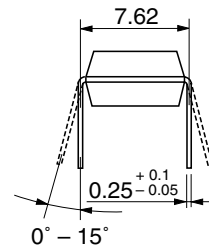
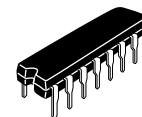
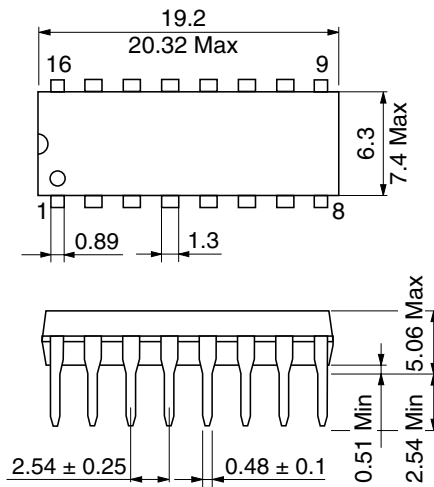
Unit: mm



Hitachi Code	DP-16C
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	0.90 g

As of July, 2002

Unit: mm

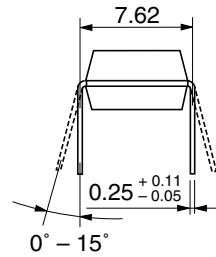
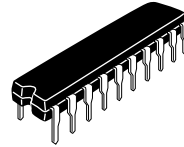
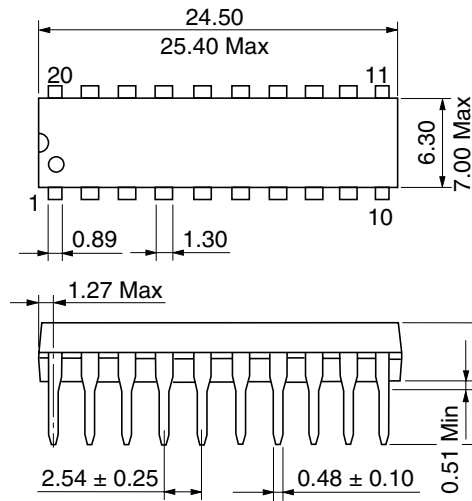


Hitachi Code	DP-16E
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	1.05 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002

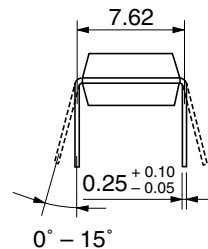
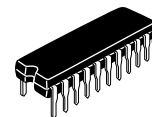
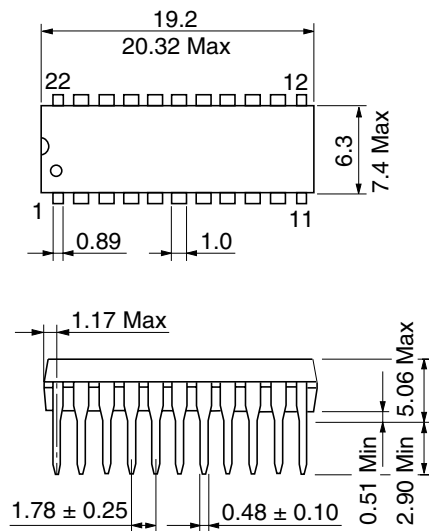
Unit: mm



Hitachi Code	DP-20N
JEDEC	—
JEITA	Conforms
Mass (reference value)	1.26 g

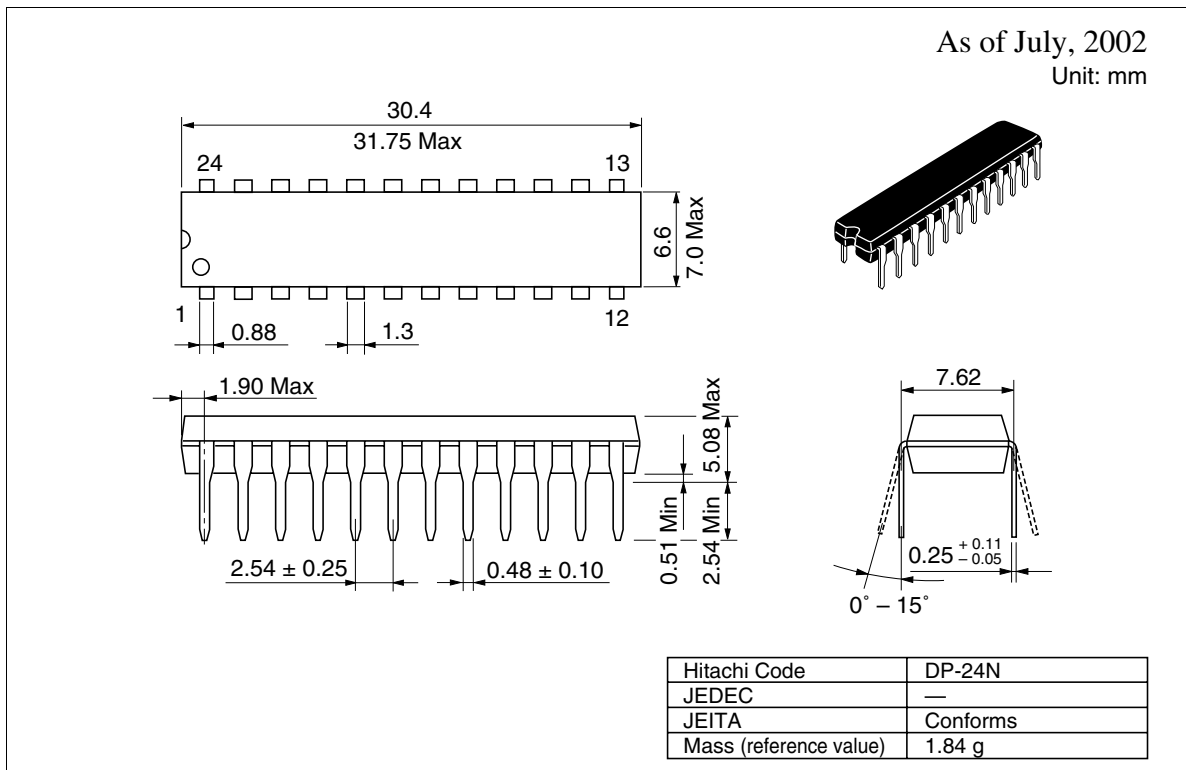
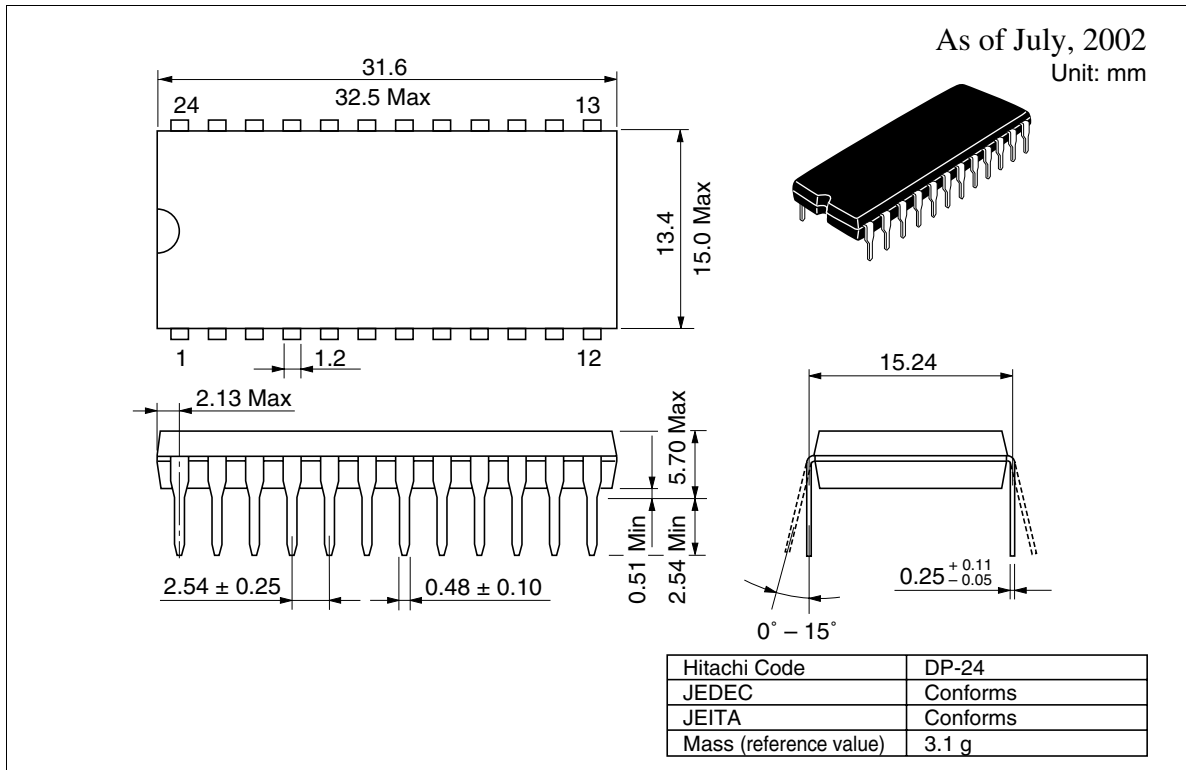
As of July, 2002

Unit: mm



Hitachi Code	DP-22NS
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.90 g

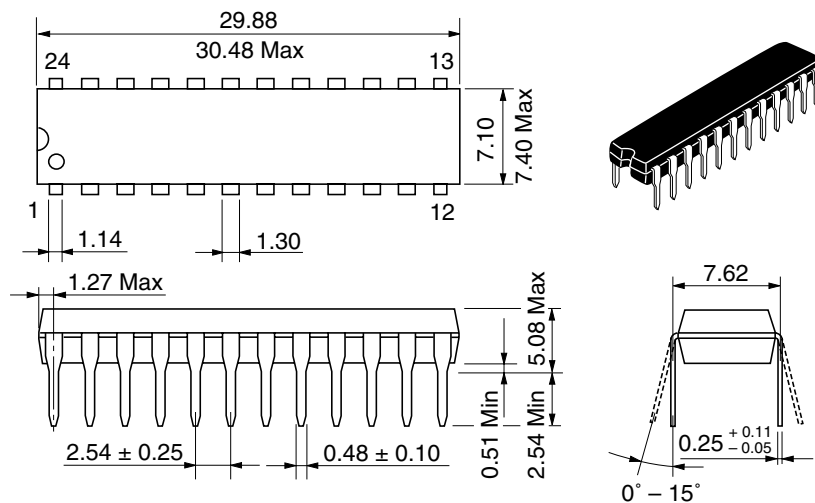
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002

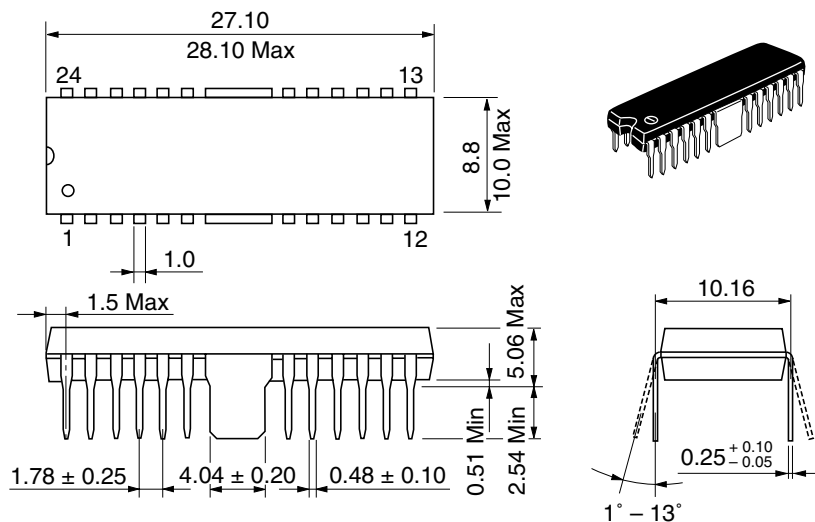
Unit: mm



Hitachi Code	DP-24NC
JEDEC	—
JEITA	Conforms
Mass (reference value)	1.84 g

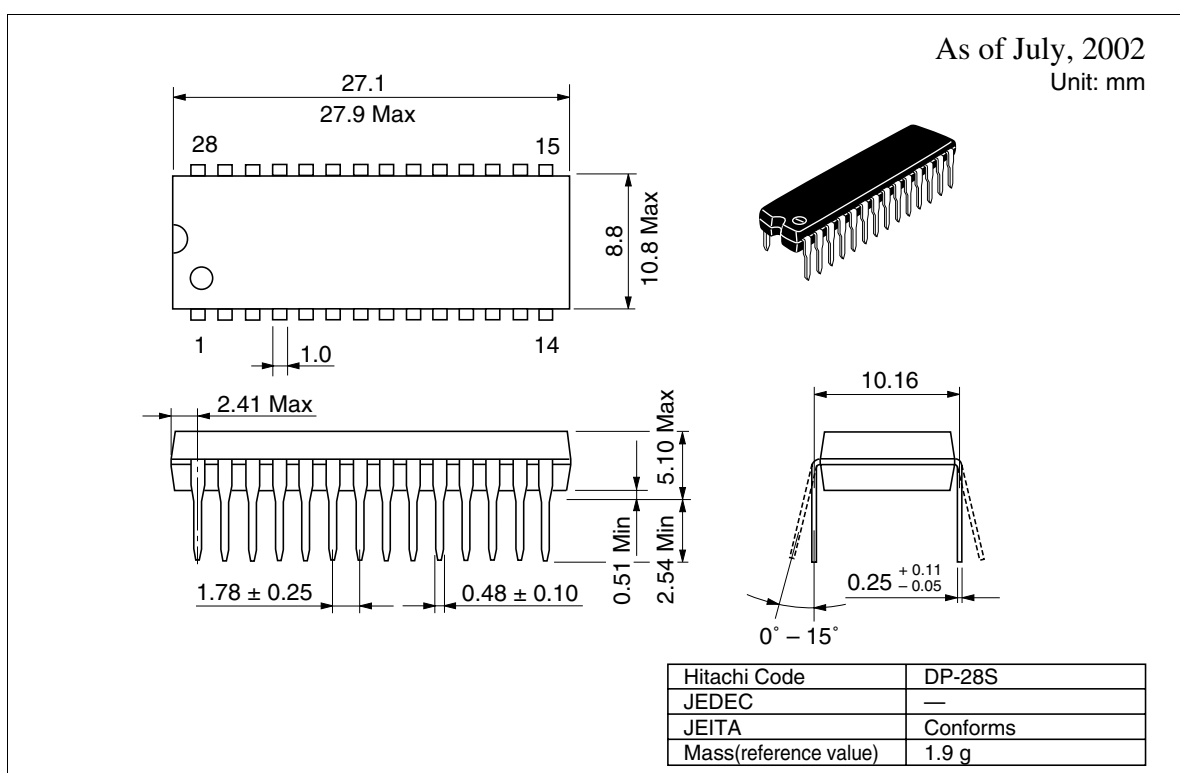
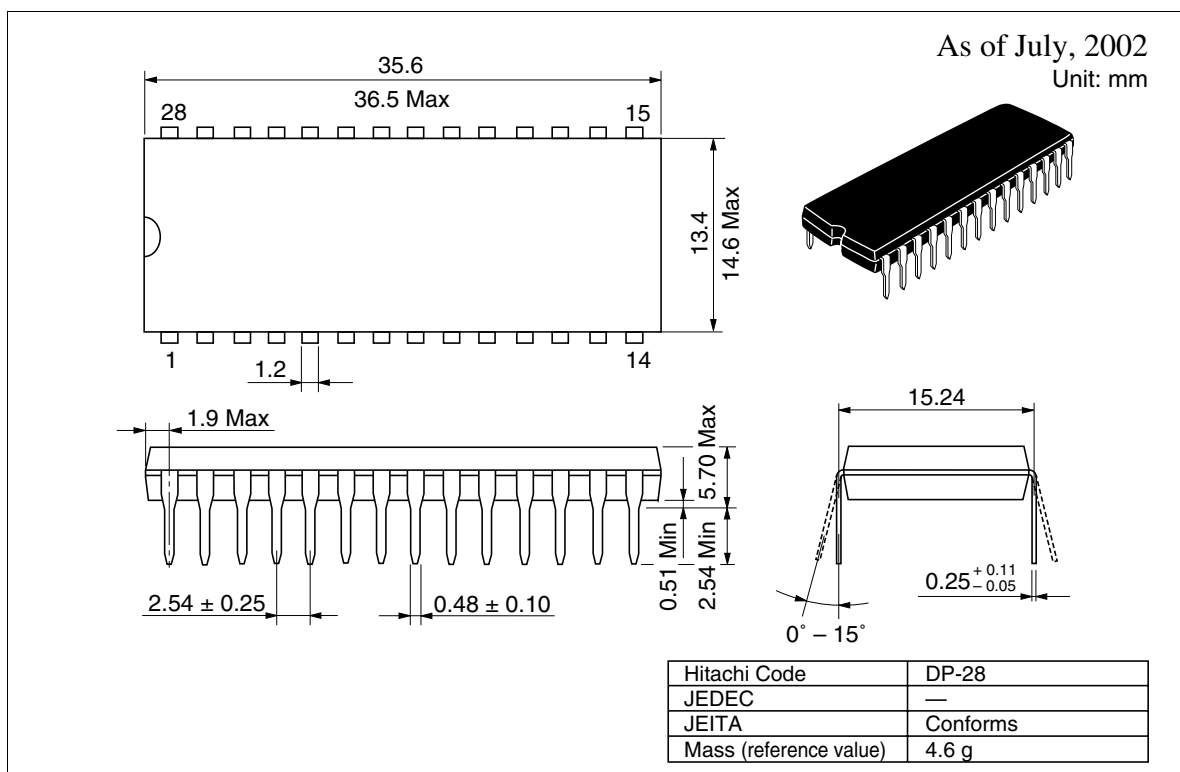
As of July, 2002

Unit: mm



Hitachi Code	DP-24TS
JEDEC	—
JEITA	—
Mass (reference value)	2.04 g

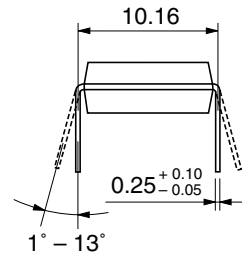
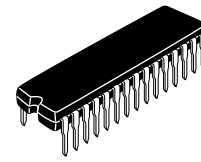
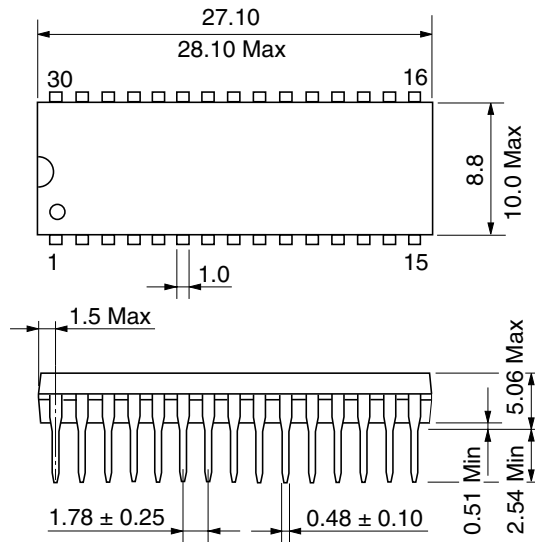
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002

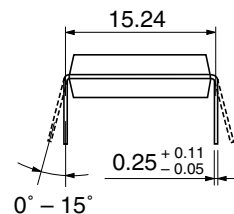
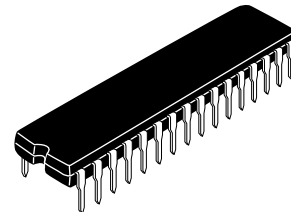
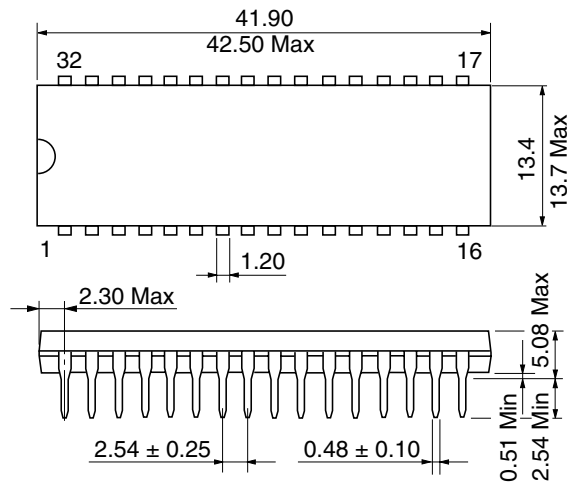
Unit: mm



Hitachi Code	DP-30S
JEDEC	—
JEITA	Conforms
Mass(reference value)	1.98 g

As of July, 2002

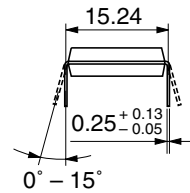
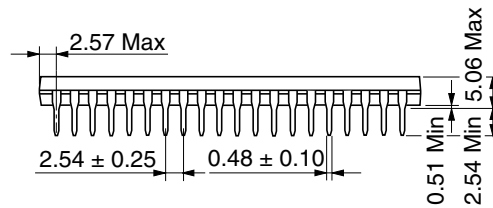
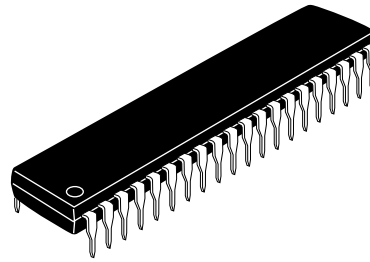
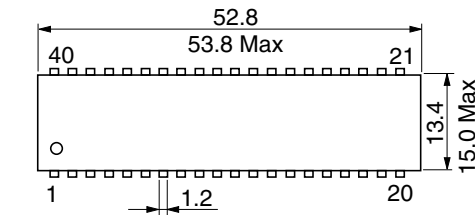
Unit: mm



Hitachi Code	DP-32
JEDEC	—
JEITA	Conforms
Mass (reference value)	5.1 g

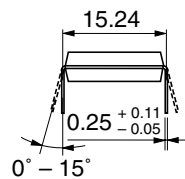
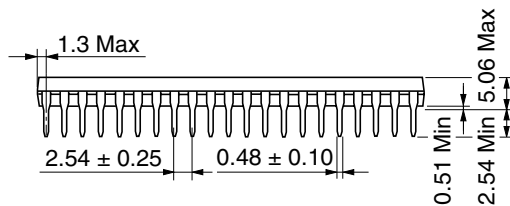
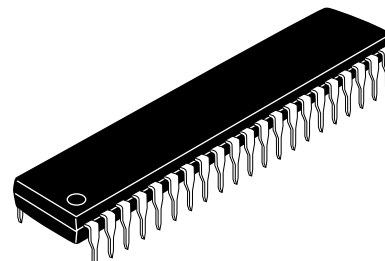
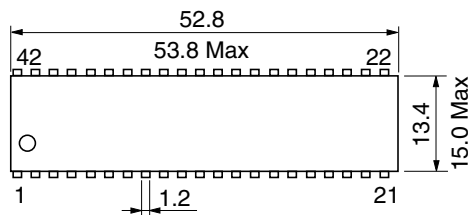
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Hitachi Code	DP-40
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	6.0 g

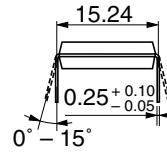
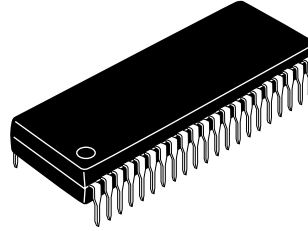
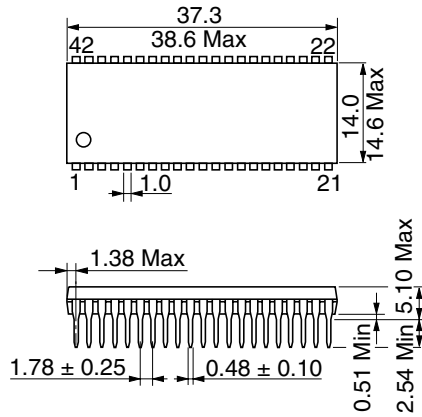
As of July, 2002
Unit: mm



Hitachi Code	DP-42
JEDEC	—
JEITA	Conforms
Mass (reference value)	6.0 g

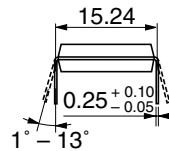
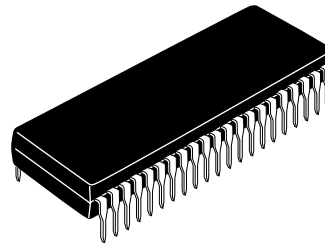
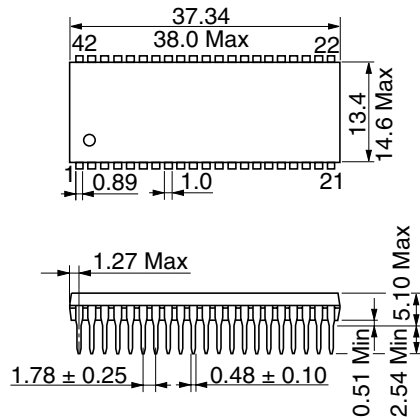
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Hitachi Code	DP-42S
JEDEC	—
JEITA	Conforms
Mass (reference value)	4.8 g

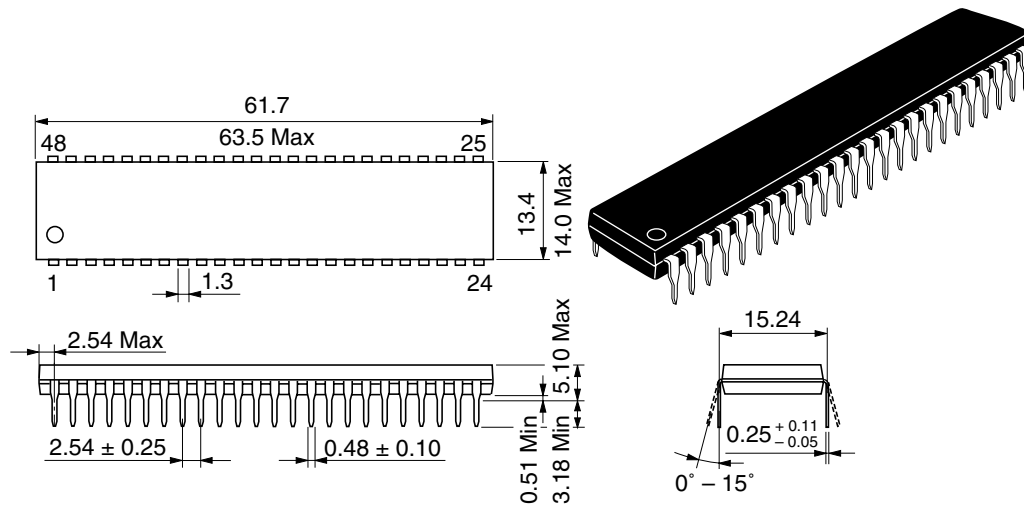
As of July, 2002
Unit: mm



Hitachi Code	DP-42SA
JEDEC	—
JEITA	Conforms
Mass (reference value)	4.42 g

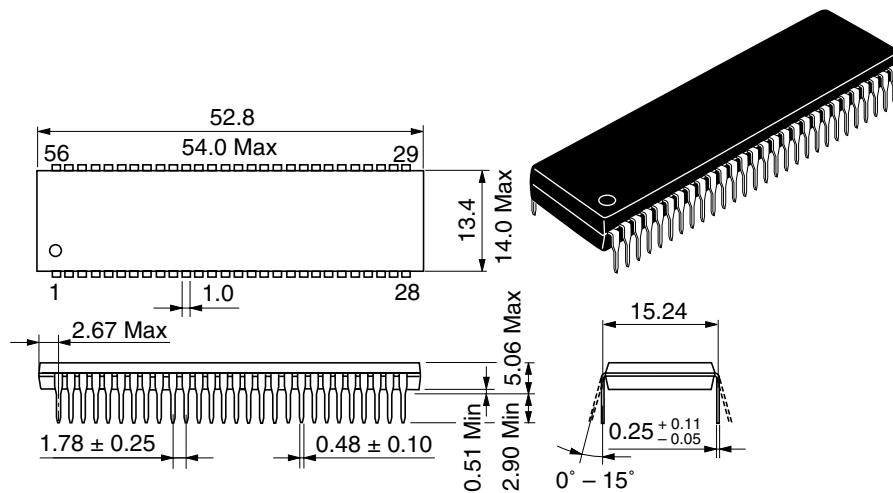
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Hitachi Code	DP-48
JEDEC	—
JEITA	Conforms
Mass (reference value)	7.5 g

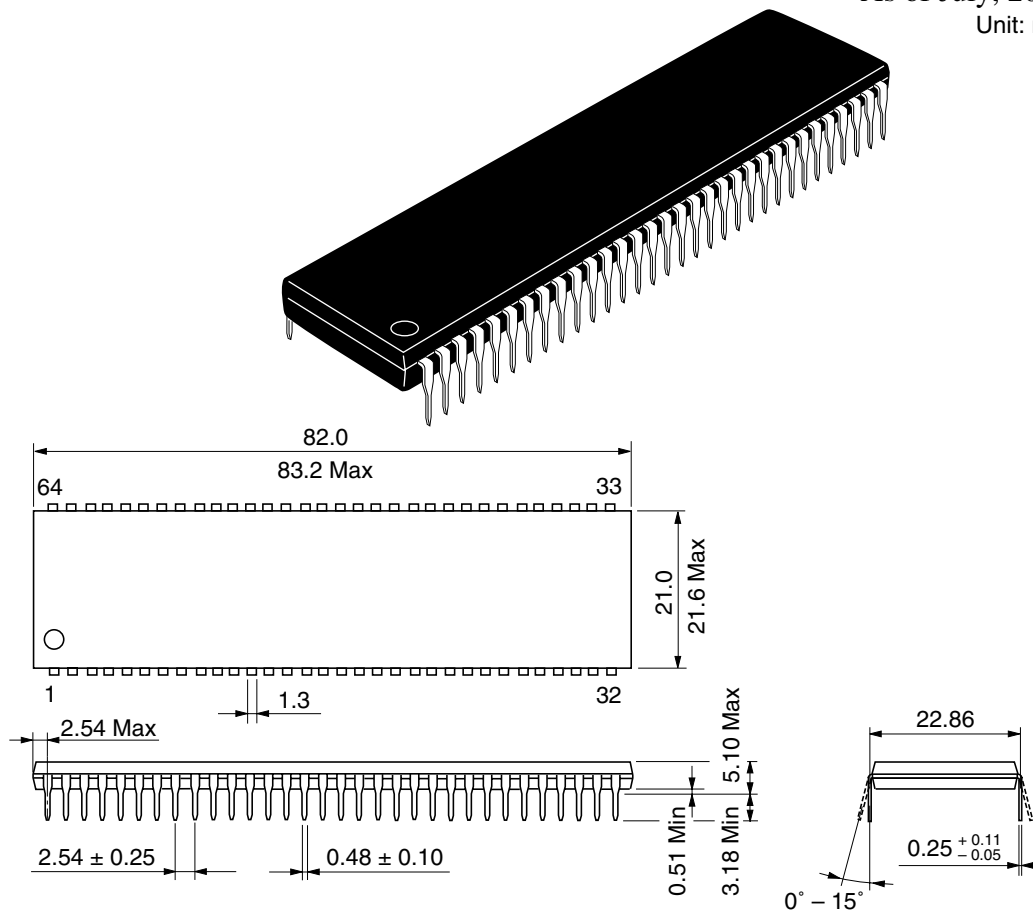
As of July, 2002
Unit: mm



Hitachi Code	DP-56SA
JEDEC	—
JEITA	Conforms
Mass (reference value)	5.88 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

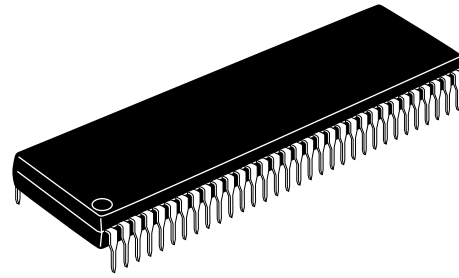
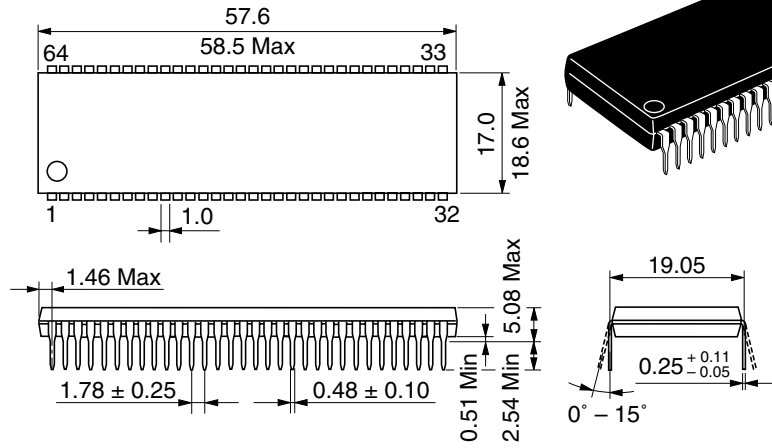
As of July, 2002
Unit: mm



Hitachi Code	DP-64
JEDEC	—
JEITA	Conforms
Mass (reference value)	15.1 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

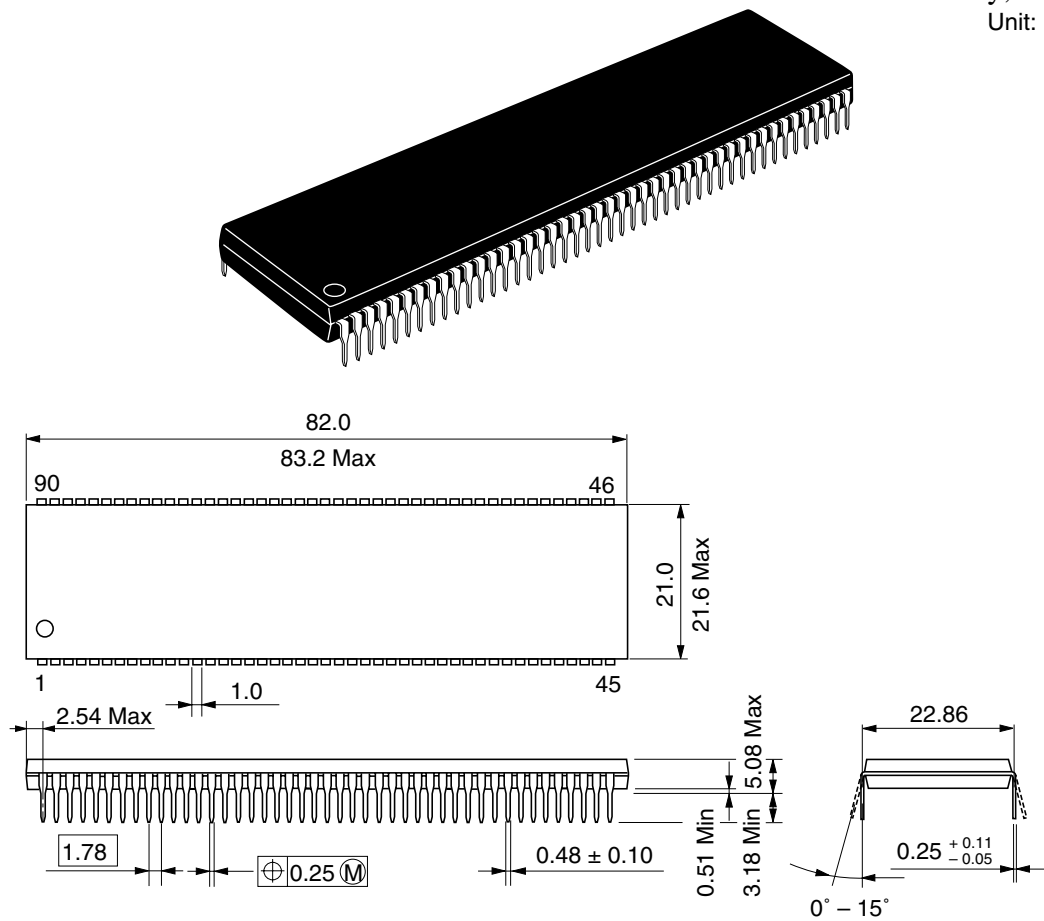
As of July, 2002
Unit: mm



Hitachi Code	DP-64S
JEDEC	—
JEITA	Conforms
Mass (reference value)	8.8 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

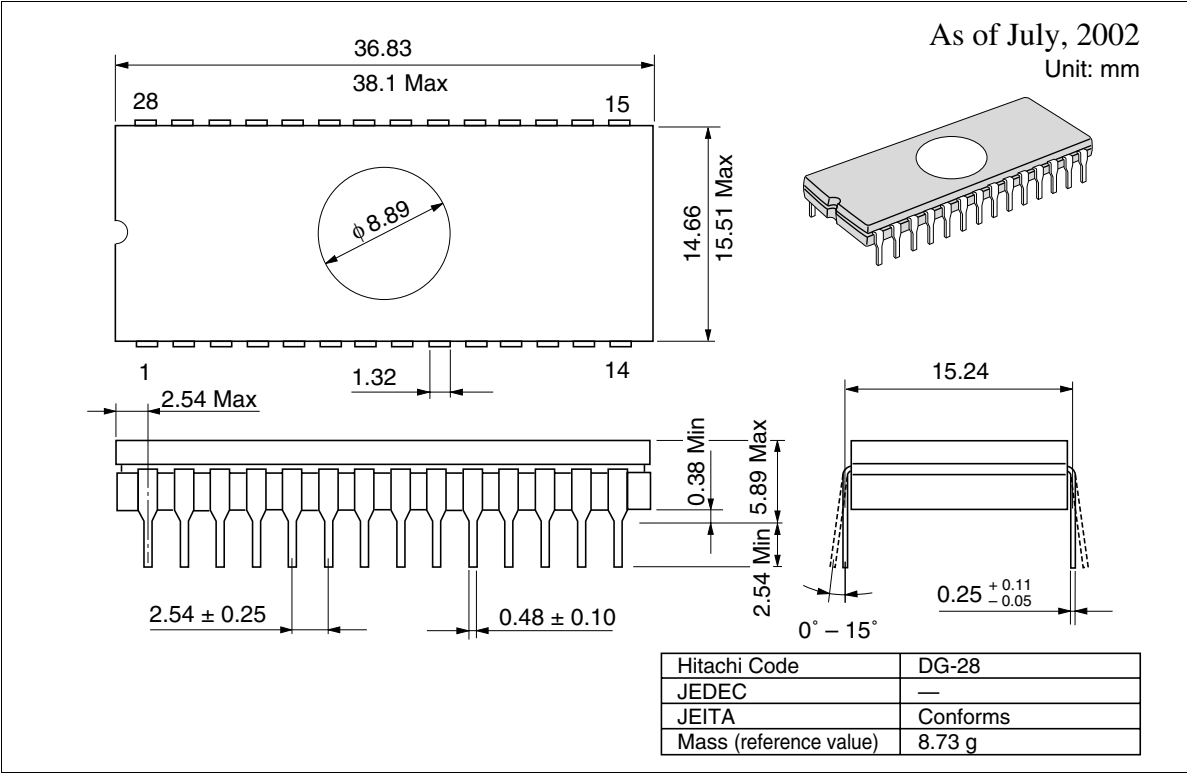
As of July, 2002
Unit: mm

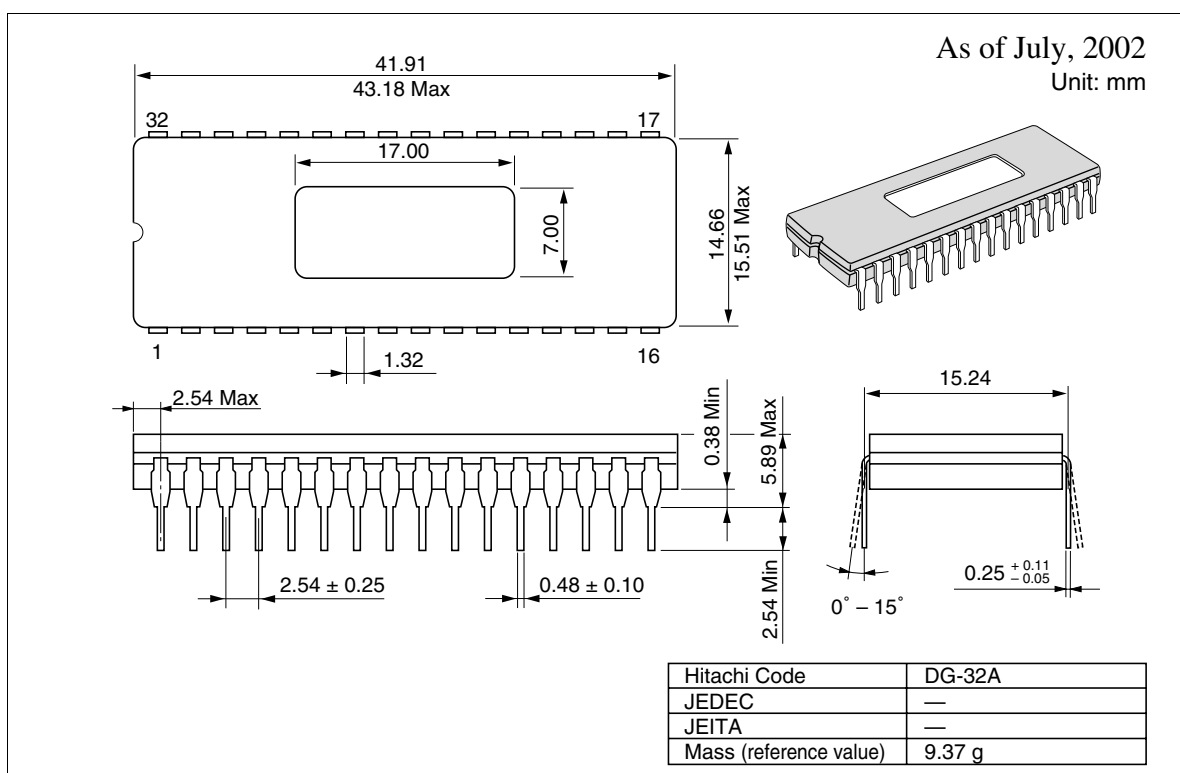
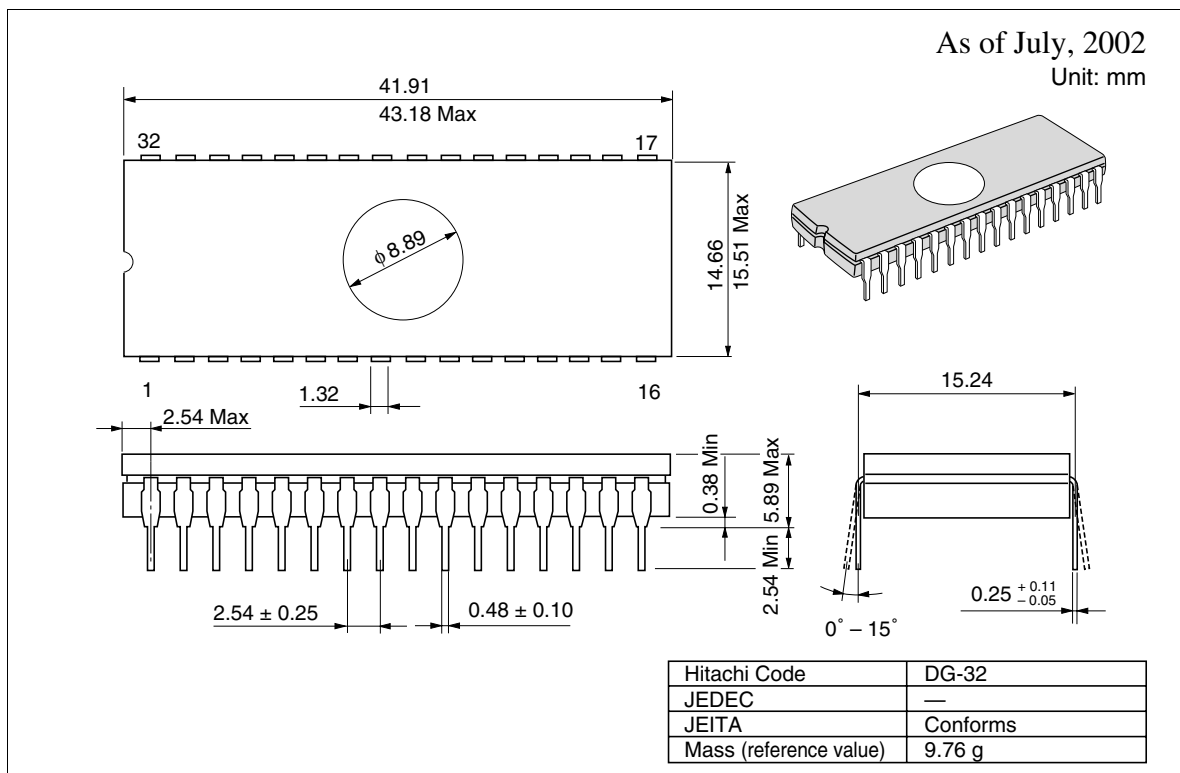


Hitachi Code	DP-90S
JEDEC	—
JEITA	Conforms
Mass (reference value)	15.2 g

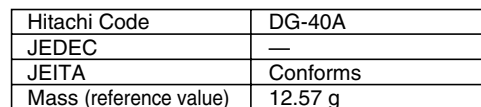
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

2. Cerdip

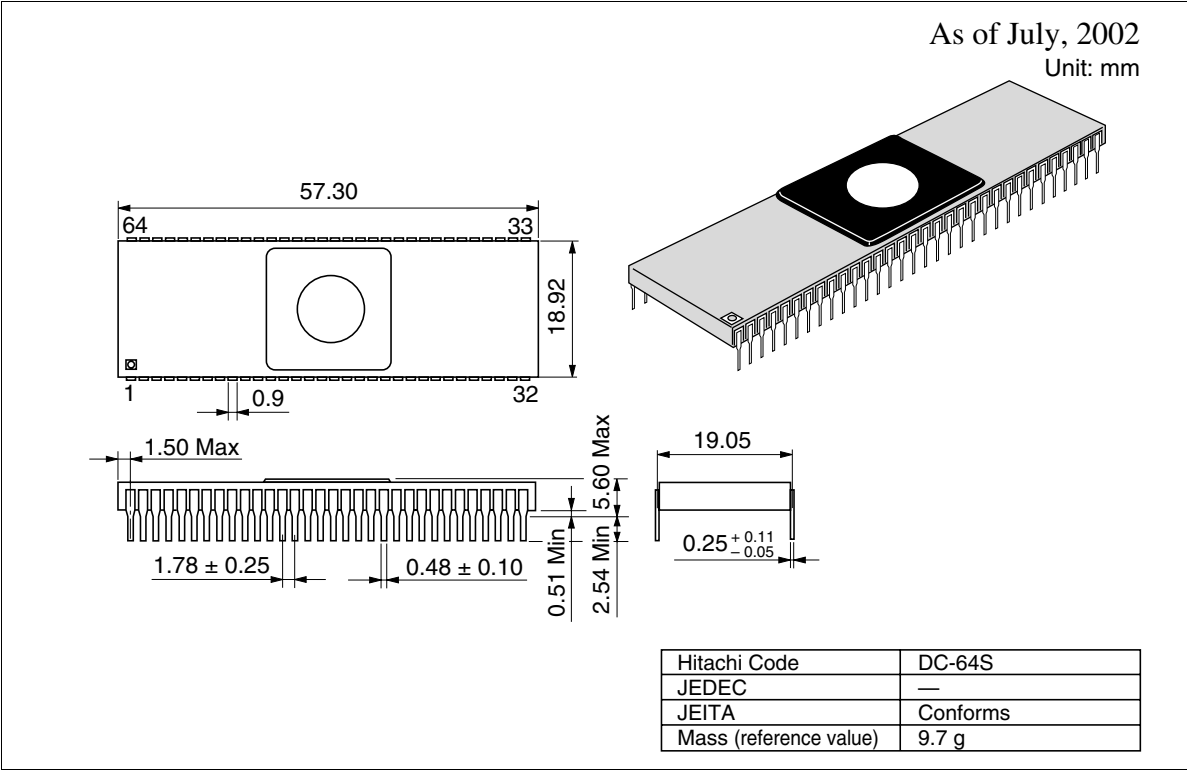




Unit: mm

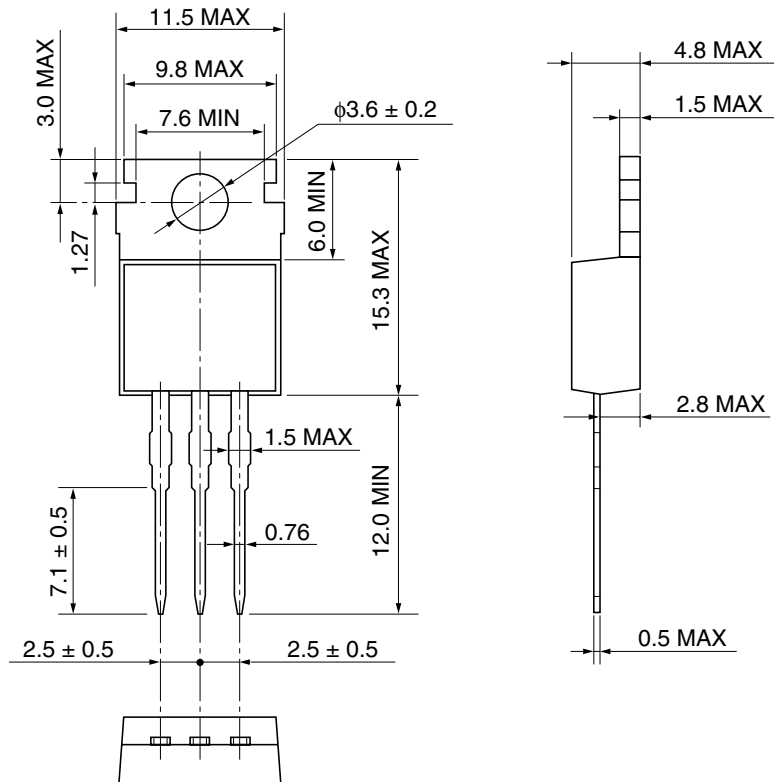


3. Ceramic DIP



4. Plastic SIP

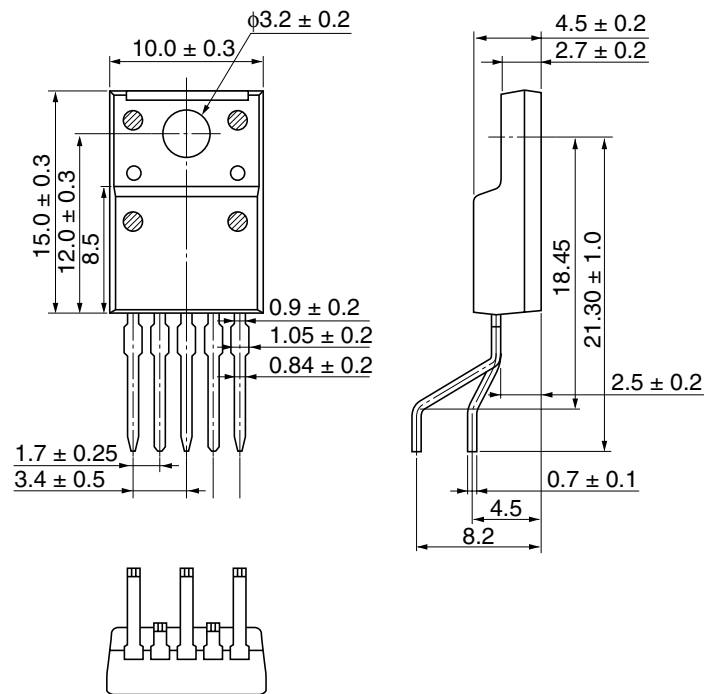
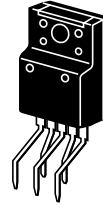
As of July, 2002
Unit: mm



Hitachi Code	SP-3T
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	1.8 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

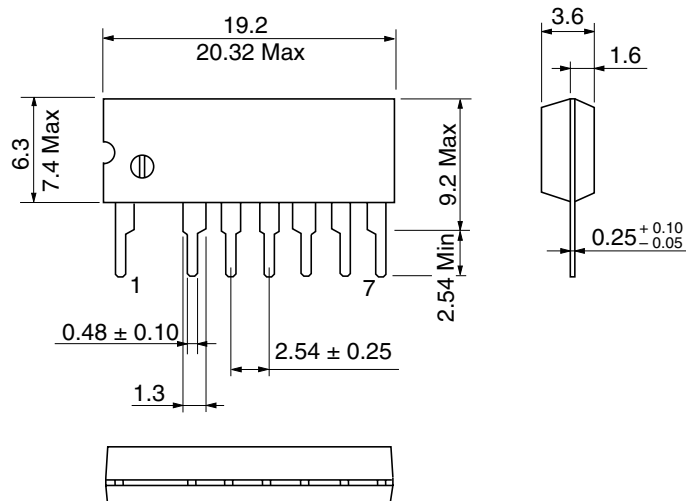
As of July, 2002
Unit: mm



Hitachi Code	SP-5TB
JEDEC	—
JEITA	—
Mass (reference value)	1.9 g

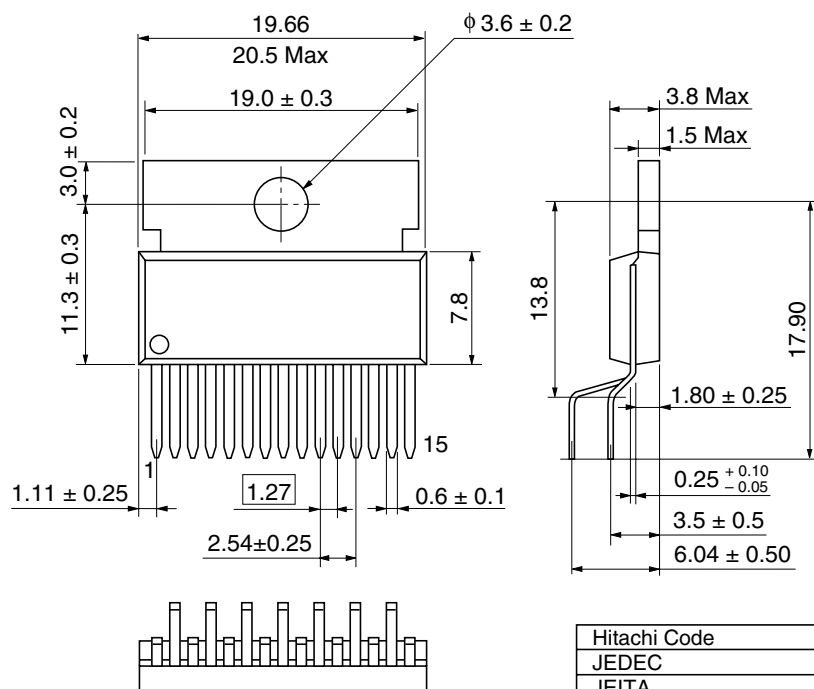
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



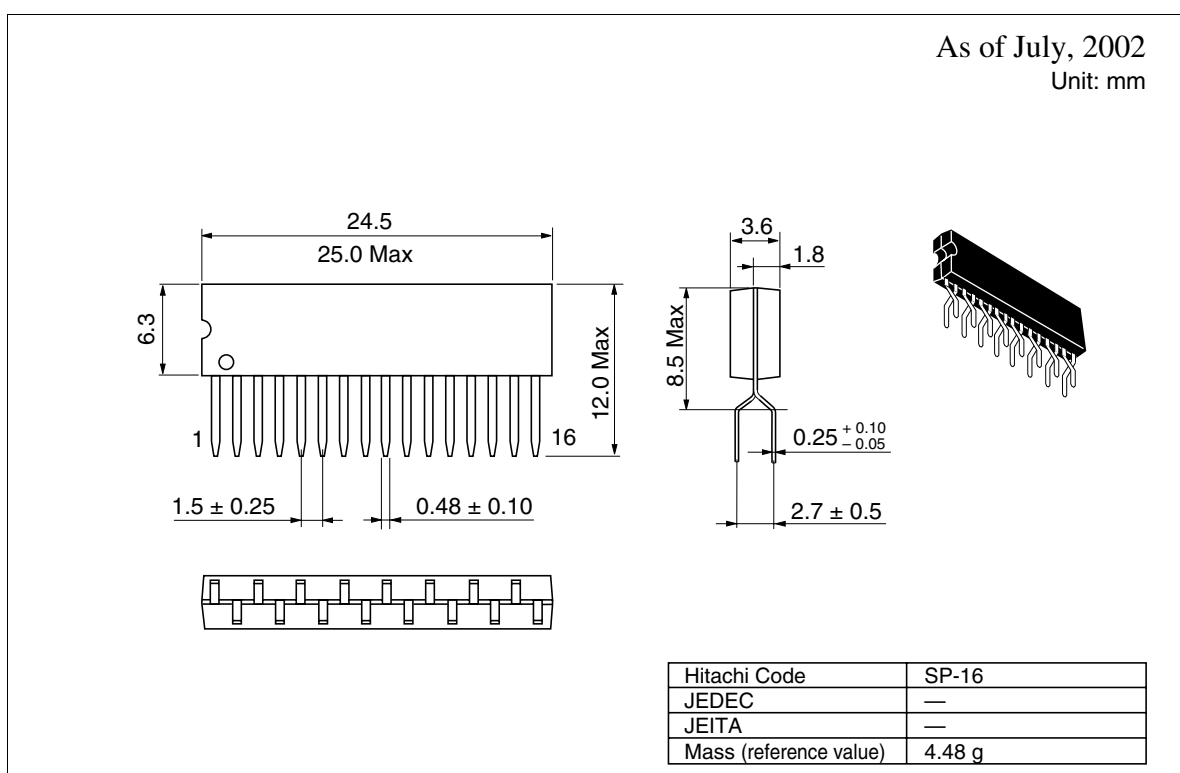
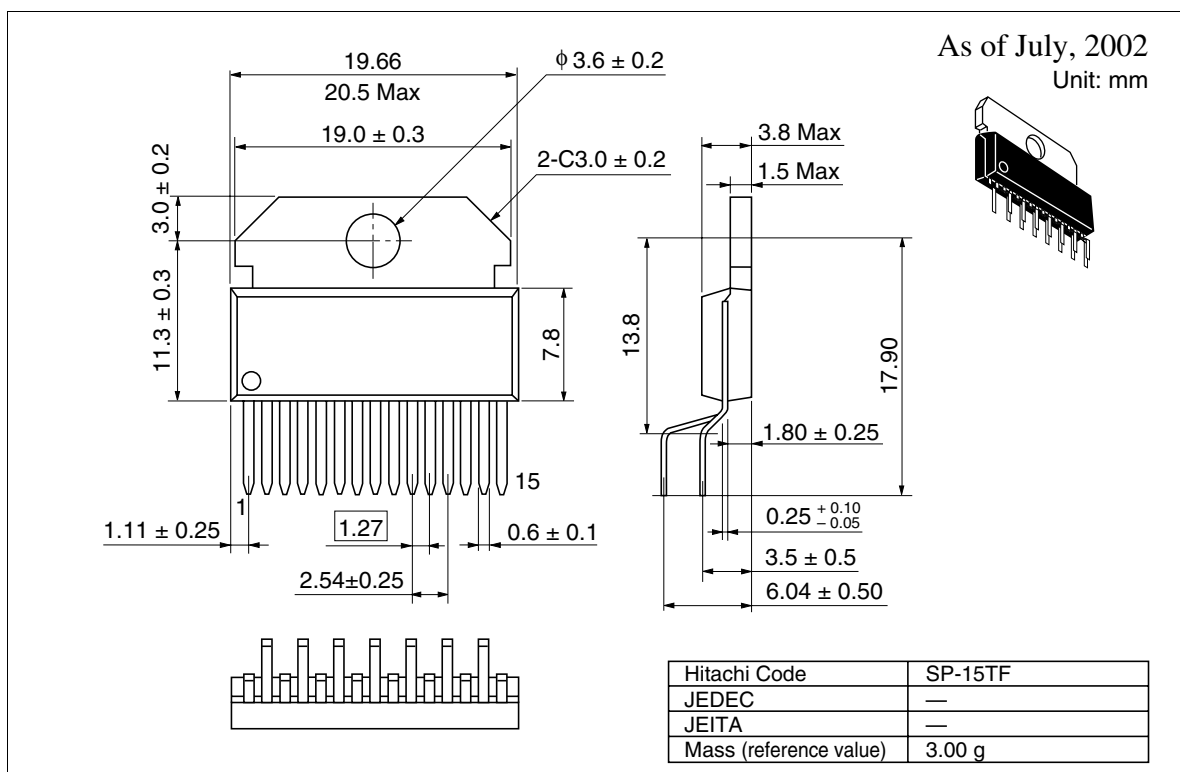
Hitachi Code	SP-7
JEDEC	—
JEITA	—
Mass (reference value)	0.83 g

As of July, 2002
Unit: mm

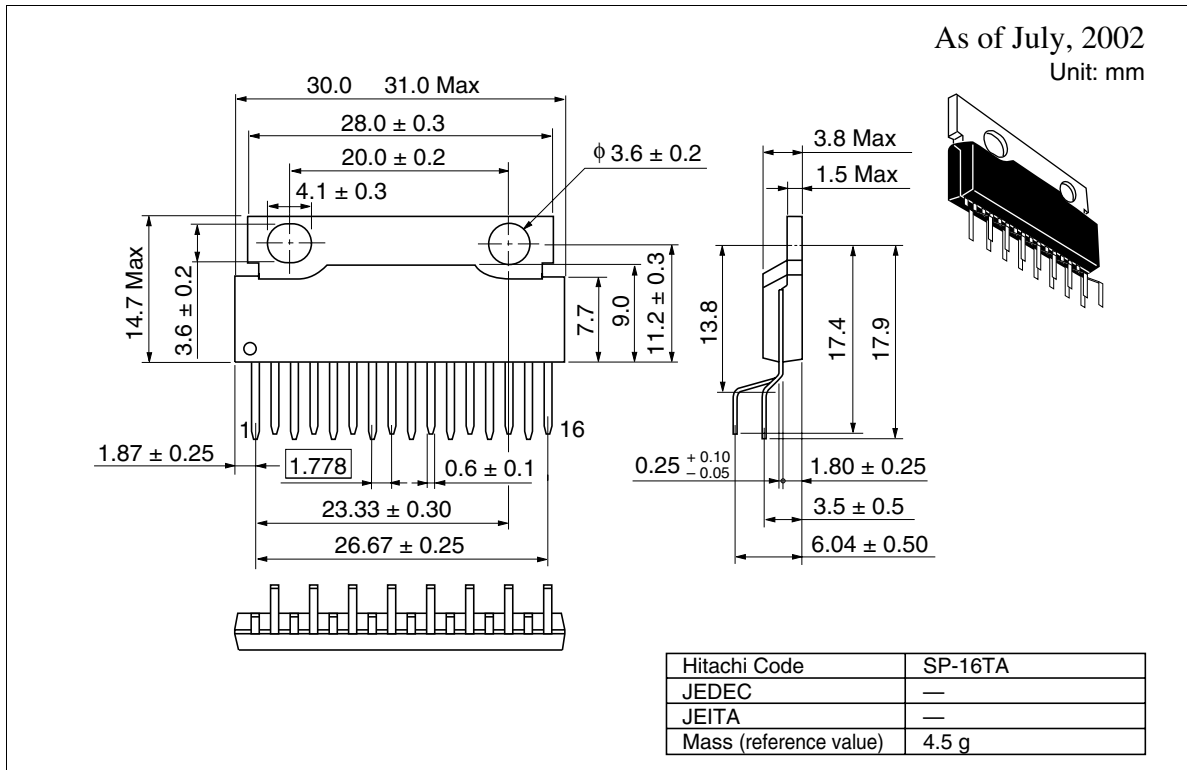


Hitachi Code	SP-15TA
JEDEC	—
JEITA	—
Mass (reference value)	3.10 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

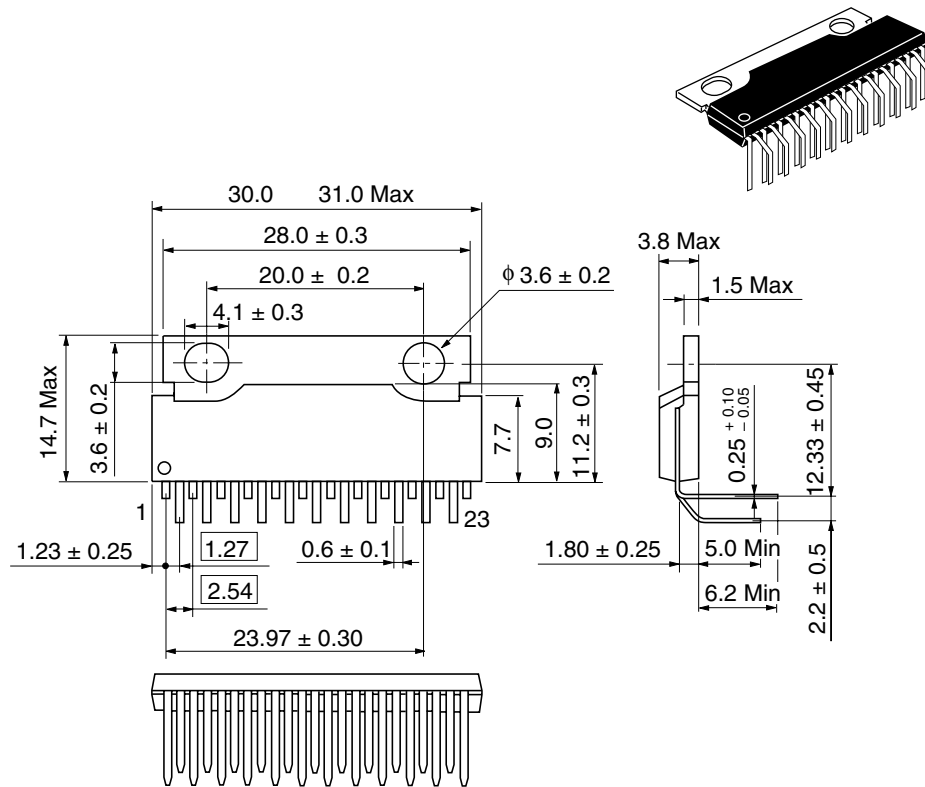


The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

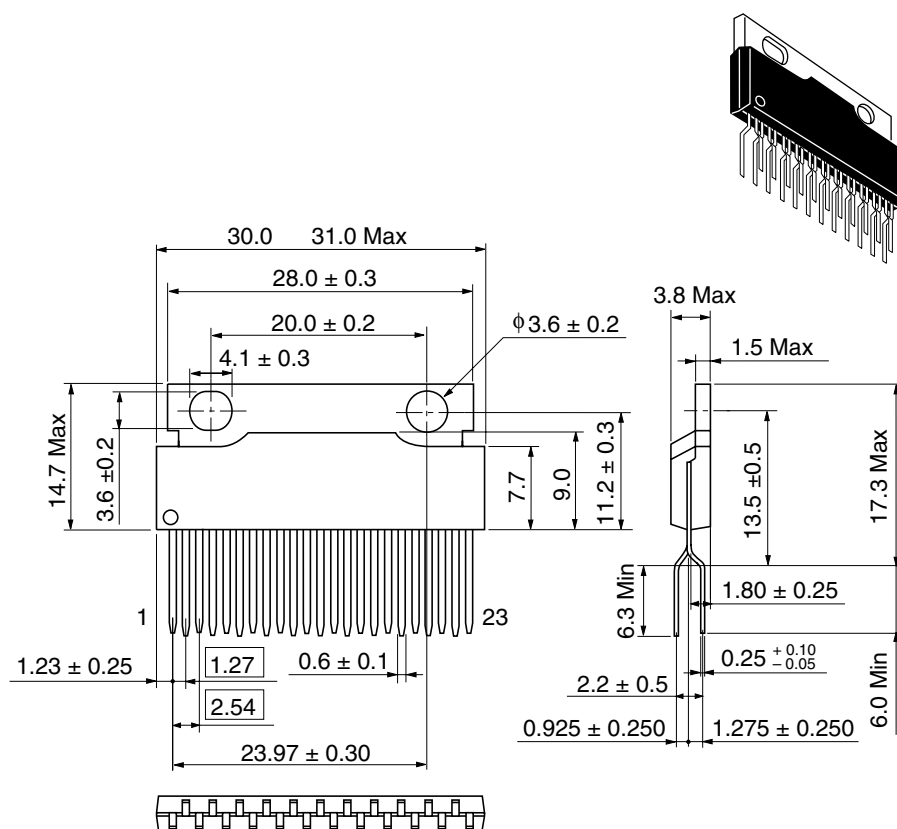
As of July, 2002
Unit: mm



Hitachi Code	SP-23TA
JEDEC	—
JEITA	—
Mass (reference value)	4.61 g

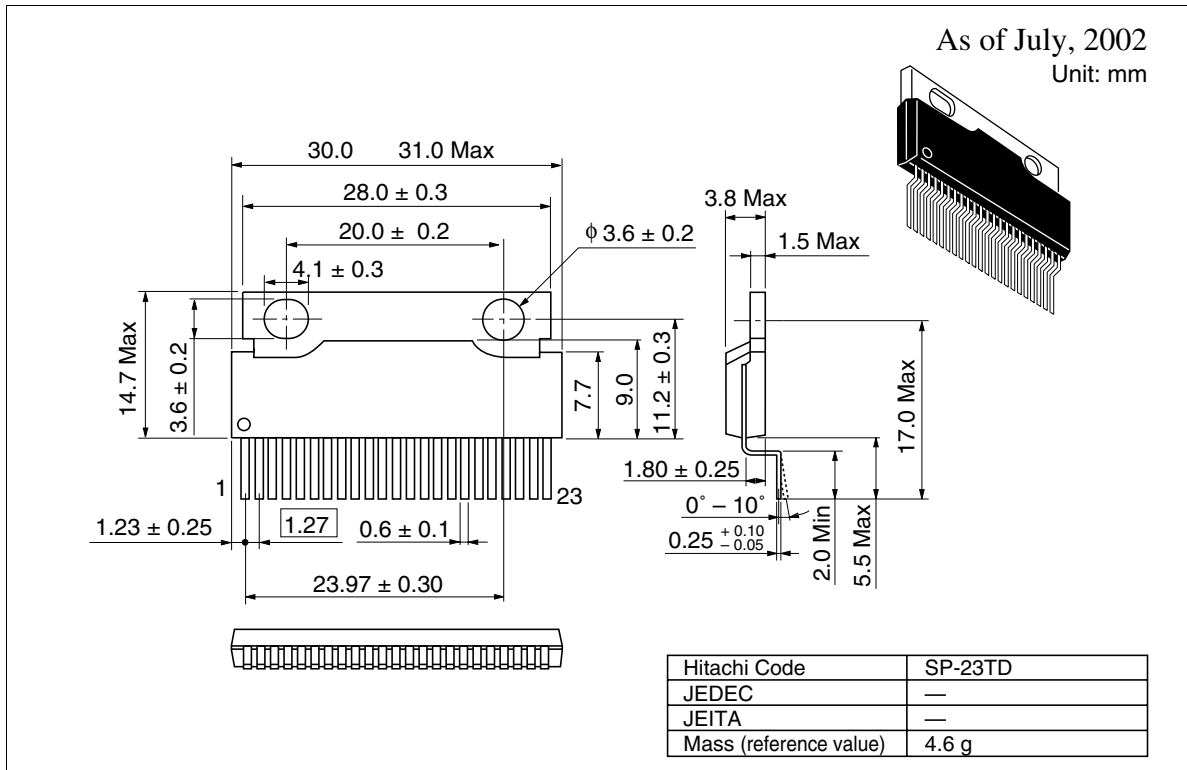
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



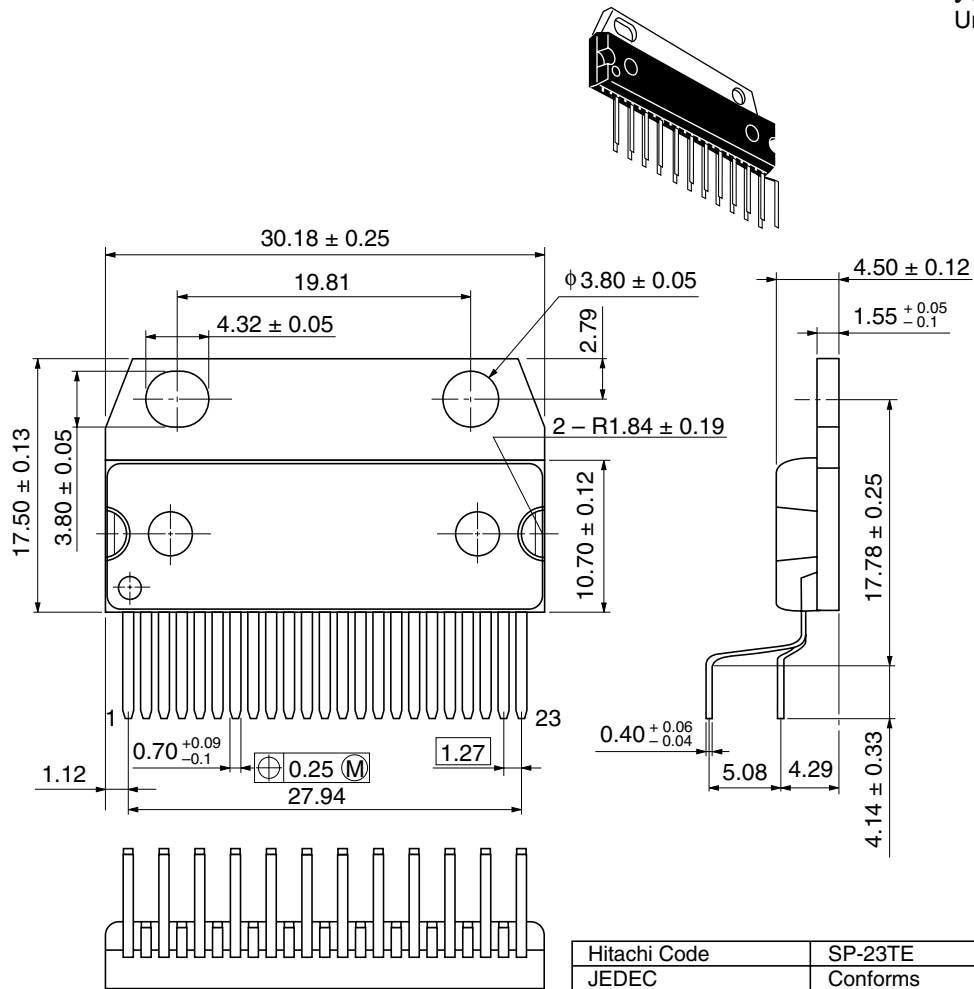
Hitachi Code	SP-23TB
JEDEC	—
JEITA	—
Mass (reference value)	4.6 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

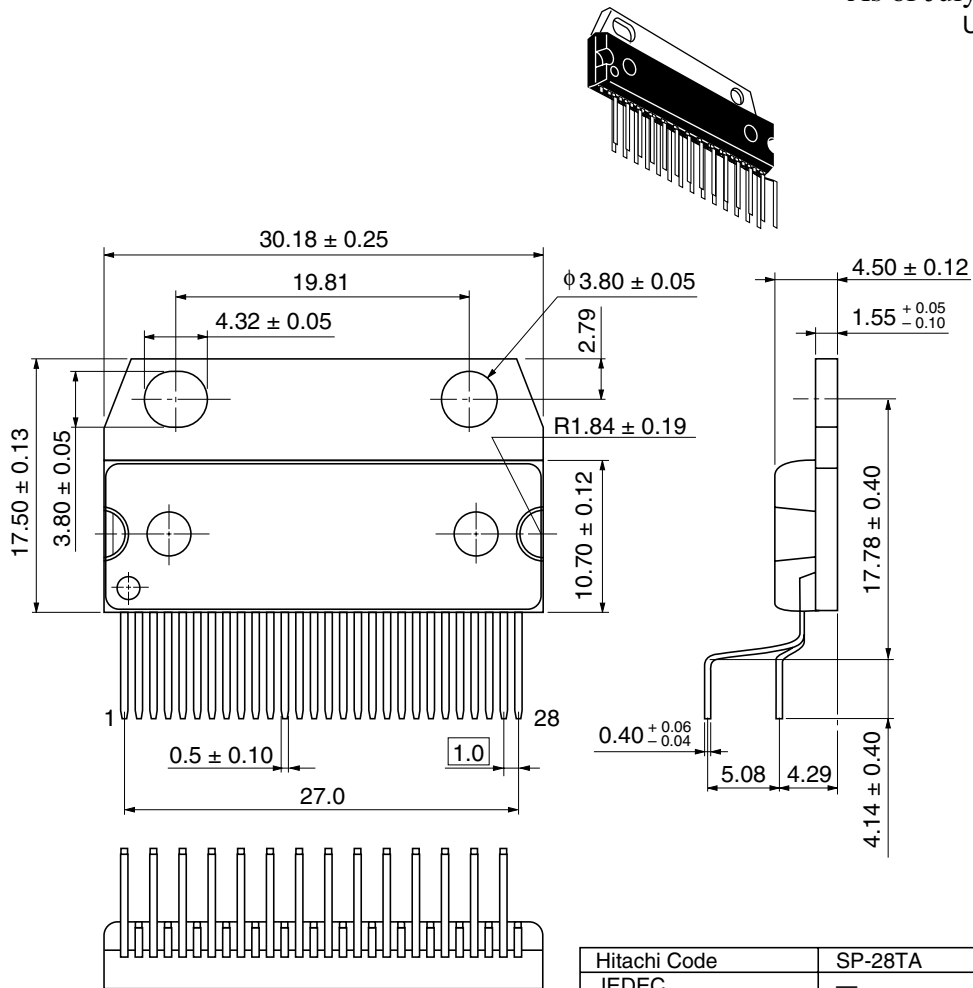
As of July, 2002
Unit: mm



Hitachi Code	SP-23TE
JEDEC	Conforms
JEITA	—
Mass (reference value)	8.5 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

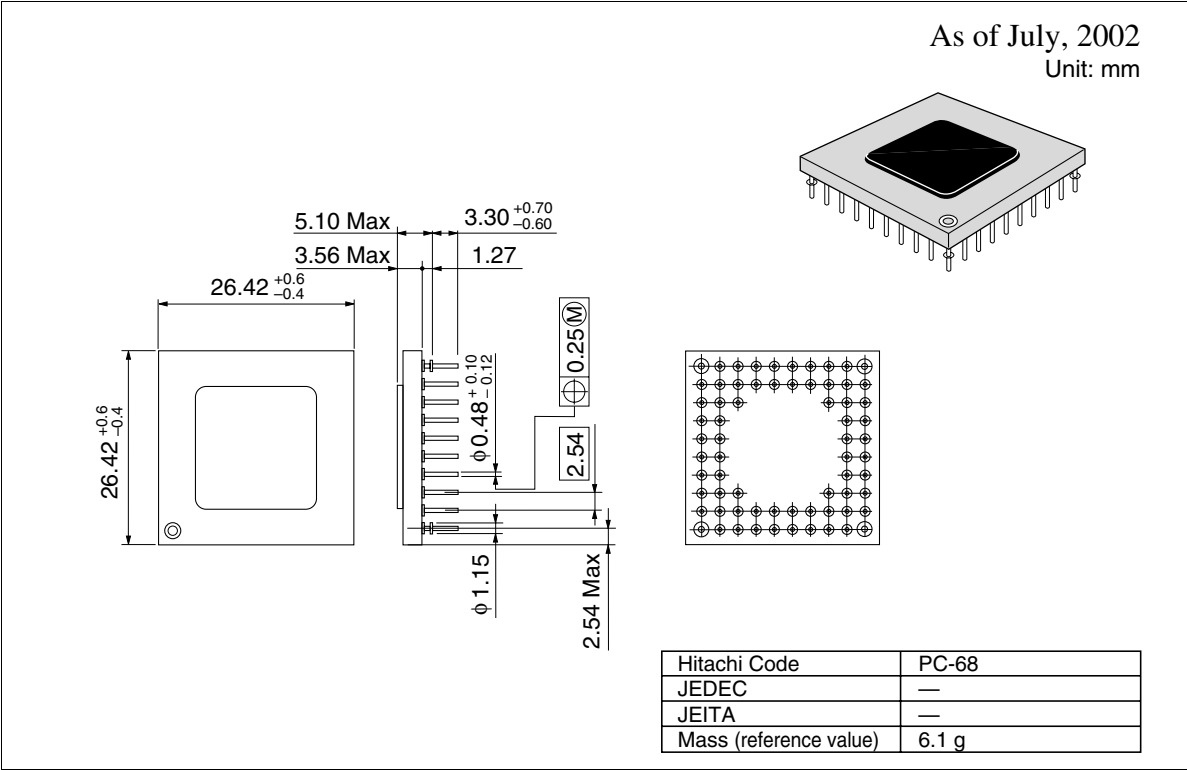
As of July, 2002
Unit: mm



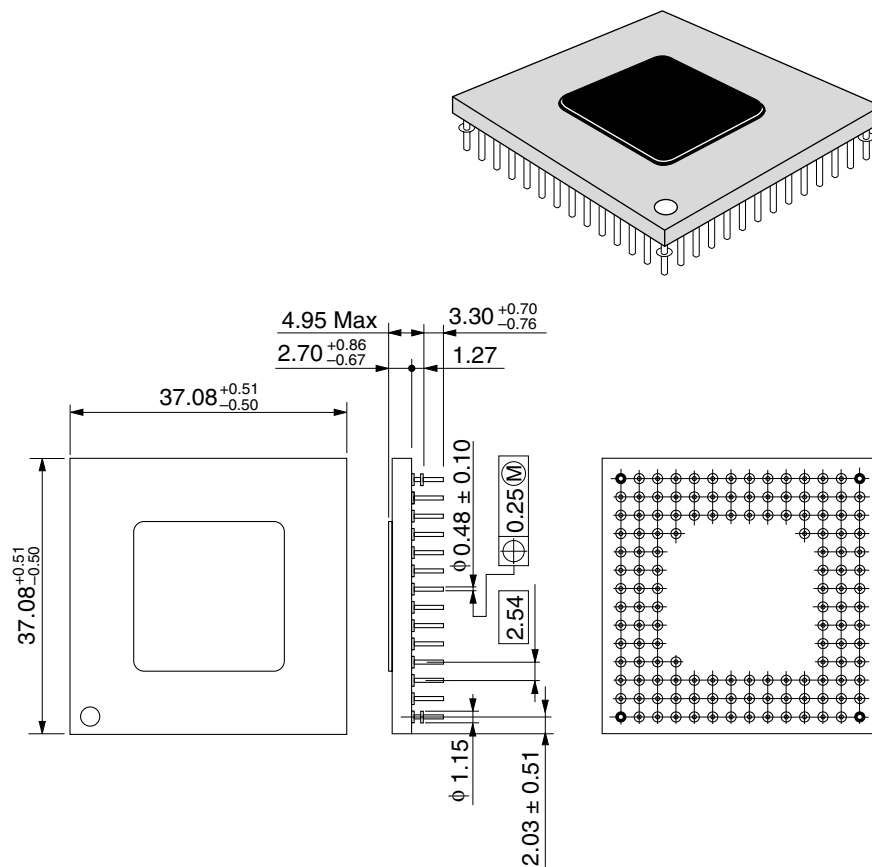
Hitachi Code	SP-28TA
JEDEC	—
JEITA	—
Mass (reference value)	8.5 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

5. Ceramic PGA



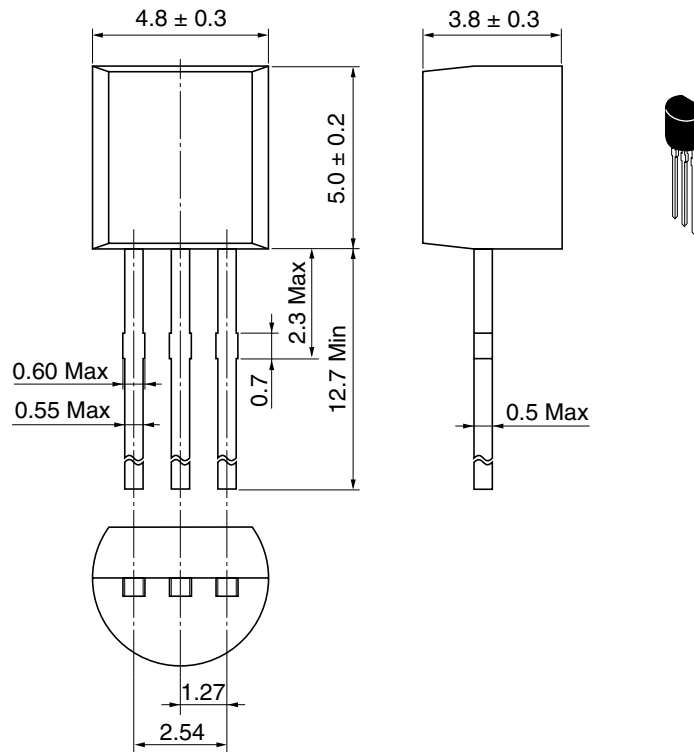
As of July, 2002
Unit: mm



Hitachi Code	PC-135
JEDEC	—
JEITA	—
Mass (reference value)	12.7 g

6. Others

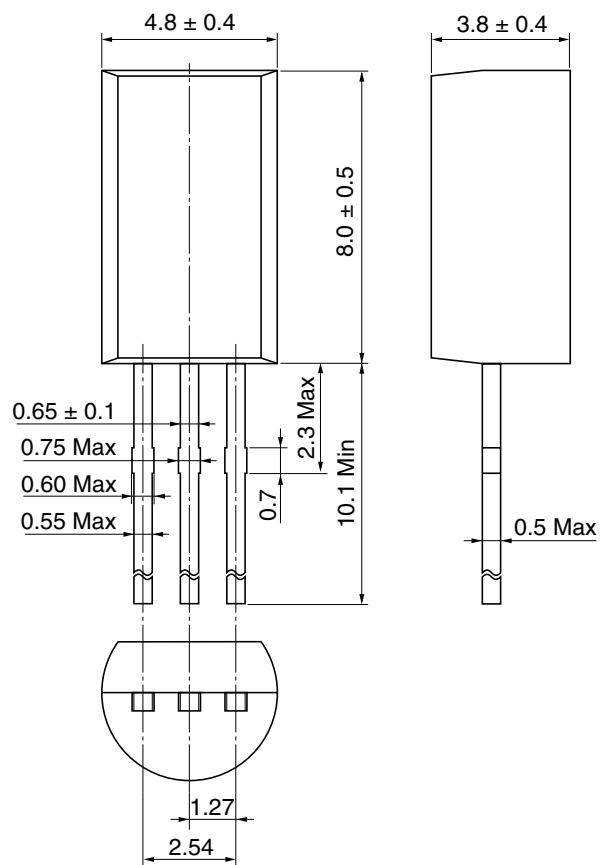
As of July, 2002
Unit: mm



Hitachi Code	TO-92 (1)
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	0.25 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm

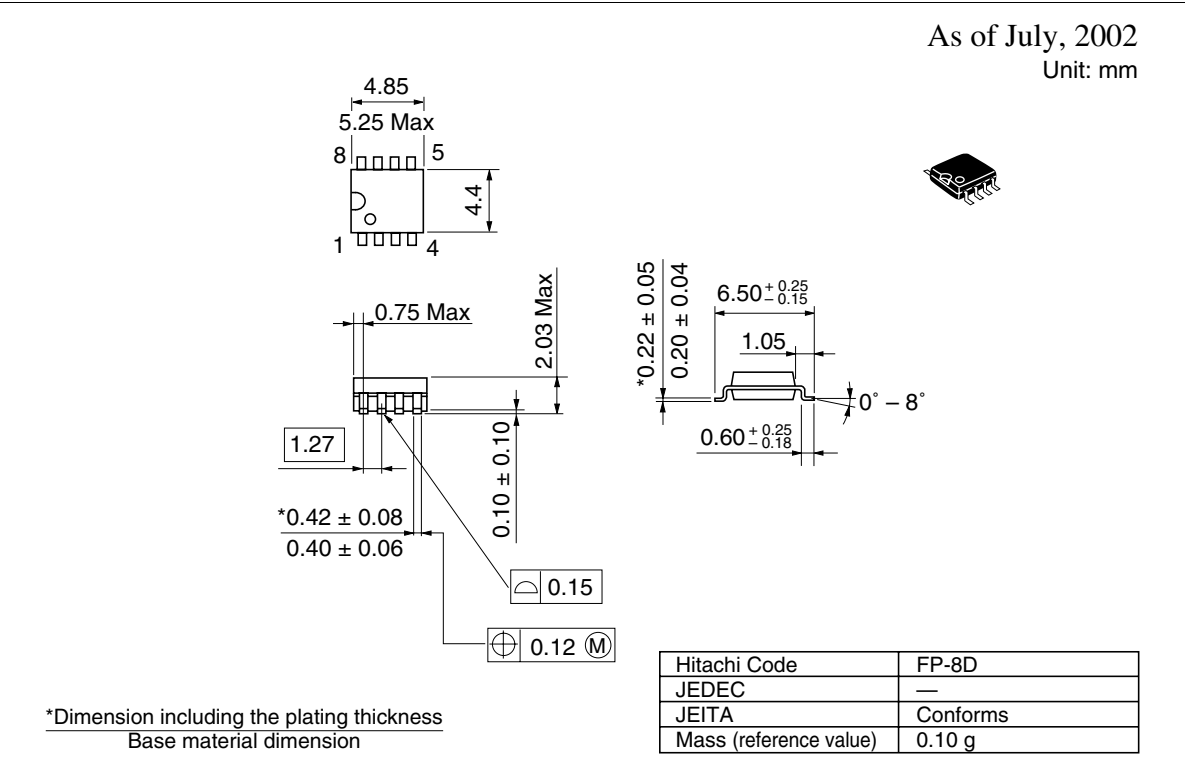


Hitachi Code	TO-92 Mod
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.35 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

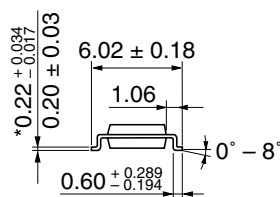
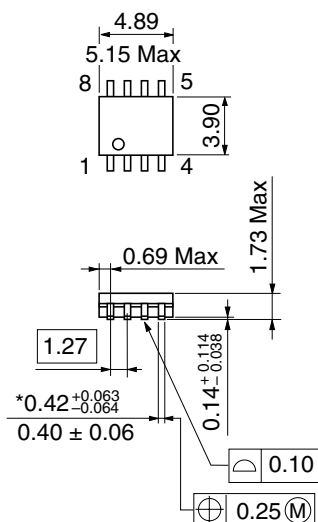
2.1.2 Surface Mount Packages

1. Plastic SOP



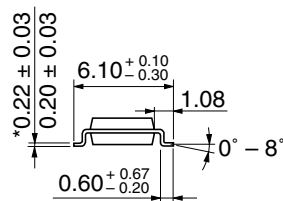
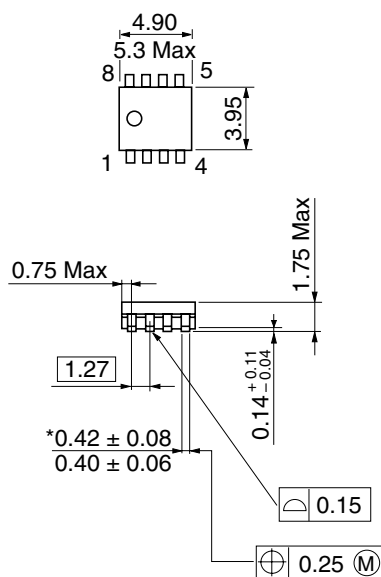
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Hitachi Code	FP-8DB
JEDEC	—
JEITA	—
Mass (reference value)	0.08 g

As of July, 2002
Unit: mm

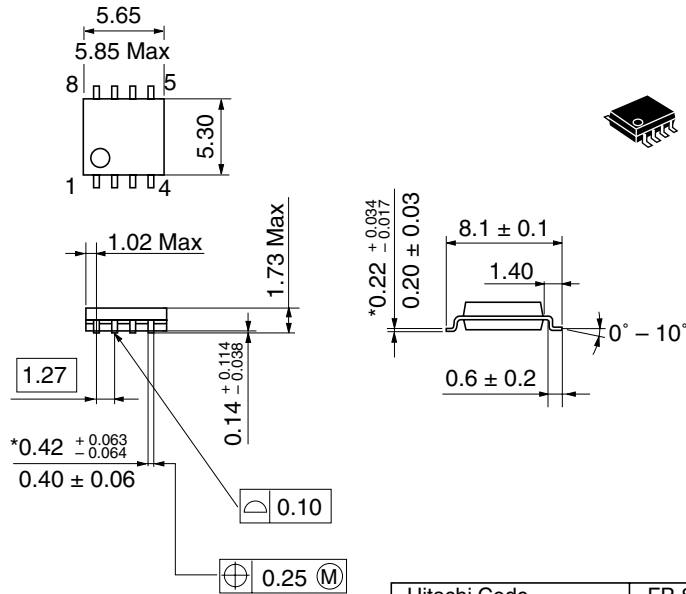


Hitachi Code	FP-8DC
JEDEC	Conforms
JEITA	—
Mass (reference value)	0.085 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002

Unit: mm

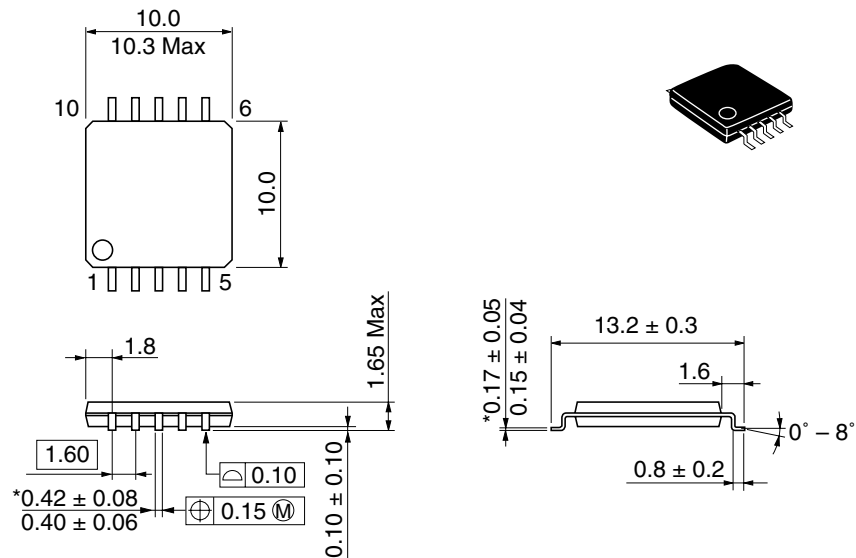


*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-8DF
JEDEC	—
JEITA	—
Mass (reference value)	0.153 g

As of July, 2002

Unit: mm



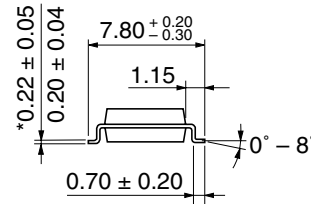
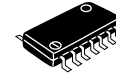
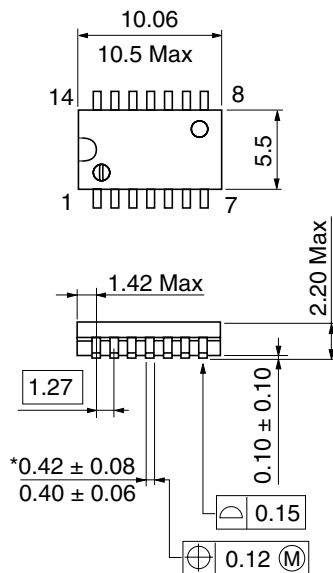
*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-10D
JEDEC	—
JEITA	—
Mass (reference value)	0.4 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002

Unit: mm

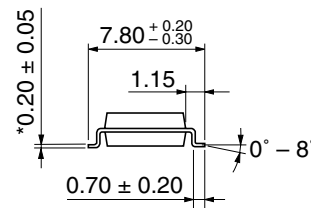
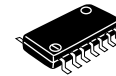
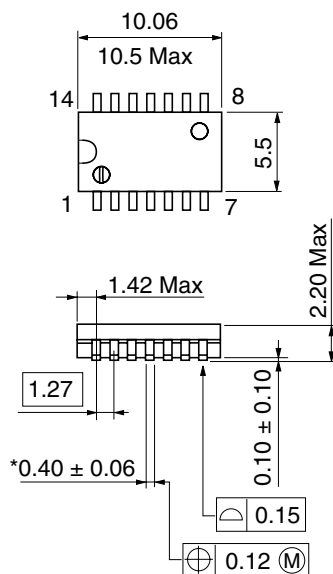


*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-14DA
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.23 g

As of July, 2002

Unit: mm w

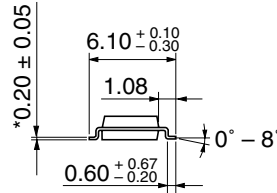
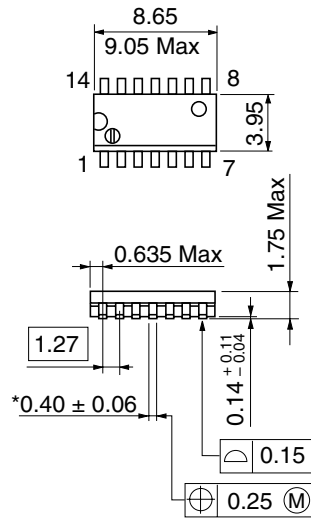


*Ni/Pd/Au plating

Hitachi Code	FP-14DAV
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.23 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

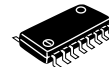
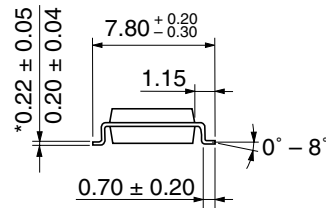
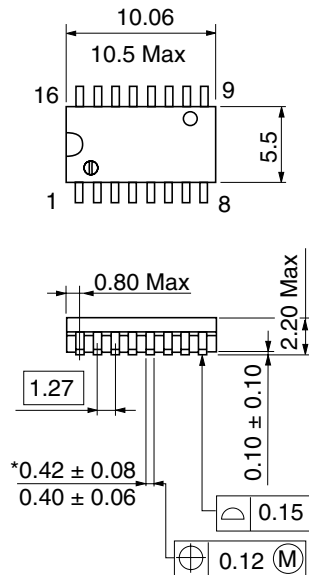
As of July, 2002
Unit: mm



*Ni/Pd/Au plating

Hitachi Code	FP-14DNV
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	0.13 g

As of July, 2002
Unit: mm

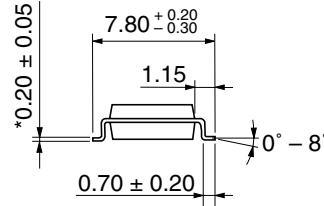
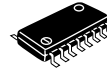
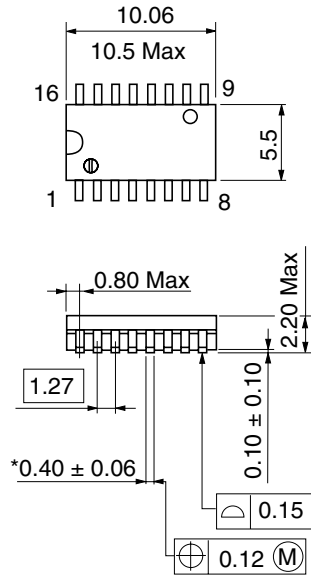


*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-16DA
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.24 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

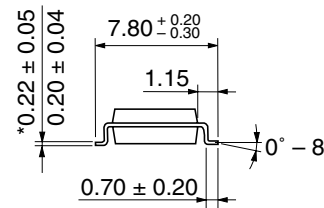
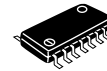
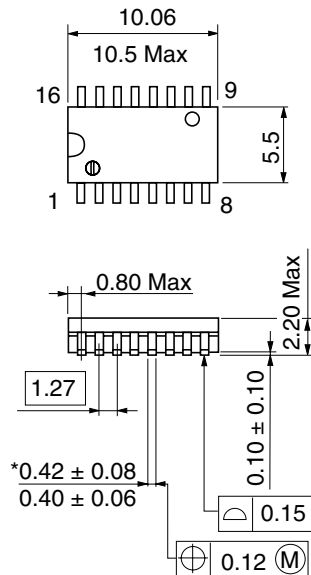
As of July, 2002
Unit: mm



*Ni/Pd/Au plating

Hitachi Code	FP-16DAV
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.24 g

As of July, 2002
Unit: mm

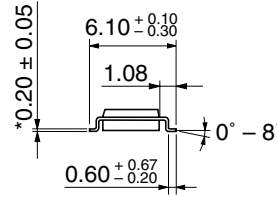
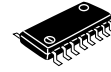
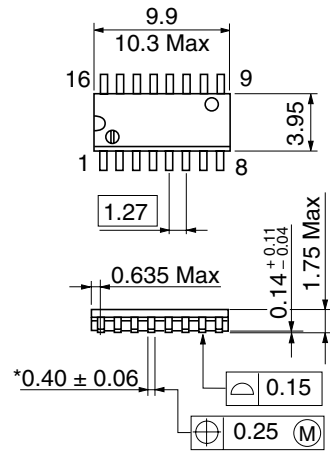


*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-16DC
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.24 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

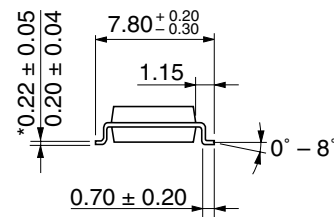
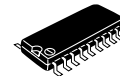
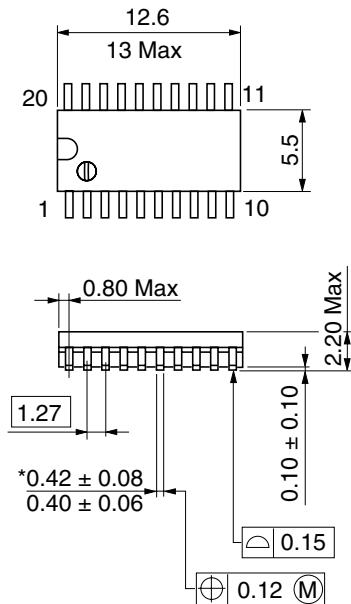
As of July, 2002
Unit: mm



*Ni/Pd/Au plating

Hitachi Code	FP-16DNV
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	0.15 g

As of July, 2002
Unit: mm



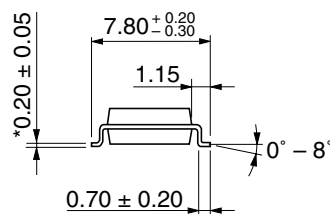
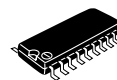
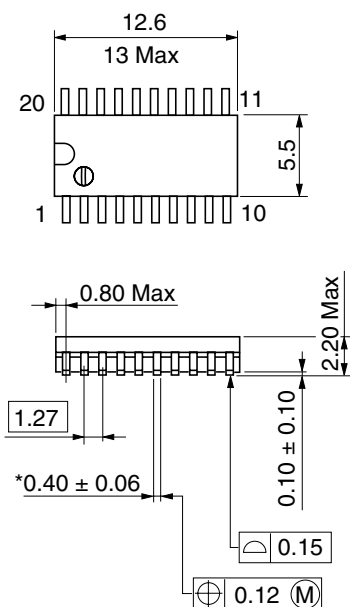
*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-20DA
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.31 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002

Unit: mm

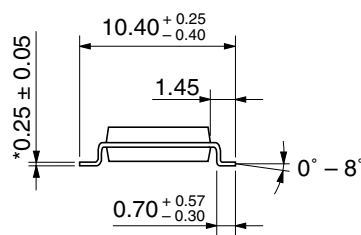
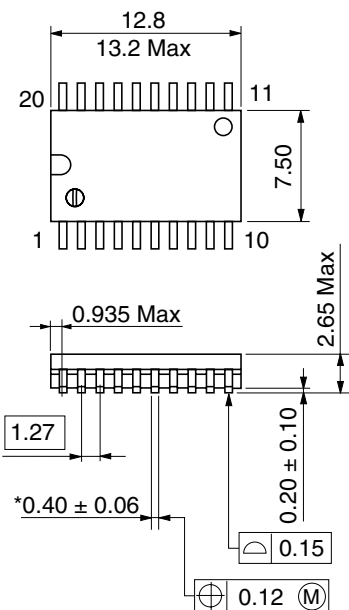


Hitachi Code	FP-20DAV
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.31 g

*Ni/Pd/Au plating

As of July, 2002

Unit: mm

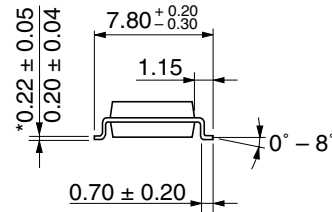
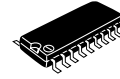
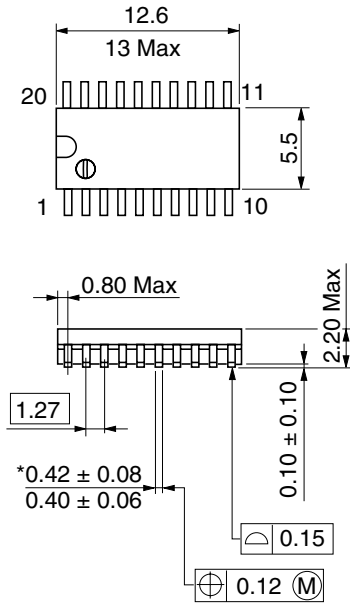


Hitachi Code	FP-20DBV
JEDEC	Conforms
JEITA	—
Mass (reference value)	0.52 g

*Ni/Pd/Au plating

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



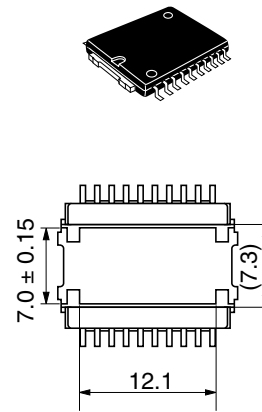
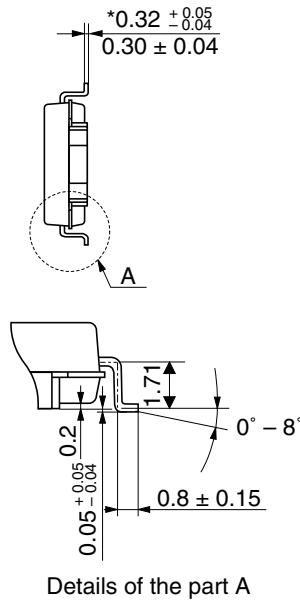
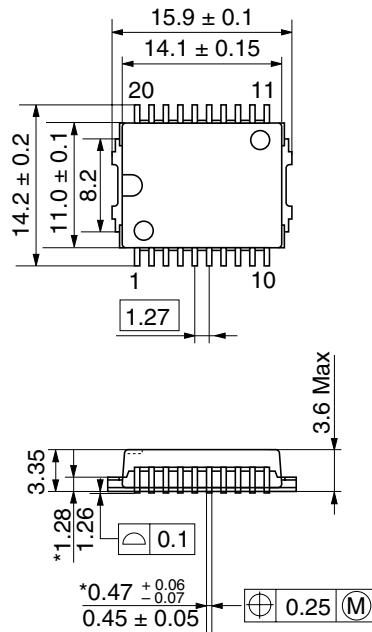
*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-20DE
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.31 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Preliminary

As of July, 2002
Unit: mm

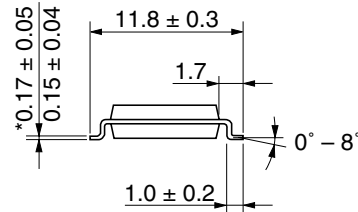
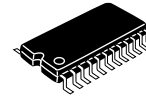
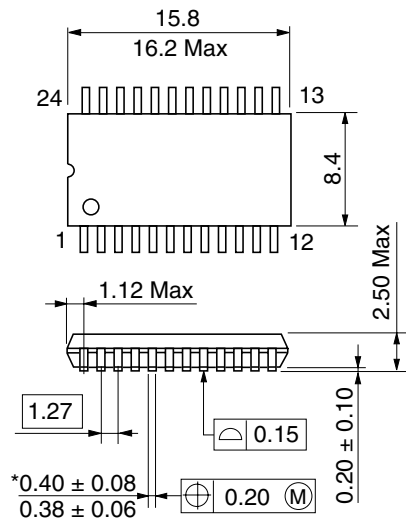


*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-20DT
JEDEC	Conforms
JEITA	—
Mass (reference value)	2.05 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

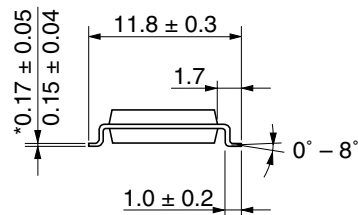
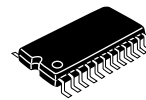
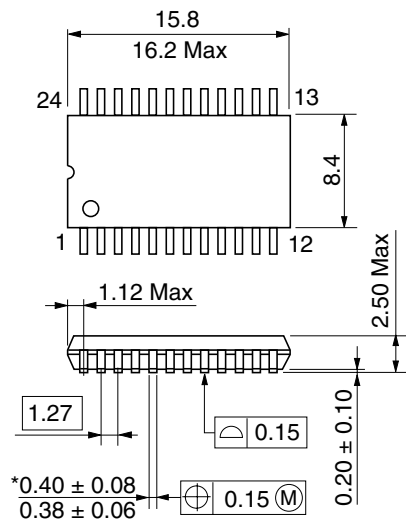
As of July, 2002
Unit: mm



Hitachi Code	FP-24D
JEDEC	Conforms
JEITA	—
Mass (reference value)	0.6 g

*Dimension including the plating thickness
Base material dimension

As of July, 2002
Unit: mm

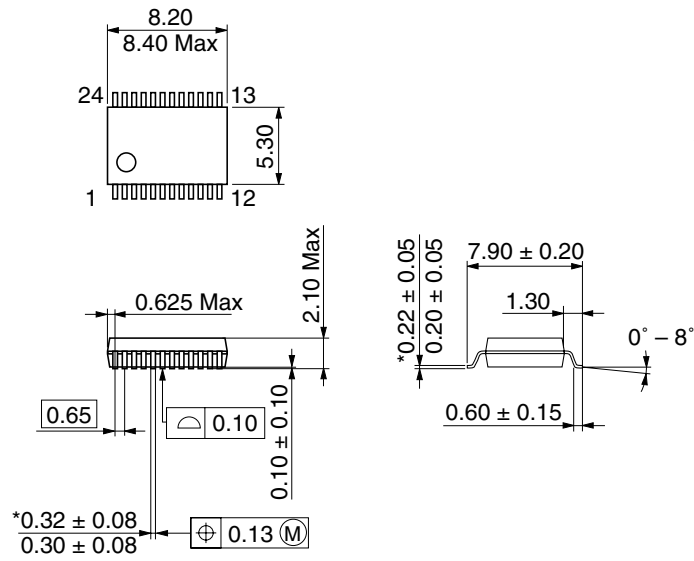


Hitachi Code	FP-24DB
JEDEC	Conforms
JEITA	—
Mass (reference value)	0.6 g

*Dimension including the plating thickness
Base material dimension

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

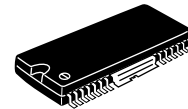
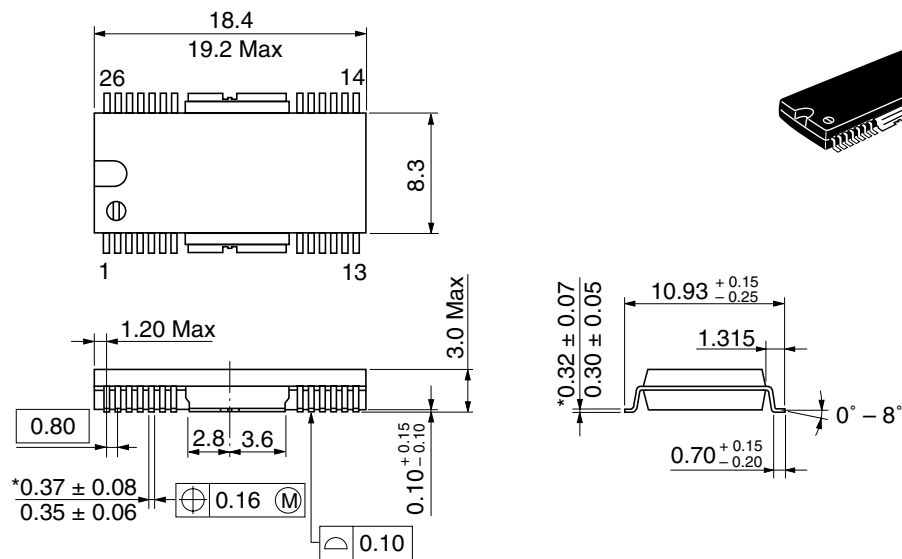
As of July, 2002
Unit: mm



*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-24DSA
JEDEC	Conforms
JEITA	—
Mass (reference value)	0.19g

As of July, 2002
Unit: mm



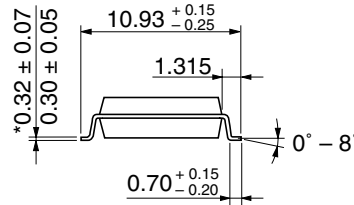
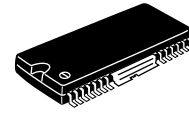
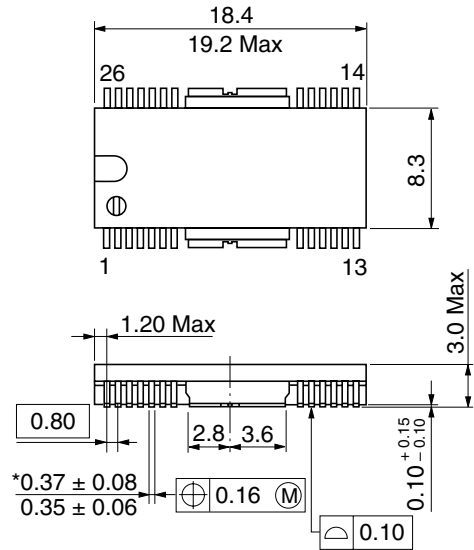
*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-26DT
JEDEC	—
JEITA	—
Mass (reference value)	0.98 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002

Unit: mm

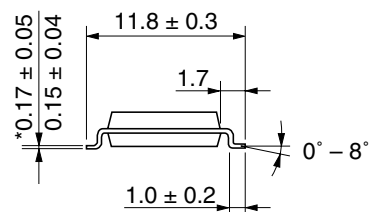
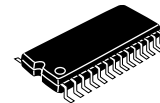
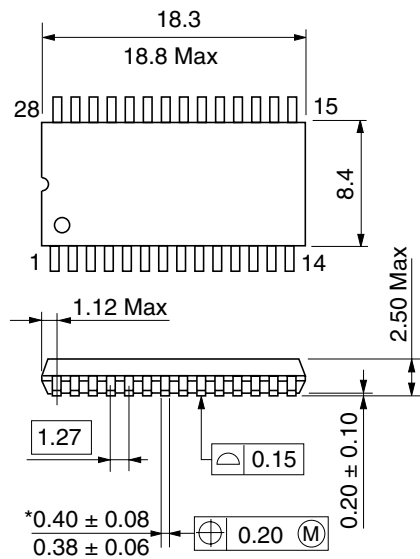


*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-26DTA
JEDEC	—
JEITA	—
Mass (reference value)	0.98 g

As of July, 2002

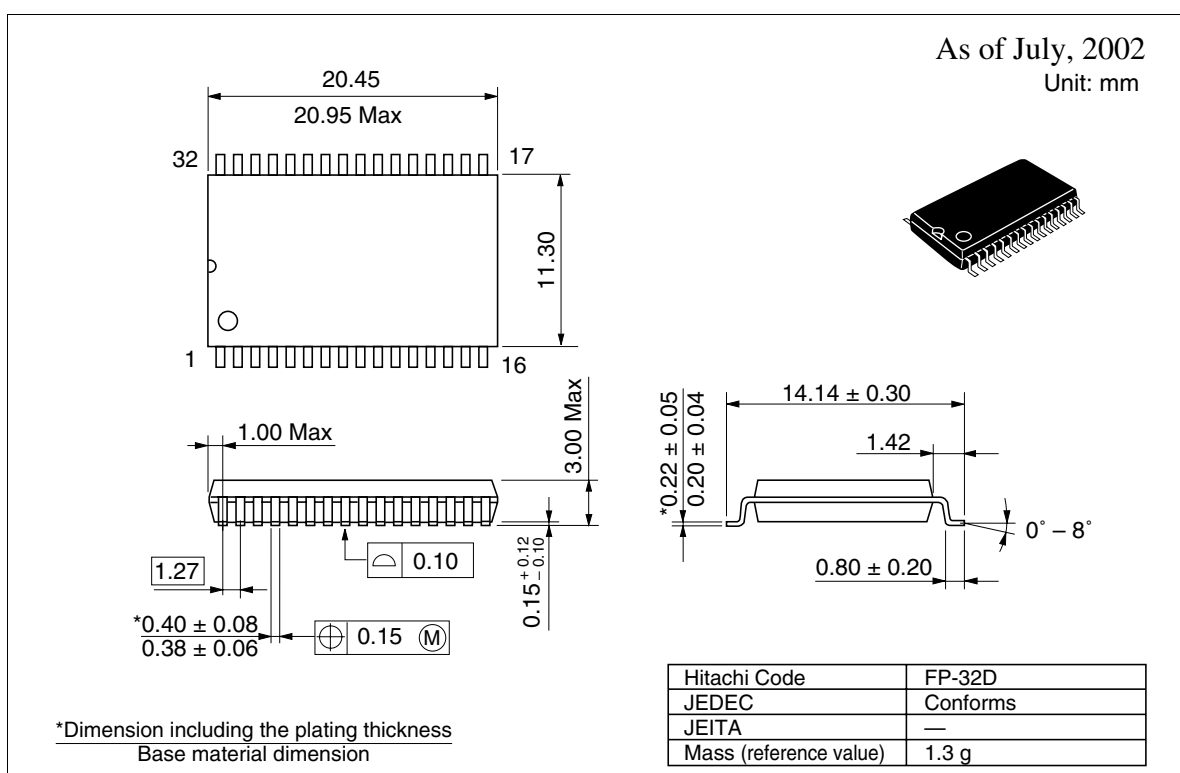
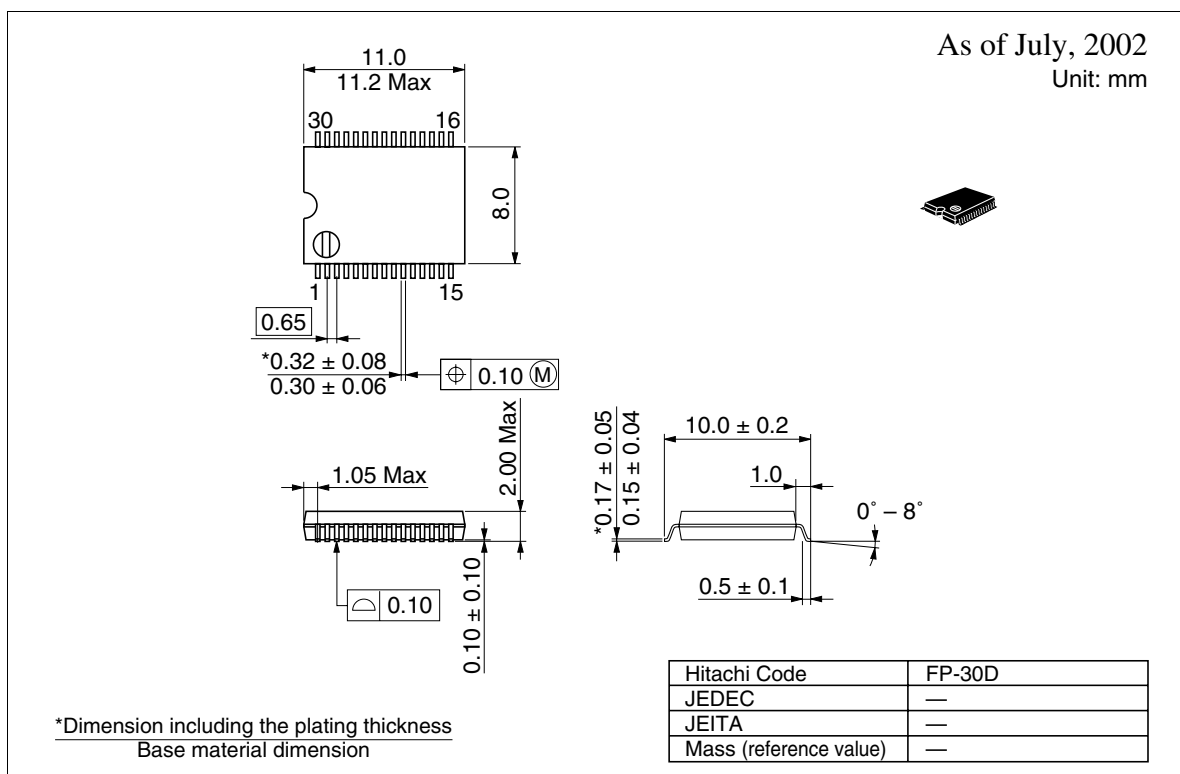
Unit: mm



*Dimension including the plating thickness
Base material dimension

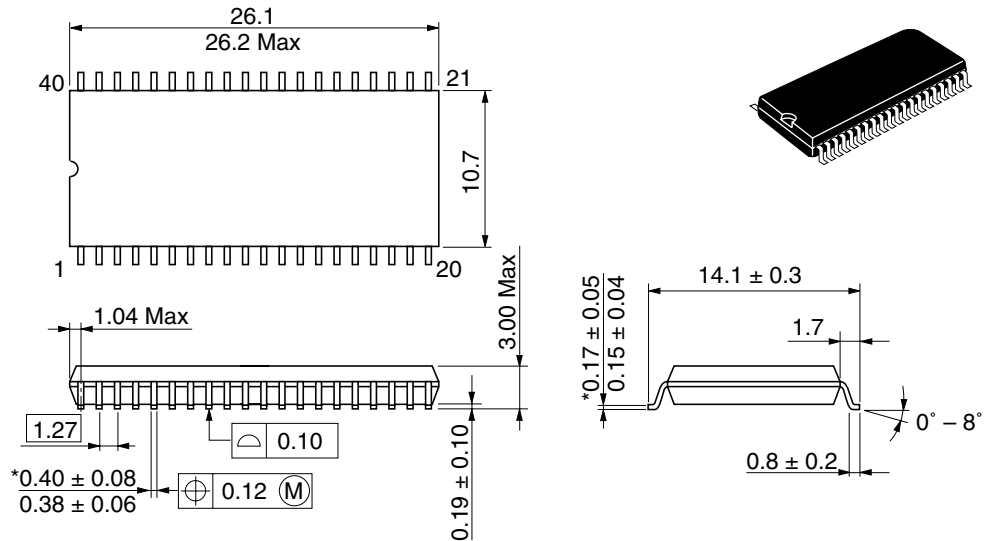
Hitachi Code	FP-28D
JEDEC	Conforms
JEITA	—
Mass (reference value)	0.7 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

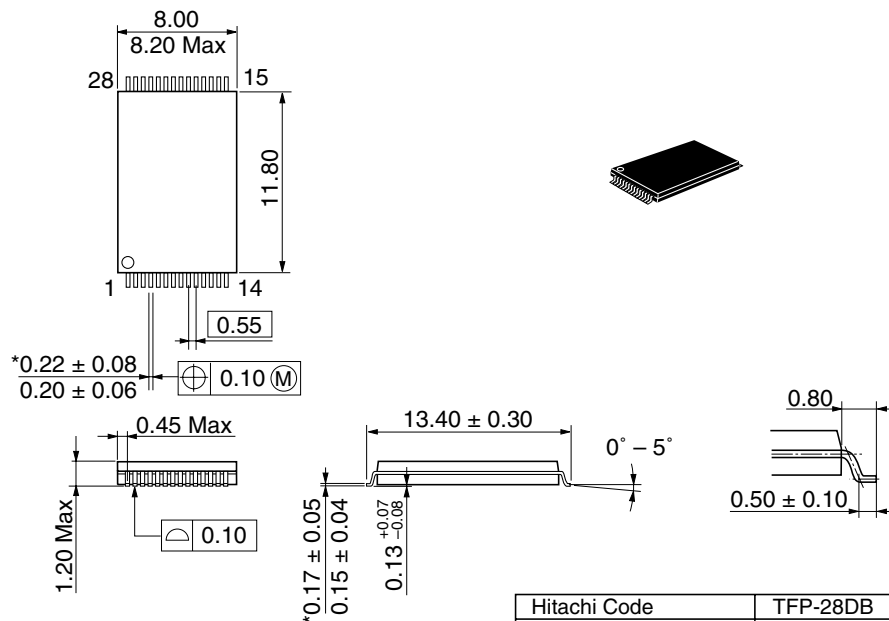
As of July, 2002
Unit: mm



*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-40D
JEDEC	—
JEITA	—
Mass (reference value)	1.5 g

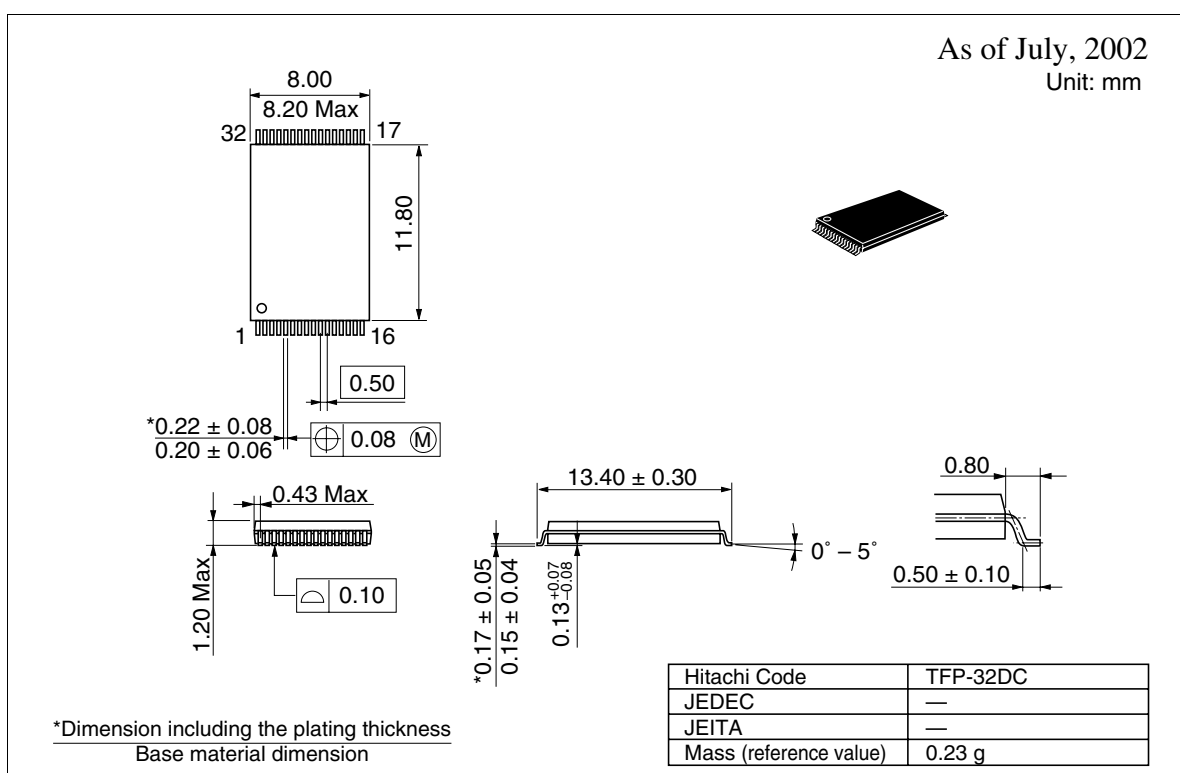
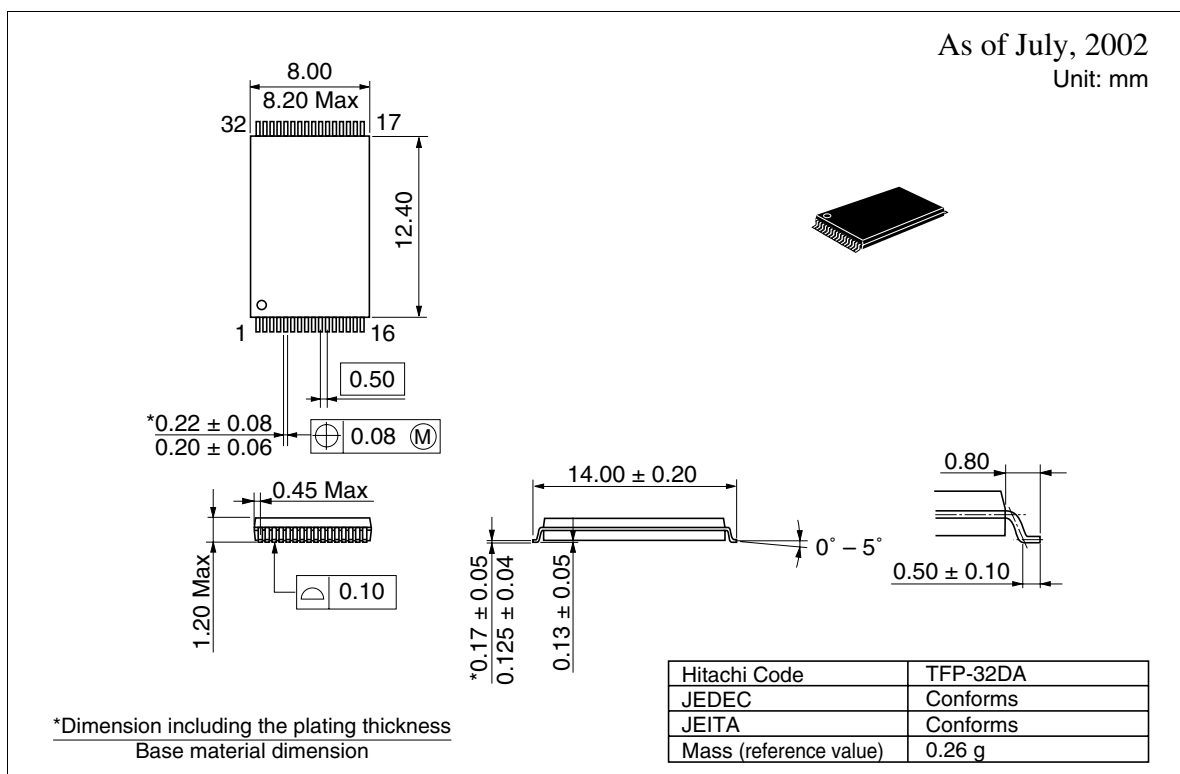
As of July, 2002
Unit: mm



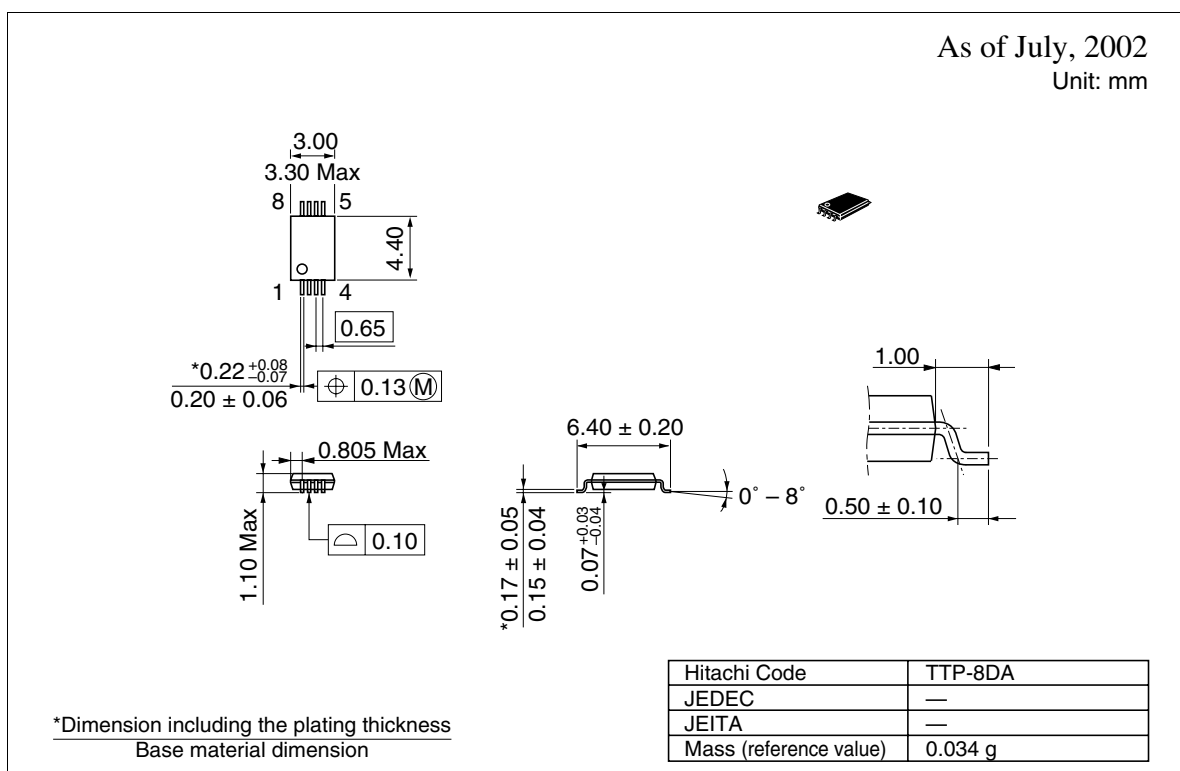
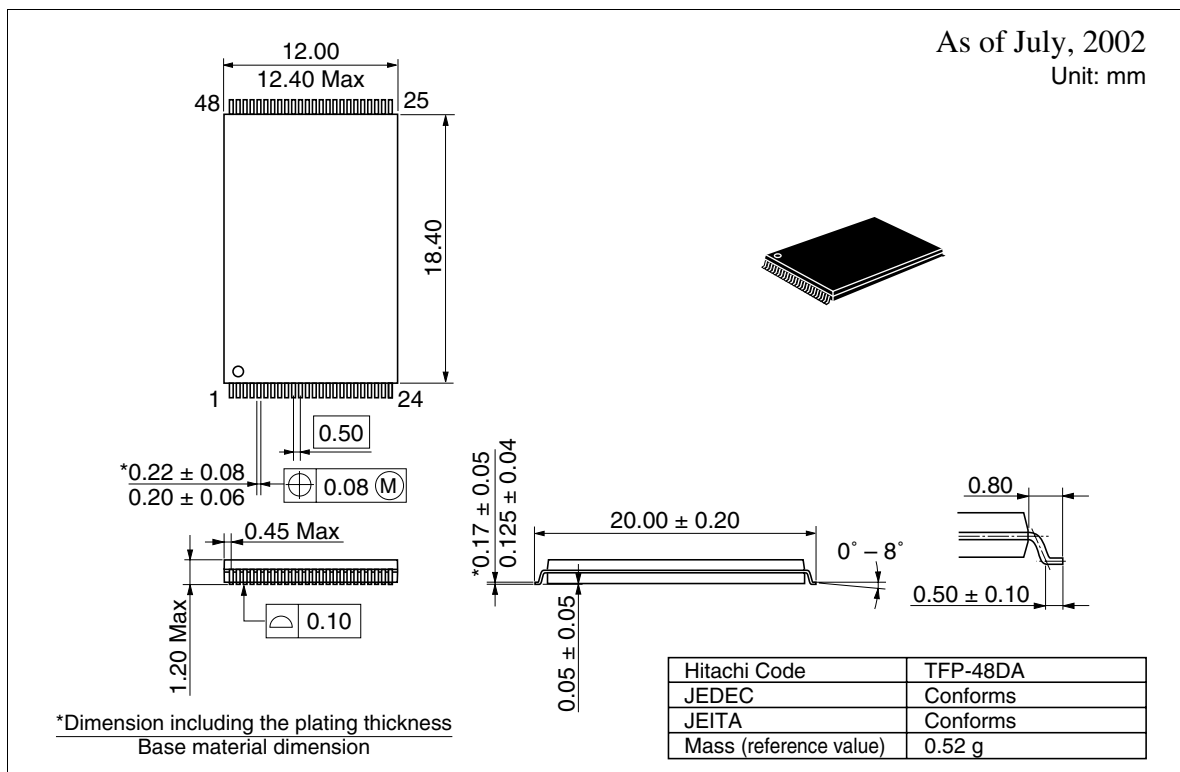
*Dimension including the plating thickness
Base material dimension

Hitachi Code	TFP-28DB
JEDEC	—
JEITA	—
Mass (reference value)	0.23 g

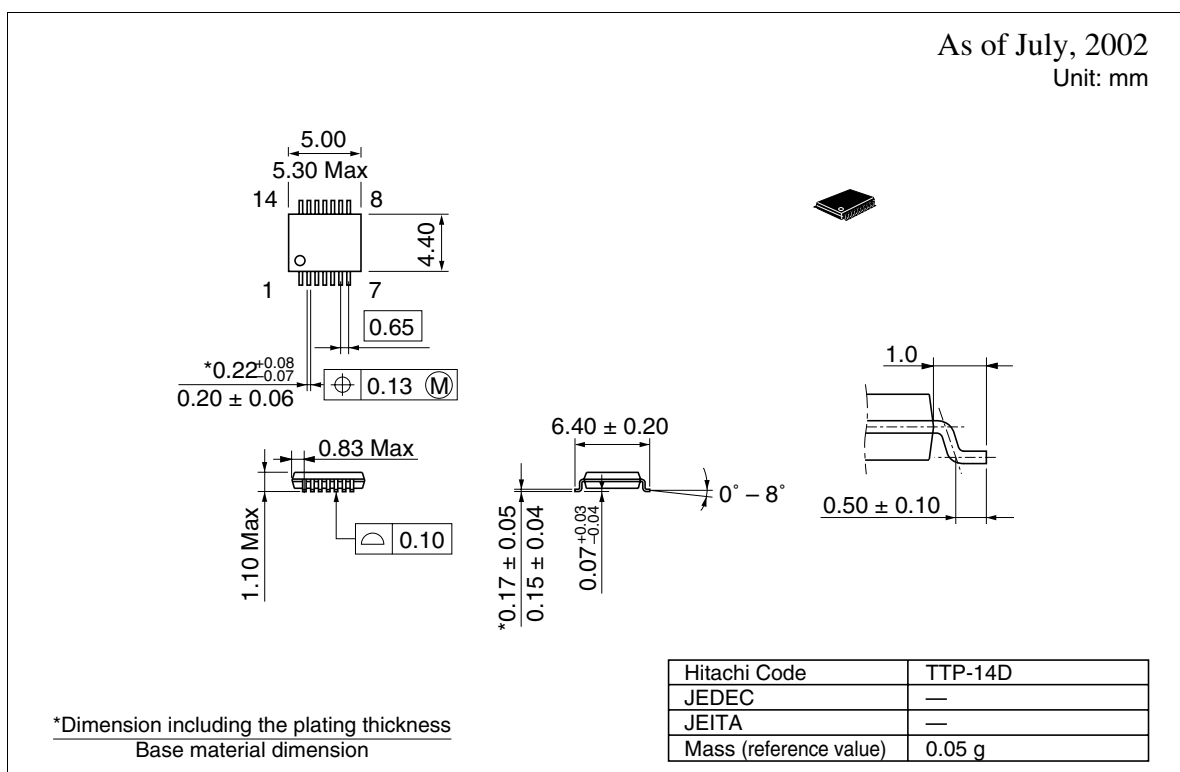
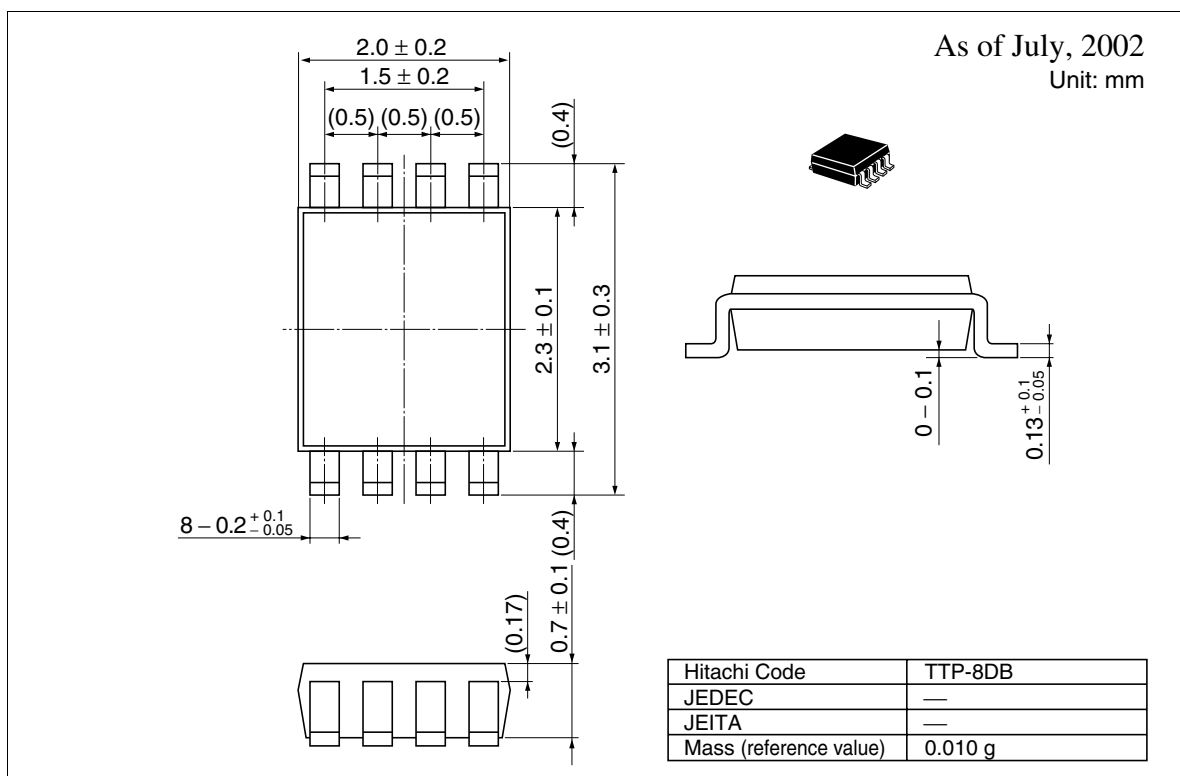
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

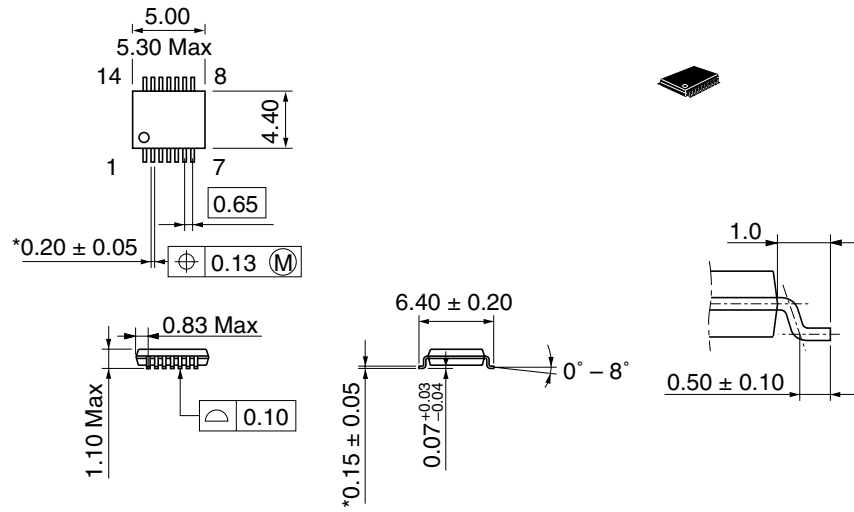


The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

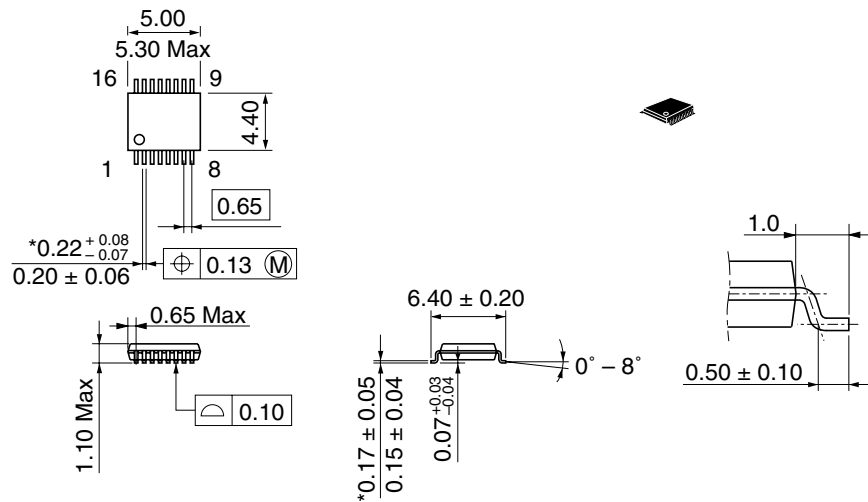
As of July, 2002
Unit: mm



*Ni/Pd/Au plating

Hitachi Code	TTP-14DV
JEDEC	—
JEITA	—
Mass (reference value)	0.05 g

As of July, 2002
Unit: mm



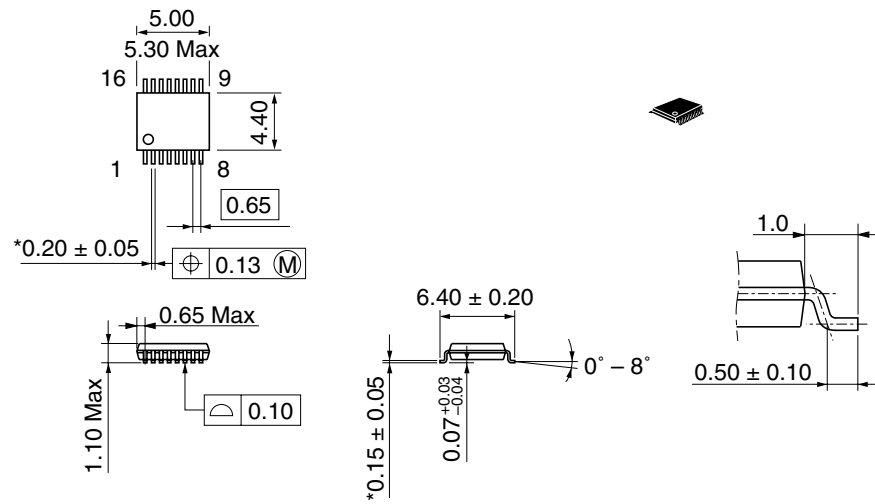
*Dimension including the plating thickness
Base material dimension

Hitachi Code	TTP-16DA
JEDEC	—
JEITA	—
Mass (reference value)	0.05 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002

Unit: mm

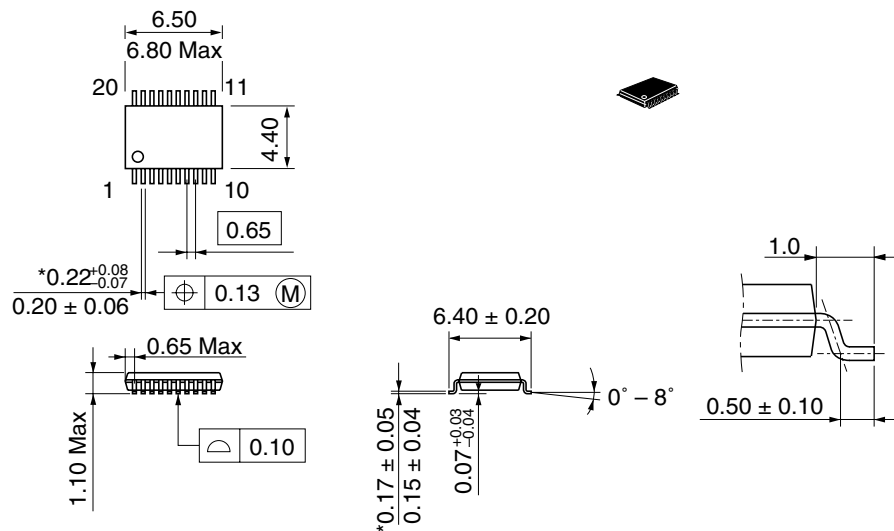


*Ni/Pd/Au plating

Hitachi Code	TTP-16DAV
JEDEC	—
JEITA	—
Mass (reference value)	0.05 g

As of July, 2002

Unit: mm

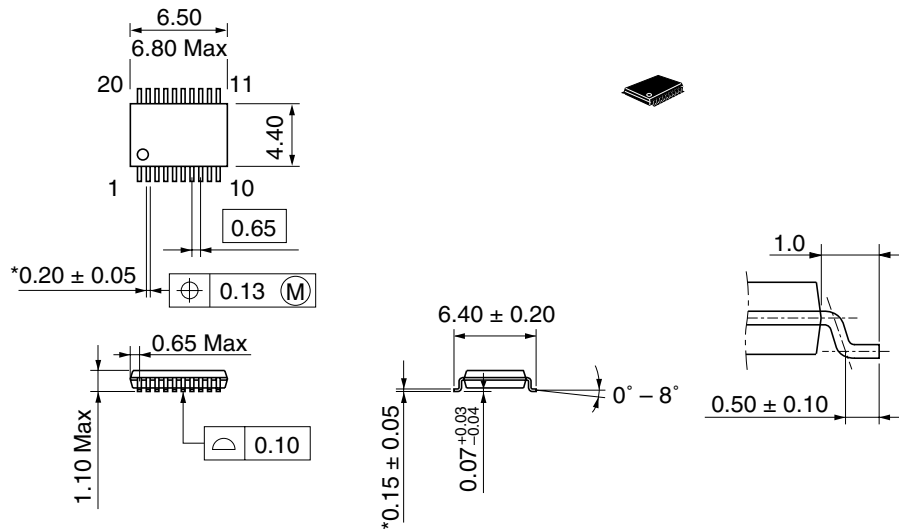


*Dimension including the plating thickness
Base material dimension

Hitachi Code	TTP-20DA
JEDEC	—
JEITA	—
Mass (reference value)	0.07 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

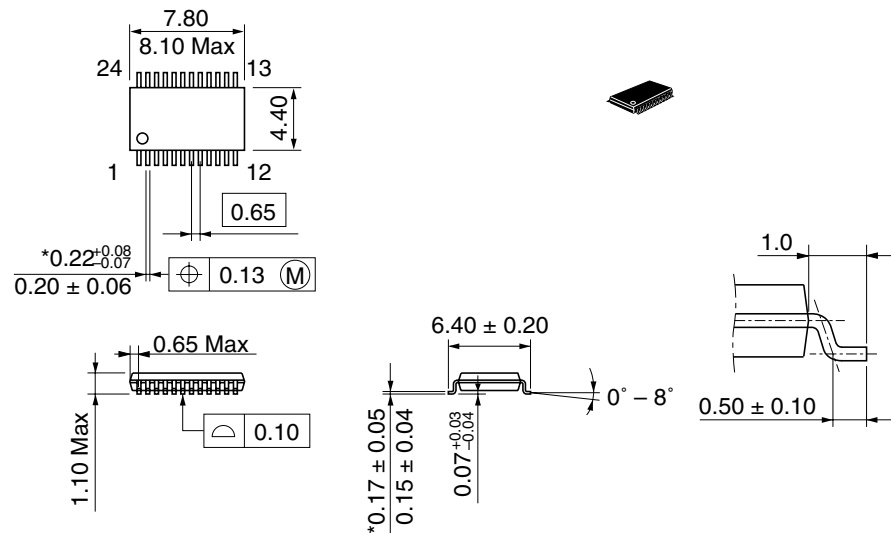
As of July, 2002
Unit: mm



*Ni/Pd/Au plating

Hitachi Code	TTP-20DAV
JEDEC	—
JEITA	—
Mass (reference value)	0.07 g

As of July, 2002
Unit: mm

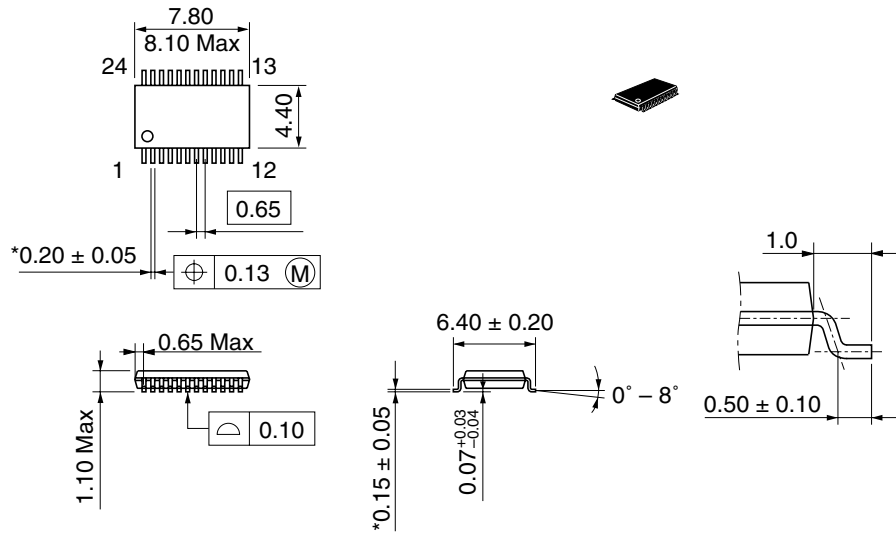


*Dimension including the plating thickness
Base material dimension

Hitachi Code	TTP-24DB
JEDEC	—
JEITA	—
Mass (reference value)	0.08 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

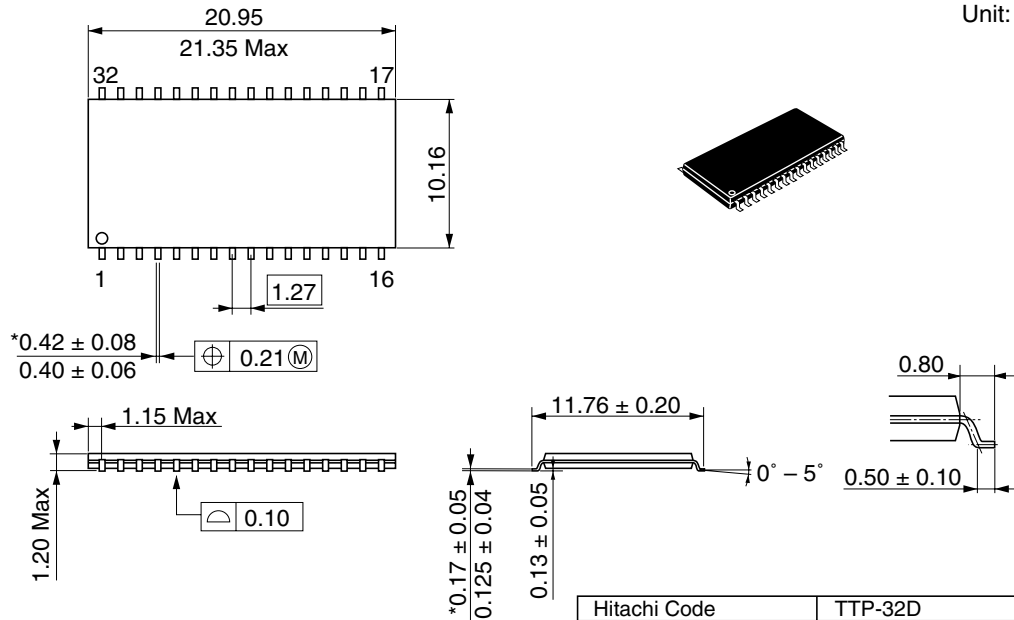
As of July, 2002
Unit: mm



*Ni/Pd/Au plating

Hitachi Code	TTP-24DBV
JEDEC	—
JEITA	—
Mass (reference value)	0.09 g

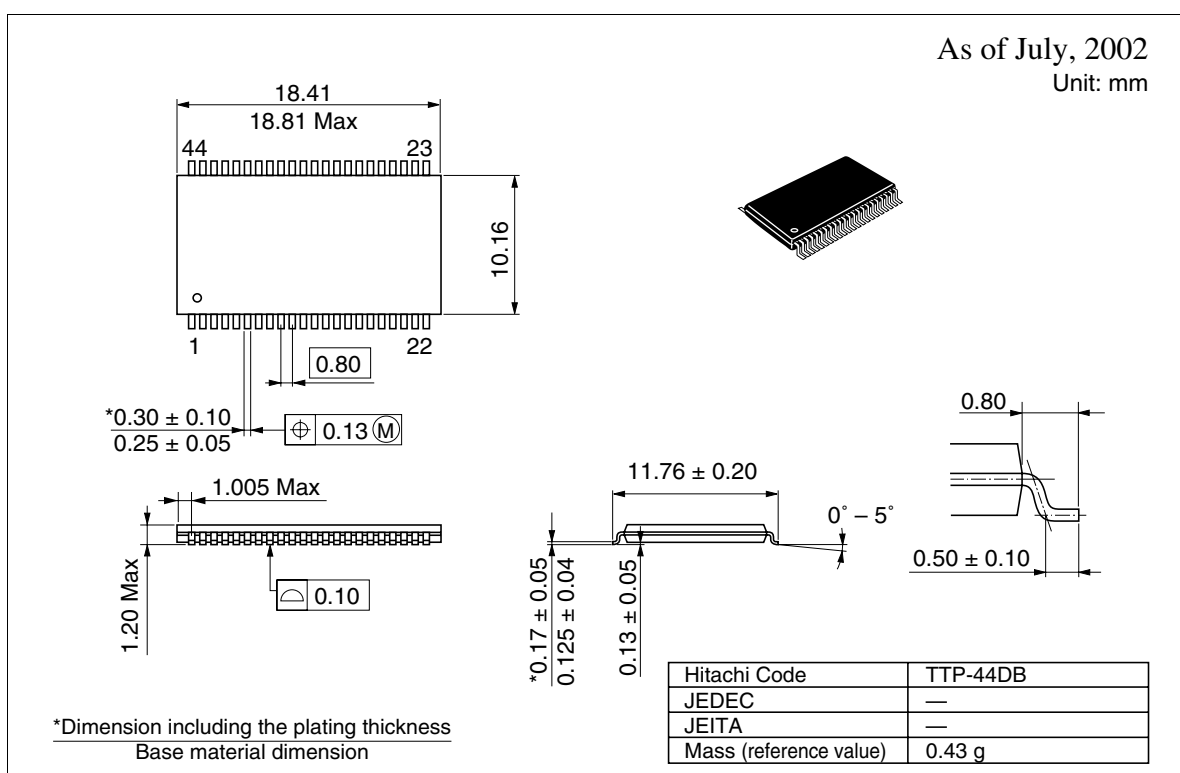
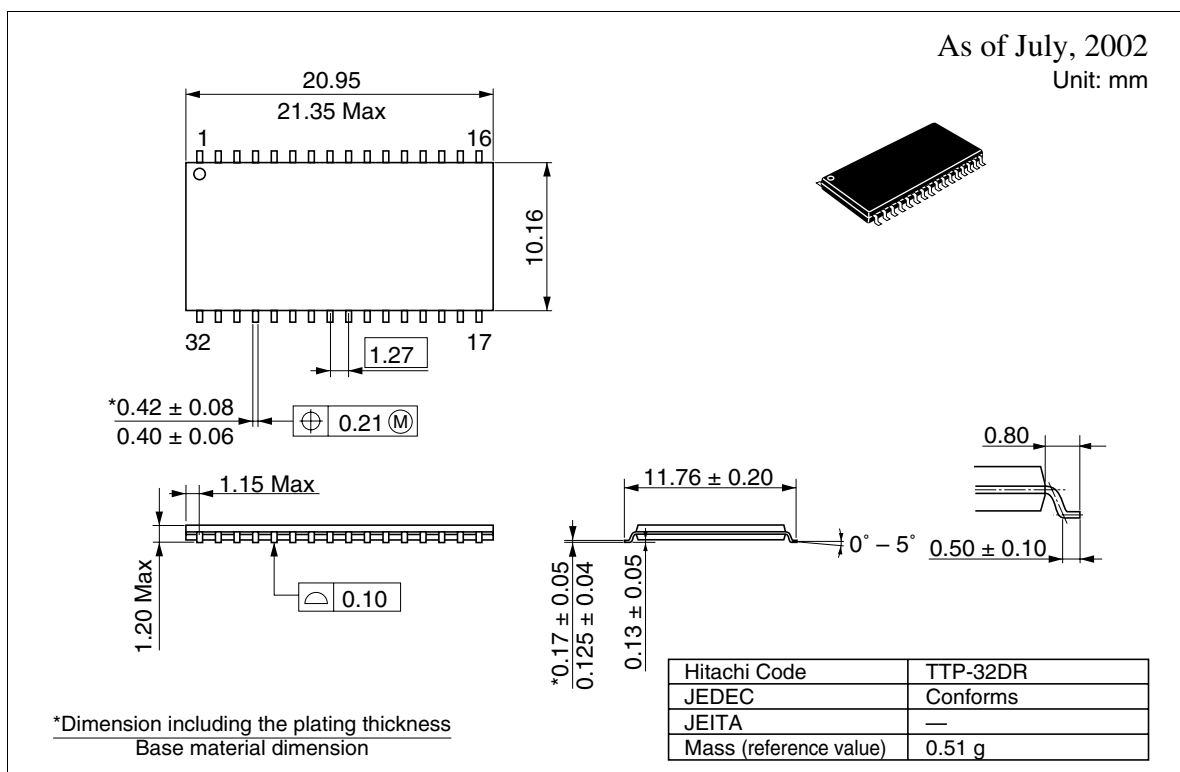
As of July, 2002
Unit: mm



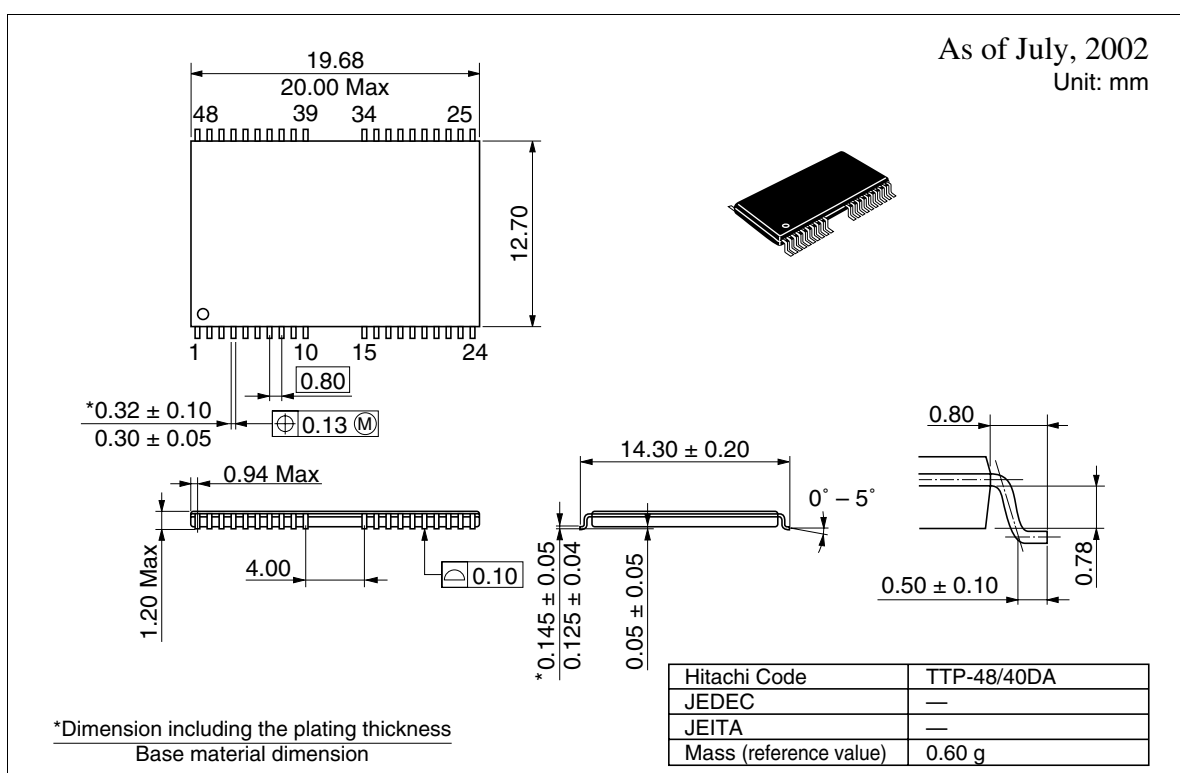
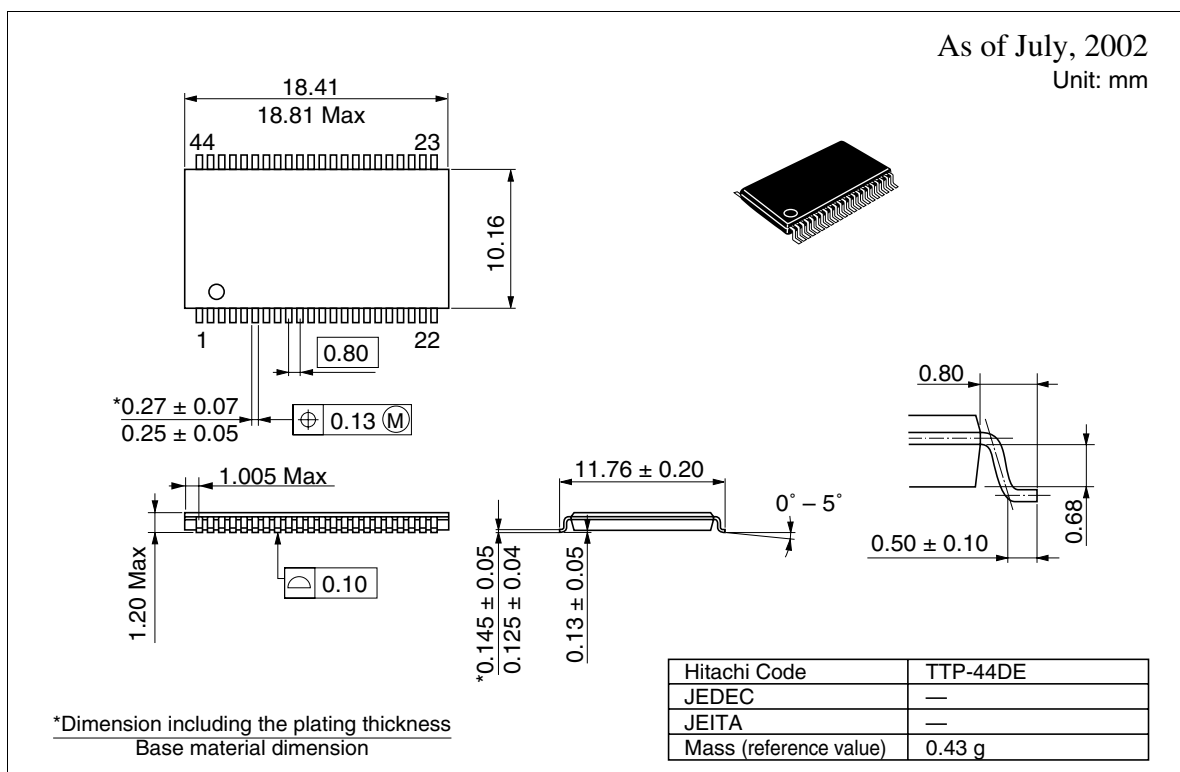
*Dimension including the plating thickness
Base material dimension

Hitachi Code	TTP-32D
JEDEC	Conforms
JEITA	—
Mass (reference value)	0.51 g

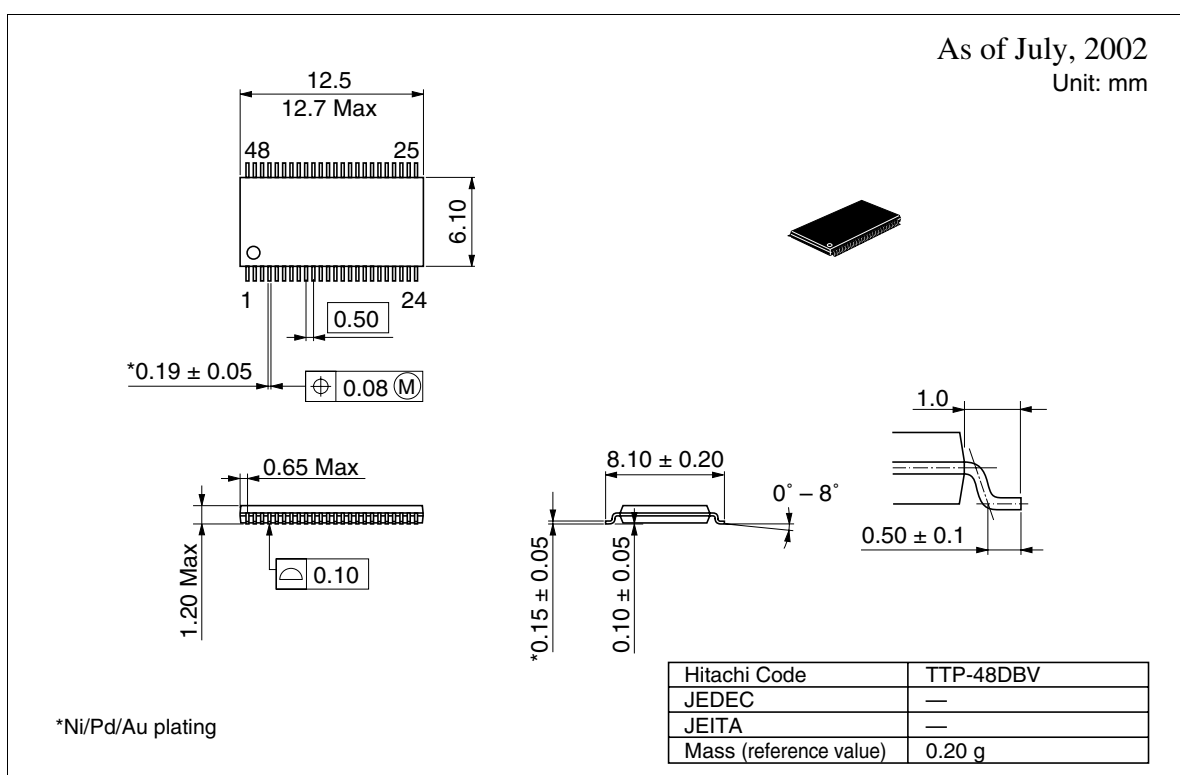
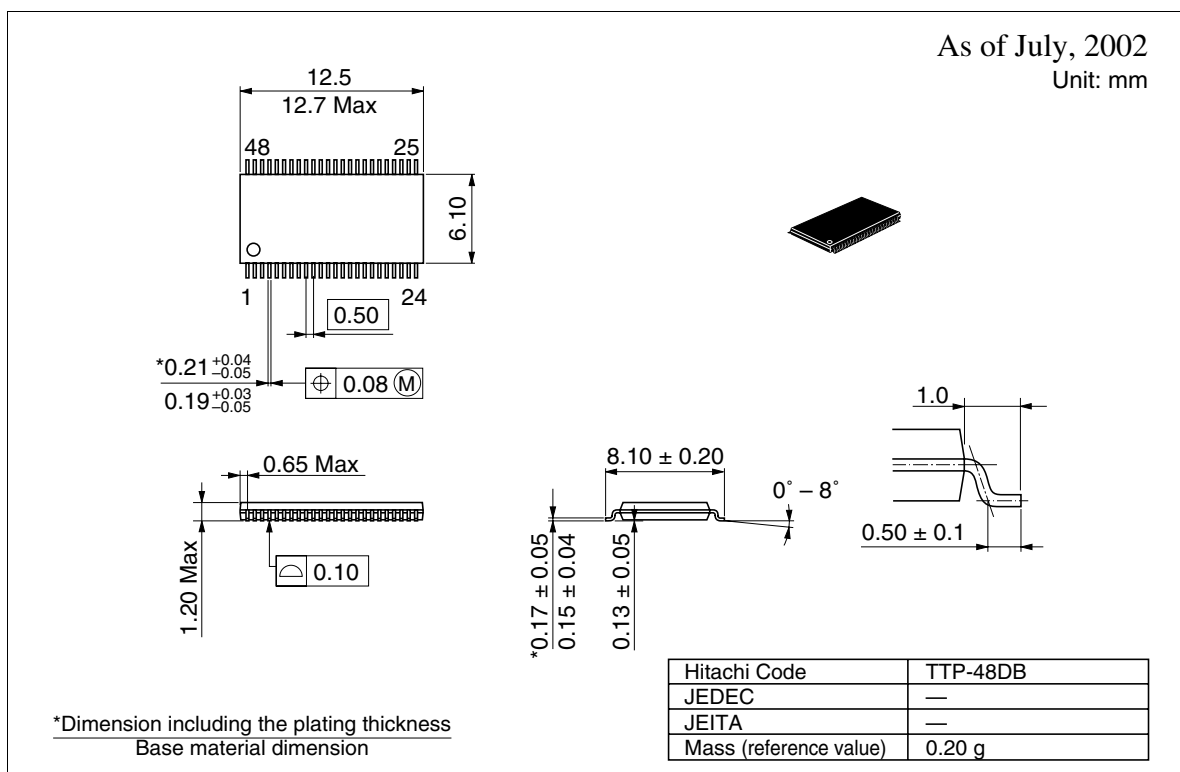
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



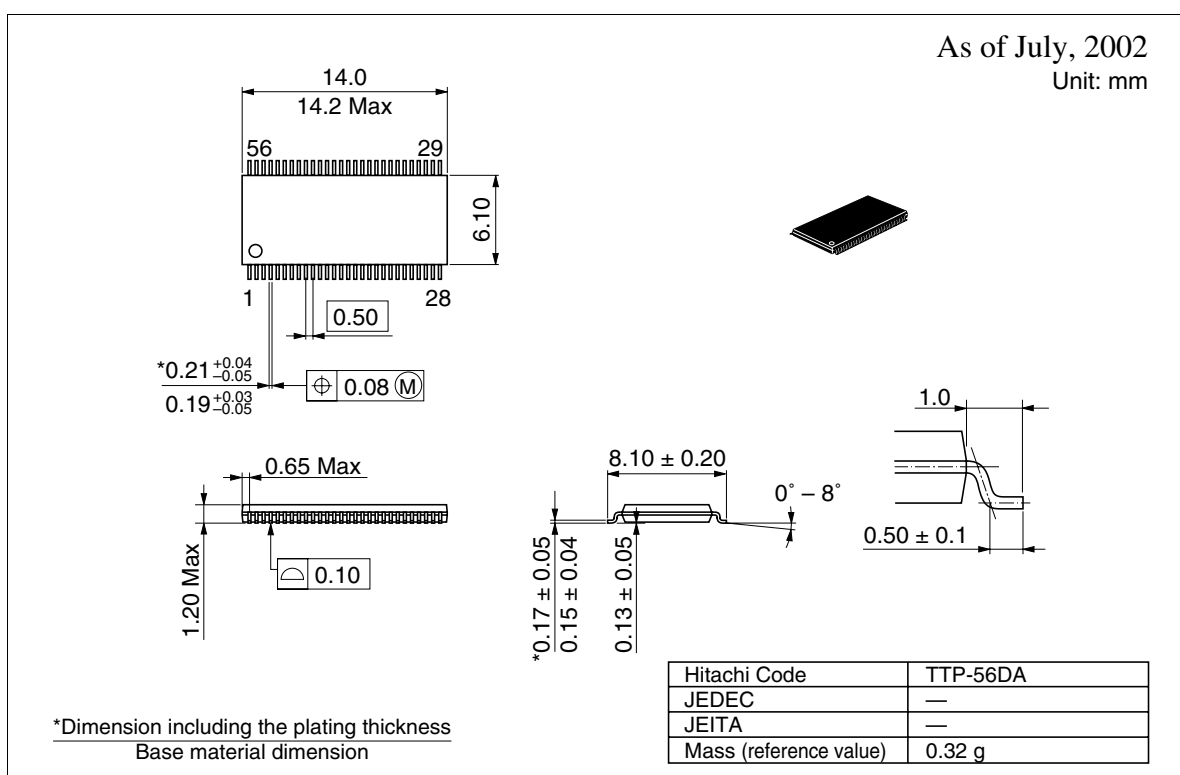
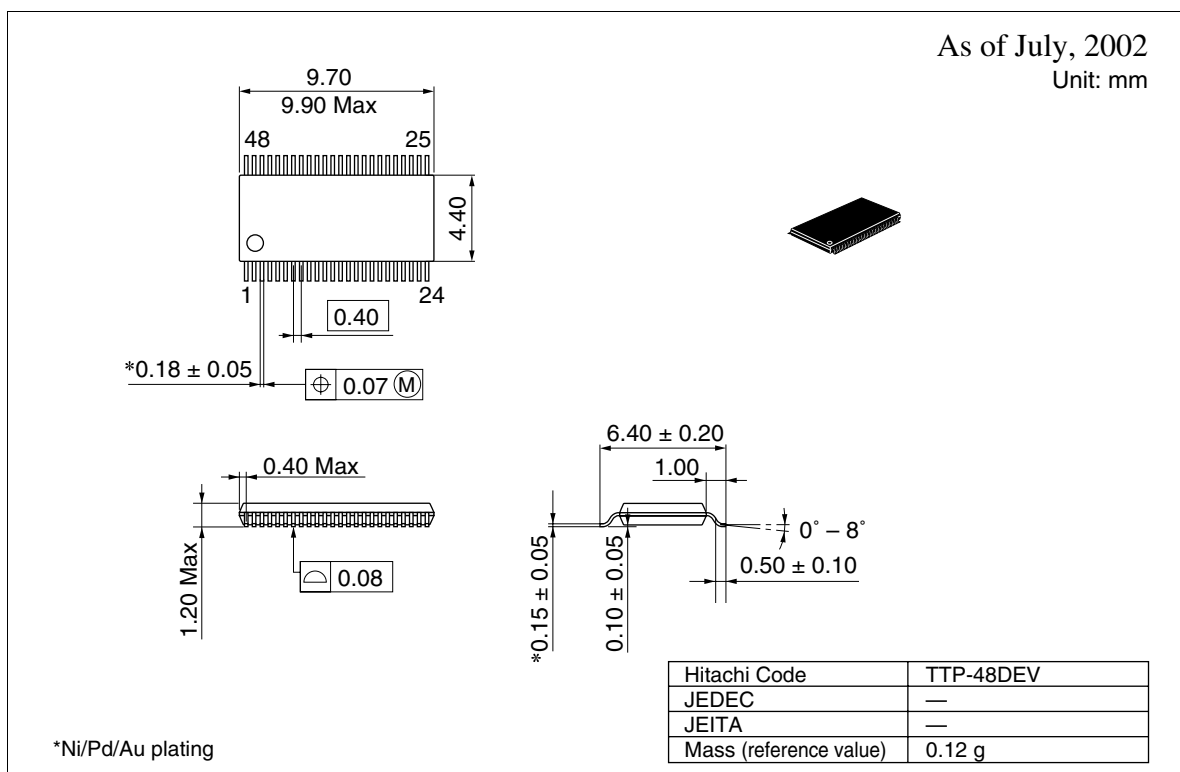
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



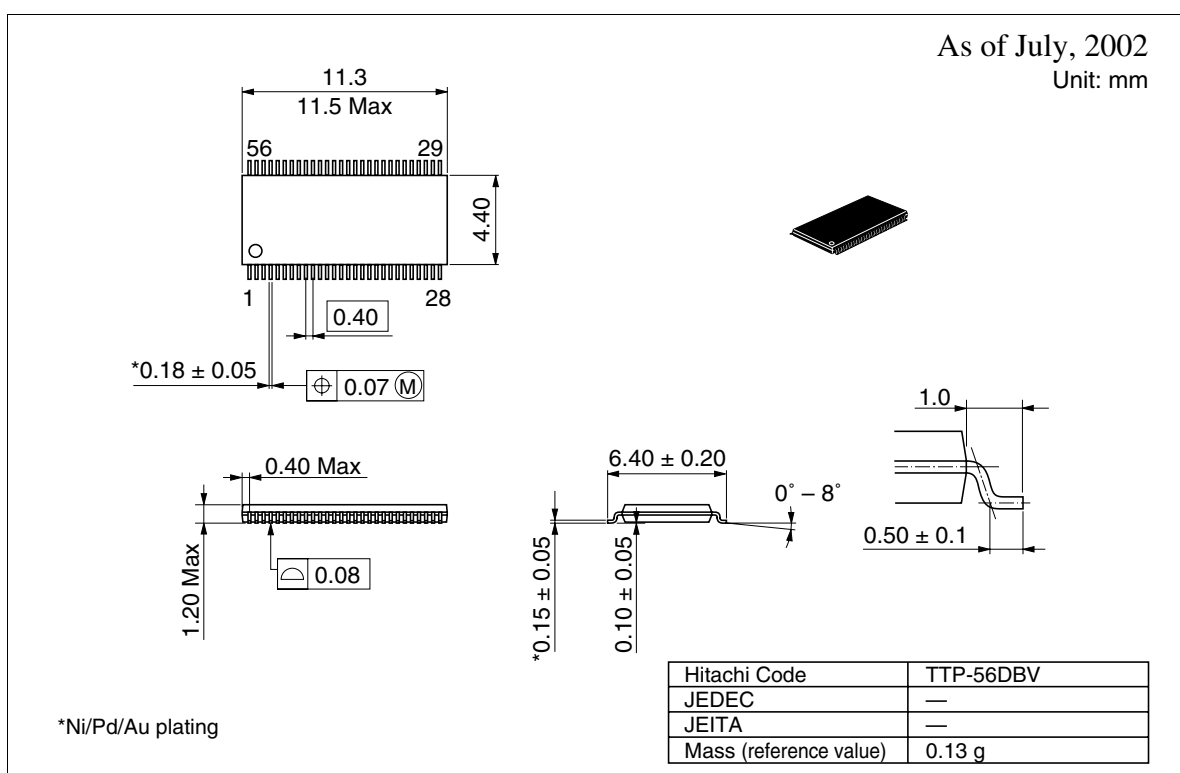
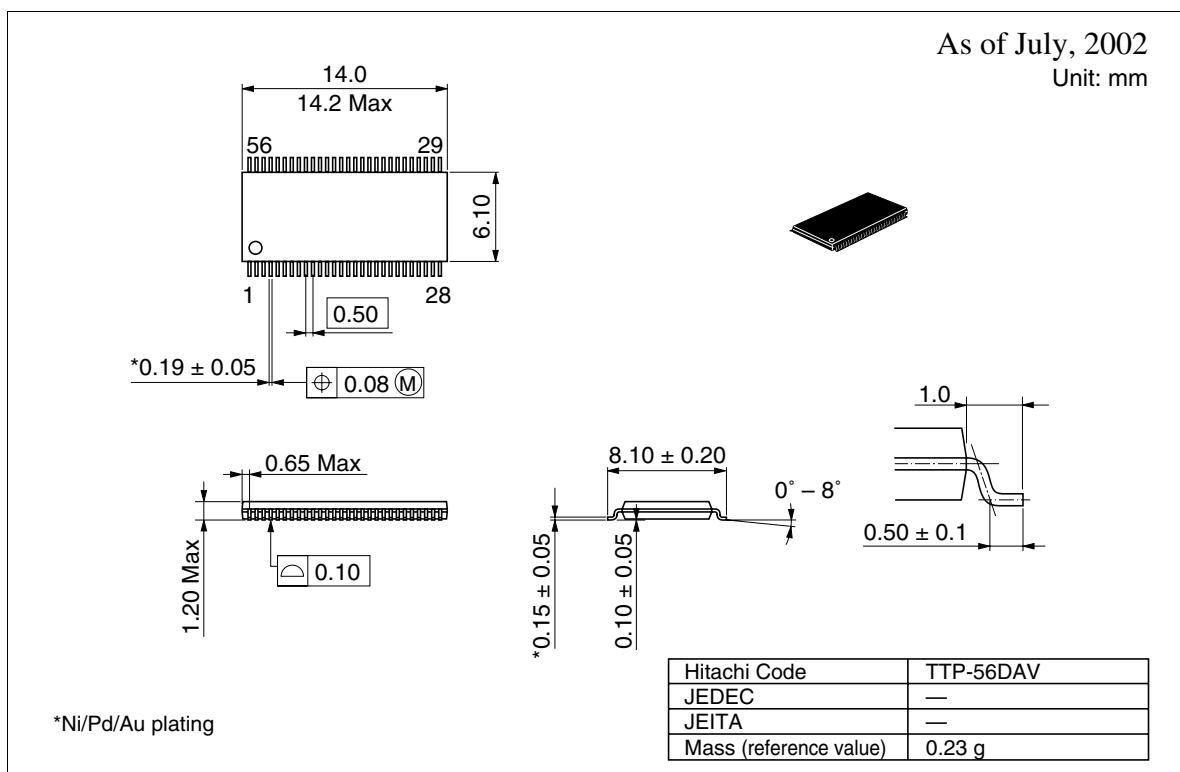
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



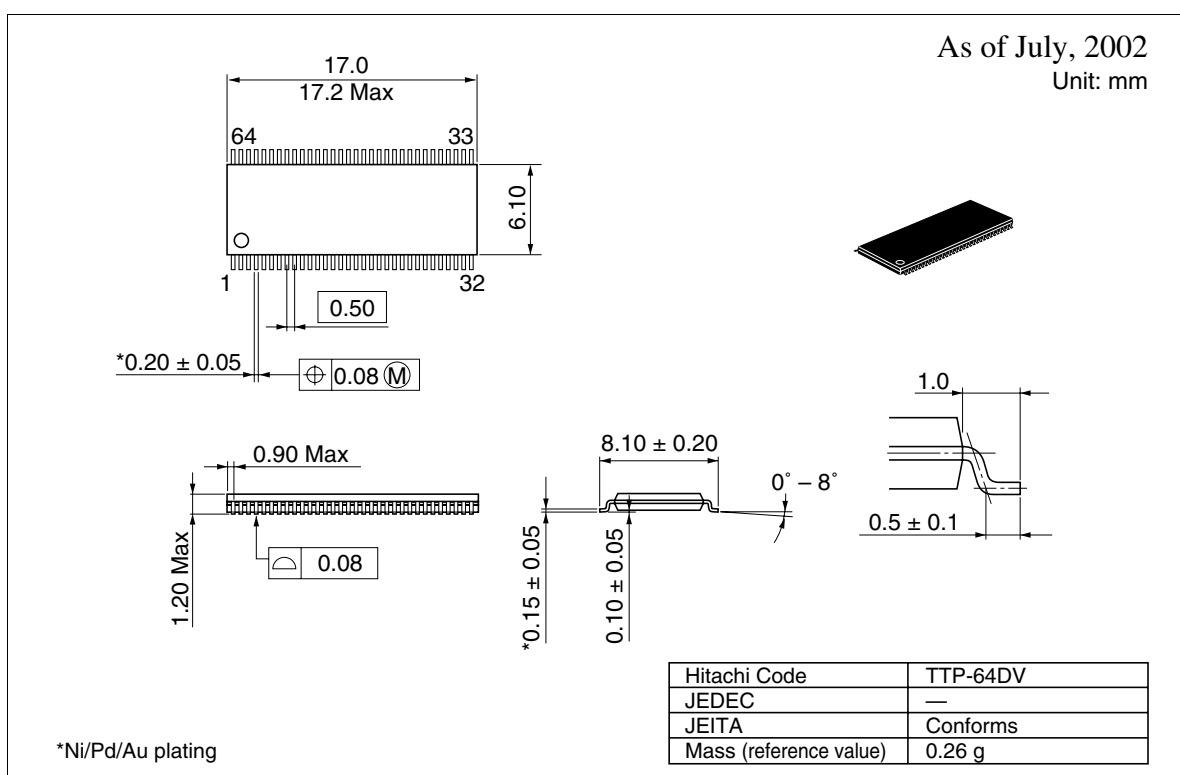
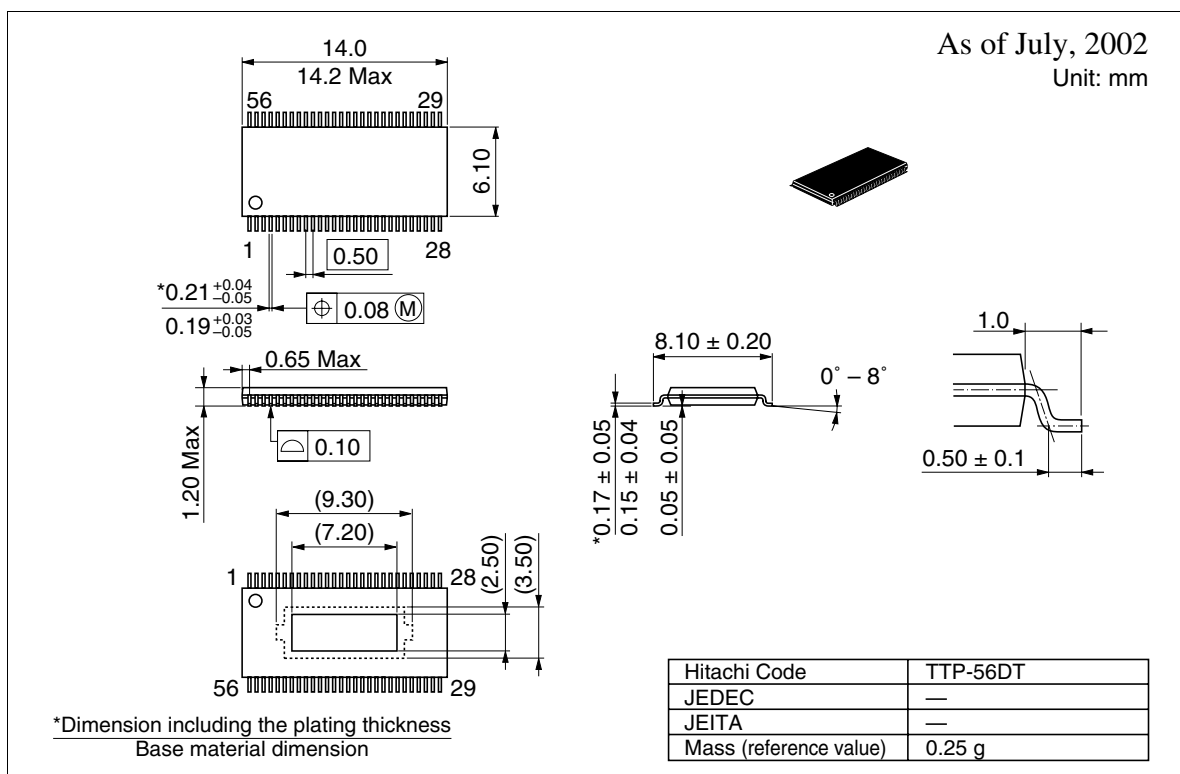
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



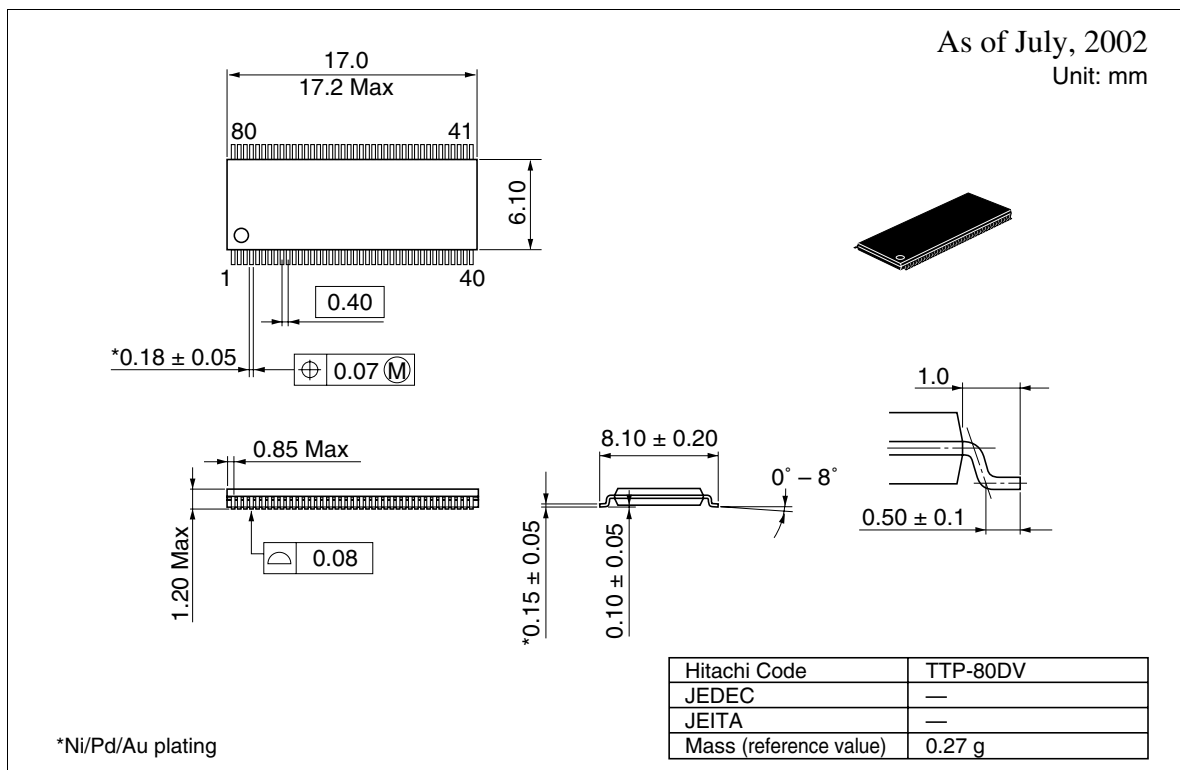
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The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

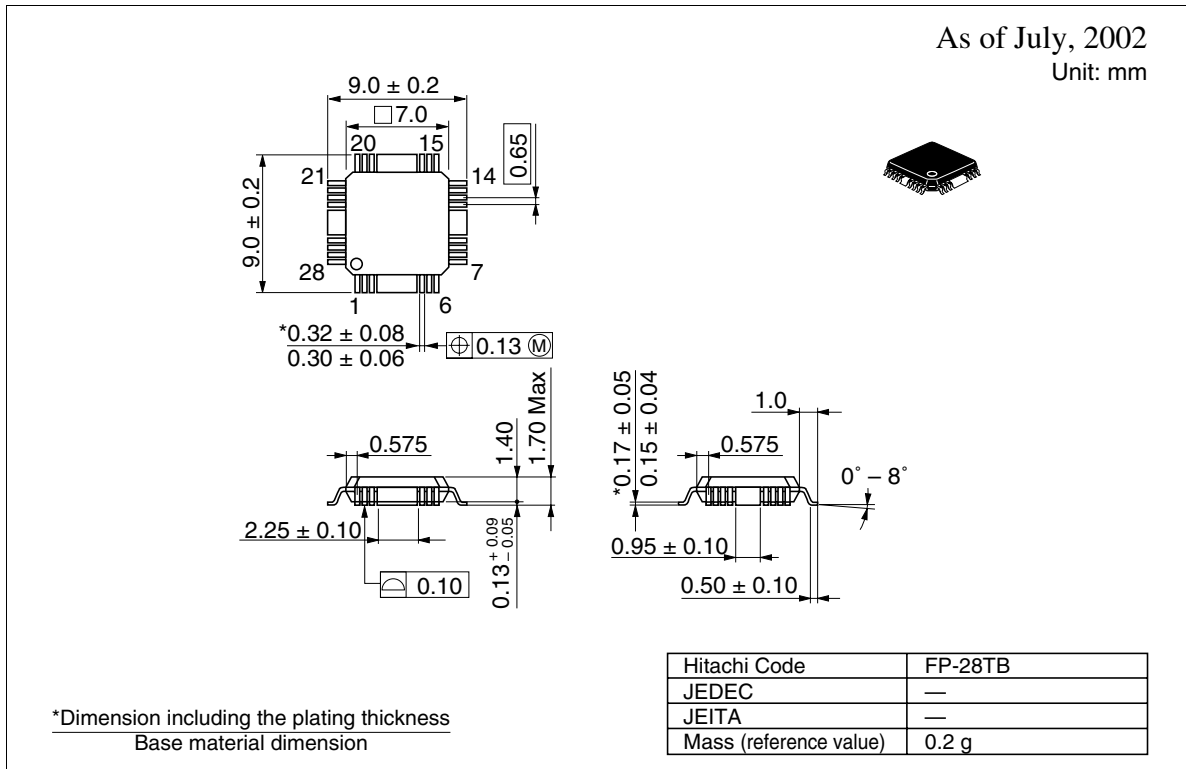


The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



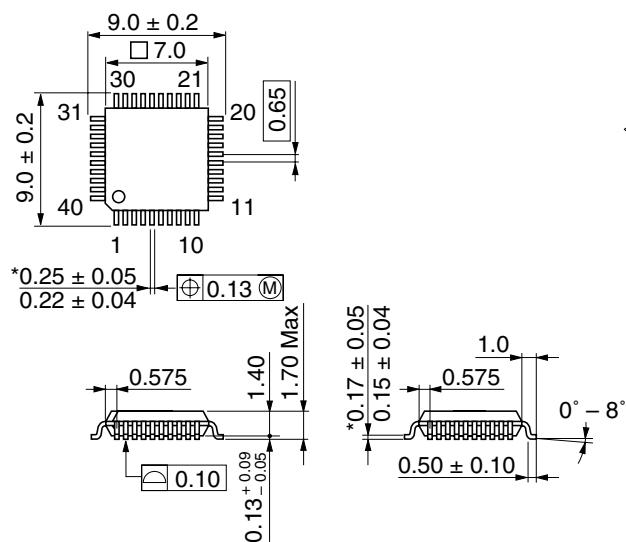
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

2. Plastic QFP



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

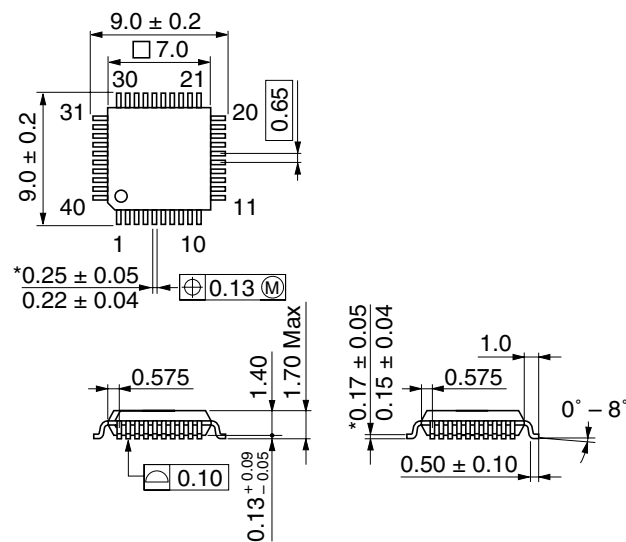
As of July, 2002
Unit: mm



*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-40
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.2 g

As of July, 2002
Unit: mm

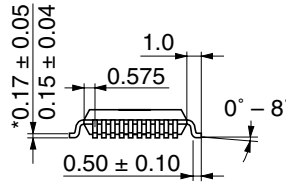
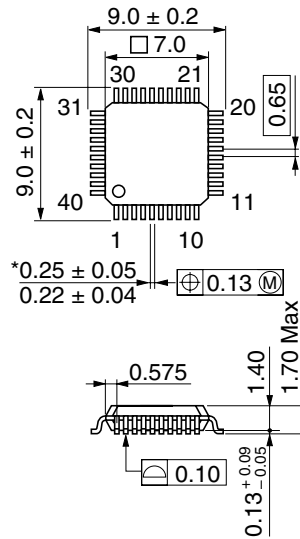


*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-40A
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.2 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

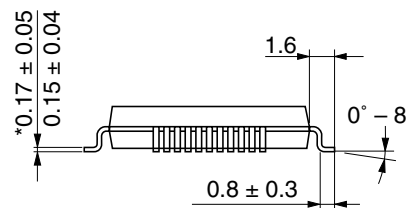
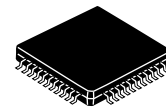
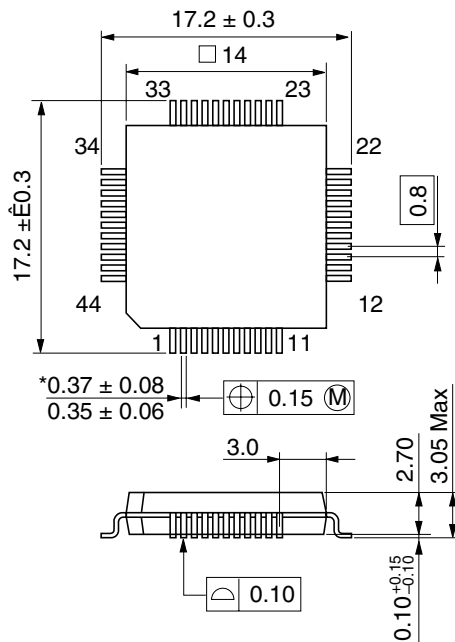
As of July, 2002
Unit: mm



*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-40B
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.2 g

As of July, 2002
Unit: mm



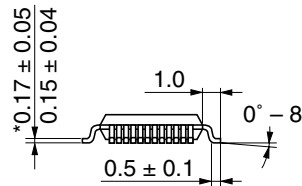
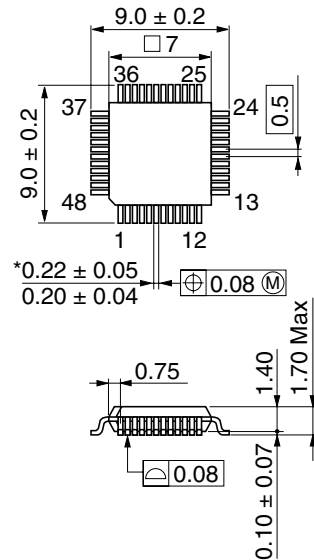
*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-44A
JEDEC	—
JEITA	Conforms
Mass (reference value)	1.2 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002

Unit: mm

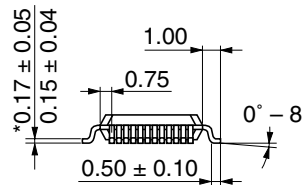
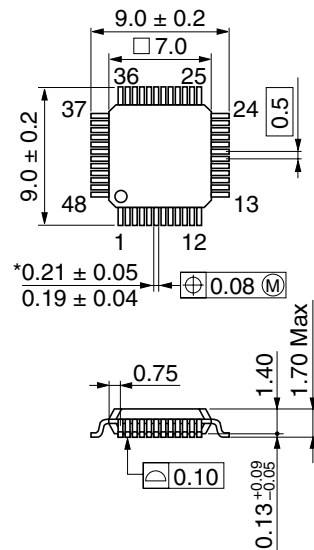


*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-48B
JEDEC	—
JEITA	—
Mass (reference value)	0.2 g

As of July, 2002

Unit: mm



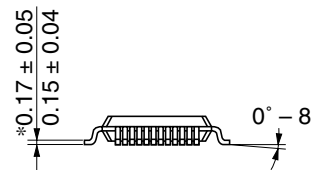
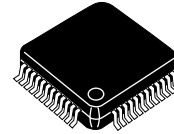
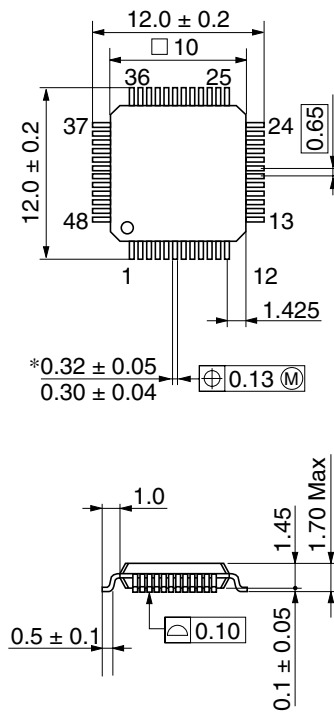
*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-48C
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.2 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002

Unit: mm

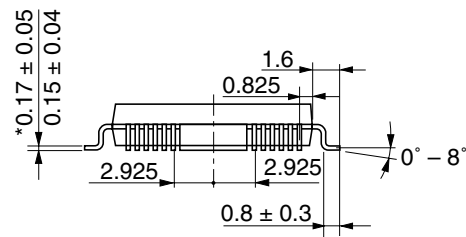
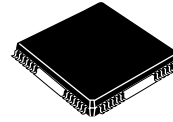
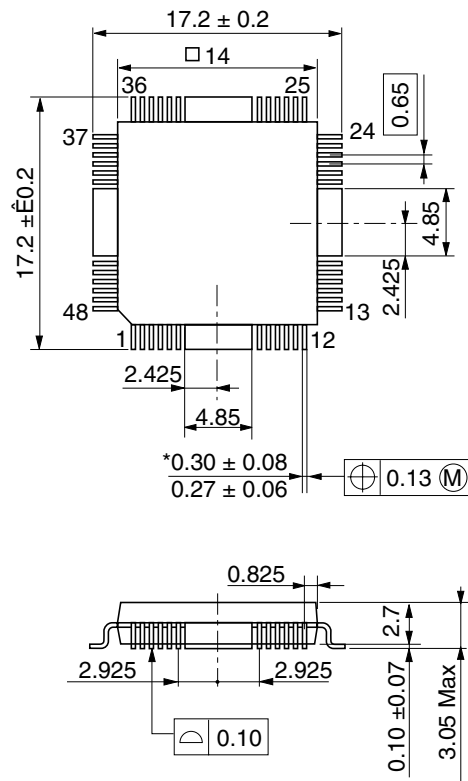


*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-48F
JEDEC	—
JEITA	—
Mass (reference value)	0.4 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

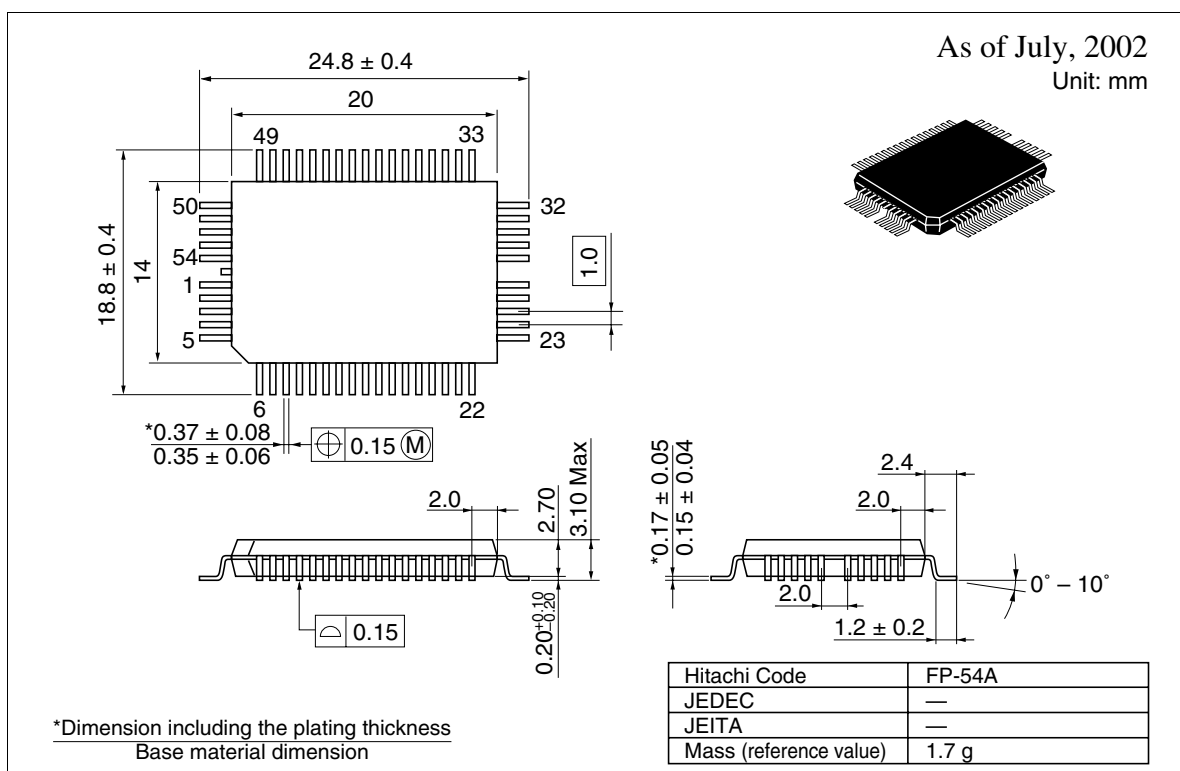
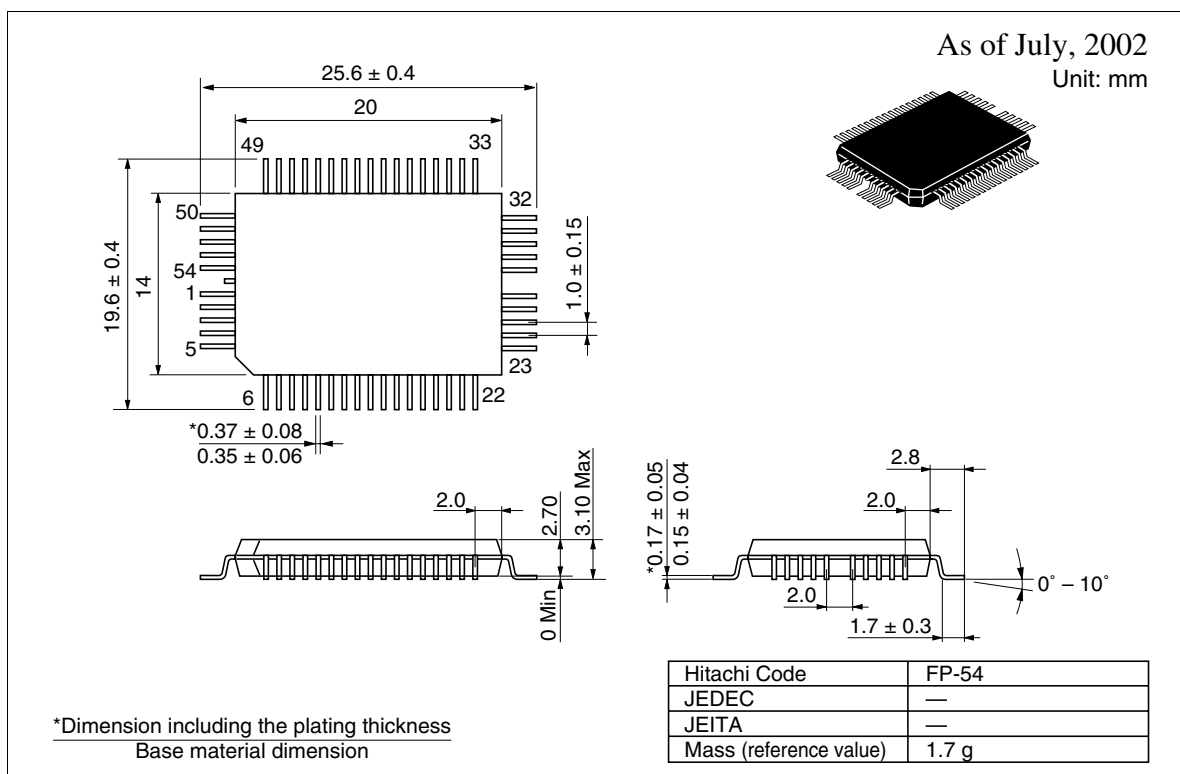
As of July, 2002
Unit: mm



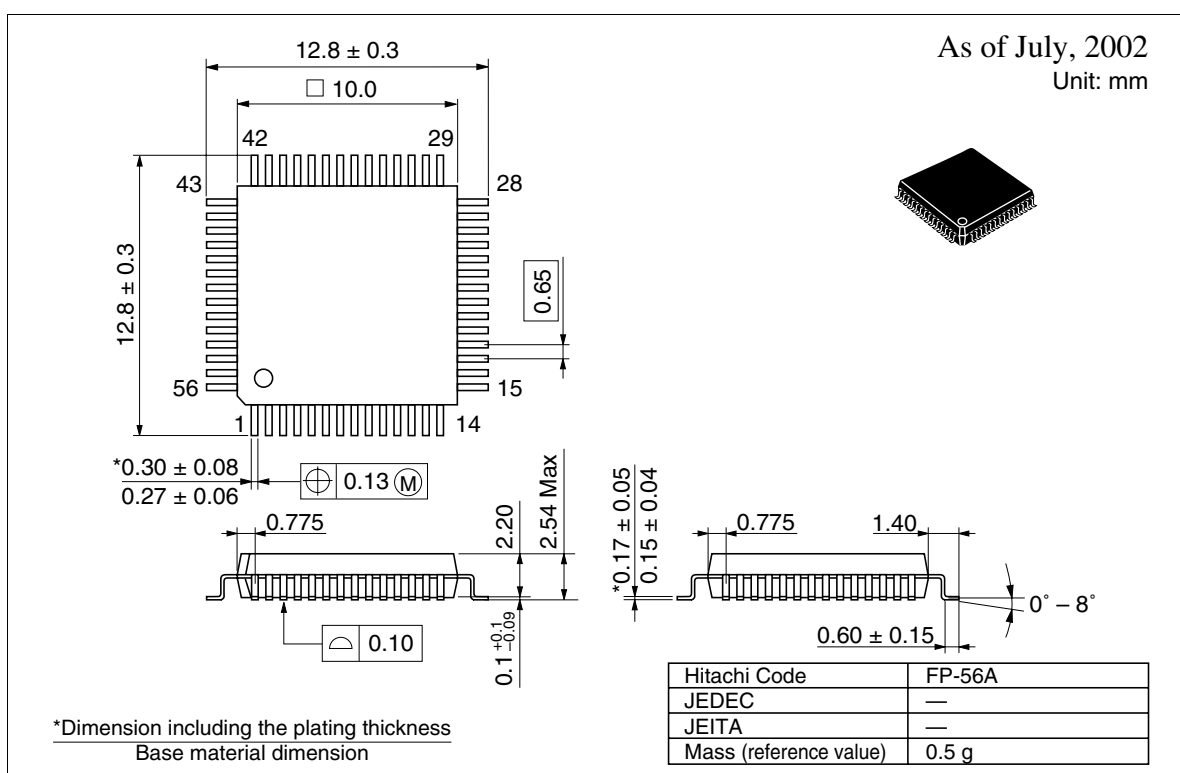
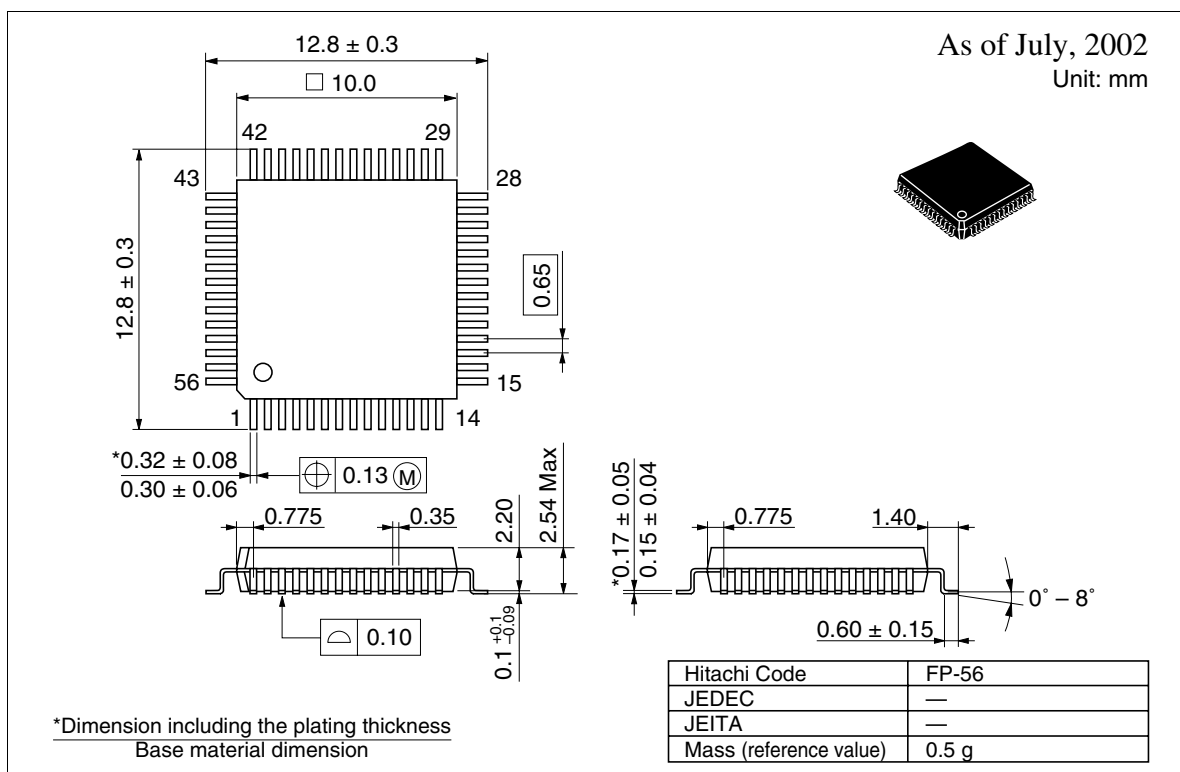
*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-48TB
JEDEC	—
JEITA	—
Mass (reference value)	1.2 g

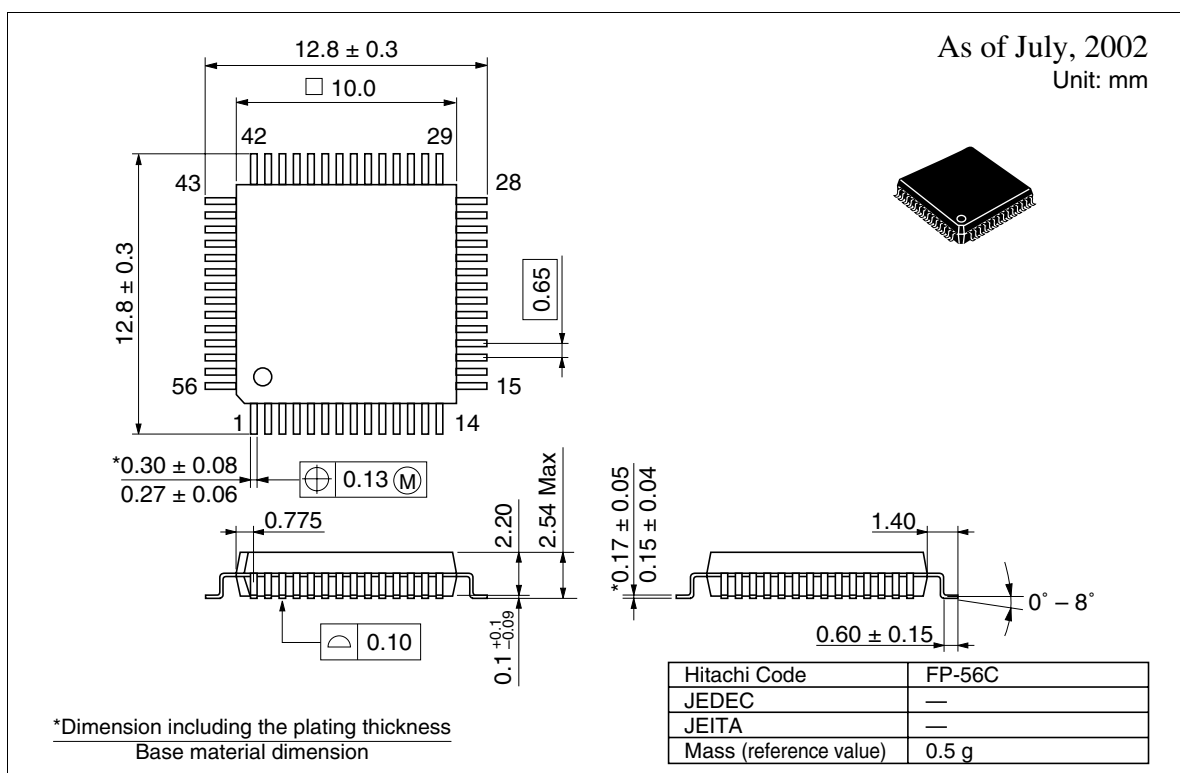
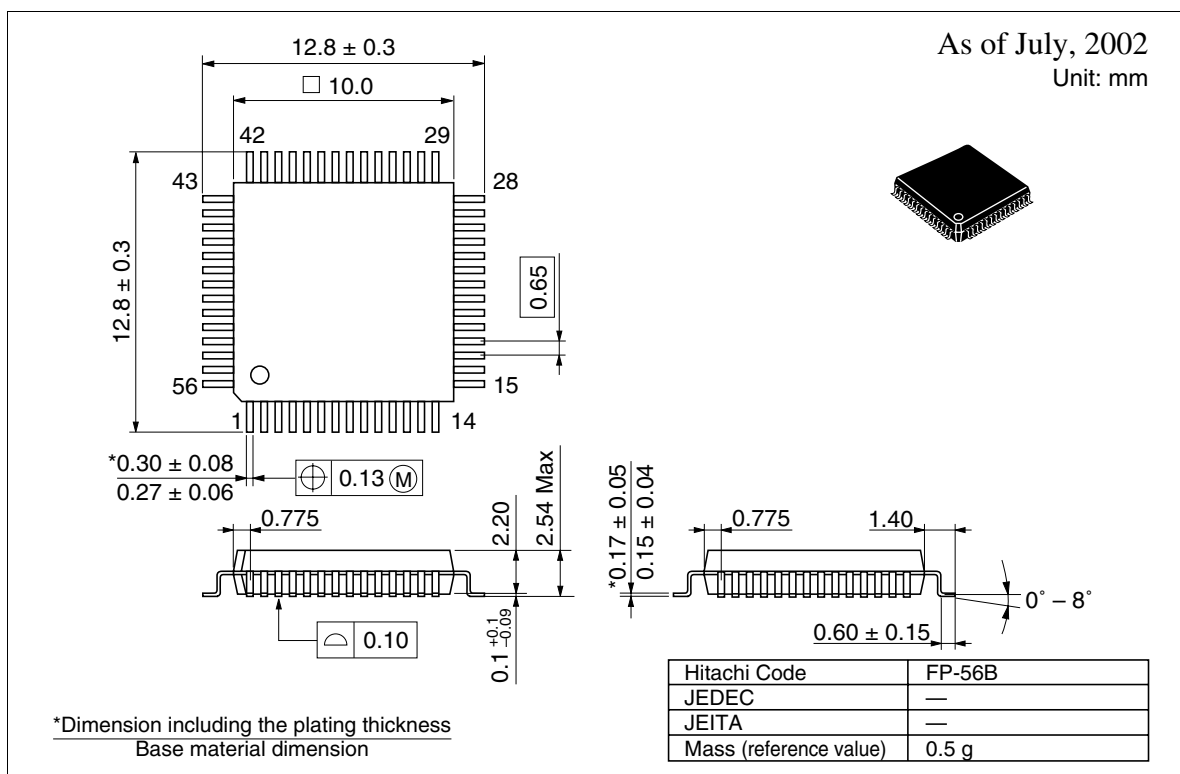
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



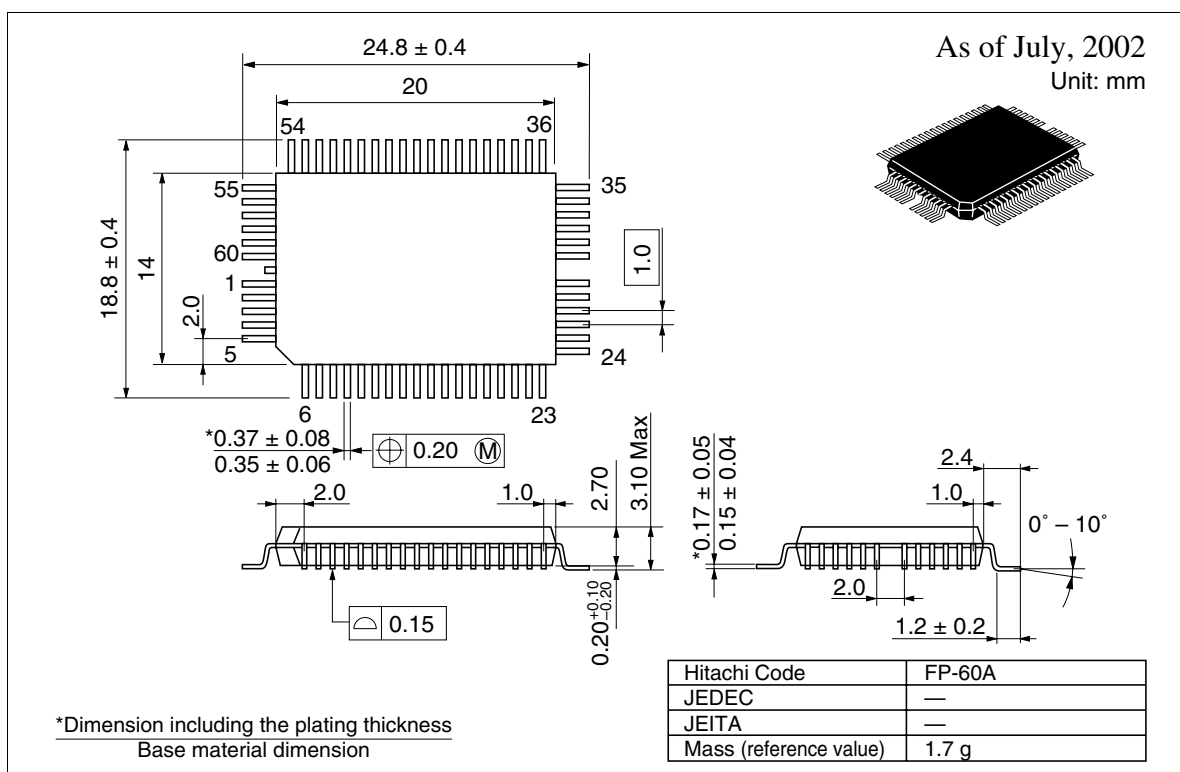
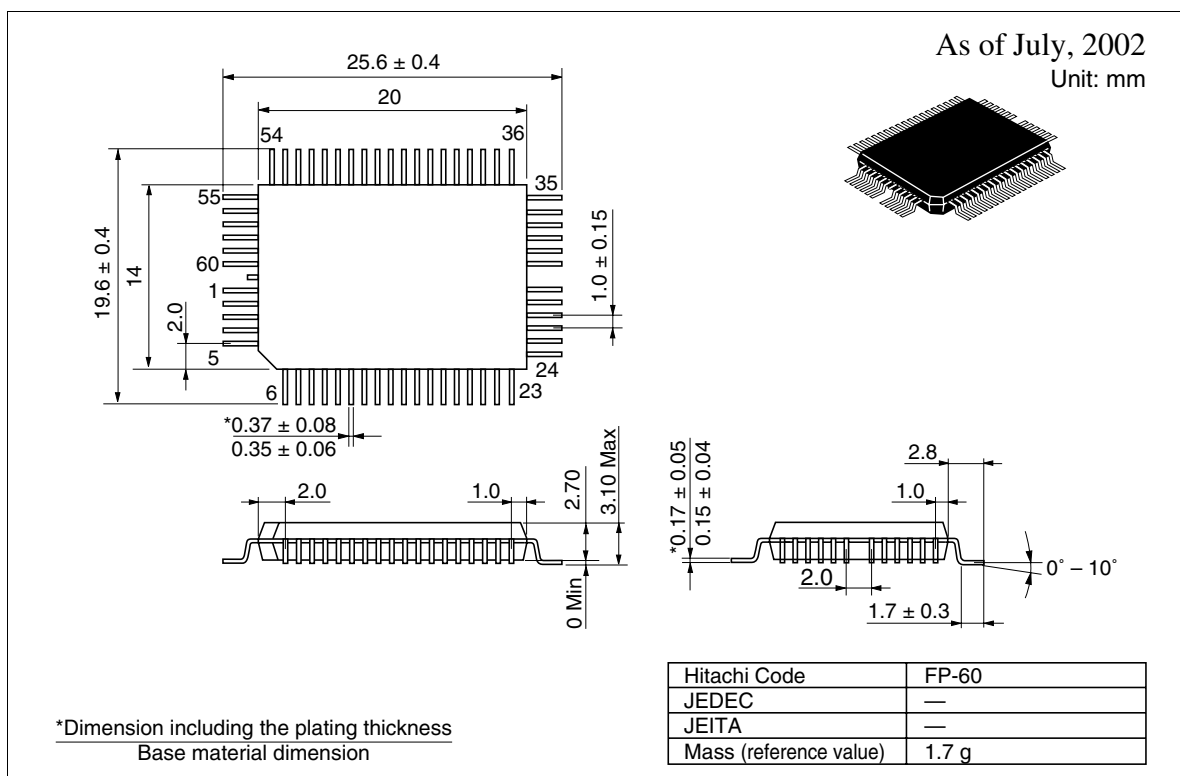
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



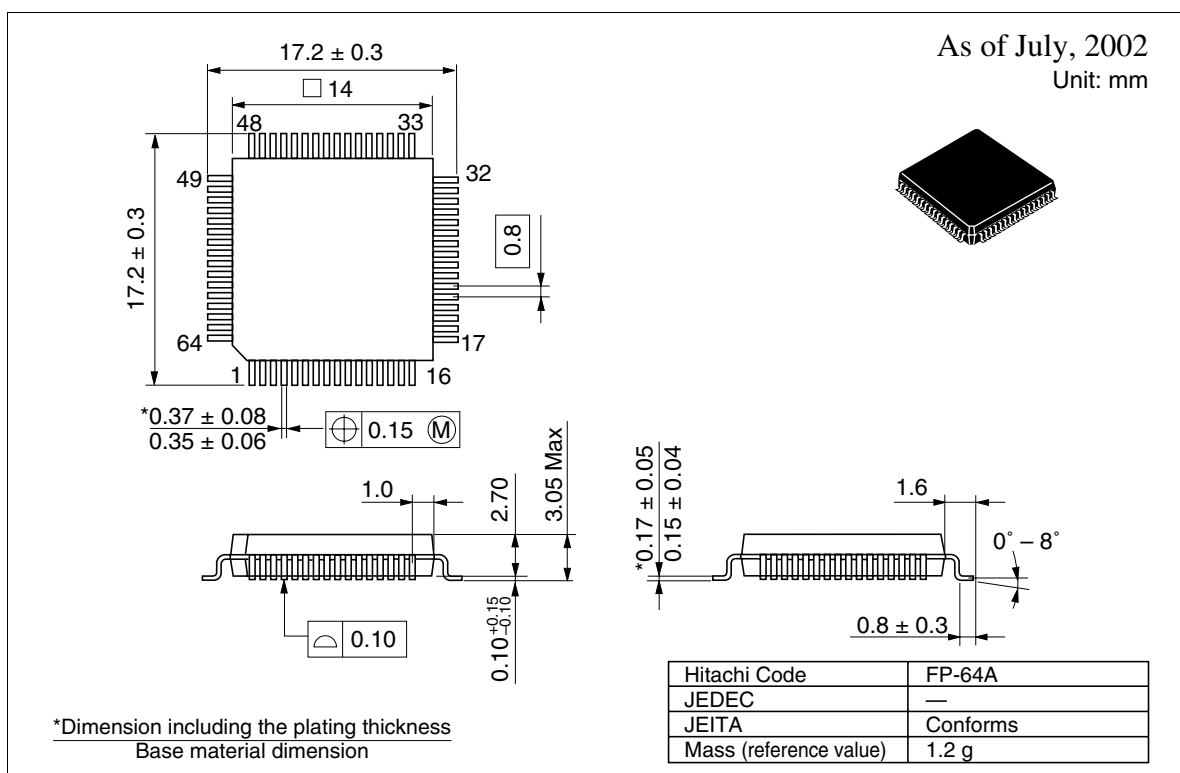
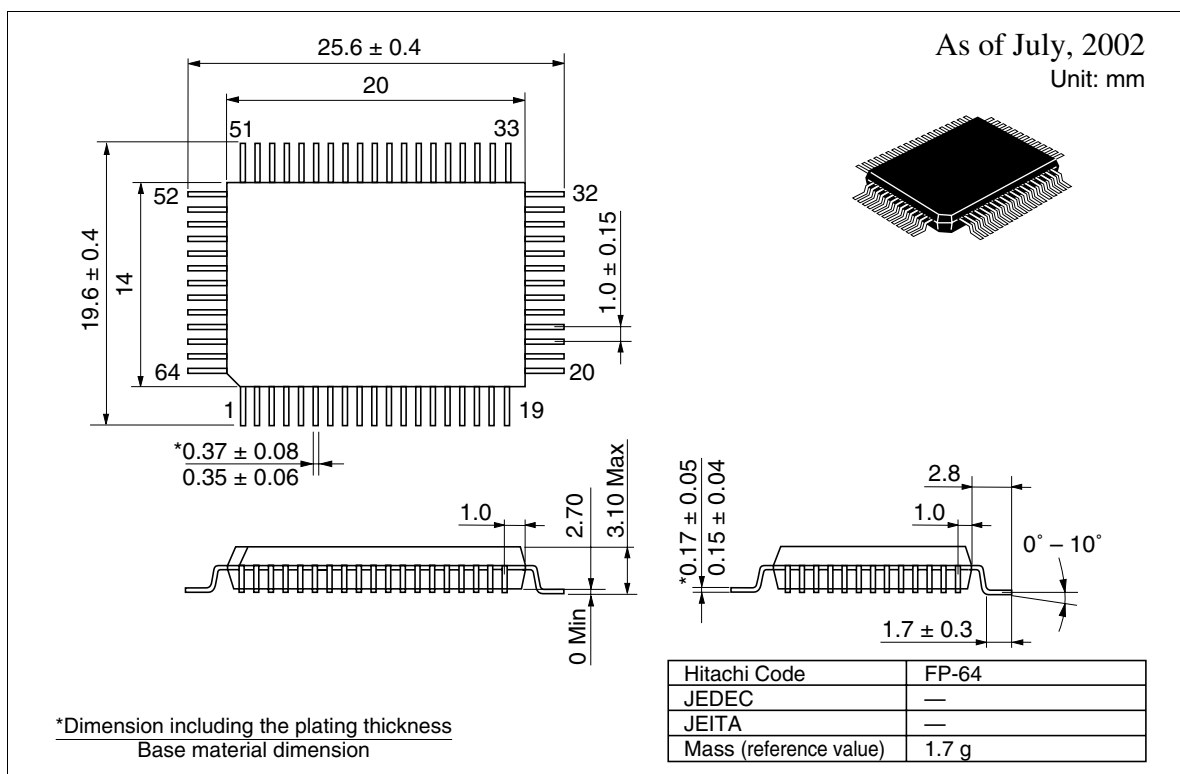
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



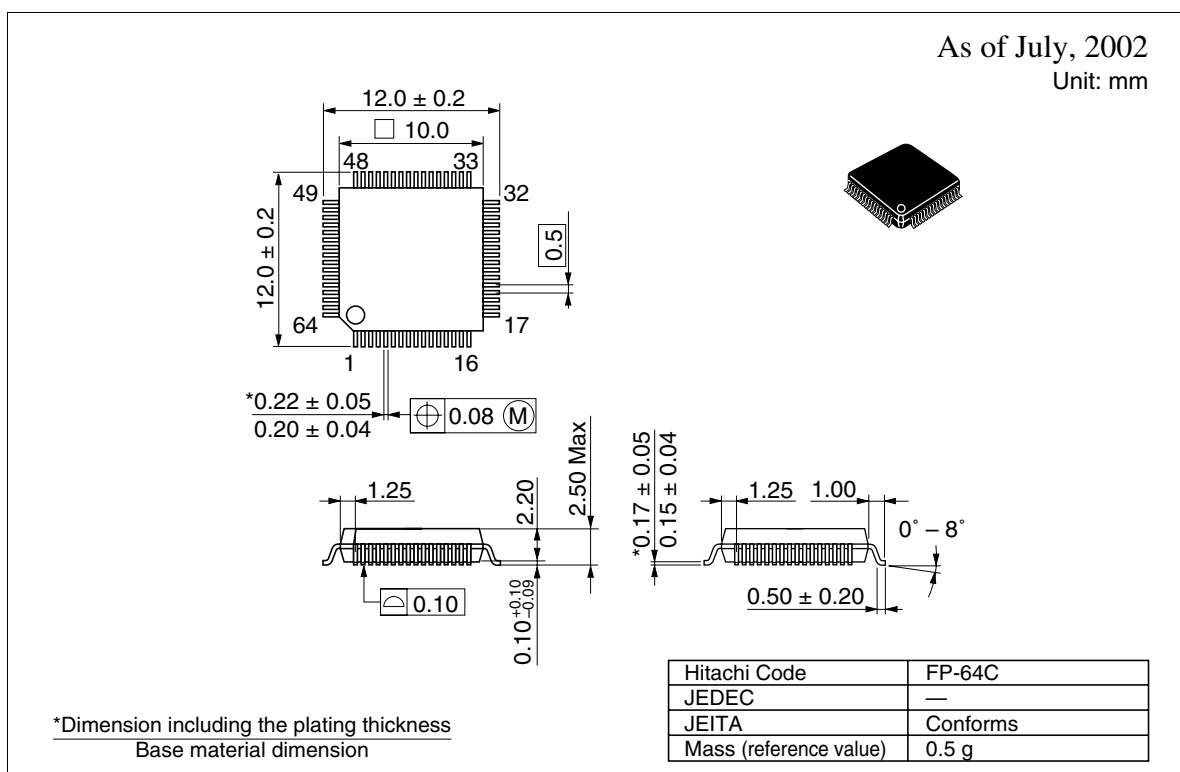
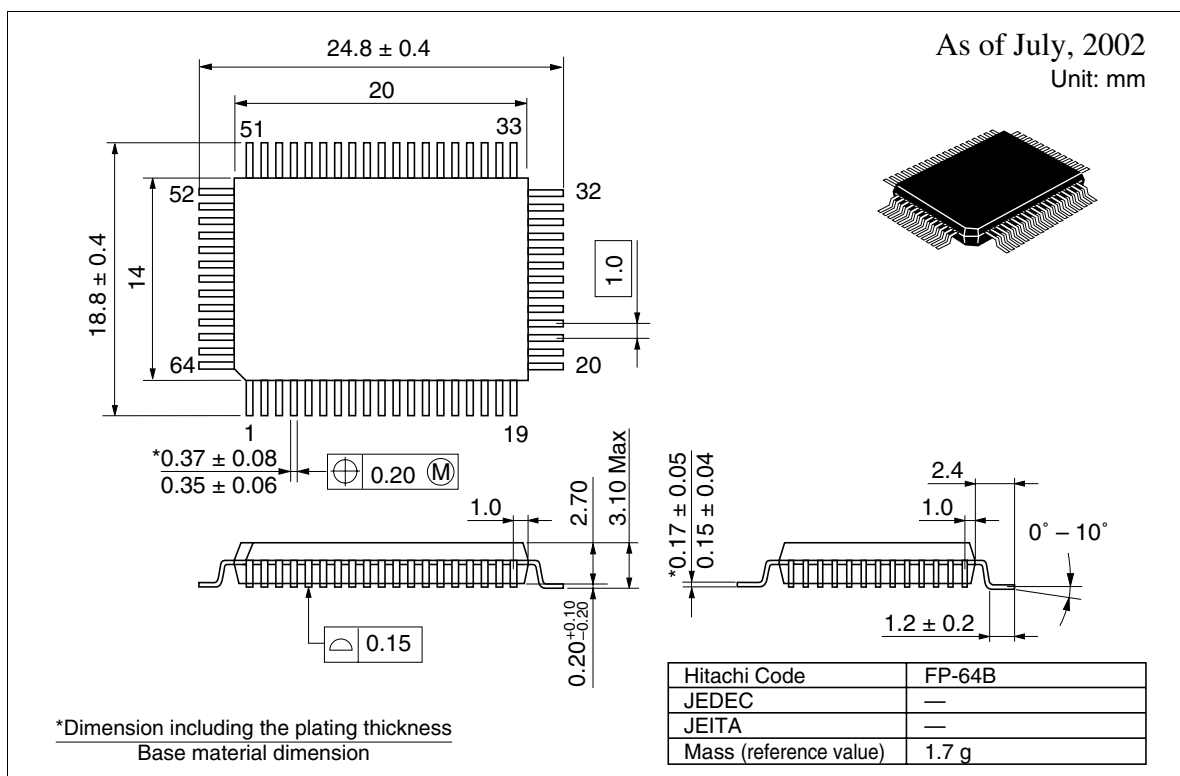
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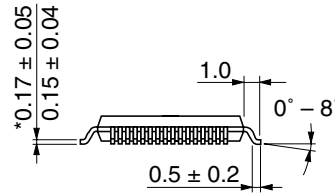
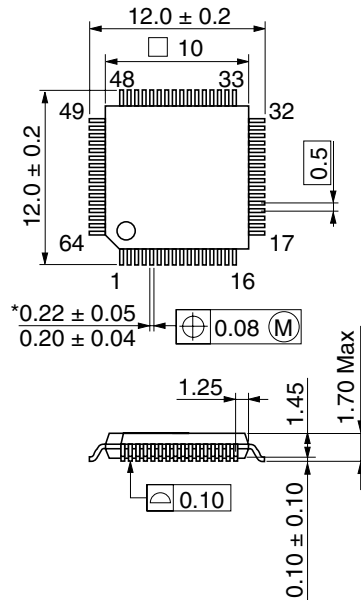
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The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002

Unit: mm

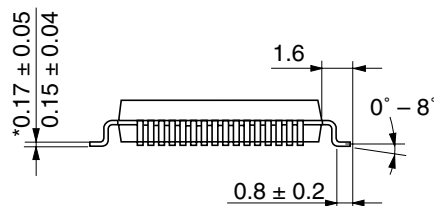
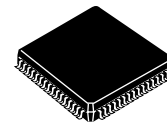
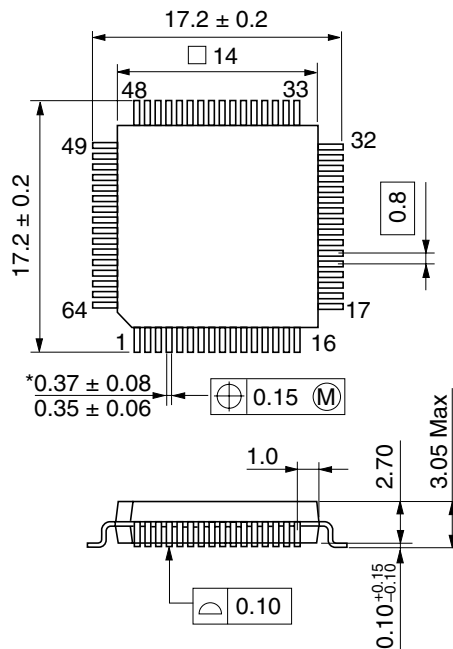


*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-64E
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.4 g

As of July, 2002

Unit: mm

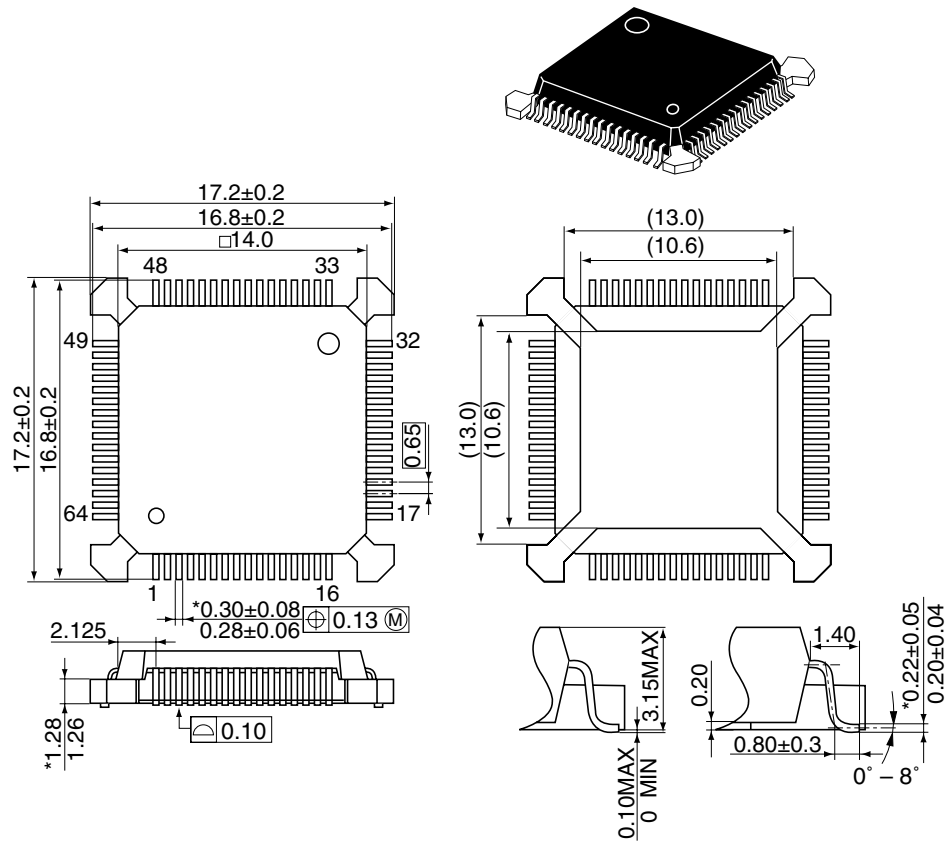


*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-64H
JEDEC	—
JEITA	Conforms
Mass (reference value)	1.2 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

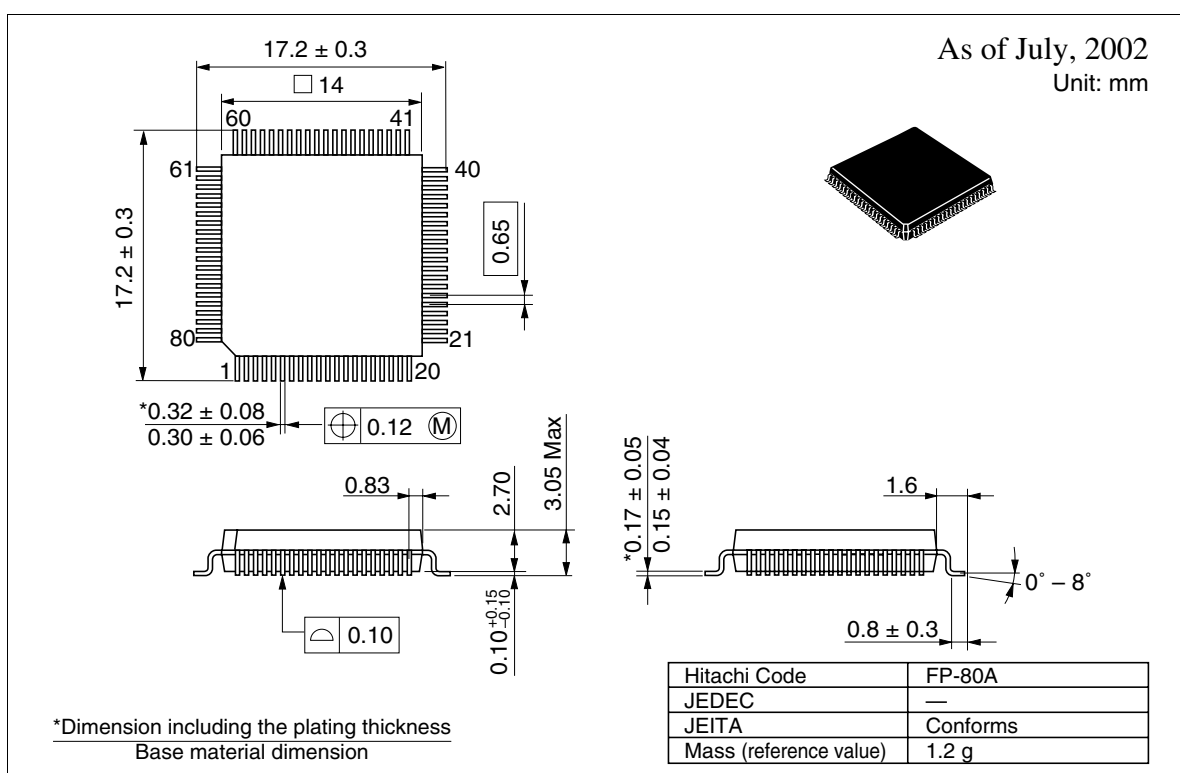
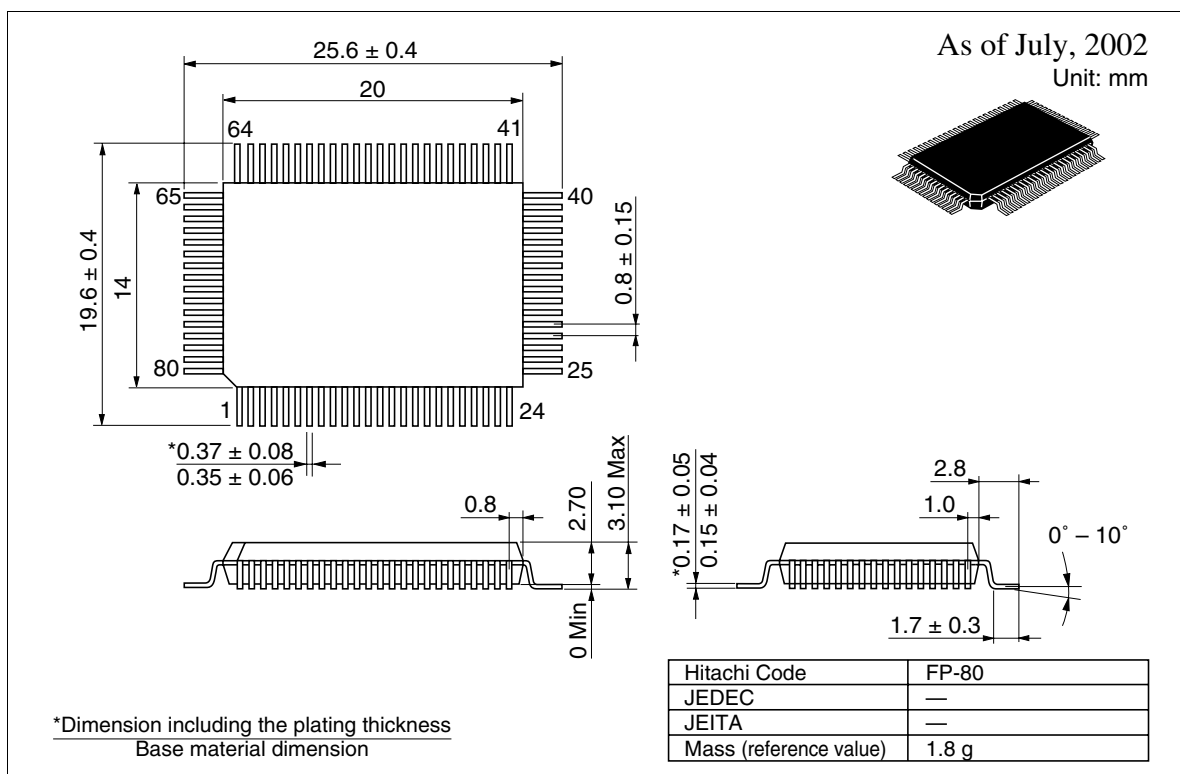
As of July, 2002
Unit: mm



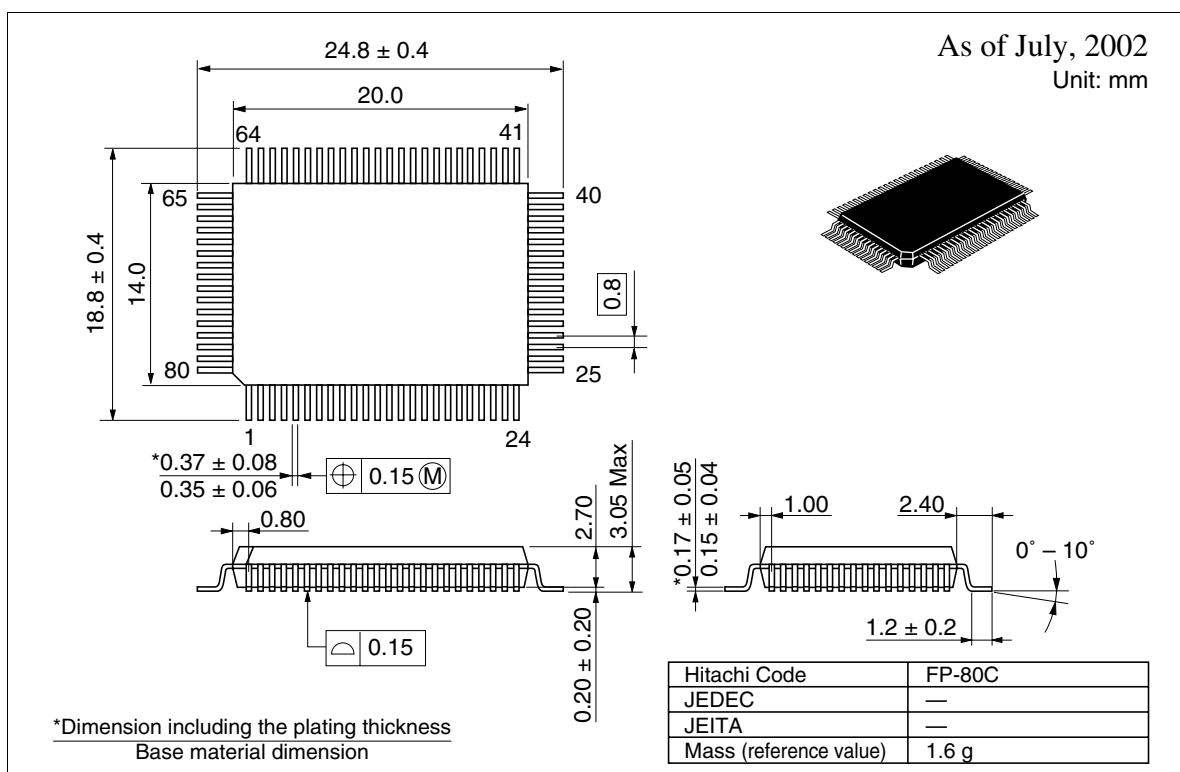
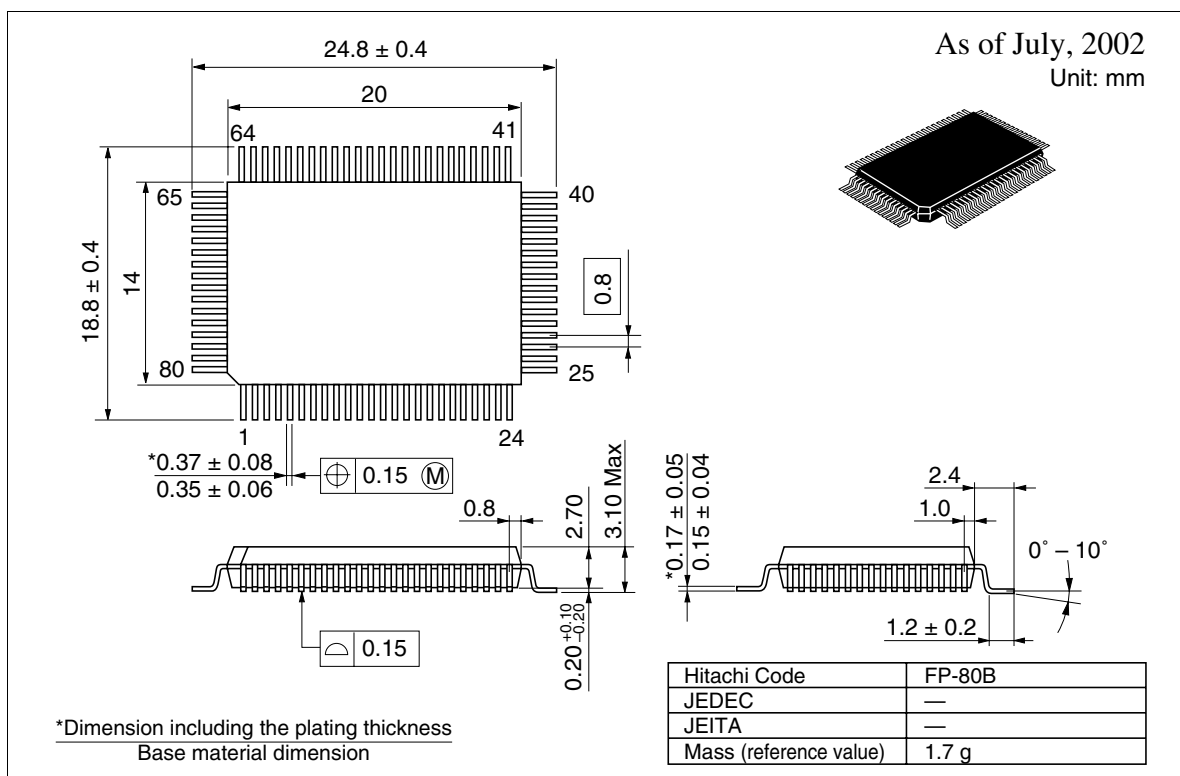
*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-64TA
JEDEC	Conforms
JEITA	—
Mass (reference value)	2.4 g

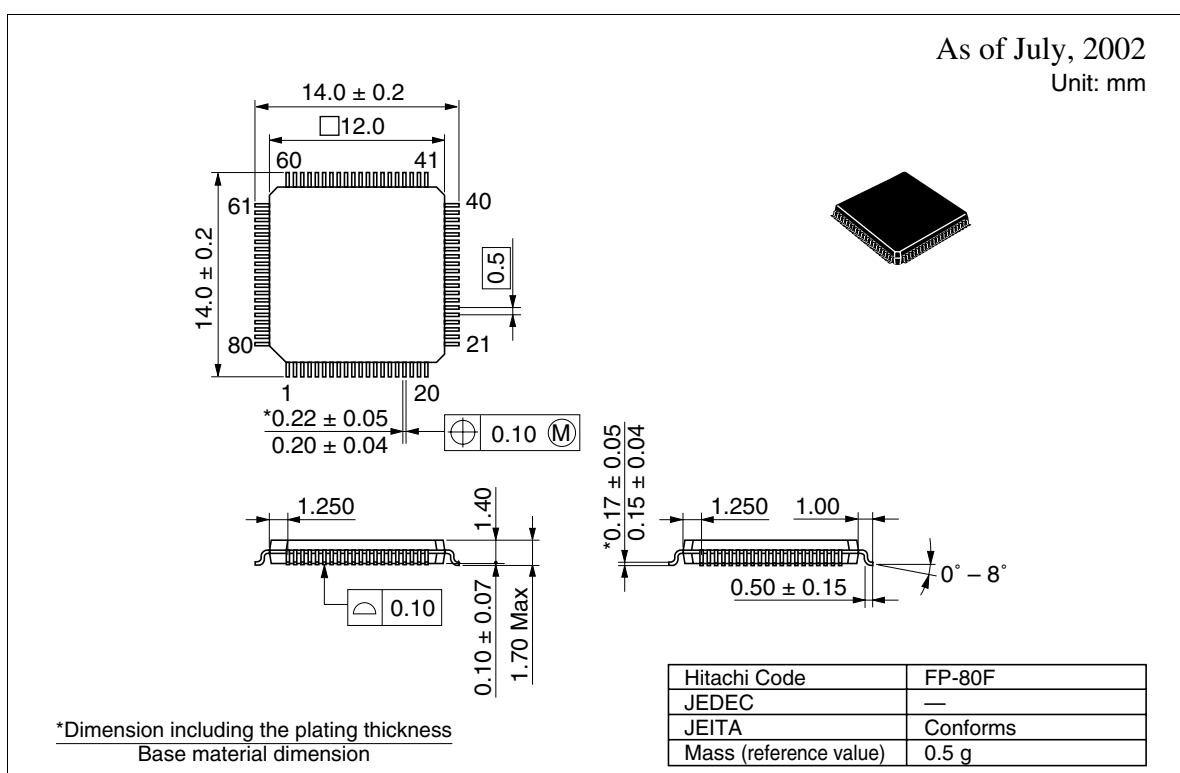
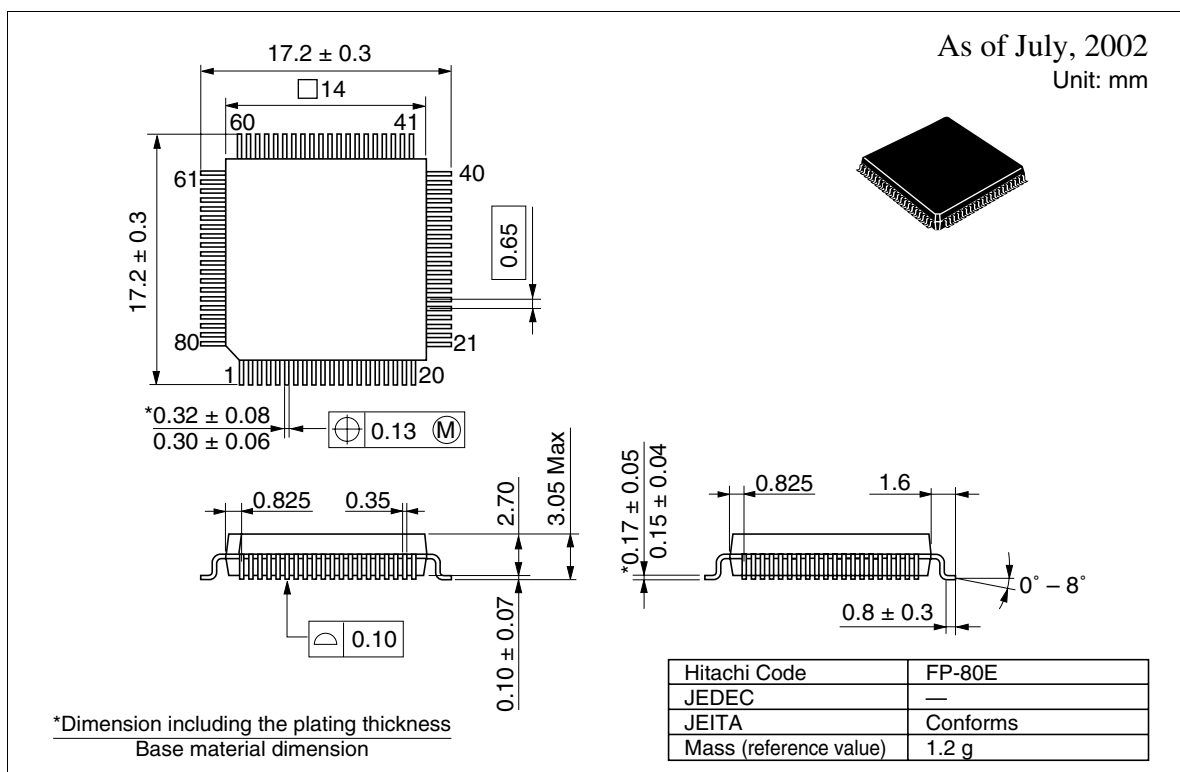
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



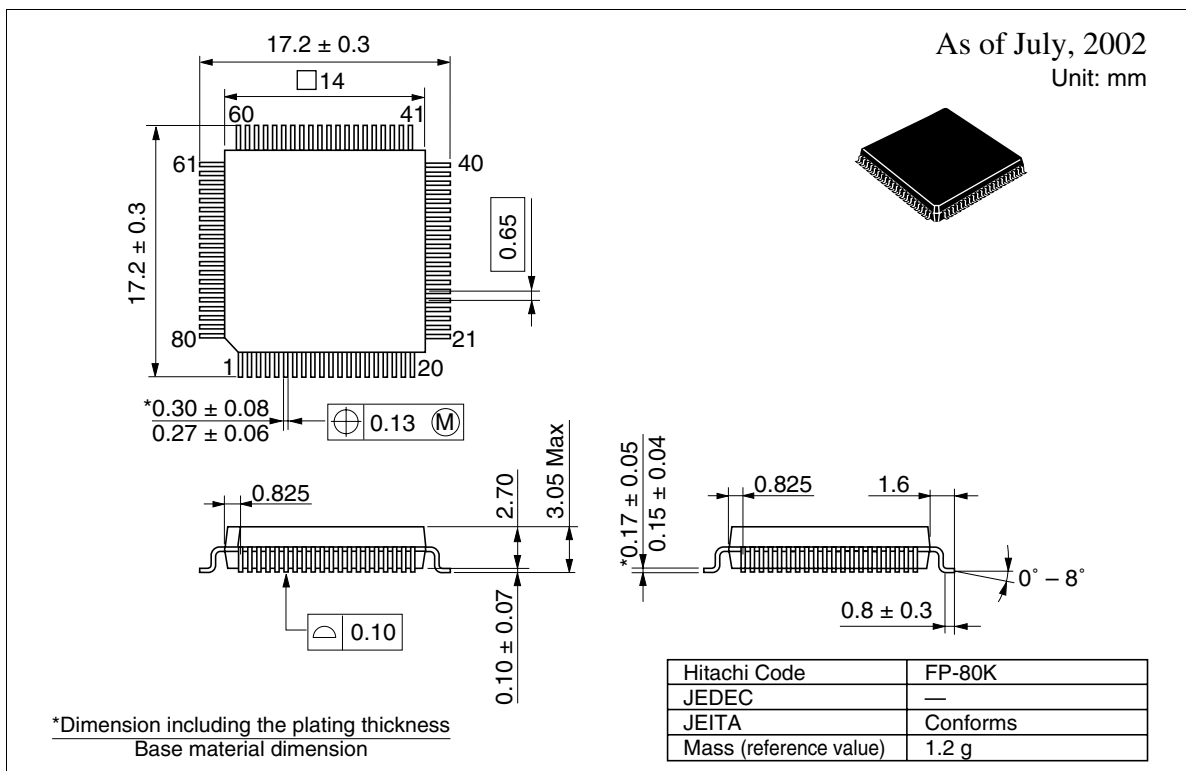
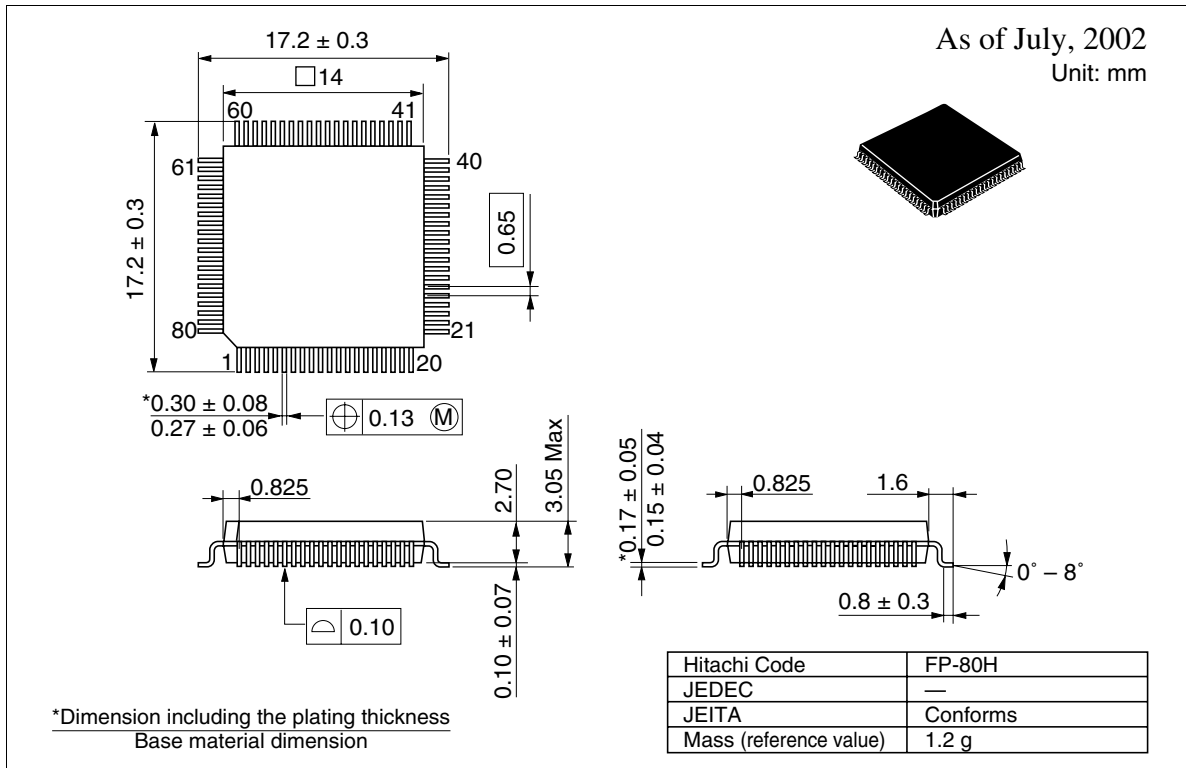
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



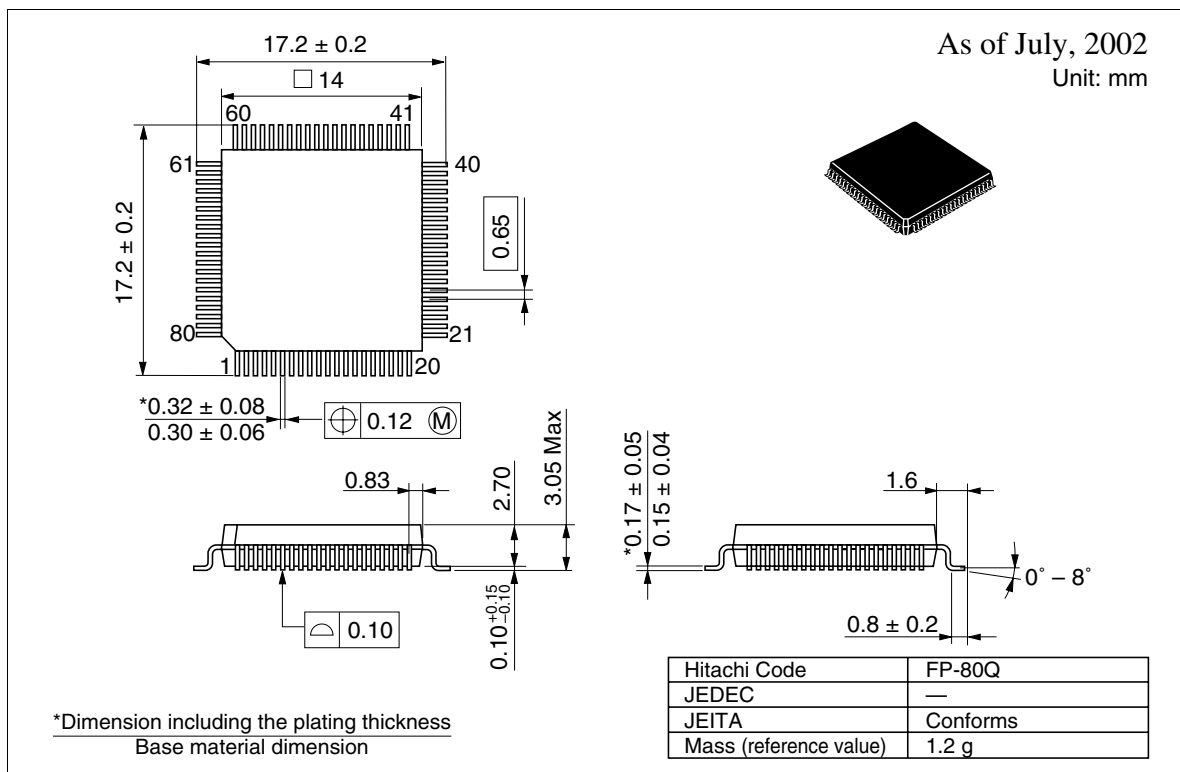
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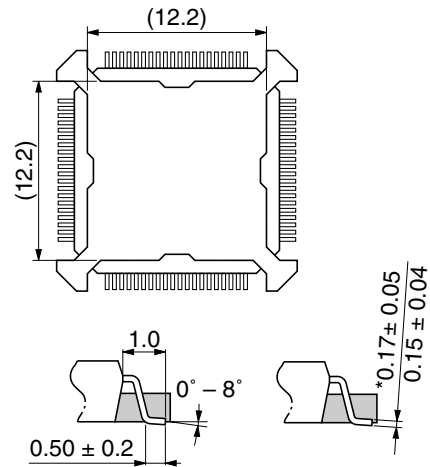
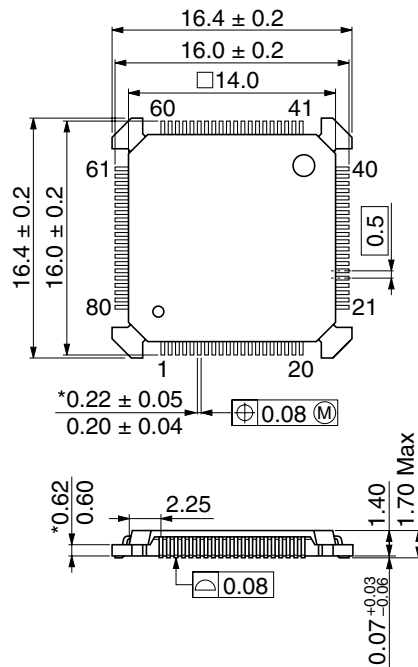
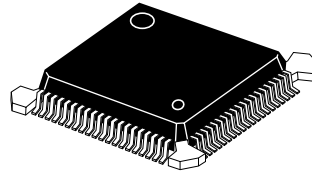


The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002

Unit: mm

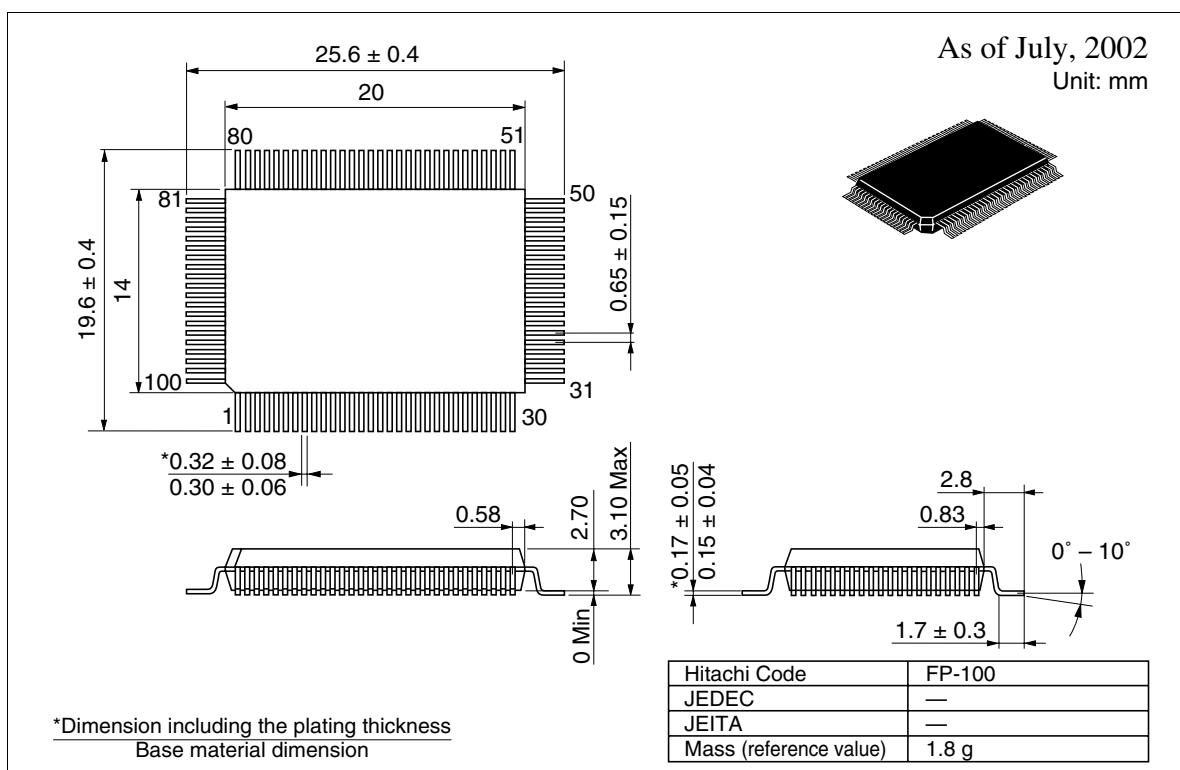
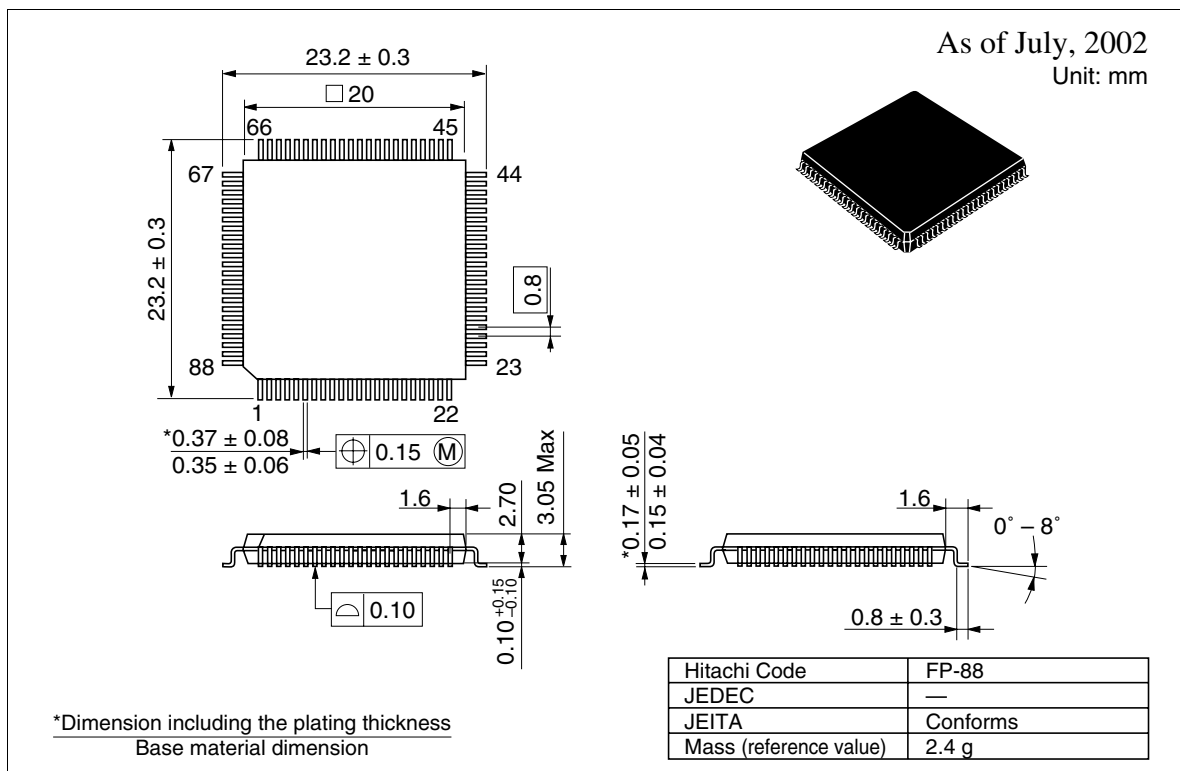
() : reference value



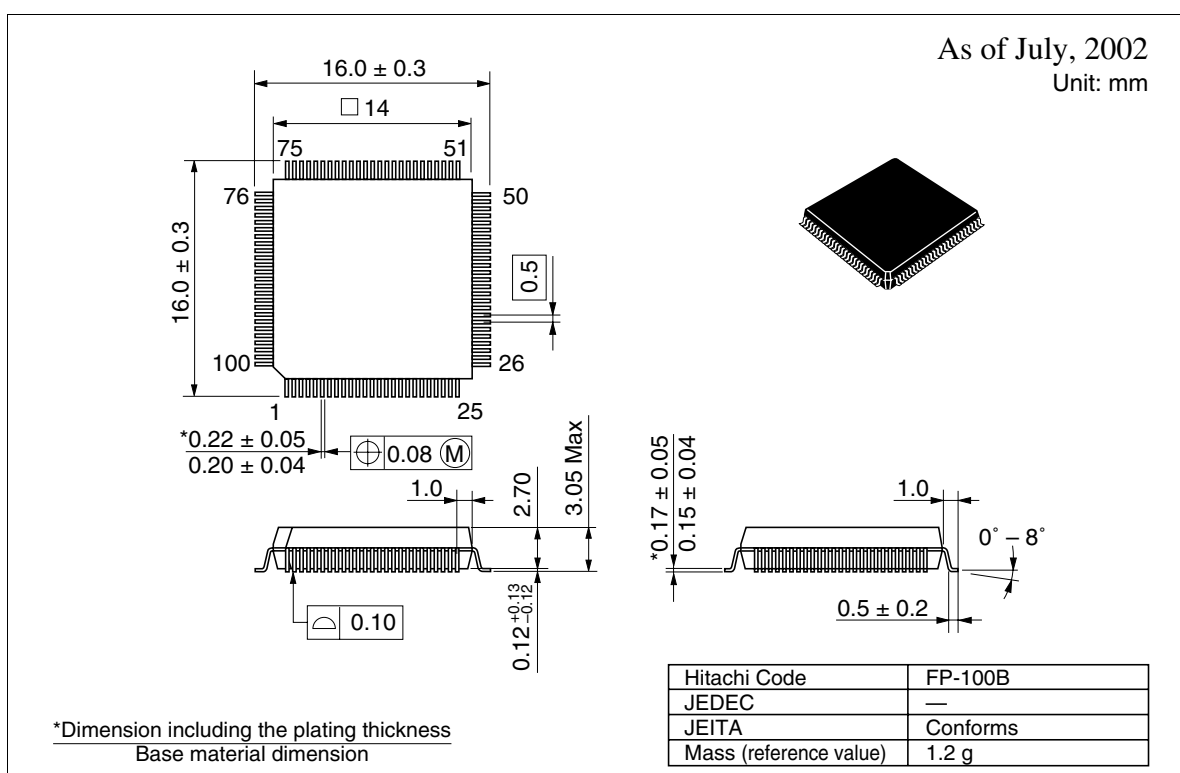
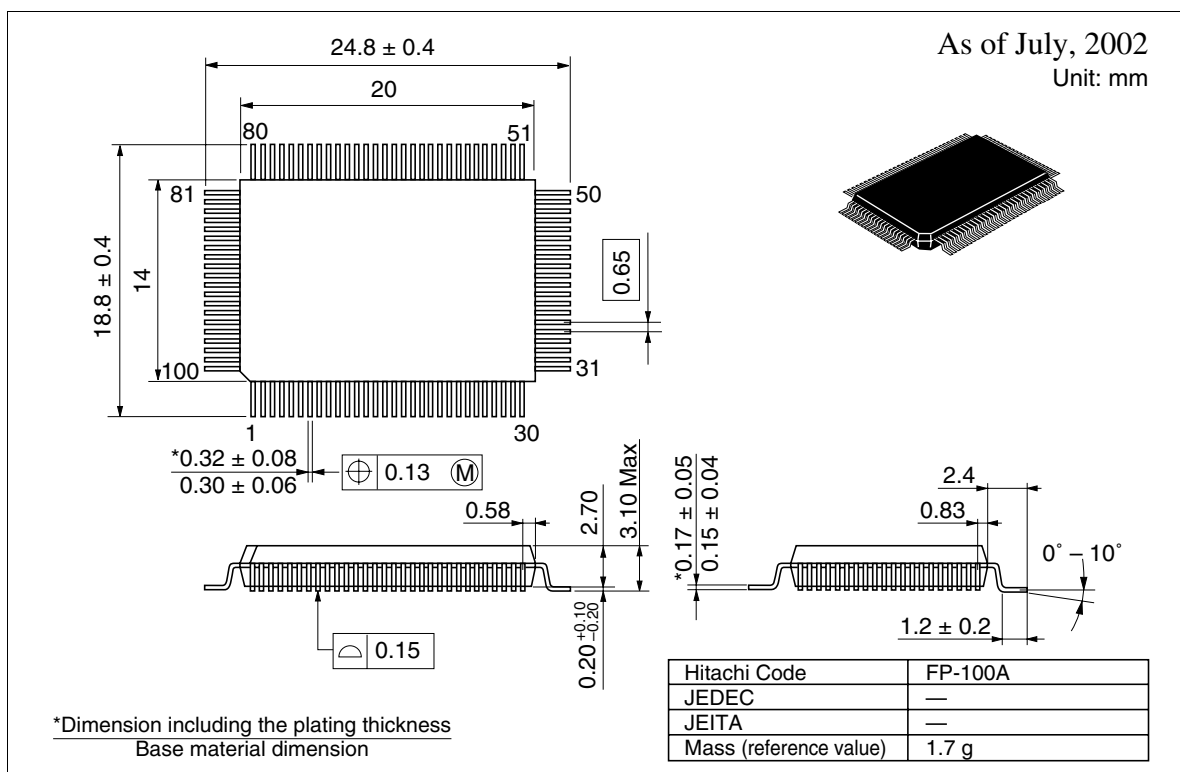
*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-80TA
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	1.3 g

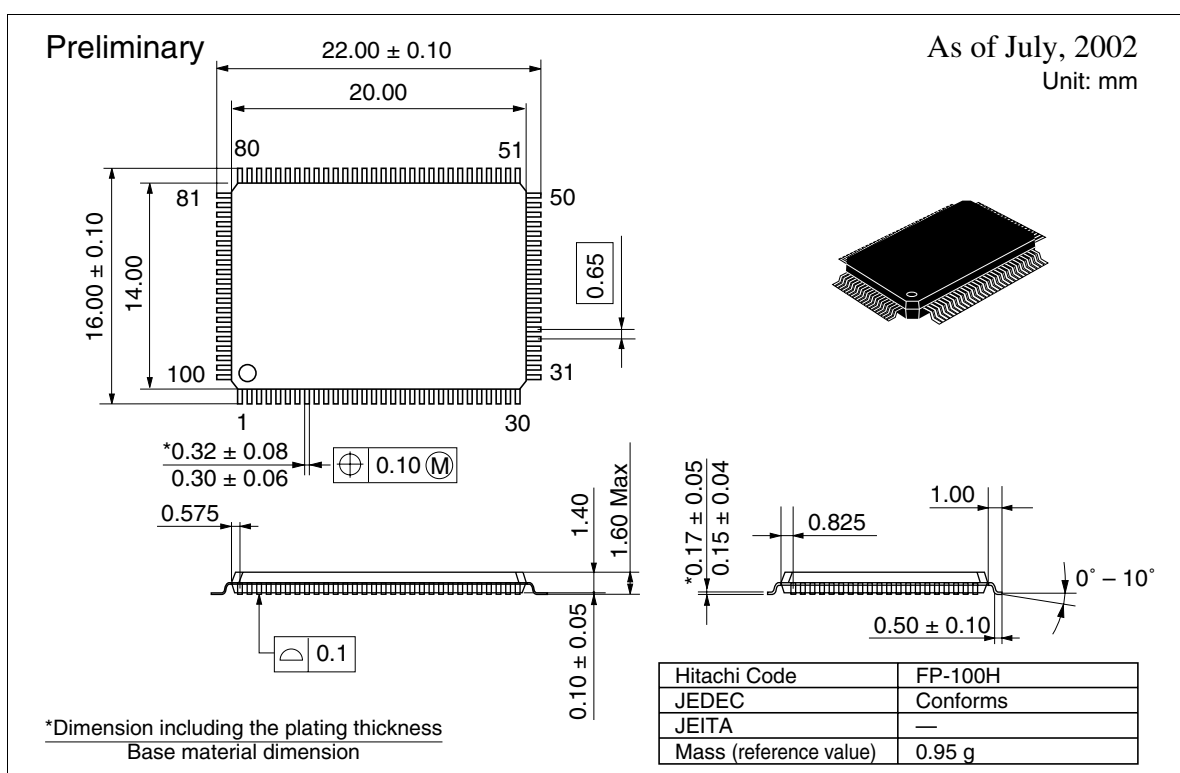
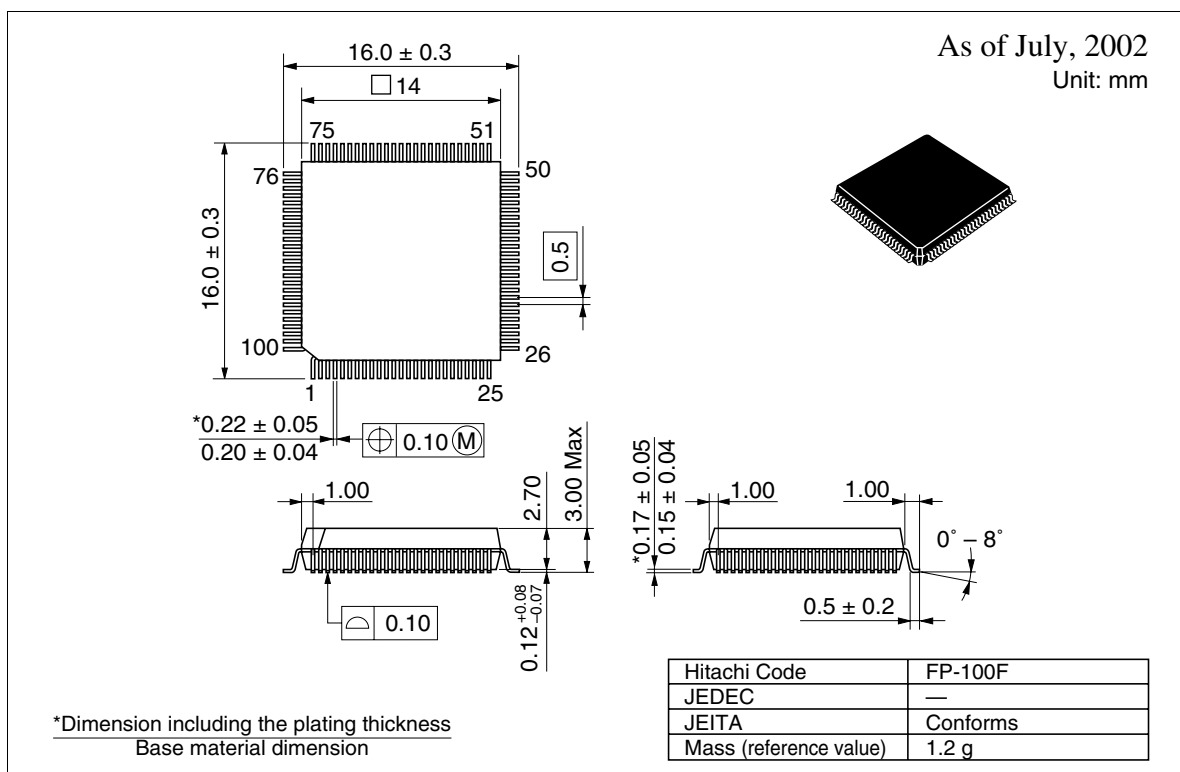
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



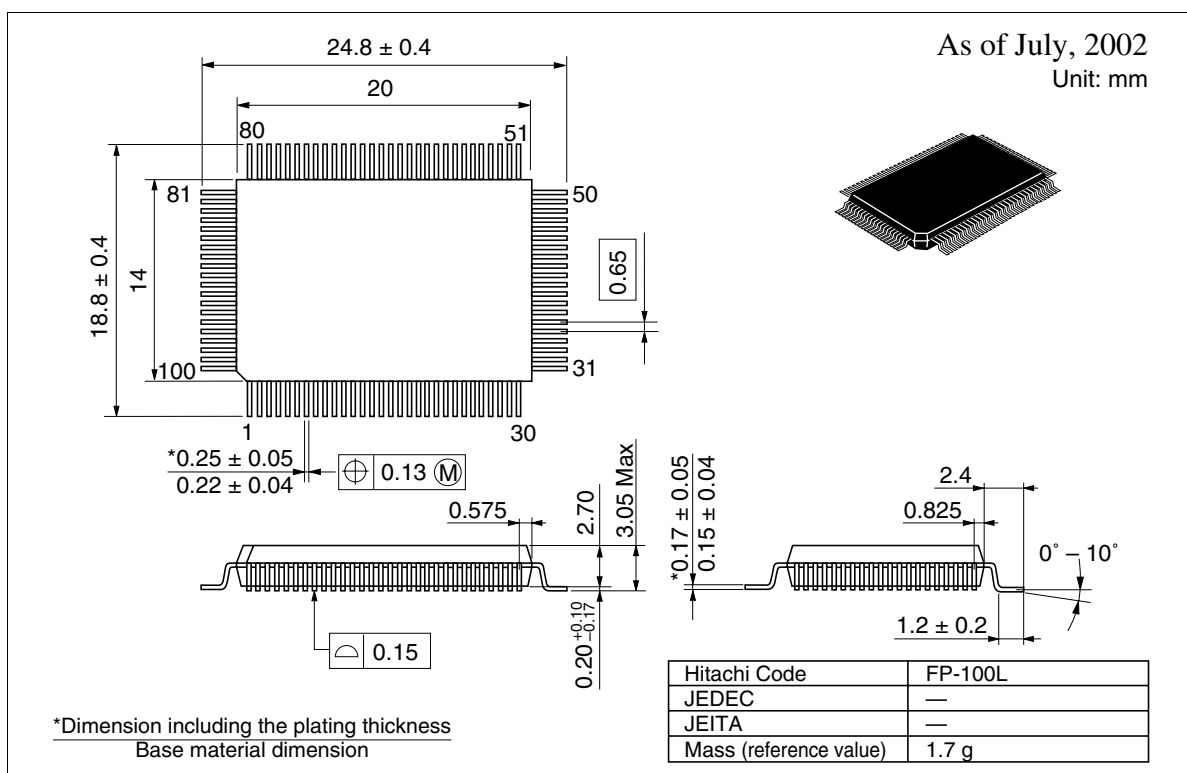
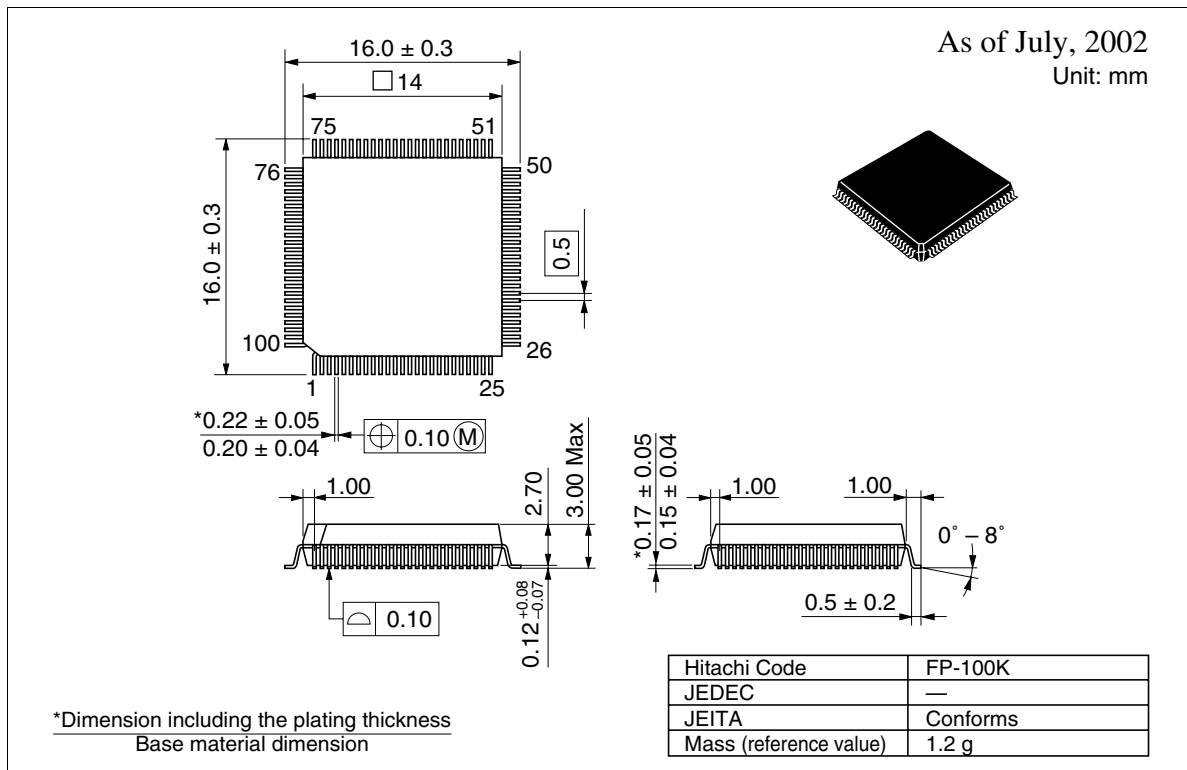
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



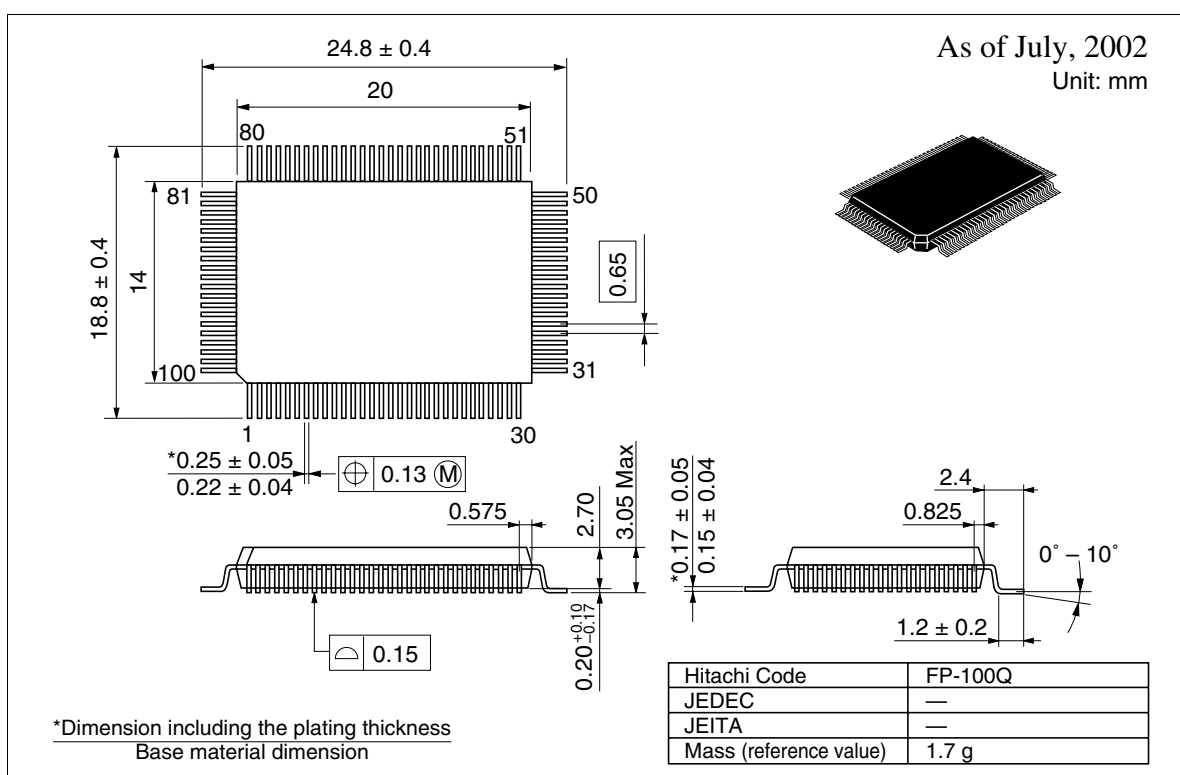
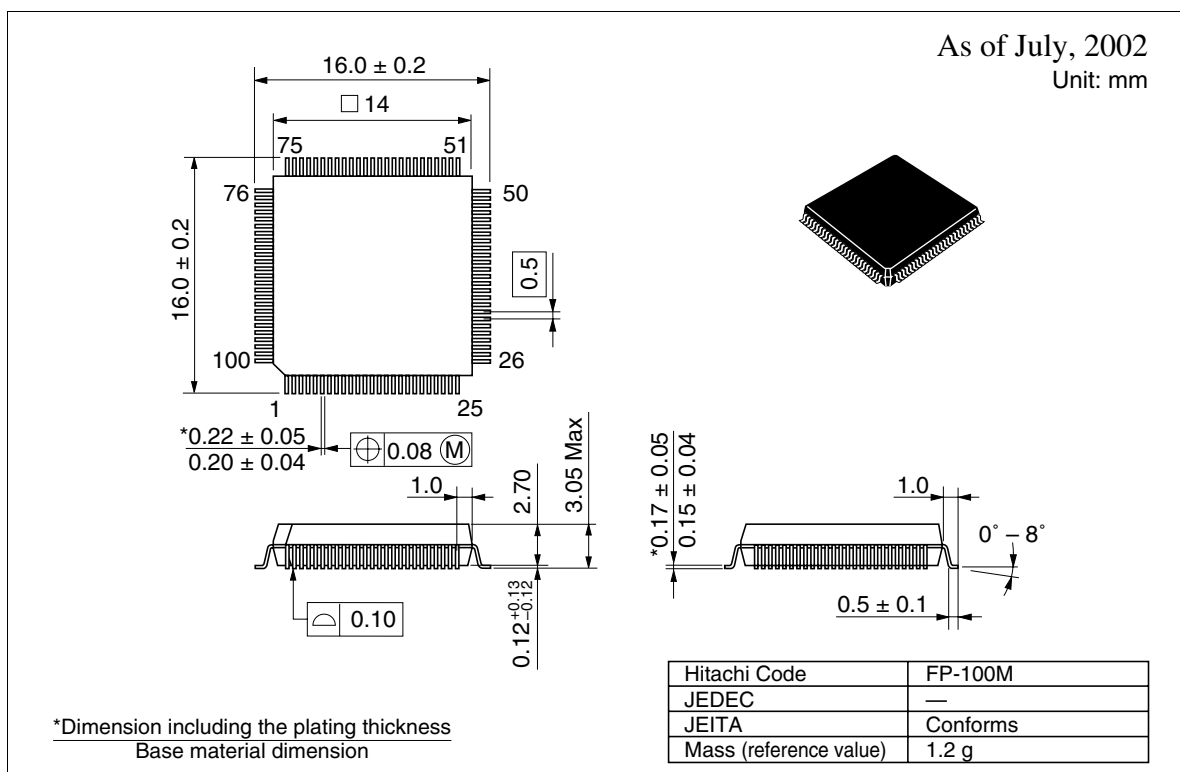
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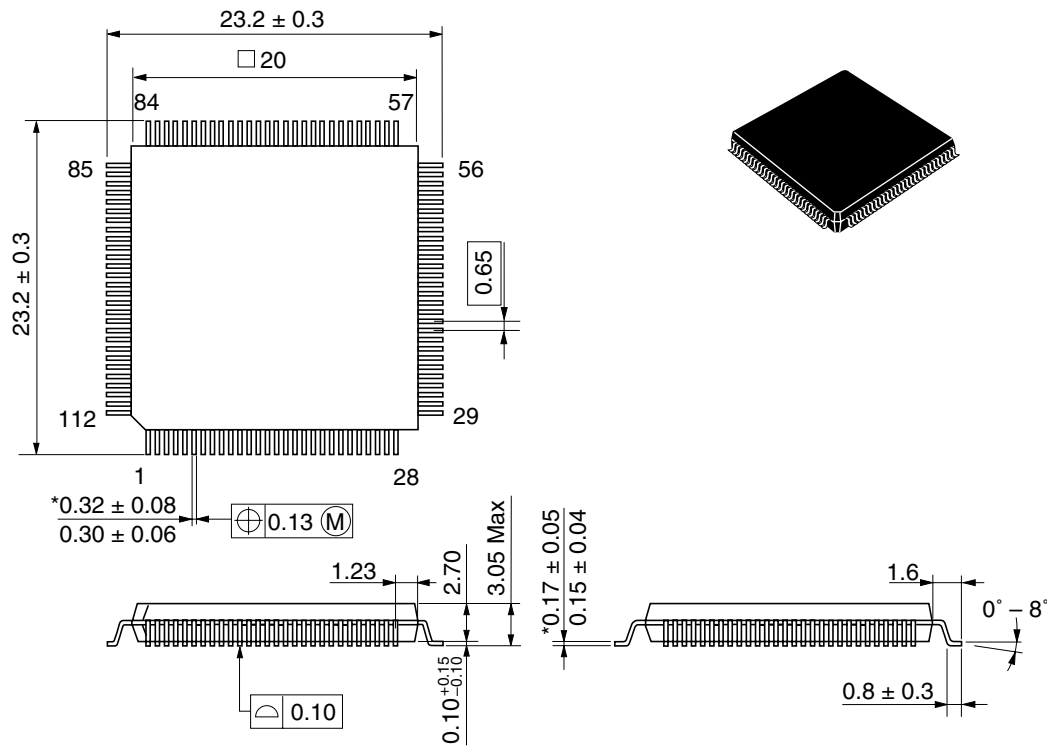


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As of July, 2002
Unit: mm

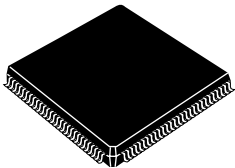


*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-112
JEDEC	—
JEITA	Conforms
Mass (reference value)	2.4 g

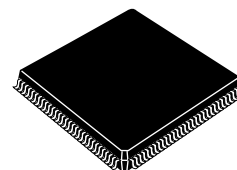
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Unit: mm


$$\frac{\text{*Dimension including the plating thickness}}{\text{Base material dimension}}$$

170

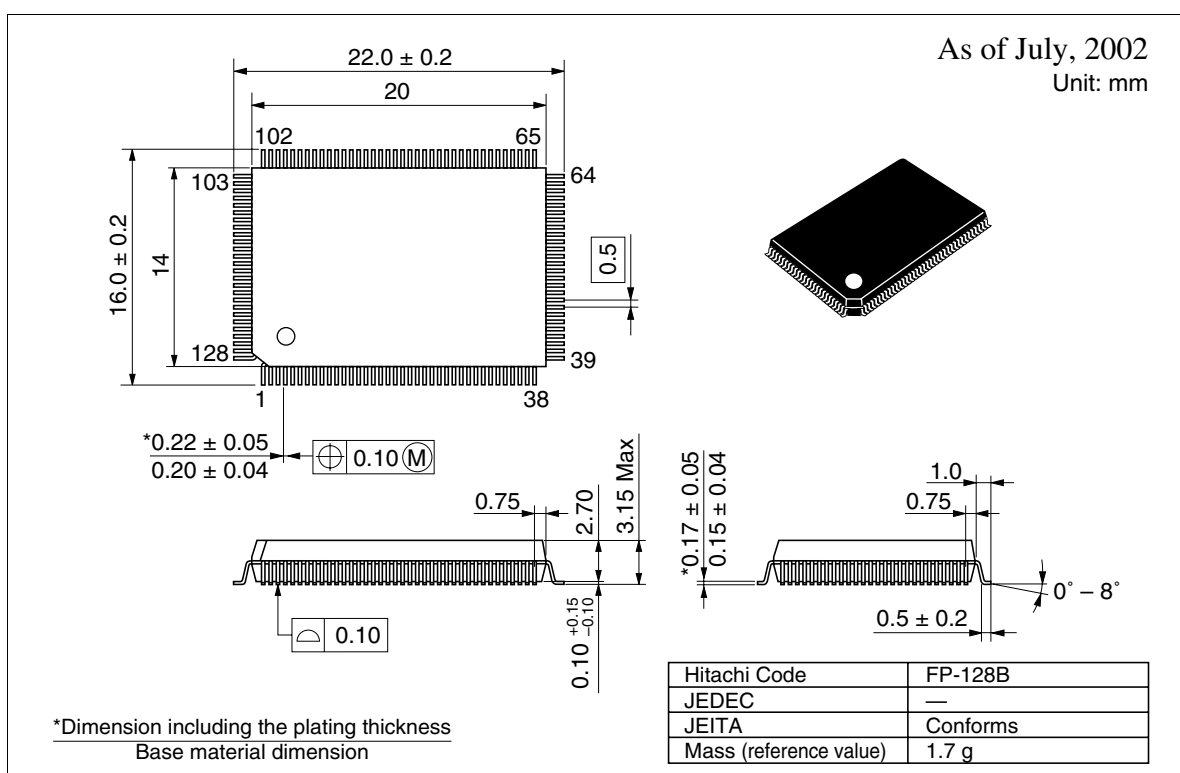
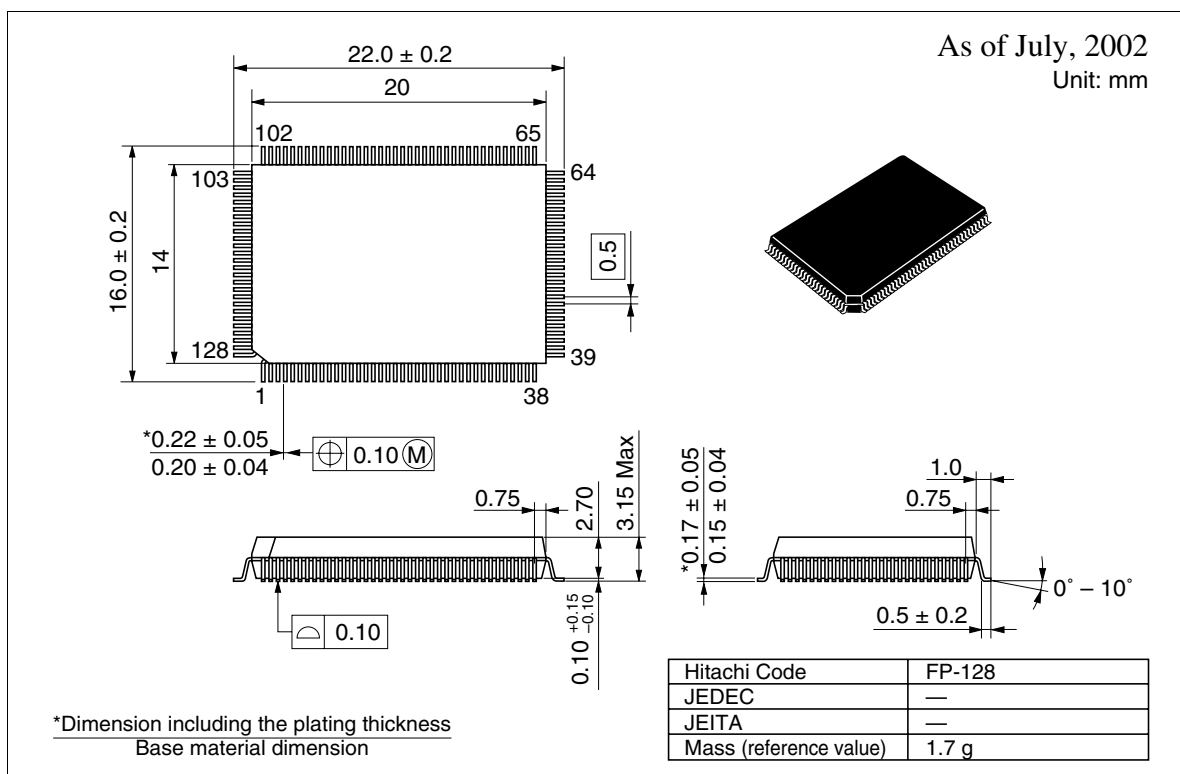
Unit: mm



Hitachi Code	FP-120A
JEDEC	—
JEITA	Conforms
Mass (reference value)	2.3 g

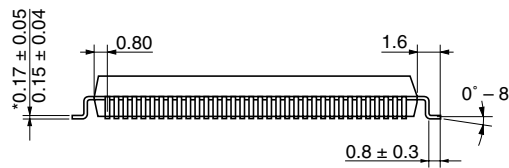
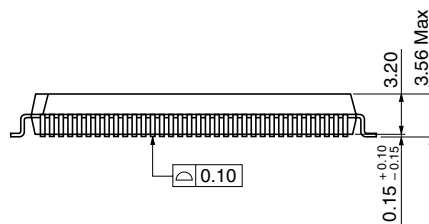
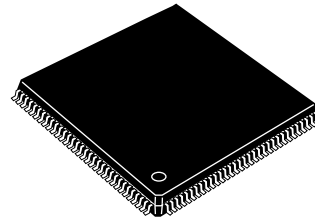
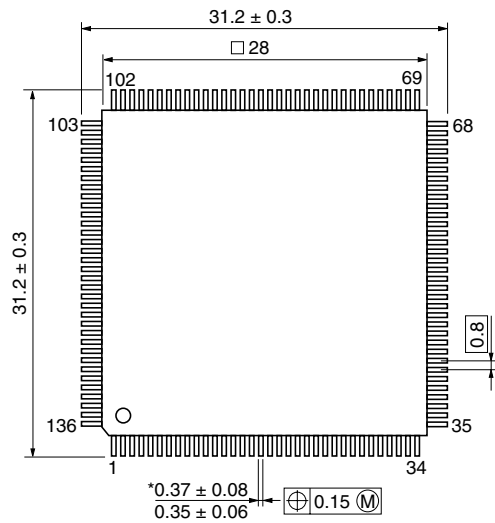
$$\frac{\text{*Dimension including the plating thickness}}{\text{Base material dimension}}$$

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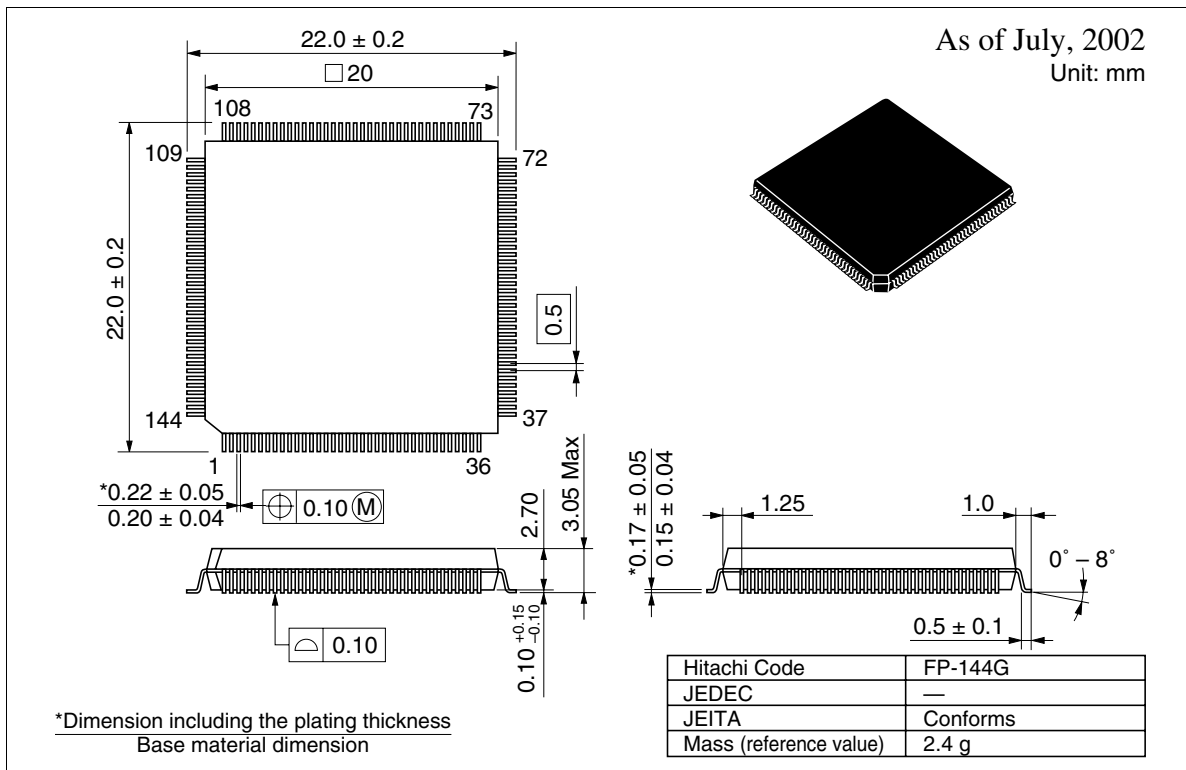
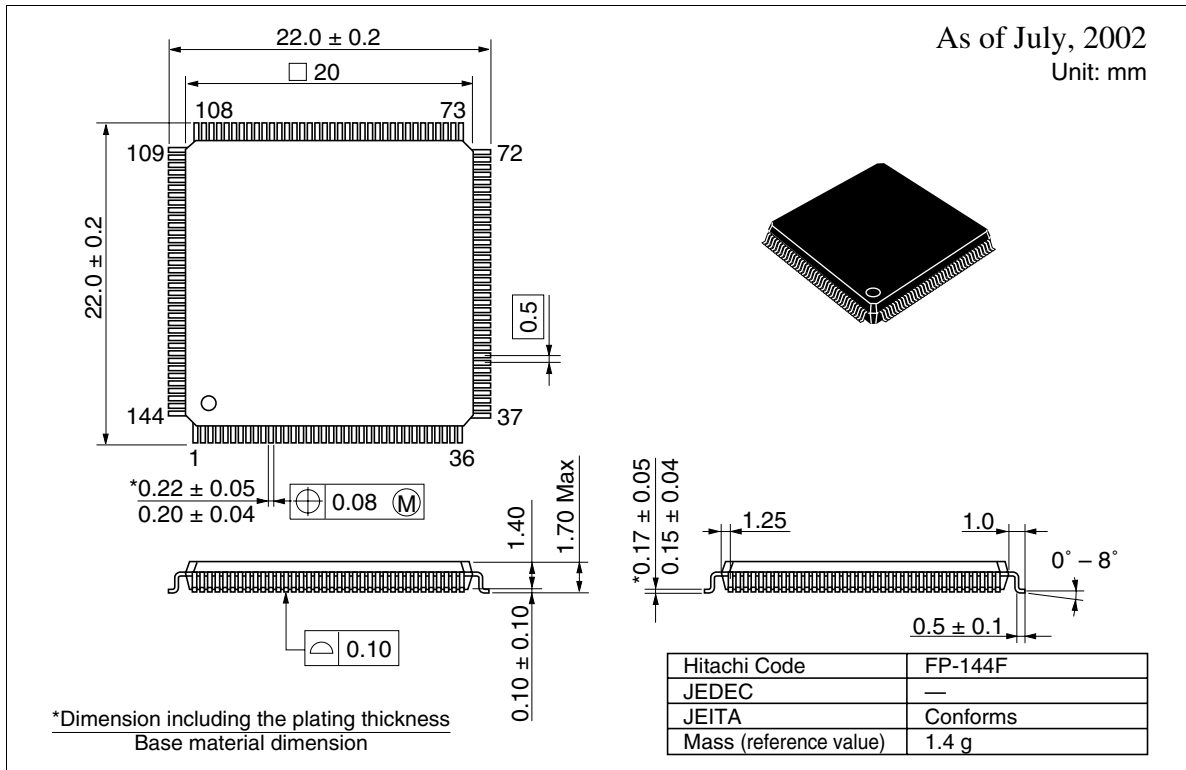
As of July, 2002
Unit: mm



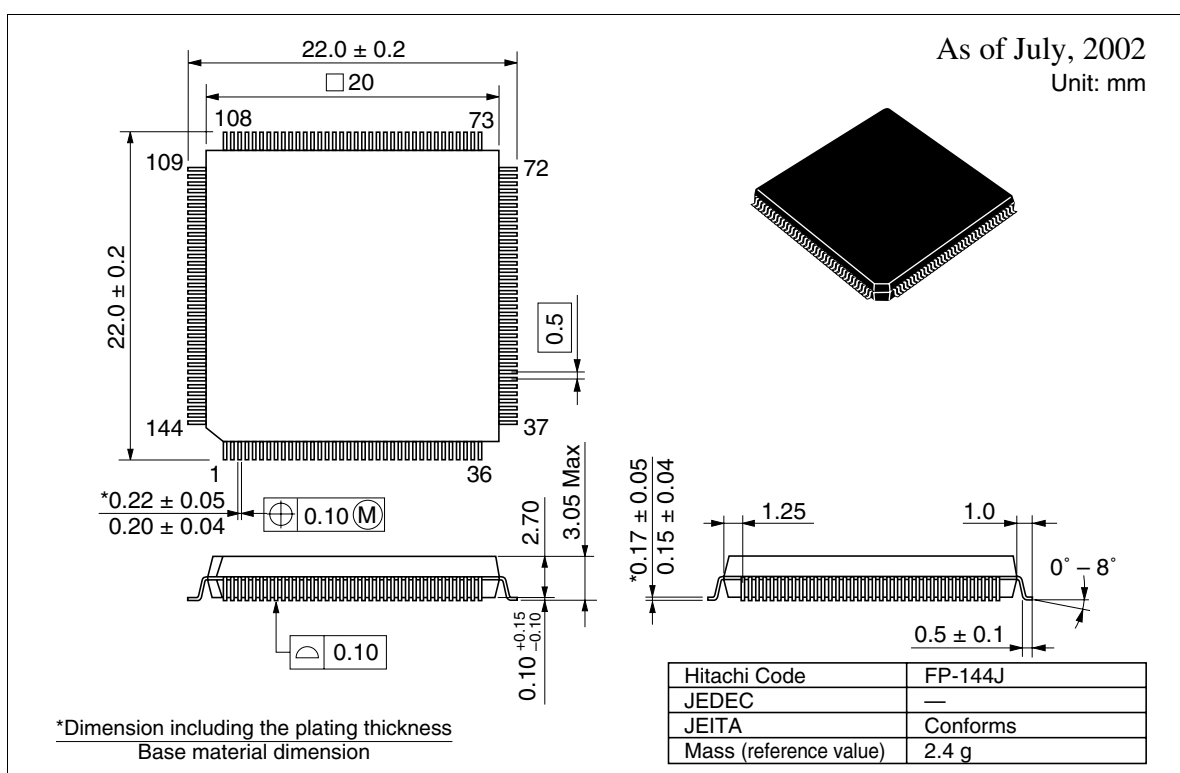
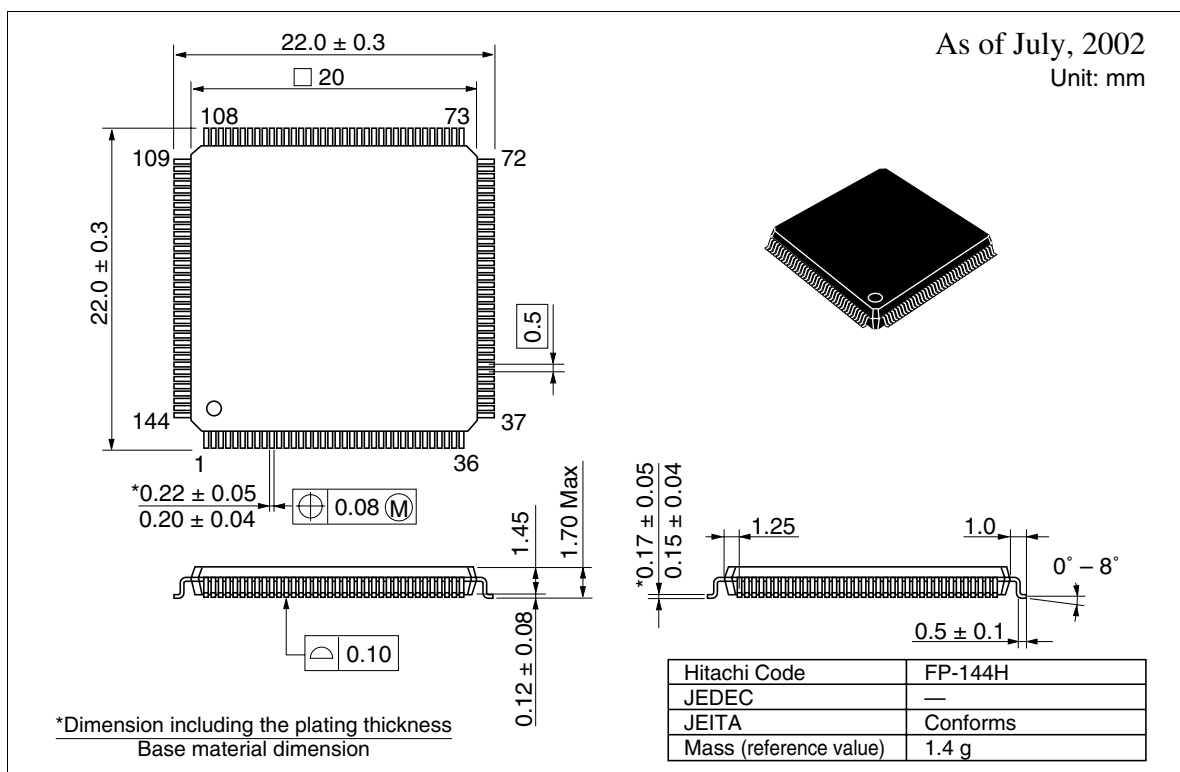
*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-136
JEDEC	—
JEITA	—
Mass (reference value)	5.3 g

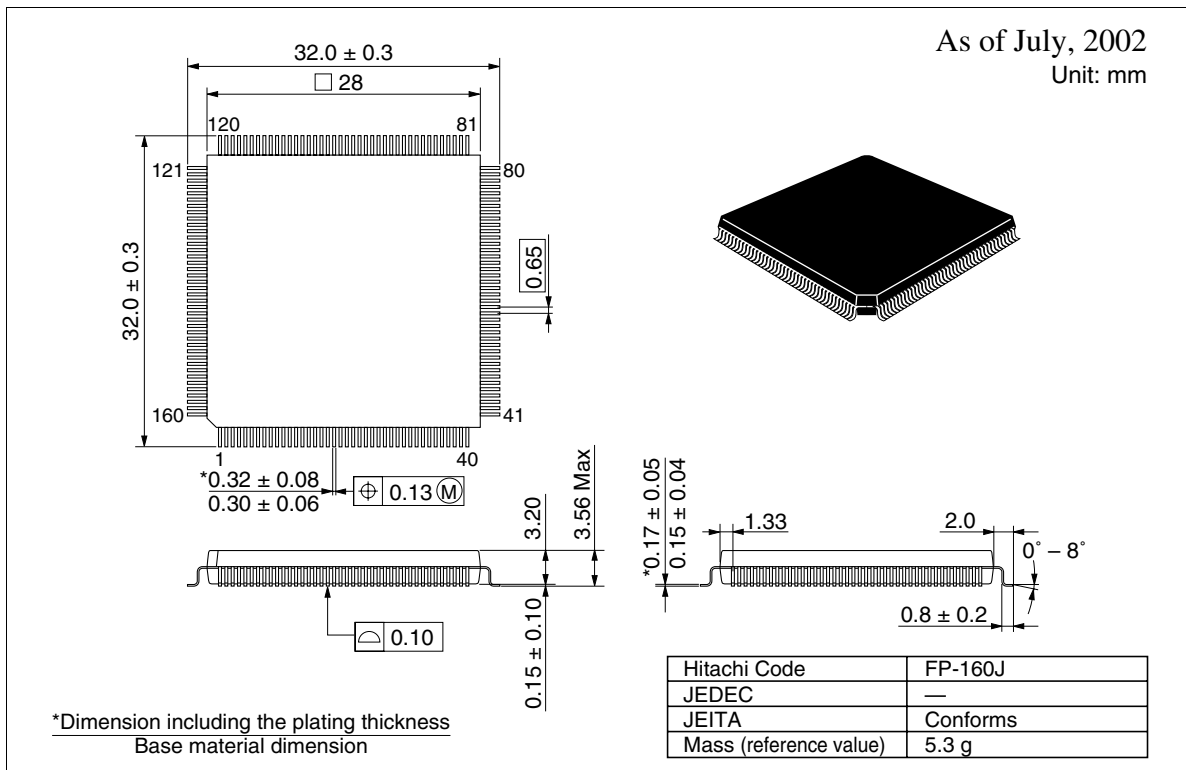
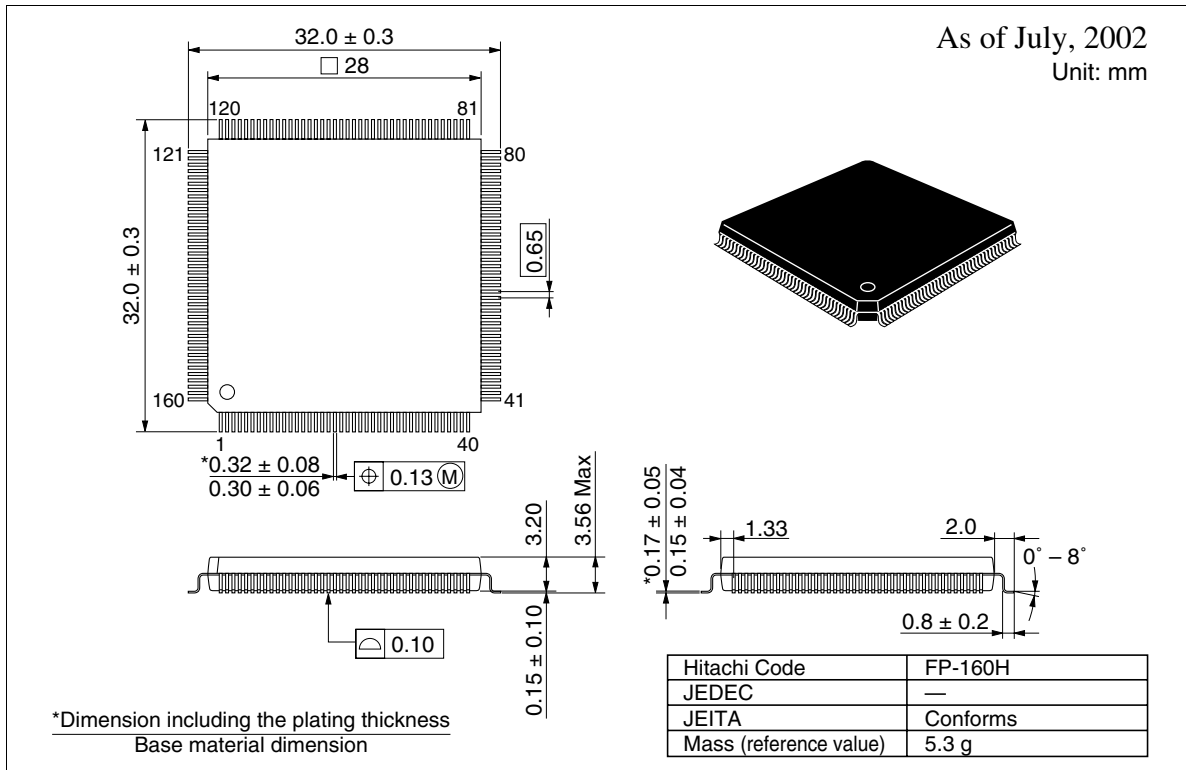
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



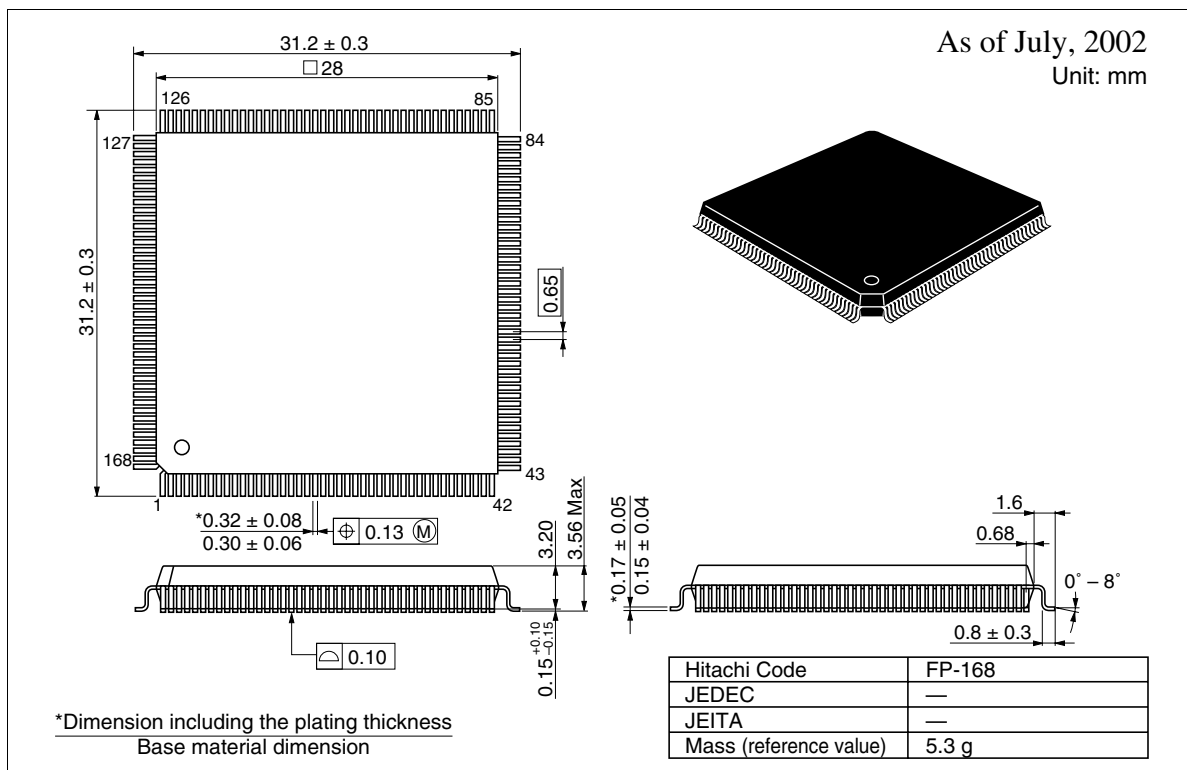
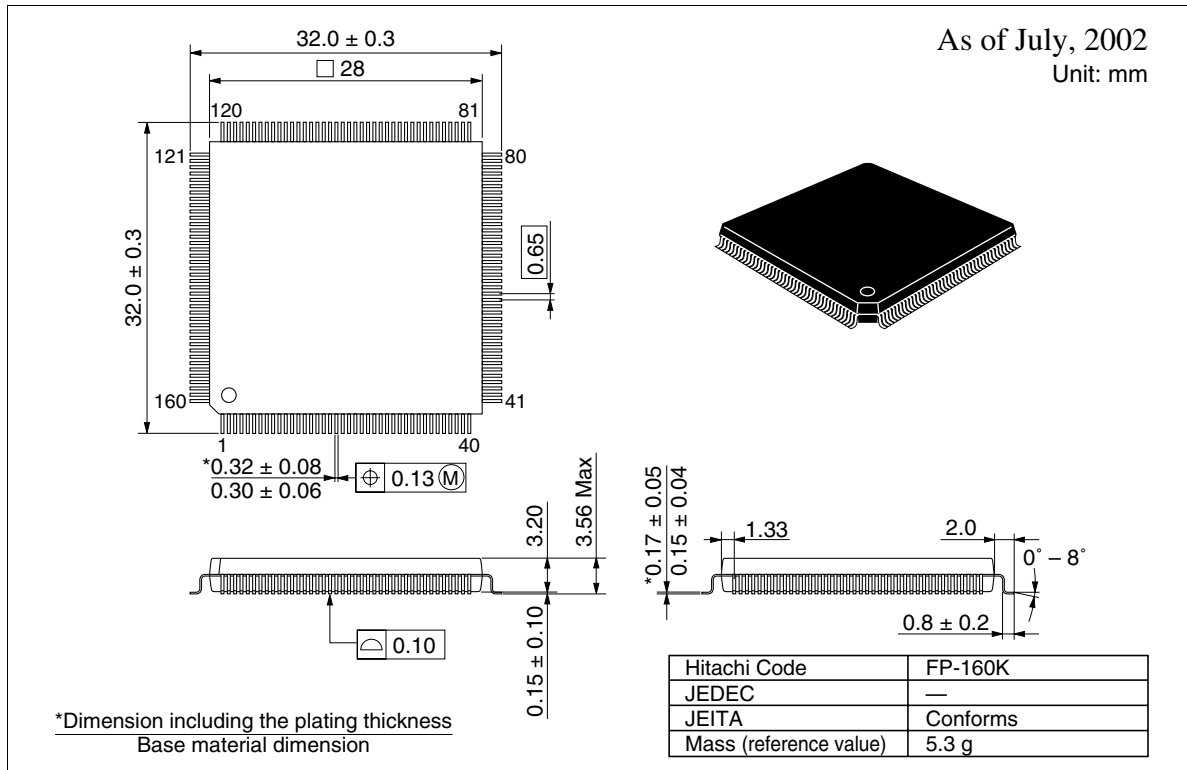
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



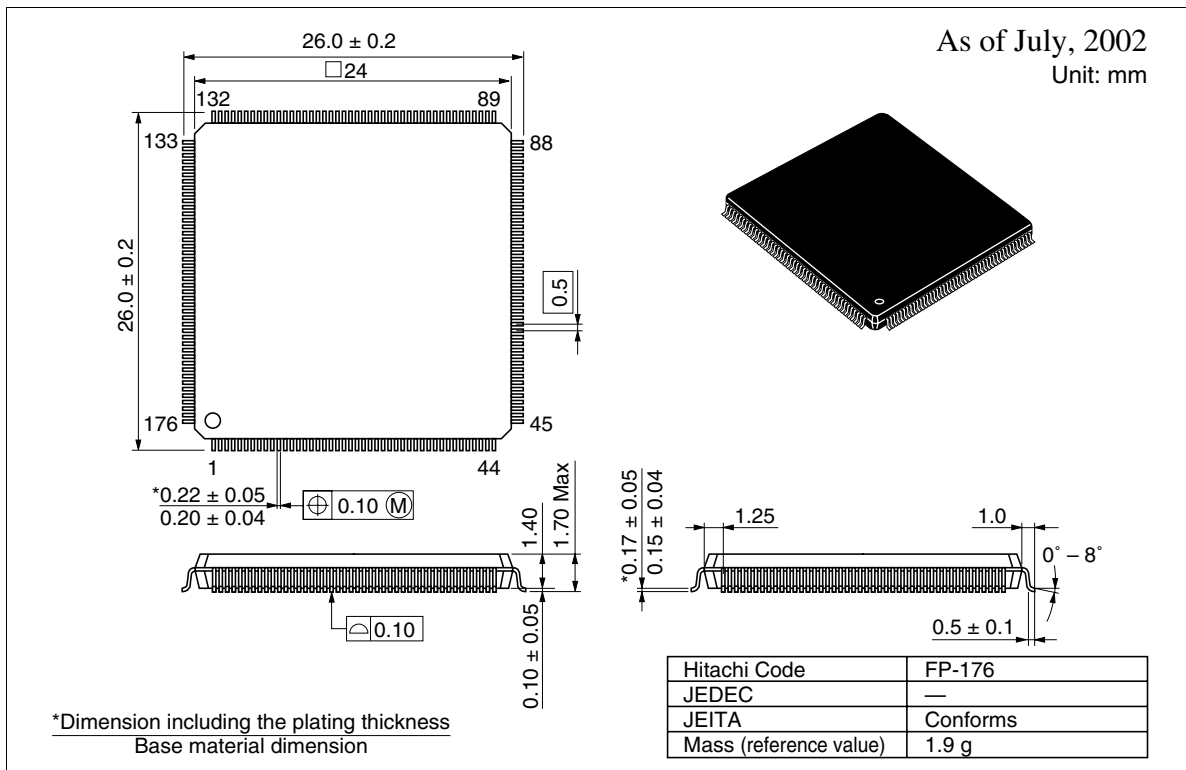
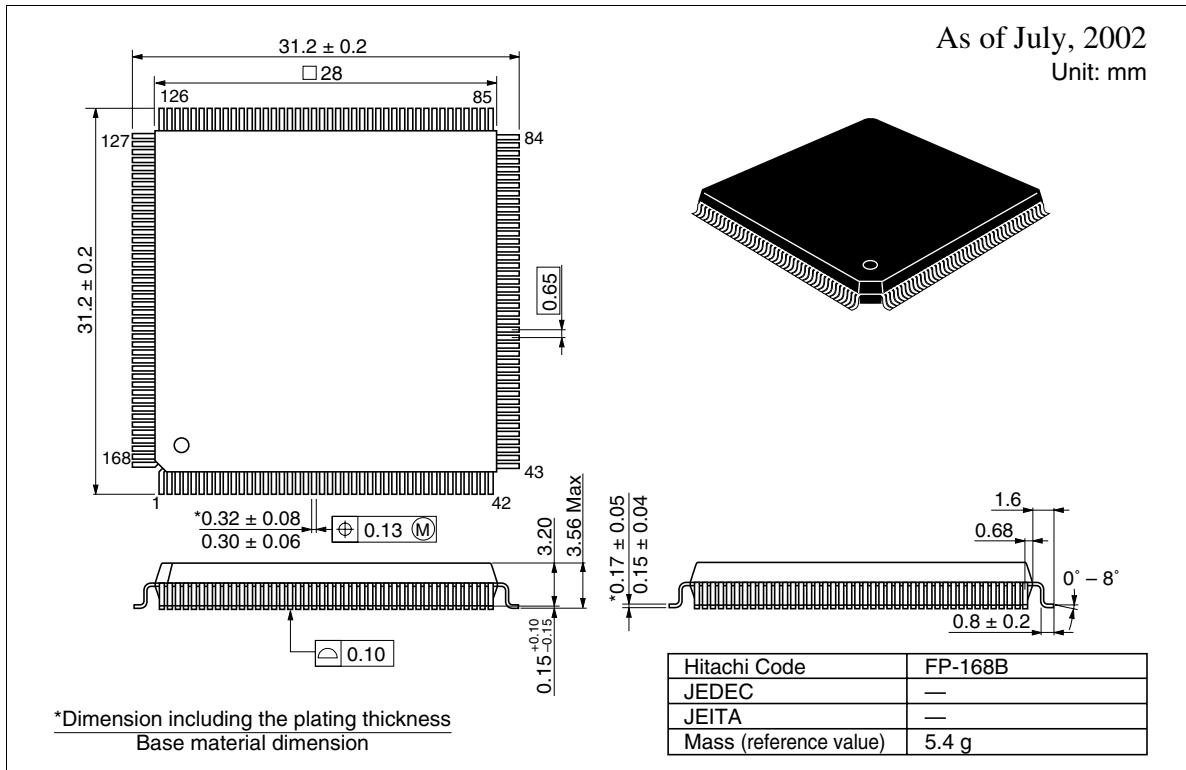
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



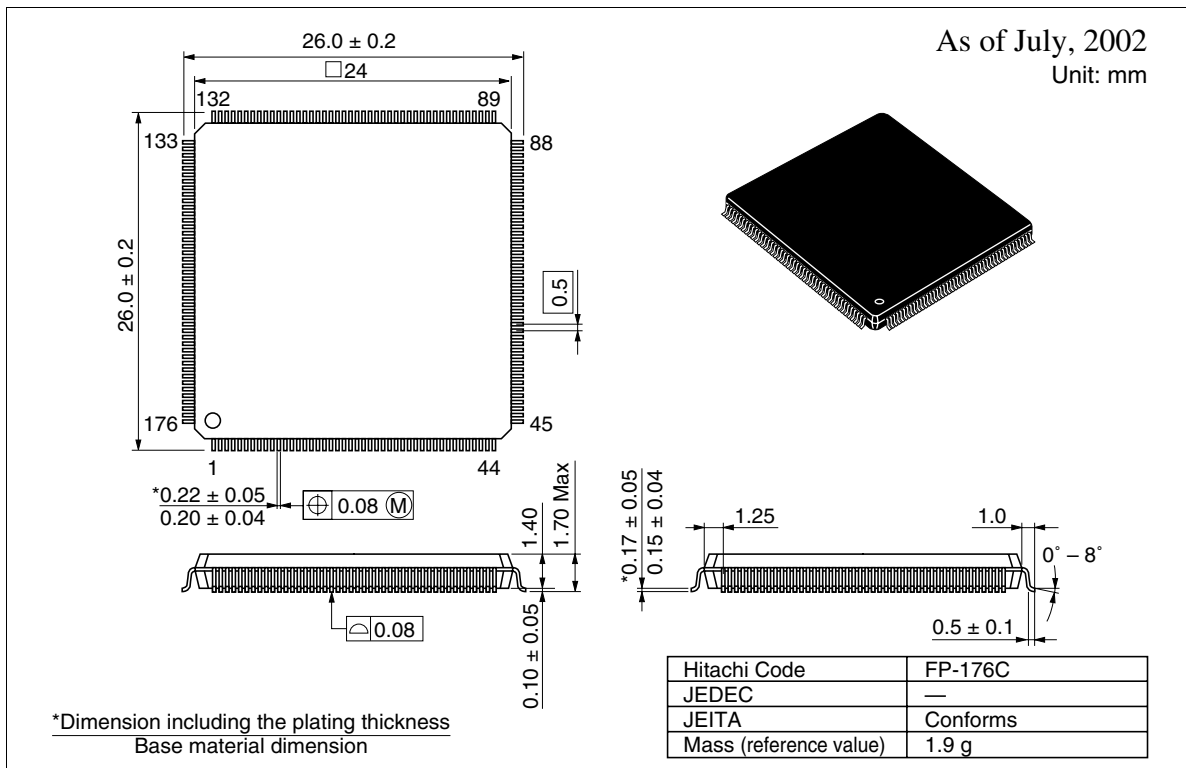
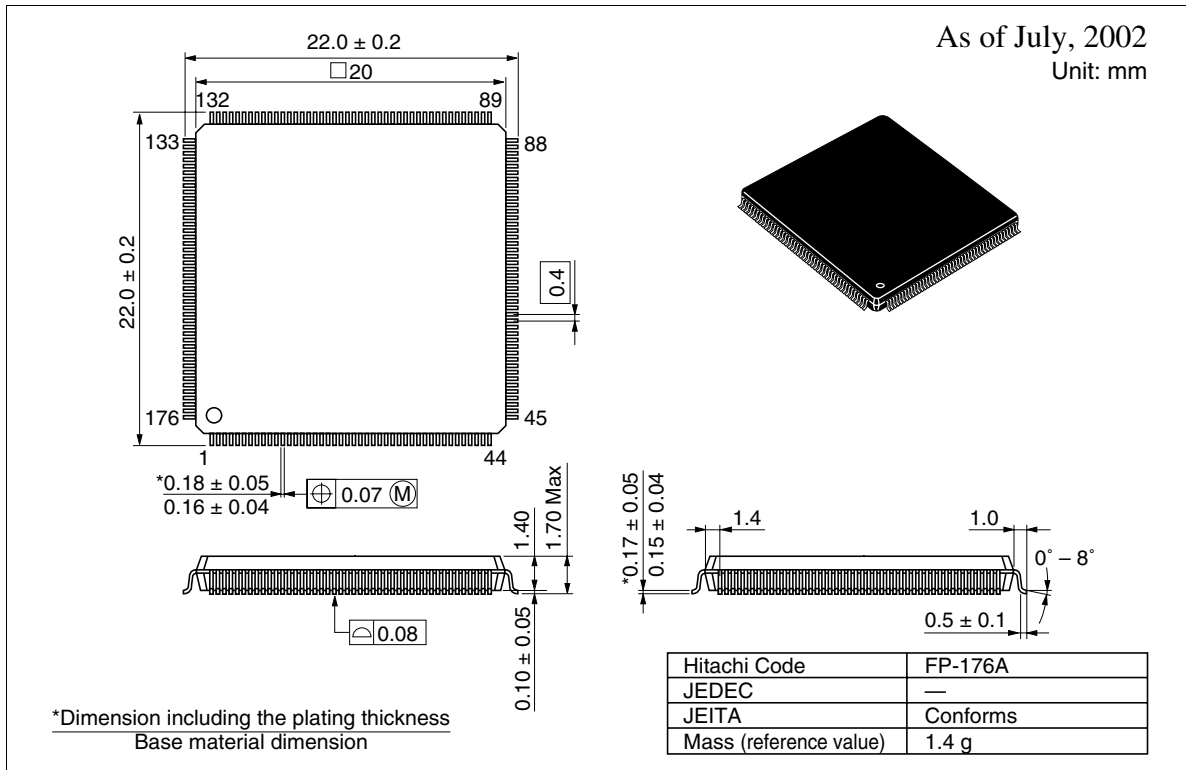
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



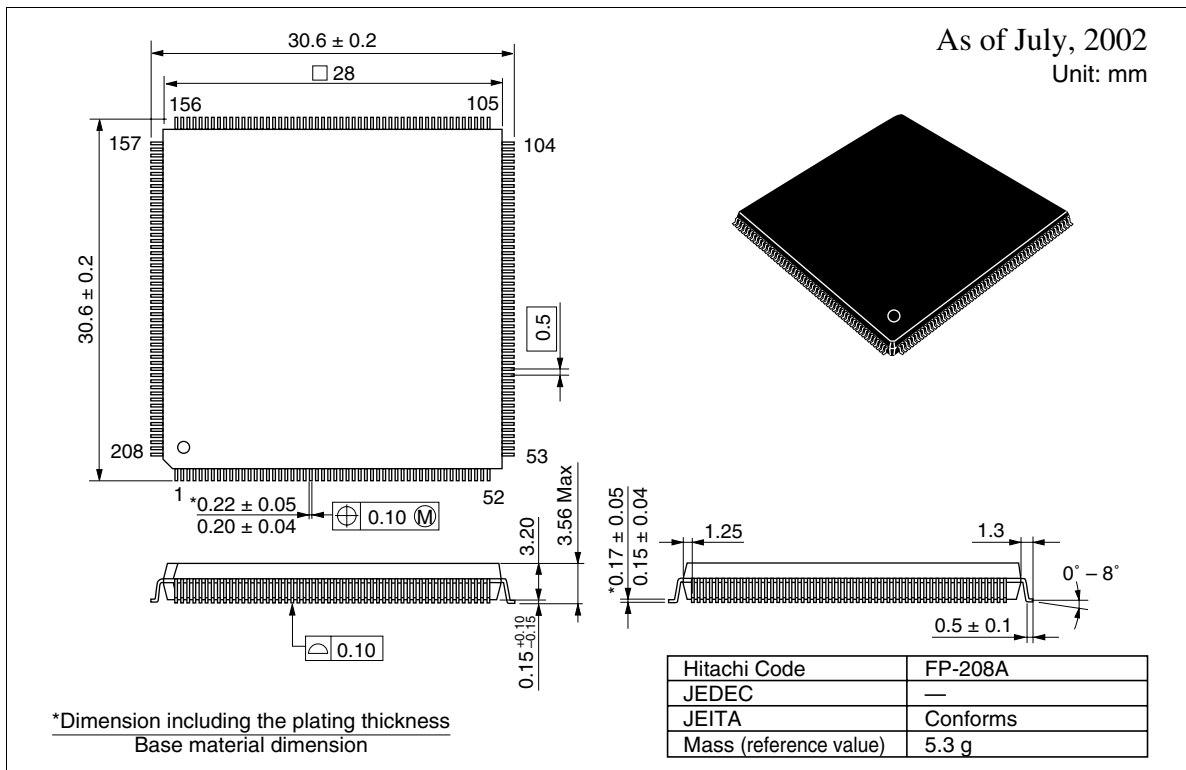
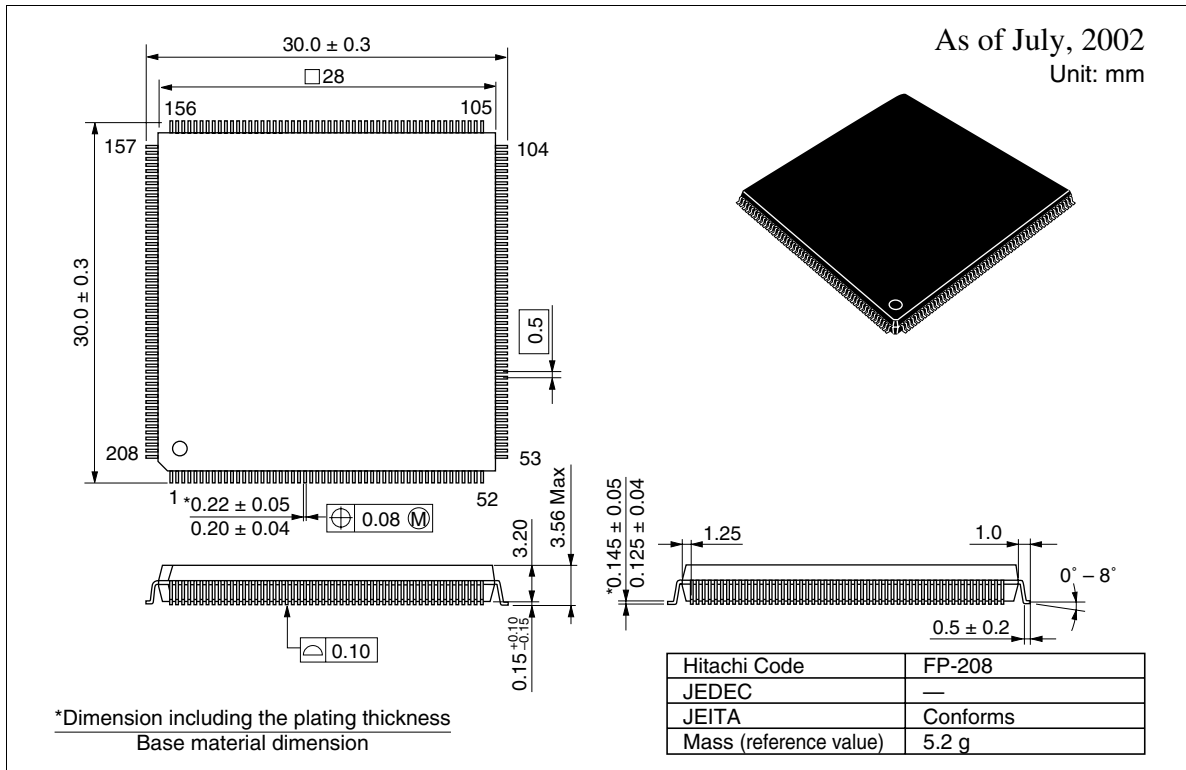
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



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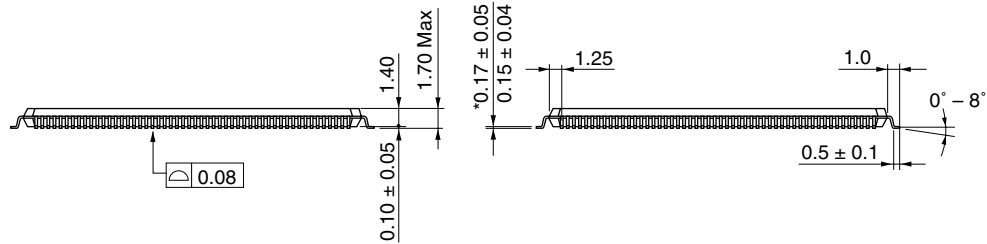
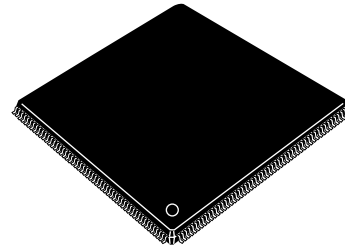
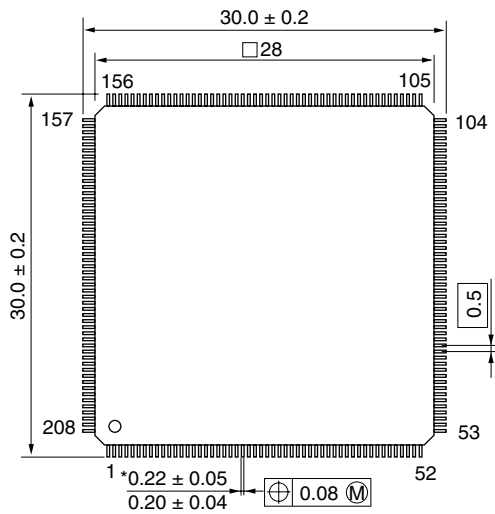


The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



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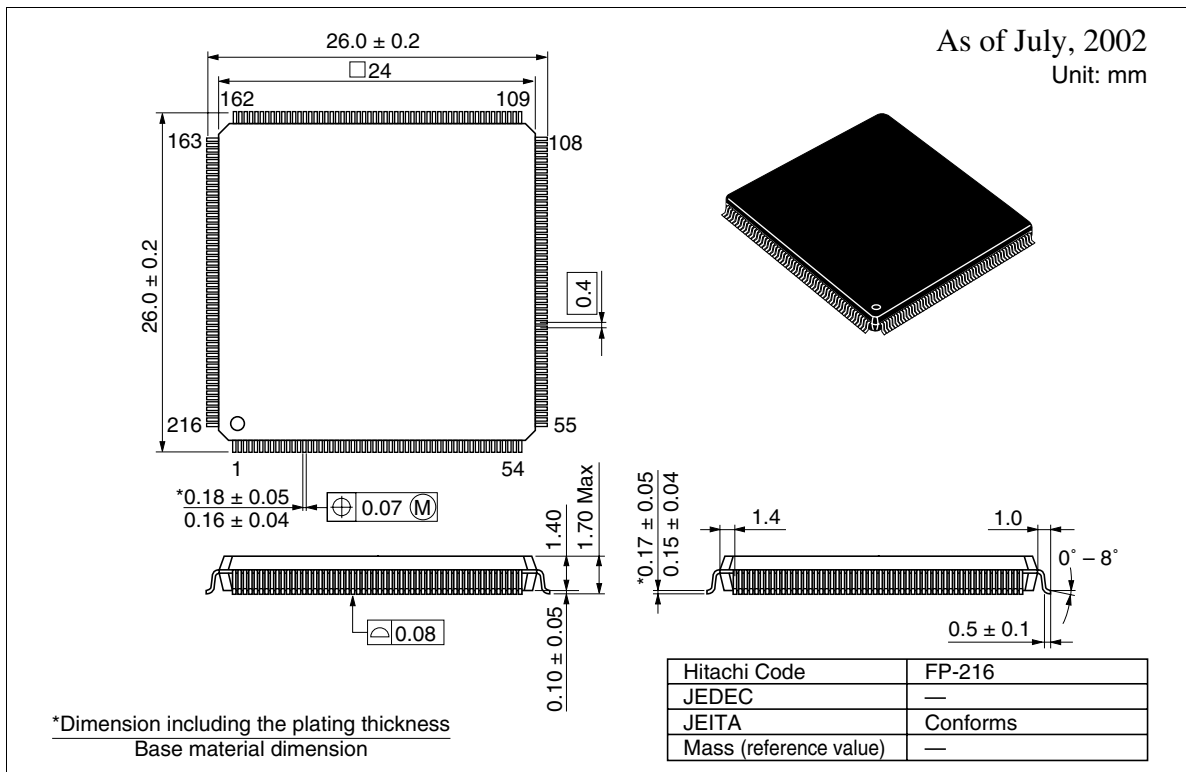
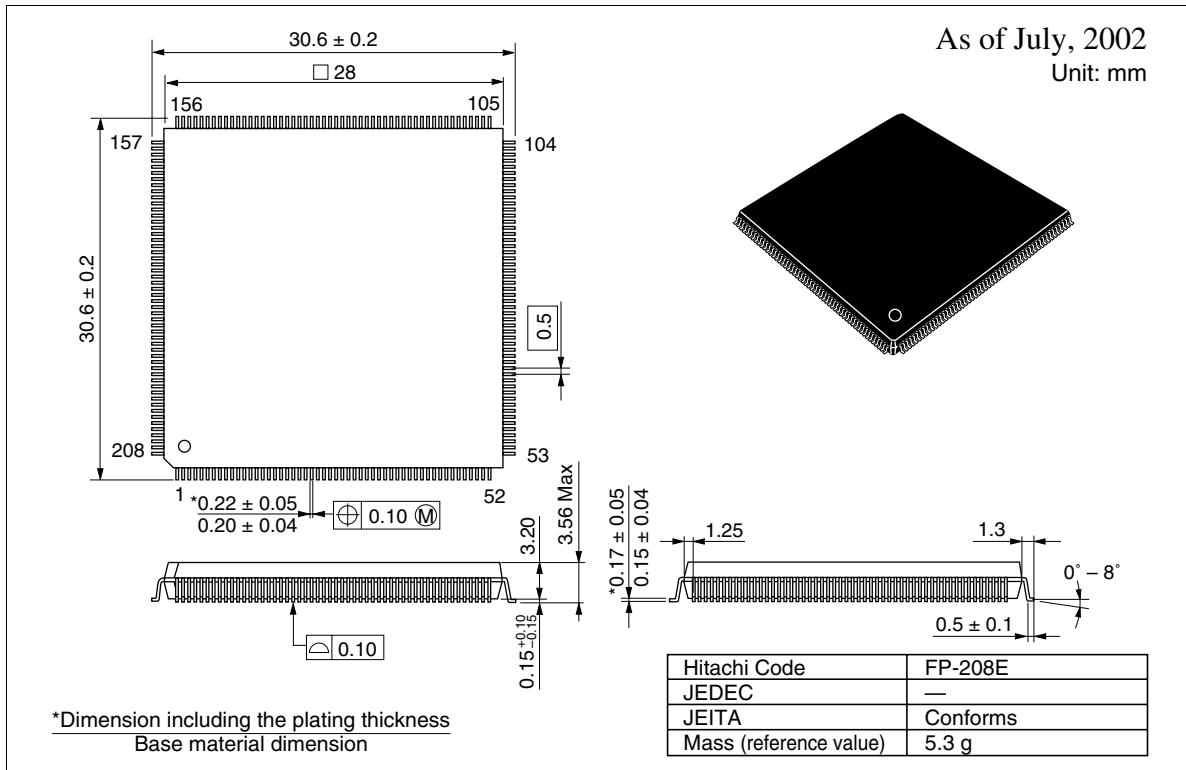
As of July, 2002
Unit: mm



*Dimension including the plating thickness
Base material dimension

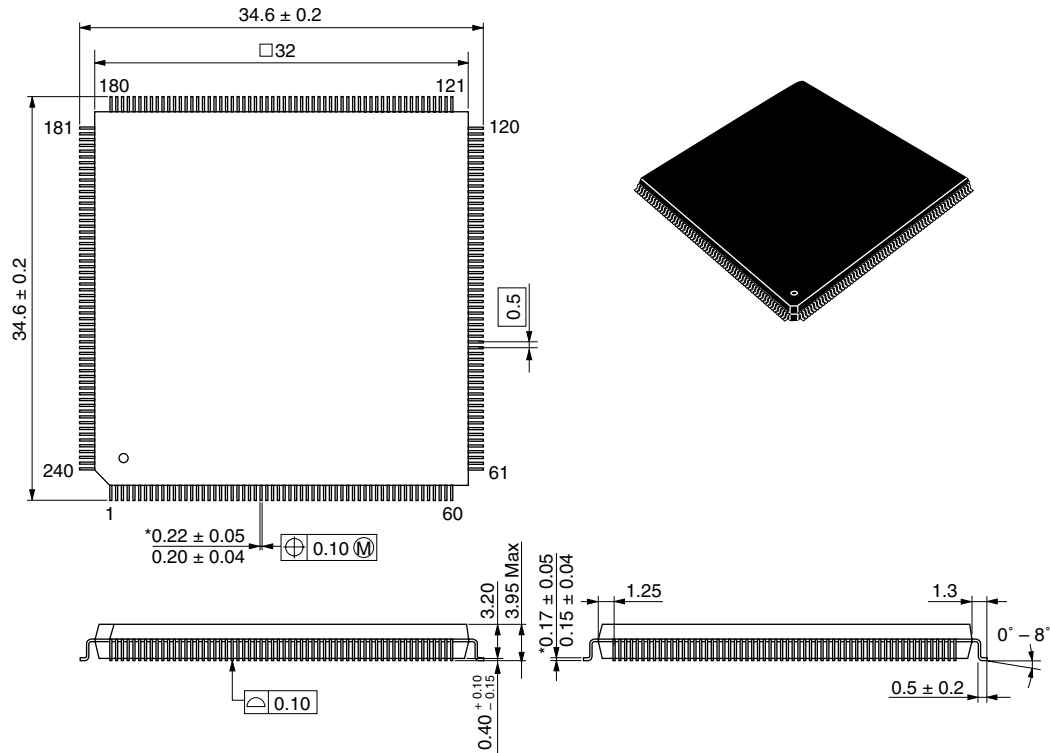
Hitachi Code	FP-208C
JEDEC	—
JEITA	Conforms
Mass (reference value)	2.7 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm

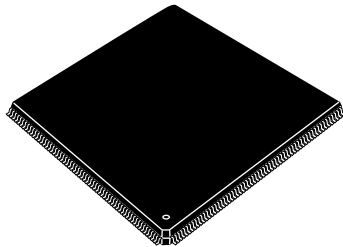


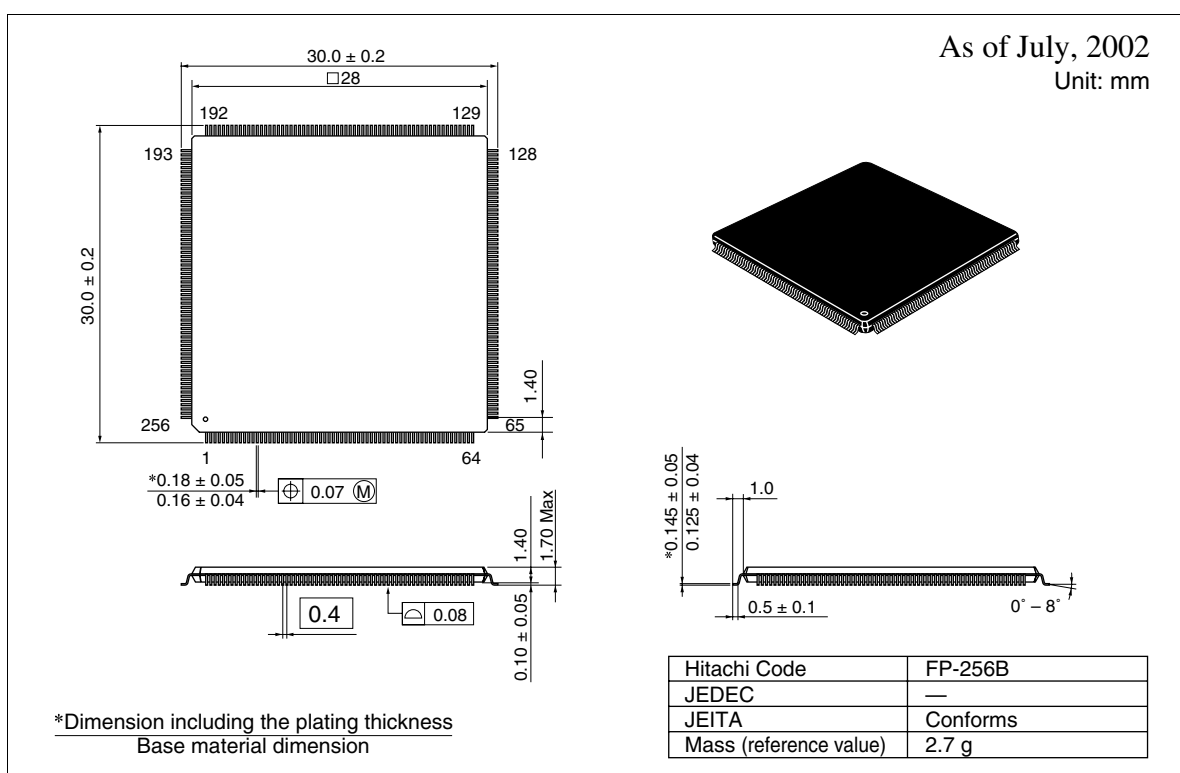
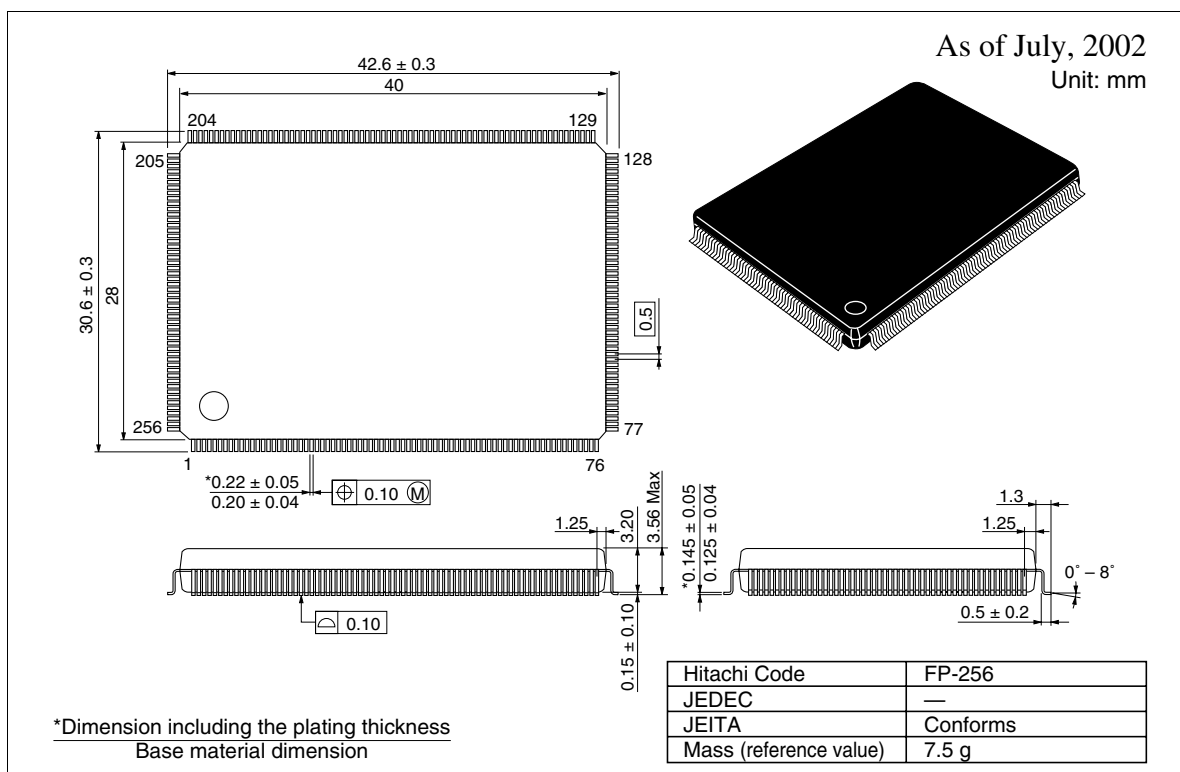
*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-240
JEDEC	—
JEITA	Conforms
Mass (reference value)	7.0 g

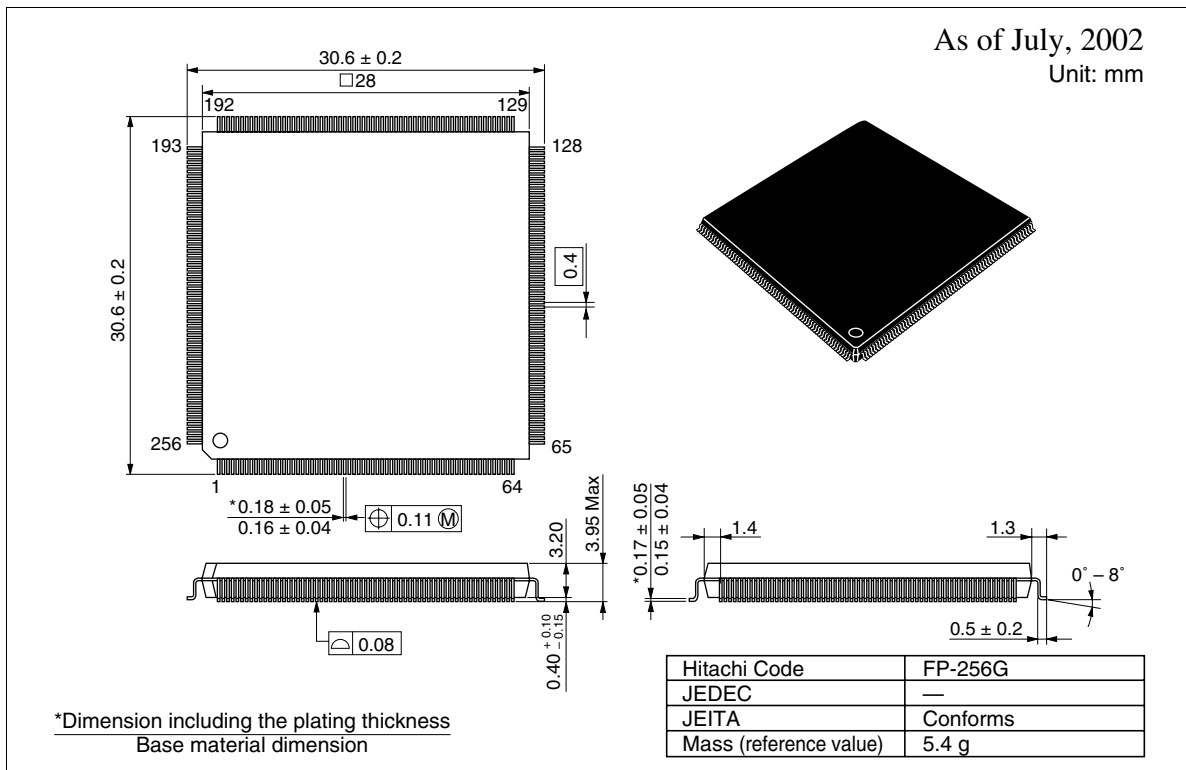
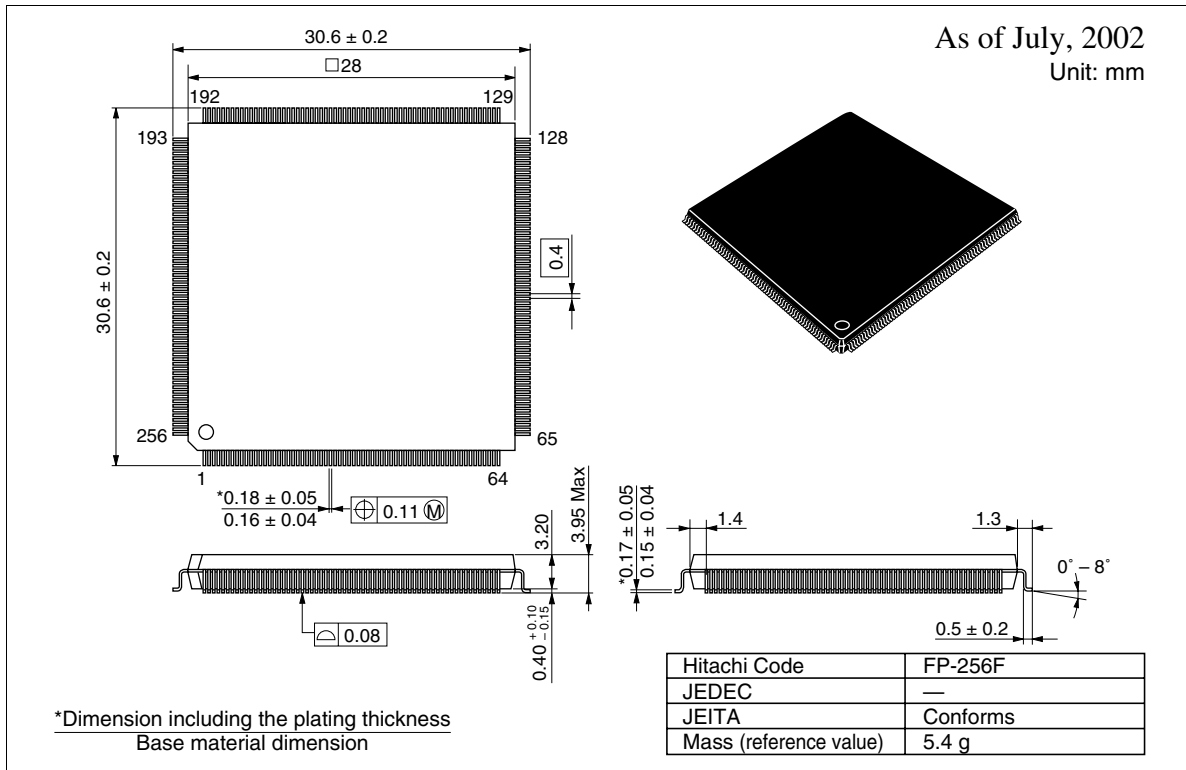
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Unit: mm

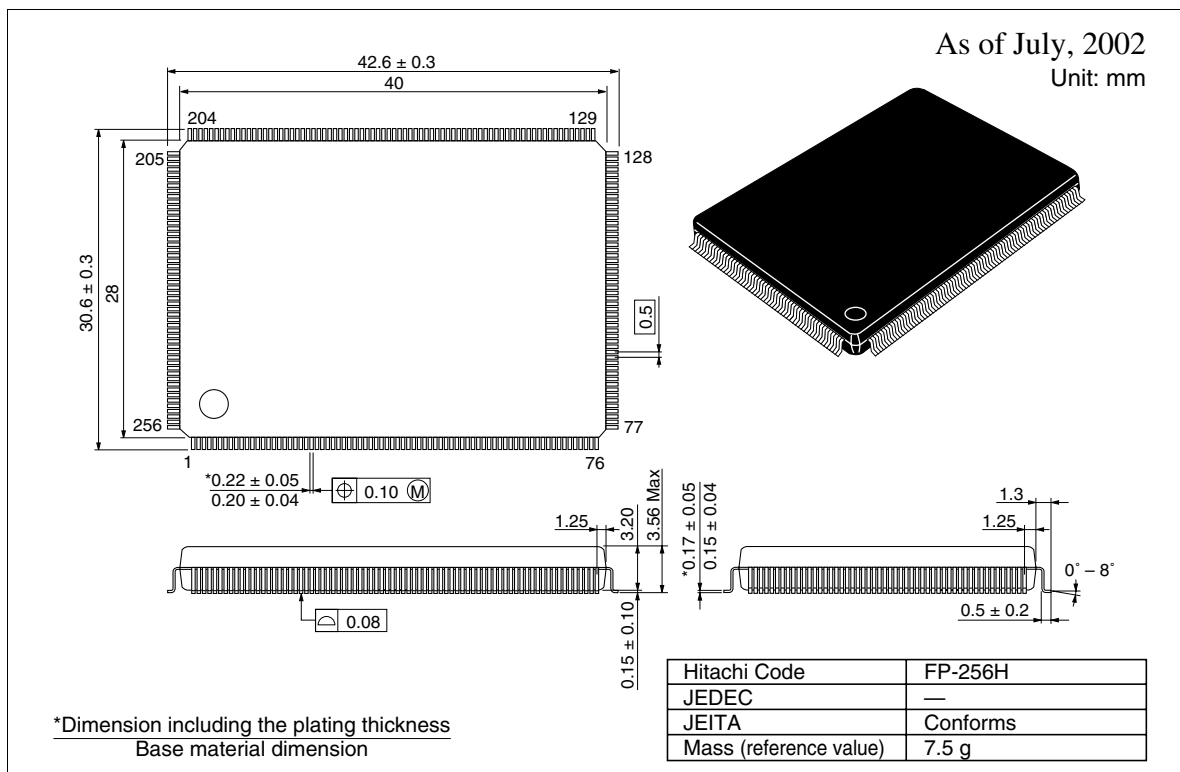

$$\frac{\text{*Dimension including the plating thickness}}{\text{Base material dimension}}$$



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

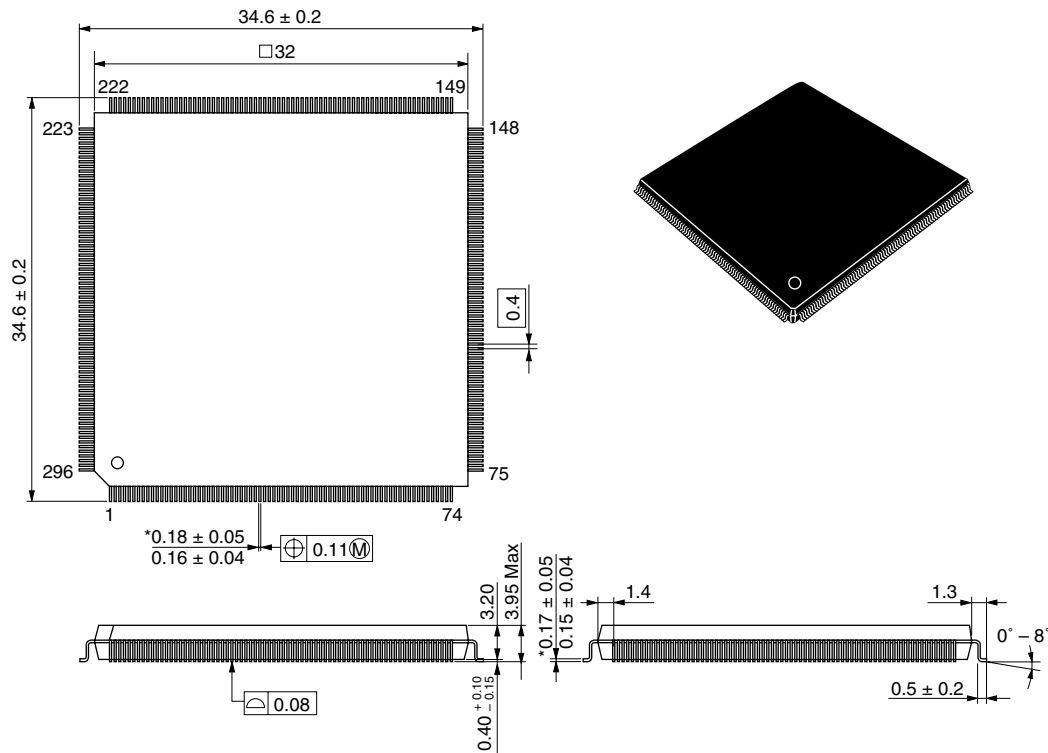


The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm

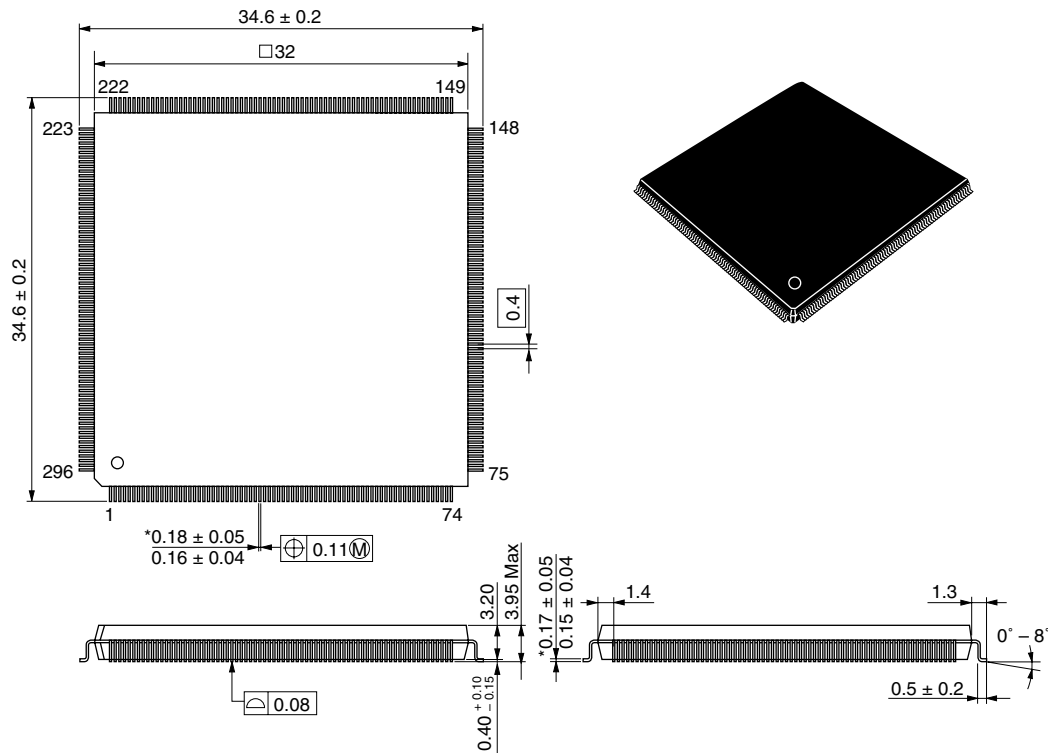


*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-296
JEDEC	—
JEITA	Conforms
Mass (reference value)	7.0 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

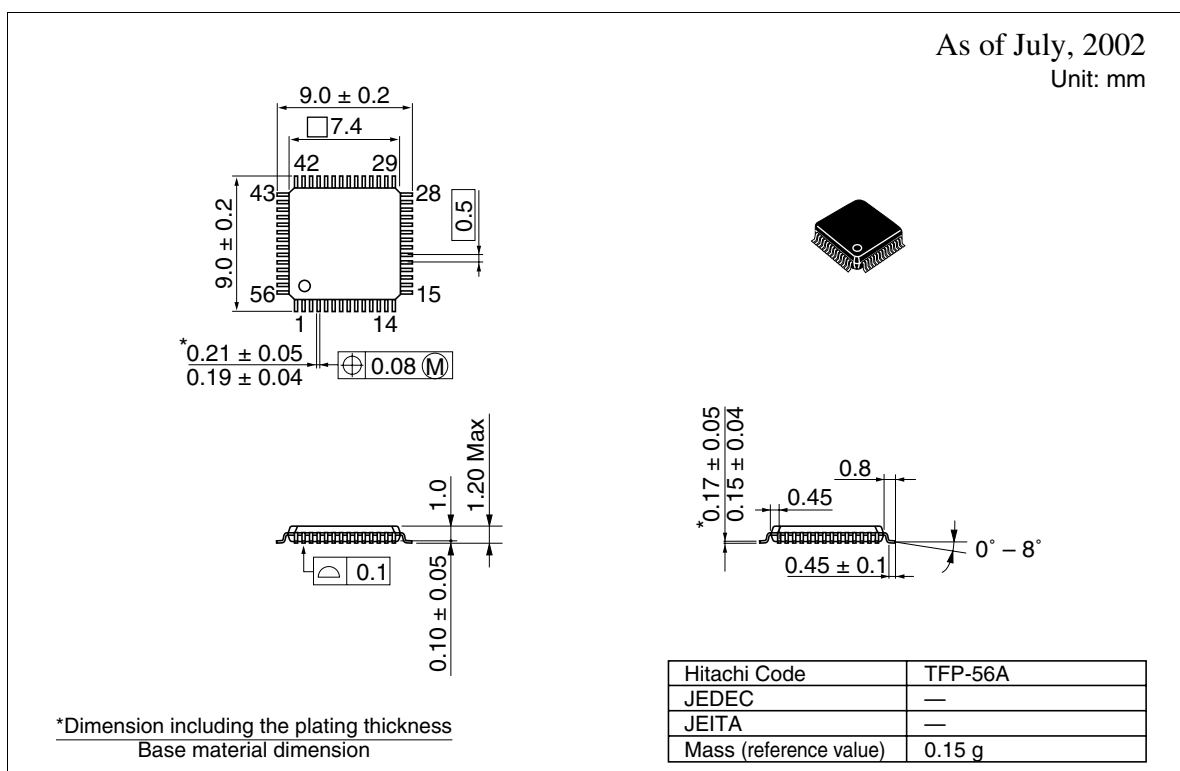
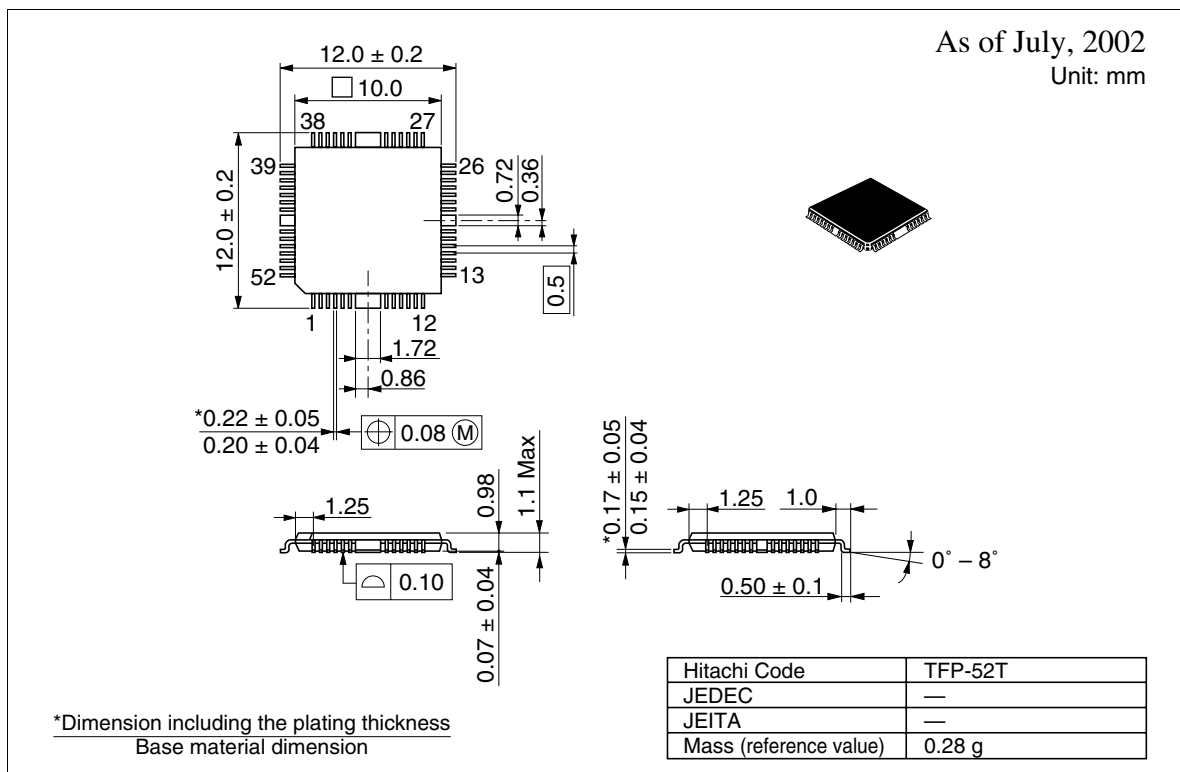
As of July, 2002
Unit: mm



*Dimension including the plating thickness
Base material dimension

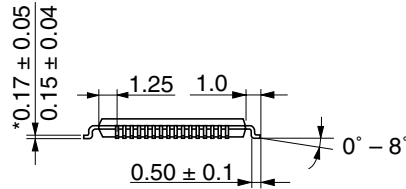
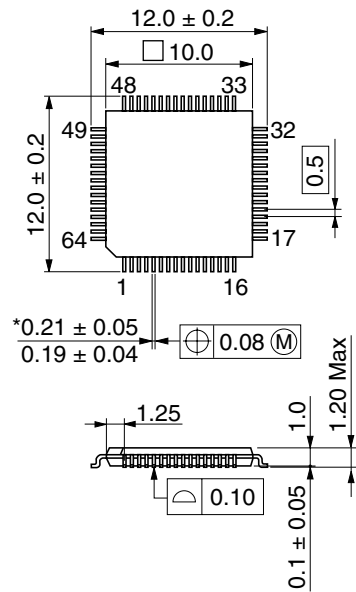
Hitachi Code	FP-296B
JEDEC	—
JEITA	Conforms
Mass (reference value)	7.0 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



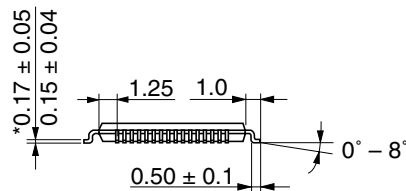
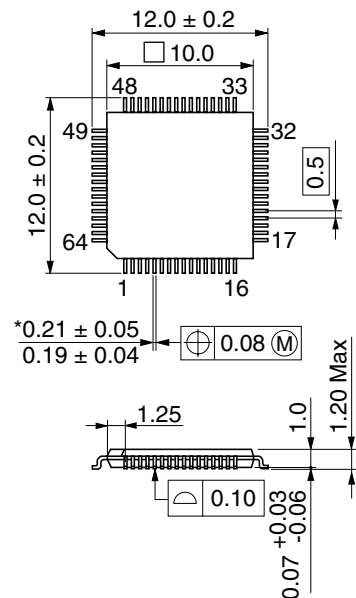
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Hitachi Code	TFP-64B
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.4 g

As of July, 2002
Unit: mm

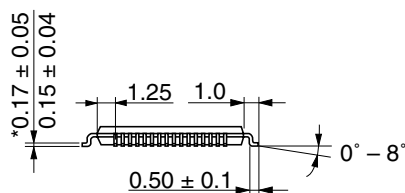
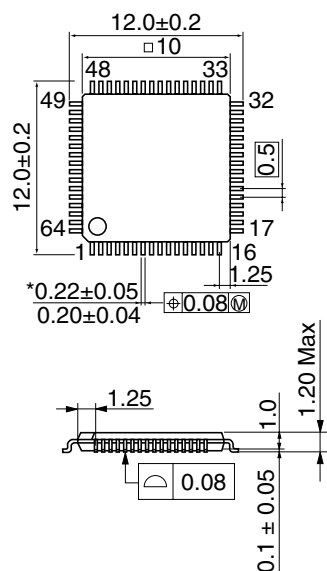


Hitachi Code	TFP-64C
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.4 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002

Unit: mm

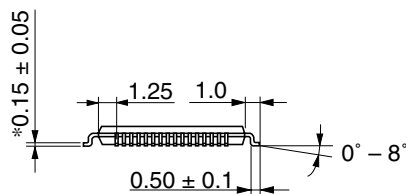
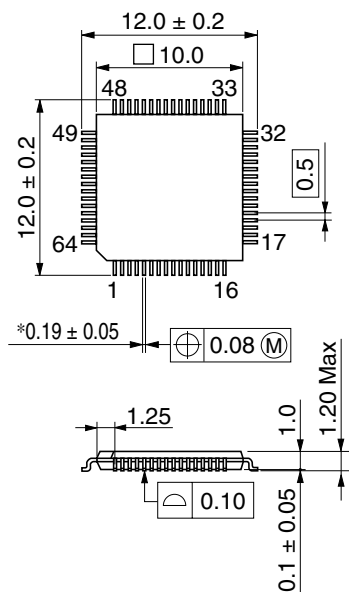


*Dimension including the plating thickness
Base material dimension

Hitachi Code	TFP-64E
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.3 g

As of July, 2002

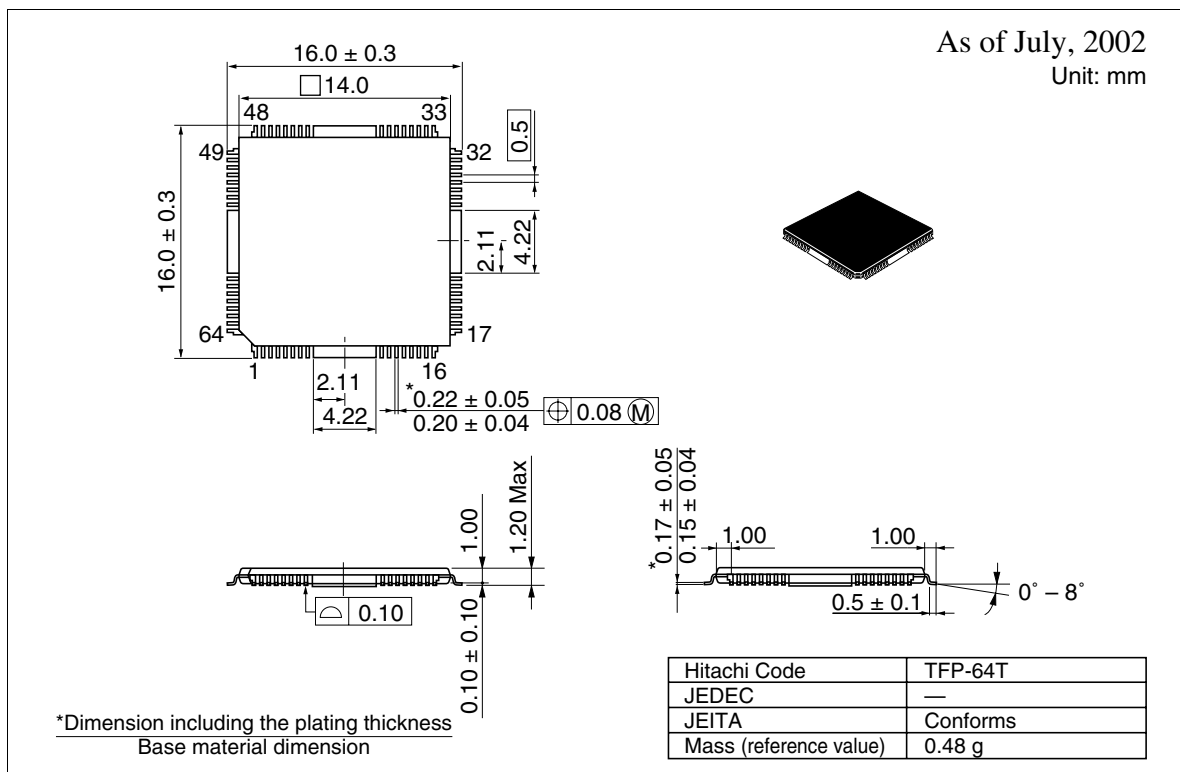
Unit: mm



*Ni/Pd/Au plating

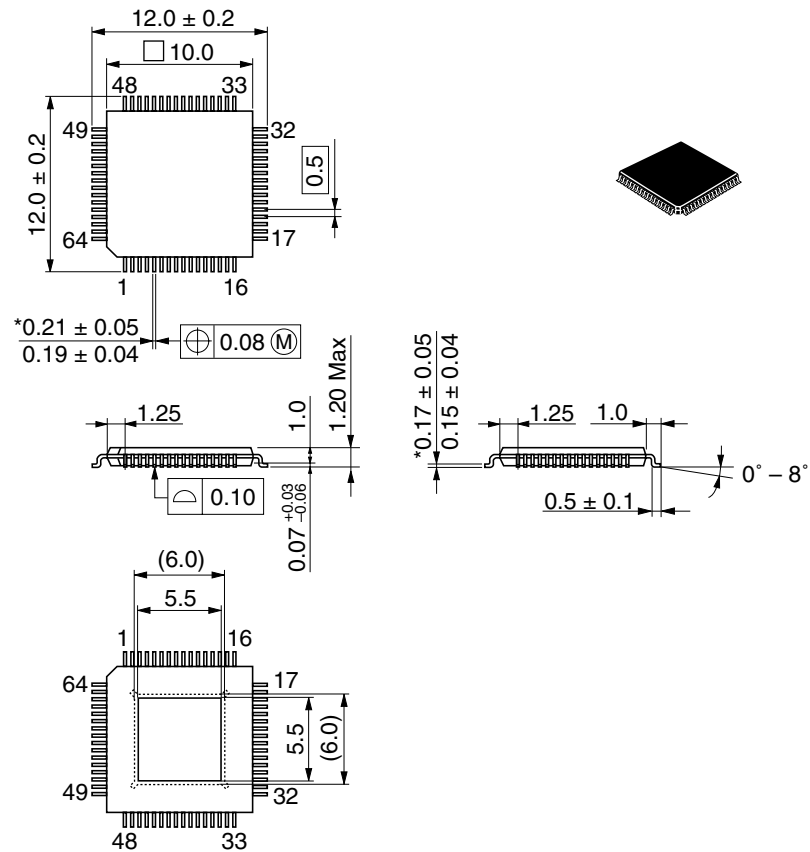
Hitachi Code	TFP-64FV
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.4 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

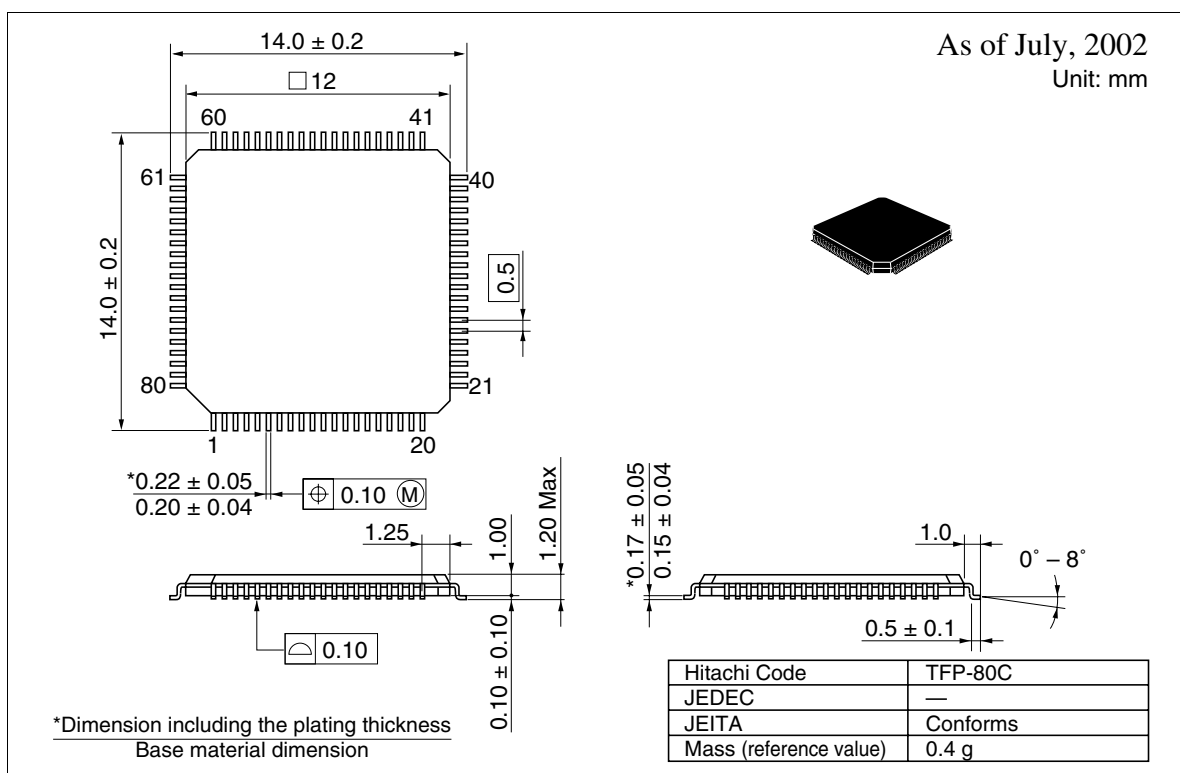
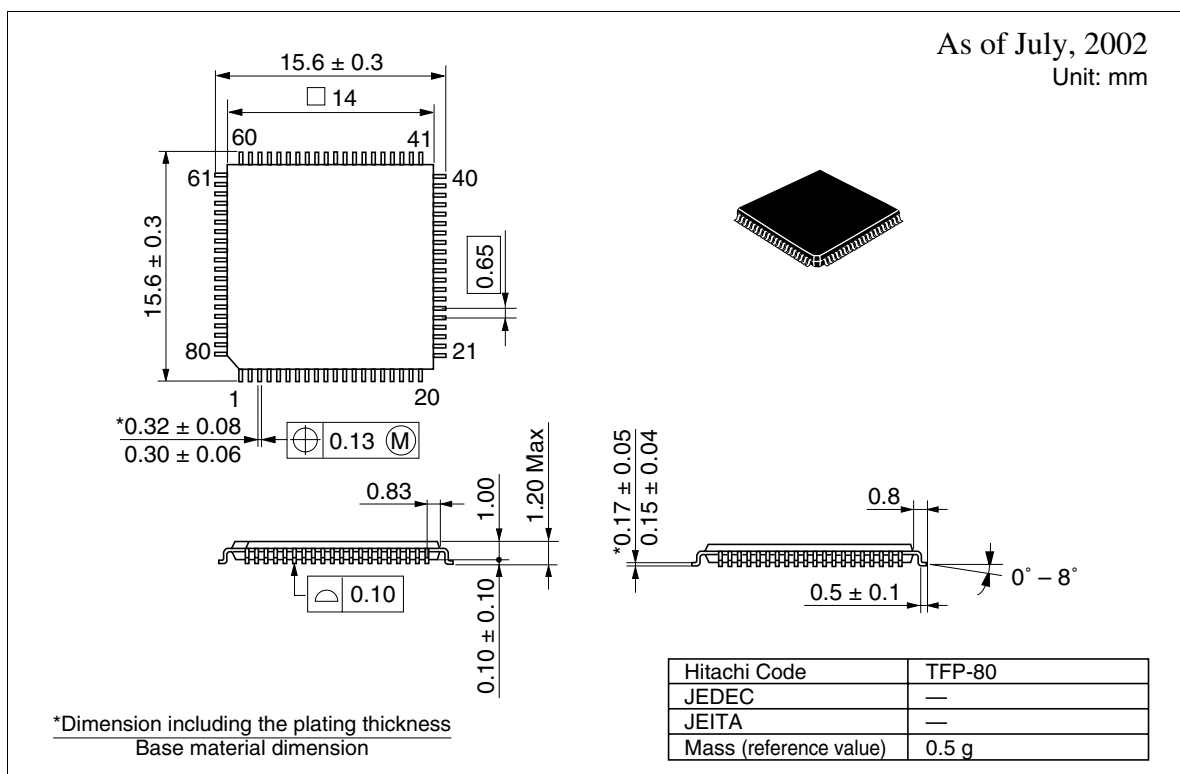
As of July, 2002
Unit: mm



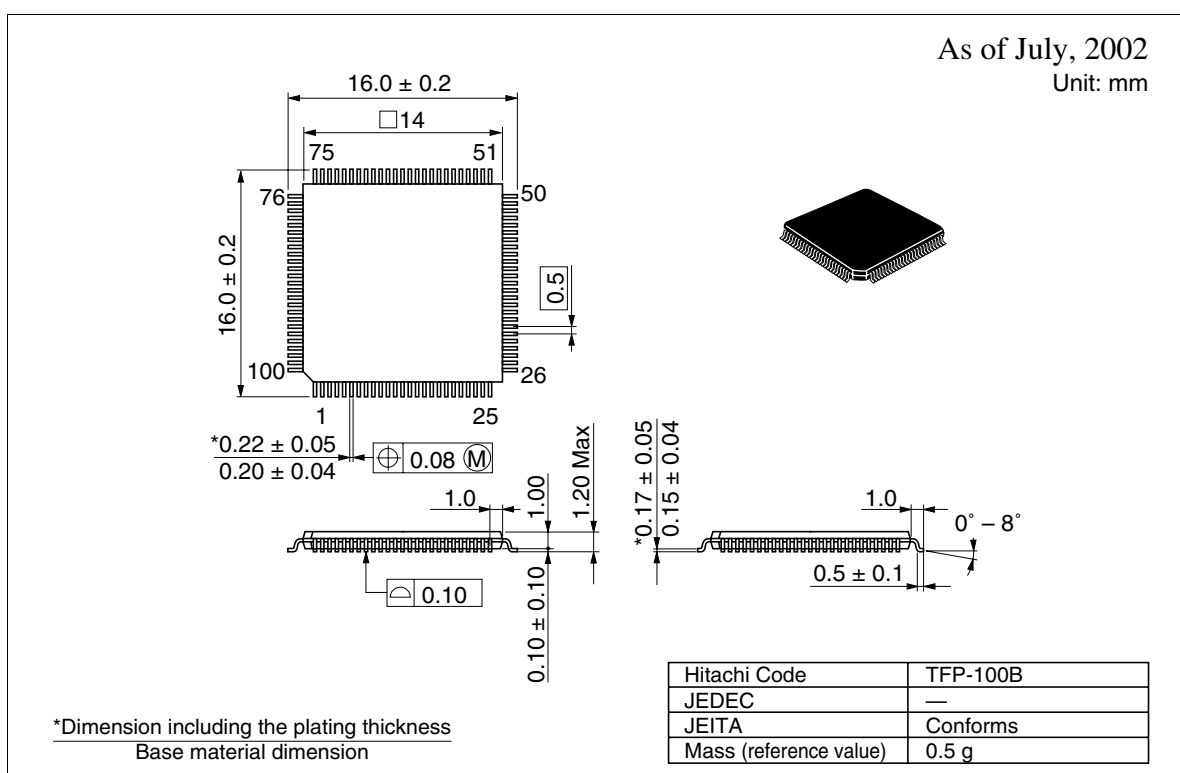
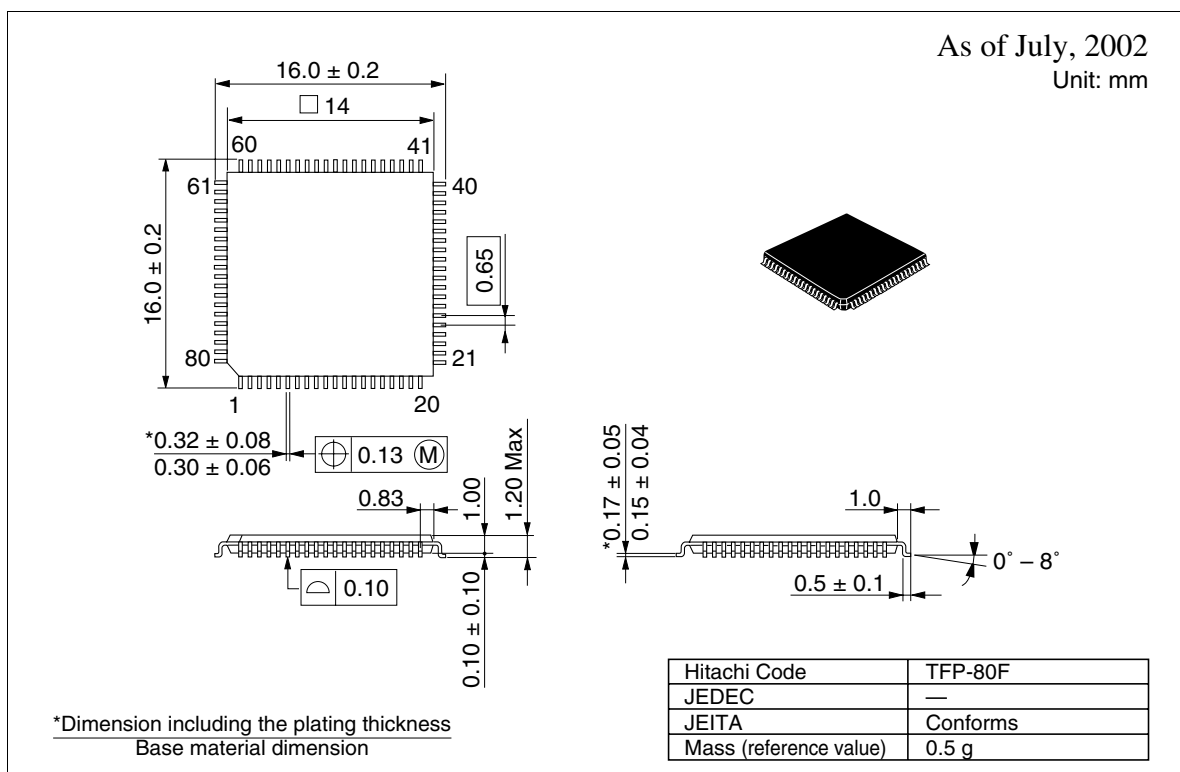
*Dimension including the plating thickness
Base material dimension

Hitachi Code	TFP-64TA
JEDEC	—
JEITA	—
Mass (reference value)	0.4 g

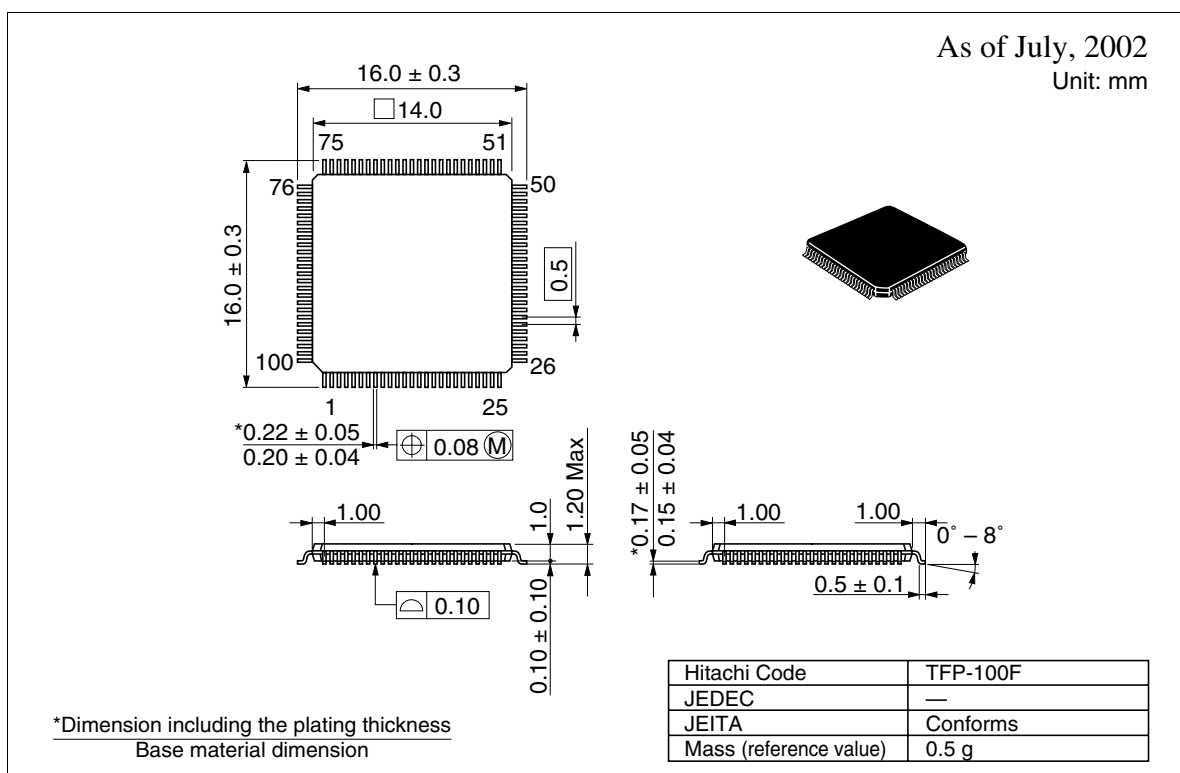
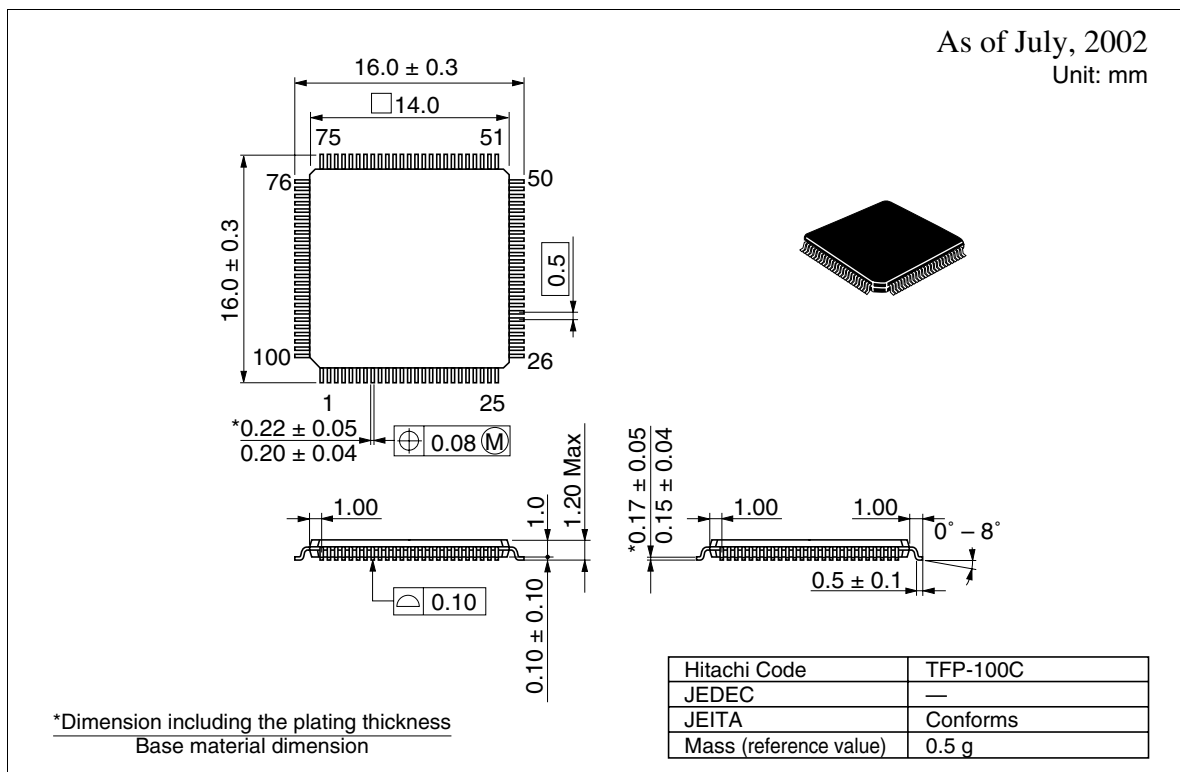
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



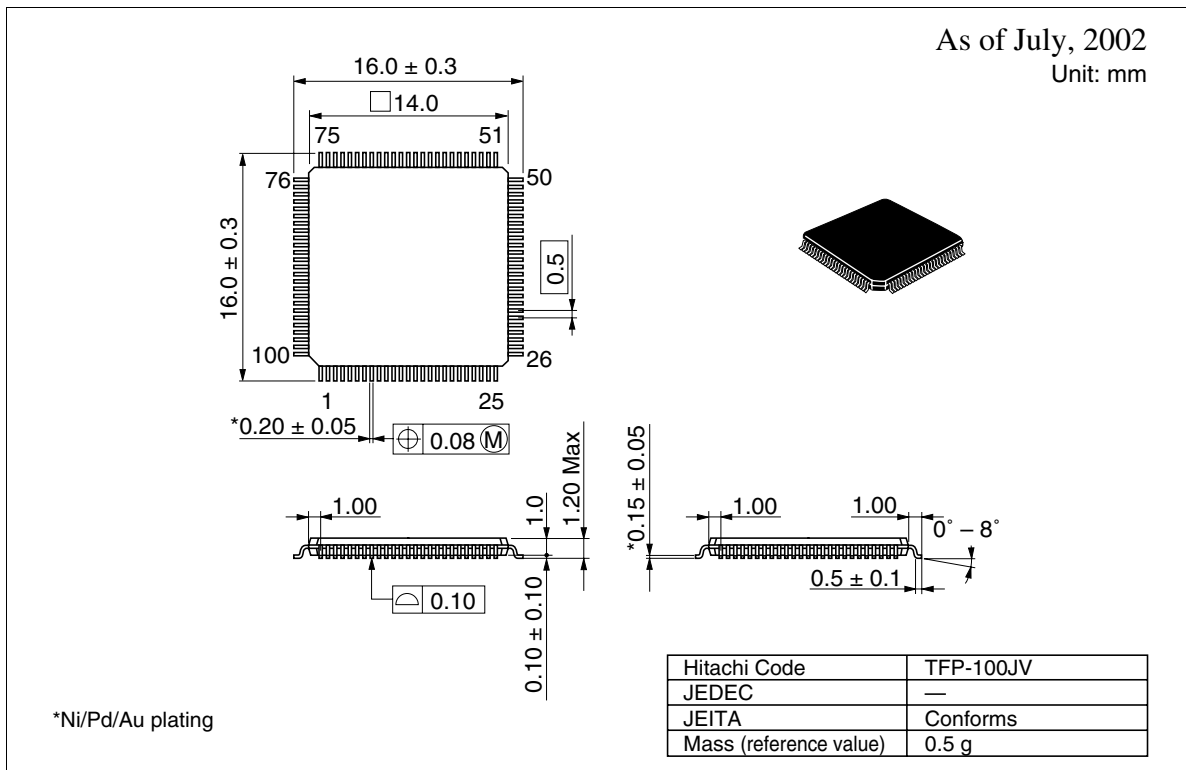
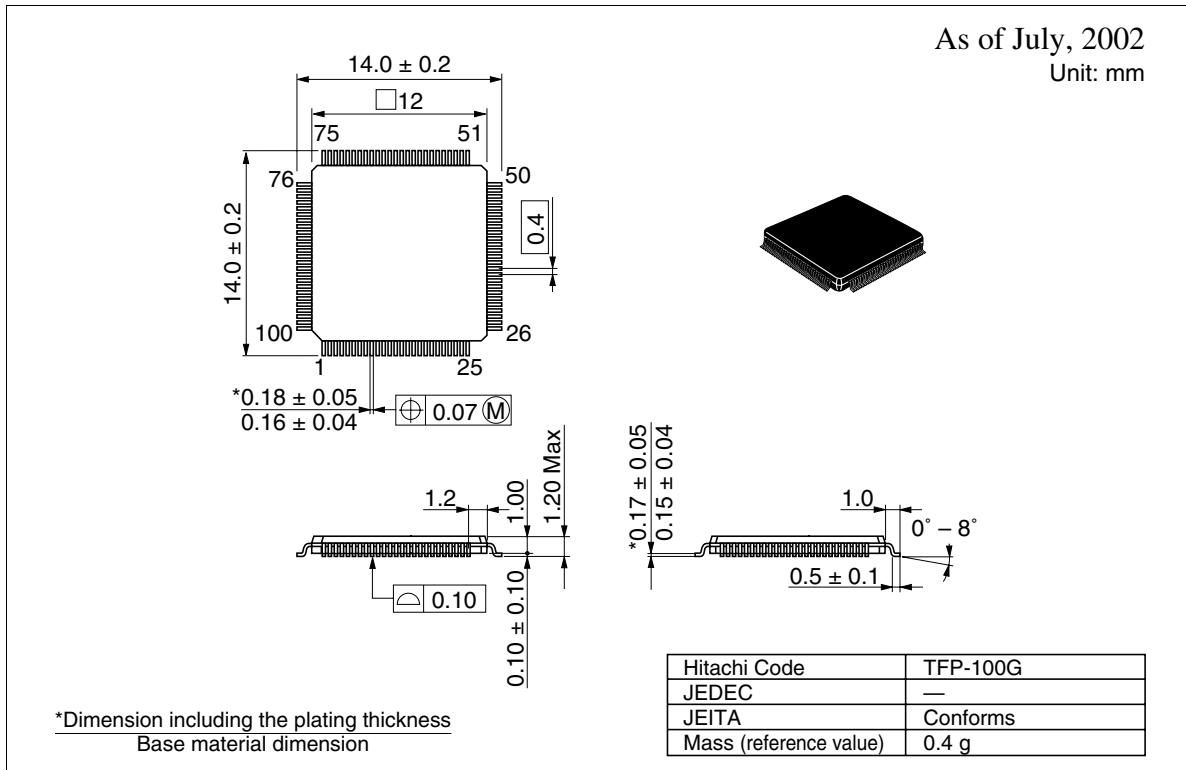
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



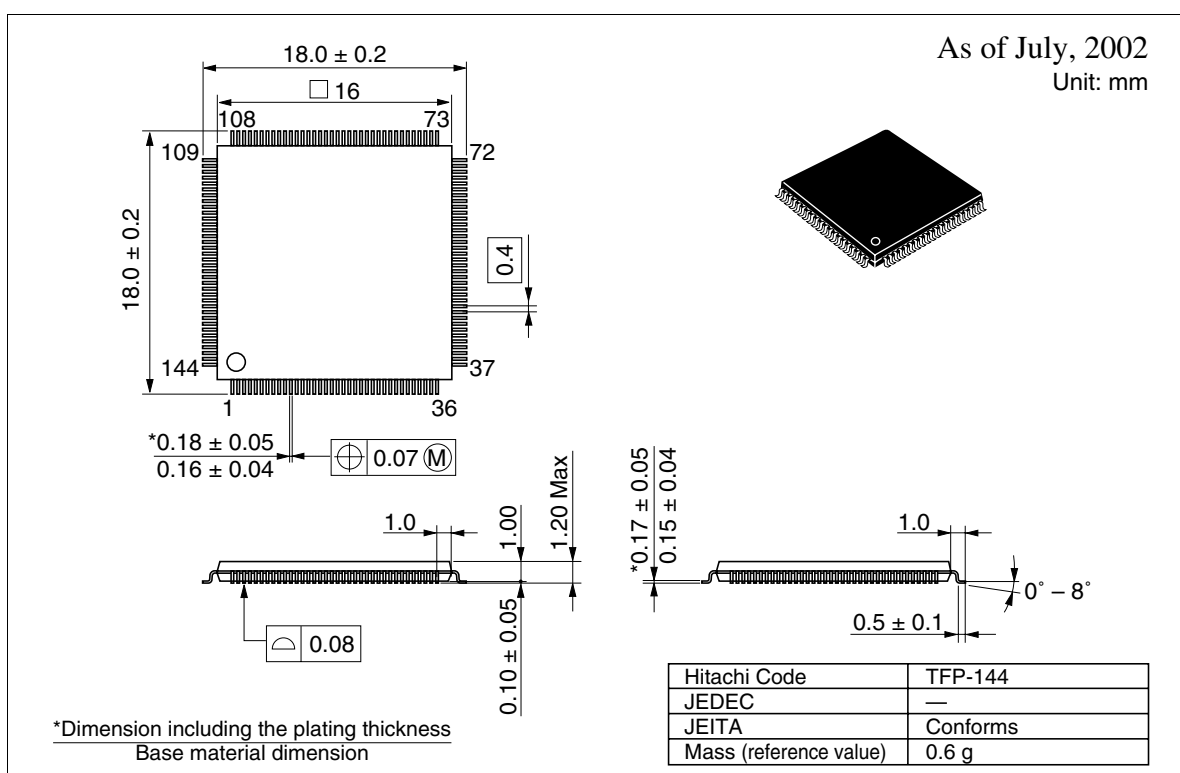
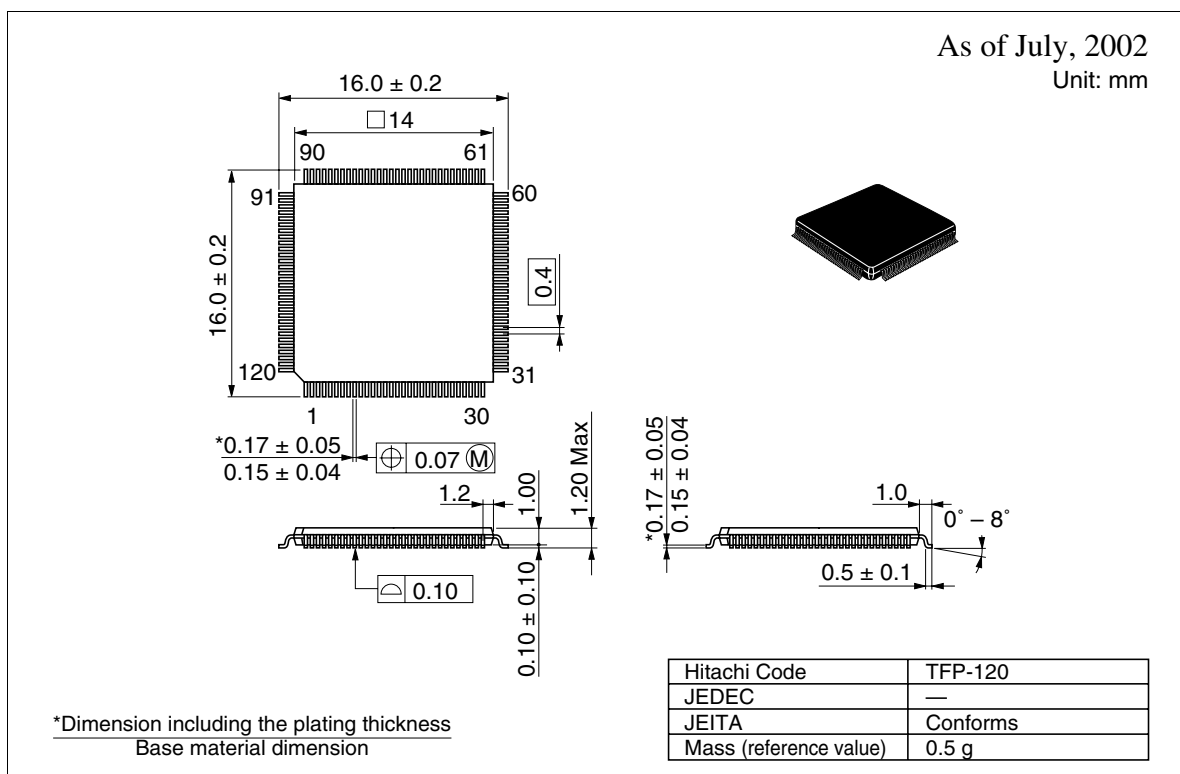
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

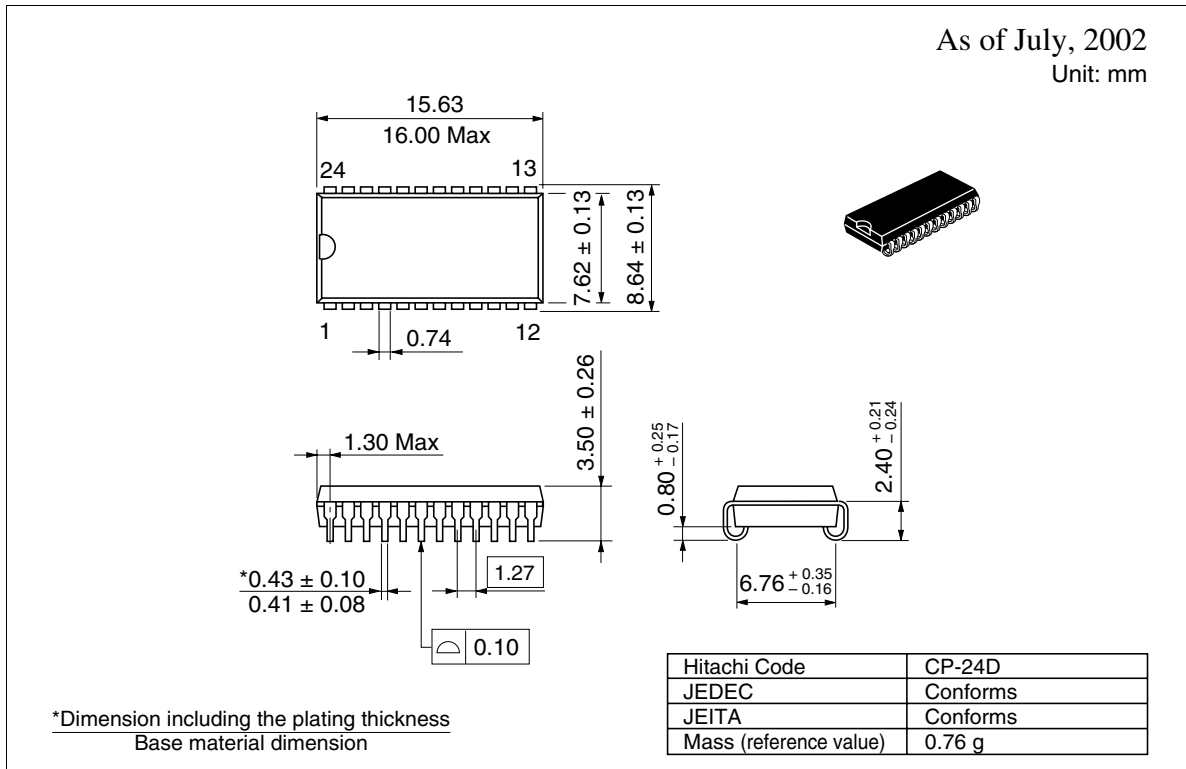


The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



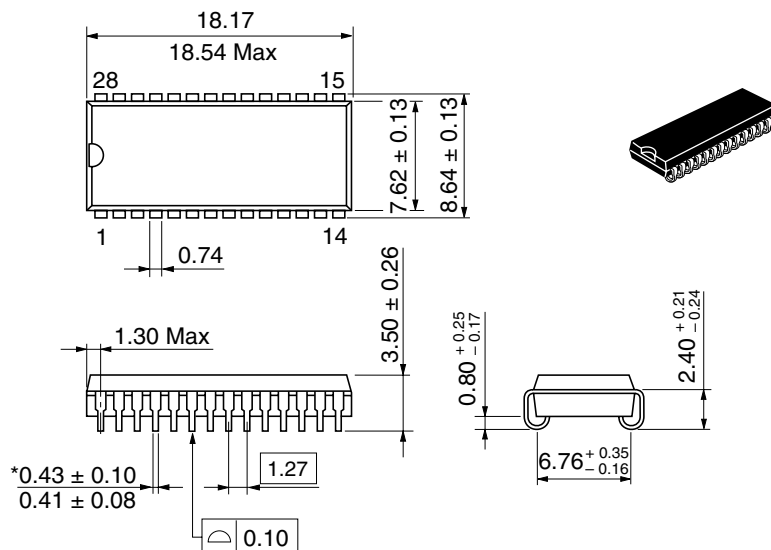
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

3. Plastic SOJ



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

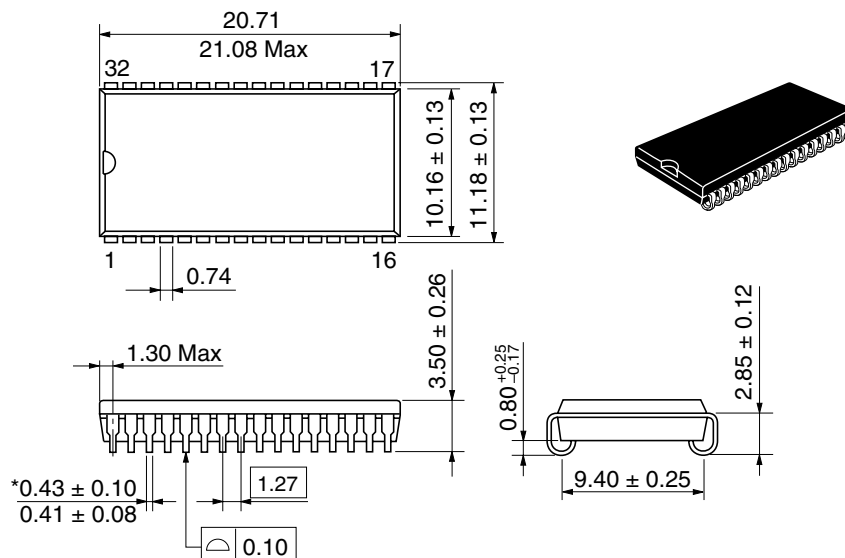
As of July, 2002
Unit: mm



*Dimension including the plating thickness
Base material dimension

Hitachi Code	CP-28DN
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	0.92 g

As of July, 2002
Unit: mm

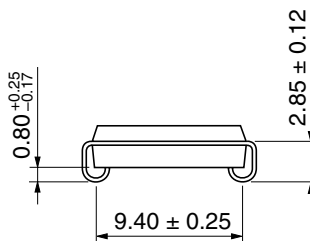
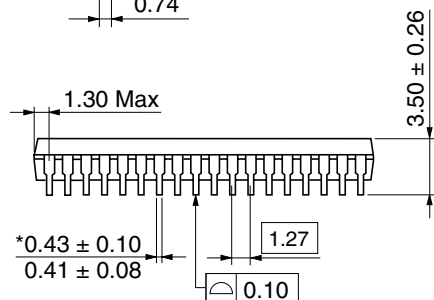
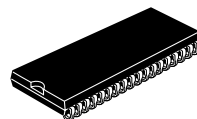
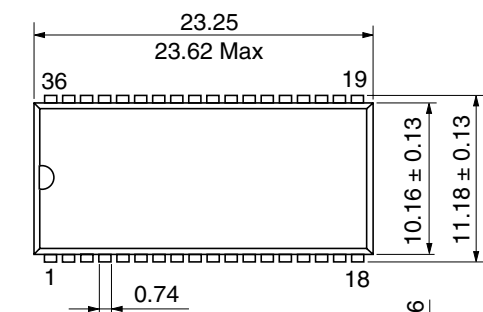


*Dimension including the plating thickness
Base material dimension

Hitachi Code	CP-32DB
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	1.2 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

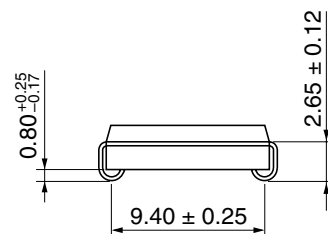
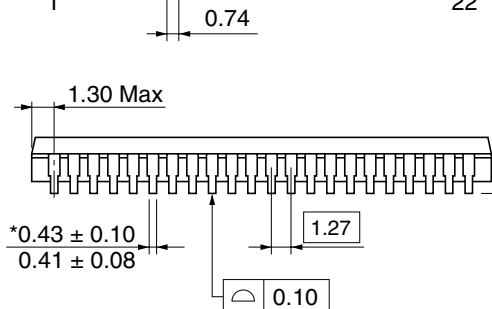
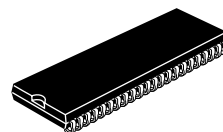
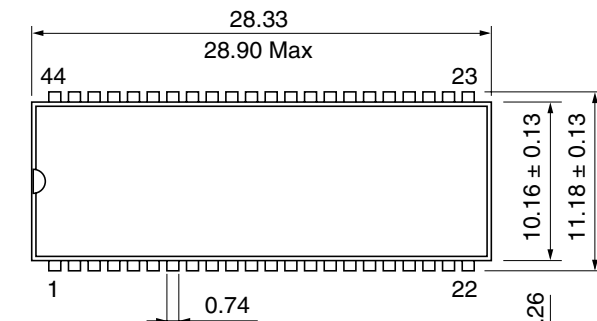
As of July, 2002
Unit: mm



*Dimension including the plating thickness
Base material dimension

Hitachi Code	CP-36D
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	1.4 g

As of July, 2002
Unit: mm

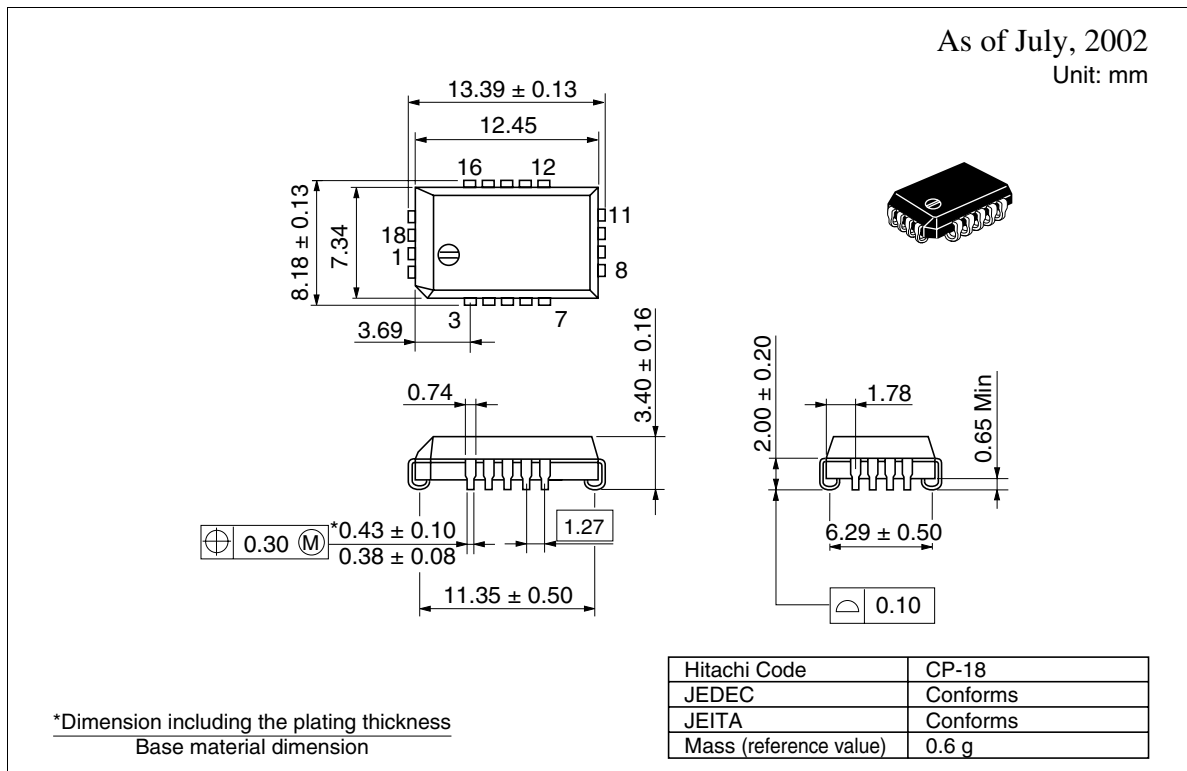


*Dimension including the plating thickness
Base material dimension

Hitachi Code	CP-44D
JEDEC	Conforms
JEITA	—
Mass (reference value)	1.8 g

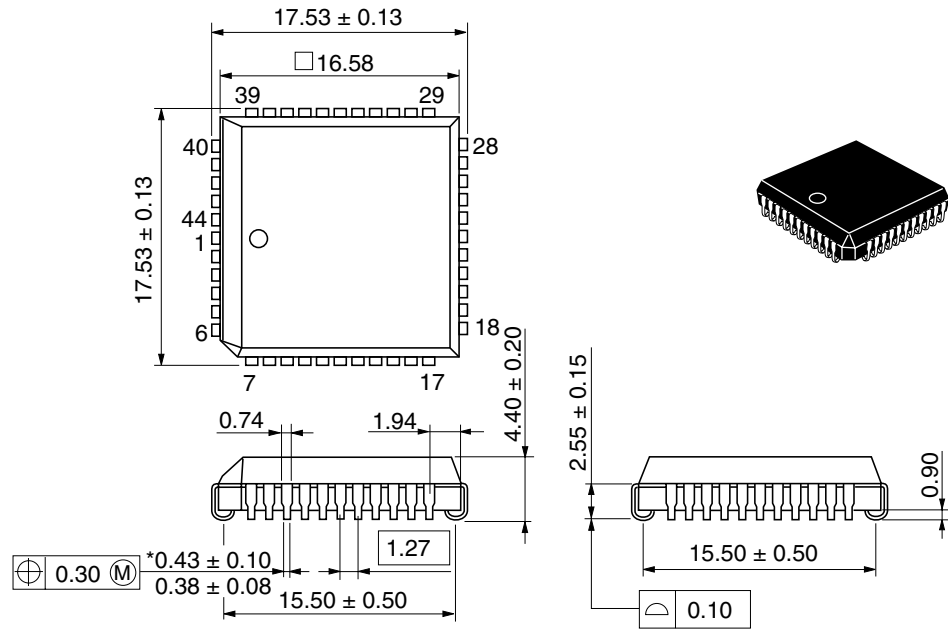
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

4. QFJ(PLCC)



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm

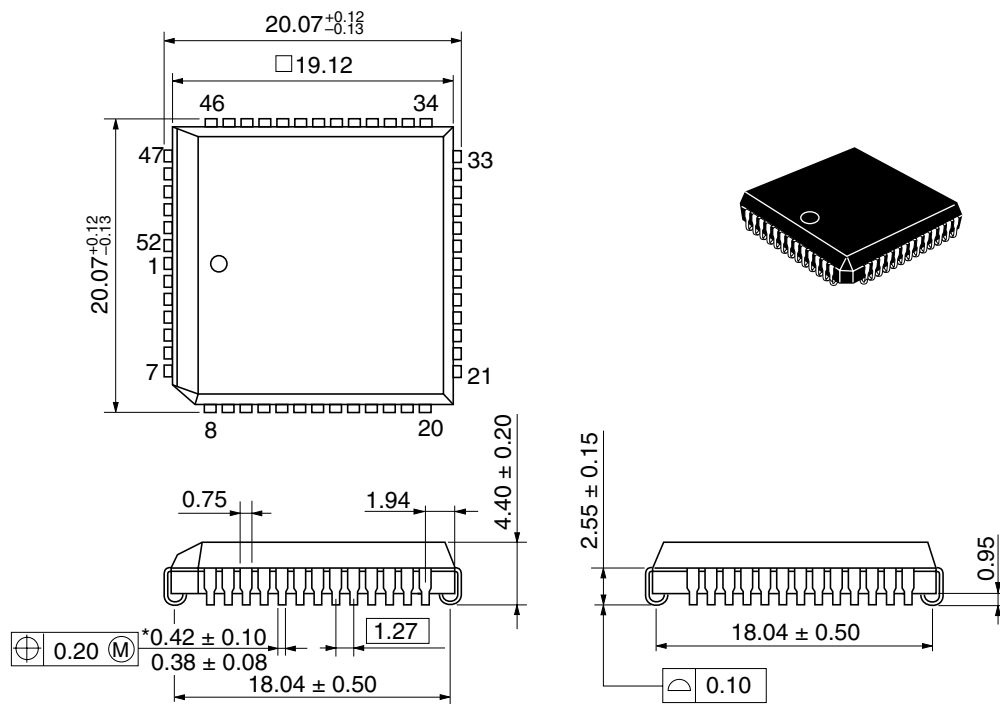


*Dimension including the plating thickness
Base material dimension

Hitachi Code	CP-44
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	2.0 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm

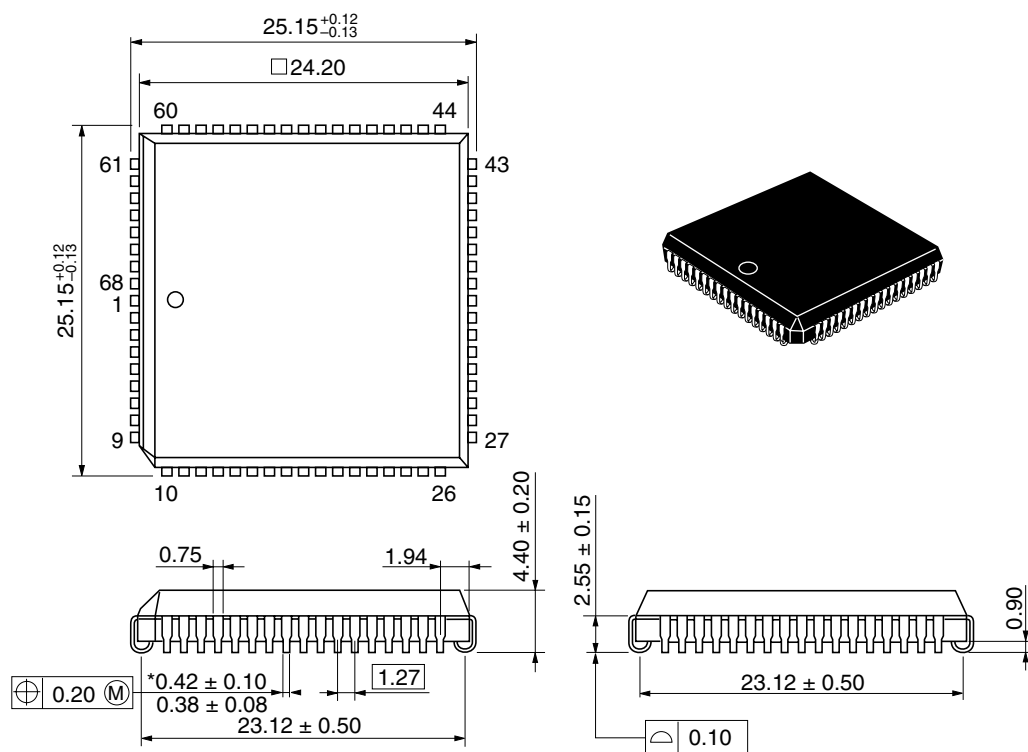


*Dimension including the plating thickness
Base material dimension

Hitachi Code	CP-52
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	2.8 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm

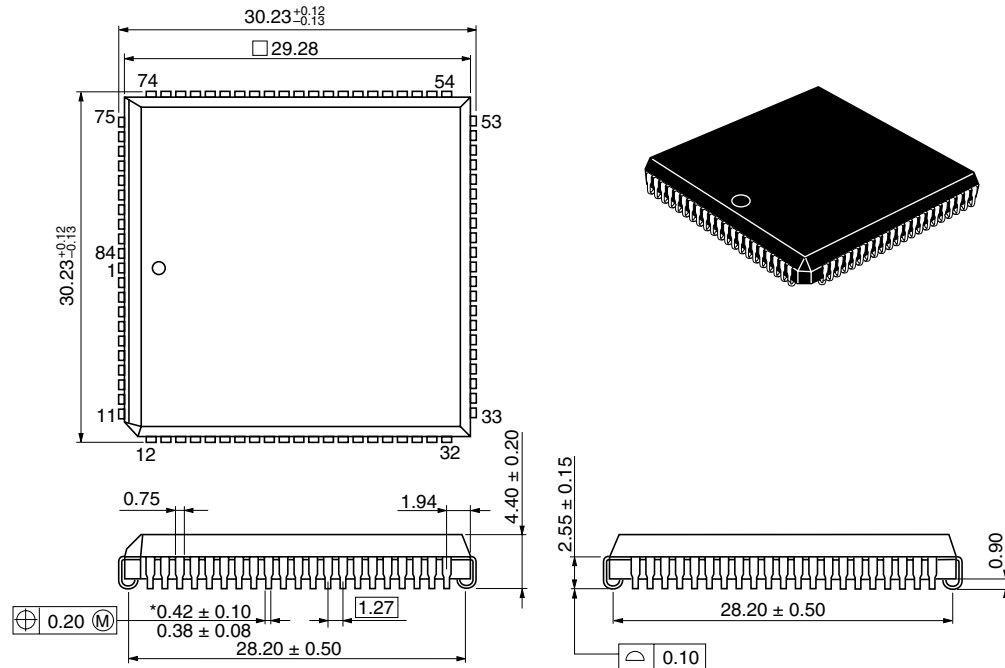


*Dimension including the plating thickness
Base material dimension

Hitachi Code	CP-68
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	4.2 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



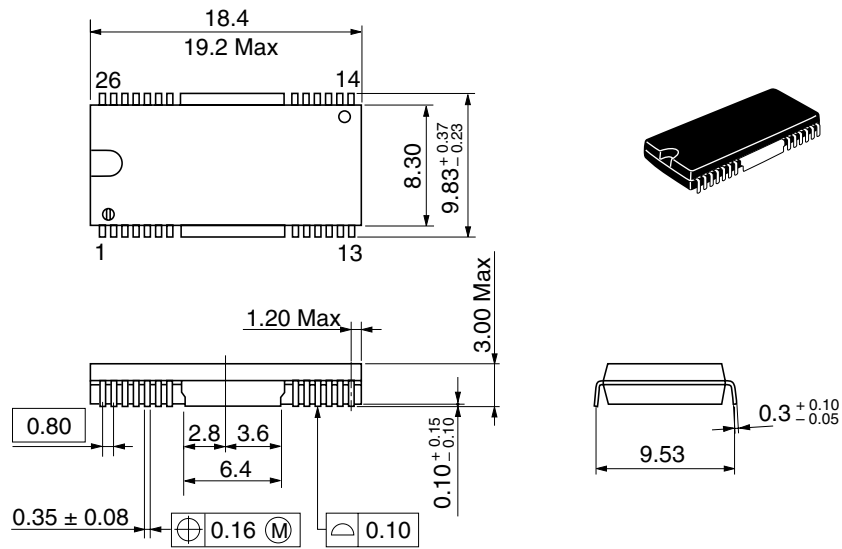
*Dimension including the plating thickness
Base material dimension

Hitachi Code	CP-84
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	6.4 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

5. HSOI

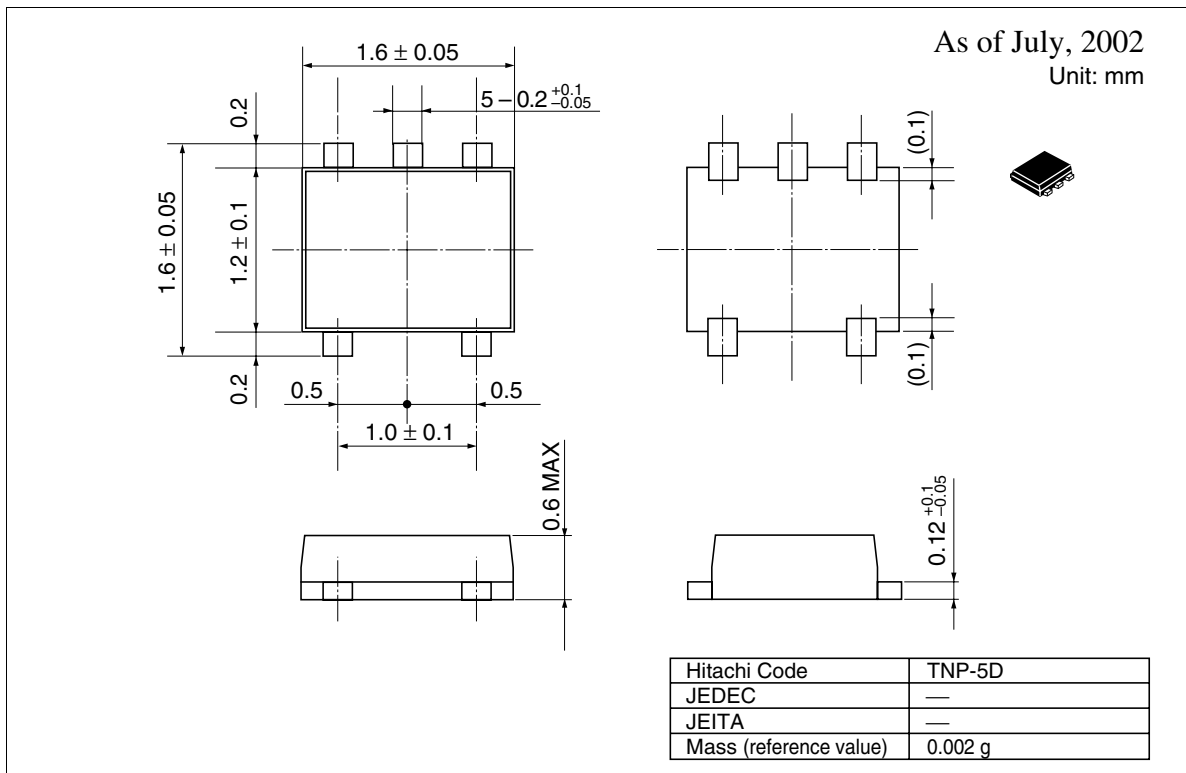
As of July, 2002
Unit: mm



Hitachi Code	MP-26DT
JEDEC	—
JEITA	—
Mass (reference value)	0.98 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

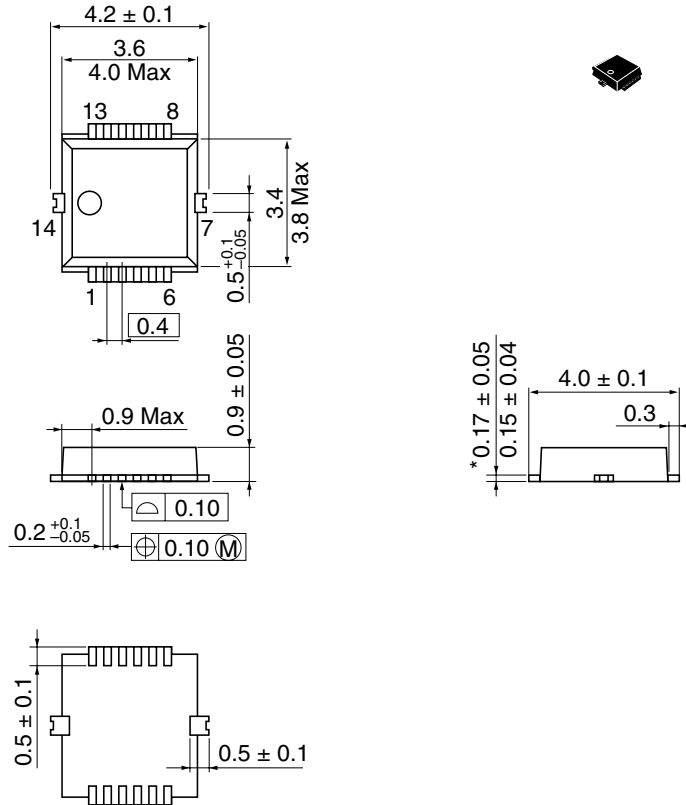
6. Plastic VSON



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

7. Plastic VQFN

As of July, 2002
Unit: mm

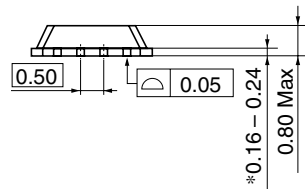
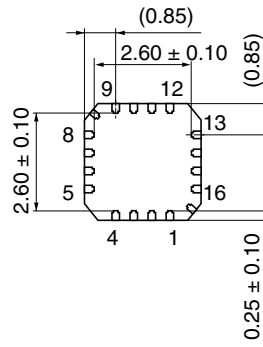
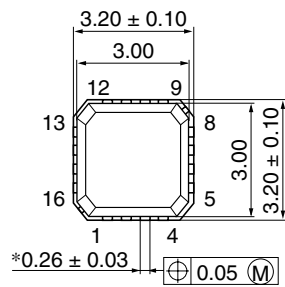


*Dimension including the plating thickness
Base material dimension

Hitachi Code	TNP-14
JEDEC	—
JEITA	—
Mass (reference value)	0.026 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

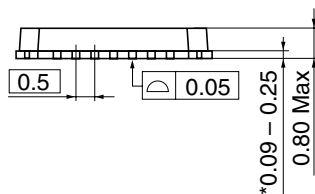
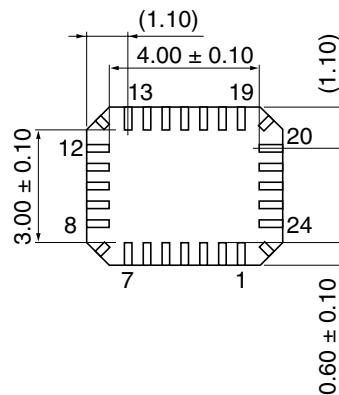
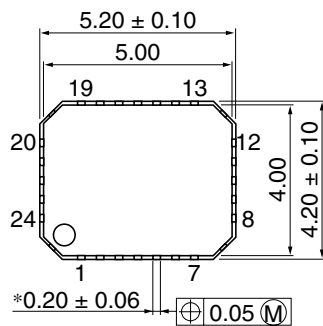
As of July, 2002
Unit: mm



*Ni/Pd/Au plating

Hitachi Code	TNP-16AV
JEDEC	—
JEITA	—
Mass (reference value)	0.019 g

As of July, 2002
Unit: mm

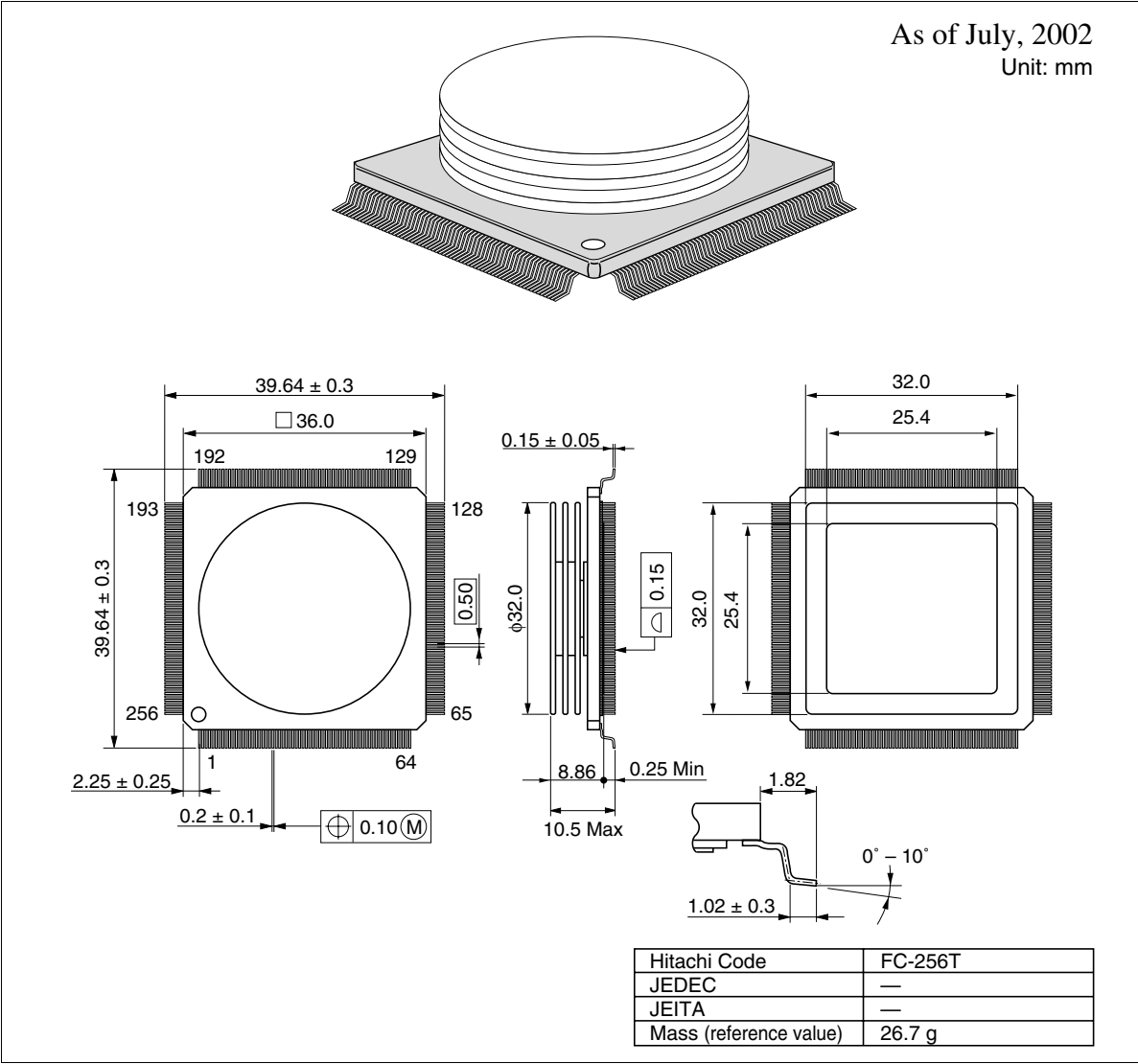


*Ni/Pd/Au plating

Hitachi Code	TNP-24AV
JEDEC	—
JEITA	—
Mass (reference value)	0.04 g

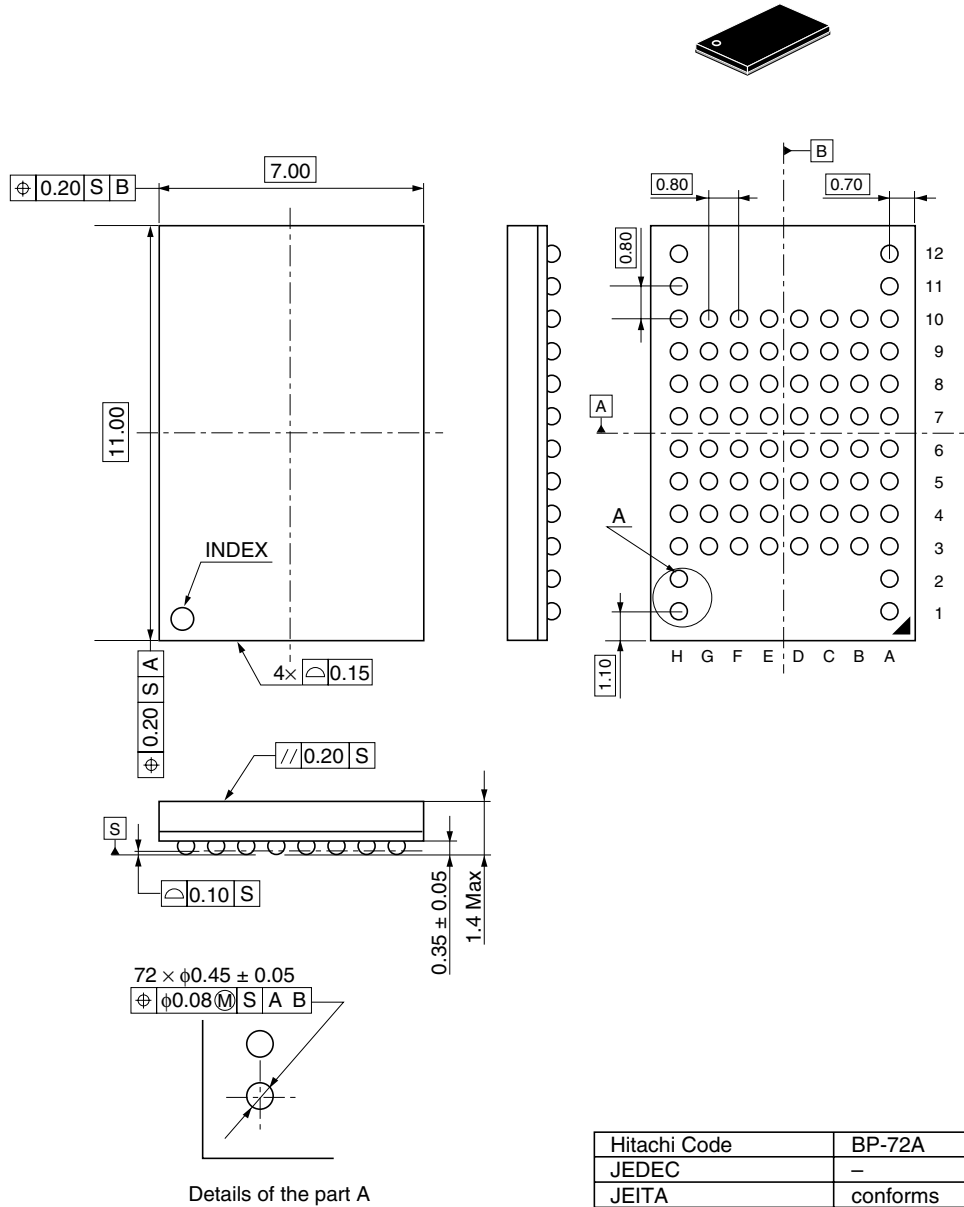
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

8. Ceramic QFP



9. Plastic BGA

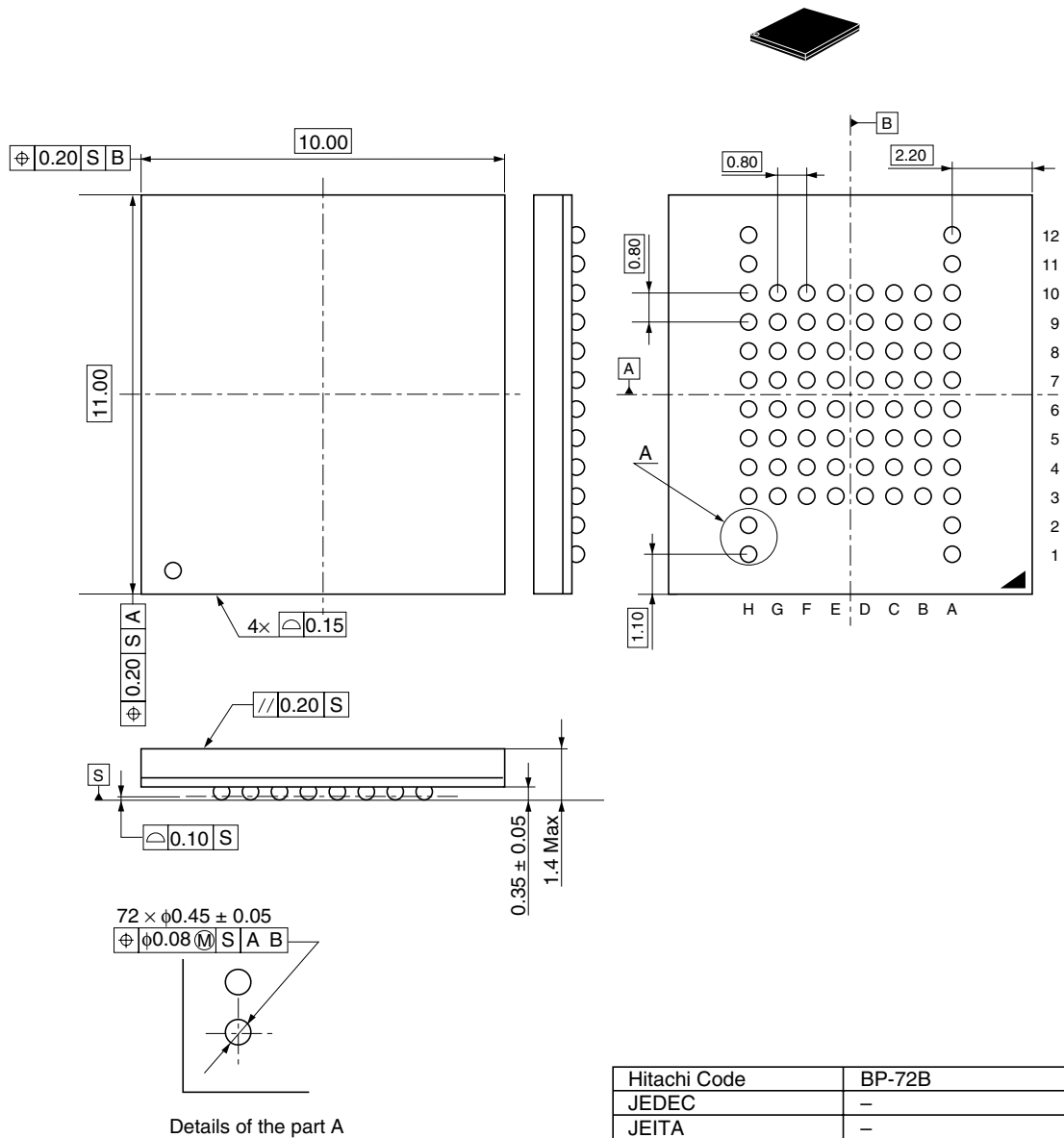
As of July, 2002
Unit: mm



Hitachi Code	BP-72A
JEDEC	—
JEITA	conforms
Mass (reference value)	0.17 g

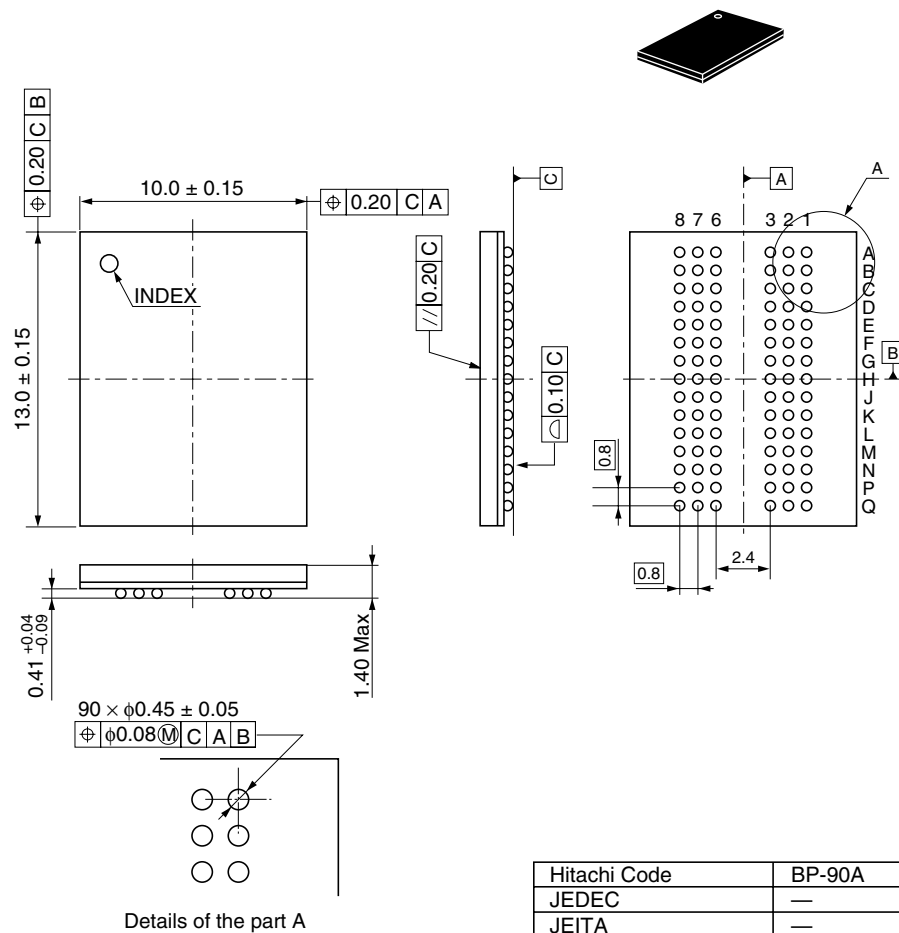
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

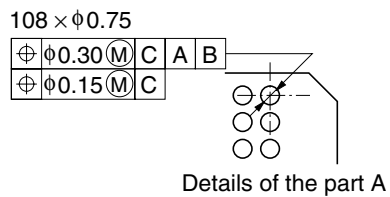
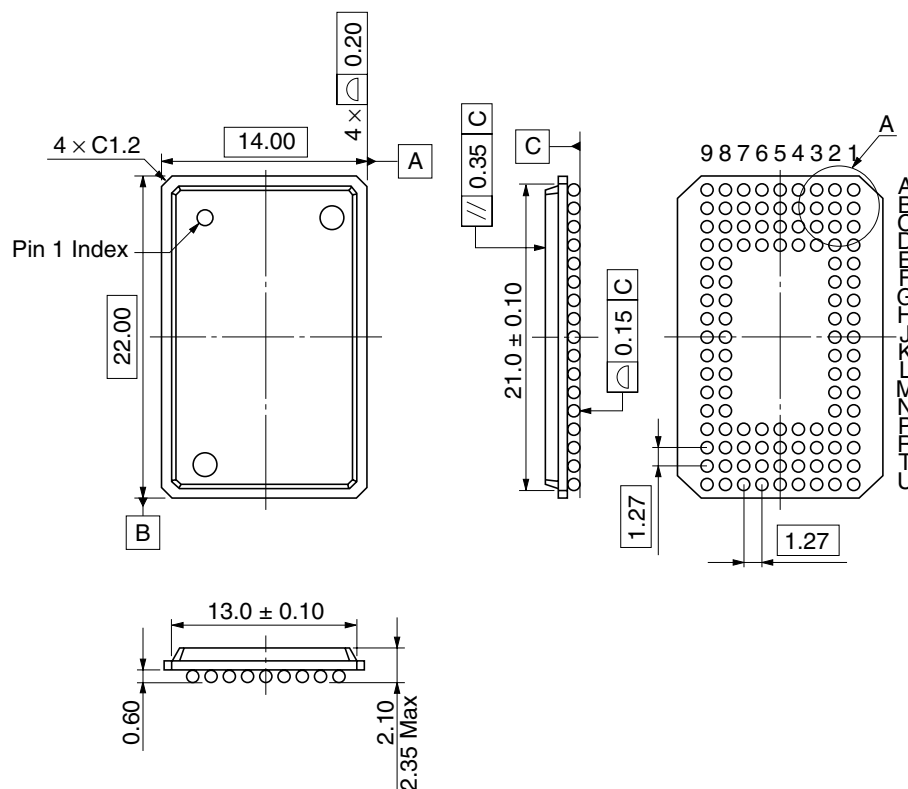
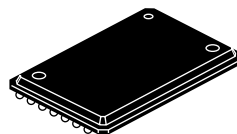
As of July, 2002
Unit: mm



Hitachi Code	BP-90A
JEDEC	—
JEITA	—
Mass (reference value)	0.26 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

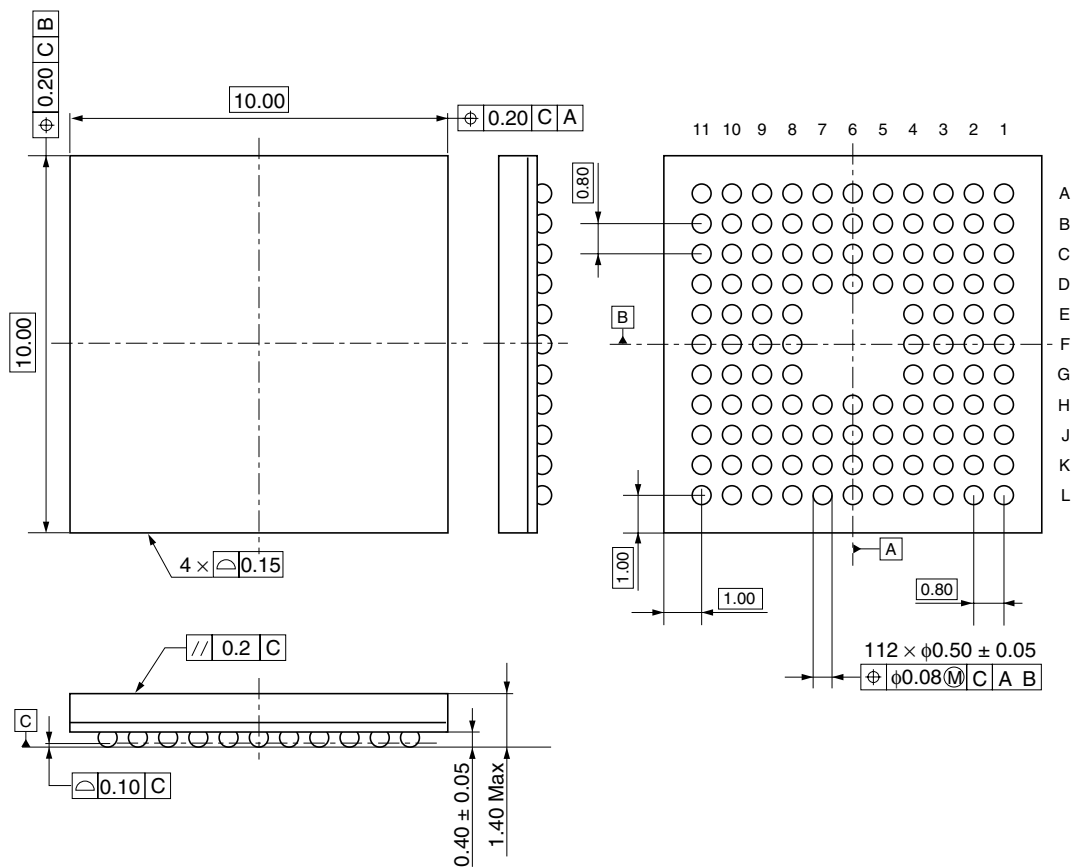
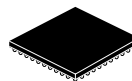
As of July, 2002
Unit: mm



Hitachi Code	BP-108
JEDEC	—
JEITA	—
Mass (reference value)	1.2 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

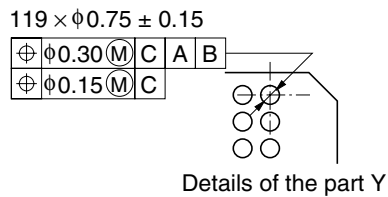
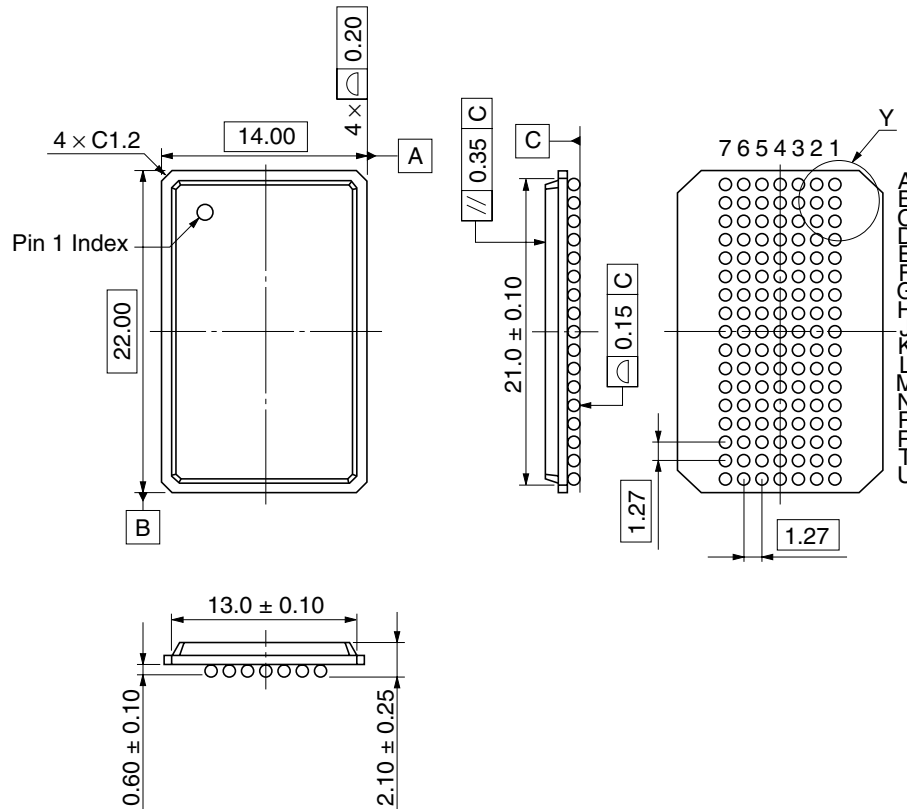
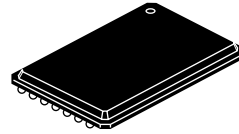
As of July, 2002
Unit: mm



Hitachi Code	BP-112
JEDEC	—
JEITA	—
Mass (reference value)	0.3 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

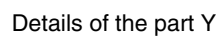
As of July, 2002
Unit: mm



Hitachi Code	BP-119A
JEDEC	Conforms
JEITA	—
Mass (reference value)	1.2 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Unit: mm

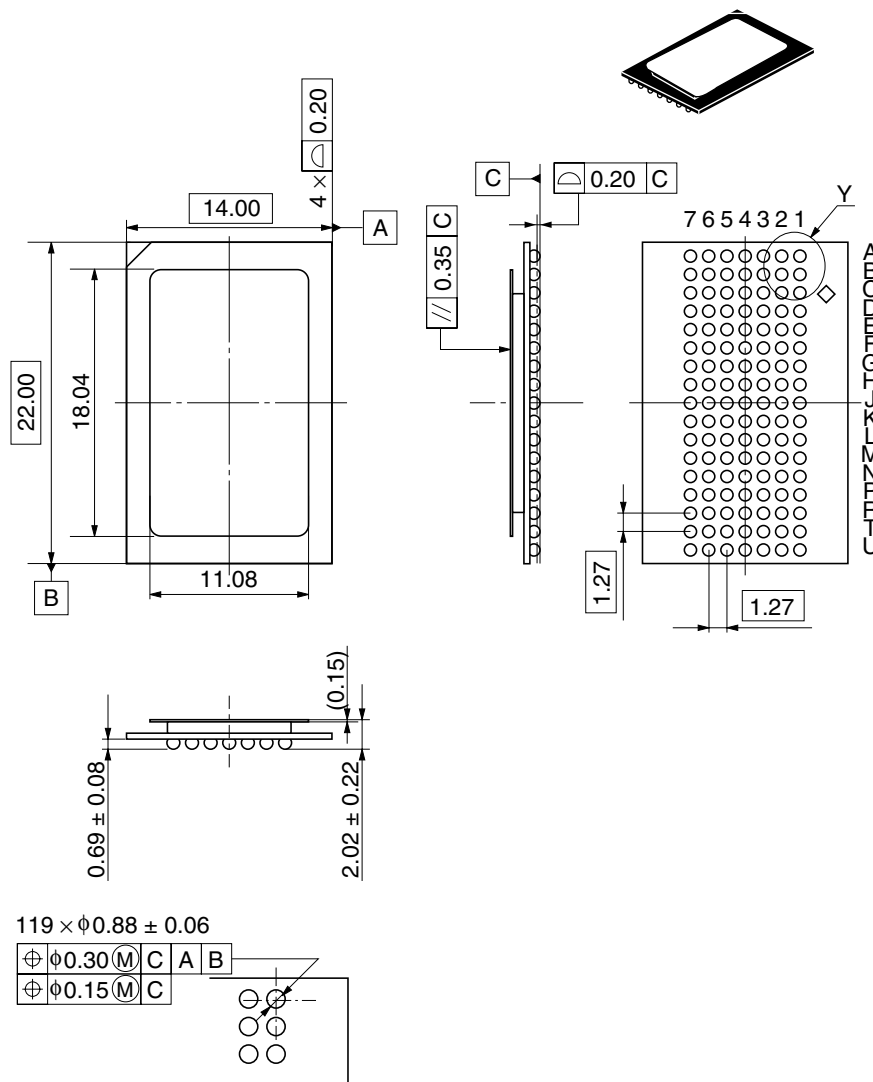


Hitachi Code	BP-119C
JEDEC	—
JEITA	—
Mass (reference value)	1.0 g

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Preliminary

As of July, 2002
Unit: mm

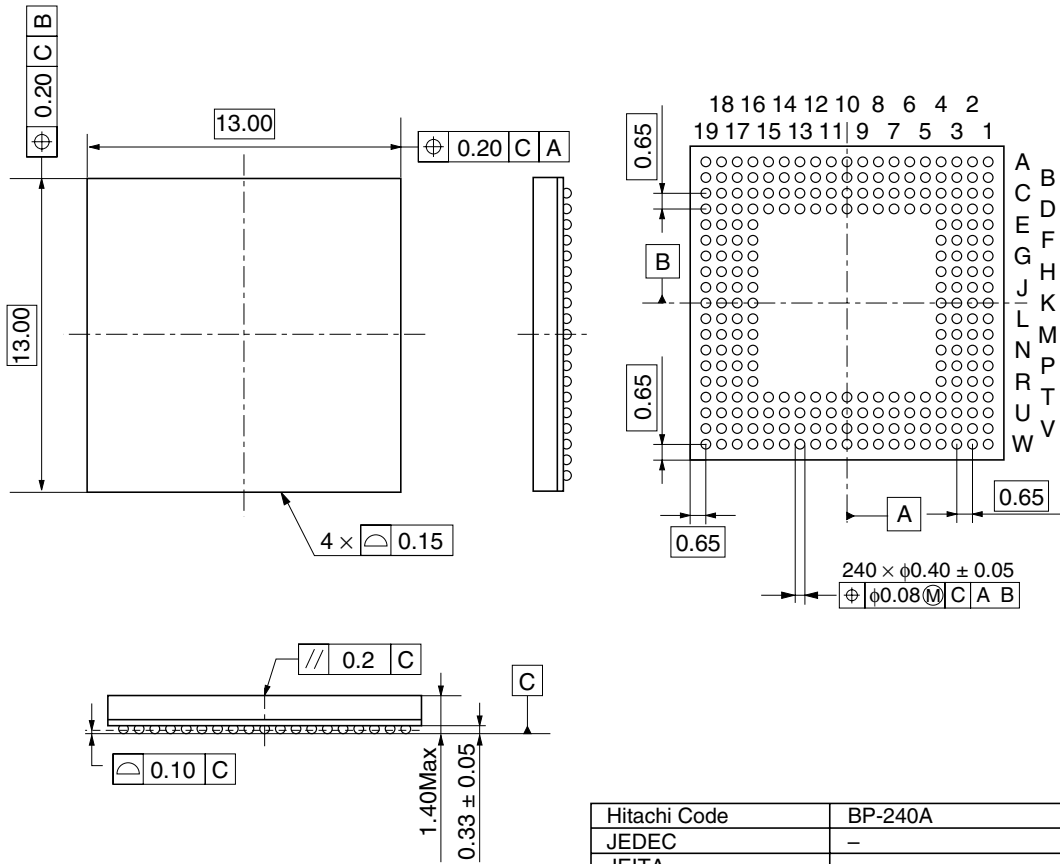
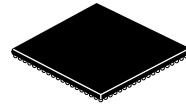


Details of the part Y

Hitachi Code	BP-119E
JEDEC	—
JEITA	—
Mass (reference value)	1.1 g

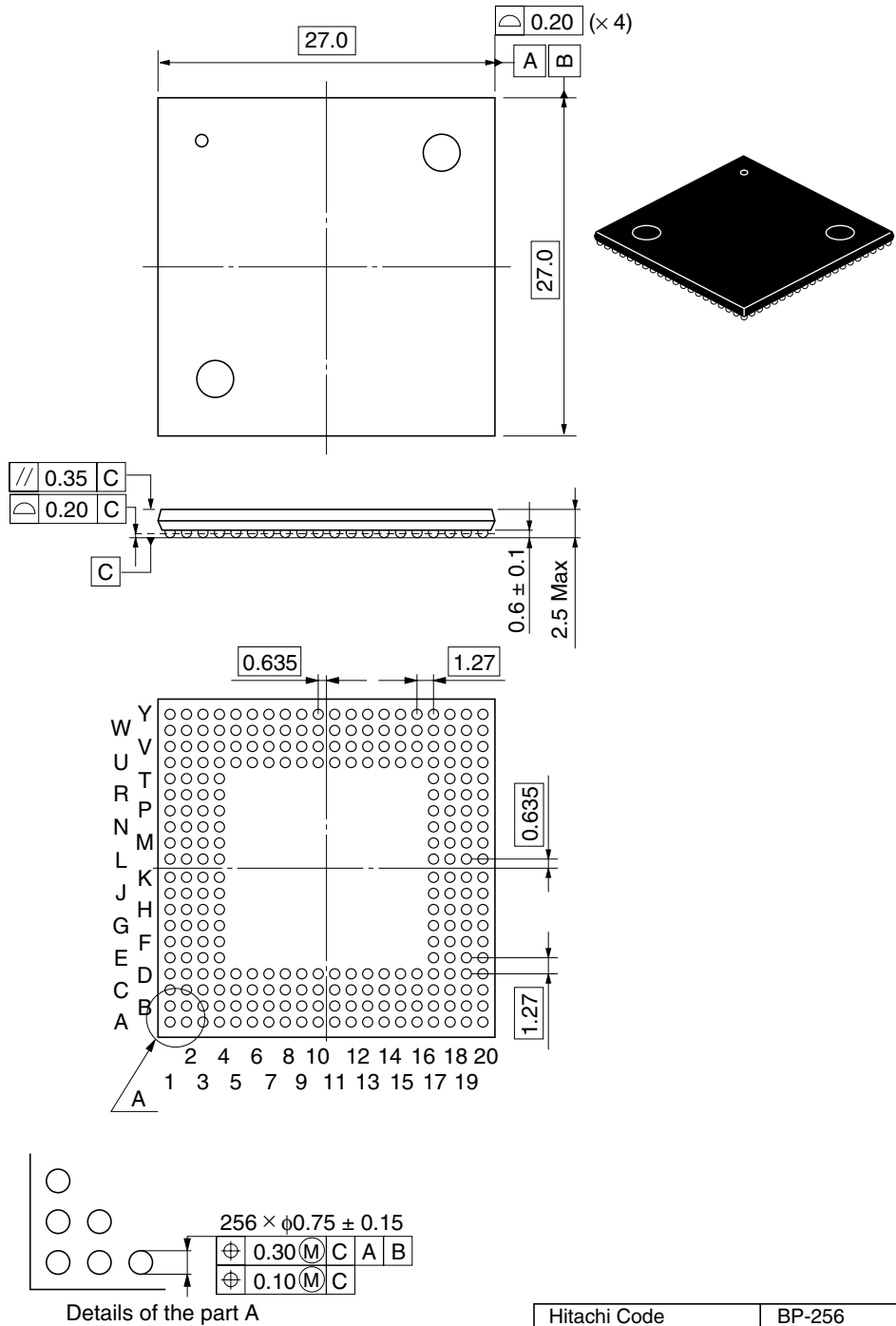
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Unit: mm



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm

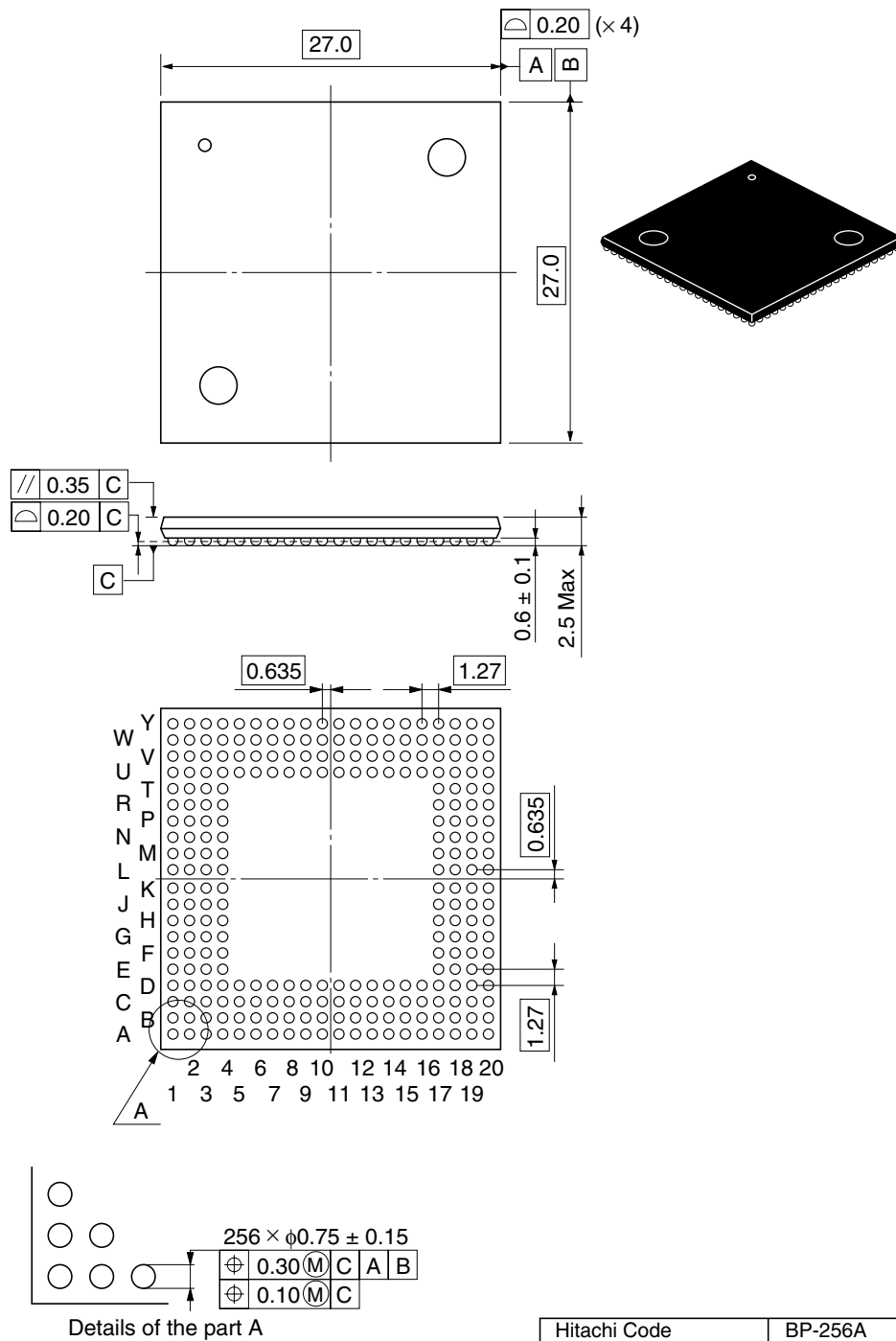


Hitachi Code	BP-256
JEDEC	—
JEITA	—
Mass (reference value)	3.0 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

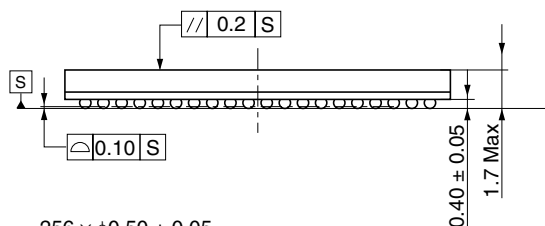
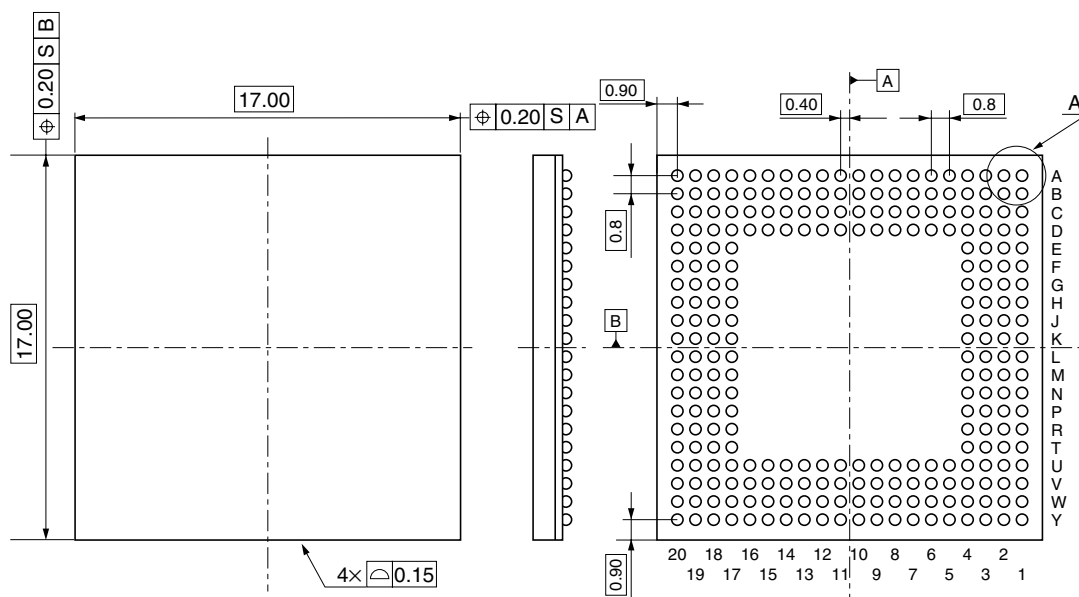
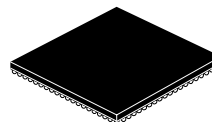
As of July, 2002

Unit: mm

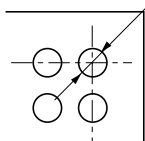


The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Unit: mm


$$256 \times \phi 0.50 \pm 0.05$$

\oplus	$\phi 0.08$	(M)	S	A	B
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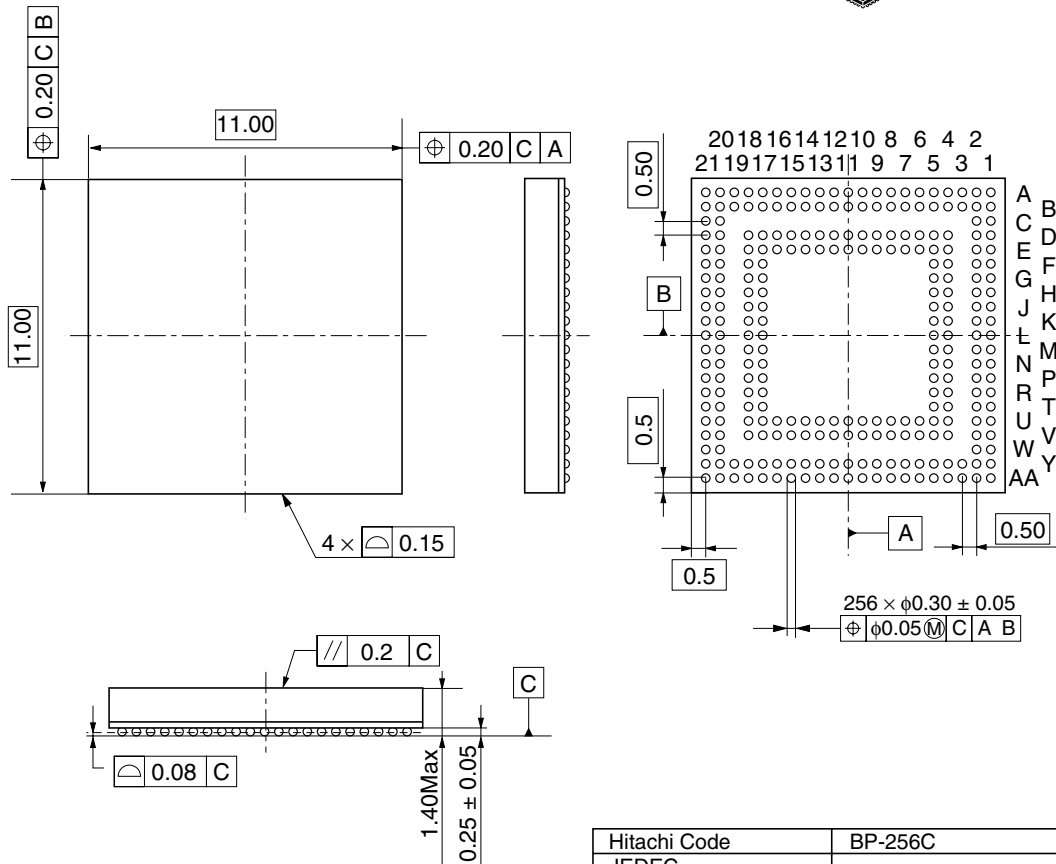


Details of the part A

Hitachi Code	BP-256B
JEDEC	—
JEITA	—
Mass (reference value)	0.7 g

224

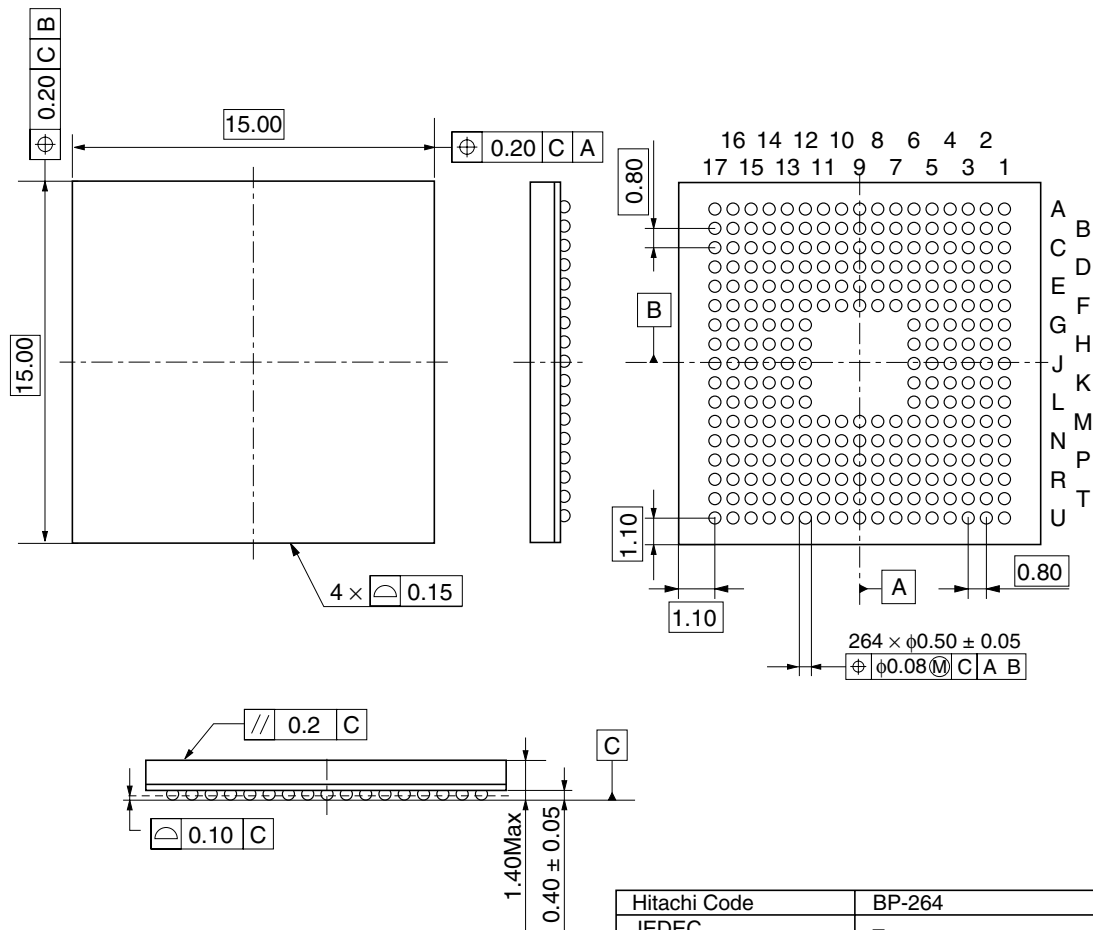
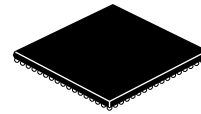
Unit: mm



Hitachi Code	BP-256C
JEDEC	—
JEITA	—
Mass (reference value)	0.3 g

225

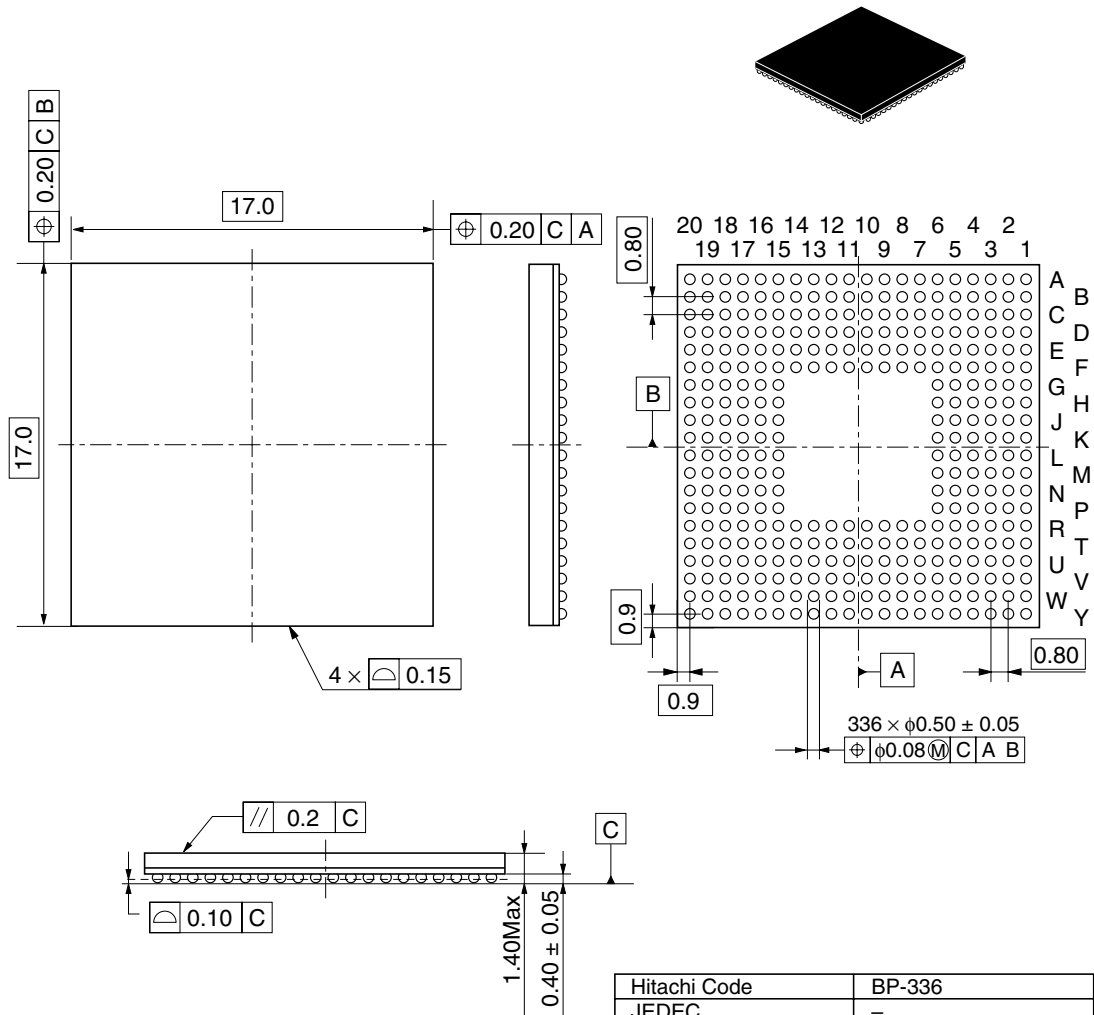
As of July, 2002
Unit: mm



Hitachi Code	BP-264
JEDEC	—
JEITA	—
Mass (reference value)	0.6 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

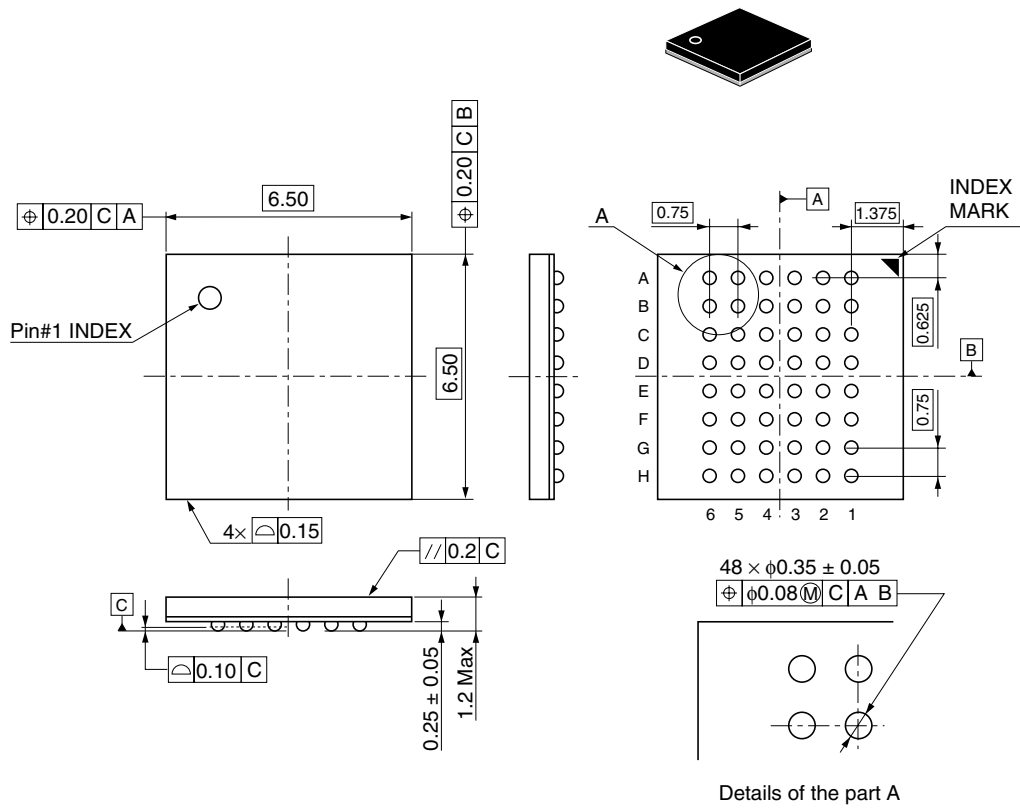
As of July, 2002
Unit: mm



Hitachi Code	BP-336
JEDEC	-
JEITA	-
Mass (reference value)	0.6 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

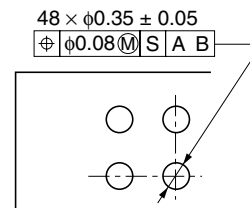
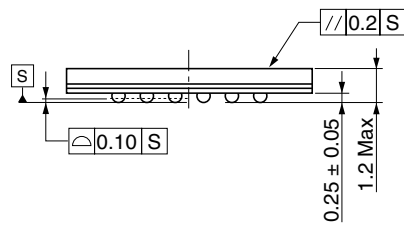
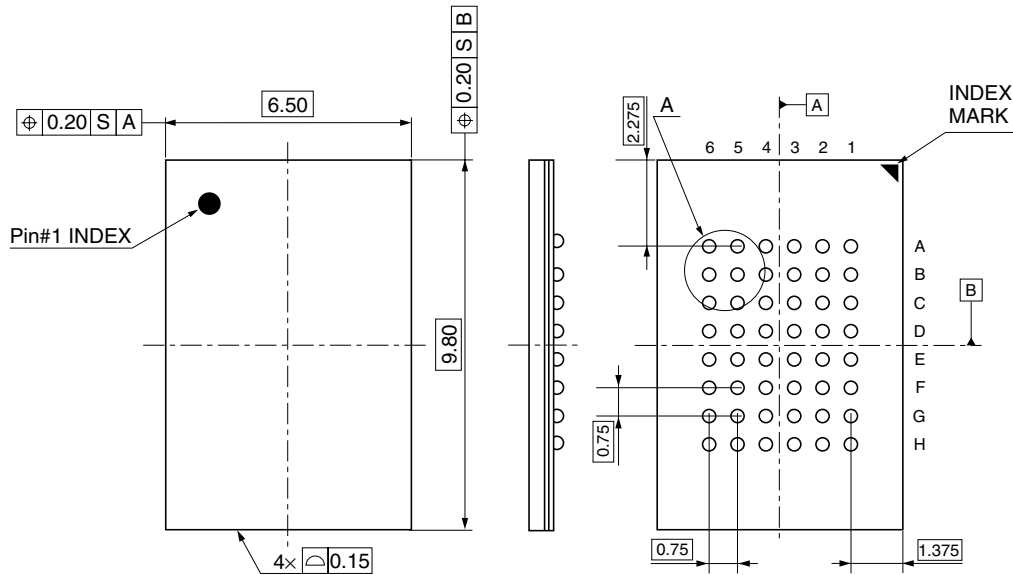
As of July, 2002
Unit: mm



Hitachi Code	TBP-48
JEDEC	—
JEITA	—
Mass (reference value)	0.09 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm

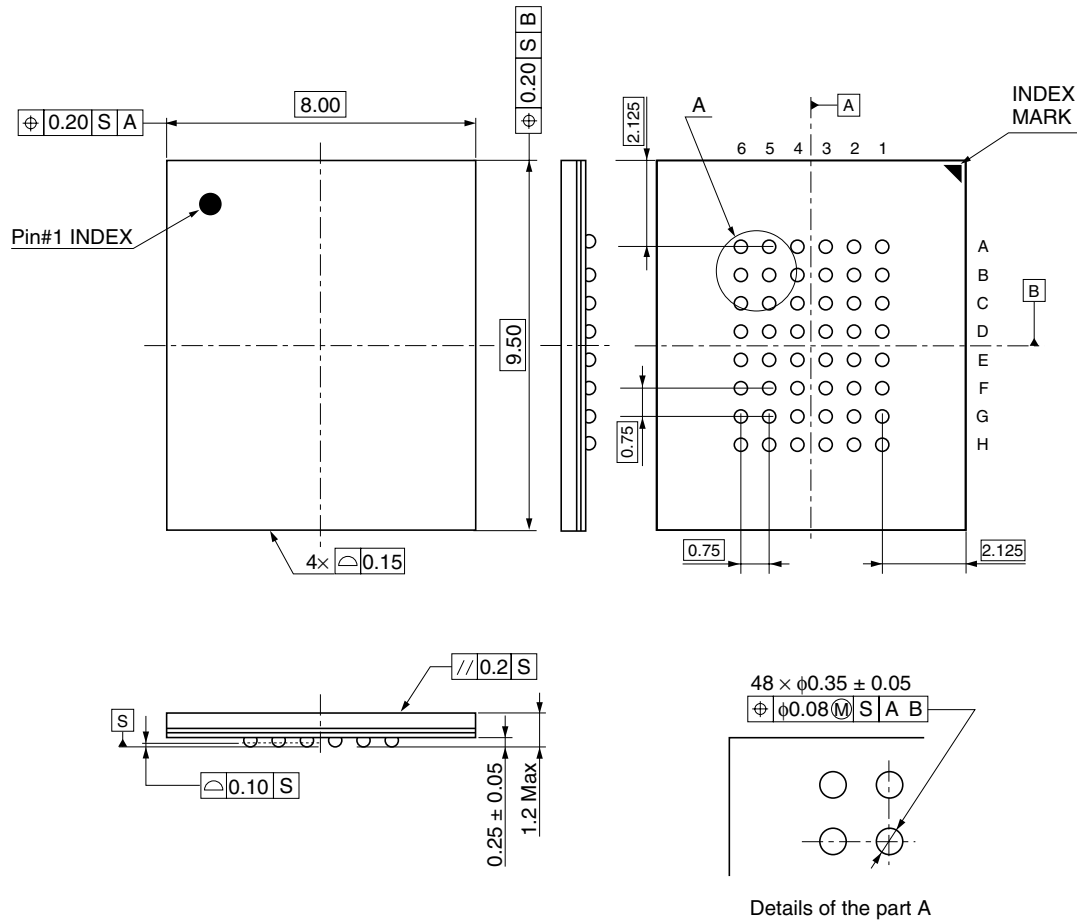


Details of the part A

Hitachi Code	TBP-48A
JEDEC	—
JEITA	—
Mass (reference value)	0.13 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm

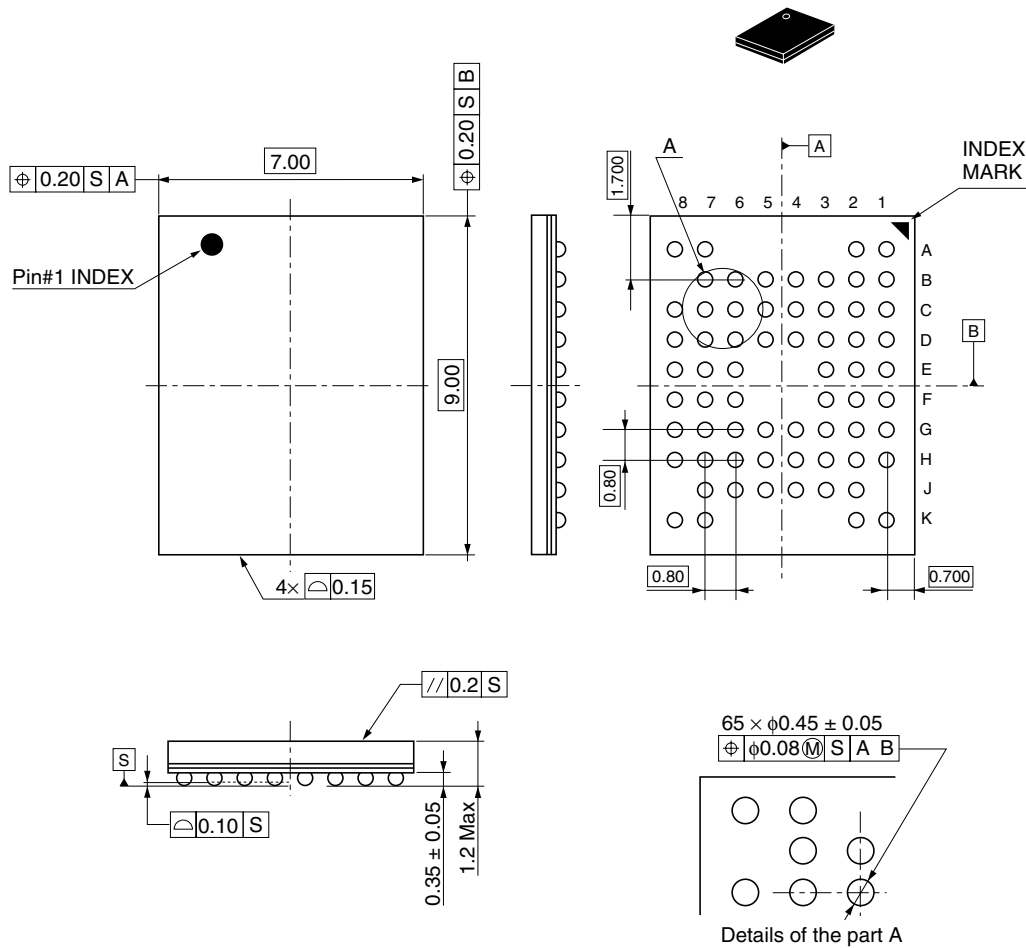


Hitachi Code	TBP-48F
JEDEC	—
JEITA	—
Mass (reference value)	0.15 g

230

Preliminary

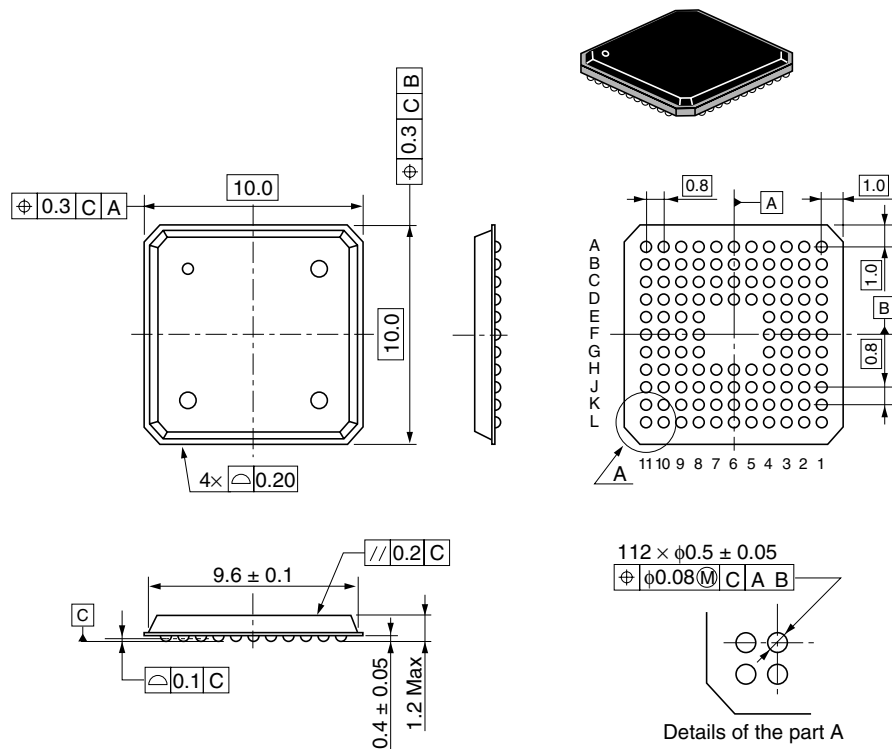
As of July, 2002
Unit: mm



Hitachi Code	TBP-65
JEDEC	—
JEITA	—
Mass (reference value)	0.13 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

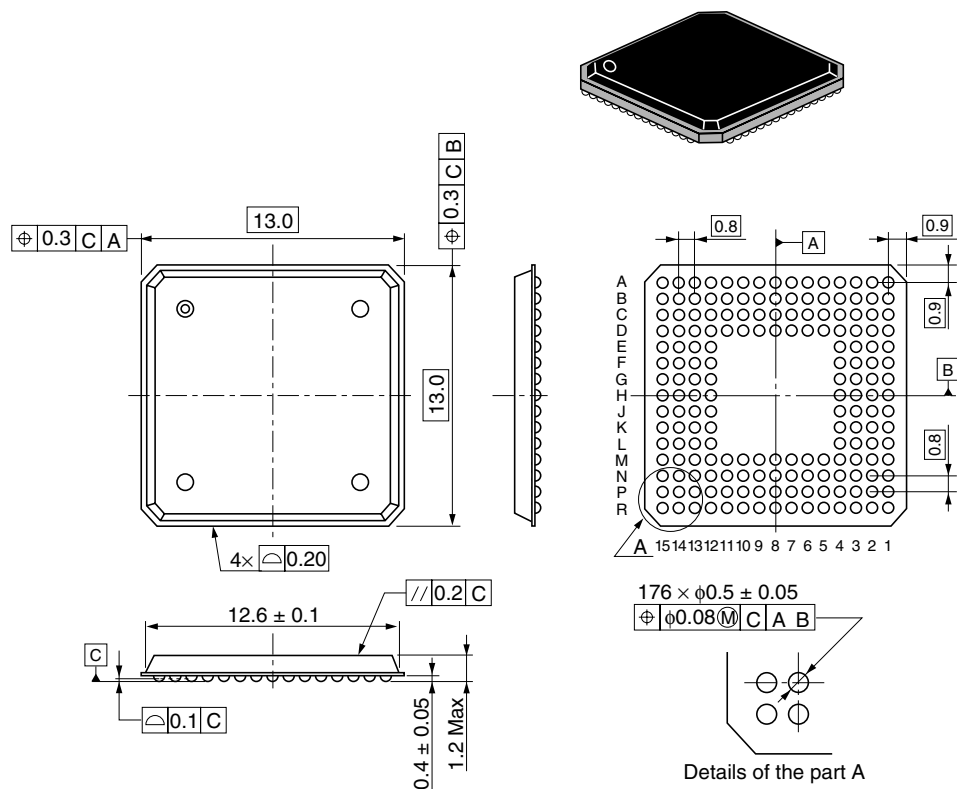
As of July, 2002
Unit: mm



Hitachi Code	TBP-112
JEDEC	—
JEITA	—
Mass (reference value)	0.19 g

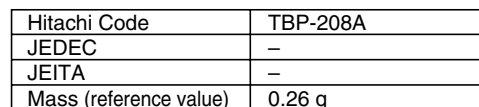

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Hitachi Code	TBP-176
JEDEC	—
JEITA	—
Mass (reference value)	0.32 g

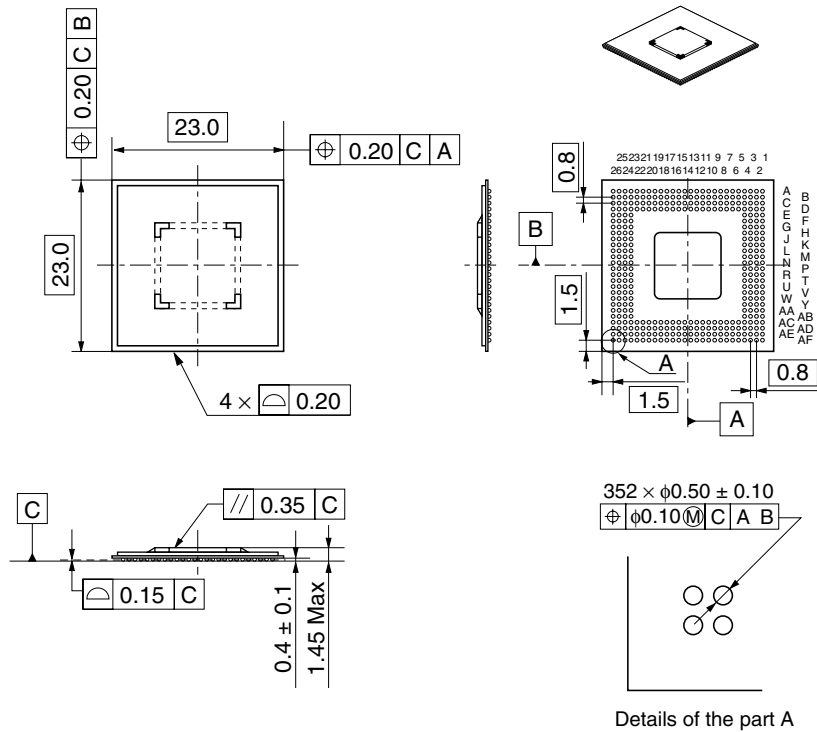
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



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10. Tape BGA

As of July, 2002
Unit: mm

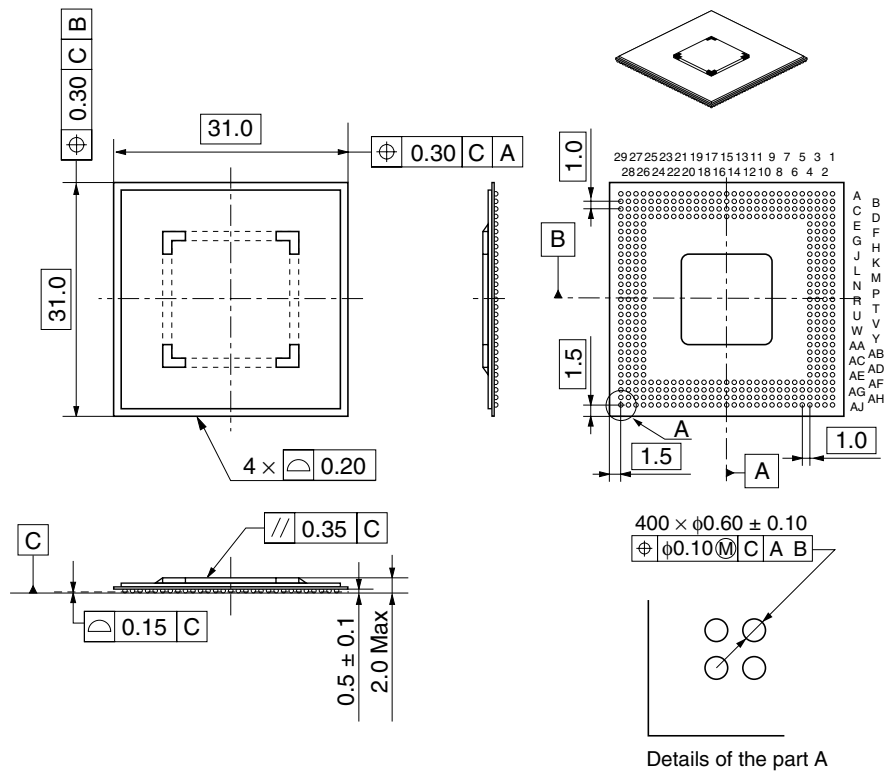


Hitachi Code	BT-352T
JEDEC	—
JEITA	—
Mass (reference value)	1.5 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

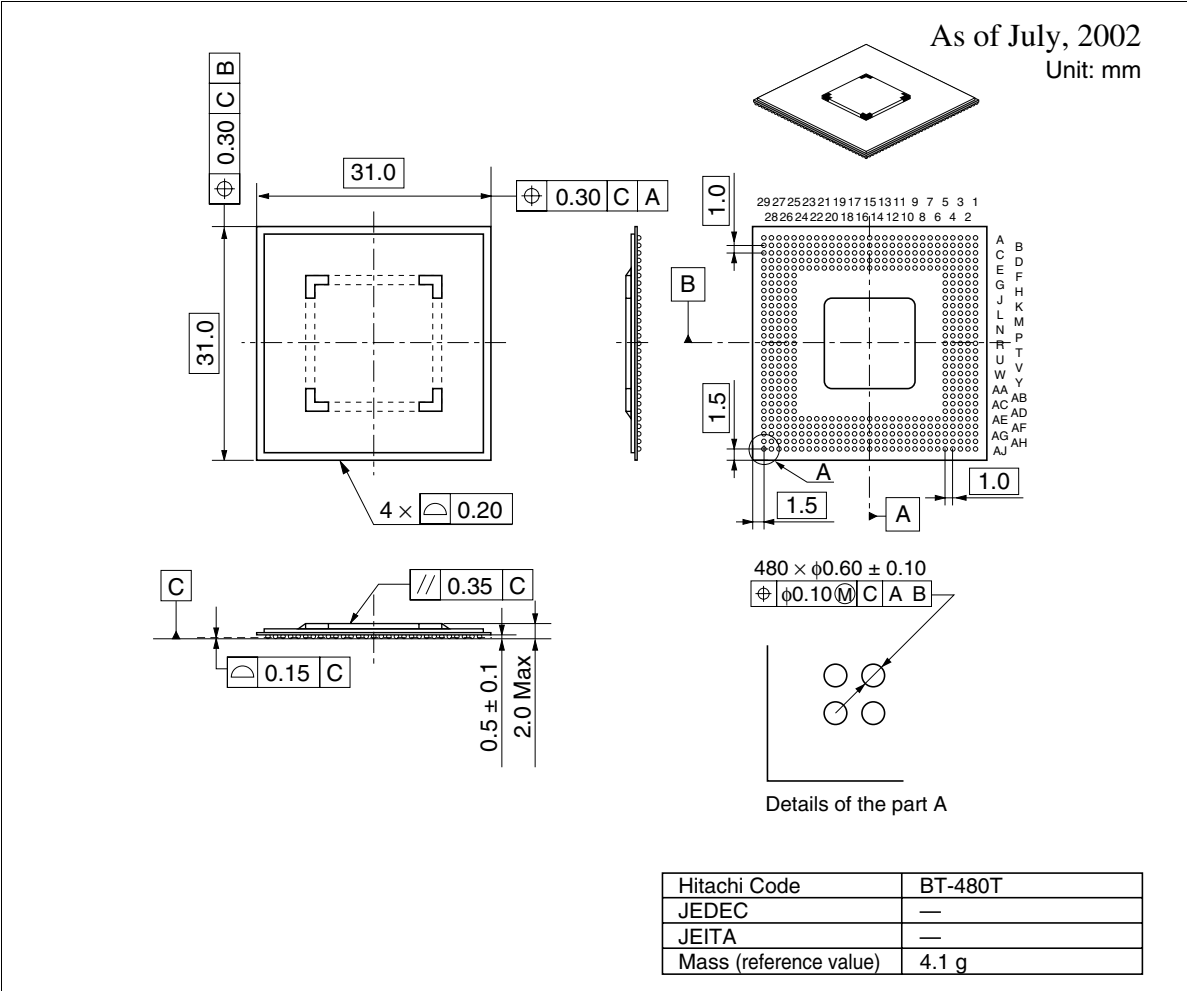
As of July, 2002

Unit: mm



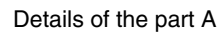
Hitachi Code	BT-400T
JEDEC	—
JEITA	—
Mass (reference value)	4.0 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Unit: mm

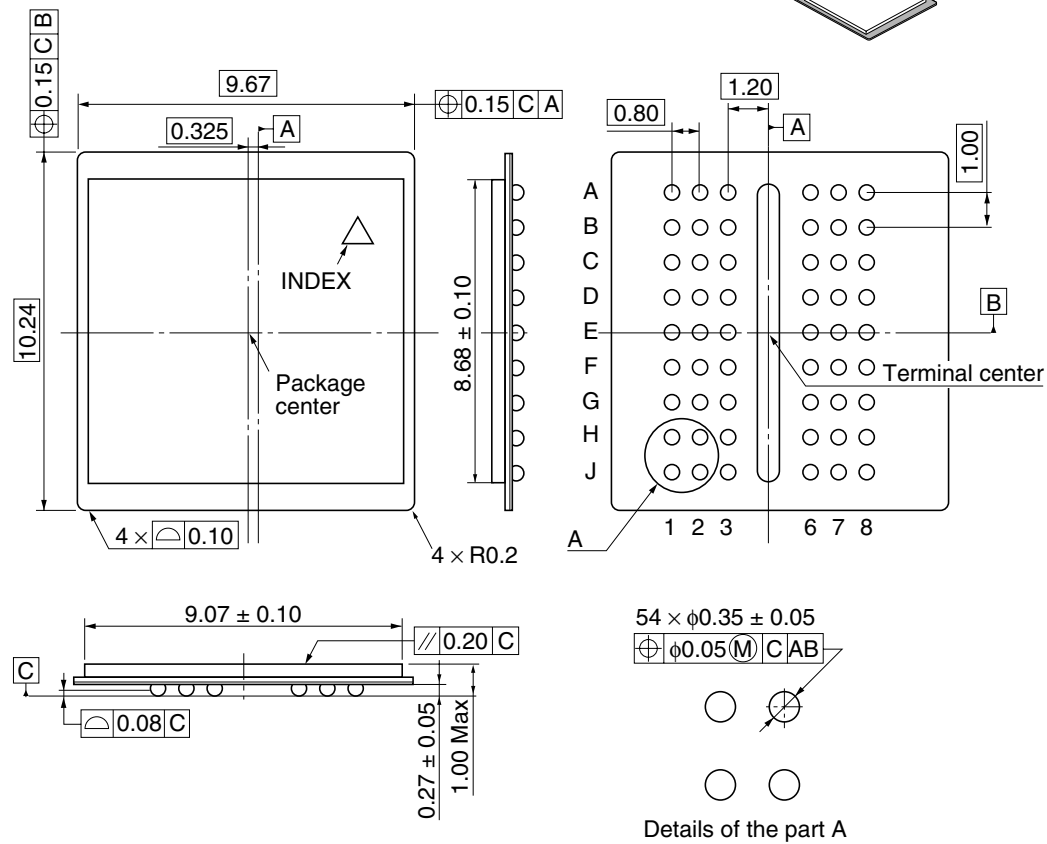


Hitachi Code	TBT-54
JEDEC	—
JEITA	—
Mass (reference value)	0.13 g

238

As of July, 2002

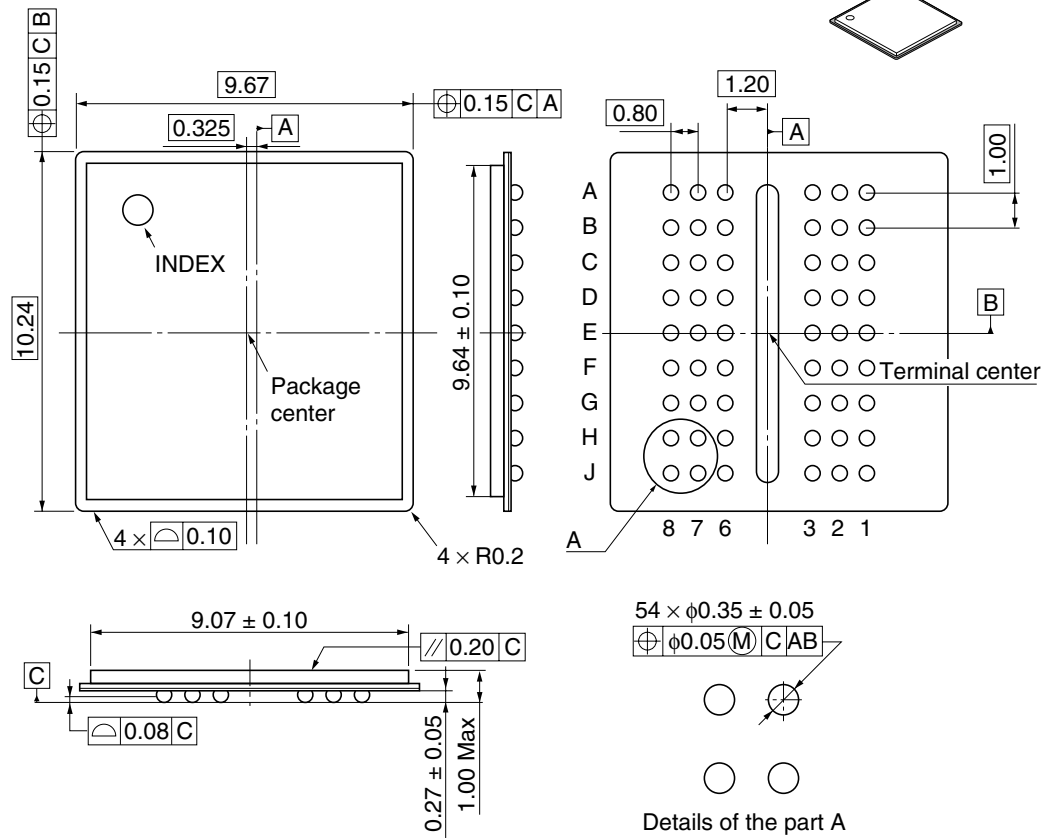
Unit: mm



Hitachi Code	TBT-54R
JEDEC	—
JEITA	—
Mass (reference value)	0.13 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

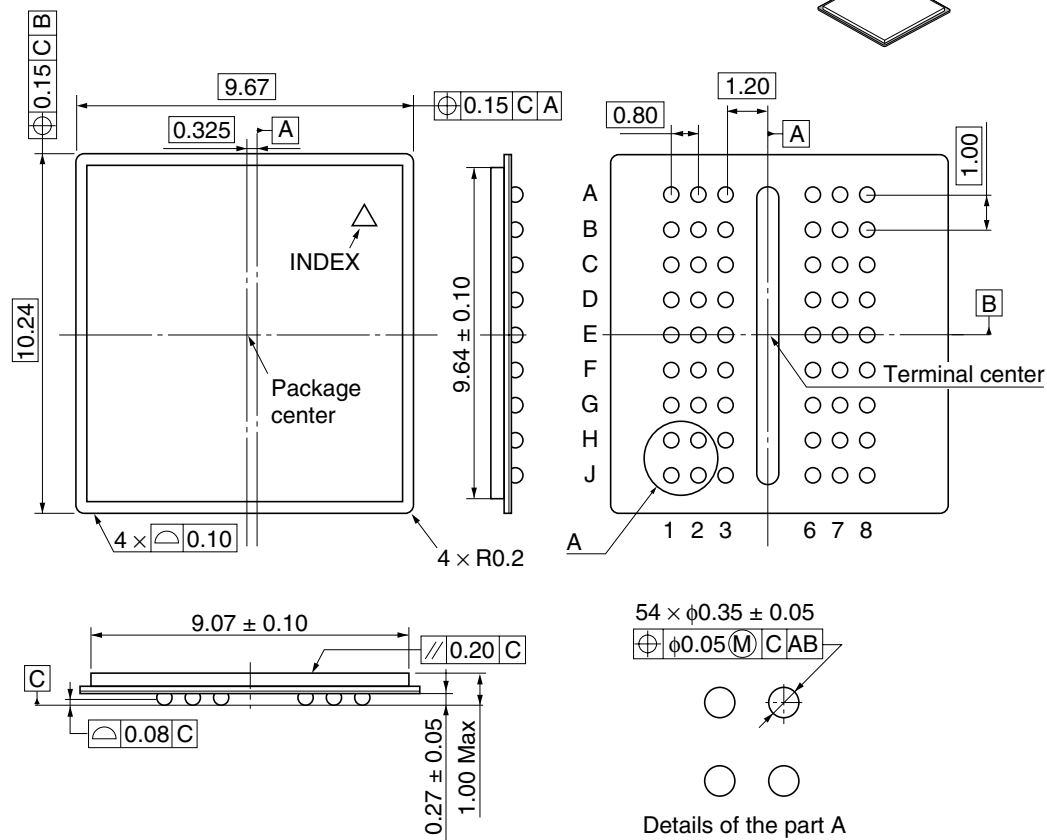
As of July, 2002
Unit: mm



Hitachi Code	TBT-54A
JEDEC	—
JEITA	—
Mass (reference value)	0.14 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

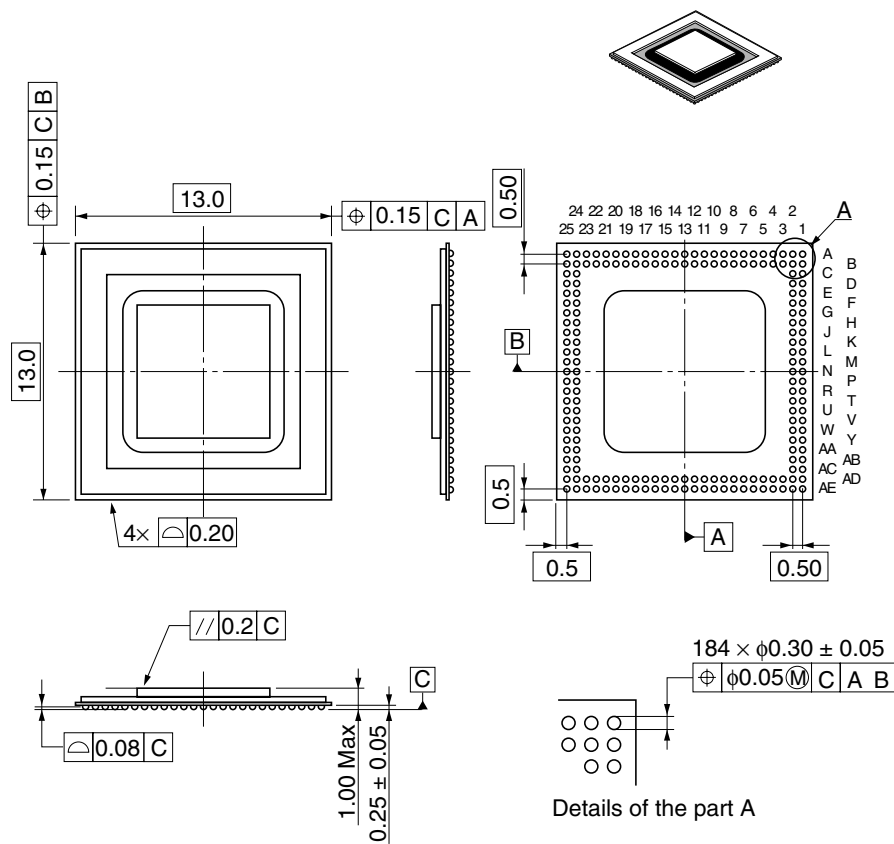
As of July, 2002
Unit: mm



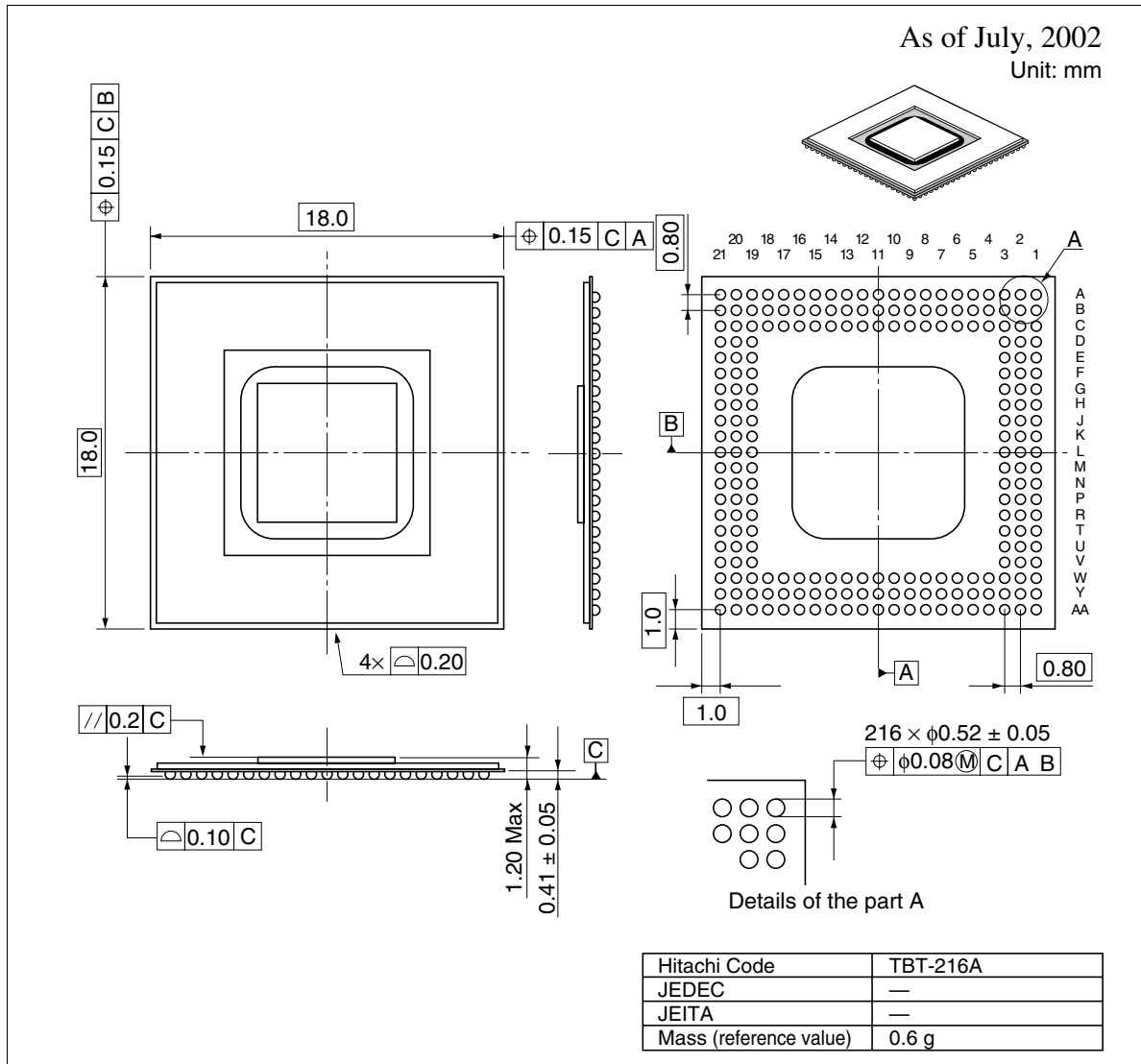
Hitachi Code	TBT-54AR
JEDEC	—
JEITA	—
Mass (reference value)	0.14 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm

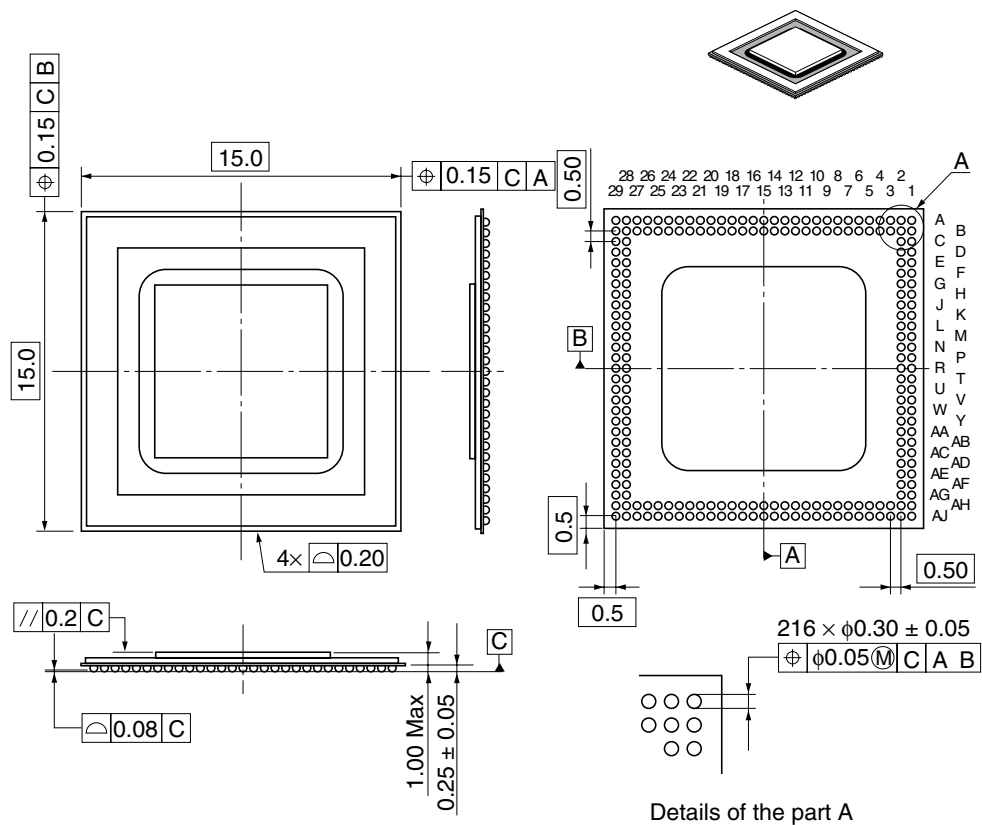


Hitachi Code	TBT-184A
JEDEC	—
JEITA	—
Mass (reference value)	0.3 g



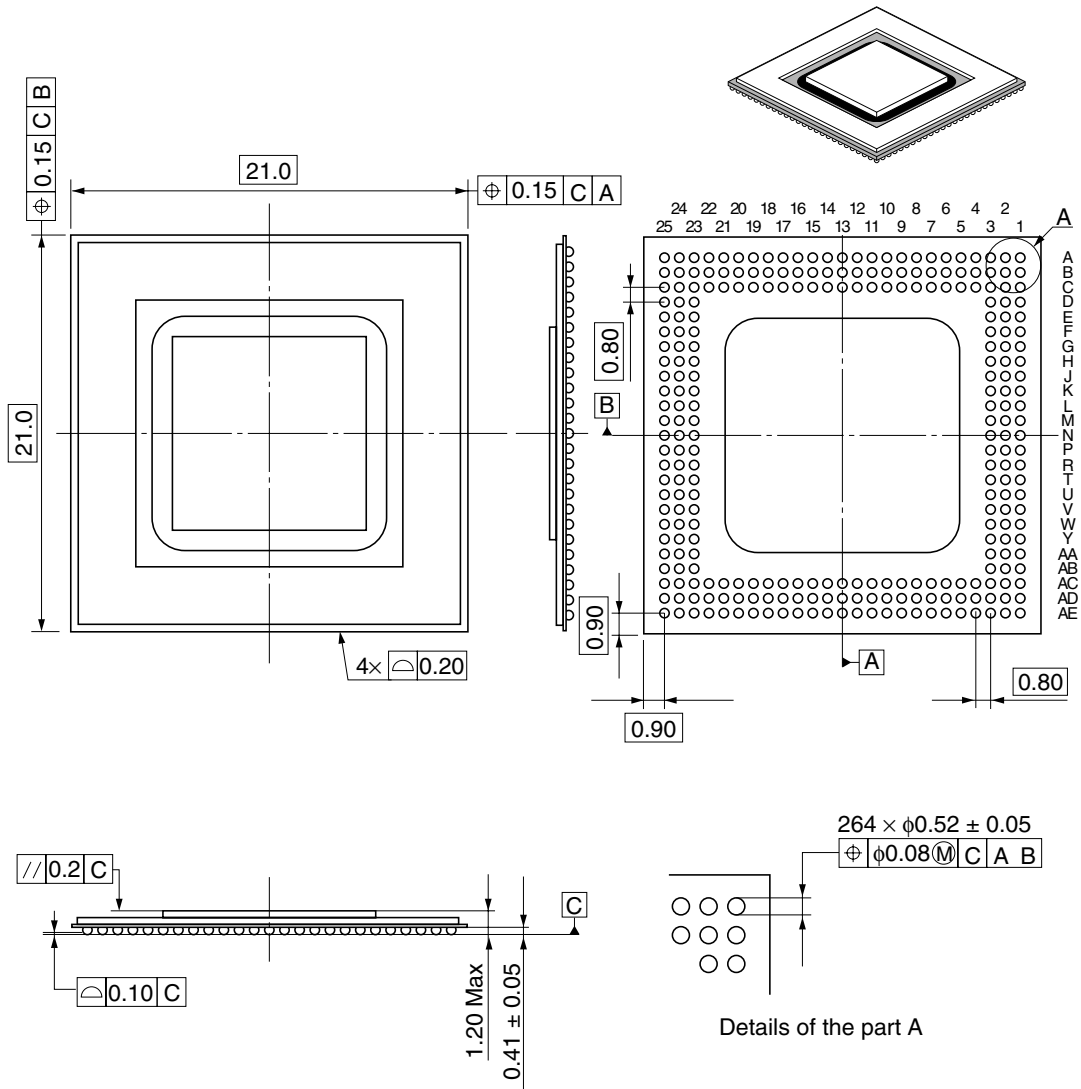
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Hitachi Code	TBT-216B
JEDEC	—
JEITA	—
Mass (reference value)	0.4 g

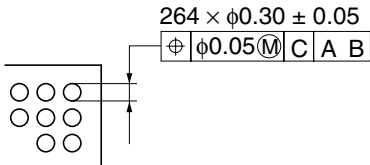
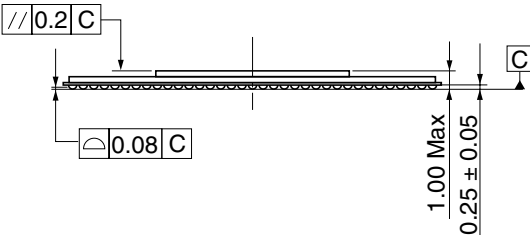
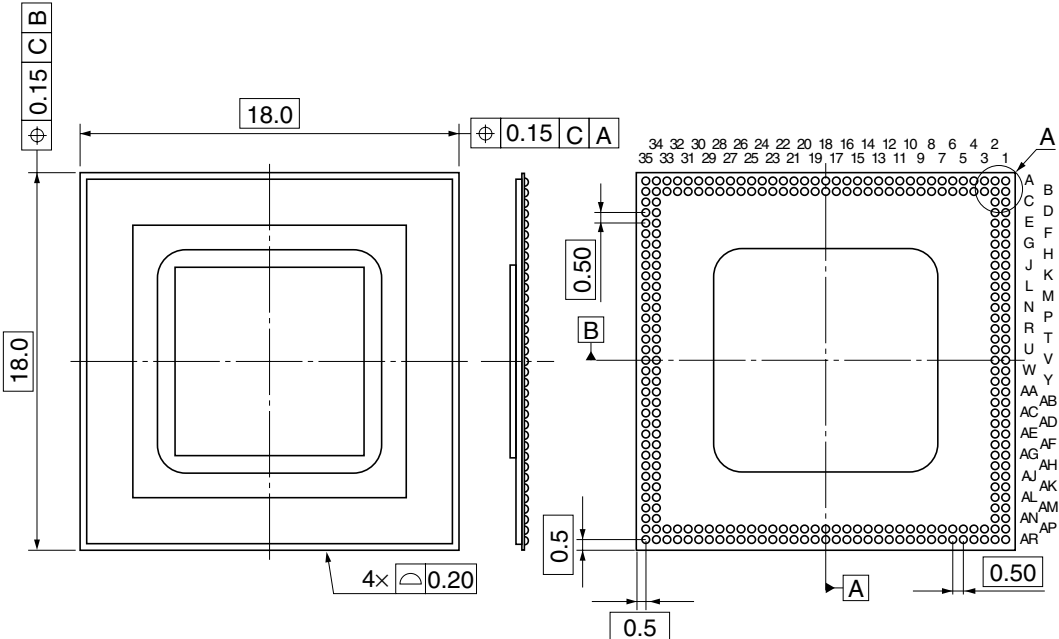
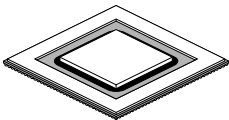
As of July, 2002
Unit: mm



Hitachi Code	TBT-264A
JEDEC	—
JEITA	—
Mass (reference value)	0.8 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

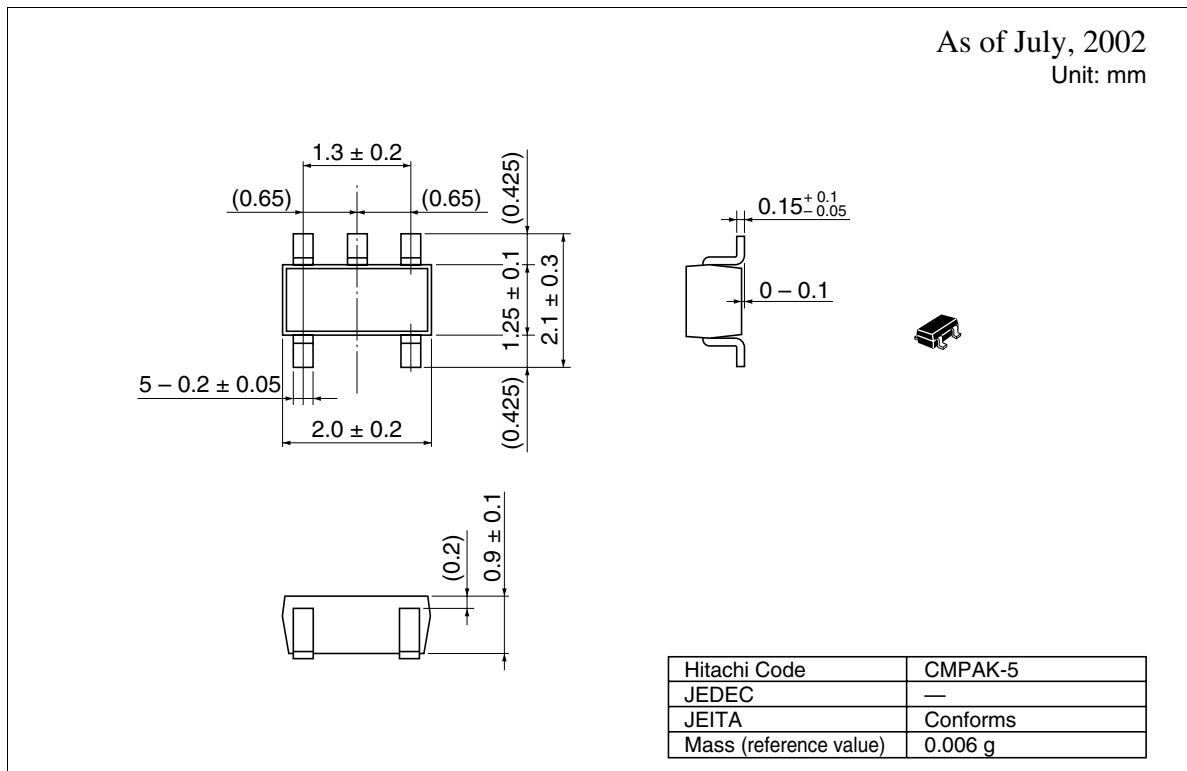
Unit: mm



Details of the part A

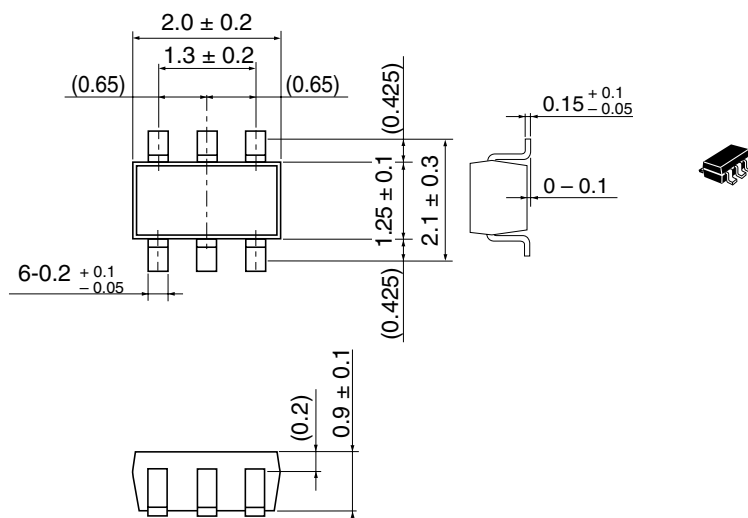
Hitachi Code	TBT-264B
JEDEC	—
JEITA	—
Mass (reference value)	0.5 g

11. Others



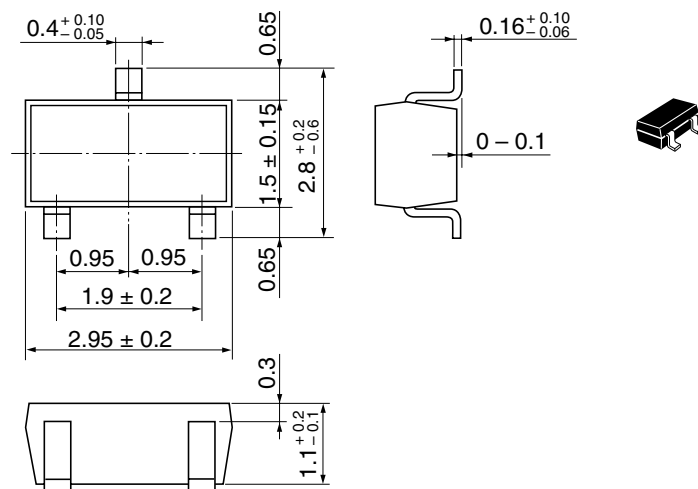
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Hitachi Code	CMPAK-6
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.006 g

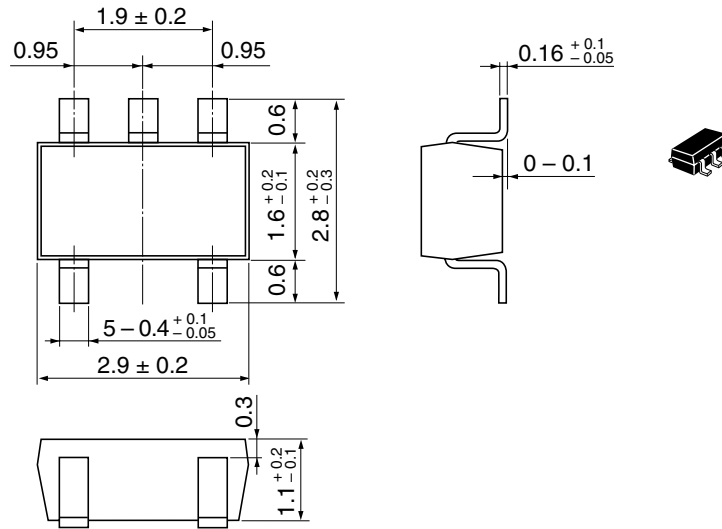
As of July, 2002
Unit: mm



Hitachi Code	MPAK
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.011 g

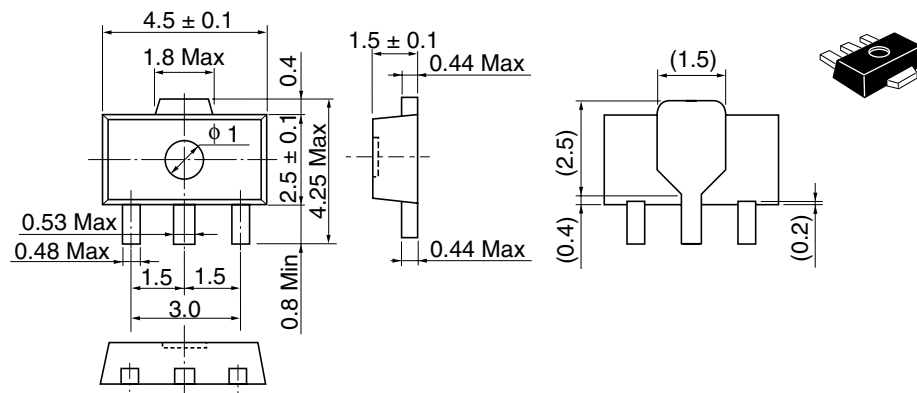
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Hitachi Code	MPAK-5
JEDEC	—
JEITA	—
Mass (reference value)	0.015 g

As of July, 2002
Unit: mm



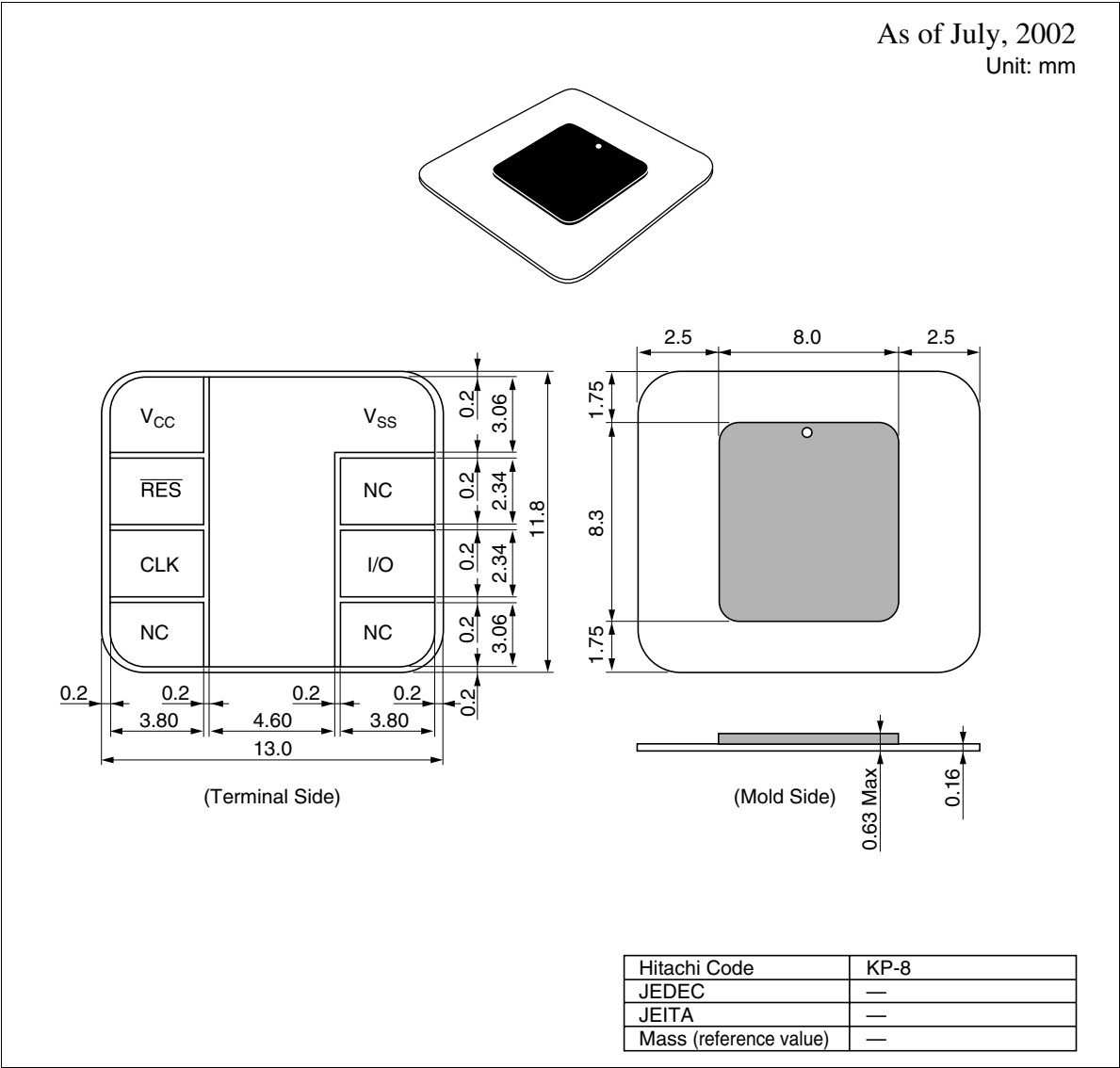
Hitachi Code	UPAK
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.050 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

2.2 IC Package for Smartcard

COT for Smartcard

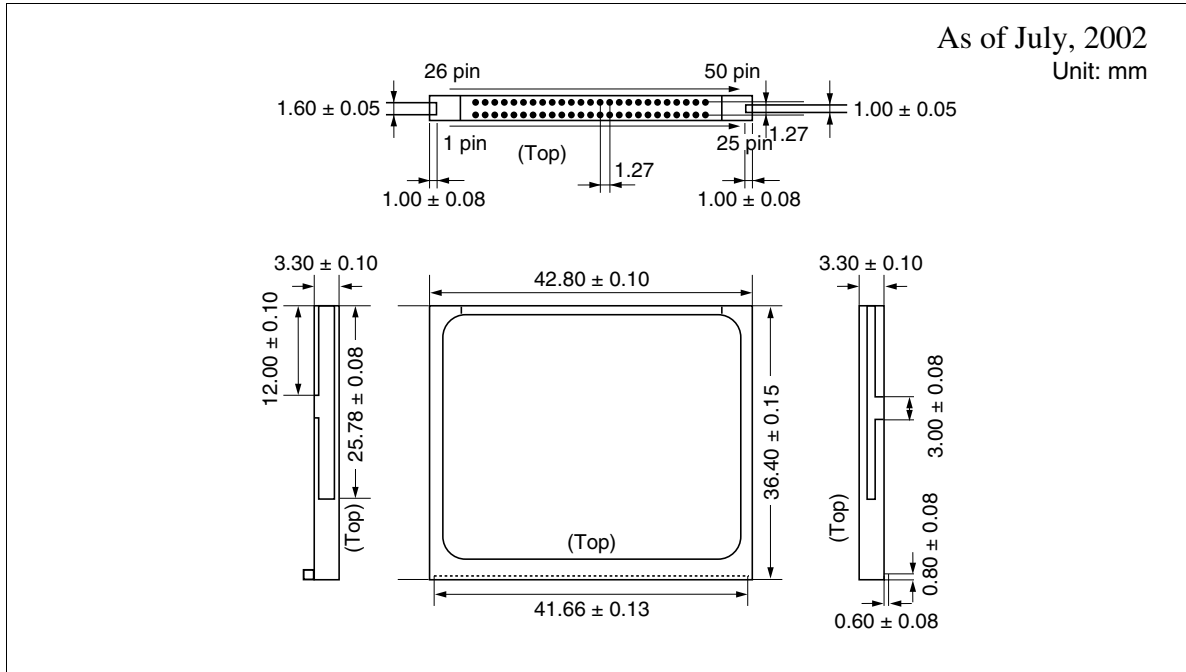
As of July, 2002
Unit: mm



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

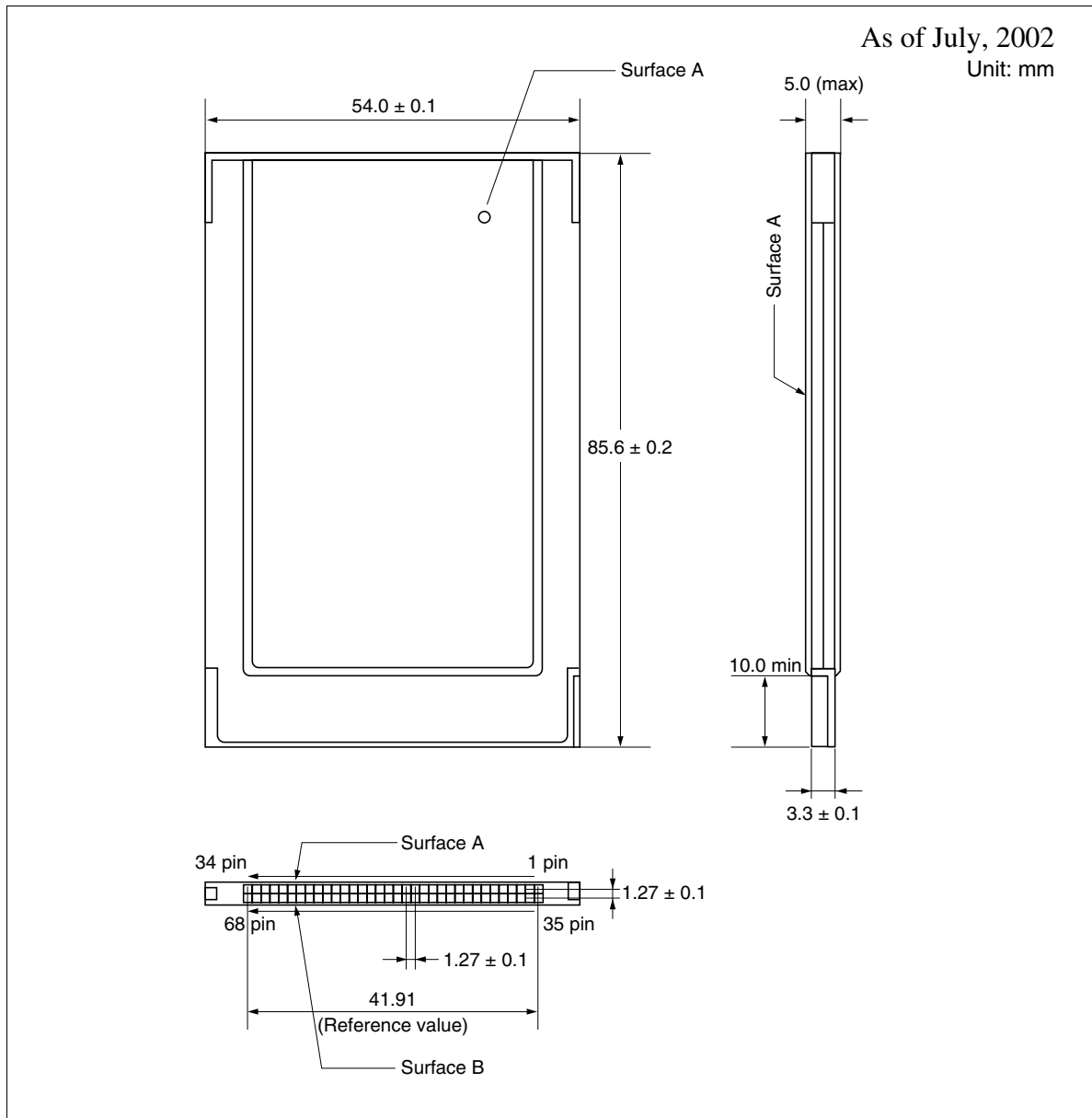
2.3 Flash Card

2.3.1 CompactFlash™ Type I



Note: CompactFlash™ is a trademark of SanDisk Corporation and is licensed royalty-free to the CFA which in turn will license it royalty-free to CFA members.

2.3.2 PC-ATA Card Type II

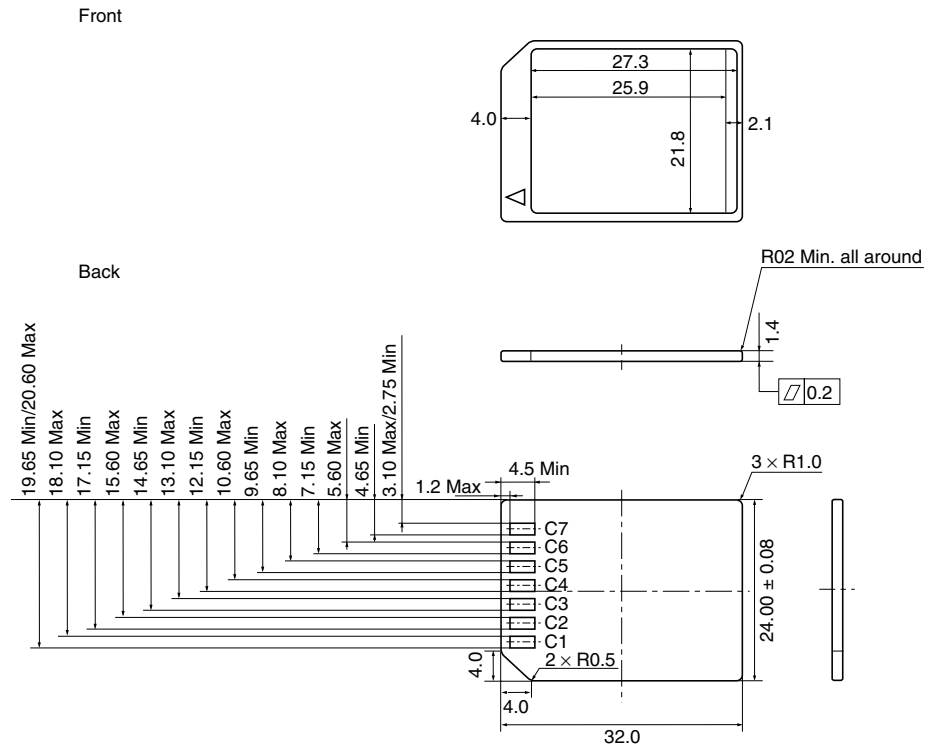


2.3.3 MultiMediaCard™

As of July, 2002

Unit: mm

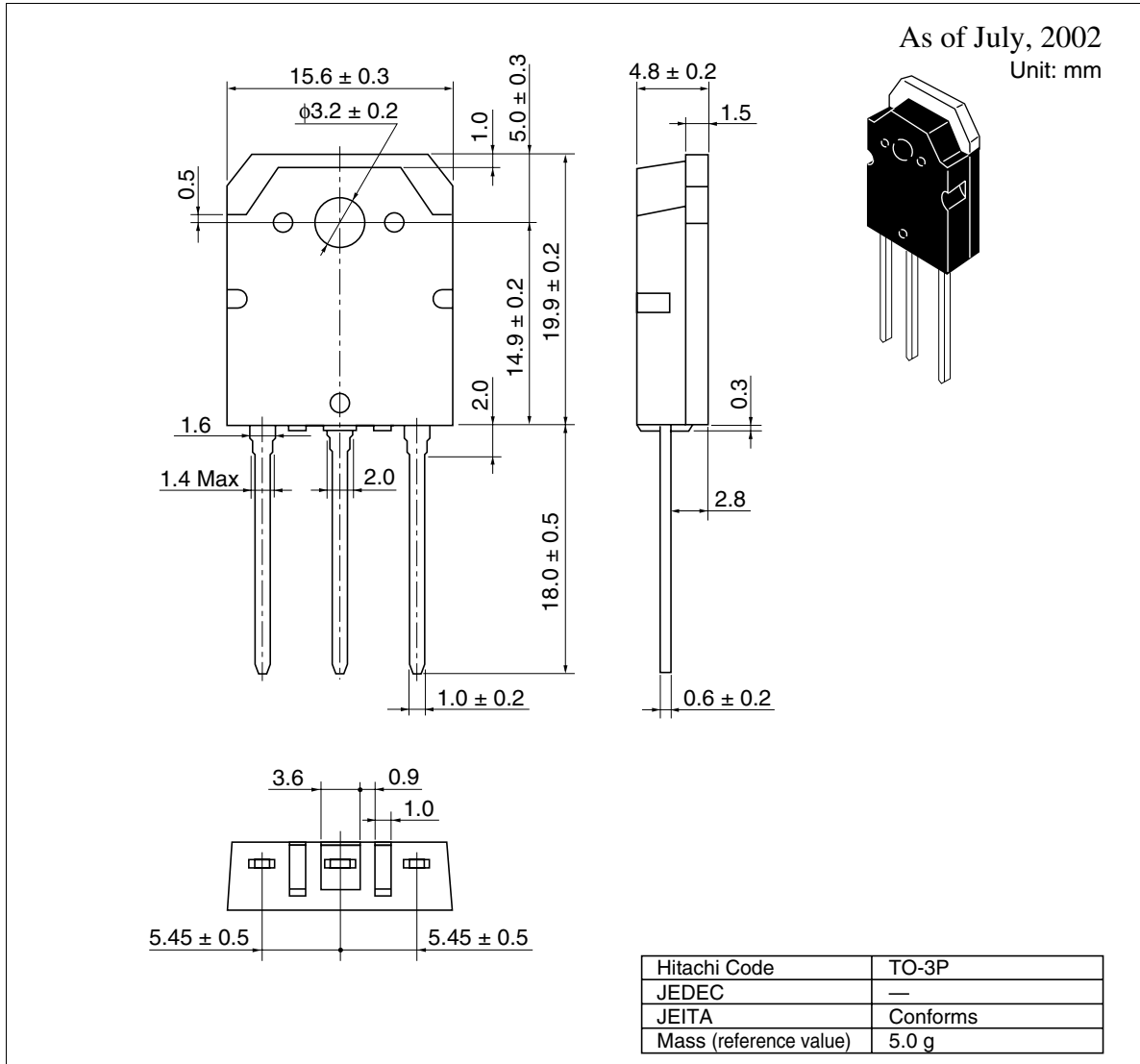
Tolerance: 0.1 mm



Note: MultiMediaCard™ is a trademark of Siemens AG.

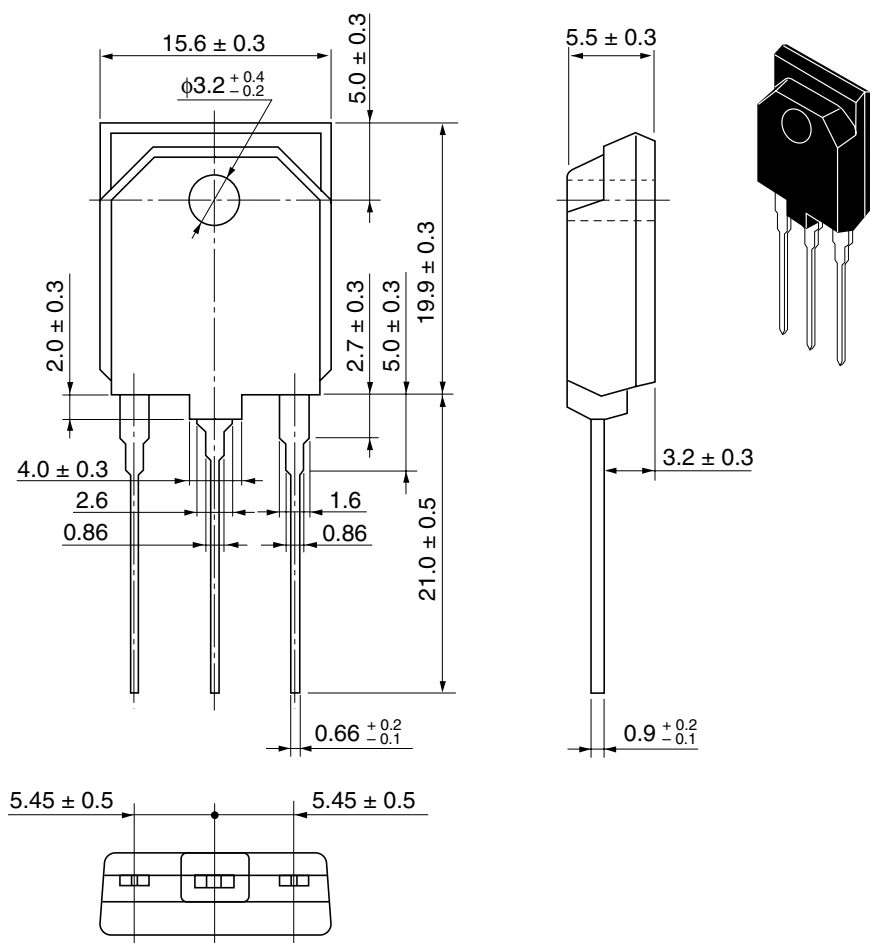
2.4 Transistor Packages

2.4.1 Pin Insertion Packages



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

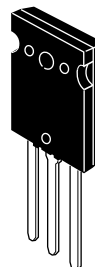
As of July, 2002
Unit: mm



Hitachi Code	TO-3PFM
JEDEC	—
JEITA	—
Mass (reference value)	5.2 g

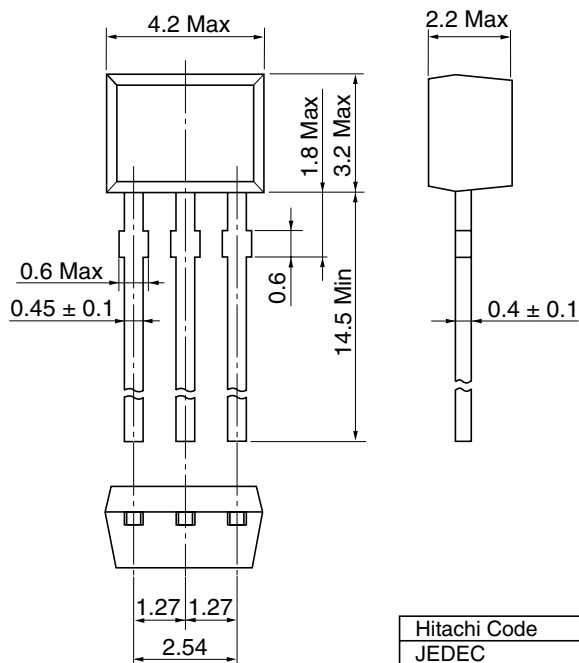
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Unit: mm



Hitachi Code	TO-3PL
JEDEC	—
JEITA	—
Mass (reference value)	9.9 g

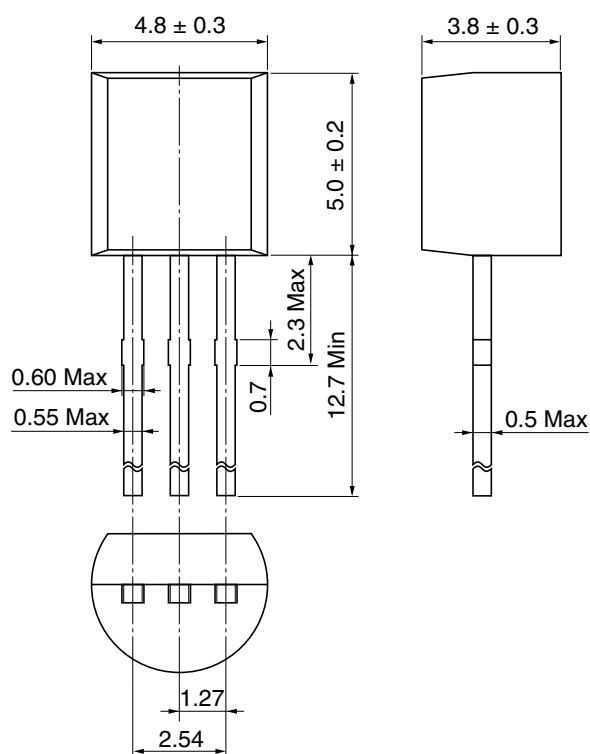
Unit: mm



Hitachi Code	SPAK
JEDEC	—
JEITA	—
Mass (reference value)	0.10 g

256

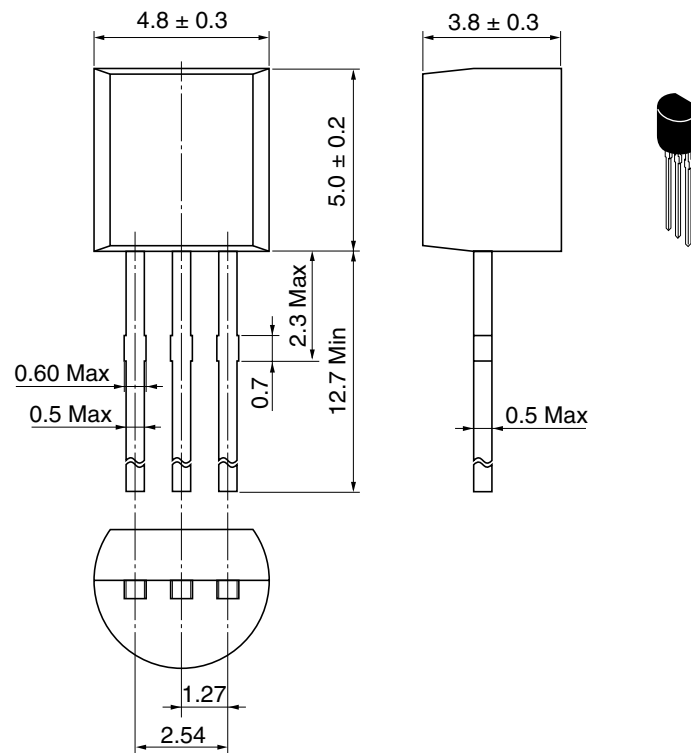
As of July, 2002
Unit: mm



Hitachi Code	TO-92 (1)
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	0.25 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

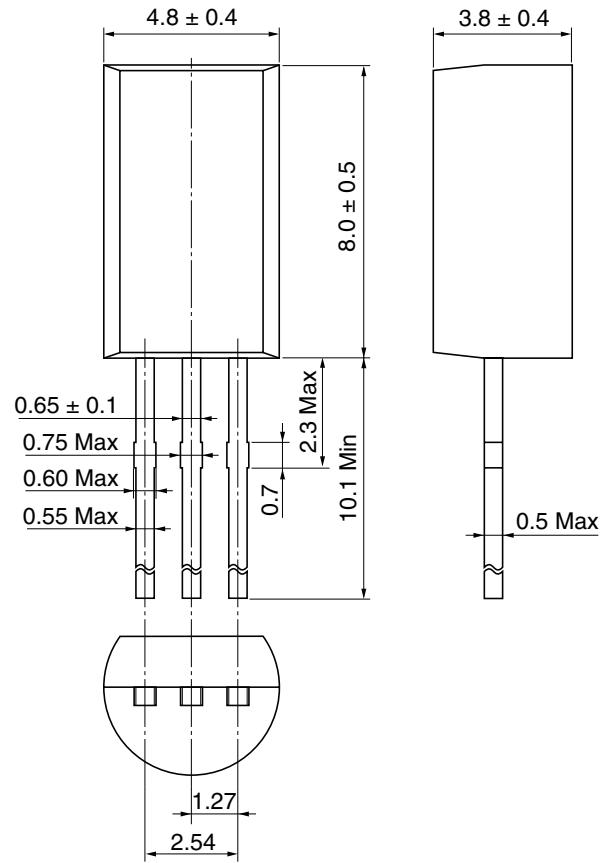
As of July, 2002
Unit: mm



Hitachi Code	TO-92 (2)
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	0.25 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

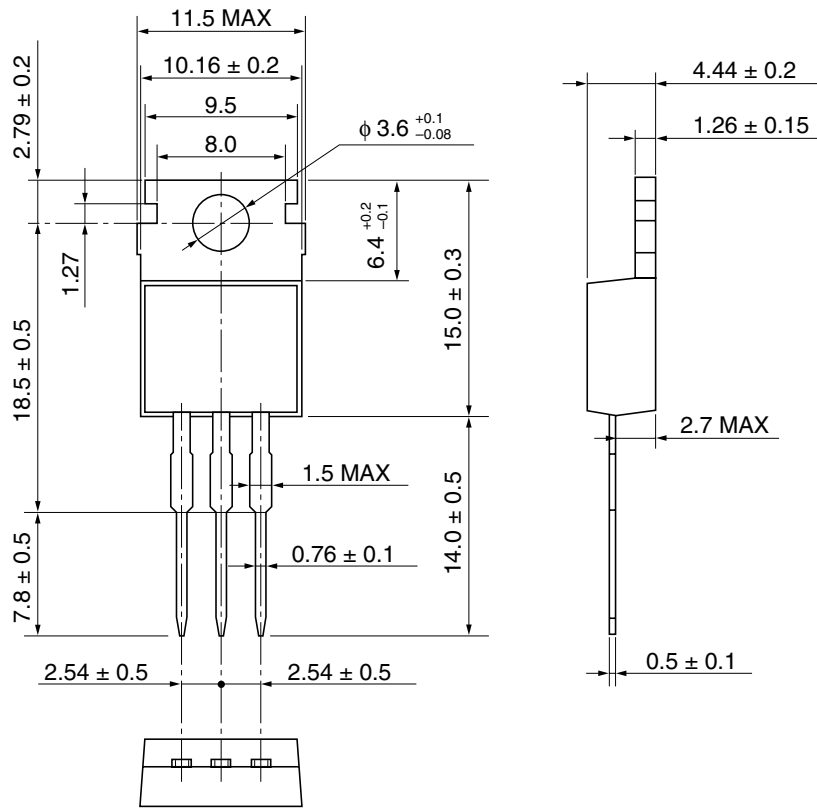
As of July, 2002
Unit: mm



Hitachi Code	TO-92 Mod
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.35 g

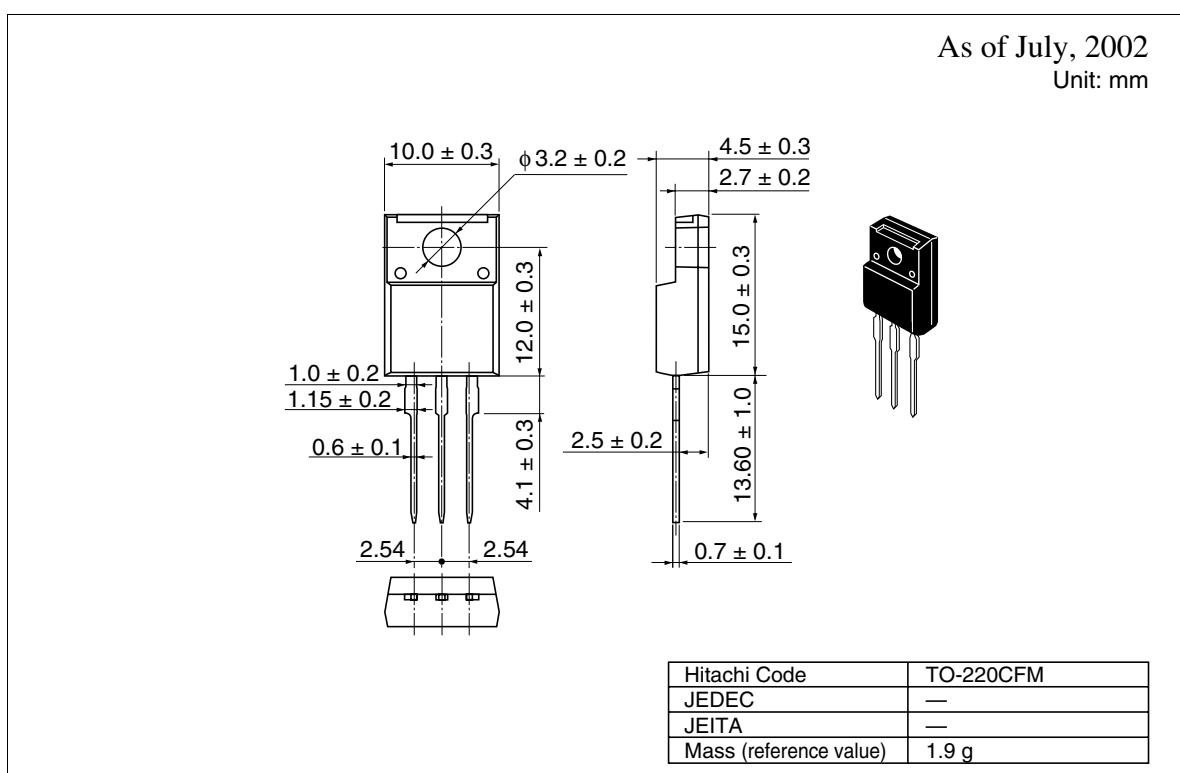
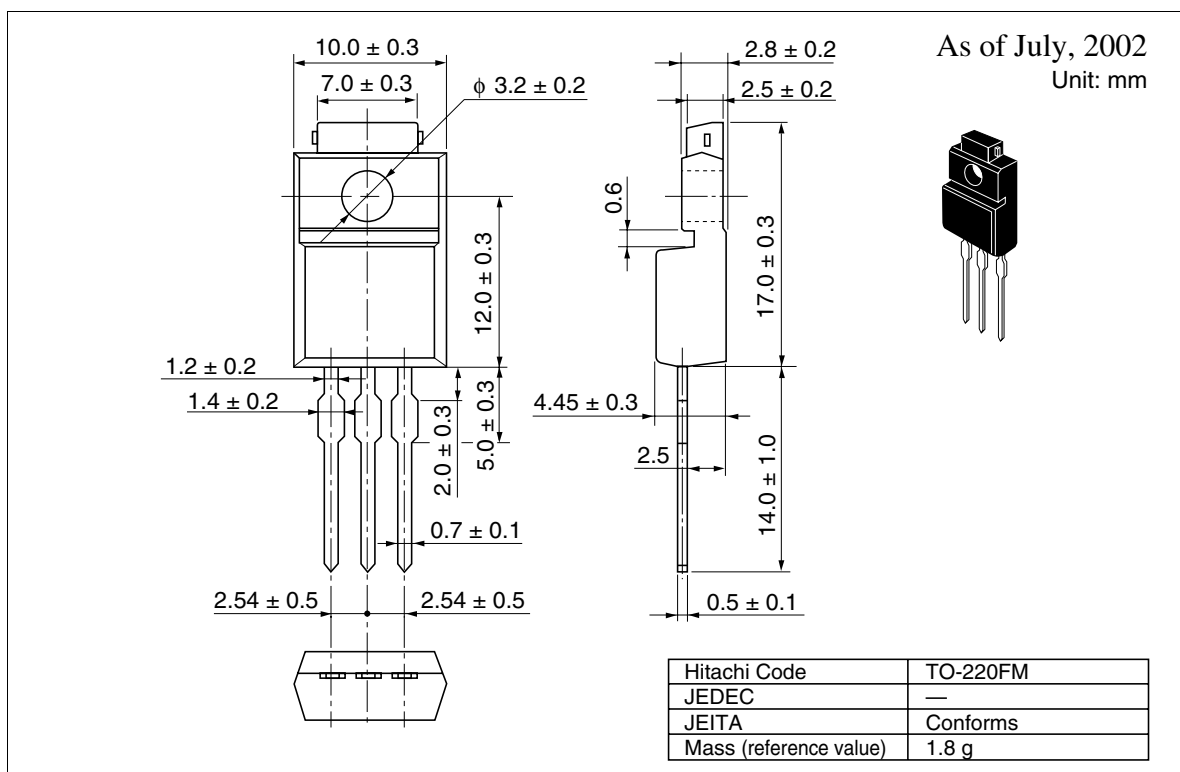
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



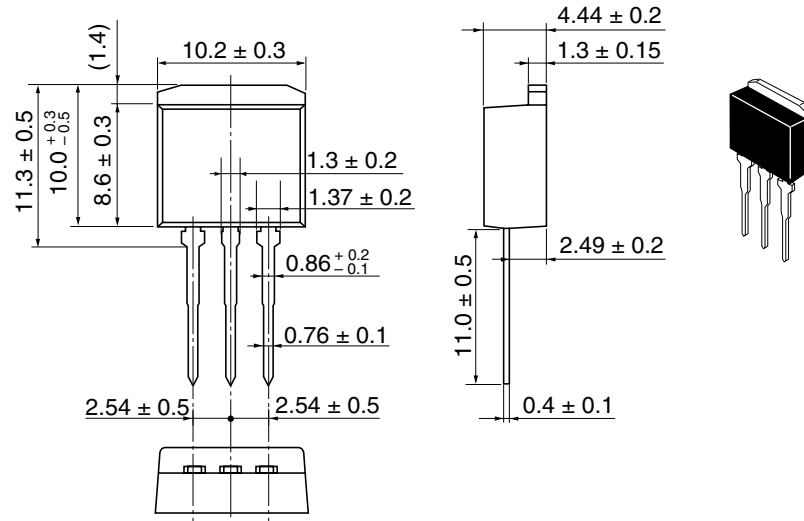
Hitachi Code	TO-220AB
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	1.8 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



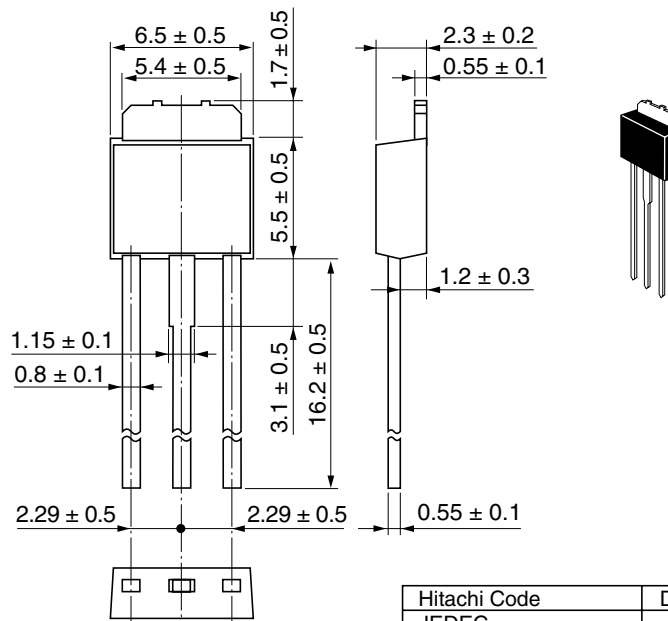
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Hitachi Code	LPAK (L)
JEDEC	—
JEITA	—
Mass (reference value)	1.40 g

As of July, 2002
Unit: mm

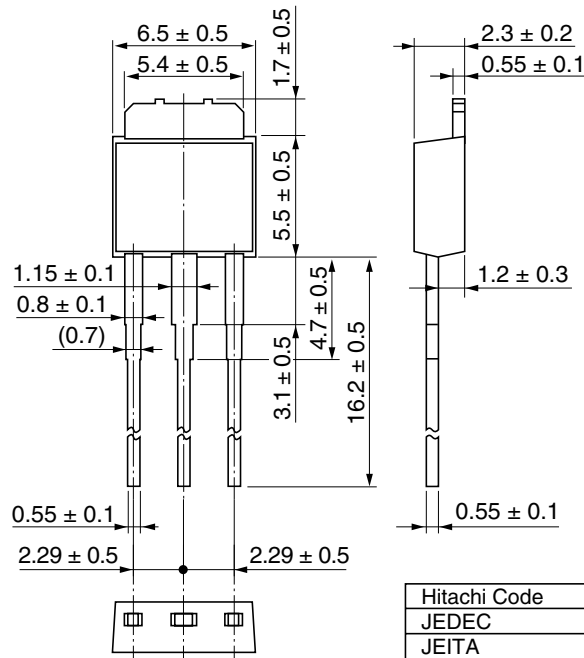


Hitachi Code	DPAK (L)-(1)
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.42 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002

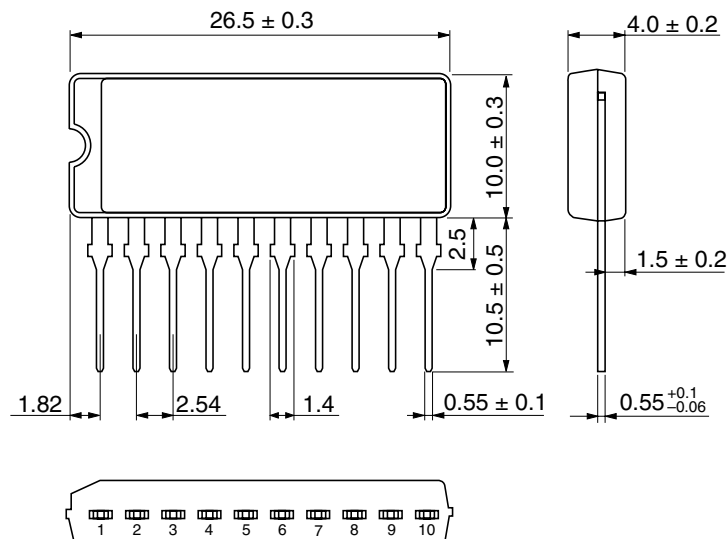
Unit: mm



Hitachi Code	DPAK (L)-(2)
JEDEC	—
JEITA	—
Mass (reference value)	0.42 g

As of July, 2002

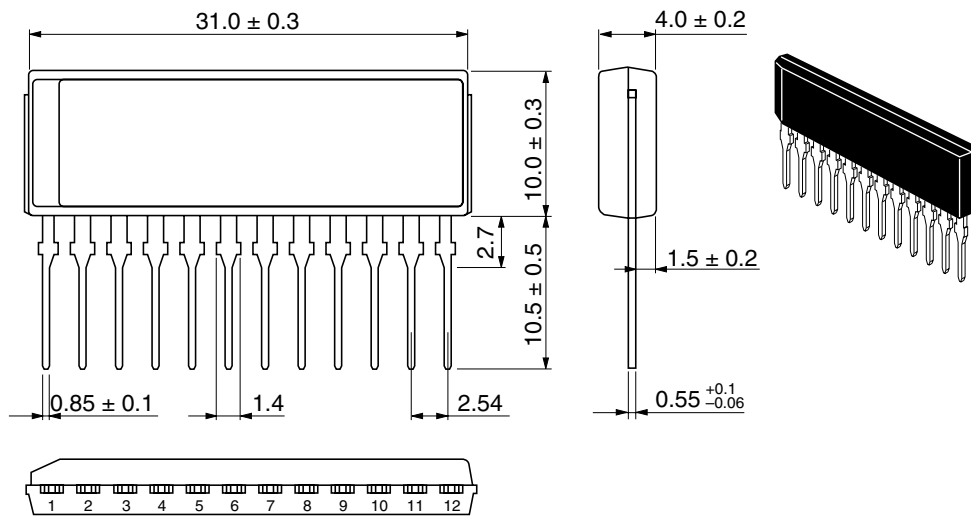
Unit: mm



Hitachi Code	SP-10
JEDEC	—
JEITA	—
Mass (reference value)	2.9 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

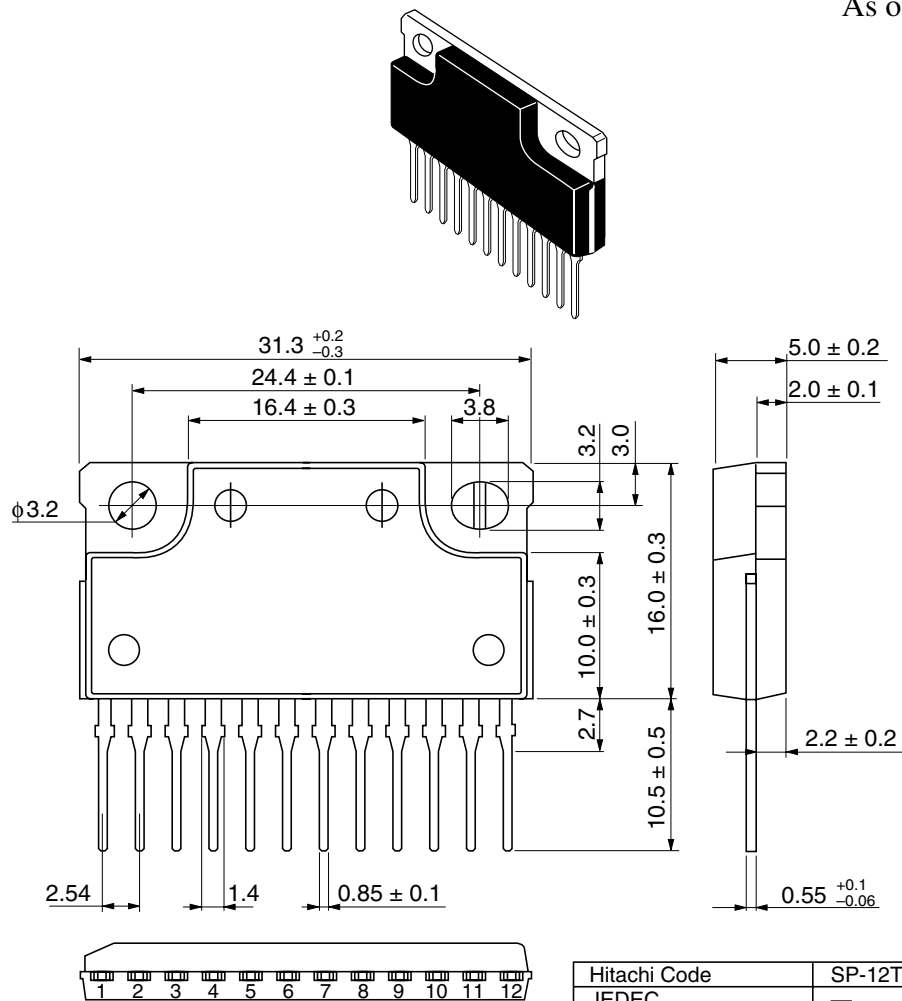
As of July, 2002
Unit: mm



Hitachi Code	SP-12
JEDEC	—
JEITA	—
Mass (reference value)	3.6 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

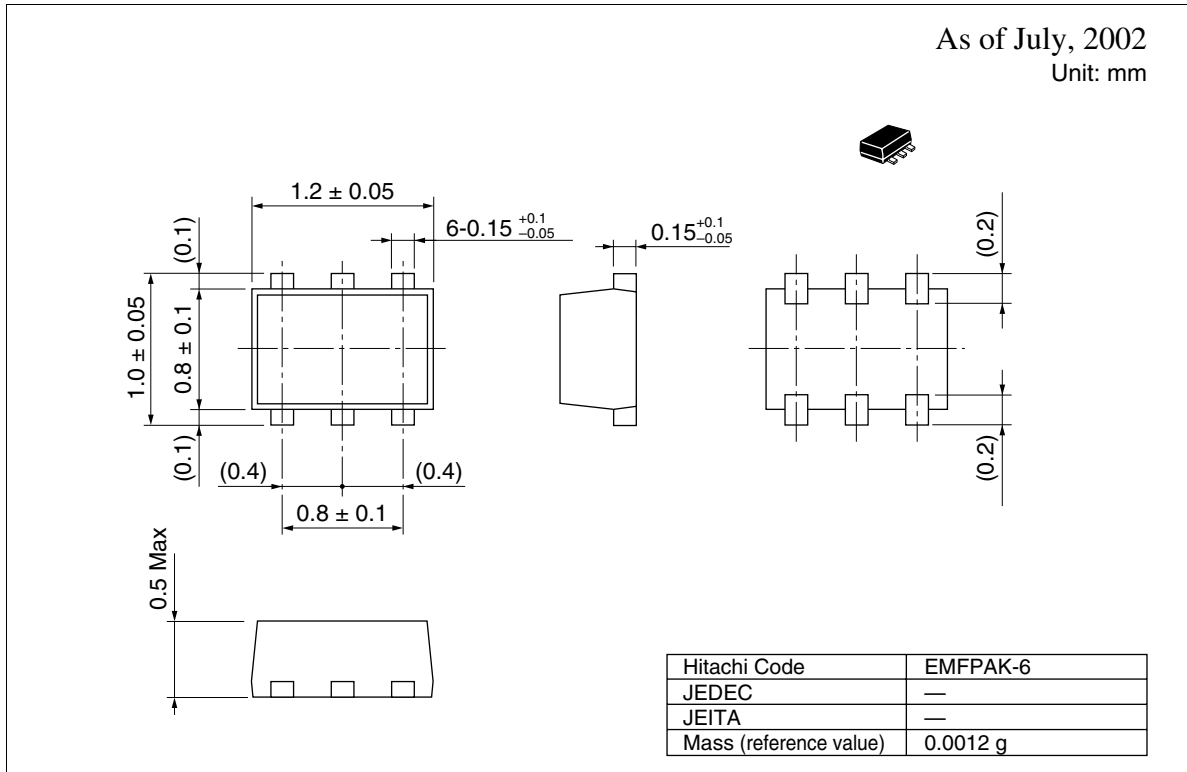
As of July, 2002
Unit: mm



Hitachi Code	SP-12TA
JEDEC	—
JEITA	—
Mass (reference value)	6.1 g

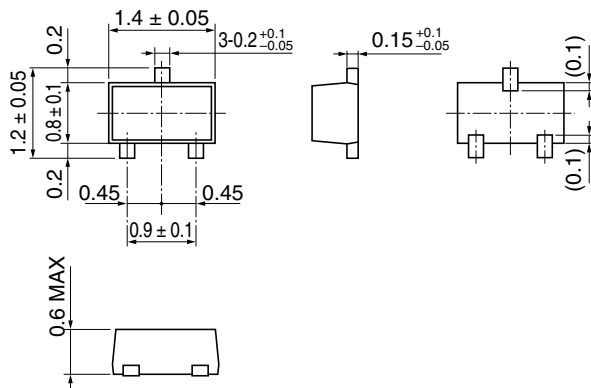
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

2.4.2 Surface Mount Packages



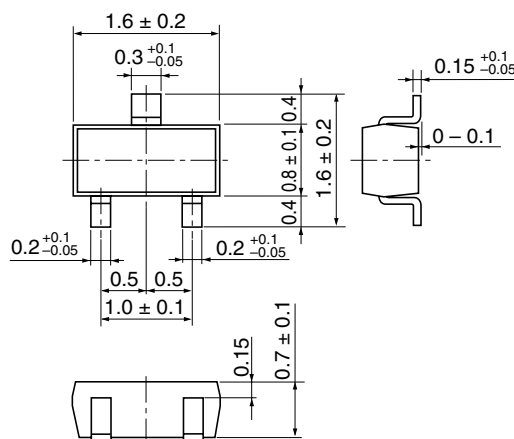
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Hitachi Code	MFPAK
JEDEC	—
JEITA	—
Mass (reference value)	0.0016 g

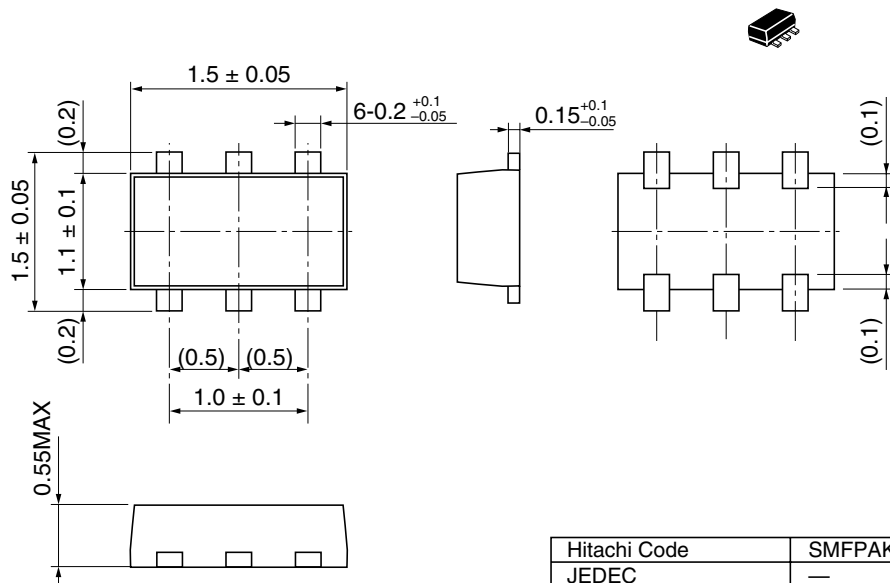
As of July, 2002
Unit: mm



Hitachi Code	SMPAK
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.003 g

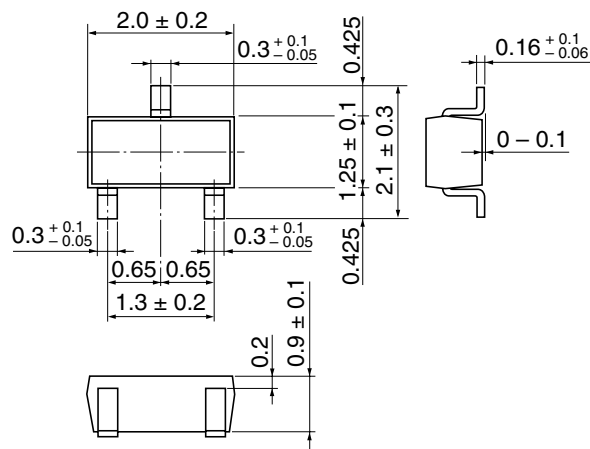
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Hitachi Code	SMFPAK-6
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.0025 g

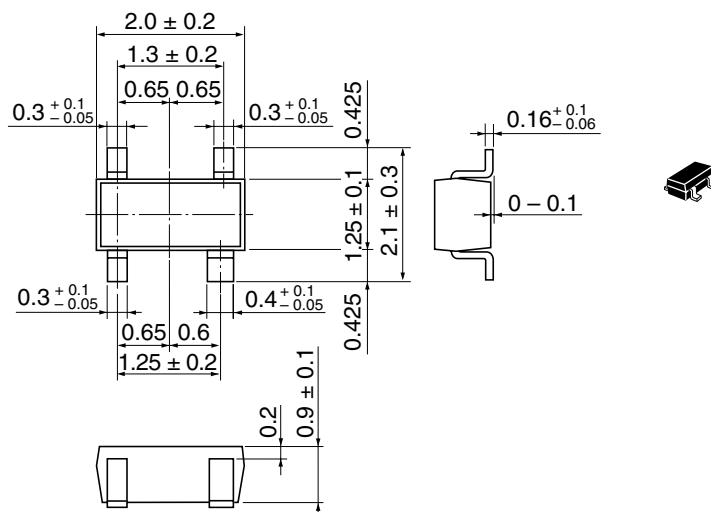
As of July, 2002
Unit: mm



Hitachi Code	CMPAK
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.006 g

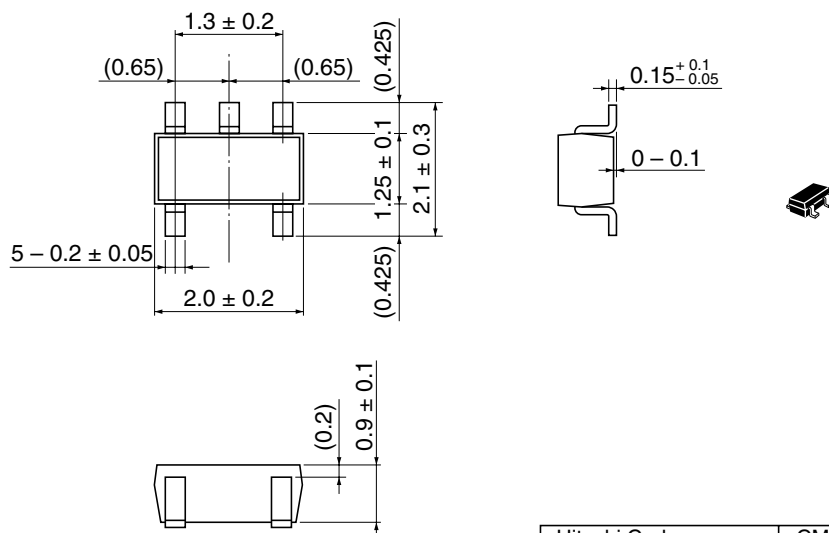
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Hitachi Code	CMPAK-4(T)
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.006 g

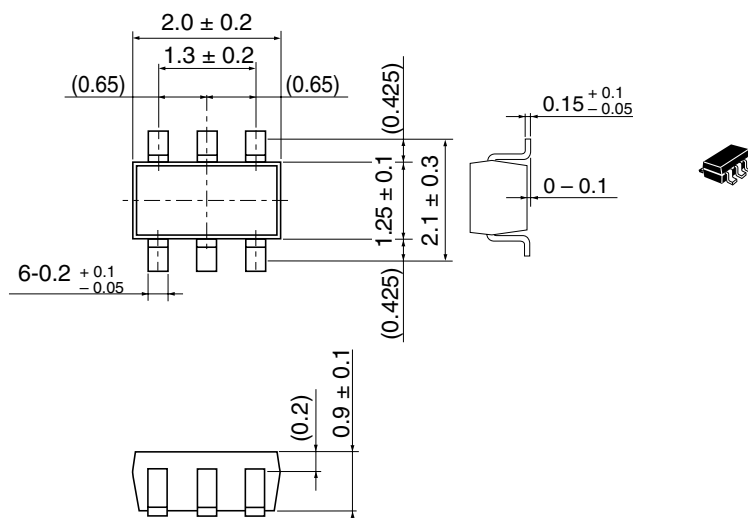
As of July, 2002
Unit: mm



Hitachi Code	CMPAK-5(T)
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.006 g

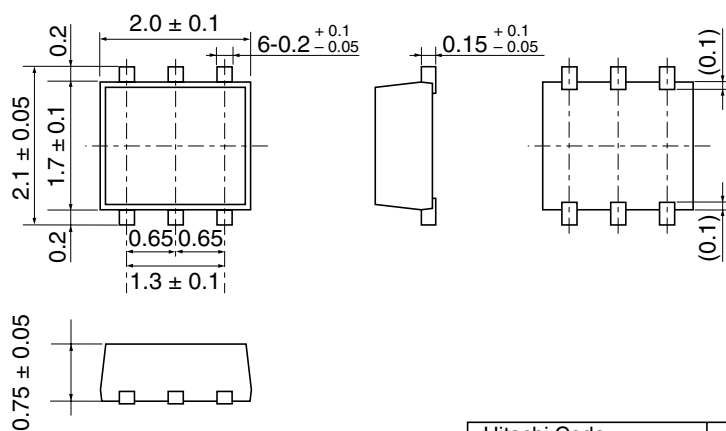
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Hitachi Code	CMPAK-6
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.006 g

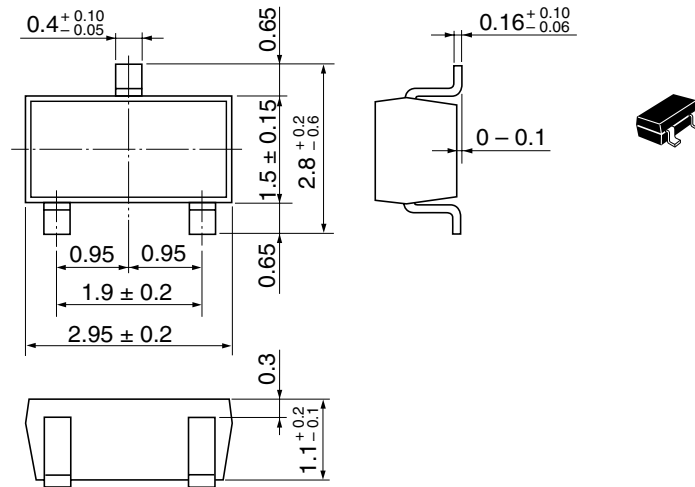
As of July, 2002
Unit: mm



Hitachi Code	CMFPAK-6
JEDEC	—
JEITA	—
Mass (reference value)	0.0065 g

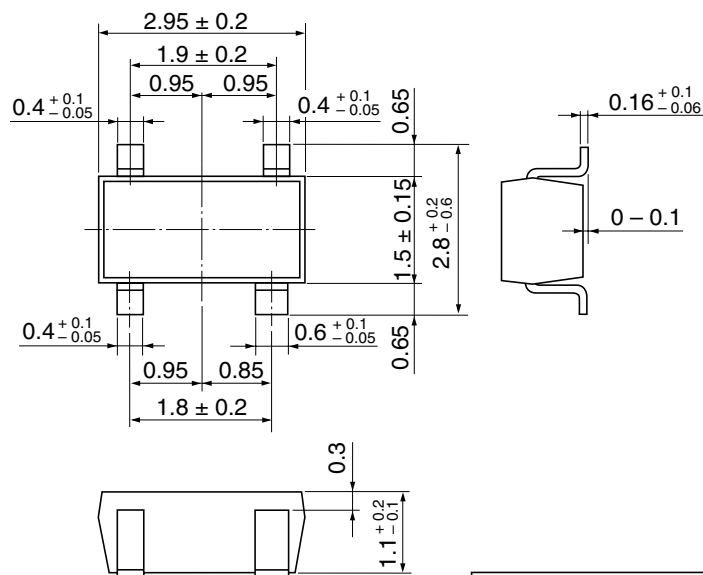
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Hitachi Code	MPAK(T)
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.011 g

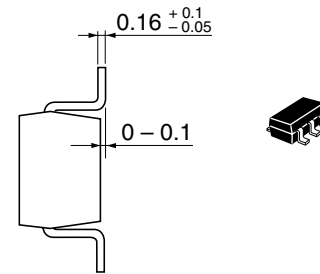
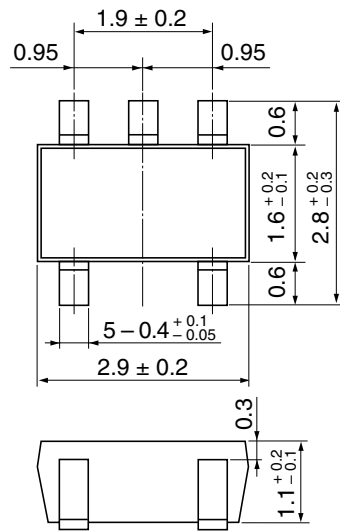
As of July, 2002
Unit: mm



Hitachi Code	MPAK-4
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.013 g

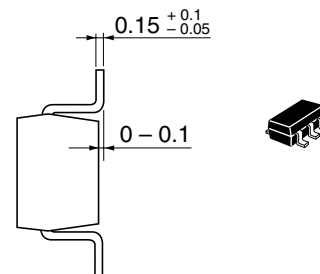
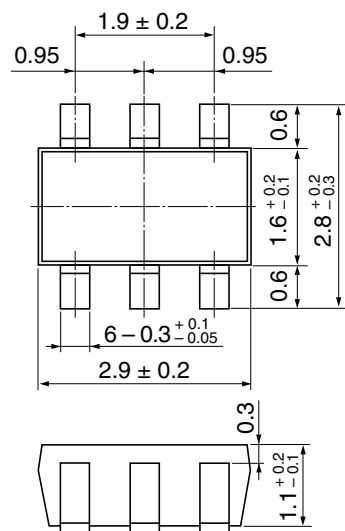
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Hitachi Code	MPAK-5
JEDEC	—
JEITA	—
Mass (reference value)	0.015 g

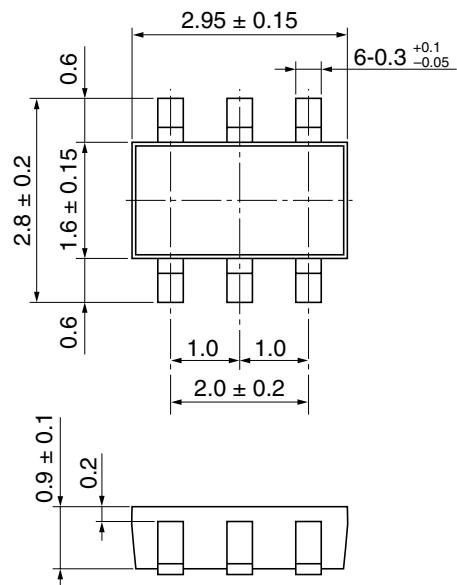
As of July, 2002
Unit: mm



Hitachi Code	MPAK-6
JEDEC	—
JEITA	—
Mass (reference value)	0.014 g

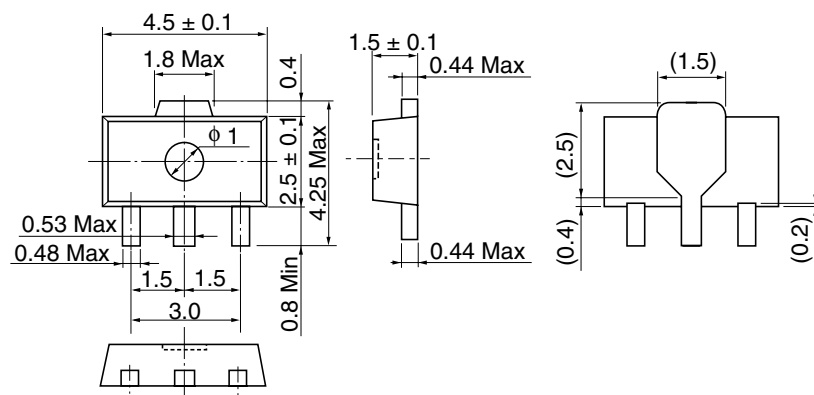
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Hitachi Code	TSOP-6
JEDEC	—
JEITA	—
Mass (reference value)	0.012 g

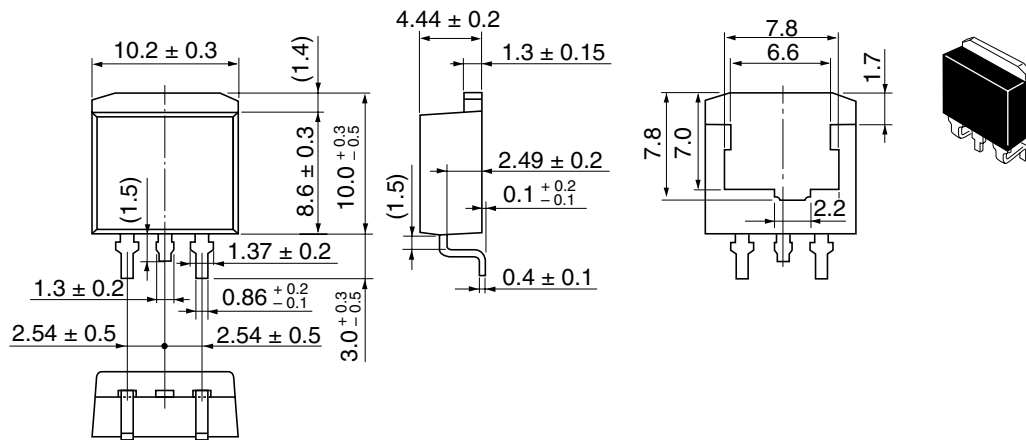
As of July, 2002
Unit: mm



Hitachi Code	UPAK
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.050 g

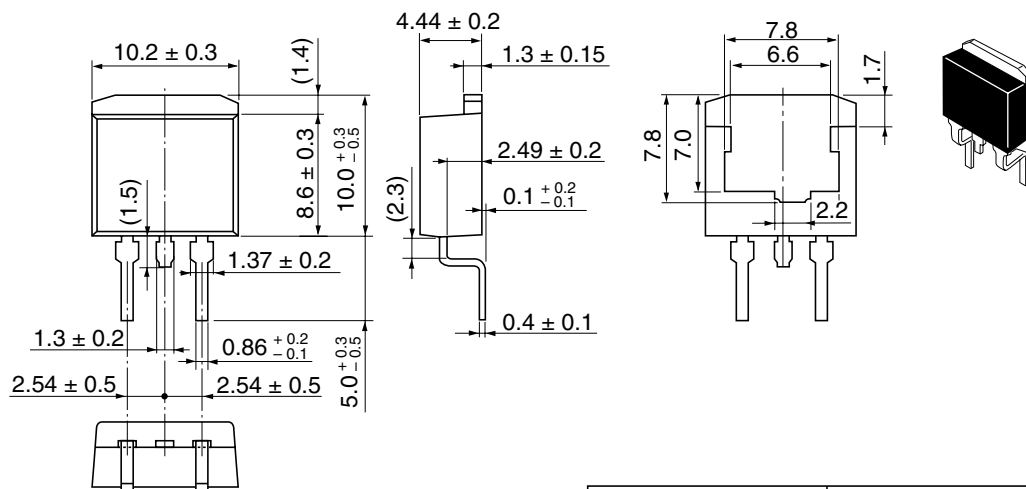
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Hitachi Code	LDBAK (S)-(1)
JEDEC	—
JEITA	—
Mass (reference value)	1.30 g

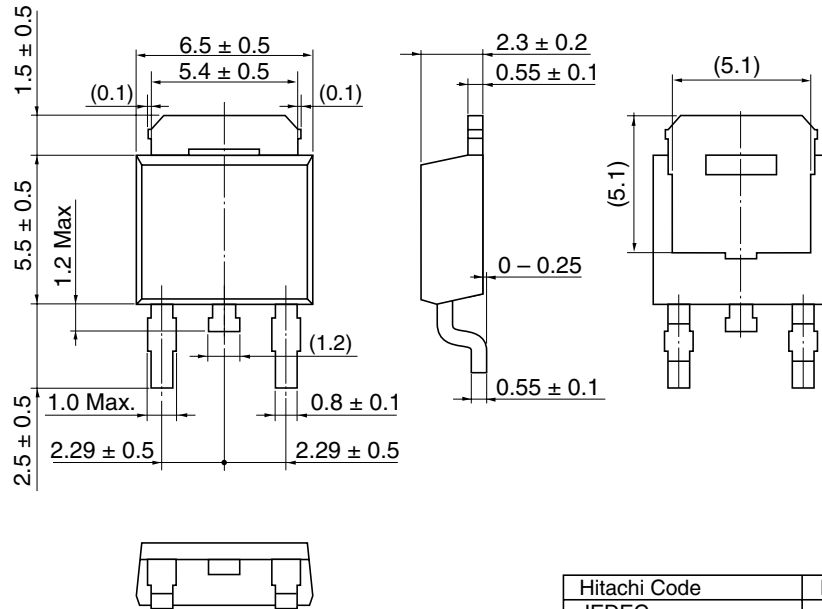
As of July, 2002
Unit: mm



Hitachi Code	LDBAK (S)-(2)
JEDEC	—
JEITA	—
Mass (reference value)	1.35 g

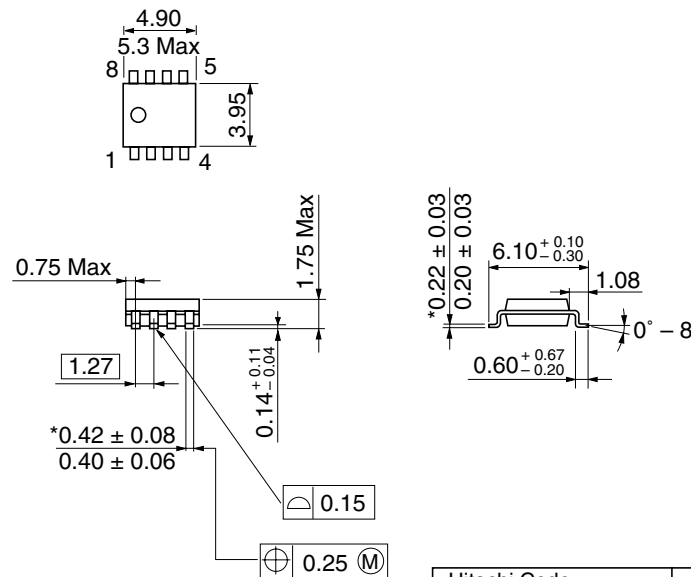
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Hitachi Code	DPAK (S)
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.28 g

As of July, 2002
Unit: mm



*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-8DA
JEDEC	Conforms
JEITA	—
Mass (reference value)	0.085 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

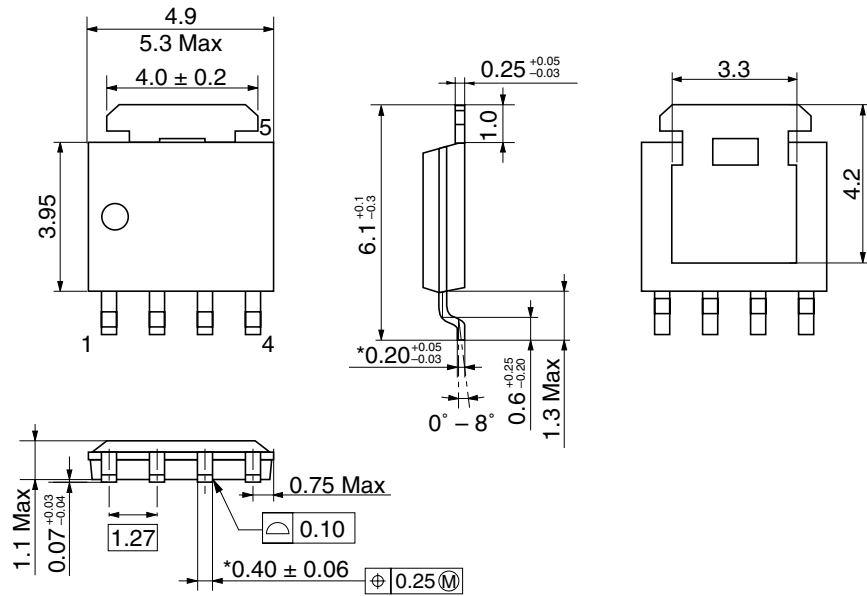
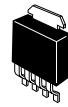
Unit: mm



Hitachi Code	TTP-8D
JEDEC	—
JEITA	—
Mass (reference value)	—

276

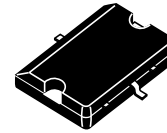
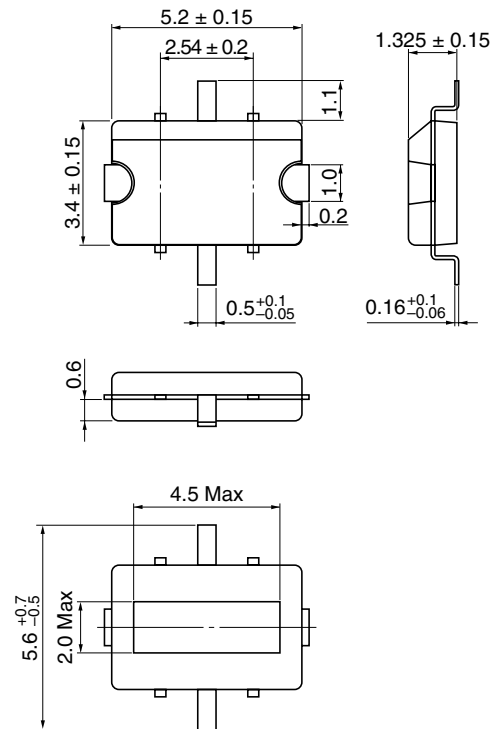
As of July, 2002
Unit: mm



*Ni/Pd/Au plating

Hitachi Code	LFPAK
JEDEC	—
JEITA	—
Mass (reference value)	0.080 g

As of July, 2002
Unit: mm

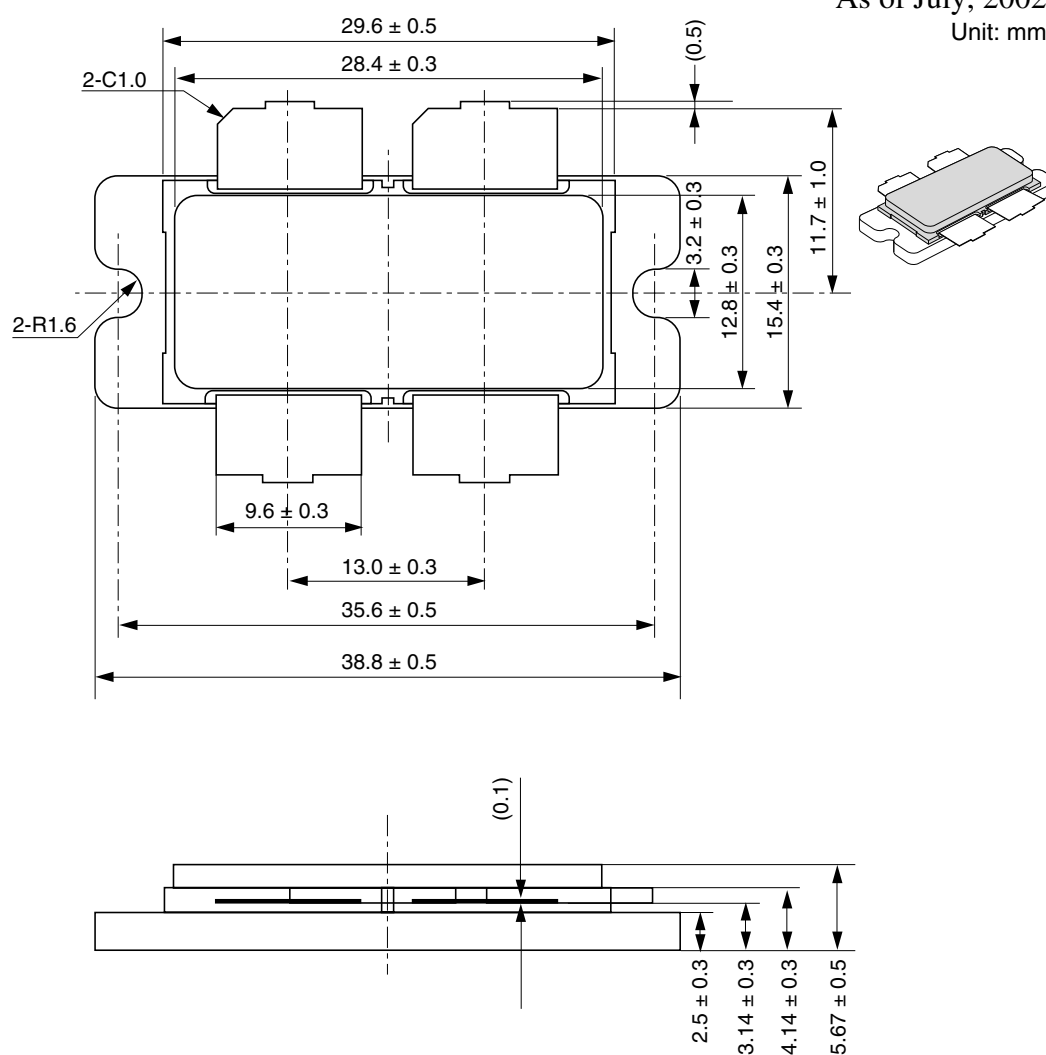


Hitachi Code	RP8P
JEDEC	—
JEITA	—
Mass (reference value)	0.08 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

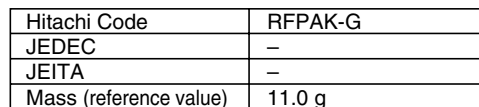
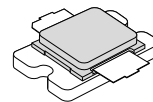
As of July, 2002

Unit: mm



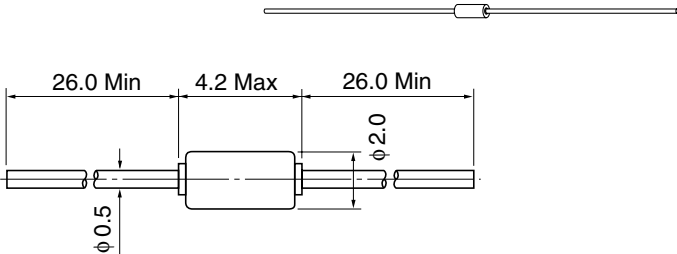
Hitachi Code	RFPAK-F
JEDEC	-
JEITA	-
Mass (reference value)	17.2 g

Unit: mm



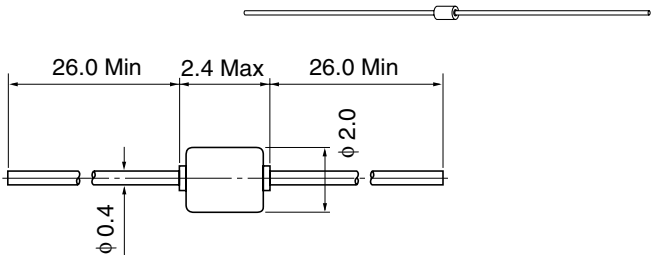
2.5 Diode Packages

As of July, 2002
Unit: mm



Hitachi Code	DO-35
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	0.13 g

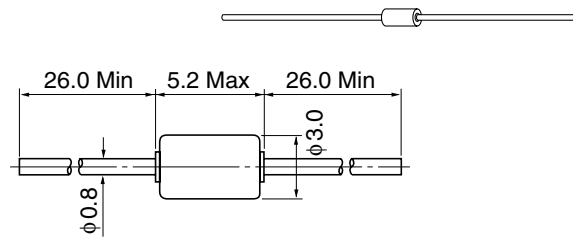
As of July, 2002
Unit: mm



Hitachi Code	MHD
JEDEC	Conforms
JEITA	—
Mass (reference value)	0.084 g

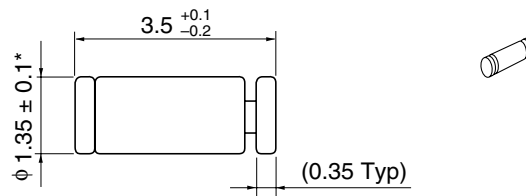
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Hitachi Code	DO-41
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	0.38 g

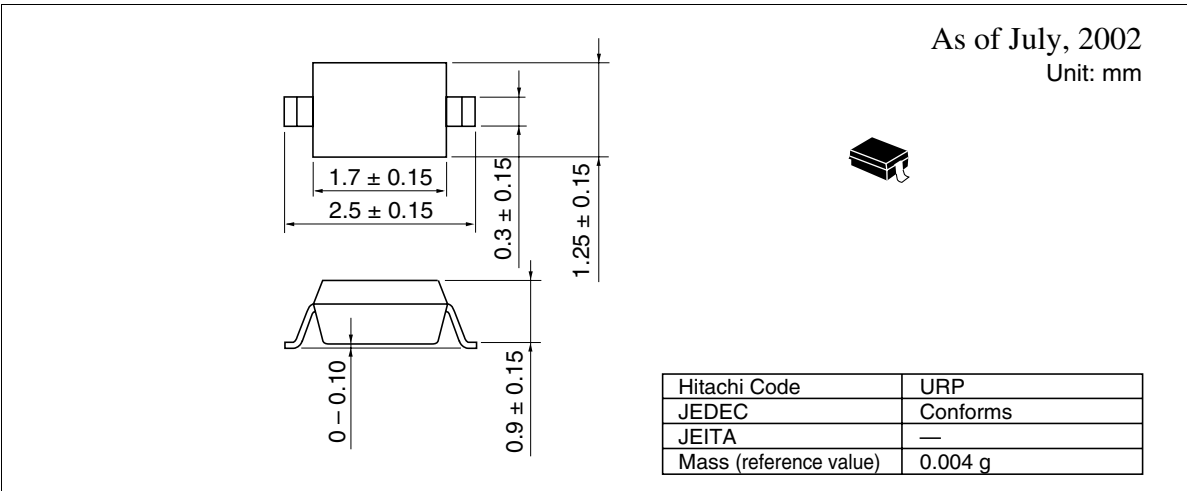
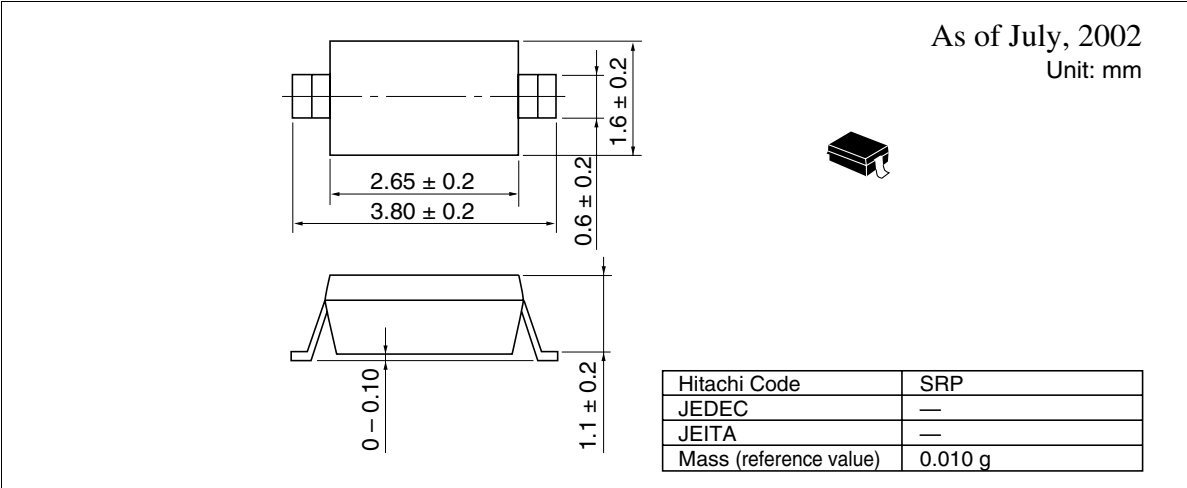
As of July, 2002
Unit: mm



Hitachi Code	LLD
JEDEC	—
JEITA	—
Mass (reference value)	0.027 g

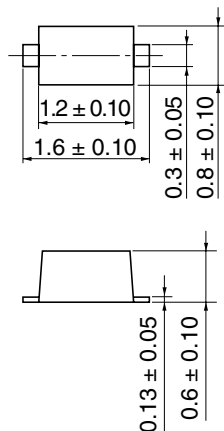
* HSK122: $\phi 1.4 \pm 0.1$ type

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



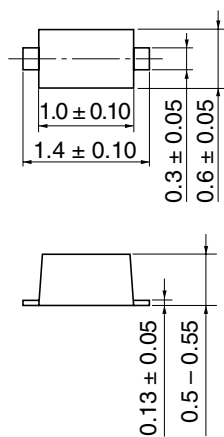
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Hitachi Code	UFP
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.0016 g

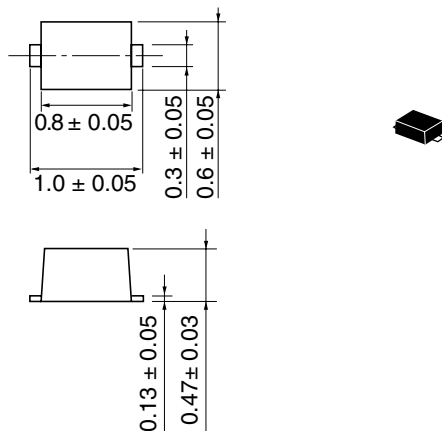
As of July, 2002
Unit: mm



Hitachi Code	SFP
JEDEC	—
JEITA	—
Mass (reference value)	0.0010 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

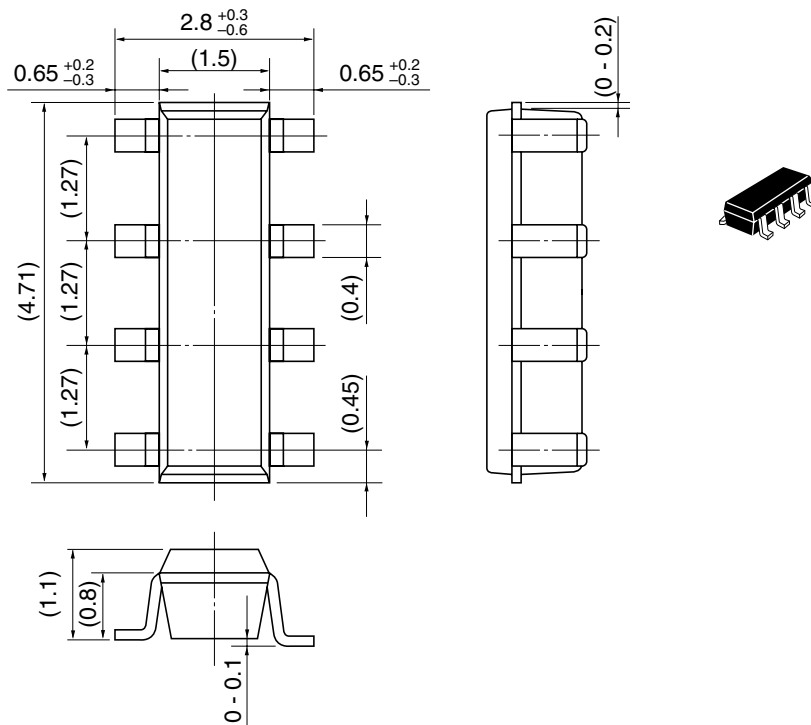
As of July, 2002
Unit: mm



Hitachi Code	EFP
JEDEC	—
JEITA	—
Mass (reference value)	0.0007 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

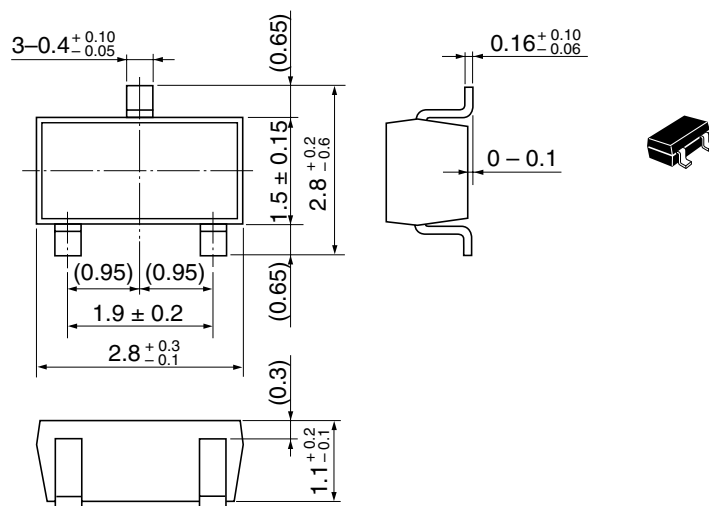
As of July, 2002
Unit: mm



Hitachi Code	MOP
JEDEC	—
JEITA	—
Mass (reference value)	0.020 g

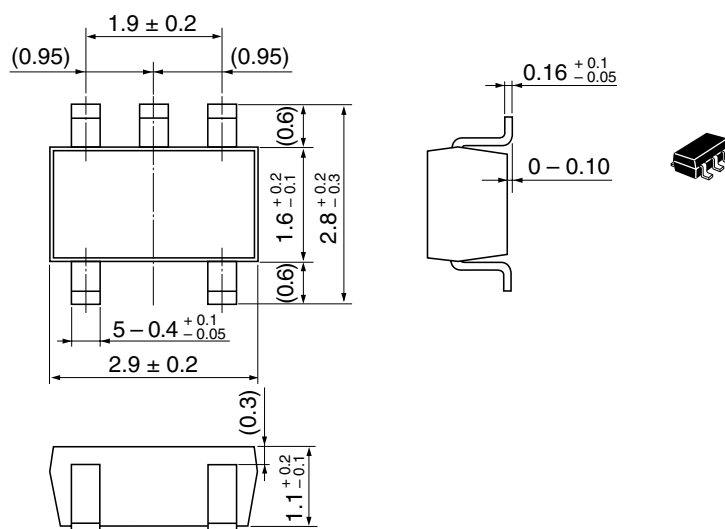
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Hitachi Code	MPAK(D)
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.011 g

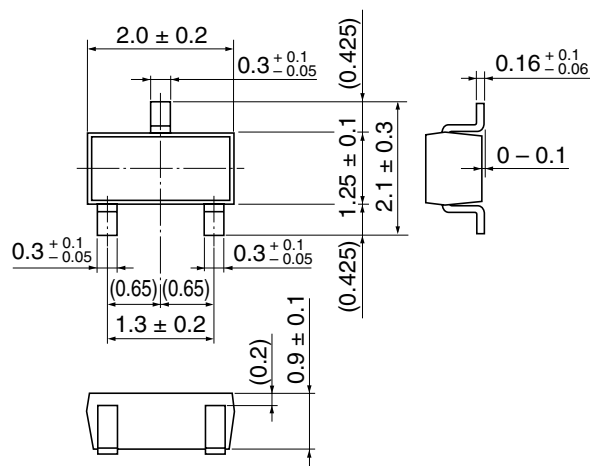
As of July, 2002
Unit: mm



Hitachi Code	MPAK-5
JEDEC	—
JEITA	—
Mass (reference value)	0.013 g

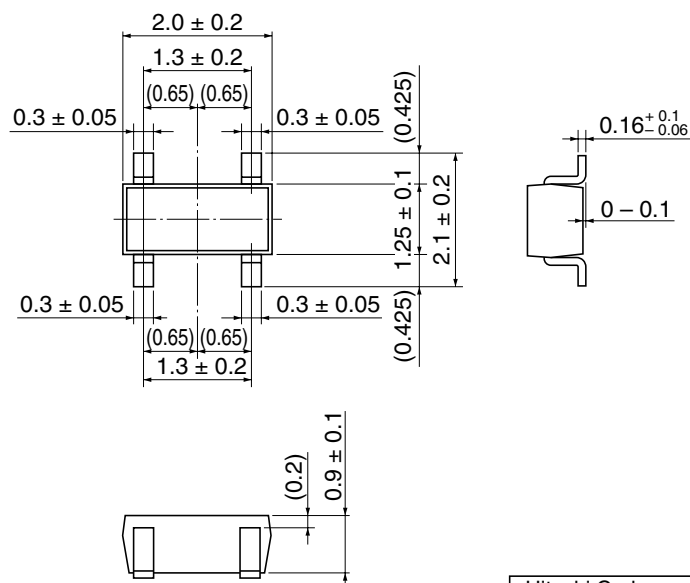
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Hitachi Code	CMPAK
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.006 g

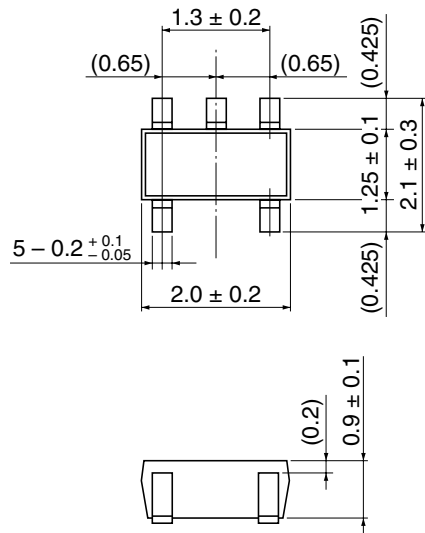
As of July, 2002
Unit: mm



Hitachi Code	CMPAK-4(D)
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.006 g

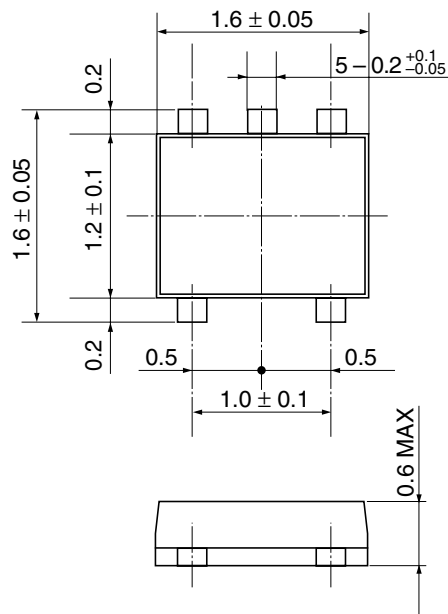
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Hitachi Code	CMPAK-5(D)
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.006 g

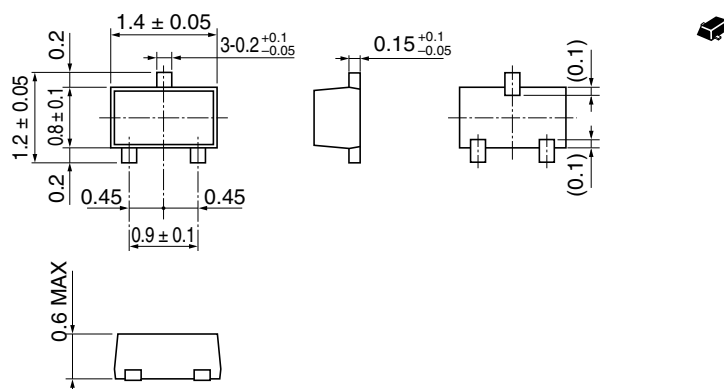
As of July, 2002
Unit: mm



Hitachi Code	VSON-5
JEDEC	—
JEITA	—
Mass (reference value)	0.002 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Hitachi Code	MFP-PAK
JEDEC	—
JEITA	—
Mass (reference value)	0.0016 g

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

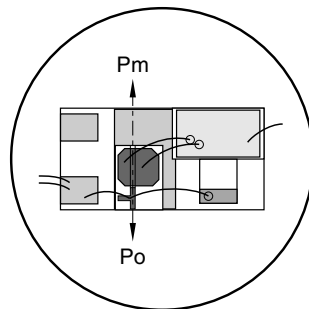
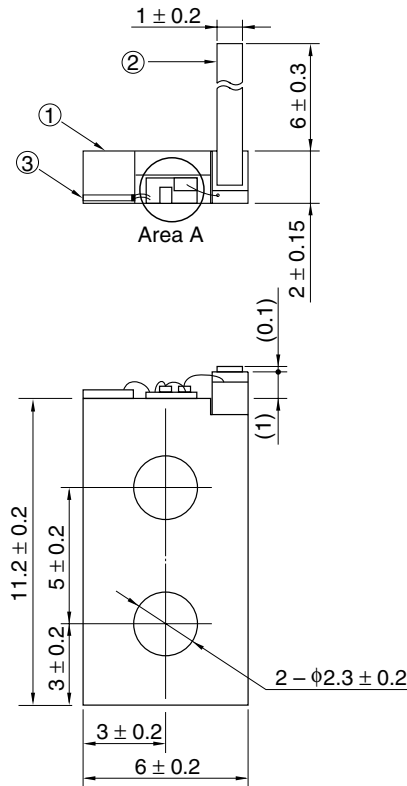
2.6 Optodevice Packages

The Opto-Device Division is being transferred to OpNext, Inc. as of October 1, 2002. For any inquiries on the optoelectronic devices, please contact the Hitachi sales office as same as before.

2.6.1 Laser Diode Packages

As of July, 2002

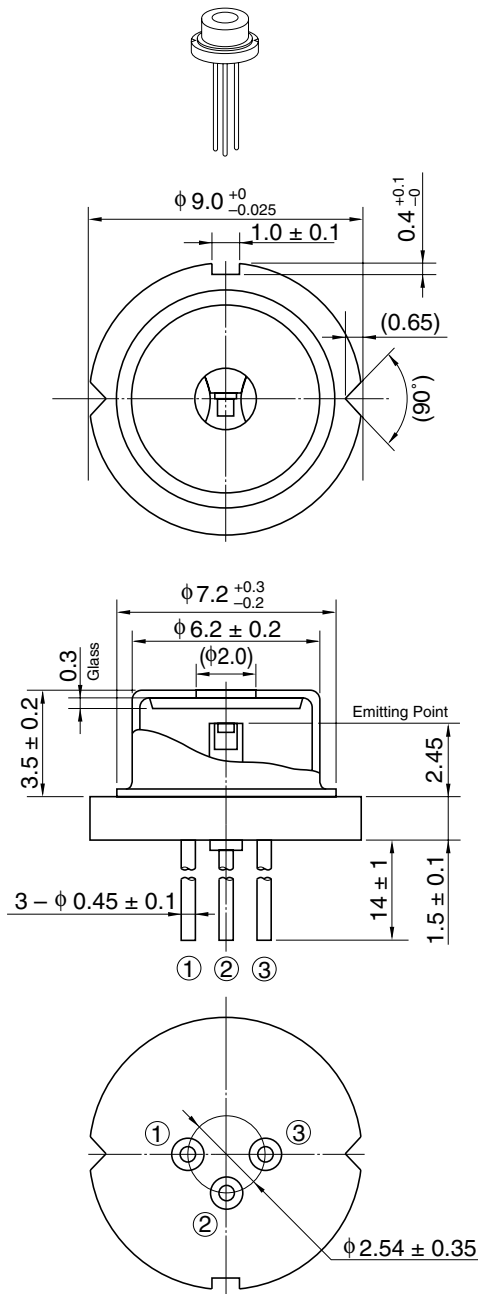
Unit: mm



Enlargement of Area A

Hitachi Code	LD/AF
JEDEC	—
JEITA	—
Mass (reference value)	1.1 g

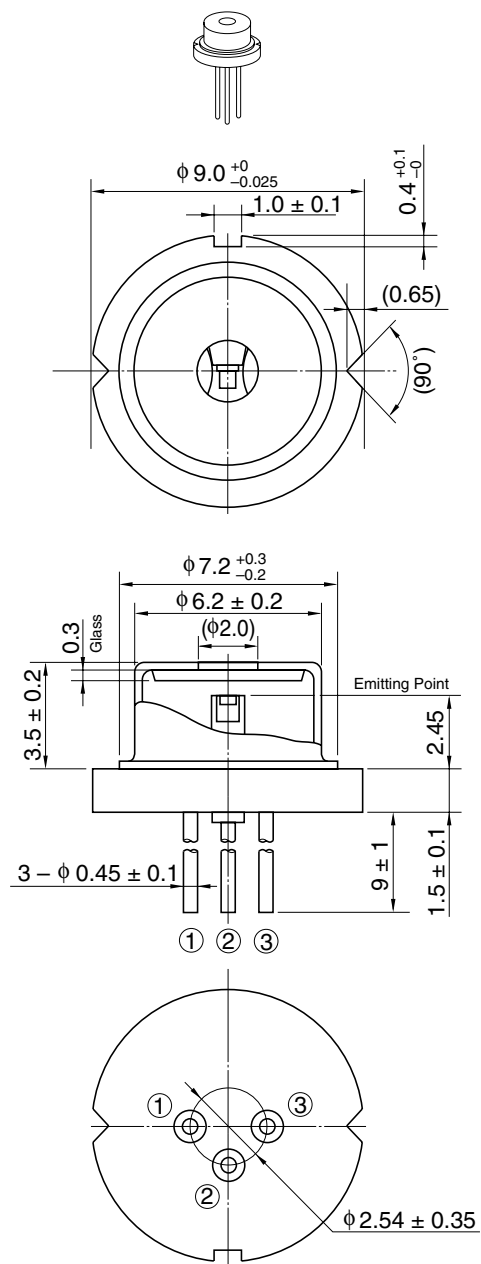
As of July, 2002
Unit: mm



Hitachi Code	LD/G1
JEDEC	—
JEITA	—
Mass (reference value)	1.1 g

As of July, 2002

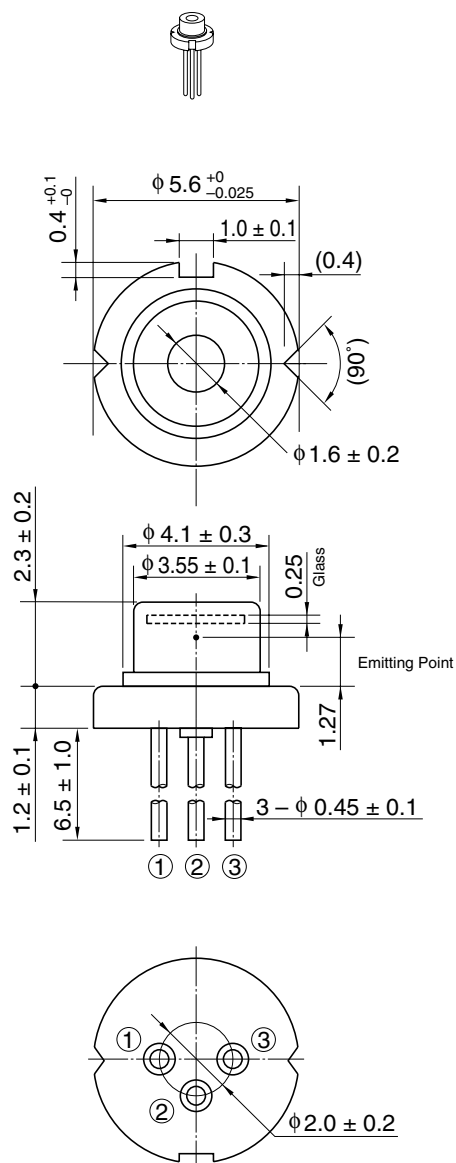
Unit: mm



Hitachi Code	LD/G2
JEDEC	—
JEITA	—
Mass (reference value)	1.1 g

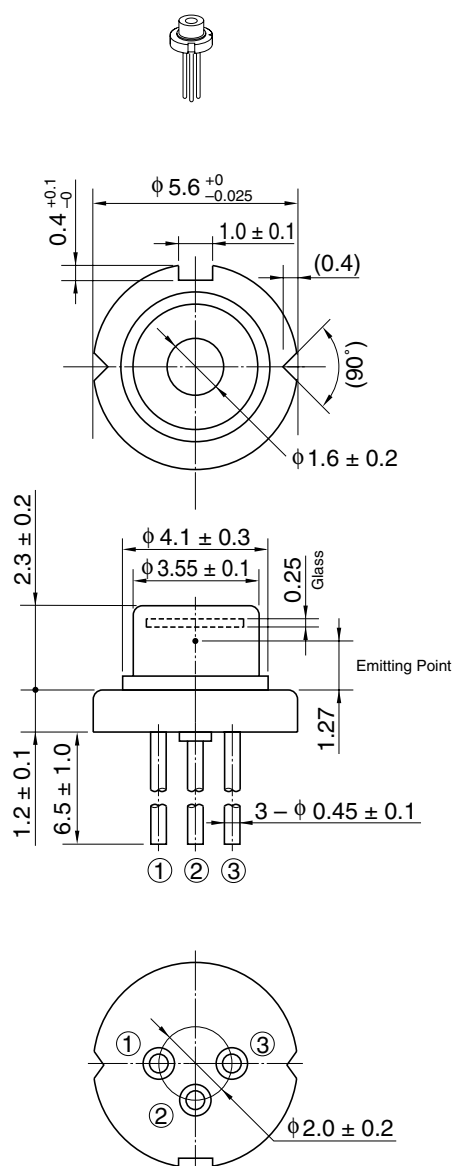
As of July, 2002

Unit: mm



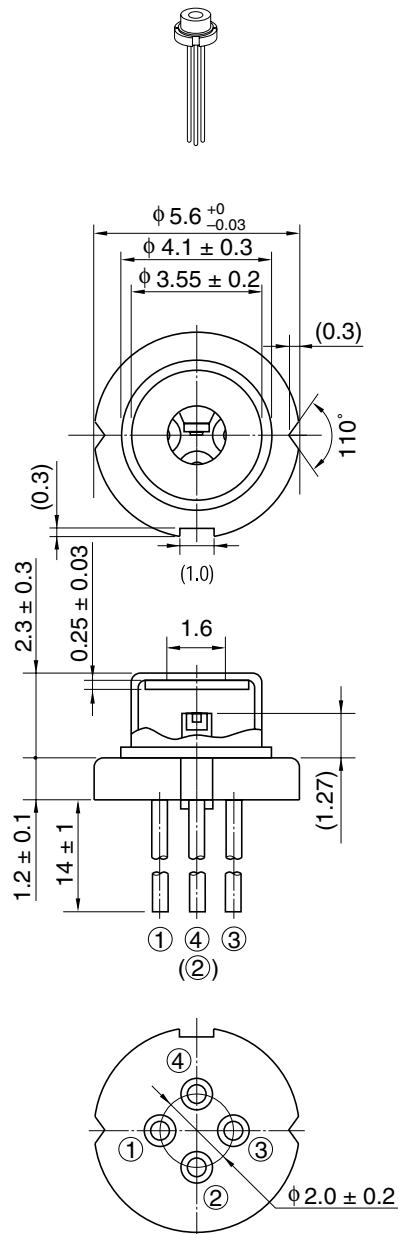
Hitachi Code	LD/MG
JEDEC	—
JEITA	—
Mass (reference value)	0.3 g

As of July, 2002
Unit: mm



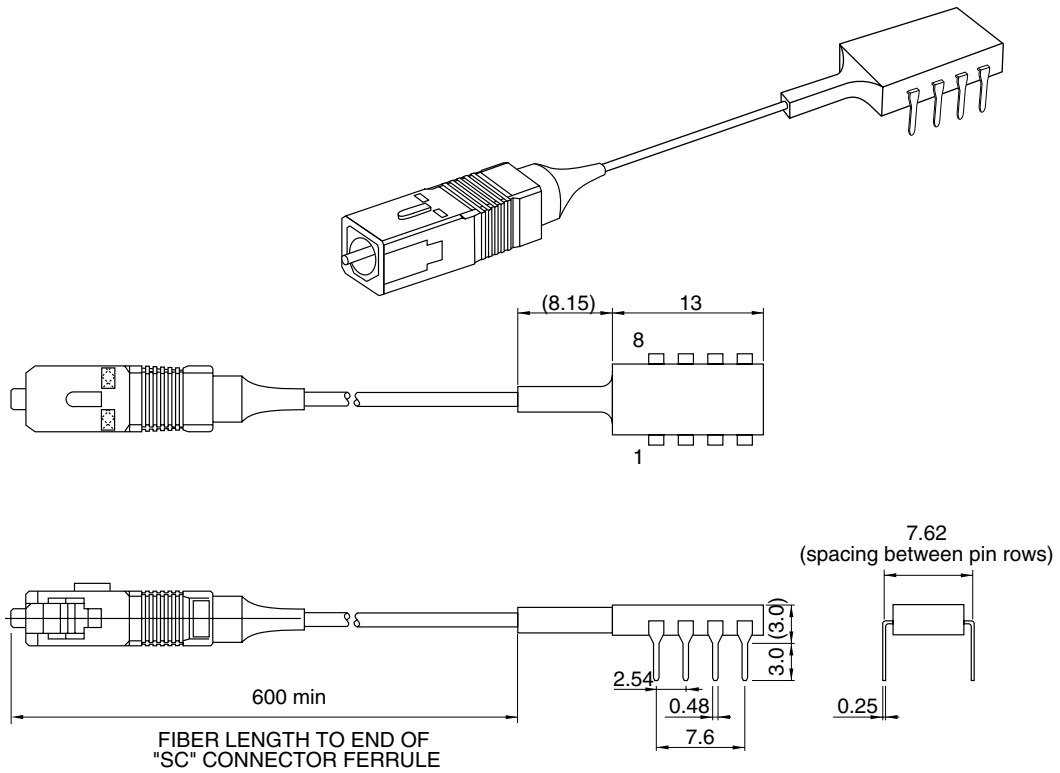
Hitachi Code	LD/FM
JEDEC	—
JEITA	—
Mass (reference value)	0.3 g

As of July, 2002
Unit: mm



Hitachi Code	LD/GN
JEDEC	—
JEITA	—
Mass (reference value)	0.35 g

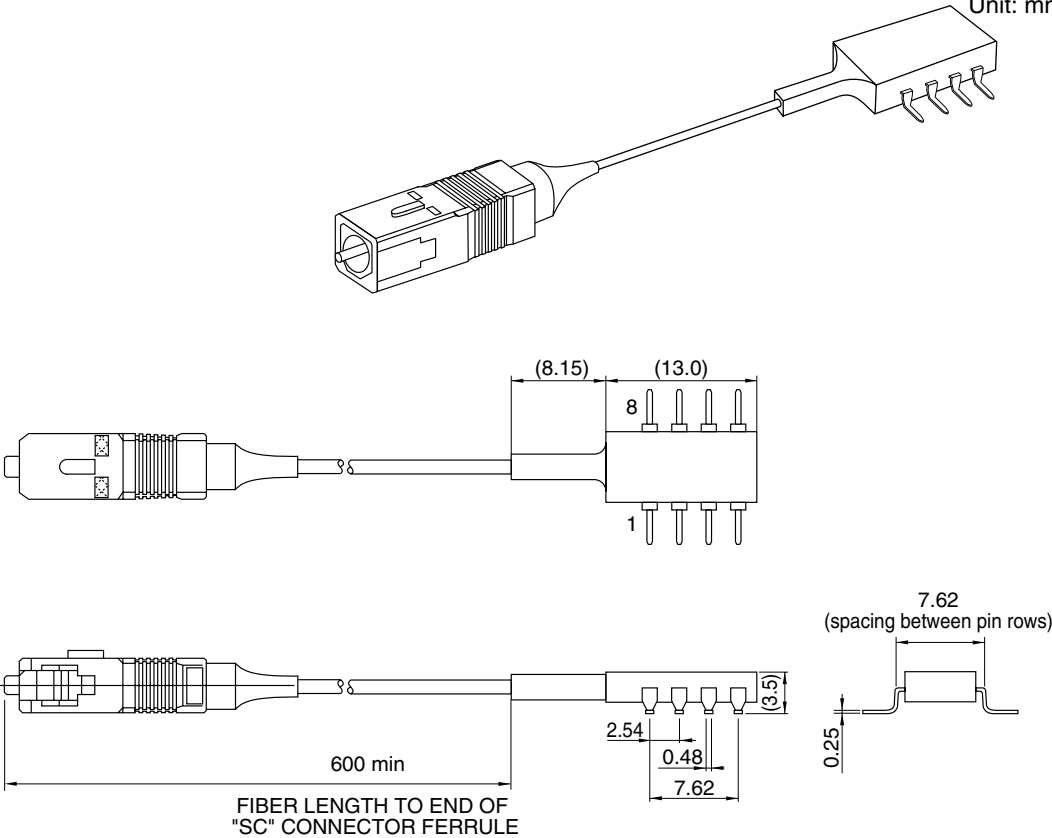
As of July, 2002
Unit: mm



Hitachi Code	LD/DJS
JEDEC	—
JEITA	—
Mass (reference value)	—

Preliminary

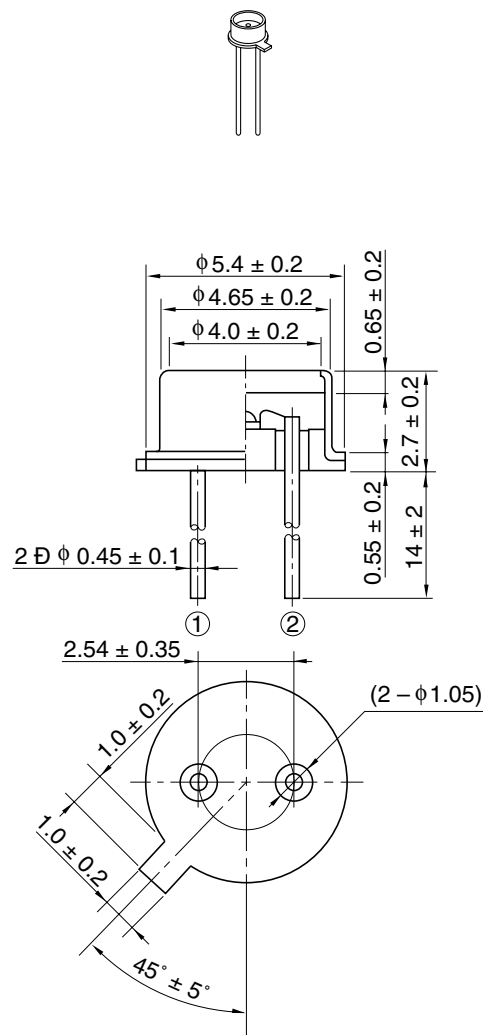
As of July, 2002
Unit: mm



Hitachi Code	LD/DNS (TBD)
JEDEC	—
JEITA	—
Mass (reference value)	—

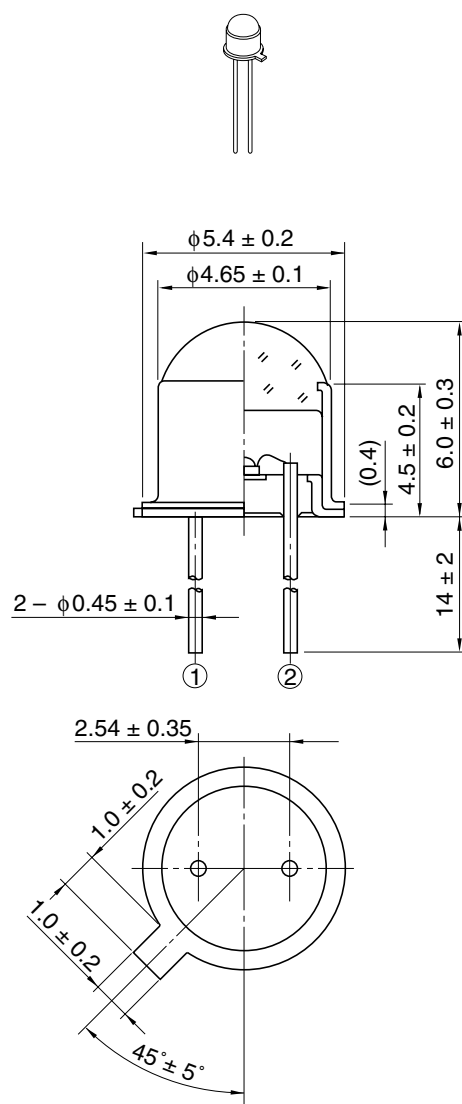
2.6.2 IRED Packages

As of July, 2002
Unit: mm



Hitachi Code	IR/SG1
JEDEC	—
JEITA	—
Mass (reference value)	0.25 g

As of July, 2002
Unit: mm



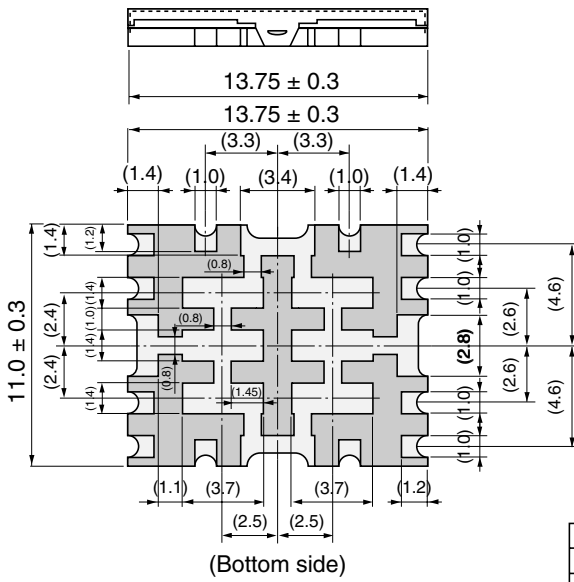
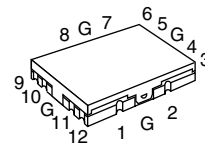
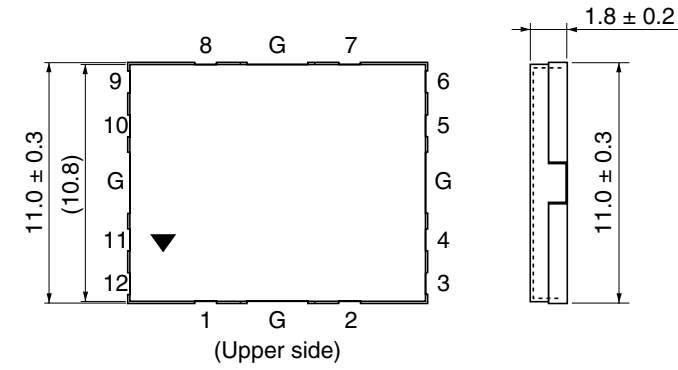
Hitachi Code	IR/FL
JEDEC	—
JEITA	—
Mass (reference value)	0.27 g

2.7

Module

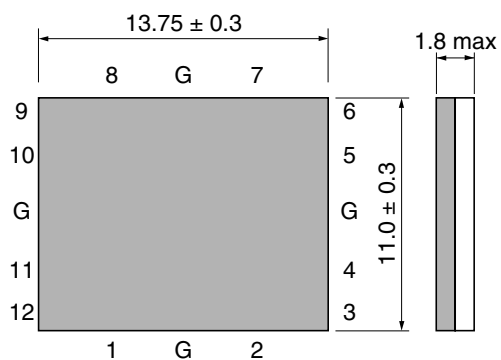
As of July, 2002

Unit: mm

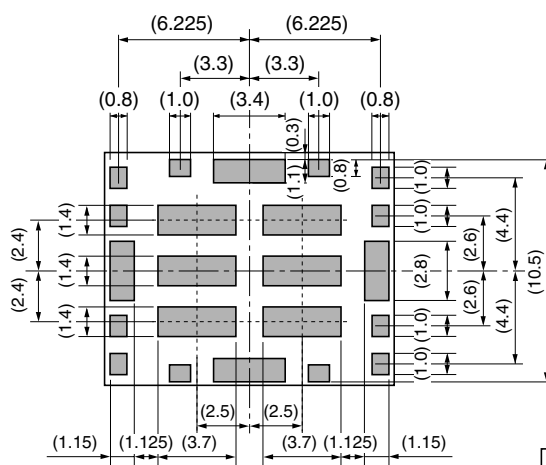
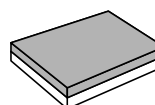


Hitachi Code	RF-O-12
JEDEC	—
JEITA	—
Mass (reference value)	—

As of July, 2002
Unit: mm



(Upper side)



(Bottom side)

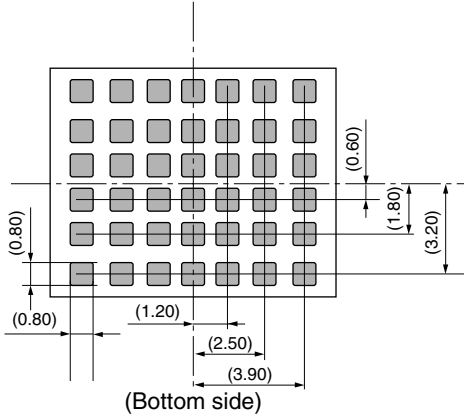
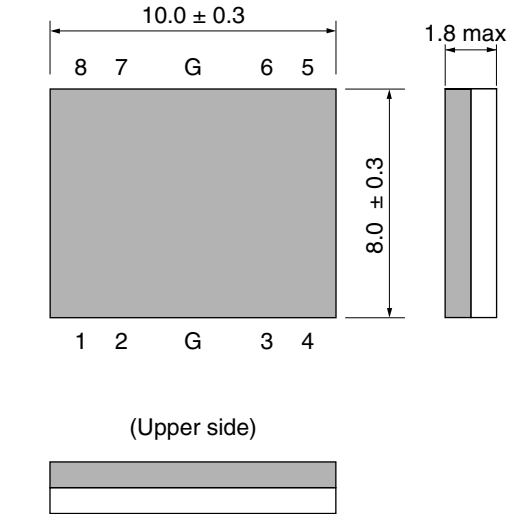
Hitachi Code	RF-Or
JEDEC	—
JEITA	—
Mass (reference value)	—

REMARK

1. The representative terminal shapes of the bottom side are shown.
2. For applied products, contact the Hitachi Sales office.

Preliminary

As of July, 2002
Unit: mm



Hitachi Code	RF-Q
JEDEC	—
JEITA	—
Mass (reference value)	—

- REMARK
1. The representative terminal shapes of the bottom side are shown.
 2. For applied products, contact the Hitachi Sales office.

Section 3 Thermal Resistance of IC Packages

3.1 Thermal Resistance

Semiconductor devices are sensitive to temperature. When the temperature is above the junction temperature of the semiconductor, the device does not operate normally. For this reason, it is necessary to perform thermal design for mounting to lower the junction temperature.

When carrying out thermal design of a package, thermal resistance is the parameter that indicates the heat removal capability of the package.

$$\theta_j = \frac{T_j - T_r}{P_d} \text{ (C/W)}$$

P_d : Power dissipation per device
 T_j : Junction temperature
 T_r : Standard temperature

θ_{ja} , the junction to ambient thermal resistance, and θ_{jc} , the junction to case thermal resistance, are the most generally used factors. Ambient temperature (T_a) and case temperature (T_c) are taken as the standard temperatures. Figure 3.1 shows package temperatures and thermal resistance.

Here, θ_{ca} indicates the case to ambient thermal resistance. The relationship:

$$\theta_{ja} = \theta_{jc} + \theta_{ca}$$

is established between them.

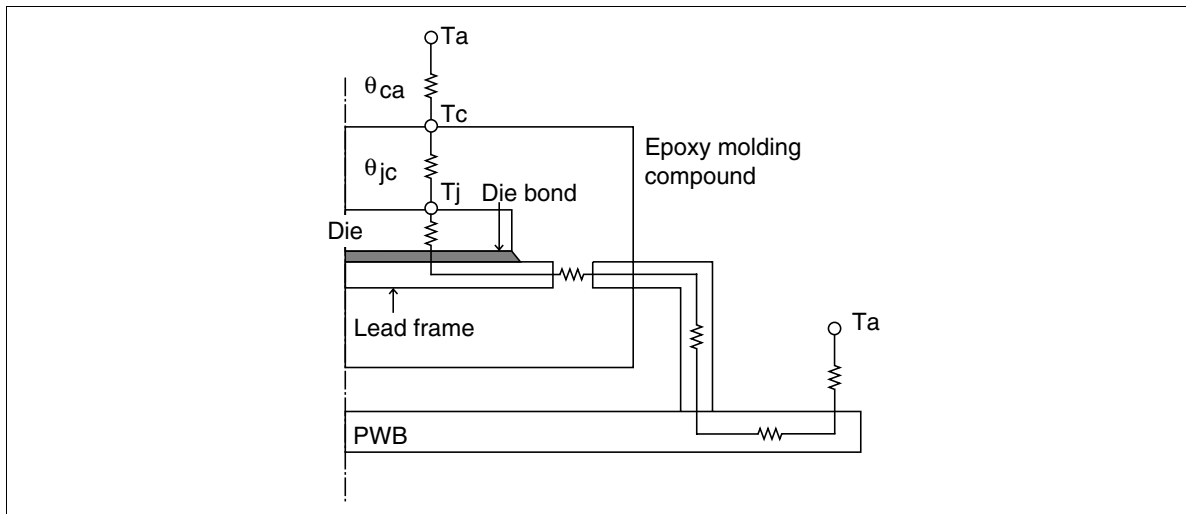


Figure 3.1 Thermal Resistance of Packages

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

3.2 Thermal Resistance Testing Method

Thermal resistance test is essentially junction temperature test. The power dissipation per device (P_d) and the ambient temperature (T_a) can be directly tested. However, junction temperature (T_j) cannot be tested directly. For this reason, junction temperature is tested indirectly making use of electrical parameters that are sensitive to temperature, such as the base to emitter voltage of the transistor and the forward voltage of the diode.

Table 3.1 shows an outline of the test system and of the principles of test. This test is made using power transistors, because these devices can increase the power dissipation per device sufficiently. The larger the power dissipation per device is, the higher the junction temperature is. As the result, the error in the test can be minimized. This method is based on MIL-STD-883C, which is a standard method.

Table 3.1 Outline of Test Method and Principles of Test

Item	Details
Outline of test system	
Principles	<p>STEP 1. Correction Temperature characteristics of base to emitter voltage (correction curve) are found.</p> <p>STEP 2. Power impression test. The base to emitter voltage (V_{BE}) is tested when the power dissipation P_d is added. T_j is found from the V_{BE} that has been tested.</p> <p>STEP 3. Calculation of thermal resistance Thermal resistance is found by the following.</p> $\theta_{ja} = \frac{T_j - T_a}{P_d}$ <div style="display: flex; align-items: center;"> </div>

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

3.3 Thermal Resistance of Various Packages

Table 3.2 shows examples of thermal resistance of various packages.

θ_{ja} indicates thermal resistance tested in a natural convection state with the package suspended in the air (not mounted on a board) and thermal resistance tested in a natural convection state with the package mounted on a glass epoxy board. In each case, the lead frame material, the die size and the board area are different. Because θ_{ja} varies depending on the lead frame material and die size, the data must be handled taking the test conditions into consideration. θ_{jc} indicates thermal resistance between the junction and the case when the surface temperature of the package body is taken as the case temperature, T_c . The heat sink temperature is taken as the case temperature for packages in the shape of a heat sink. θ_{jc} is obtained by applying silicone grease to reduce contact thermal resistance to the upper surface of the package or to the heat sink and by testing thermal resistance in a state in which the grease is in contact with a water-cooled heat sink of a copper plate.

Table 3.2 Measurement Results of Thermal Resistance for Various Packages

Division	Package name	Package code	Lead frame material	Thermal resistance							
				Die size (mm)	Test board			θ_{ja} (°C/W)		θ_{jc} (°C/W)	Evaluation method
					Material	Size (mm)	Wiring density (%)	Not mounted on board	Mounted on board		
Surface-mount type	SOP	FP-8D	Cu alloy	1.16×1.44	glass epoxy	40×40×1.6	10	258	169	72	Measurement
		FP-8DB	Cu alloy	2.0×2.0	—	—	—	235	—	56	Simulation
		FP-24D	Fe-Ni alloy	4.5×4.5	glass epoxy	120×21×1.6	30	159	94	40	Measurement
		FP-28D	Fe-Ni alloy	4.5×9.0	glass epoxy	120×21×1.6	30	121	84	40	Measurement
		FP-32D	Cu alloy	6.0×6.0	glass epoxy	67×58.5×1.6	15 or less	102	66	19	Measurement
	HSOP	FP-26DT	Cu alloy	3.9×3.9	glass epoxy	40×40×1.6	10	125	78	—	Measurement
	TSSOP	TTP-16DA	Cu alloy	1.2×1.2	glass epoxy	55×45×1.6	110	325	250	—	Measurement
		TTP-24DB	Cu alloy	1.2×1.2	glass epoxy	55×45×1.6	110	216	145	—	Measurement
	HTSSOP	TTP-56DT	Cu alloy	3.5×8.2	glass epoxy	114×76×1.6	120	—	35	10	Measurement
	TSOP(I)	TFP-28DB	Cu alloy	6.0×4.0	—	—	—	165	—	30	Simulation
		TFP-32DA	Fe-Ni alloy	6.0×8.0	—	—	—	155	—	25	Simulation
	TSOP(II)	TTP-32D	Fe-Ni alloy	6.0×14.0	—	—	—	93	—	13	Simulation
		TTP-44DB	Fe-Ni alloy	6.0×14.0	glass epoxy	120×200×1.6	30	98	63	11	Simulation
		TTP-44DE	Fe-Ni alloy	7.0×12.0	glass epoxy	140×50×1.6	30	86	57	15	Simulation
	QFP	FP-44A	Fe-Ni alloy	6.0×6.0	glass epoxy	140×50×1.6	30	121	102	—	Measurement
		FP-64	Fe-Ni alloy	6.0×6.0	glass epoxy	140×50×1.6	30	111	87	22	Measurement
		FP-64A	Fe-Ni alloy	6.0×6.0	glass epoxy	140×50×1.6	30	118	103	34	Measurement
		FP-64B	Fe-Ni alloy	6.3×6.3	glass epoxy	140×50×1.6	30	111	87	24	Simulation
		FP-64H	Cu alloy	6.3×6.3	glass epoxy	114×76×1.6	30	94	60	—	Measurement
		FP-80	Fe-Ni alloy	6.0×6.0	glass epoxy	140×50×1.6	30	98	88	—	Measurement

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Division	Package name	Package code	Lead frame material	Thermal resistance							
				Die size (mm)	Test board			θ_{ja} (°C/W)		θ_{jc} (°C/W)	Evaluation method
					Material	Size (mm)	Wiring density (%)	Not mounted on board	Mounted on board		
Surface-mount type	QFP	FP-80A	Fe-Ni alloy	6.0×6.0	glass epoxy	140×50×1.6	30	115	99	25	Measurement
		FP-80B	Fe-Ni alloy	6.3×6.3	glass epoxy	140×50×1.6	30	98	89	24	Simulation
		FP-80Q	Cu alloy	6.3×6.3	glass epoxy	114×76×1.6	30	94	58	—	Measurement
		FP-100	Fe-Ni alloy	6.0×6.0	glass epoxy	140×50×1.6	30	97	88	24	Measurement
		FP-100A	Fe-Ni alloy	6.3×6.3	glass epoxy	140×50×1.6	30	97	88	24	Simulation
		FP-100B	Fe-Ni alloy	6.3×6.3	glass epoxy	114×76×1.6	30	107	80	25	Simulation
		FP-100M	Cu alloy	6.3×6.3	glass epoxy	114×76×1.6	30	99	58	—	Measurement
				8.4×8.4	glass epoxy	114×76×1.6	30	86	47	14	Simulation
		FP-112	Fe-Ni alloy	8.4×8.4	—	—	—	82	—	19	Measurement
		FP-112B	Cu alloy	6.3×6.3	glass epoxy	114×76×1.6	30	74	54	20	Measurement
		FP-128	Fe-Ni alloy	6.3×6.3	glass epoxy	114×76×1.6	30	93	63	19	Simulation
		FP-128B	Fe-Ni alloy	6.3×6.3	glass epoxy	114×76×1.6	30	93	63	19	Simulation
		FP-136	Fe-Ni alloy	6.3×6.3	glass epoxy	140×50×1.6	30	88	73	20	Measurement
		FP-144G	Cu alloy	6.3×6.3	glass epoxy	114×76×1.6	30	65	45	18	Simulation
				10.5×10.5	glass epoxy	114×76×1.6	30	57	37	7	Measurement
		FP-144J	Fe-Ni alloy	6.3×6.3	glass epoxy	114×76×1.6	30	100	64	18	Simulation
				10.5×10.5	glass epoxy	114×76×1.6	30	75	45	8	Simulation
		FP-160H	Cu alloy	6.3×6.3	glass epoxy	114×76×1.6	30	69	52	19	Simulation
				10.5×10.5	glass epoxy	114×76×1.6	30	46	33	9	Simulation
		FP-168	Fe-Ni alloy	6.3×6.3	glass epoxy	114×76×1.6	30	77	57	15	Measurement
				8.4×8.4	—	—	—	69	—	—	Measurement
				10.5×10.5	glass epoxy	114×76×1.6	30	54	38	9	Simulation
		FP-208	Fe-Ni alloy	8.4×8.4	—	—	—	72	—	—	Measurement
		FP-208A	Cu alloy	8.4×8.4	glass epoxy	140×50×1.6	200	66	36	15	Simulation
				10.5×10.5	glass epoxy	140×50×1.6	200	53	32	11	Measurement
		FP-240	Cu alloy	8.4×8.4	glass epoxy	114×76×1.6	30	54	42	14	Measurement
				12.6×12.6	glass epoxy	114×76×1.6	30	47	37	8	Simulation
		FP-256F	Cu alloy	10.5×10.5	glass epoxy	114×76×1.6	30	53	40	12	Measurement
				14.7×14.7	glass epoxy	114×76×1.6	30	40	29	7	Simulation
		FP-296	Cu alloy	10.5×10.5	glass epoxy	114×76×1.6	30	50	39	11	Measurement
				14.7×14.7	glass epoxy	114×76×1.6	30	37	30	6	Measurement

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Division	Package name	Package code	Lead frame material	Thermal resistance							
				Die size (mm)	Test board			θ_{ja} (°C/W)		θ_{jc} (°C/W)	Evaluation method
					Material	Size (mm)	Wiring density (%)	Not mounted on board	Mounted on board		
Surface-mount type	LQFP	FP-64E	Fe-Ni alloy	4.2×4.2	glass epoxy	114×76×1.6	30	161	98	21	Measurement
				6.3×6.3	glass epoxy	114×76×1.6	30	127	77	12	Measurement
		FP-144H	Fe-Ni alloy	10.5×10.5	glass epoxy	40×40×1.6	200	84	61	15	Measurement
		FP-176	Fe-Ni alloy	6.3×6.3	glass epoxy	114×76×1.6	30	93	61	10	Simulation
				10.5×10.5	glass epoxy	114×76×1.6	30	66	42	5	Simulation
		FP-176A	Cu alloy	6.3×6.3	glass epoxy	114×76×1.6	30	90	55	9	Simulation
		FP-176C	Cu alloy	8.4×8.4	glass epoxy	114×76×1.6	30	73	45	6	Simulation
		FP-208C	Cu alloy	6.3×6.3	glass epoxy	114×76×1.6	30	88	57	10	Simulation
		FP-216	Cu alloy	8.4×8.4	glass epoxy	114×76×1.6	30	68	44	6	Simulation
	HQFP	FP-56B	Cu alloy	5.0×5.0	glass epoxy	55×45×1.6	10	117	67	—	Measurement
		FP-64TA	Cu alloy	5.5×5.5	glass epoxy	105×76.2×0.8	240	—	15	2	Measurement
		FP-80M	Cu alloy	6.0×6.0	glass epoxy	55×45×1.6	10	85	78	37	Measurement
		FP-208E	Cu alloy	8.4×8.4	glass epoxy	114×76×1.6	30	43	25	—	Measurement
		FP-240B	Cu alloy	8.4×8.4	glass epoxy	114×76×1.6	30	36	27	5	Simulation
		FP-256G	Cu alloy	8.4×8.4	glass epoxy	114×76×1.6	30	—	29	—	Measurement
				8.4×8.4	glass epoxy	114×76×1.6	30	40	27	5	Simulation
		FP-296B	Cu alloy	10.5×10.5	glass epoxy	114×76×1.6	30	—	26	5	Simulation
	HLQFP	FP-80TA	Cu alloy	—	glass epoxy	100×100×1.6	200	—	15	3	Measurement
	HTQFP	TFP-64T	Cu alloy	6.5×6.5	glass epoxy	40×40×1.6	120	92	36	—	Measurement
		TFP-64TA	Cu alloy	5.5×5.5	glass epoxy	105×76.2×0.8	205	—	25	—	Measurement
	TQFP	TFP-80C	Fe-Ni alloy	8.4×8.4	glass epoxy	140×75×1.6	30	122	58	26	Measurement
		TFP-80F	Fe-Ni alloy	6.3×6.3	glass epoxy	114×76×1.6	30	124	74	7	Simulation
		TFP-100B	Fe-Ni alloy	6.3×6.3	glass epoxy	114×76×1.6	30	140	73	15	Simulation
		TFP-100G	Fe-Ni alloy	6.3×6.3	glass epoxy	114×76×1.6	30	125	76	6	Simulation
		TFP-120	Fe-Ni alloy	4.2×4.2	glass epoxy	114×76×1.6	30	153	96	20	Simulation
				10.5×10.5	—	—	—	95	—	—	Measurement
				10.5×10.5	glass epoxy	114×76×1.6	30	88	50	5	Simulation
		TFP-144	Cu alloy	6.3×6.3	glass epoxy	114×76×1.6	30	102	62	8	Simulation
	SOJ	CP-24D	Cu alloy	6.0×6.0	glass epoxy	140×50×1.6	30	131	76	30	Measurement
				4.0×10.0	—	—	—	102	—	11	Simulation

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Division	Package name	Package code	Lead frame material	Thermal resistance							
				Die size (mm)	Test board			θ_{ja} (°C/W)		θ_{jc} (°C/W)	Evaluation method
					Material	Size (mm)	Wiring density (%)	Not mounted on board	Mounted on board		
Surface-mount type	SOJ	CP-28DN	Cu alloy	4.5×9.0	glass epoxy	140×50×1.6	30	110	76	20	Measurement
				5.0×9.0	glass epoxy	140×50×1.6	30	93	52	19	Simulation
		CP-32DB	Fe-Ni alloy	7.0×12.0	glass epoxy	140×50×1.6	30	80	68	16	Simulation
		CP-36D	Fe-Ni alloy	7.0×12.0	glass epoxy	140×50×1.6	30	77	66	15	Simulation
		CP-44D	Fe-Ni alloy	7.0×12.0	glass epoxy	140×50×1.6	30	74	63	15	Simulation
	QFJ (PLCC)	CP-44	Cu alloy	6.0×6.0	glass epoxy	67×58.5×1.6	15 or less	85	60	—	Measurement
		CP-52	Cu alloy	6.0×6.0	glass epoxy	67×58.5×1.6	15 or less	72	57	—	Measurement
		CP-68	Cu alloy	6.0×6.0	glass epoxy	140×50×1.6	30	62	54	19	Measurement
	HSOI	MP-26DT	Cu alloy	3.9×3.9	glass epoxy	40×40×1.6	10	125	78	—	Measurement
	BGA	BP-119A	Substrate	7.94×15.46	—	—	—	58	—	6	Measurement
		BP-256	Substrate	6.3×6.3	glass epoxy	143×143×1.27	200	66	30	5	Measurement
	TFBGA	TBP-112	Substrate	6.3×6.3	glass epoxy	50×108×1.2	200	—	36	—	Measurement
		TBP-176	Substrate	8.4×8.4	glass epoxy	50×108×1.2	200	—	31	—	Measurement
		TBT-216B	Substrate	7.0×7.0	glass epoxy	50×108×1.2	200	—	51	—	Measurement
Pin insertion type	DIP	DP-8	Cu alloy	1.22×1.42	glass epoxy	40×40×1.6	10	150	125	—	Measurement
		DP-16	Cu alloy	2.0×2.3	glass epoxy	40×40×1.6	10	124	100	—	Measurement
		DP-24NC	Cu alloy	4.0×10.0	—	—	—	77	—	26	Simulation
		DP-28	Fe-Ni alloy	5.0×6.0	—	—	—	84	—	20	Simulation
		DP-32	Cu alloy	6.0×14.0	—	—	—	55	—	14	Simulation
	G-DIP	DG-28	Fe-Ni alloy	6.3×6.3	—	—	—	56	—	14	Measurement
		DG-32	Fe-Ni alloy	6.3×6.3	—	—	—	70	—	28	Measurement
		DG-32A	Fe-Ni alloy	10.5×4.2	—	—	—	57	—	8	Measurement
		DG-40A	Fe-Ni alloy	6.3×6.3	—	—	—	53	—	11	Measurement
	SIP	SP-23TA	Cu alloy	4.2×4.2	glass epoxy	55×45×1.6	10	37	30	—	Measurement
	PGA	PC-135	Al ₂ O ₃	12.6×12.6	—	—	—	26	—	—	Measurement

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office. However, for the TBT-216B, DG-28, DG-32, DG-32A and DG-40A in which lead-free pins were originally used, V is not added to the end of the package code.

Measuring conditions

- Natural convection state
- Ta (ambient temperature) : room temperature

Section 4 Packing Specifications

4.1 Forms of Package Packing

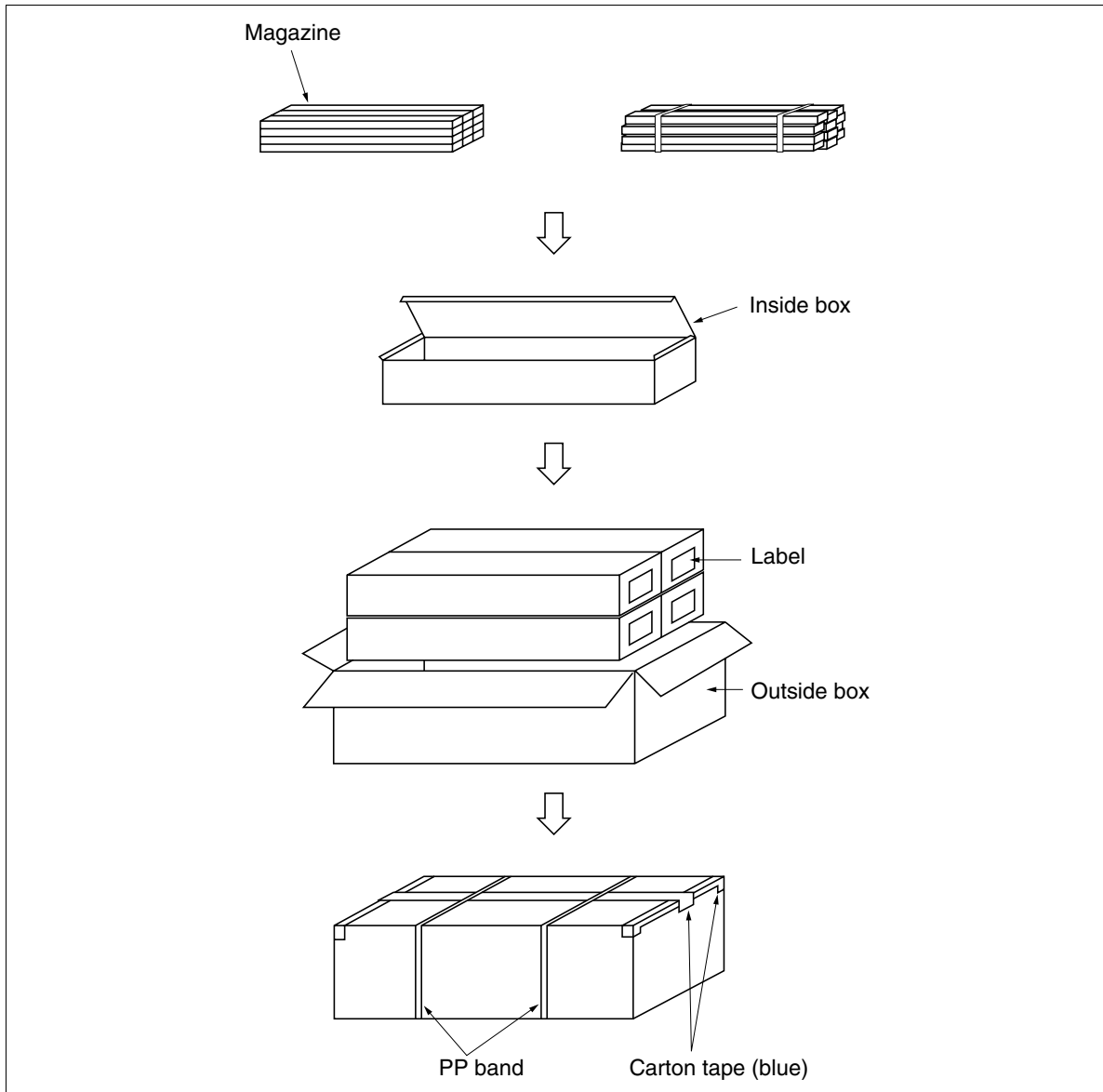
The packing forms for packages are as shown below.

The magazine, tray, or tape is designed so that the package is not subjected to damage during transport.

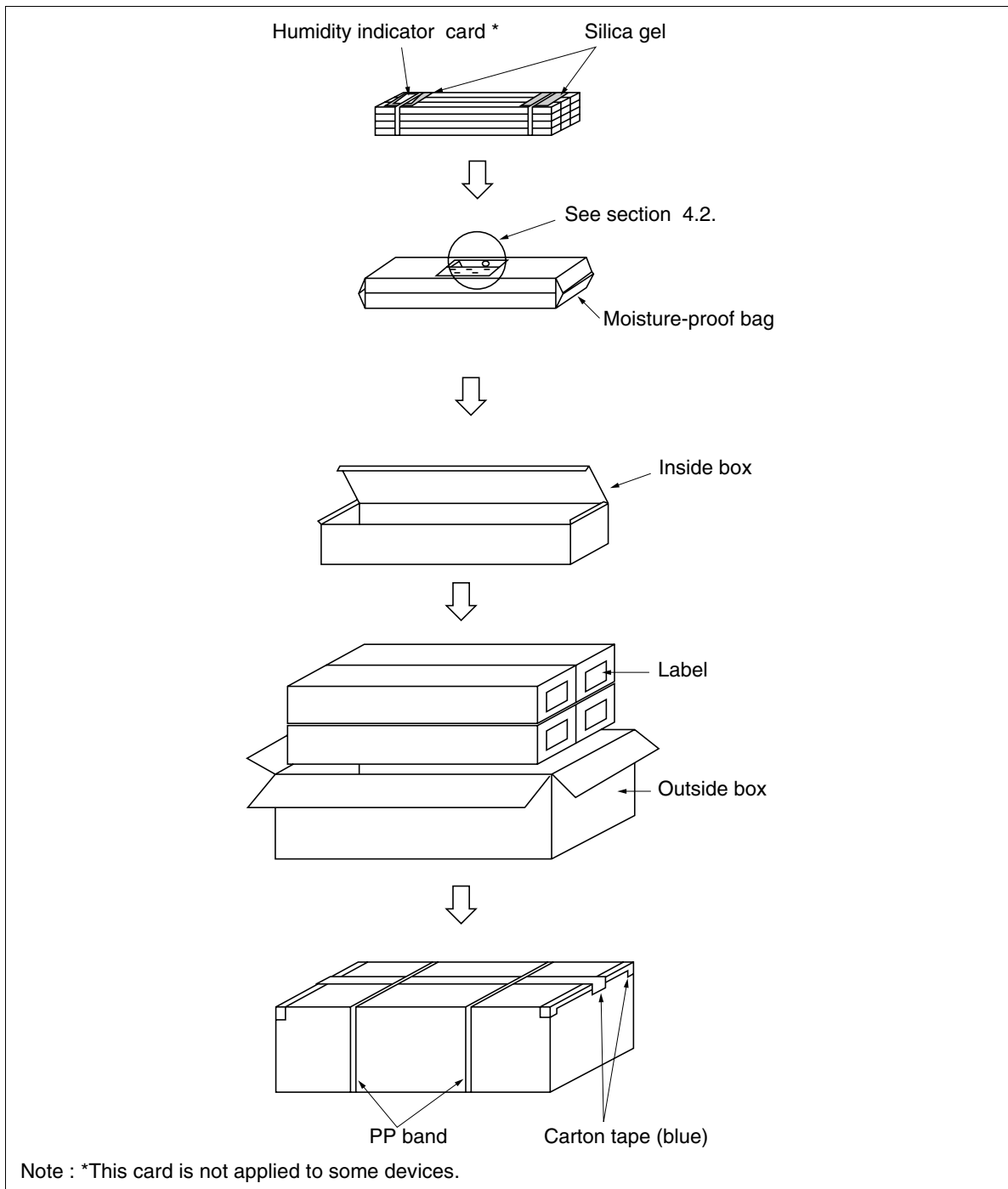
When the seal is opened, the package should be handled with great care so that it is not damaged.

1. Example of Standard Packing Specifications for Magazines

(1) Moisture-proof packing is not applied

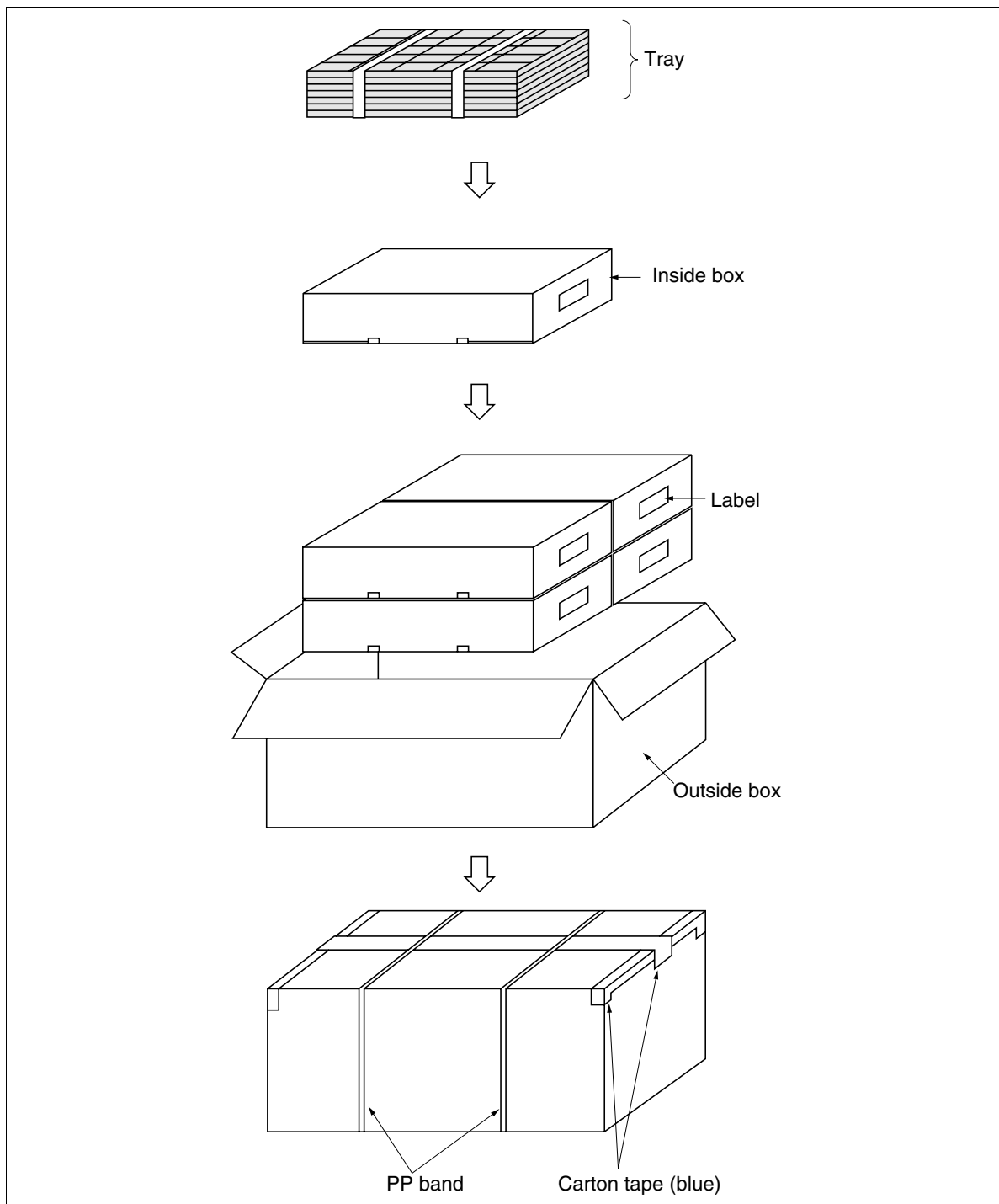


(2)Moisture-proof packing is applied

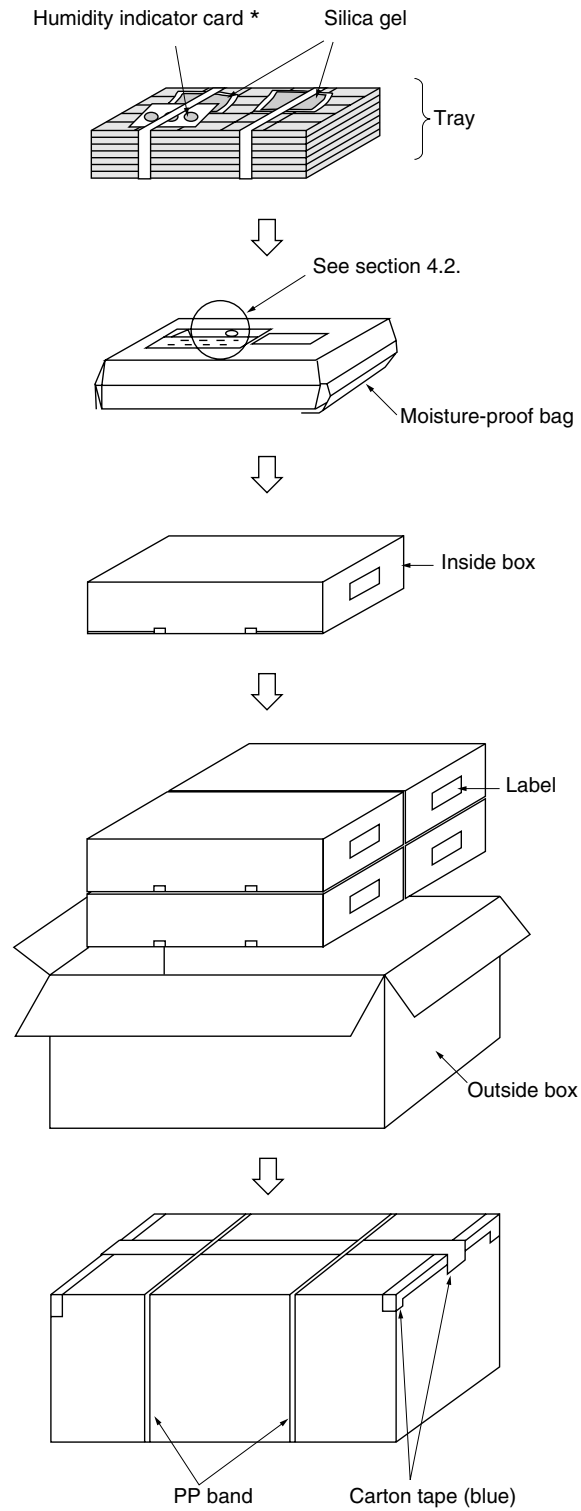


2. Example of Standard Packing Specifications for Trays

(1) Moisture-proof packing is not applied



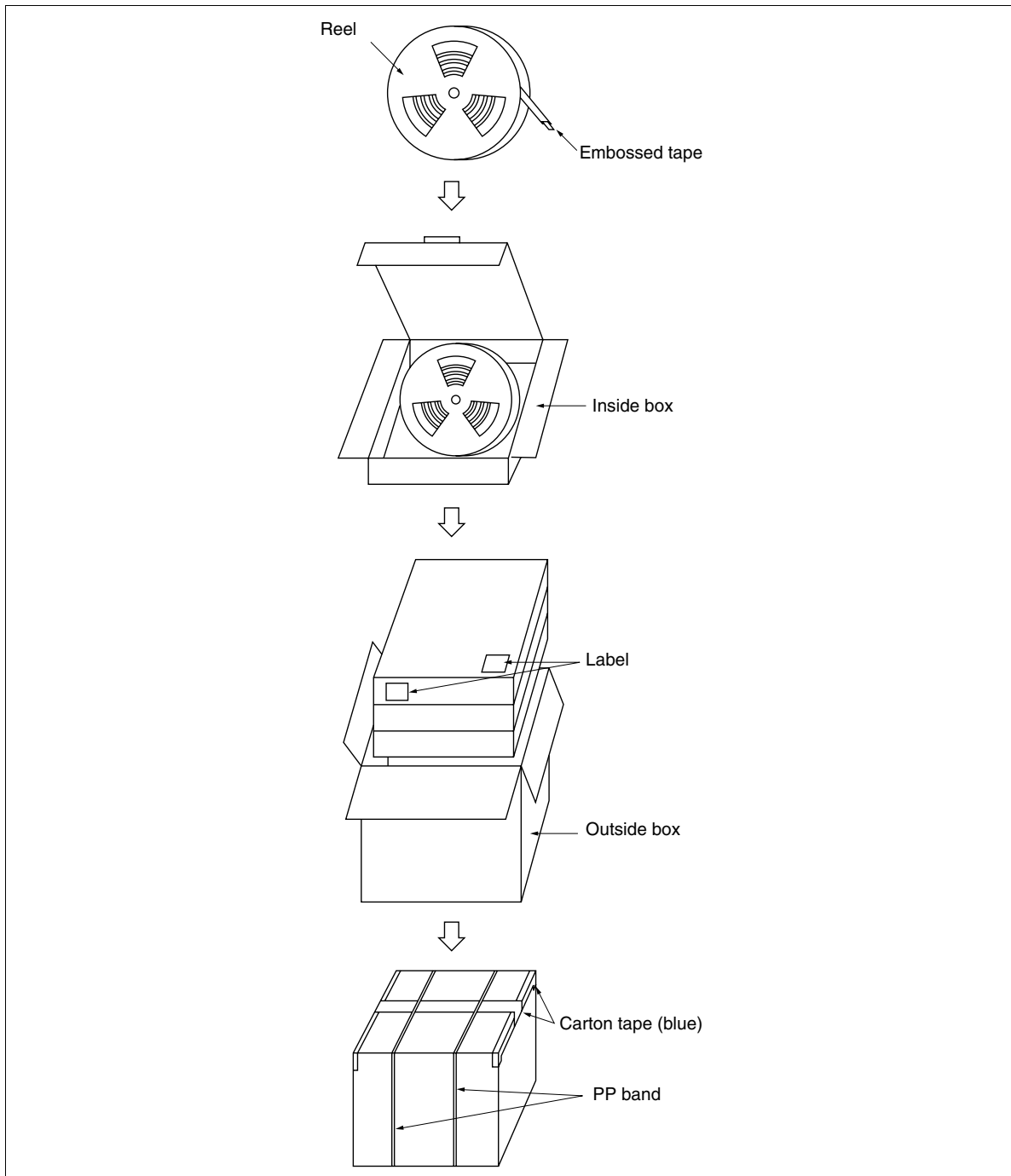
(2)Moisture-proof packing is applied



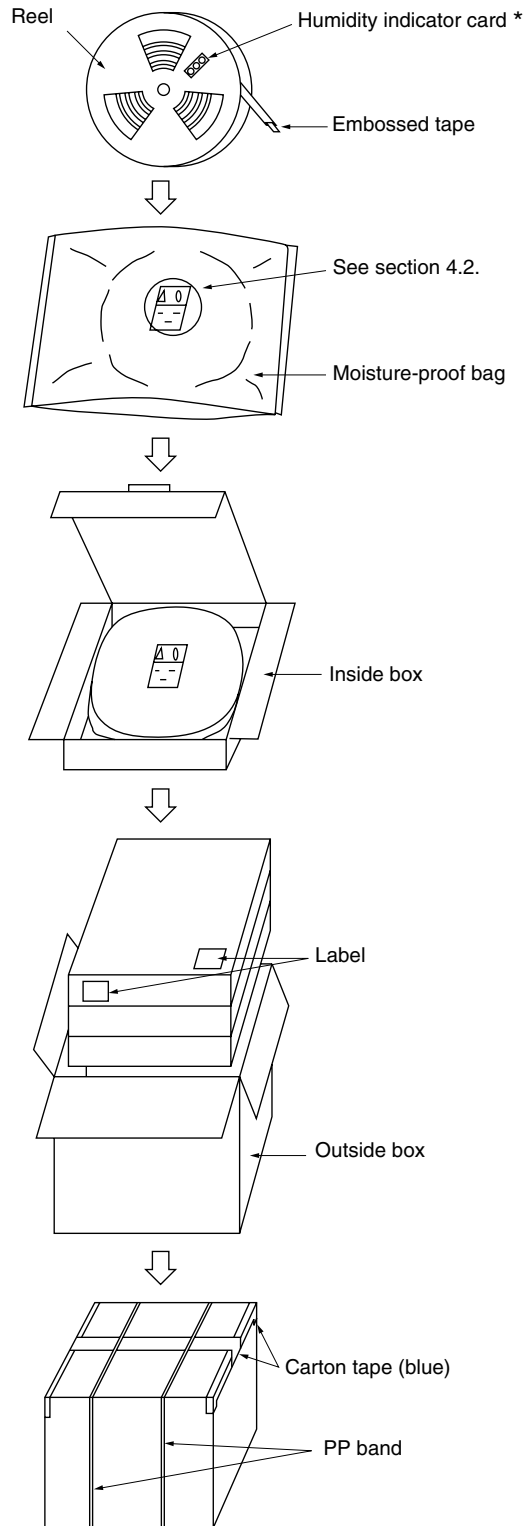
Note : *This card is not applied to some devices.

3. Example of Standard Packing Specifications for Embossed Tapes

(1) Moisture-proof packing is not applied



(2)Moisture-proof packing is applied

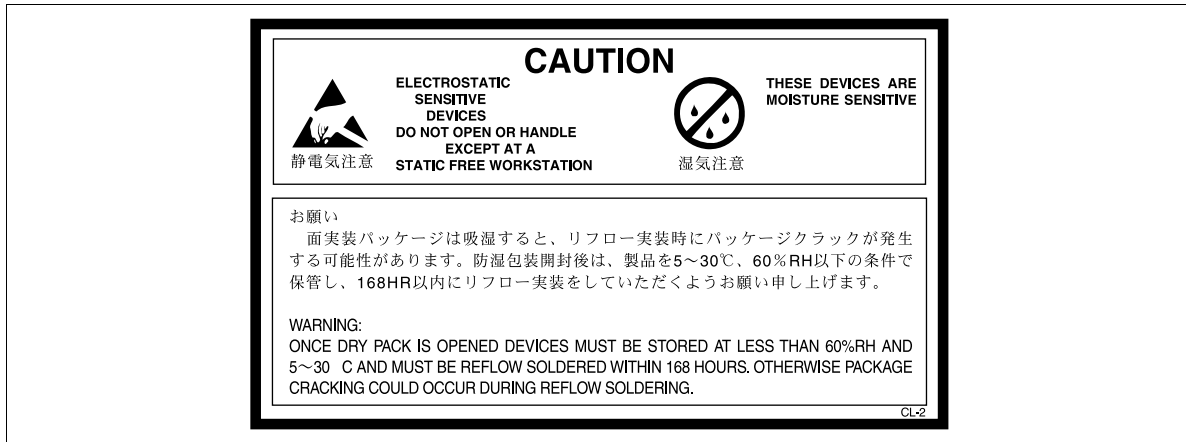


Note : *This card is not applied to some devices.

4.2 Storage Conditions after Moisture-proof Bag is Opened

When a surface mount package is subjected to reflow soldering after the package has absorbed moisture, cracking of the package occurs. For this reason, moisture-proof packing is carried out for plastic surface mount packages which carry large dies for the purpose of preventing moisture absorption during transport and storage. The storage conditions after the moisture-proof bag is opened is written on the surface of the moisture-proof bag. Please handle packages according to this instructions.

Example1 of storage conditions written on surface of moisture-proof bag



Example2 of storage conditions written on surface of moisture-proof bag



4.3 Packing Specifications for IC Packages

(◆: In mass production, △: Under development)

As of July, 2002

Package Name	Nominal Dimensions mm (mil)	Mounting Height (Max.) mm	Terminal Pitch mm	Terminal Count	Package Code	Magazine	Hard Tray		Embossed Taping	Radial Taping
							Non Heat Proof	Heat Proof		
DIP	7.62 (300)	5.06	2.54	7	DP-7	◆				
				8	DP-8	◆				
					DP-8B	◆				
				14	DP-14	◆				
				16	DP-16	◆				
					DP-16C	◆				
		DP-16E			◆					
		5.08		20	DP-20N	◆				
				24	DP-24N	◆				
	DP-24NC				◆					
	15.24 (600)	5.06		40	DP-40	◆				
				42	DP-42	◆				
		5.08		32	DP-32	◆				
		5.10		48	DP-48	◆				
		5.70		24	DP-24	◆				
				28	DP-28	◆				
	22.86 (900)	5.10		64	DP-64	◆				
SDIP	7.62 (300)	5.06	1.78	22	DP-22NS	◆				
	10.16 (400)			30	DP-30S	◆				
				5.10	28	DP-28S	◆			
	15.24 (600)	5.06		56	DP-56SA	◆				
		5.10		42	DP-42S	◆				
		DP-42SA			◆					
	19.05 (750)	5.08		64	DP-64S	◆				
	22.86 (900)			90	DP-90S	◆				
HSDIP	10.16 (400)	5.06	1.78	24	DP-24TS	◆				
G-DIP	15.24 (600)	5.89	2.54	28	DG-28	◆				
				32	DG-32	◆				
					DG-32A	◆				
	6.30	40		DG-40A	◆					
SIP	14.2 × 30.0	3.8	1.27	23	SP-23TA	◆				
			SP-23TD		◆					
	6.3 × 24.5	8.5	1.5	16	SP-16	◆				
	6.3 × 19.2	9.2	2.54	7	SP-7	◆				
	14.2 × 30.0	17.0	1.778	16	SP-16TA	◆				
	14.3 × 20.0	17	1.27	15	SP-15TA	◆				
SP-15TF					◆					

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office. However, for the DG-28, DG-32, DG-32A and DG-40A in which lead-free pins were originally used, V is not added to the end of the package code.

As of July, 2002

Package Name	Nominal Dimensions mm (mil)	Mounting Height (Max.) mm	Terminal Pitch mm	Terminal Count	Package Code	Magazine	Hard Tray		Embossed Taping	Radial Taping		
							Non Heat Proof	Heat Proof				
SIP	14.2 × 30.0	17.3	1.27	23	SP-23TB	◆						
	17.5 × 30.18	20.82			SP-23TE	◆						
		20.97	1.0	28	SP-28TA	◆						
	15.0 × 10.0	21.75	1.7	5	SP-5TB	◆						
	15.0 × 10.2	22	2.5	3	SP-3T	◆						
PGA	10* ¹	5.10	2.54	68	PC-68		◆					
	14* ¹	4.95		135	PC-135		◆					
SOP	3.81 (150)* ²	1.75	1.27	8	FP-8DC				◆			
				14	FP-14DNV	◆			◆			
				16	FP-16DNV	◆			◆			
	5.72(225)	1.73		8	FP-8DB	◆			◆			
					FP-8D	◆			◆			
					FP-8DF				◆			
	5.65 × 8.10	1.73		14	FP-14DA	◆			◆			
	7.62 (300)	2.20			FP-14DAV	◆			◆			
					16	FP-16DA	◆			◆		
		16		FP-16DAV	◆			◆				
				20	FP-20DA	◆			◆			
					FP-20DAV	◆			◆			
					FP-20DBV	◆			◆			
	7.62 (300)* ²	2.65		24	FP-24D	◆						
	11.43 (450)	2.50			FP-24DB	◆			◆			
					28	FP-28D	◆					
	12.70 (500)	1.65	1.60	10	FP-10D			◆				
	13.34 (525)	3.00	1.27	32	FP-32D	◆			◆			
				40	FP-40D	◆		◆	◆			
HSOP	5.5 × 10.06	2.20	1.27	16	FP-16DC	◆			◆			
	5.5 × 12.6			20	FP-20DE	◆			◆			
	8.3 × 18.4	3.0	0.80	26	FP-26DT				◆			
					FP-26DTA				◆			
	11.0 × 14.1	3.6	1.27	20	FP-20DT			Δ				
SSOP	5.30 × 8.20	2.10	0.65	24	FP-24DSA				Δ			
	8.0 × 11.0	2.00		30	FP-30D	◆						
TSSOP	4.40 × 3.00	1.10	0.65	8	TTP-8DA				◆			
	4.40 × 5.00			14	TTP-14D				◆			
					TTP-14DV				◆			
				16	TTP-16DA				◆			
					TTP-16DAV				◆			
	4.40 × 6.50			20	TTP-20DA			◆	◆			
					TTP-20DAV				◆			

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002

Package Name	Nominal Dimensions mm (mil)	Mounting Height (Max.) mm	Terminal Pitch mm	Terminal Count	Package Code	Magazine	Hard Tray		Embossed Taping	Radial Taping
							Non Heat Proof	Heat Proof		
TSSOP	4. 40 × 7.80	1.10	0.65	24	TTP-24DB				◆	
					TTP-24DBV				◆	
	4. 40 × 9.70	1.20	0.40	48	TTP-48DEV				△	
	4. 40 × 11.3			56	TTP-56DBV				◆	
	6.10 × 12.5		0.50	48	TTP-48DB				◆	
				TTP-48DBV				◆		
	6.10 × 14.0			56	TTP-56DA				◆	
				TTP-56DAV				◆		
	6.10 × 17.0			64	TTP-64DV				◆	
				80	TTP-80DV				◆	
HTSSOP	6.10 × 14.0	1.20	0.50	56	TTP-56DT				◆	
VSSOP	2.3 × 2.0	0.9	0.5	8	TTP-8DB				◆	
TSOP (I)	8 × 13.4	1.20	0.55	28	TFP-28DB			◆	◆	
			0.50	32	TFP-32DC			◆		
	TFP-32DA					◆	◆			
	12 × 20			48	TFP-48DA			◆	◆	
TSOP (II)	10.16(400)	1.20	1.27	32	TTP-32D			◆	◆	
				TTP-32DR			◆	◆		
			0.80	44	TTP-44DB			◆	◆	
				TTP-44DE			◆	◆		
	12.70 (500)	48	TTP-48/40DA			◆				
QFP	10 × 10	2.50	0.5	64	FP-64C			◆		
		2.54	0.65	56	FP-56			◆	◆	
					FP-56A			◆	◆	
	14 × 14	3.00	0.5	100	FP-100F			△		
		3.05	0.8	44	FP-44A			◆		
				64	FP-64A			◆		
				FP-64H			△			
				0.65	80	FP-80A			◆	
		FP-80E					◆	◆		
		FP-80H					◆	◆		
		FP-80Q					◆			
		0.5	100	FP-100B			◆			
				FP-100M			◆			
		14 × 20	3.10	1.0	80	FP-80C		◆	◆	
	FP-54						◆	◆		
	FP-54A					◆	◆			
	60				FP-60		◆	◆		
					FP-60A		◆	◆		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002

Package Name	Nominal Dimensions mm (mil)	Mounting Height (Max.) mm	Terminal Pitch mm	Terminal Count	Package Code	Magazine	Hard Tray		Embossed Taping	Radial Taping	
							Non Heat Proof	Heat Proof			
QFP	14 × 20	3.10	1.0	64	FP-64		◆	◆			
					FP-64B		◆	◆			
			0.8	80	FP-80		◆	◆			
					FP-80B		◆	◆			
			0.65	100	FP-100		◆	◆			
					FP-100A		◆	◆			
		3.15	0.5	128	FP-128			◆			
				FP-128B				◆			
		20 × 20	3.05	0.8	88	FP-88			◆		
				0.65	112	FP-112			◆		
					FP-112B			◆			
	0.5			144	FP-144G			◆			
					FP-144J			◆			
	28 × 28	3.56	0.8	136	FP-136			◆			
			0.65	160	FP-160H			◆			
				168	FP-168			◆			
					FP-168B			◆			
			0.5	208	FP-208			◆			
					FP-208A			◆			
		3.95	0.4	256	FP-256F			◆			
		28 × 40	3.56	0.5		FP-256			◆		
					FP-256H			△			
	32 × 32	3.95		240	FP-240			◆			
			0.4	296	FP-296			◆			
LQFP	7 × 7	1.70	0.65	40	FP-40			◆	◆		
					FP-40B			◆	◆		
			0.5	48	FP-48B			◆			
					FP-48C			◆	◆		
	10 × 10		0.65		FP-48F			△			
			0.5	64	FP-64E			◆	◆		
	14 × 20	1.60	0.65	100	FP-100H			△			
	20 × 20	1.70	0.5	144	FP-144F			◆			
					FP-144H			◆			
			0.4	176	FP-176A			◆			
	24 × 24		0.5		FP-176			◆			
				FP-176C			◆				
			0.4	216	FP-216			◆			
	28 × 28	0.5	208	FP-208C			◆				
0.4		256	FP-256B				△				

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002

Package Name	Nominal Dimensions mm (mil)	Mounting Height (Max.) mm	Terminal Pitch mm	Terminal Count	Package Code	Magazine	Hard Tray		Embossed Taping	Radial Taping		
							Non Heat Proof	Heat Proof				
HQFP	10 × 10	2.54	0.65	56	FP-56B			◆	◆			
					FP-56C			◆	◆			
	14 × 14	3.00	0.5	100	FP-100K			△				
				48	FP-48TB				◆			
					80	FP-80K				◆		
					FP-80N				◆			
	3.15	64	FP-64TA			◆						
			14 × 20	3.05	0.8	80	FP-80M		◆	◆		
						100	FP-100L		◆	◆		
	FP-100Q						◆	◆				
	20 × 20	120	FP-120A				◆					
	28 × 28		160	FP-160J			◆					
				FP-160K			◆					
	3.56	0.5	208	FP-208E			◆					
			3.95	256	FP-256G			◆				
				0.5	240	FP-240B			◆			
		32 × 32	0.4	296	FP-296B			◆				
HLQFP	7 × 7	1.70	0.65	28	FP-28TB			◆	◆			
				40	FP-40A			◆	◆			
	12 × 12		0.5	80	FP-80F			◆				
				FP-80TA			◆	◆				
HTQFP	10 × 10	1.1	0.5	52	TFP-52T			◆				
				64	TFP-64TA			◆	◆			
	TFP-64T						◆					
	100				TFP-100F			◆				
TQFP	7.4 × 7.4	1.20	0.5	56	TFP-56A				△			
	10 × 10			64	TFP-64B			◆	◆			
					TFP-64C			◆	◆			
					TFP-64E			◆				
					TFP-64FV			◆	◆			
				12 × 12	80	TFP-80C			◆	◆		
	0.4				100	TFP-100G			◆			
	14 × 14			0.65	80	TFP-80			◆			
						TFP-80F			◆			
				0.5	100	TFP-100B			◆	◆		
						TFP-100C			◆			
						TFP-100JV			◆			
	0.4			120	TFP-120			◆				
				144	TFP-144			◆				
SOJ	7.62 (300)	3.76	1.27	24	CP-24D	◆			◆			
	28			CP-28DN	◆			◆				
	10.16 (400)			32	CP-32DB	◆			◆			

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Package Name	Nominal Dimensions mm (mil)	Mounting Height (Max.) mm	Terminal Pitch mm	Terminal Count	Package Code	Magazine	Hard Tray		Embossed Taping	Radial Taping
							Non Heat Proof	Heat Proof		
SOJ	10.16 (400)	3.76	1.27	36	CP-36D	◆			◆	
				44	CP-44D	◆			◆	
QFJ	7.34 × 12.45	3.56	1.27	18	CP-18	◆			◆	
	16.58	4.60		44	CP-44	◆		◆	◆	
	19.12			52	CP-52	◆			◆	
	24.20			68	CP-68	◆		◆	◆	
	29.28			84	CP-84	◆		◆	◆	
HSOI	9.53 (375)	3.00	0.80	26	MP-26DT		◆		◆	
P-VSON	1.2 × 1.6	0.6	0.5	5	TNP-5D				◆	
P-VQFN	3 × 3	0.80	0.50	16	TNP-16AV				◆	
	3.4 × 3.6	0.95	0.4	14	TNP-14				△	
	4 × 5	0.80	0.5	24	TNP-24AV				◆	
C-QFP	36 × 36	10.5	0.50	256	FC-256T		△			
BGA	14 × 22	2.24	1.27	119	BP-119C			◆		
					BP-119E			△	△	
		2.35		108	BP-108			◆		
		119		BP-119A			◆			
		256		BP-256			◆			
				BP-256A			△			
LFBGA	7 × 11	1.4	0.80	72	BP-72A			◆	◆	
	10 × 10	1.40		112	BP-112			△		
	10 × 11	1.4		72	BP-72B			△		
	11 × 11	1.40	0.50	256	BP-256C			△	△	
	10 × 13		0.8	90	BP-90A			◆		
	13 × 13		0.65	240	BP-240A			◆	◆	
	15 × 15		0.80	264	BP-264			◆		
	17 × 17			336	BP-336			◆		
		1.7	0.8	256	BP-256B			◆		
HBGA	31 × 31	2.0	1.0	400	BT-400T			◆		
				480	BT-480T			◆		
HLFBGA	23 × 23	1.45	0.8	352	BT-352T			◆		
TFBGA	6.5 × 6.5	1.2	0.75	48	TBP-48			◆		
	7 × 9		0.80	65	TBP-65			△	△	
	6.5 × 9.8		0.75	48	TBP-48A			◆		
	8 × 9.5				TBP-48F			△		
	10 × 10		0.8	112	TBP-112			◆		
	12 × 12	1.20	0.65	208	TBP-208A			◆	◆	
	13 × 13	1.2	0.8	176	TBP-176			◆		
	10 × 11	1.00	0.80 × 1.00	54	TBT-54			△		
					TBT-54R			△		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office. However, for the FC-256T in which lead-free pins were originally used, V is not added to the end of the package code.

As of July, 2002

Package Name	Nominal Dimensions mm (mil)	Mounting Height (Max.) mm	Terminal Pitch mm	Terminal Count	Package Code	Magazine	Hard Tray		Embossed Taping	Radial Taping
							Non Heat Proof	Heat Proof		
TFBGA	10 × 11	1.00	0.80 × 1.00	54	TBT-54A			Δ		
				TBT-54AR			Δ			
	13 × 13		0.50	184	TBT-184A			◆		
	15 × 15	216		TBT-216B			◆			
	18 × 18		1.20	0.80	TBT-216A			◆		
				0.50	264	TBT-264B			◆	
	21 × 21	1.20	0.80	TBT-264A			Δ			
TO-92	—	—	1.27	3	TO-92(1)					◆
TO-92Mod	—	—	1.27	3	TO-92Mod					◆
CMPAK	—	1.1	0.65	5	CMPAK-5				◆	
				6	CMPAK-6				◆	
MPAK	—	1.4	0.95	3	MPAK				◆	
				5	MPAK-5				◆	
UPAK	—	1.6	1.5	3	UPAK				◆	

Notes: 1. Number of pins in one pin row or column of the pin matrix of the package arranged according to the pin arrangement rule (including latent pins).

2. JEDEC

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office. However, for the TBT-184A, TBT-216B and TBT-264B in which lead-free pins were originally used, V is not added to the end of the package code.

4.3.1 Magazines for IC

- Magazine material

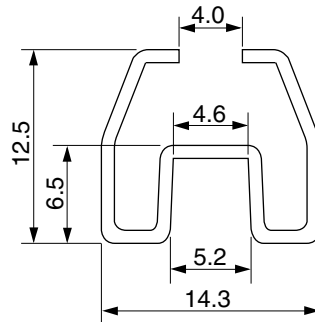
In this document, magazine materials are abbreviated as follows.

Magazine material	Abbreviation
Polyvinyl chloride	PVC
Polystyrene	PS

- In this document, standard types of magazines are shown.

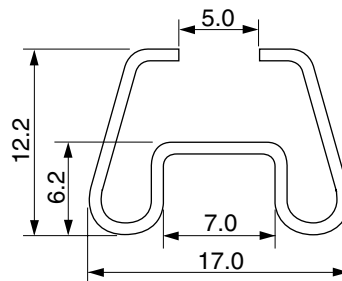
1. DIP

As of July, 2002
Unit: mm



Magazine type	PM209	Package code	Maximum Storage No.
Material	PS	DP-8, DP-7	49 or 50 IC/Magazine
Thickness	1 ± 0.3 mm	DP-14, DP-16, DP-16C,	25 IC/Magazine
Length	500 ± 3 mm	DP-16E	
Dimensional tolerance	—		

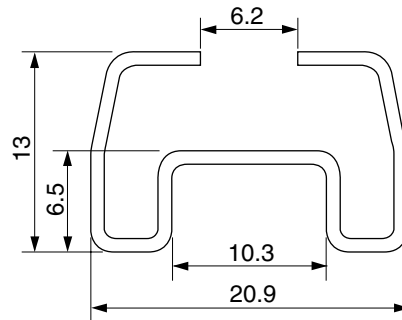
As of July, 2002
Unit: mm



Magazine type	PM322	Package code	Maximum Storage No.
Material	PS	DP-28S	17 IC/Magazine
Thickness	1 ± 0.3 mm		
Length	495 ± 3 mm		
Dimensional tolerance	—		

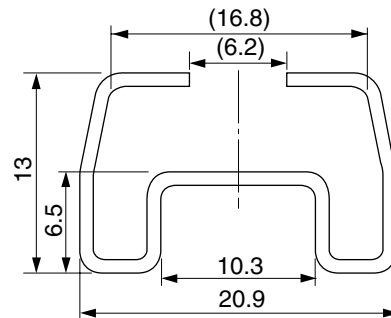
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Magazine type	PM208	Package code	Maximum Storage No.
Material	PS	DP-24	15 IC/Magazine
Thickness	1 ± 0.3 mm	DP-28	13 IC/Magazine
Length	495 ± 3 mm	DP-32	11 IC/Magazine
Dimensional tolerance	—	DP-40	9 IC/Magazine
		DP-42	9 IC/Magazine
		DP-42S	12 IC/Magazine

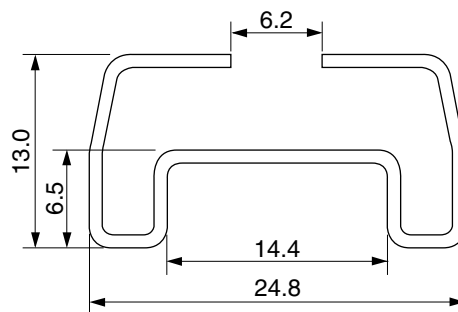
As of July, 2002
Unit: mm



Magazine type	PM208L	Package code	Maximum Storage No.
Material	PS	DP-42SA	12 IC/Magazine
Thickness	1 ± 0.3 mm	DP-56SA	9 IC/Magazine
Length	500 ± 3 mm		
Dimensional tolerance	± 0.3 mm		

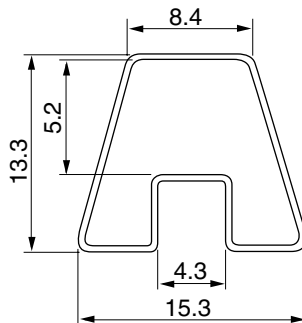
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Magazine type	PM249	Package code	Maximum Storage No.
Material	PS	DP-64S	8 IC/Magazine
Thickness	1 ± 0.3 mm		
Length	495 ± 3 mm		
Dimensional tolerance	—		

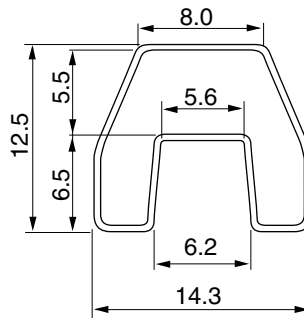
As of July, 2002
Unit: mm



Magazine type	PM248	Package code	Maximum Storage No.
Material	PVC	DP-20N	18 IC/Magazine
Thickness	0.5 ± 0.3 mm	DP-24N, DP-24NC	15 IC/Magazine
Length	500 ± 3 mm		
Dimensional tolerance	—		

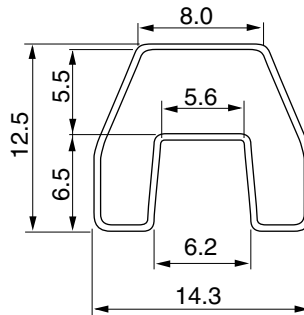
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Magazine type	PM304	Package code	Maximum Storage No.
Material	PVC	DP-8, DP-7, DP-8B	49 or 50 IC/Magazine
Thickness	0.55 ± 0.3 mm	DP-14, DP-16, DP-16C, DP-16E, DP-22NS	25 IC/Magazine
Length	500 ± 3 mm	DP-20N	18 IC/Magazine
Dimensional tolerance	—	DP-24N, DP-24NC	15 IC/Magazine

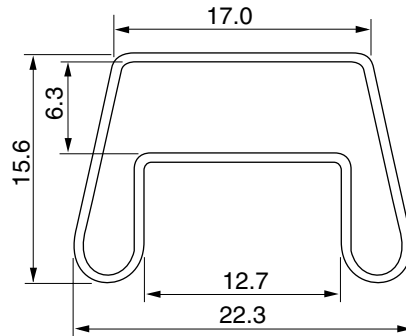
As of July, 2002
Unit: mm



Magazine type	PM431	Package code	Maximum Storage No.
Material	PVC	DP-8	49 or 50 IC/Magazine
Thickness	0.55 ± 0.3 mm	DP-14, DP-16, DP-16C, DP-16E, DP-22NS	25 IC/Magazine
Length	500 ± 3 mm	DP-20N	18 IC/Magazine
Dimensional tolerance	—	DP-24N, DP-24NC	15 IC/Magazine

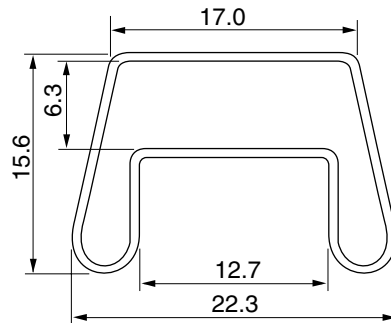
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Magazine type	PM732	Package code	Maximum Storage No.
Material	PVC	DP-24	15 IC/Magazine
Thickness	0.65 ± 0.3 mm	DP-28	13 IC/Magazine
Length	500 ± 3 mm	DP-32	11 IC/Magazine
Dimensional tolerance	—	DP-40	9 IC/Magazine
		DP-42	9 IC/Magazine

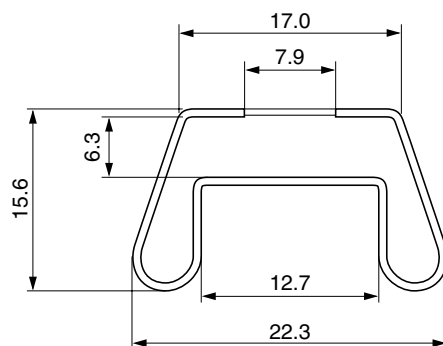
As of July, 2002
Unit: mm



Magazine type	PM215	Package code	Maximum Storage No.
Material	PVC	DP-24	15 IC/Magazine
Thickness	0.8 ± 0.3 mm	DP-28	13 IC/Magazine
Length	500 ± 3 mm	DP-40	9 IC/Magazine
Dimensional tolerance	—	DP-42	9 IC/Magazine

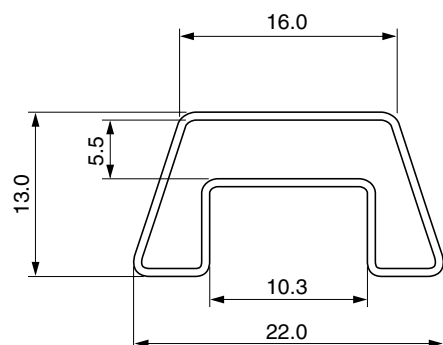
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Magazine type	PM351	Package code	Maximum Storage No.
Material	PVC	DP-28	13 IC/Magazine
Thickness	0.8 ± 0.3 mm	DP-40	9 IC/Magazine
Length	500 ± 3 mm	DP-42	9 IC/Magazine
Dimensional tolerance	—	DP-48	7 IC/Magazine

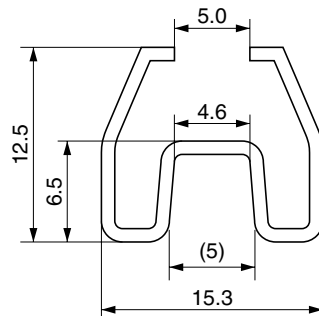
As of July, 2002
Unit: mm



Magazine type	PM402	Package code	Maximum Storage No.
Material	PVC	DP-28	13 IC/Magazine
Thickness	0.6 ± 0.3 mm	DP-40	9 IC/Magazine
Length	500 ± 3 mm		
Dimensional tolerance	—		

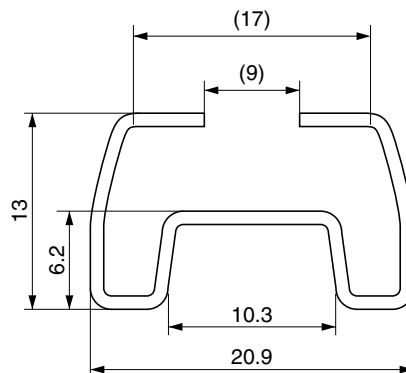
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Magazine type	PM214	Package code	Maximum Storage No.
Material	PVC	DP-24TS	17 IC/Magazine
Thickness	1 ± 0.3 mm	DP-30S	17 IC/Magazine
Length	500 ± 3 mm		
Dimensional tolerance	—		

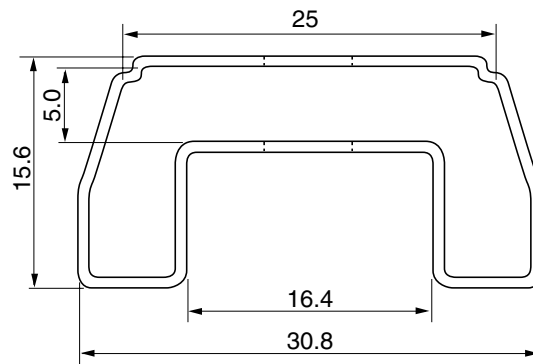
As of July, 2002
Unit: mm



Magazine type	PM206	Package code	Maximum Storage No.
Material	PVC	DP-28	13 IC/Magazine
Thickness	1 ± 0.3 mm	DP-42SA	12 IC/Magazine
Length	500 ± 3 mm	DP-56SA	9 IC/Magazine
Dimensional tolerance	—		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

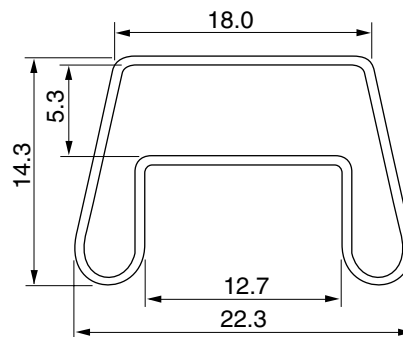
As of July, 2002
Unit: mm



Magazine type	PM335	Package code	Maximum Storage No.
Material	PVC	DP-64	5 IC/Magazine
Thickness	0.8 ± 0.3 mm	DP-90S	5 IC/Magazine
Length	495 ± 3 mm		
Dimensional tolerance	—		

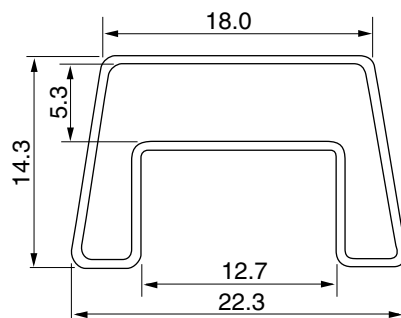
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Magazine type	PM264	Package code	Maximum Storage No.
Material	PVC	DG-28	12 IC/Magazine
Thickness	0.8 ± 0.3 mm	DG-32, DG-32A	10 IC/Magazine
Length	500 ± 3 mm	DG-40A	8 IC/Magazine
Dimensional tolerance	—		

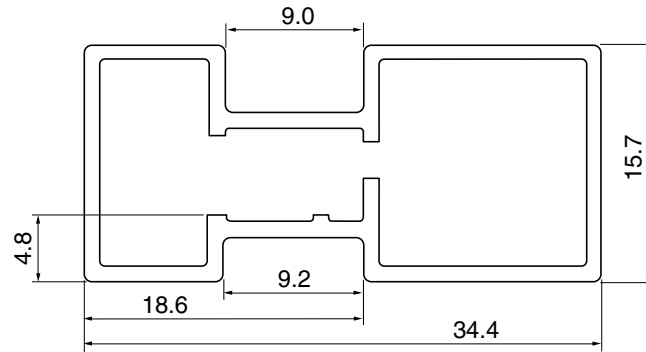
As of July, 2002
Unit: mm



Magazine type	PM739	Package code	Maximum Storage No.
Material	PVC	DG-28	12 IC/Magazine
Thickness	0.65 ± 0.3 mm	DG-32, DG-32A	10 IC/Magazine
Length	500 ± 3 mm	DG-40A	8 IC/Magazine
Dimensional tolerance	—		

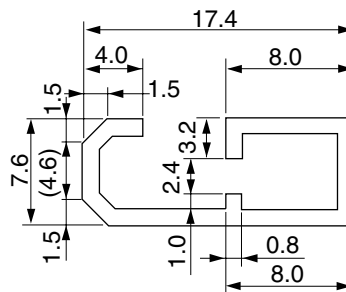
2. SIP

As of July, 2002
Unit: mm



Magazine type	PM523	Package code	Maximum Storage No.
Material	PVC	SP-3T	50 IC/Magazine
Thickness	0.7 ± 0.2 mm		
Length	540 ± 2 mm		
Dimensional tolerance	—		

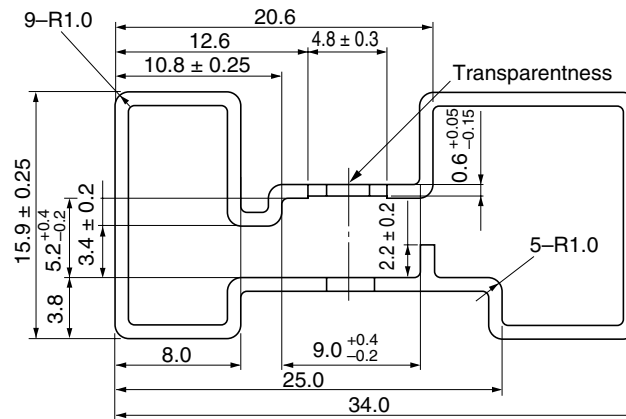
As of July, 2002
Unit: mm



Magazine type	PM282	Package code	Maximum Storage No.
Material	PVC	SP-7	24 IC/Magazine
Thickness	1 ± 0.2 mm	SP-16	19 IC/Magazine
Length	500 ± 3 mm		
Dimensional tolerance	± 0.5 mm		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

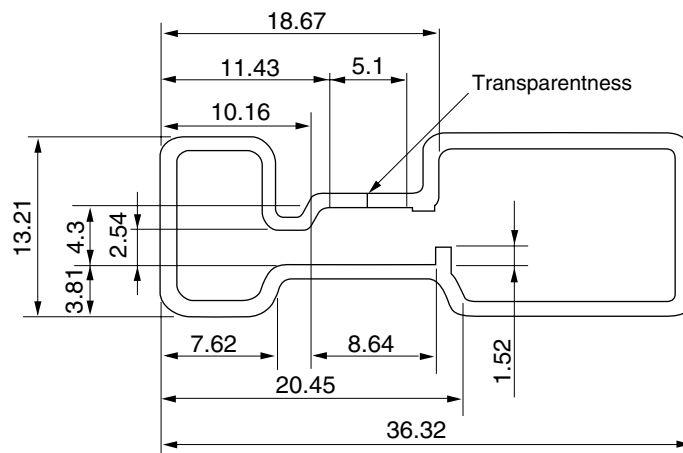
As of July, 2002
Unit: mm



Magazine type	PM470	Package code	Maximum Storage No.
Material	PVC	SP-5TB	48 IC/Magazine
Thickness	0.8 ± 0.3 mm		
Length	500 ± 3 mm		
Dimensional tolerance	± 0.5 mm		

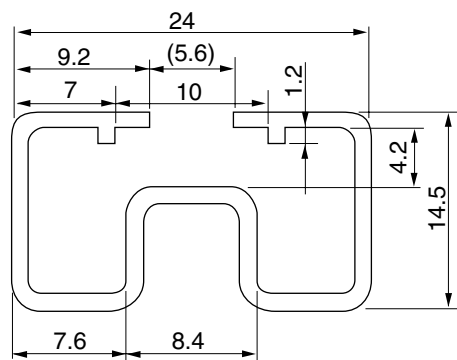
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Magazine type	PM466	Package code	Maximum Storage No.
Material	PVC	SP-15TA, SP-15TF	24 IC/Magazine
Thickness	0.89 ± 0.13 mm		
Length	500 ± 1.5 mm		
Dimensional tolerance	± 0.4 mm		

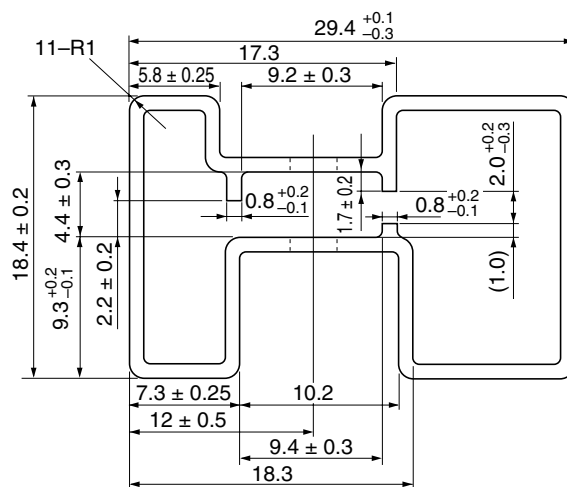
As of July, 2002
Unit: mm



Magazine type	PM500	Package code	Maximum Storage No.
Material	PVC	SP-23TA	16 IC/Magazine
Thickness	1 ± 0.2 mm		
Length	500 ± 1 mm		
Dimensional tolerance	± 0.5 mm		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm

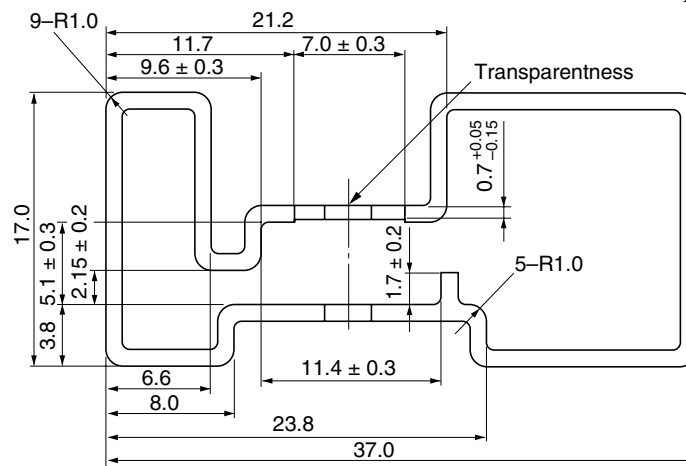


Magazine type	PM473	Package code	Maximum Storage No.
Material	PVC	SP-16TA	15 IC/Magazine
Thickness	0.8 ± 0.3 mm	SP-23TB	15 IC/Magazine
Length	500 ± 3 mm	SP-23TD	15 IC/Magazine
Dimensional tolerance	± 0.5 mm		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002

Unit: mm

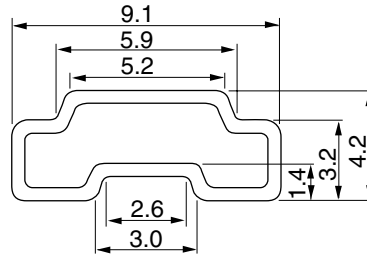


Magazine type	PM494	Package code	Maximum Storage No.
Material	PVC	SP-23TE	15 IC/Magazine
Thickness	1.0 ± 0.3 mm	SP-28TA	15 IC/Magazine
Length	500 ± 3 mm		
Dimensional tolerance	± 0.5 mm		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

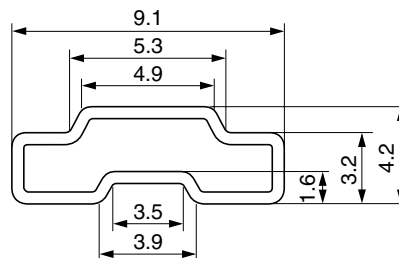
3. SOP

As of July, 2002
Unit: mm



Magazine type	PM387	Package code	Maximum Storage No.
Material	PVC	FP-8D, FP-8DB	96 IC/Magazine
Thickness	0.5 ± 0.3 mm		
Length	500 ± 3 mm		
Dimensional tolerance	± 0.5 mm		

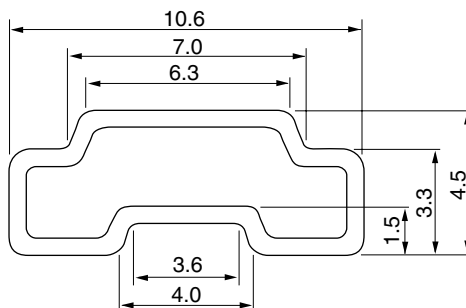
As of July, 2002
Unit: mm



Magazine type	PM449	Package code	Maximum Storage No.
Material	PVC	FP-14DNV	55 IC/Magazine
Thickness	0.5 ± 0.3 mm	FP-16DNV	48 IC/Magazine
Length	500 ± 3 mm		
Dimensional tolerance	± 0.5 mm		

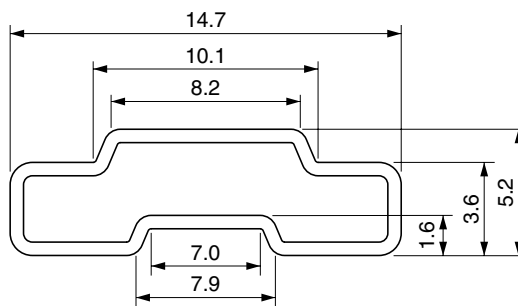
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Magazine type	PM391	Package code	Maximum Storage No.
Material	PVC	FP-14DA, FP-14DAV	47 IC/Magazine
Thickness	0.5 ± 0.3 mm	FP-16DA, FP-16DAV, FP-16DC	47 IC/Magazine
Length	500 ± 3 mm	FP-20DA, FP-20DAV, FP-20DE	38 IC/Magazine
Dimensional tolerance	± 0.5 mm		

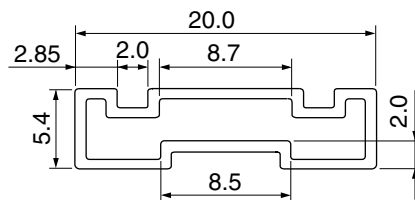
As of July, 2002
Unit: mm



Magazine type	PM487A	Package code	Maximum Storage No.
Material	PVC	FP-20DBV	37 IC/Magazine
Thickness	0.5 ± 0.3 mm		
Length	500 ± 3 mm		
Dimensional tolerance	± 0.5 mm		

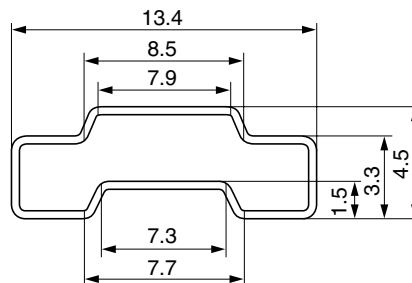
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Magazine type	PM730	Package code	Maximum Storage No.
Material	PVC	FP-24D, FP-24DB	30 IC/Magazine
Thickness	0.8 ± 0.3 mm	FP-28D	25 IC/Magazine
Length	500 ± 3 mm		
Dimensional tolerance	—		

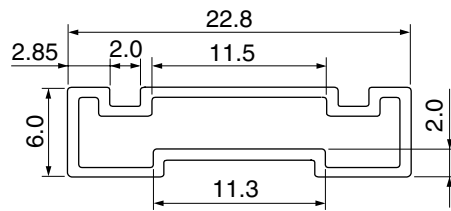
As of July, 2002
Unit: mm



Magazine type	PM485	Package code	Maximum Storage No.
Material	PVC	FP-30D	44 IC/Magazine
Thickness	0.5 ± 0.3 mm		
Length	500 ± 3 mm		
Dimensional tolerance	—		

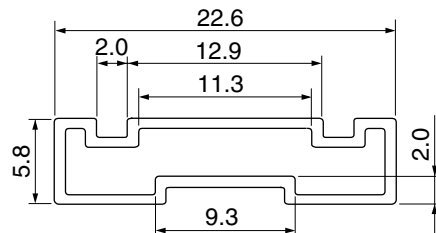
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Magazine type	PM731	Package code	Maximum Storage No.
Material	PVC	FP-32D	22 IC/Magazine
Thickness	0.8 ± 0.3 mm		
Length	500 ± 3 mm		
Dimensional tolerance	—		

As of July, 2002
Unit: mm

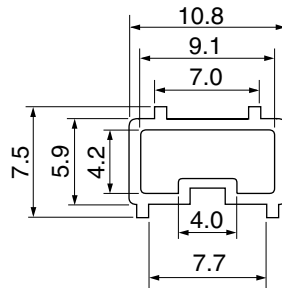


Magazine type	PM745	Package code	Maximum Storage No.
Material	PVC	FP-40D	18 IC/Magazine
Thickness	0.8 ± 0.3 mm		
Length	500 ± 3 mm		
Dimensional tolerance	—		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

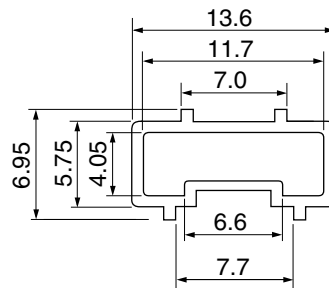
4. SOJ

As of July, 2002
Unit: mm



Magazine type	PM364MV	Package code	Maximum Storage No.
Material	PVC	CP-24D	29 IC/Magazine
Thickness	0.85 ± 0.3 mm	CP-28DN	25 IC/Magazine
Length	495 ± 3 mm		
Dimensional tolerance	—		

As of July, 2002
Unit: mm

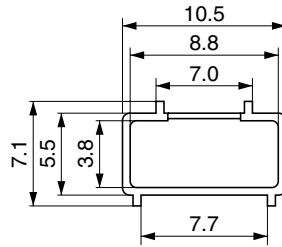


Magazine type	PMSOJ40V	Package code	Maximum Storage No.
Material	PVC	CP-32DB	22 IC/Magazine
Thickness	0.85 ± 0.3 mm	CP-36D	19 IC/Magazine
Length	495 ± 3 mm	CP-44D	16 IC/Magazine
Dimensional tolerance	—		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

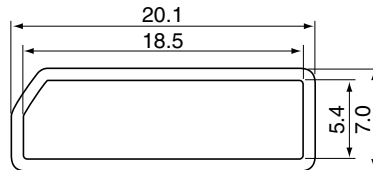
5. QFJ

As of July, 2002
Unit: mm



Magazine type	PM394	Package code	Maximum Storage No.
Material	PVC	CP-18	35 IC/Magazine
Thickness	0.85 ± 0.3 mm		
Length	495 ± 3 mm		
Dimensional tolerance	—		

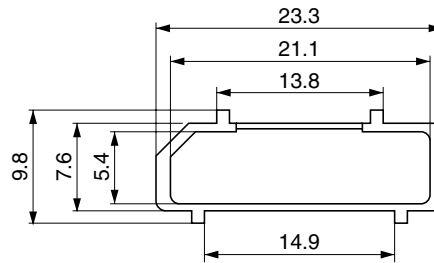
As of July, 2002
Unit: mm



Magazine type	PM354V	Package code	Maximum Storage No.
Material	PVC	CP-44	26 IC/Magazine
Thickness	0.8 ± 0.3 mm		
Length	495 ± 3 mm		
Dimensional tolerance	—		

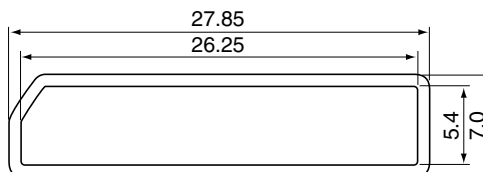
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Magazine type	PM327	Package code	Maximum Storage No.
Material	PVC	CP-52	23 IC/Magazine
Thickness	1.1 ± 0.3 mm		
Length	495 ± 3 mm		
Dimensional tolerance	—		

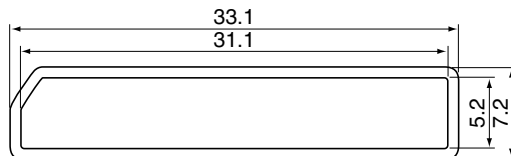
As of July, 2002
Unit: mm



Magazine type	PM333V	Package code	Maximum Storage No.
Material	PVC	CP-68	18 IC/Magazine
Thickness	0.8 ± 0.3 mm		
Length	495 ± 3 mm		
Dimensional tolerance	—		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm

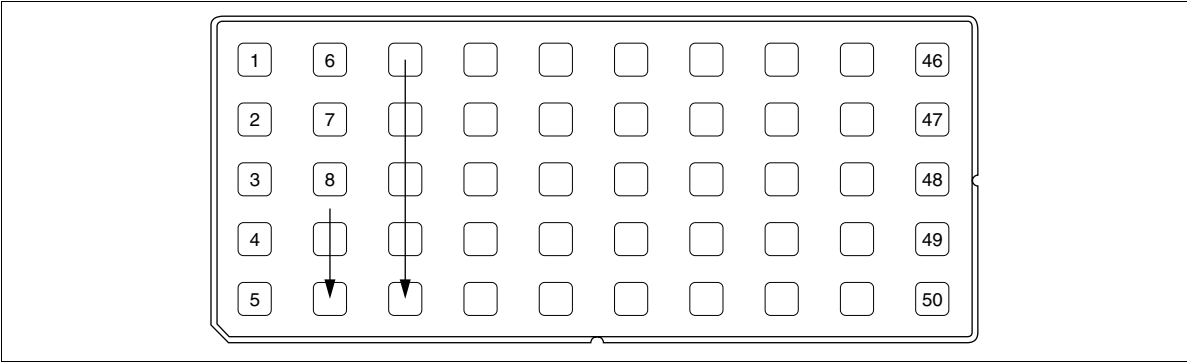


Magazine type	PM827	Package code	Maximum Storage No.
Material	PVC	CP-84	15 IC/Magazine
Thickness	1.0 ± 0.3 mm		
Length	495 ± 3 mm		
Dimensional tolerance	—		

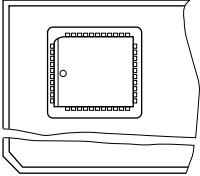
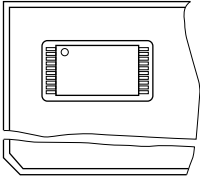
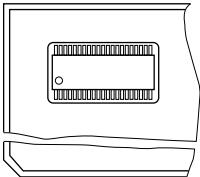
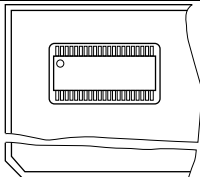
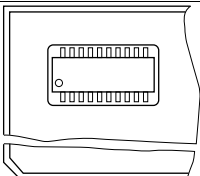
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

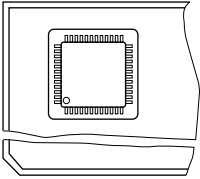
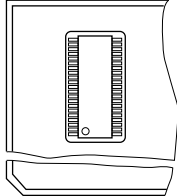
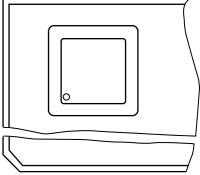
4.3.2 Trays for IC

- Package charge method (Hitachi standard)
ICs are charged in the following way when the number of ICs is less than the capacity of the tray.



- Orientation of ICs in the tray (Hitachi standard)

Package	Orientation of IC	
QFJ		
TSOP (I)		
SOP TSOP (II)		
TSOP (II) Reverse bend* ¹		
HSOP		

Package	Orientation of IC
QFP TQFP LQFP HQFP HLQFP HTQFP C-QFP	
TSSOP HSOI	
BGA TFBGA LFBGA HBGA HLFBGA	

Note: 1. "R" is added to the end of the Hitachi code for this package type.

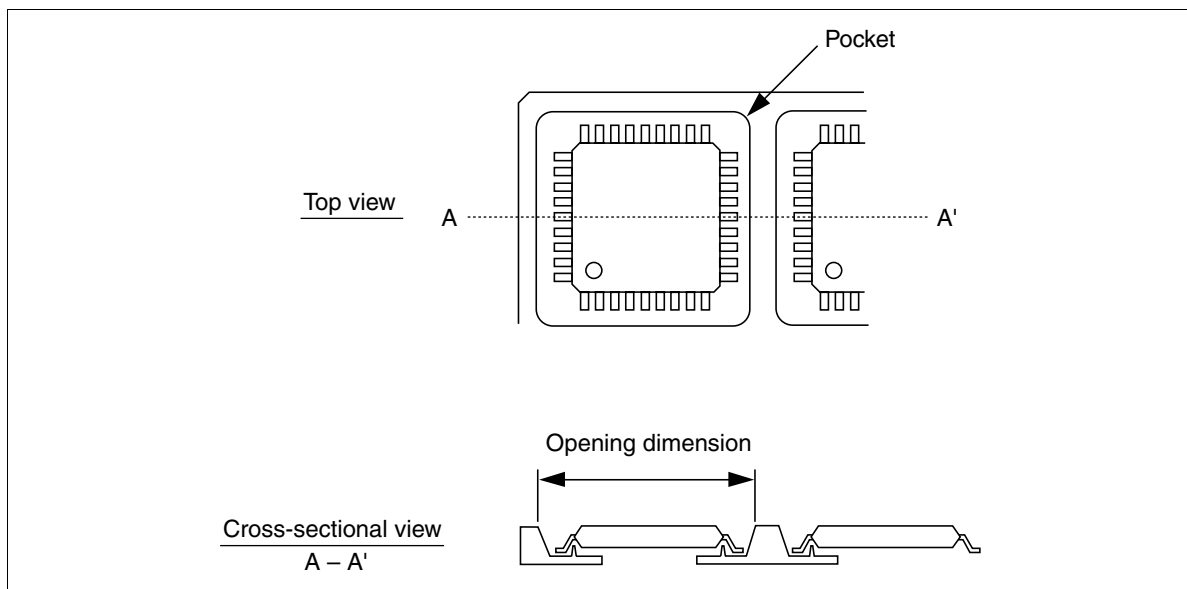
- Tray material

In this document, tray materials are abbreviated as follows.

Tray material	Abbreviation
Polyvinyl chloride	PVC
Polypropylene	PP
Polyphenylene ether	PPE
Polystyrene	PS
Polycarbonate	PC
Polyphenylene oxide	PPO

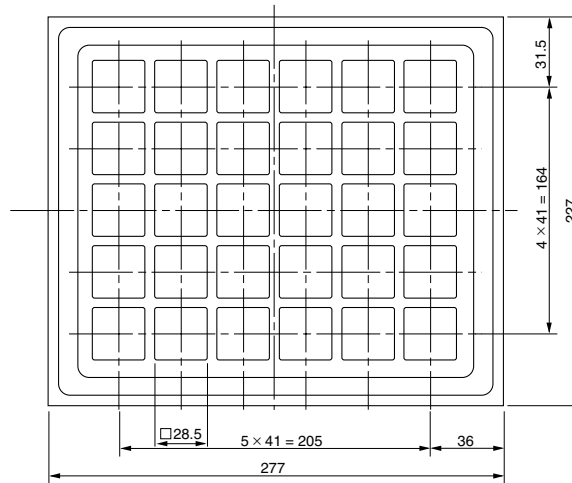
- Tray pocket dimensions

In this document, tray pocket dimensions indicate the opening dimensions.



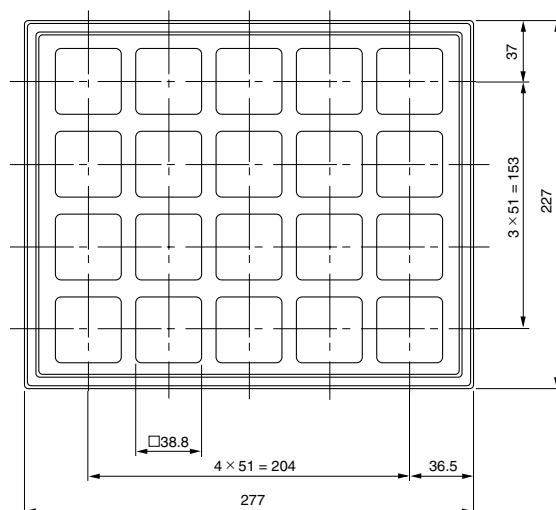
1. PGA

As of July, 2002
Unit: mm



Tray type	PT749	Package code	Maximum Storage No.
Material	Carbon PVC	PC-68	30 IC/Tray
Thickness	0.7 mm		30 IC/Inside box
Heat resistant temperature	Non heat Proof (Non baking)		
Surface resistance value	less than $1 \times 10^{10} \Omega/\text{square}$		

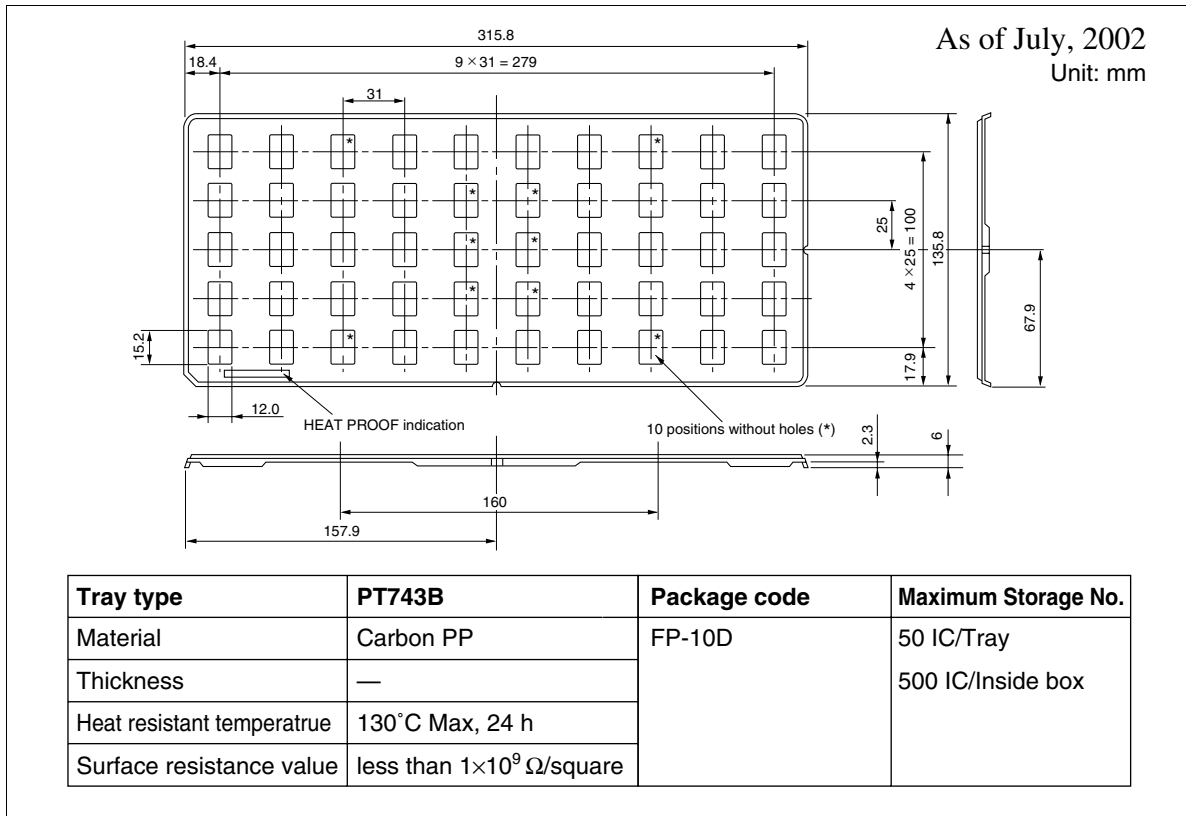
As of July, 2002
Unit: mm



Tray type	PT723	Package code	Maximum Storage No.
Material	Carbon PVC	PC-135	20 IC/Tray 20 IC/Inside box
Thickness	0.7 mm		
Heat resistant temperature	Non heat Proof (Non baking)		
Surface resistance value	less than $1 \times 10^{10} \Omega/\text{square}$		

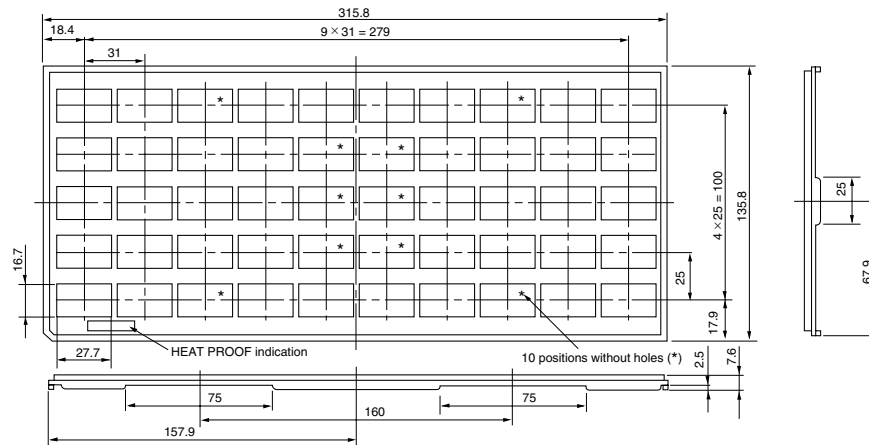
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

2. SOP



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

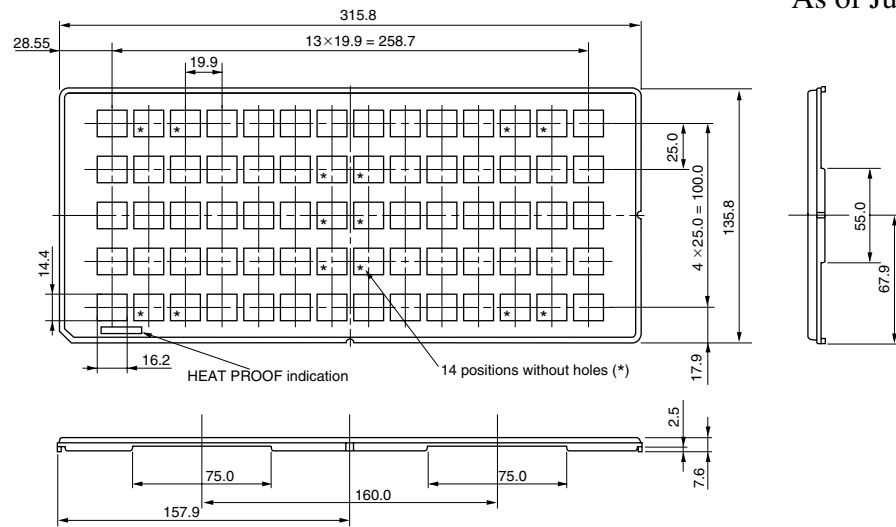
As of July, 2002
Unit: mm



Tray type	PT783	Package code	Maximum Storage No.
Material	Carbon PPE	FP-40D	50 IC/Tray
Thickness	—		500 IC/Inside box
Heat resistant temperature	130°C Max, 24 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

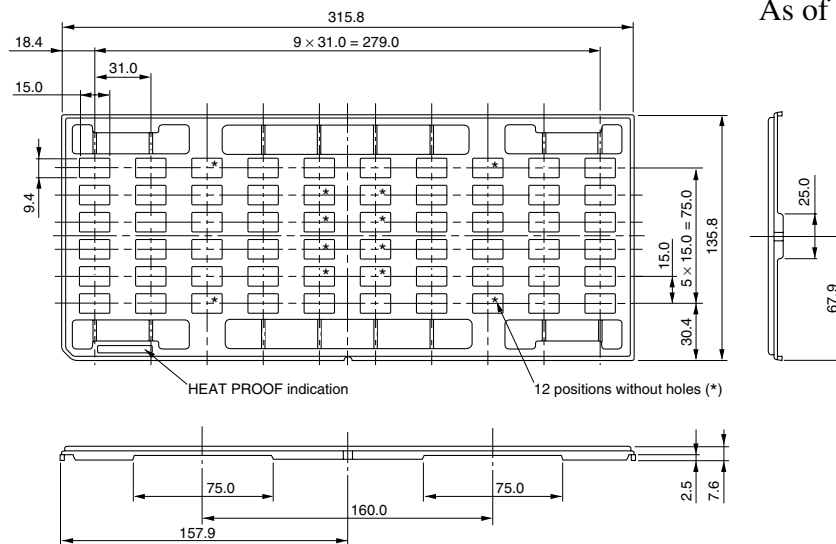
As of July, 2002
Unit: mm



Tray type	PT557B	Package code	Maximum Storage No.
Material	Carbon PPE	FP-20DT	70 IC/Tray
Thickness	—		700 IC/Inside box
Heat resistant temperature	130°C Max, 24 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

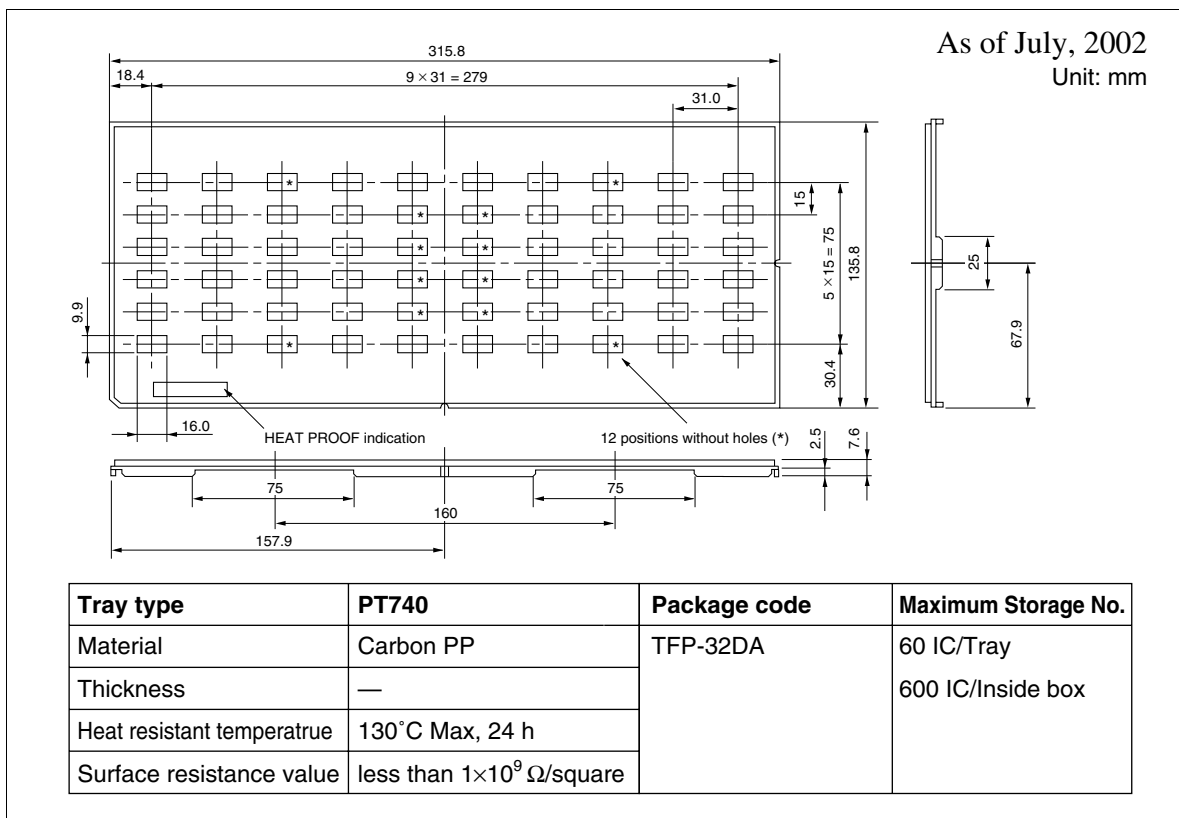
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm

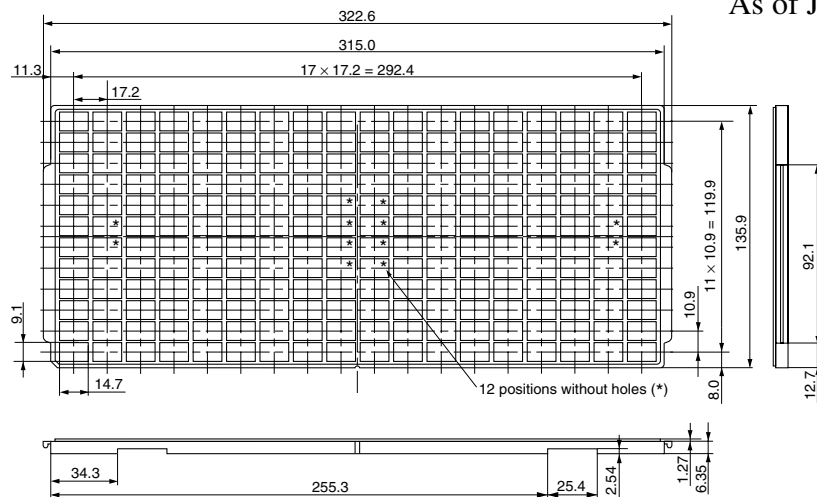


Tray type	PT858B	Package code	Maximum Storage No.
Material	Carbon PPE	TFP-28DB	60 IC/Tray
Thickness	—		600 IC/Inside box
Heat resistant temperature	130°C Max, 24 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



Tray type	PT980C	Package code	Maximum Storage No.
Material	Carbon PPE	TFP-32DC	216 IC/Tray
Thickness	—		1,728 IC/Inside box
Heat resistant temperature	150°C Max, 4 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

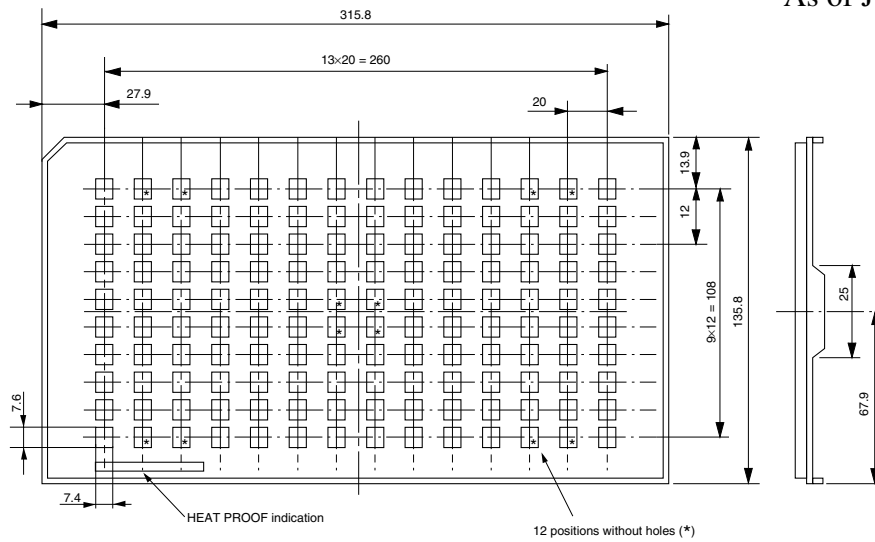
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



Tray type	PT996C	Package code	Maximum Storage No.
Material	Carbon PPE	TFP-48DA	96 IC/Tray
Thickness	—		768 IC/Inside box
Heat resistant temperaturue	150°C Max, 4 h		
Surface resistance value	less than 1×10 ⁹ Ω/square		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

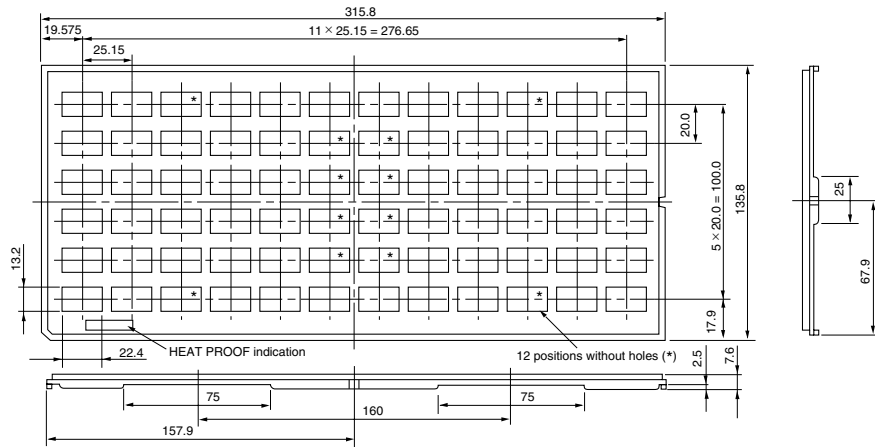
As of July, 2002
Unit: mm



Tray type	PT488	Package code	Maximum Storage No.
Material	Carbon PP	TTP-20DA	140 IC/Tray
Thickness	—		1,400 IC/Inside box
Heat resistant temperature	130°C Max, 24 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

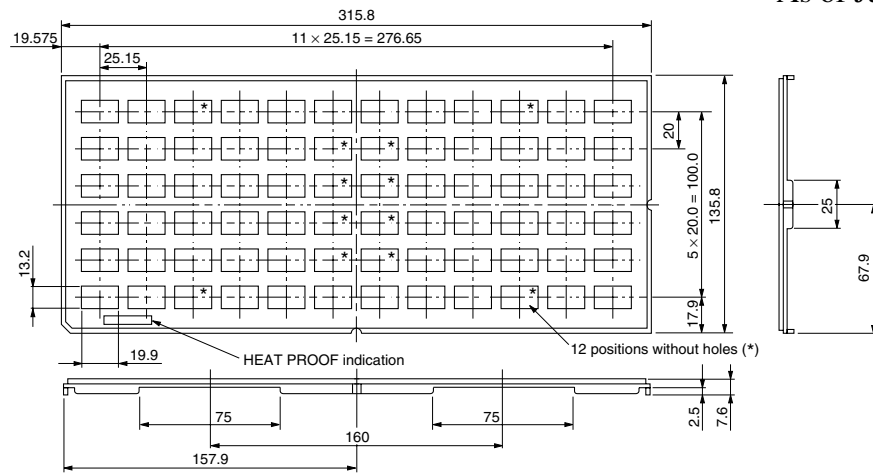
As of July, 2002
Unit: mm



Tray type	PT810	Package code	Maximum Storage No.
Material	Carbon PP	TTP-32D, TTP-32DR	72 IC/Tray
Thickness	—		720 IC/Inside box
Heat resistant temperature	130°C Max, 24 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Tray type	PT809B	Package code	Maximum Storage No.
Material	Carbon PP	TTP-44DB, TTP-44DE	72 IC/Tray
Thickness	—		720 IC/Inside box
Heat resistant temperature	130°C Max, 24 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

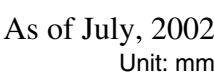
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



Tray type	PT972C	Package code	Maximum Storage No.
Material	Carbon PPE	TTP-48/40DA	91 IC/Tray
Thickness	—		728 IC/Inside box
Heat resistant temperatrue	150°C Max, 4 h		
Surface resistance value	less than 1×10 ⁹ Ω/square		

363

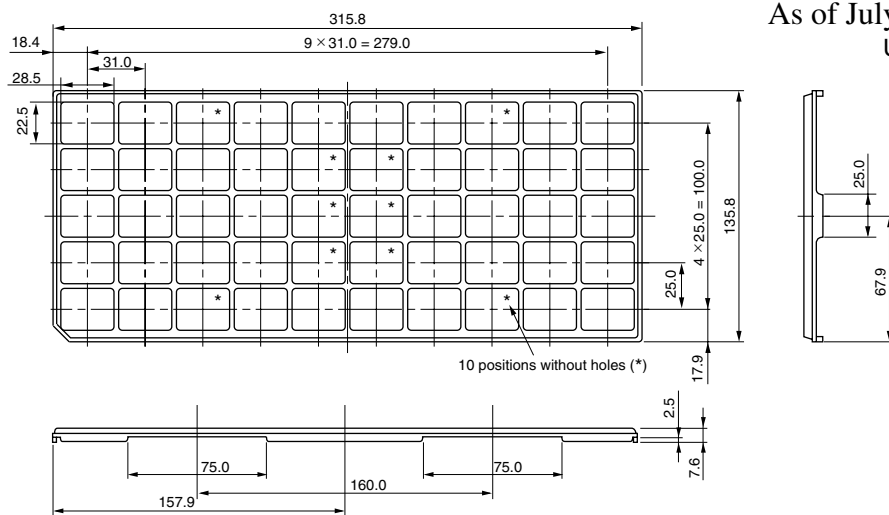
3. QFP



Tray type	PTA55C	Package code	Maximum Storage No.
Material	Carbon PPE	FP-44A, FP-64A,	84 IC/Tray
Thickness	—	FP-64H, FP-80A,	672 IC/Inside box
Heat resistant temperaturue	150°C Max, 4 h	FP-80E, FP-80H,	
Surface resistance value	less than $1 \times 10^9 \Omega$ /square	FP-80Q	

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

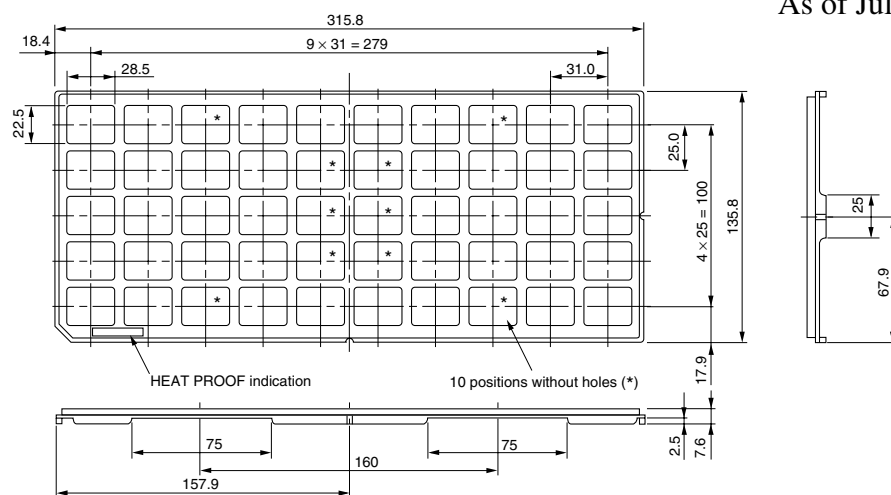
As of July, 2002
Unit: mm



Tray type	PT816AM	Package code	Maximum Storage No.
Material	Carbon PS	FP-54, FP-54A, FP-60,	50 IC/Tray
Thickness	—	FP-60A, FP-64, FP-64B,	500 IC/Inside box
Heat resistant temperature	Non heat Proof (Non baking)	FP-80, FP-80B, FP-80C, FP-80M, FP-100, FP-100A,	
Surface resistance value	less than $1 \times 10^6 \Omega/\text{square}$	FP-100L, FP-100Q	

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

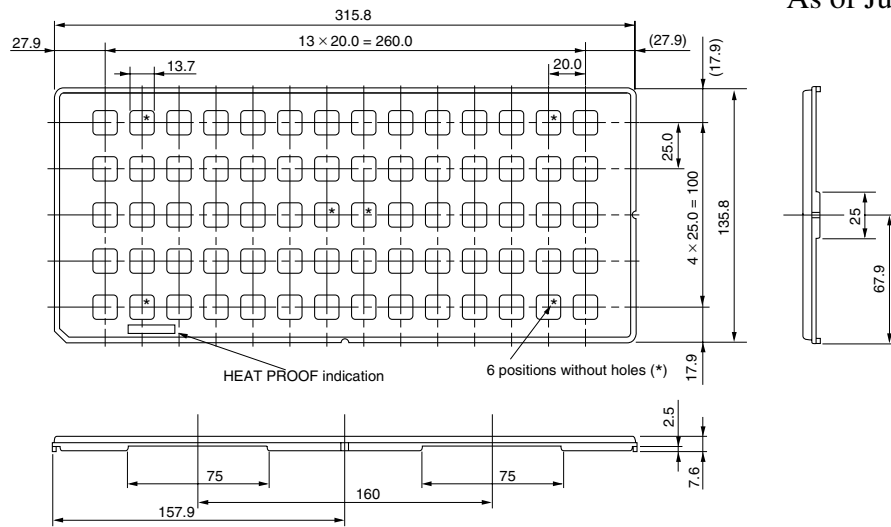
As of July, 2002
Unit: mm



Tray type	PT308C	Package code	Maximum Storage No.
Material	Carbon PPE	FP-54, FP-54A, FP-60,	50 IC/Tray
Thickness	—	FP-60A, FP-64, FP-64B,	500 IC/Inside box
Heat resistant temperature	130°C Max, 24 h	FP-80, FP-80B, FP-80C,	
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$	FP-80M, FP-100, FP-100A, FP-100L, FP-100Q	

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

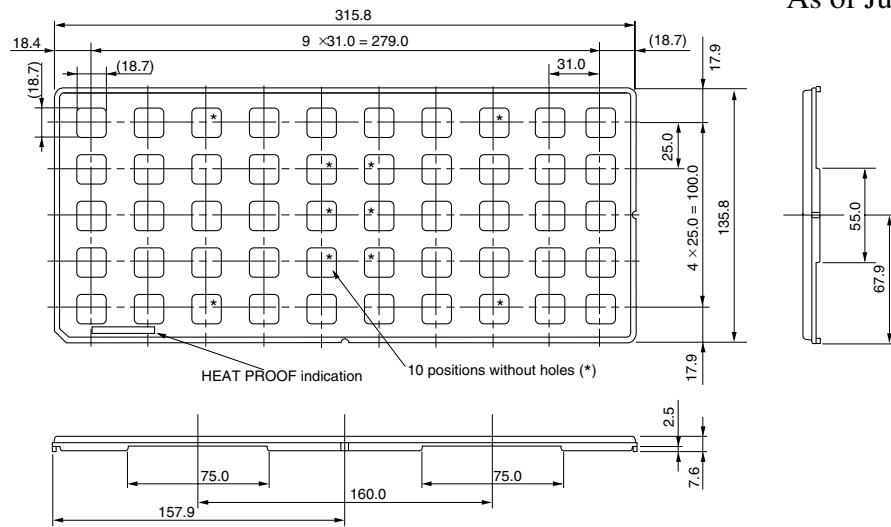
As of July, 2002
Unit: mm



Tray type	PT518B	Package code	Maximum Storage No.
Material	Carbon PP	FP-64C	70 IC/Tray
Thickness	—		700 IC/Inside box
Heat resistant temperature	130°C Max, 24 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

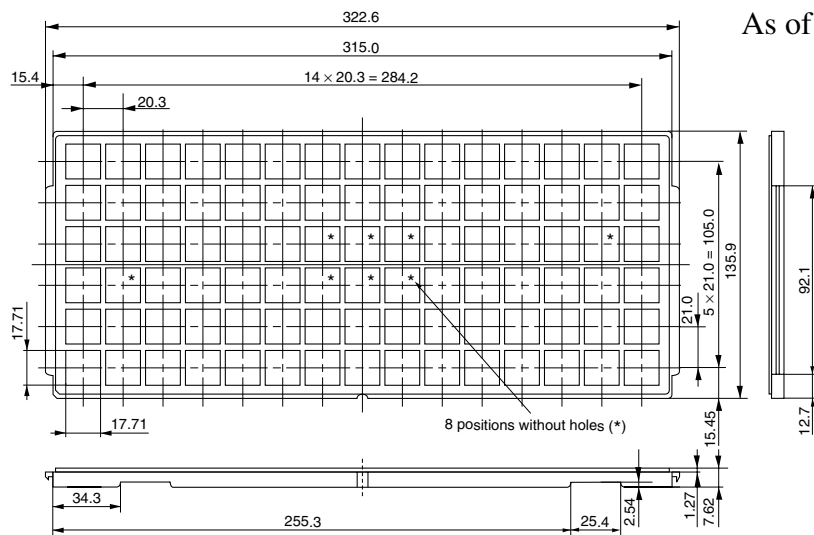
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



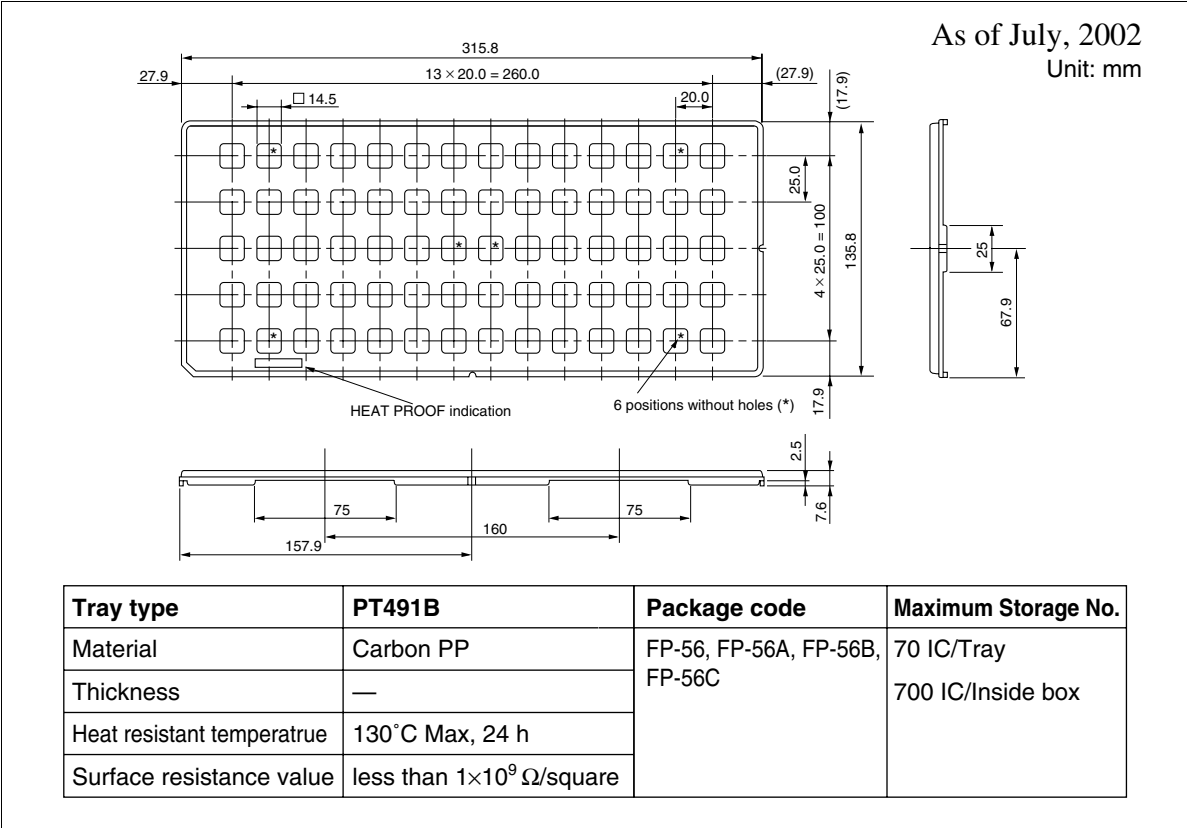
Tray type	PT546B	Package code	Maximum Storage No.
Material	Carbon PPE	FP-64TA	50 IC/Tray
Thickness	—		500 IC/Inside box
Heat resistant temperature	130°C Max, 24 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

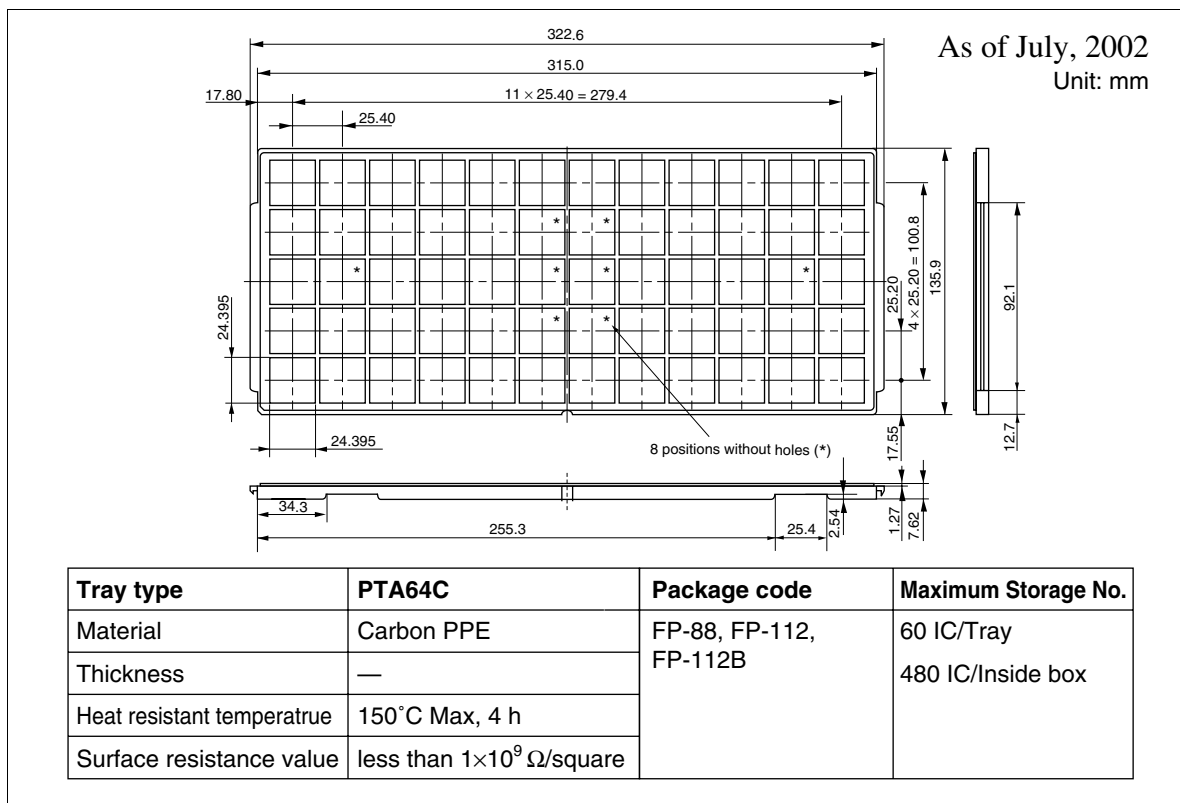


Tray type	PTA52C	Package code	Maximum Storage No.
Material	Carbon PPE	FP-100B, FP-100F FP-100K, FP-100M	90 IC/Tray
Thickness	—		720 IC/Inside box
Heat resistant temperature	150°C Max, 4 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

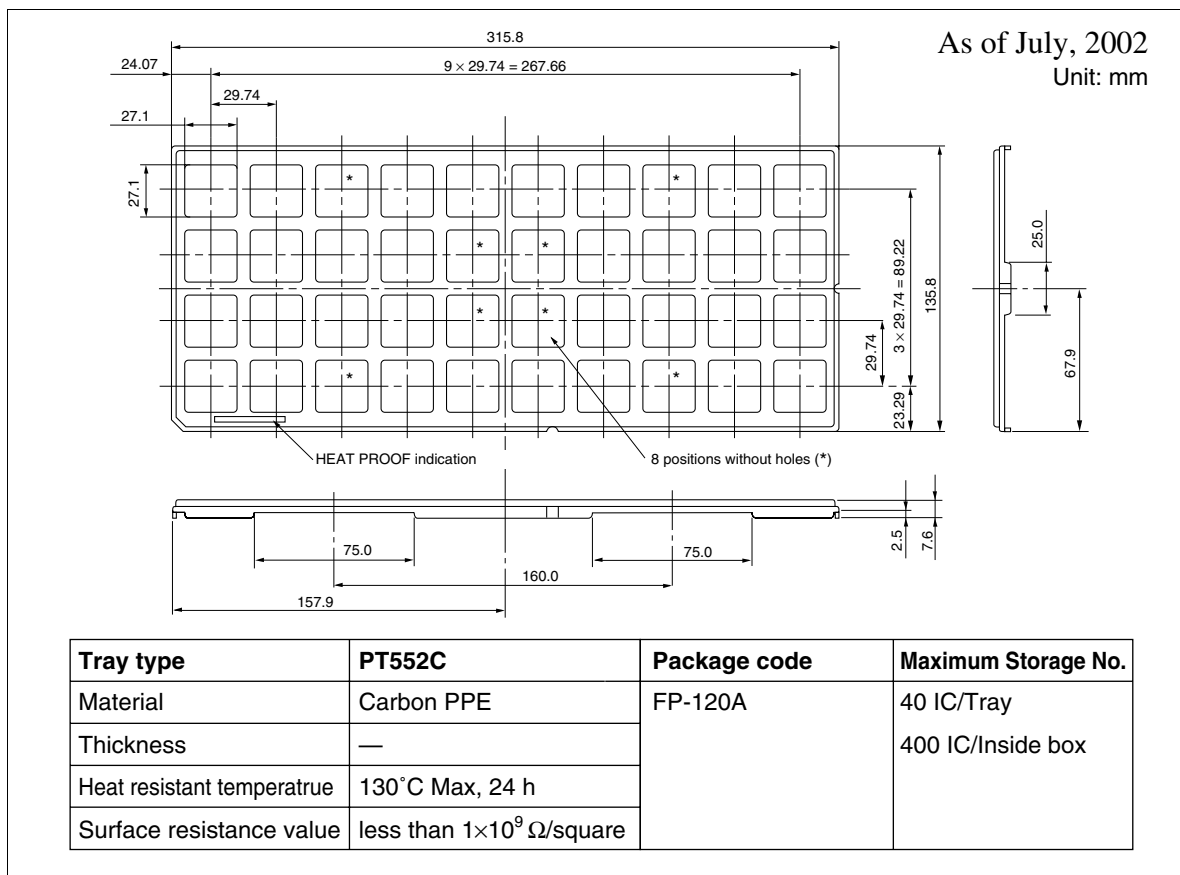
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



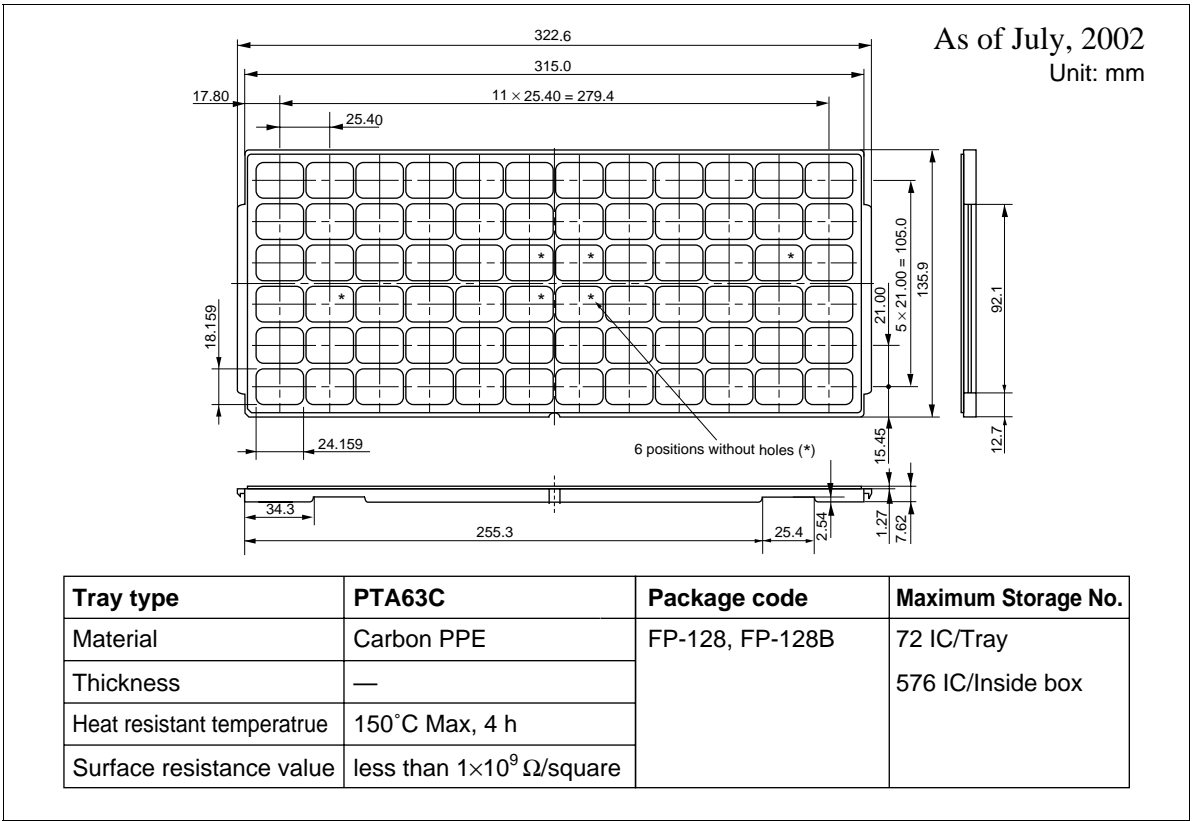
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



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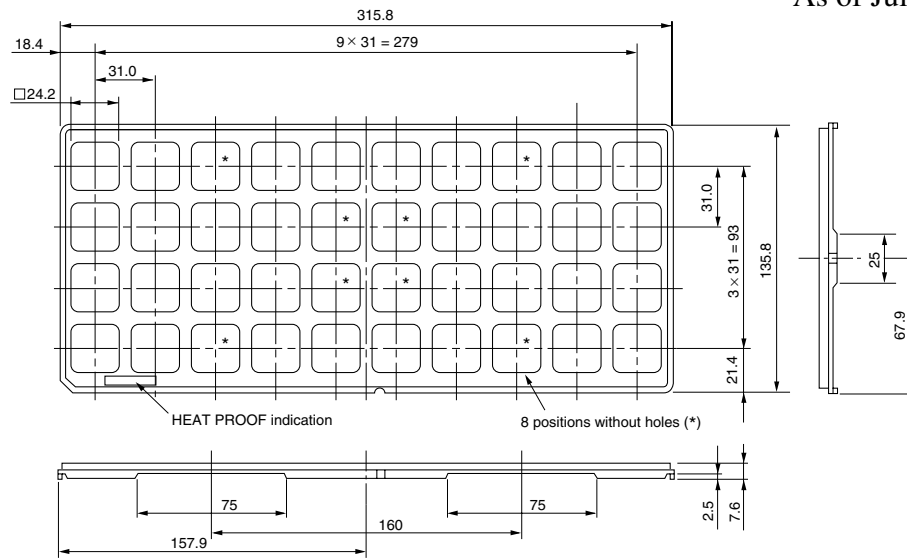


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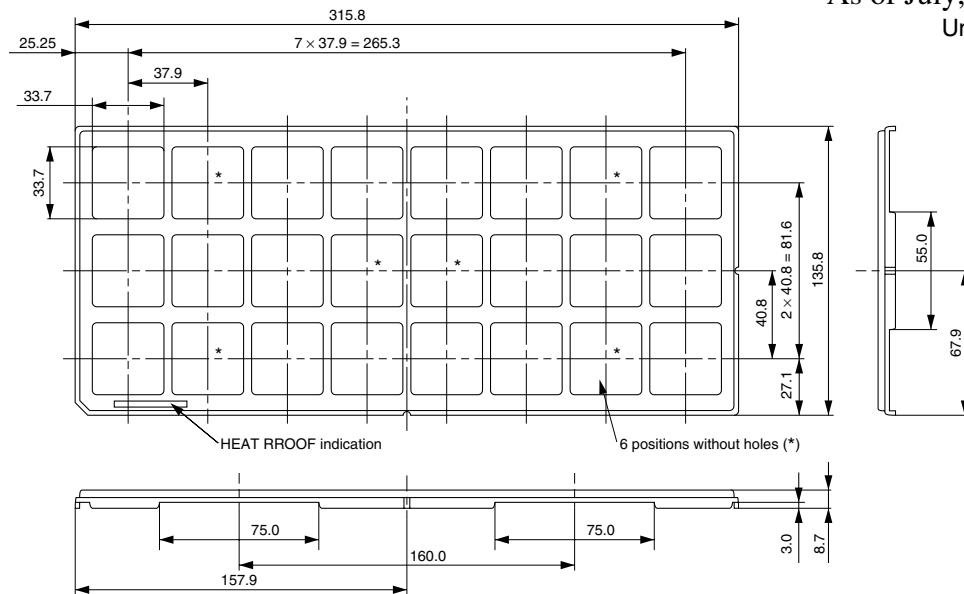
As of July, 2002
Unit: mm



Tray type	PT865B	Package code	Maximum Storage No.
Material	Carbon PPE	FP-144G, FP-144J	40 IC/Tray
Thickness	—		400 IC/Inside box
Heat resistant temperature	130°C Max, 24 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

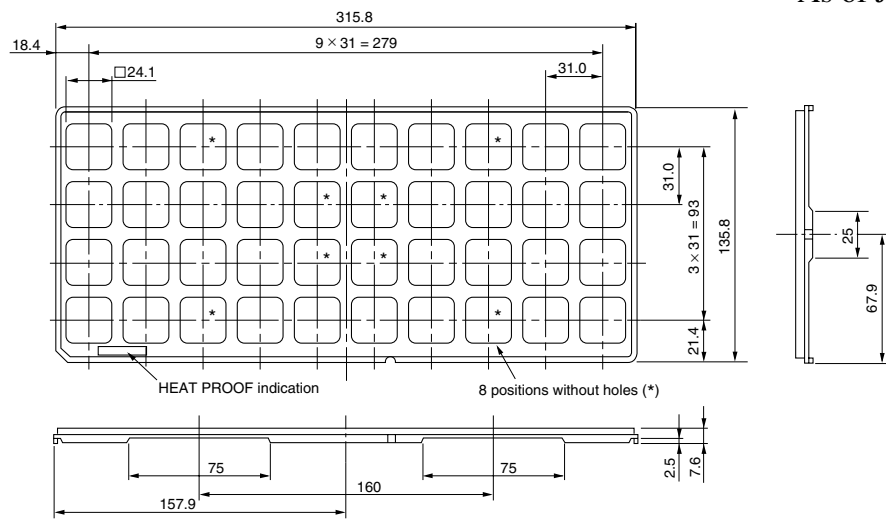
As of July, 2002
Unit: mm



Tray type	PT766C	Package code	Maximum Storage No.
Material	Carbon PPE	FP-136, FP-168, FP-168B	24 IC/Tray
Thickness	—		240 IC/Inside box
Heat resistant temperature	130°C Max, 24 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

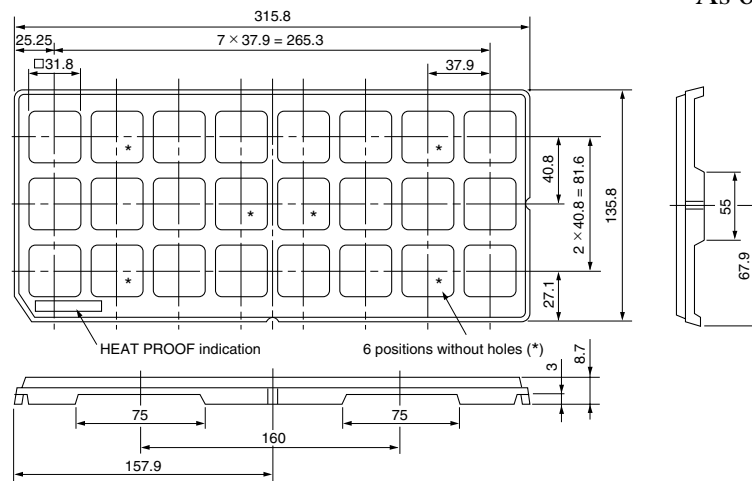
As of July, 2002
Unit: mm



Tray type	PT845B	Package code	Maximum Storage No.
Material	Carbon PPE	FP-144F, FP-144H,	40 IC/Tray
Thickness	—	FP-176A	400 IC/Inside box
Heat resistant temperature	130°C Max, 24 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

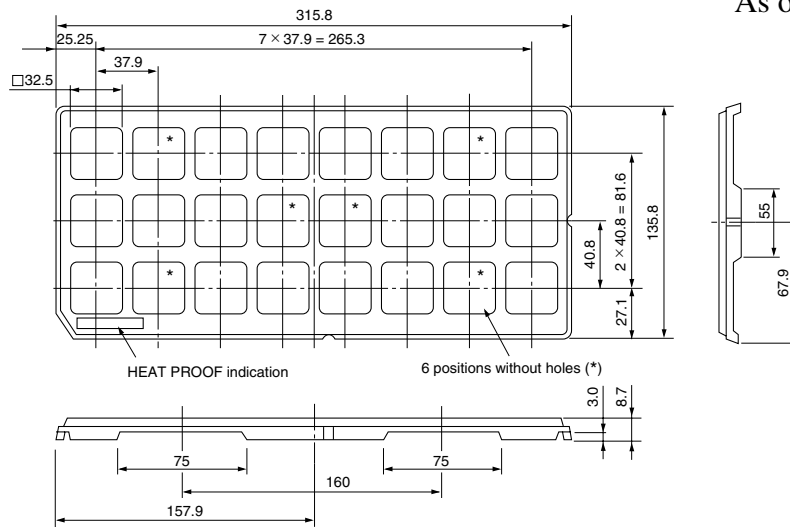
As of July, 2002
Unit: mm



Tray type	PT771C	Package code	Maximum Storage No.
Material	Carbon PPE	FP-208	24 IC/Tray
Thickness	—		240 IC/Inside box
Heat resistant temperature	130°C Max, 24 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

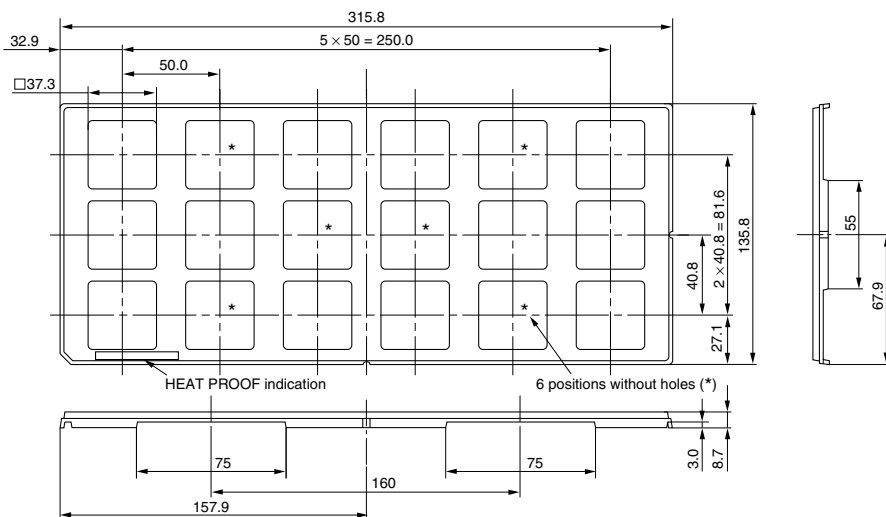
As of July, 2002
Unit: mm



Tray type	PT836B	Package code	Maximum Storage No.
Material	Carbon PPE	FP-208A, FP-208E,	24 IC/Tray
Thickness	—	FP-256F, FP-256G	240 IC/Inside box
Heat resistant temperature	130°C Max, 24 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

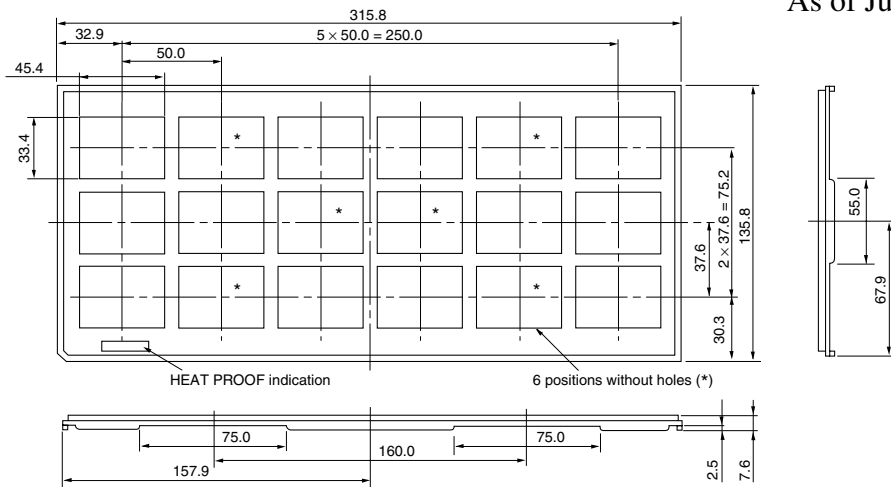
As of July, 2002
Unit: mm



Tray type	PT846B	Package code	Maximum Storage No.
Material	Carbon PPE	FP-240, FP-240B, FP-296, FP-296B	18 IC/Tray
Thickness	—		180 IC/Inside box
Heat resistant temperature	130°C Max, 24 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

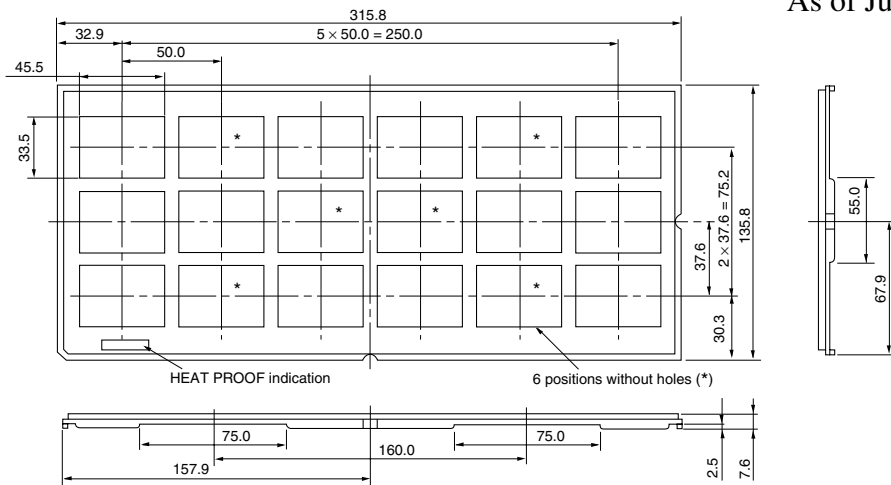
Unit: mm



Tray type	PT790	Package code	Maximum Storage No.
Material	Carbon PP	FP-256	18 IC/Tray
Thickness	—		180 IC/Inside box
Heat resistant temperaturue	130°C Max, 24 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

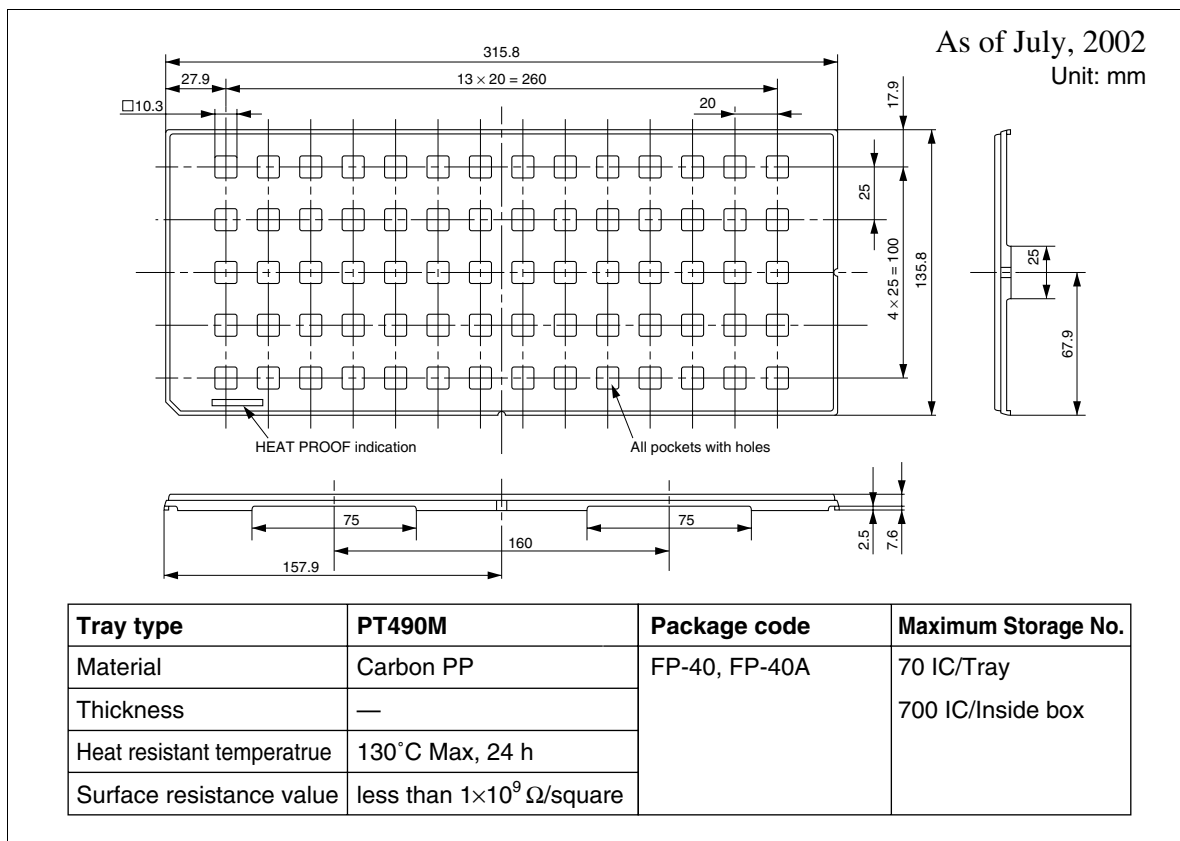
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm

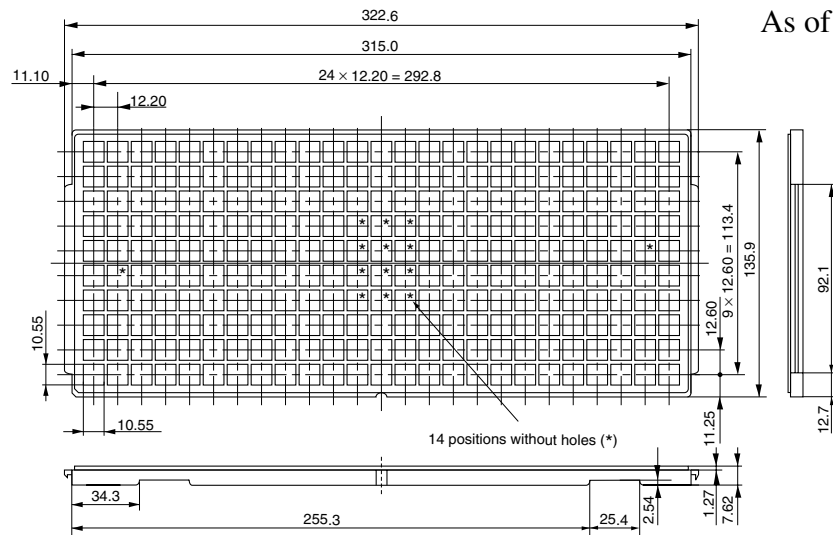


Tray type	PT790C	Package code	Maximum Storage No.
Material	Carbon PPE	FP-256H	18 IC/Tray
Thickness	—		180 IC/Inside box
Heat resistant temperature	130°C Max, 24 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



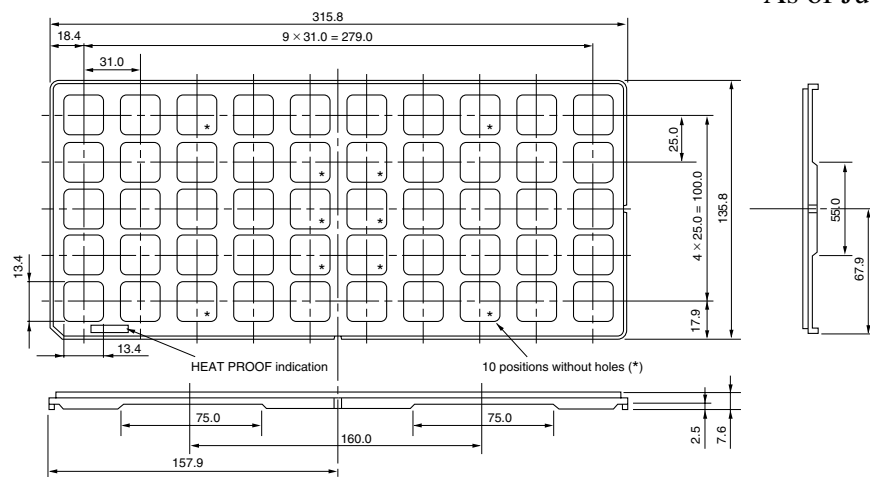
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



Tray type	PTA50C	Package code	Maximum Storage No.
Material	Carbon PPE	FP-48B	250 IC/Tray
Thickness	—		2000 IC/Inside box
Heat resistant temperature	150°C Max, 4 h		
Surface resistance value	less than $1 \times 10^7 \Omega/\text{square}$		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm

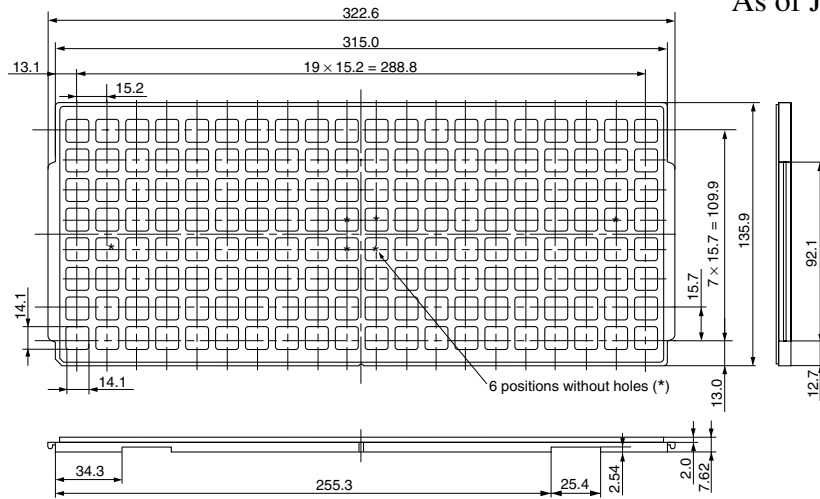


Tray type	PTA21CM	Package code	Maximum Storage No.
Material	Carbon PPE	FP-64E, FP-48F	50 IC/Tray
Thickness	—		500 IC/Inside box
Heat resistant temperature	150°C Max, 4 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002

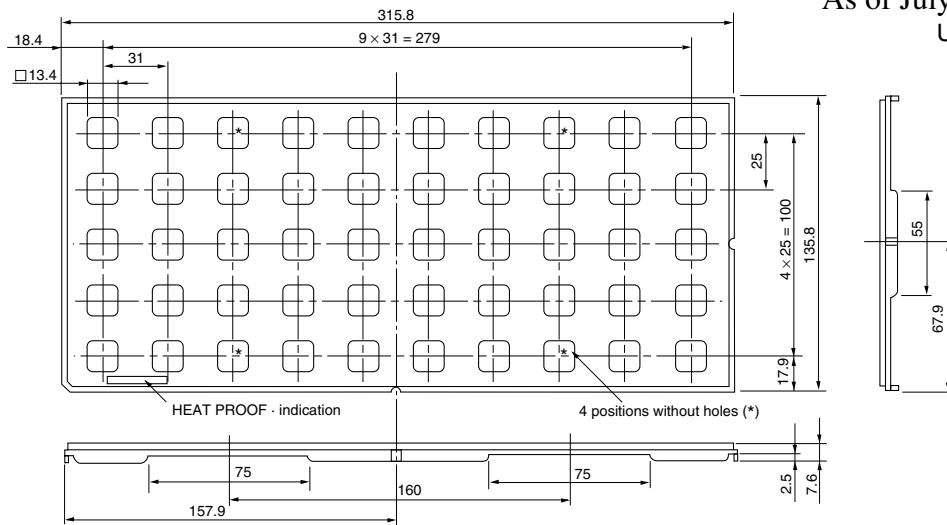
Unit: mm



Tray type	PTA25C	Package code	Maximum Storage No.
Material	Carbon PPE	FP-64E, FP-48F	160 IC/Tray
Thickness	—		1440 IC/Inside box
Heat resistant temperature	150°C Max, 4 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

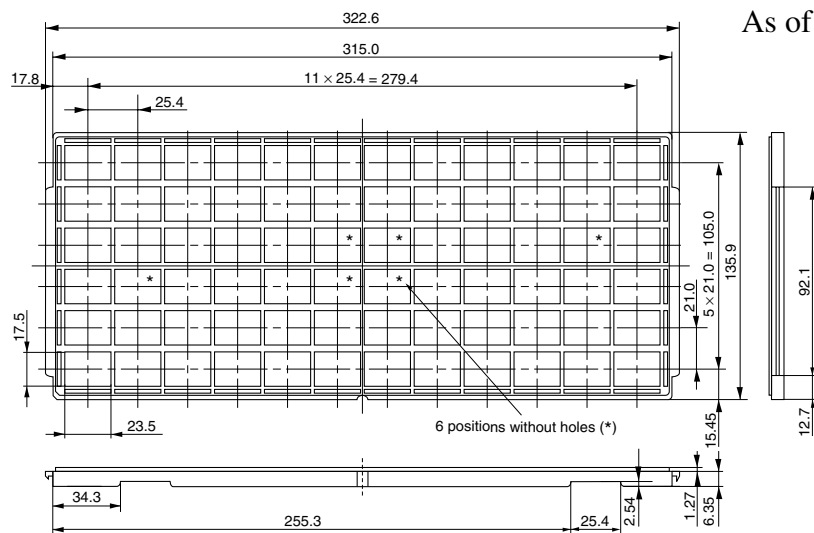
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



Tray type	PT813BM	Package code	Maximum Storage No.
Material	Carbon PC	FP-64E	50 IC/Tray
Thickness	—		500 IC/Inside box
Heat resistant temperature	130°C Max, 24 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

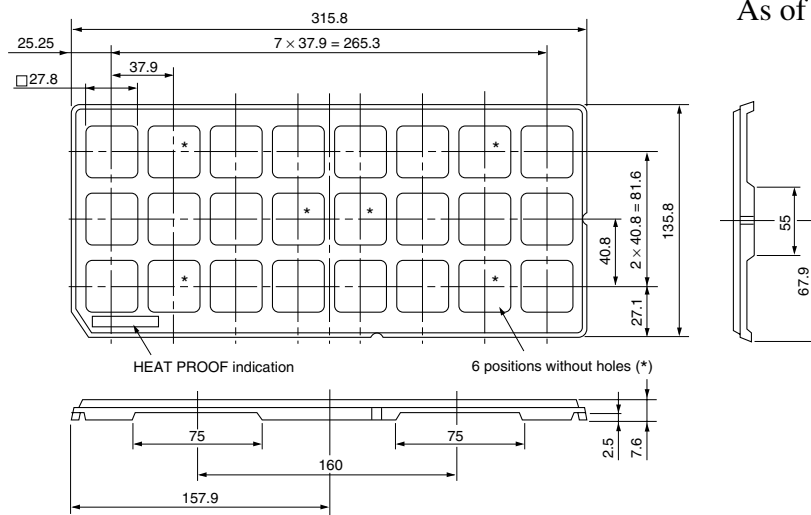


As of July, 2002
Unit: mm

Tray type	PT878CF	Package code	Maximum Storage No.
Material	Carbon PPE	FP-100H	72 IC/Tray
Thickness	—		576 IC/Inside box
Heat resistant temperature	150°C Max, 2 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

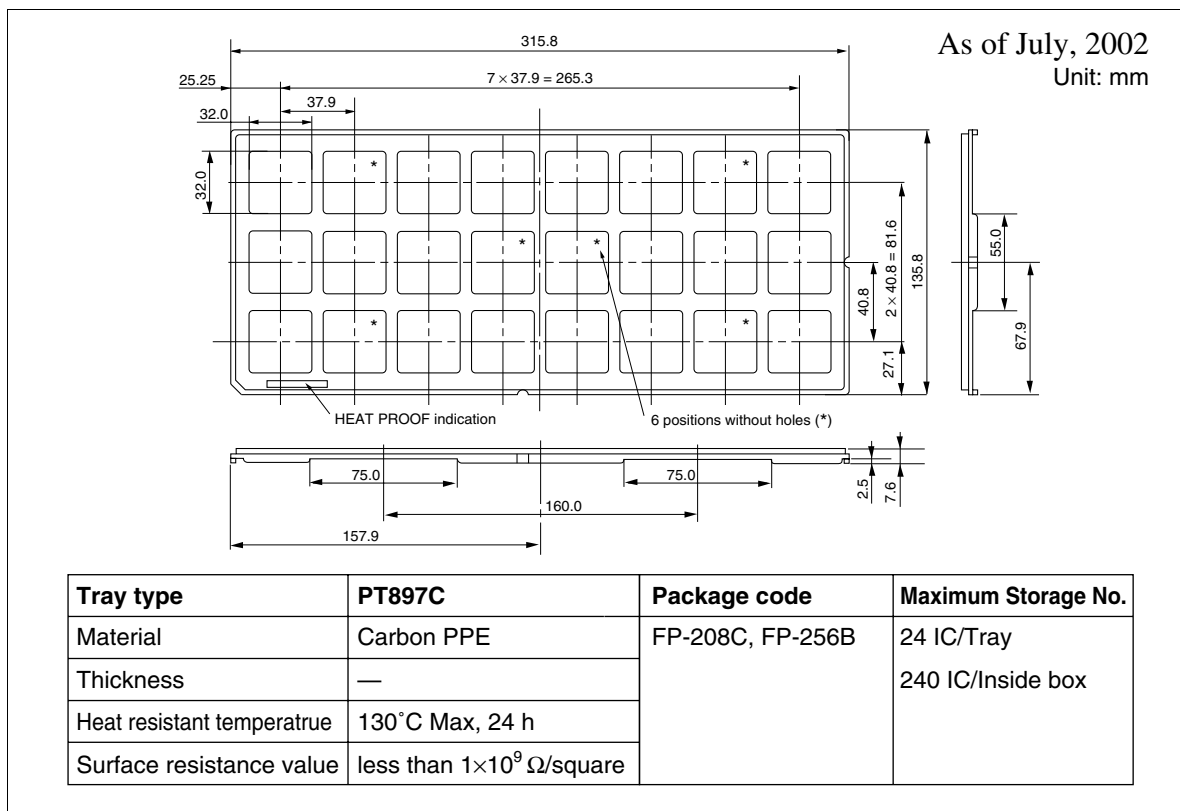
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm

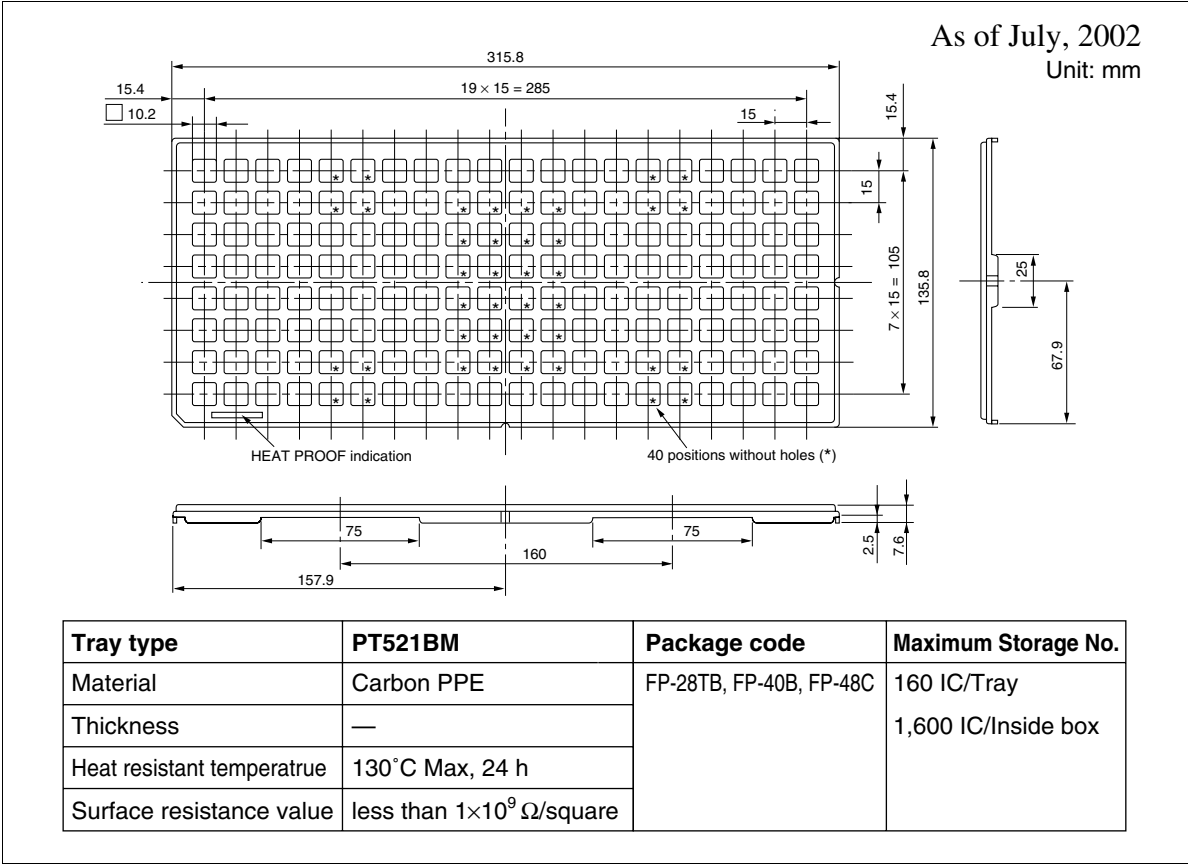


Tray type	PT873C	Package code	Maximum Storage No.
Material	Carbon PPE	FP-176, FP-176C, FP-216	24 IC/Tray
Thickness	—		240 IC/Inside box
Heat resistant temperature	130°C Max, 24 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

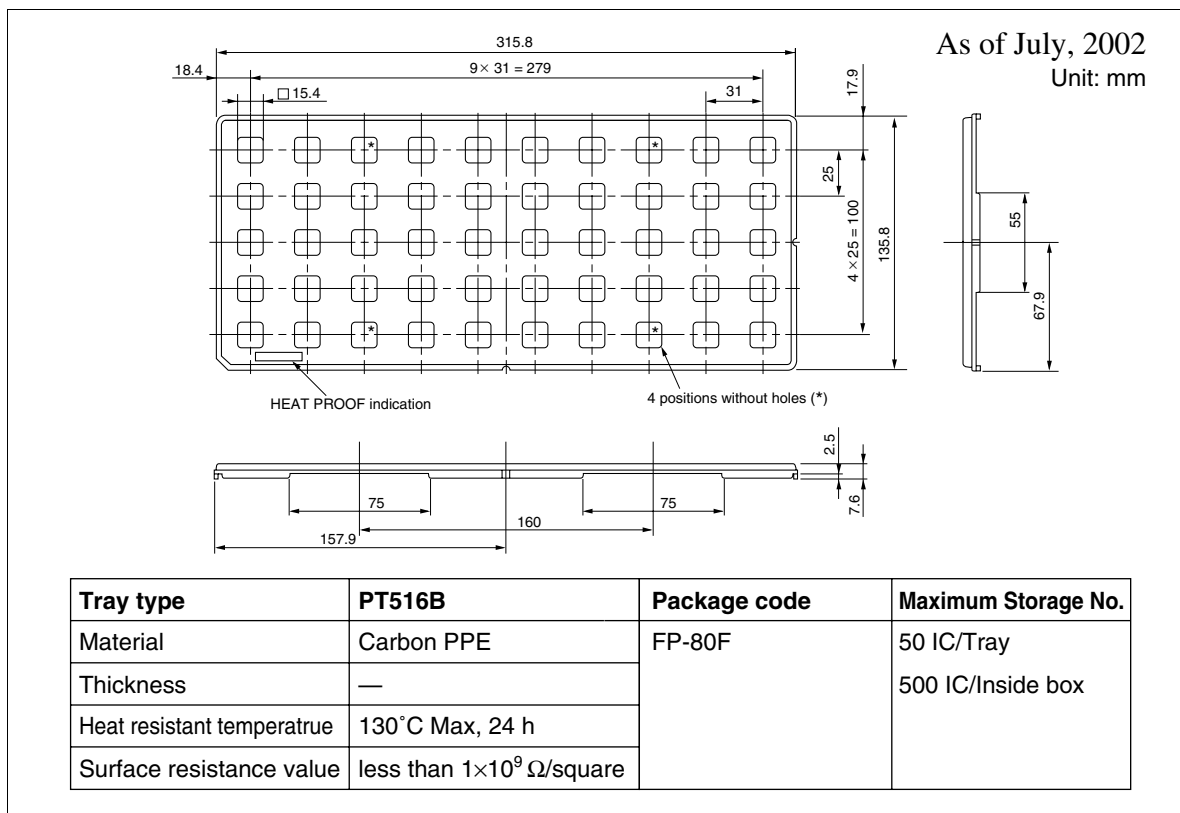
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



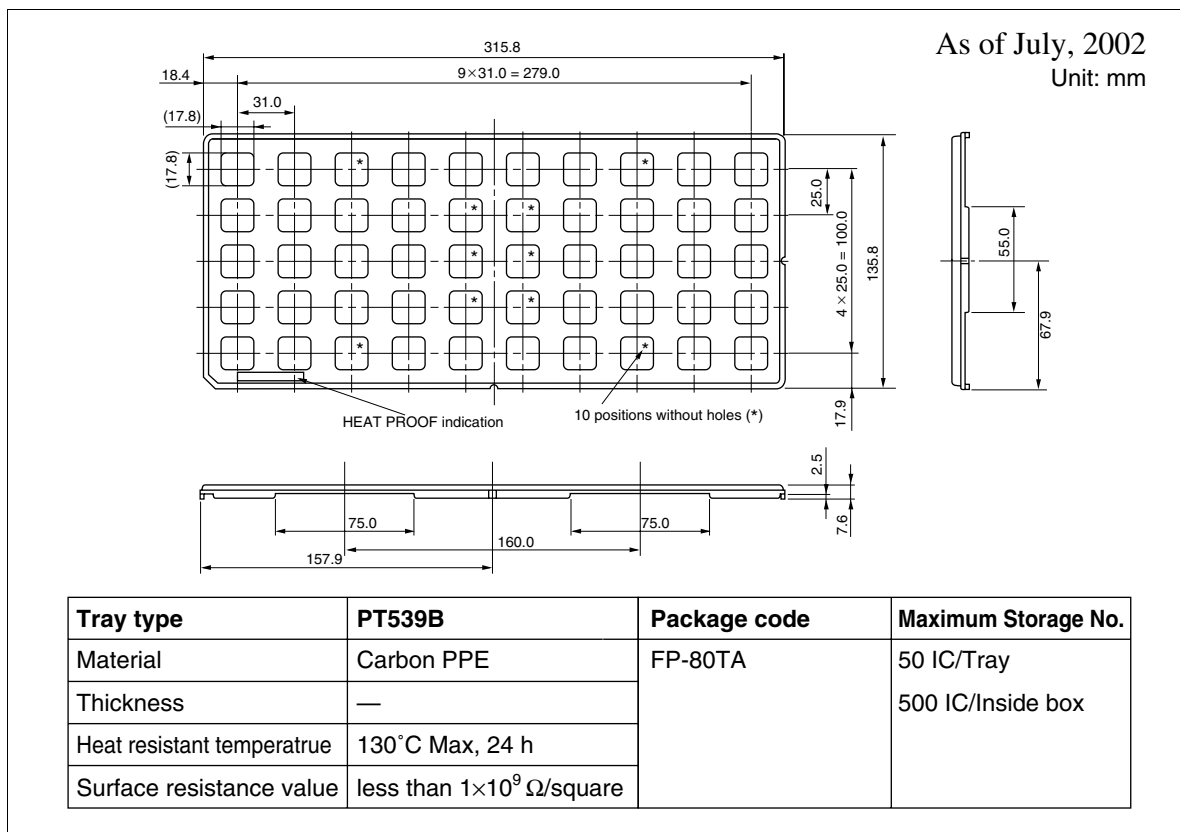
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

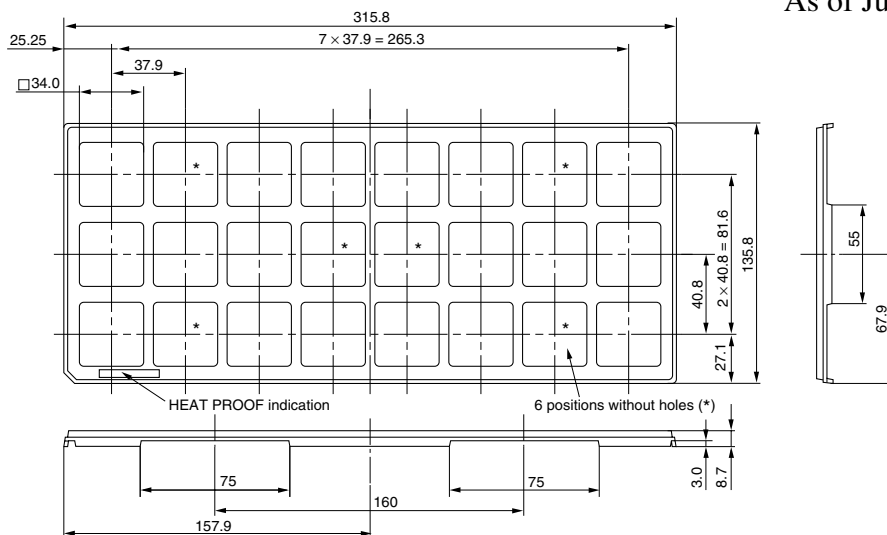


The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

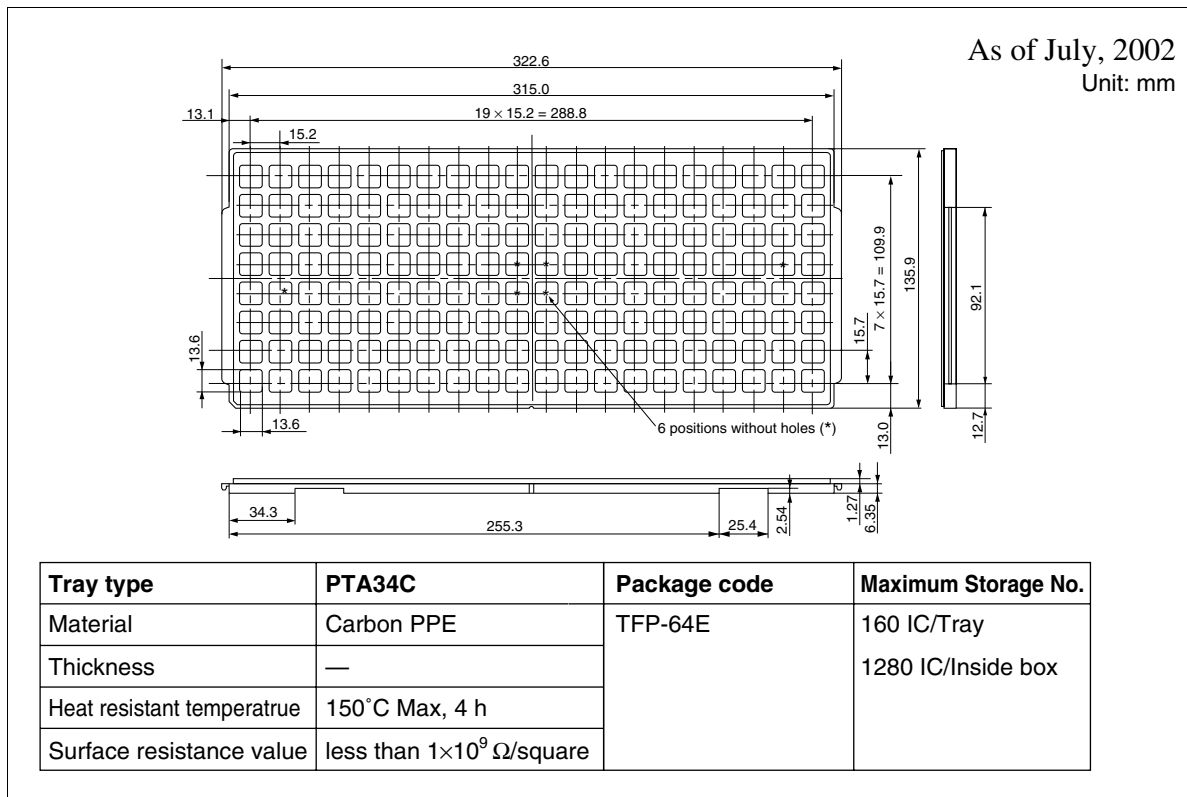
As of July, 2002
Unit: mm



Tray type	PT825B	Package code	Maximum Storage No.
Material	Carbon PPE	FP-160H, FP-160J,	24 IC/Tray
Thickness	—	FP-160K	240 IC/Inside box
Heat resistant temperature	130°C Max, 24 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

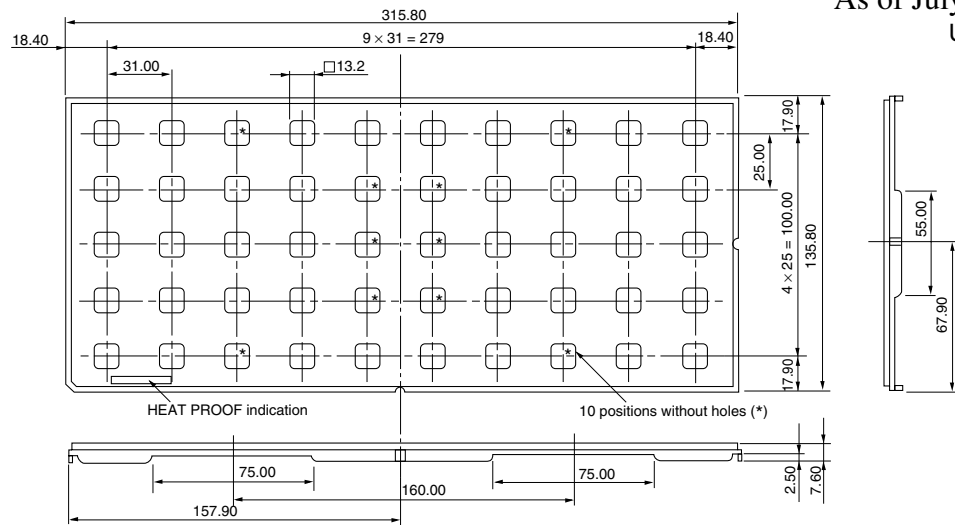
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

4. TQFP



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

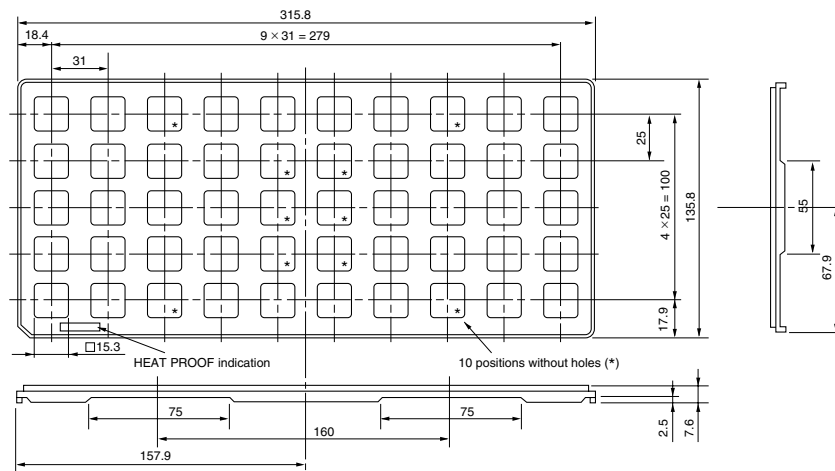
As of July, 2002
Unit: mm



Tray type	PT517BM	Package code	Maximum Storage No.
Material	Carbon PPE	TFP-64B, TFP-52T,	50 IC/Tray
Thickness	—	TFP-64C, TFP-64FV,	500 IC/Inside box
Heat resistant temperature	130°C Max, 24 h	TFP-64TA	
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

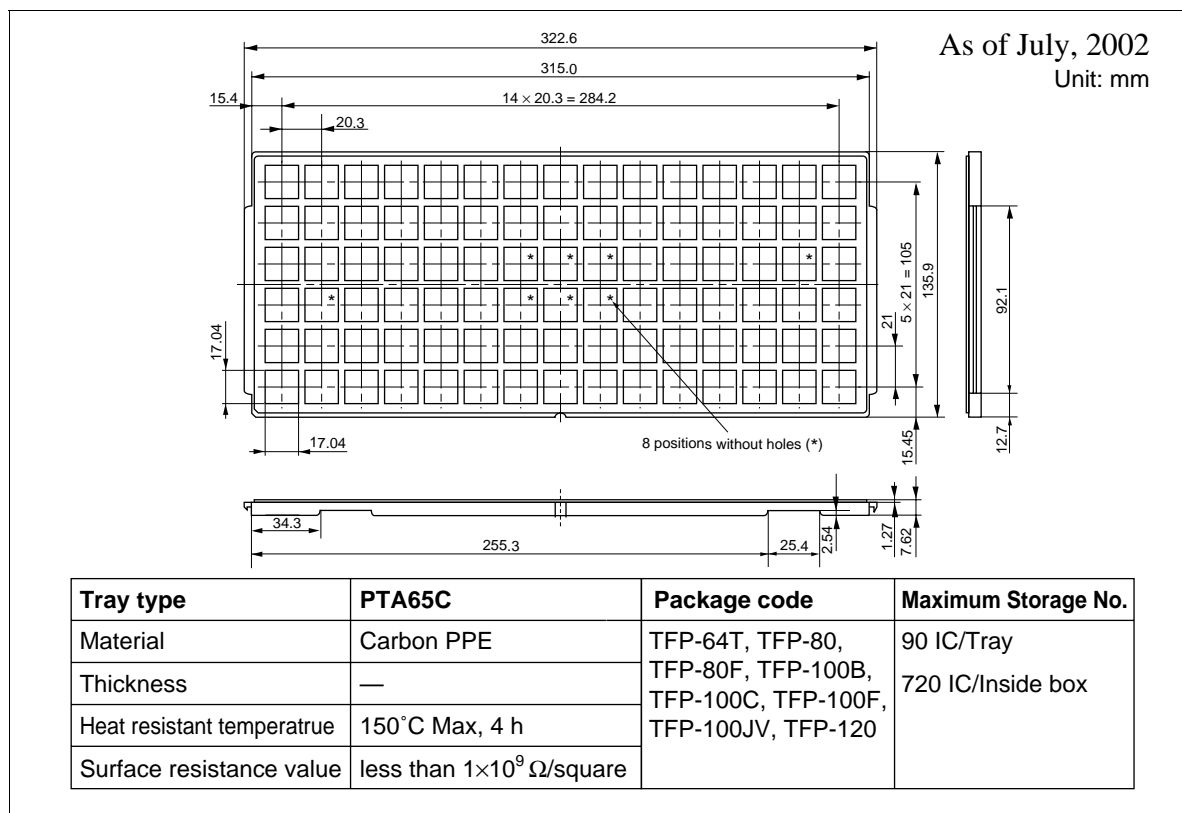
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm

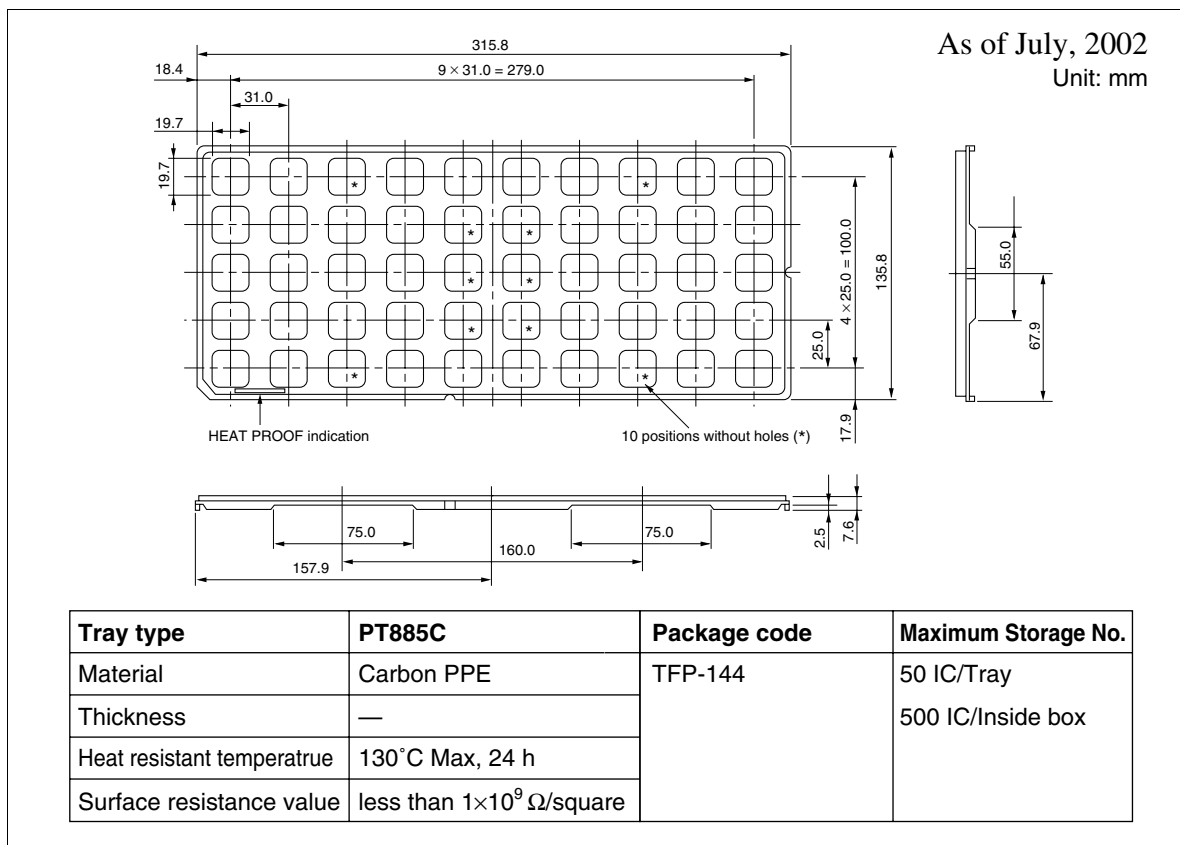


Tray type	PT828B	Package code	Maximum Storage No.
Material	Carbon PPE	TFP-80C, TFP-100G	50 IC/Tray
Thickness	—		500 IC/Inside box
Heat resistant temperature	130°C Max, 24 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



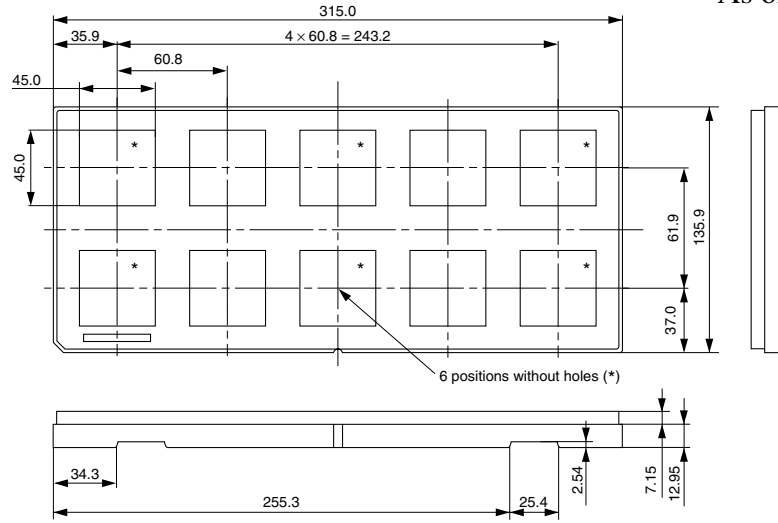
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

5. C-QFP

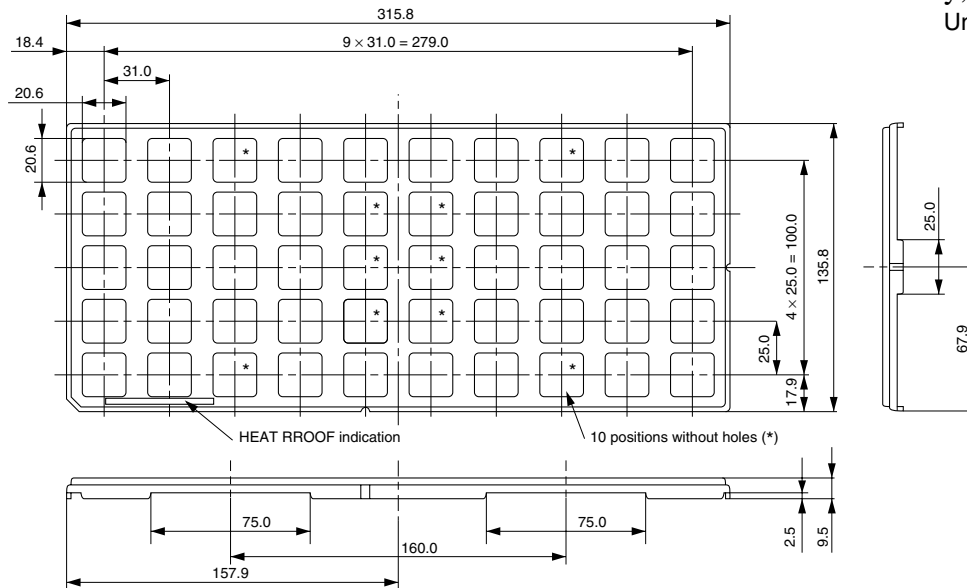
As of July, 2002
Unit: mm



Tray type	PT890A	Package code	Maximum Storage No.
Material	Carbon PS	FC-256T	10 IC/Tray 40 IC/Inside box
Thickness	—		
Heat resistant temperature	Non heat Proof (Non baking)		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

6. QFJ

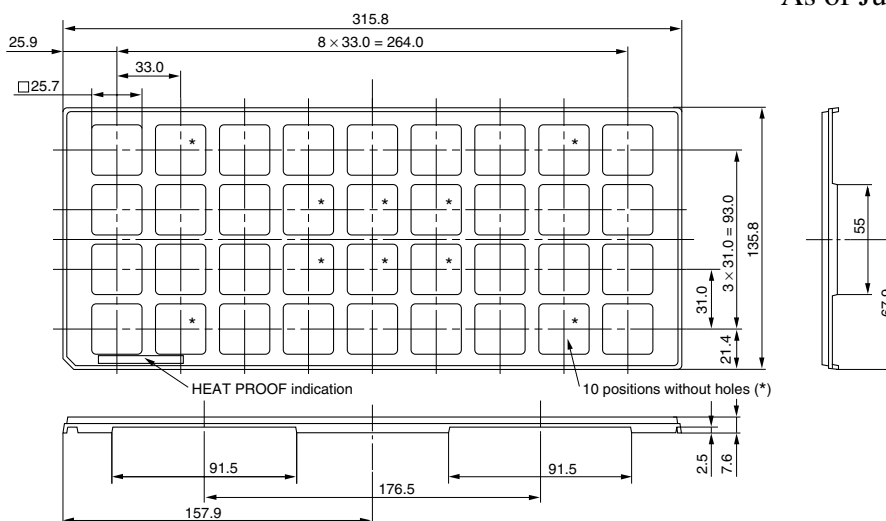
As of July, 2002
Unit: mm



Tray type	PT725B	Package code	Maximum Storage No.
Material	Carbon PPE	CP-44	50 IC/Tray
Thickness	—		500 IC/Inside box
Heat resistant temperature	130°C Max, 24 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

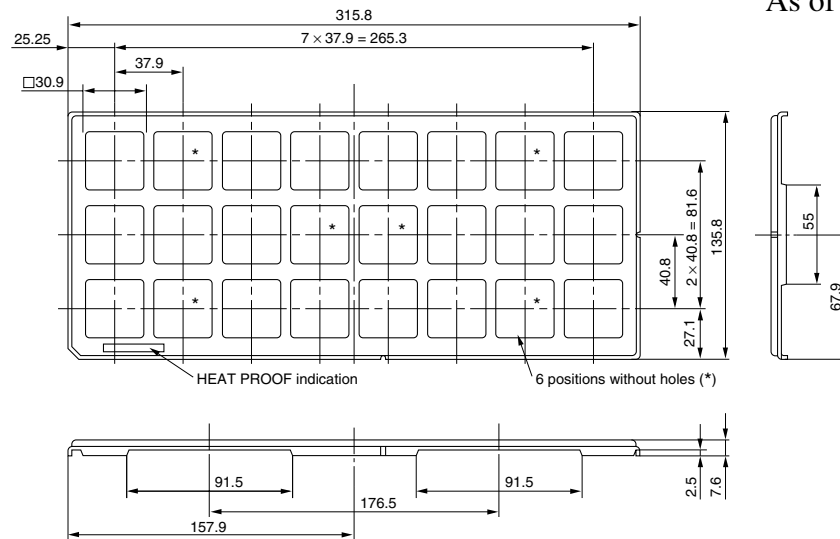
As of July, 2002
Unit: mm



Tray type	PT826C	Package code	Maximum Storage No.
Material	Carbon PPE	CP-68	36 IC/Tray
Thickness	—		324 IC/Inside box
Heat resistant temperature	130°C Max, 24 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

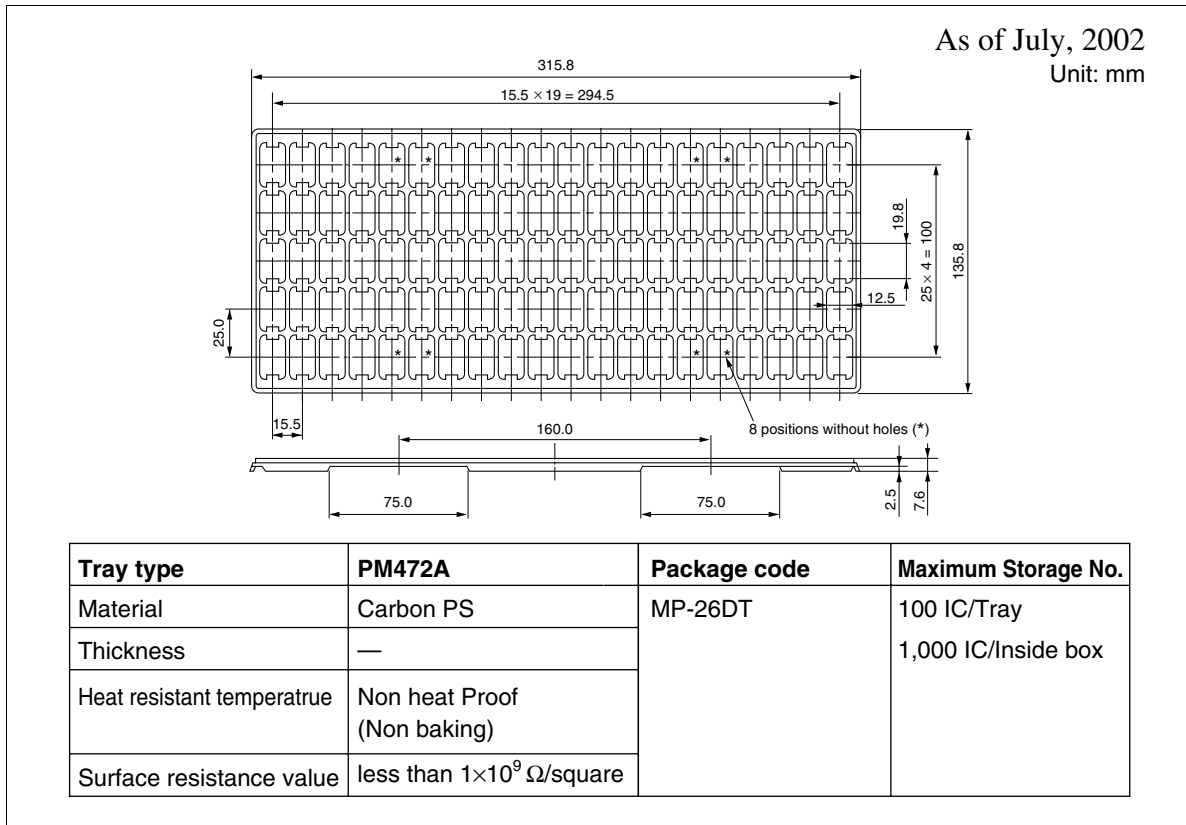
As of July, 2002
Unit: mm



Tray type	PT838C	Package code	Maximum Storage No.
Material	Carbon PPE	CP-84	24 IC/Tray
Thickness	—		216 IC/Inside box
Heat resistant temperature	130°C Max, 24 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

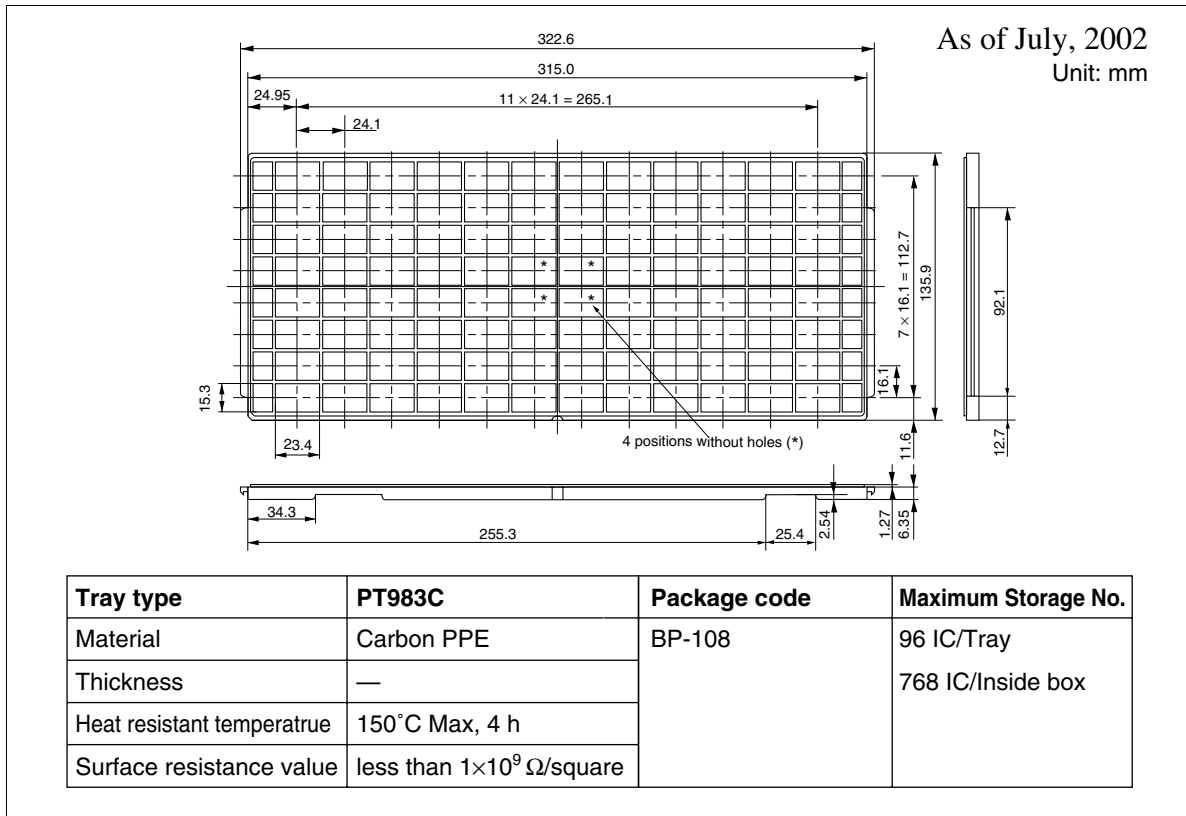
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

7. HSOI

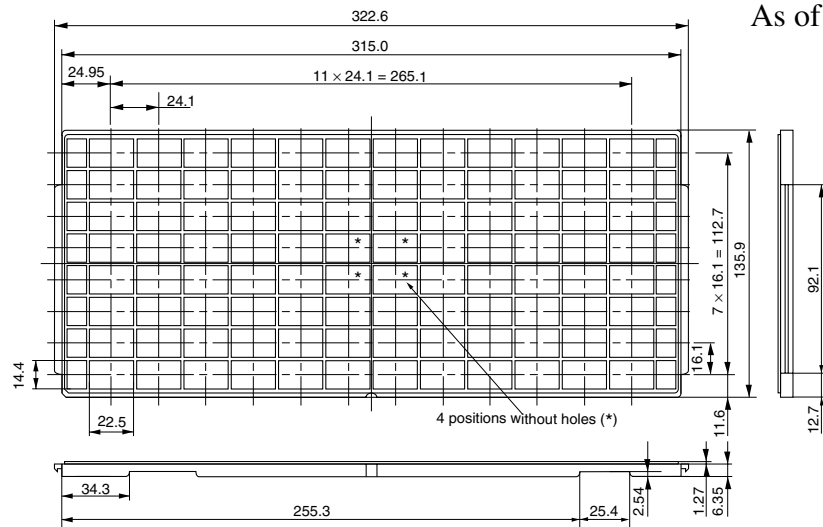


The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

8. BGA

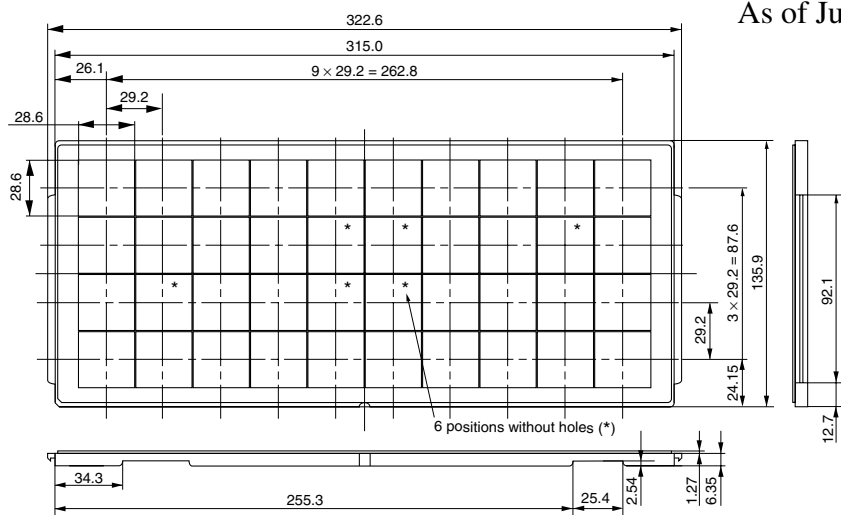


The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



Tray type	PT891C	Package code	Maximum Storage No.
Material	Carbon PPE	BP-119A, BP-119C,	96 IC/Tray
Thickness	—	BP-119E	768 IC/Inside box
Heat resistant temperature	150°C Max, 4 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

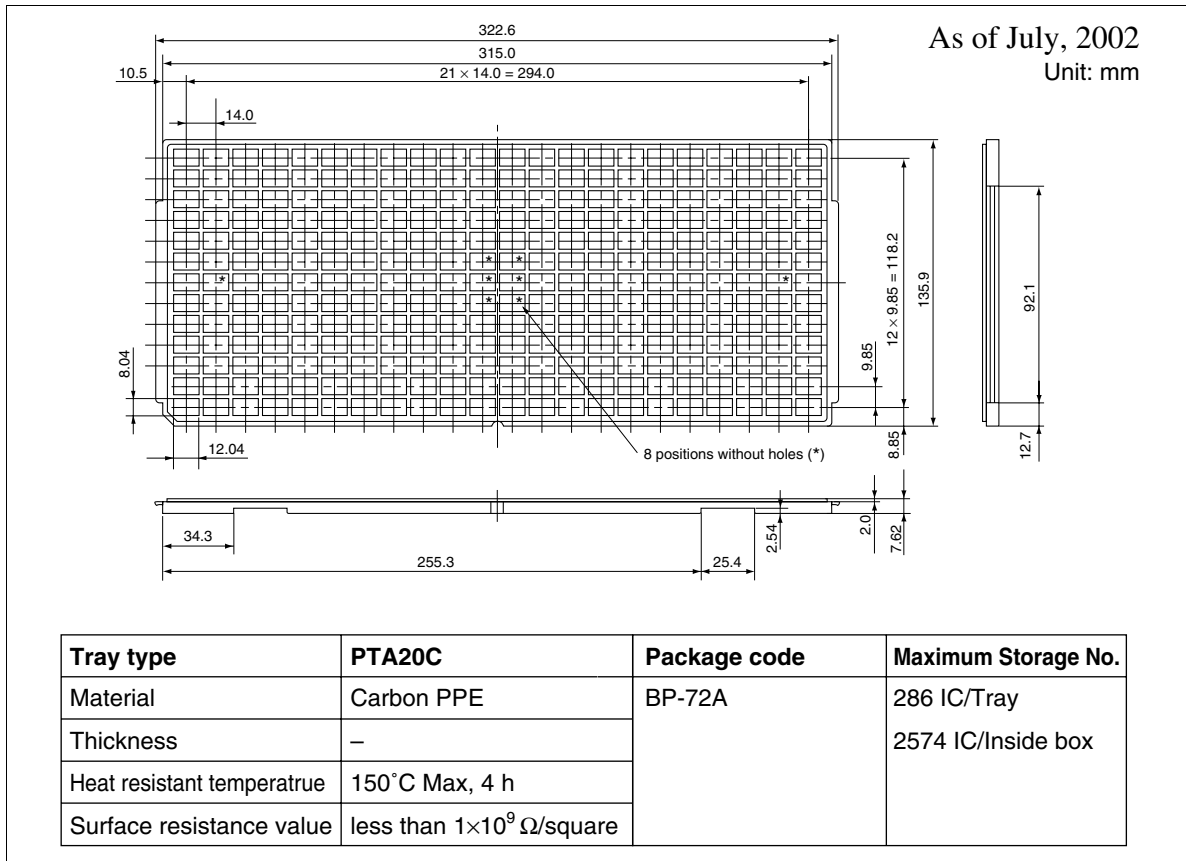
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



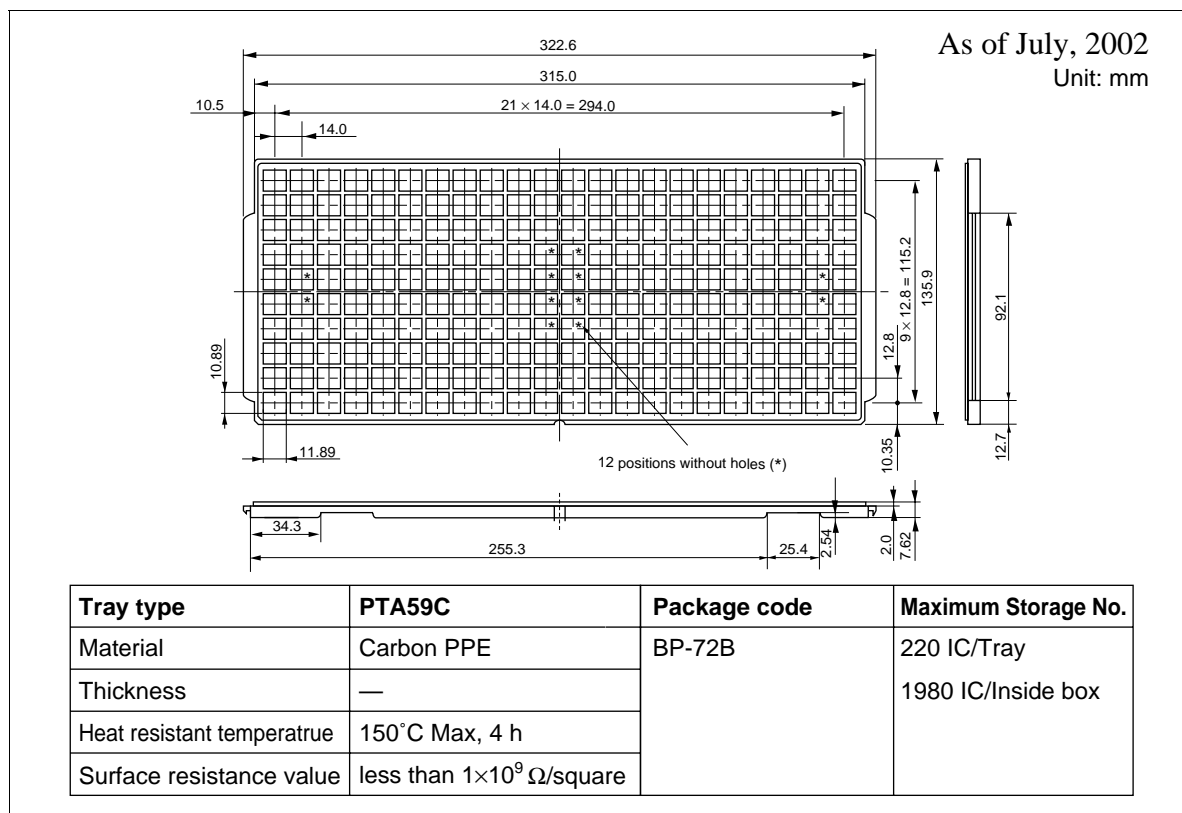
Tray type	PT933C	Package code	Maximum Storage No.
Material	Carbon PPE	BP-256, BP-256A	40 IC/Tray
Thickness	—		320 IC/Inside box
Heat resistant temperature	150°C Max, 4 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

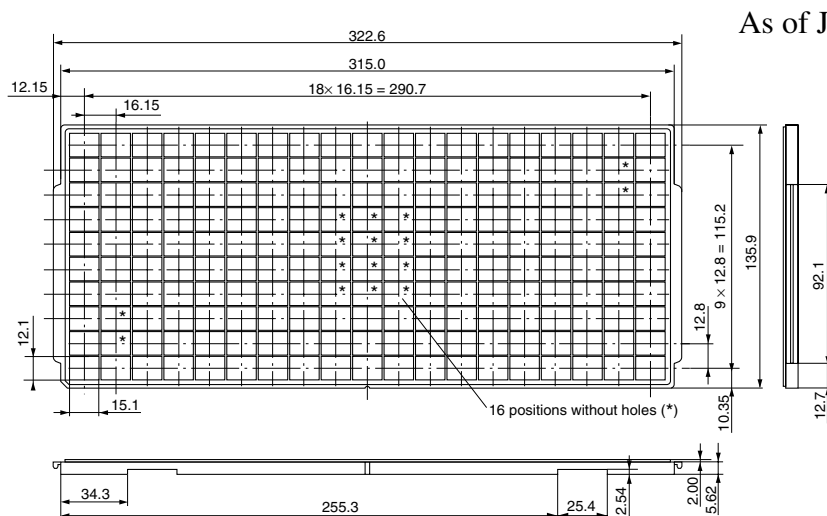
9. LFBGA



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

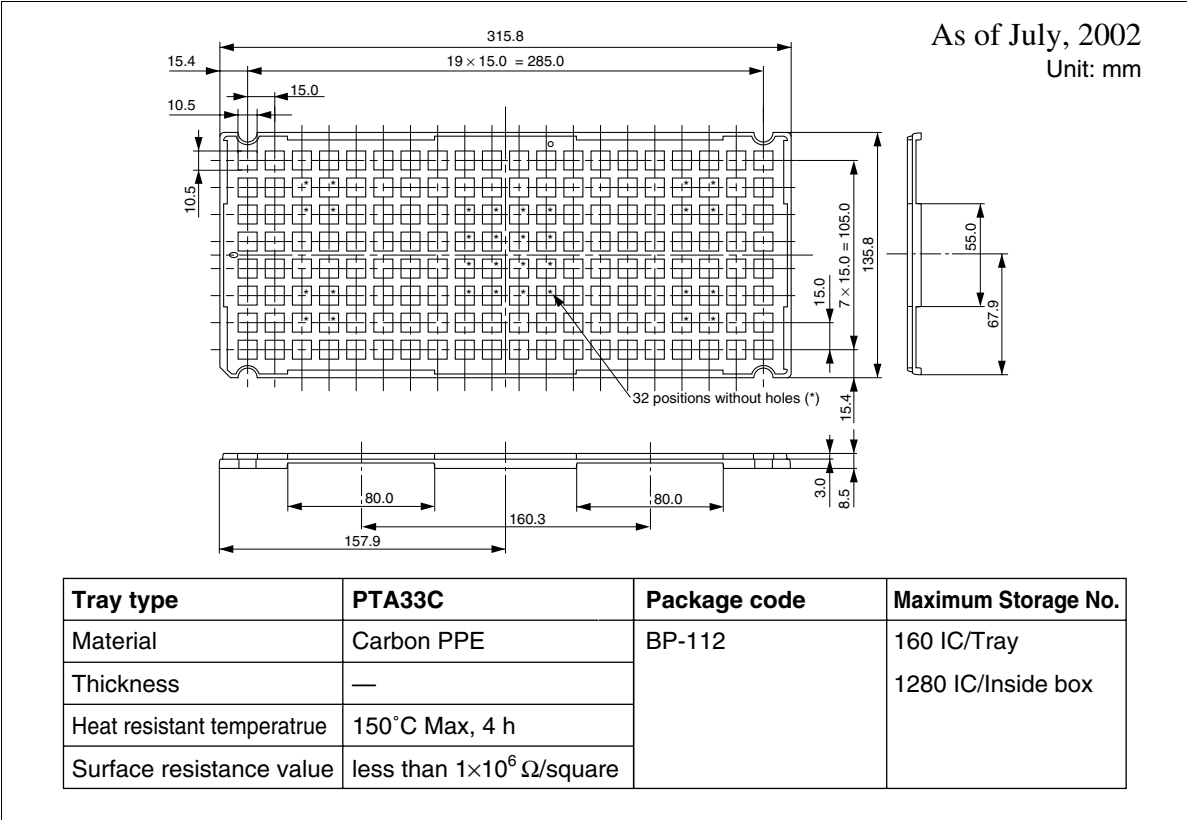


The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

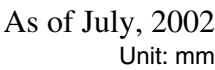


Tray type	PT998C	Package code	Maximum Storage No.
Material	Carbon PPE	BP-90A	190 IC/Tray
Thickness	—		1,710 IC/Inside box
Heat resistant temperature	150°C Max, 4 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

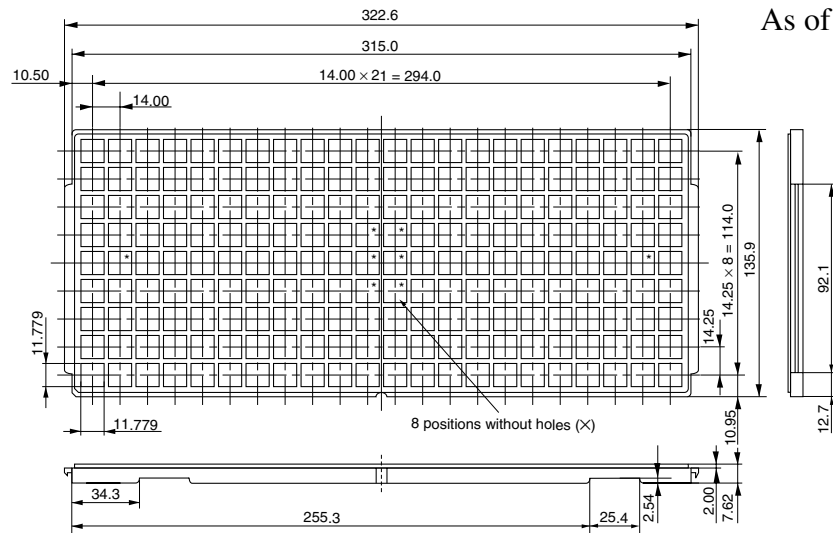


The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



Tray type	PTA36CF	Package code	Maximum Storage No.
Material	Carbon PPO	BP-256B	90 IC/Tray
Thickness	—	BP-336	720 IC/Inside box
Heat resistant temperature	150°C Max, 4 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

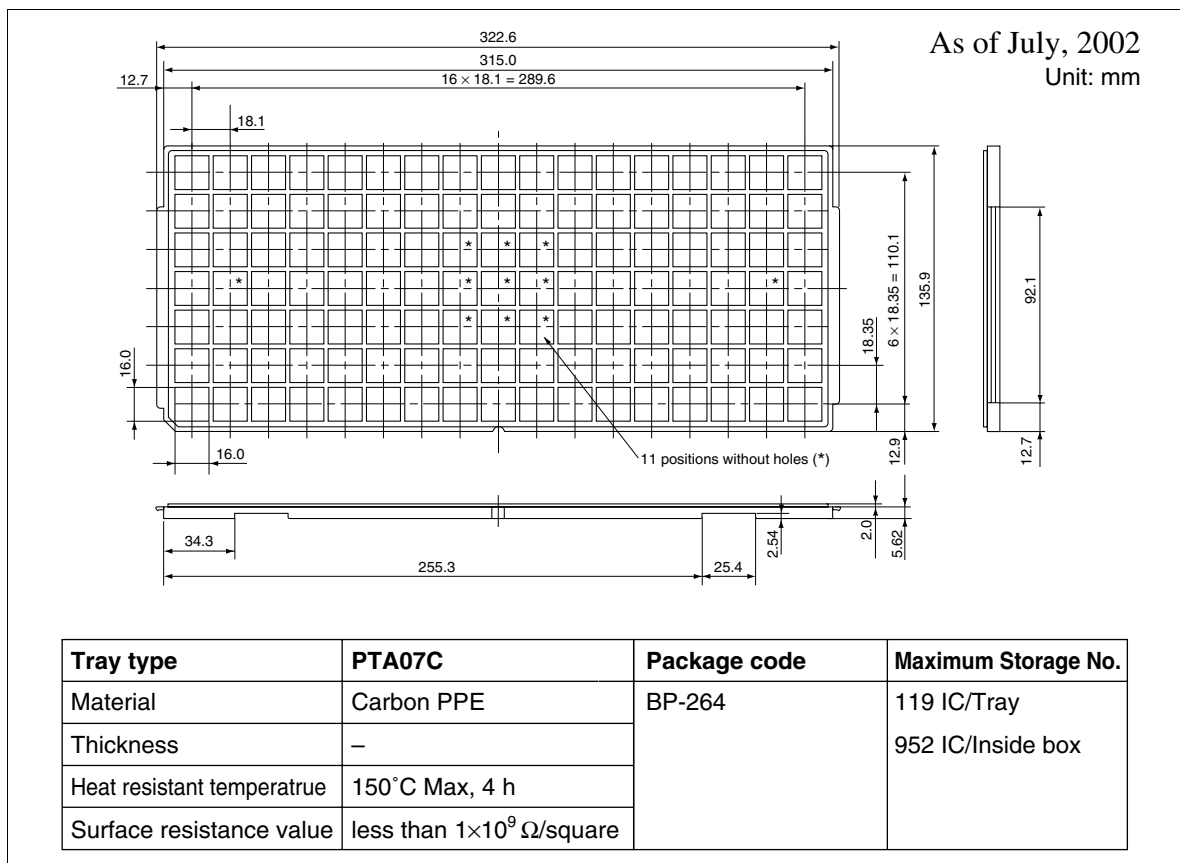
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



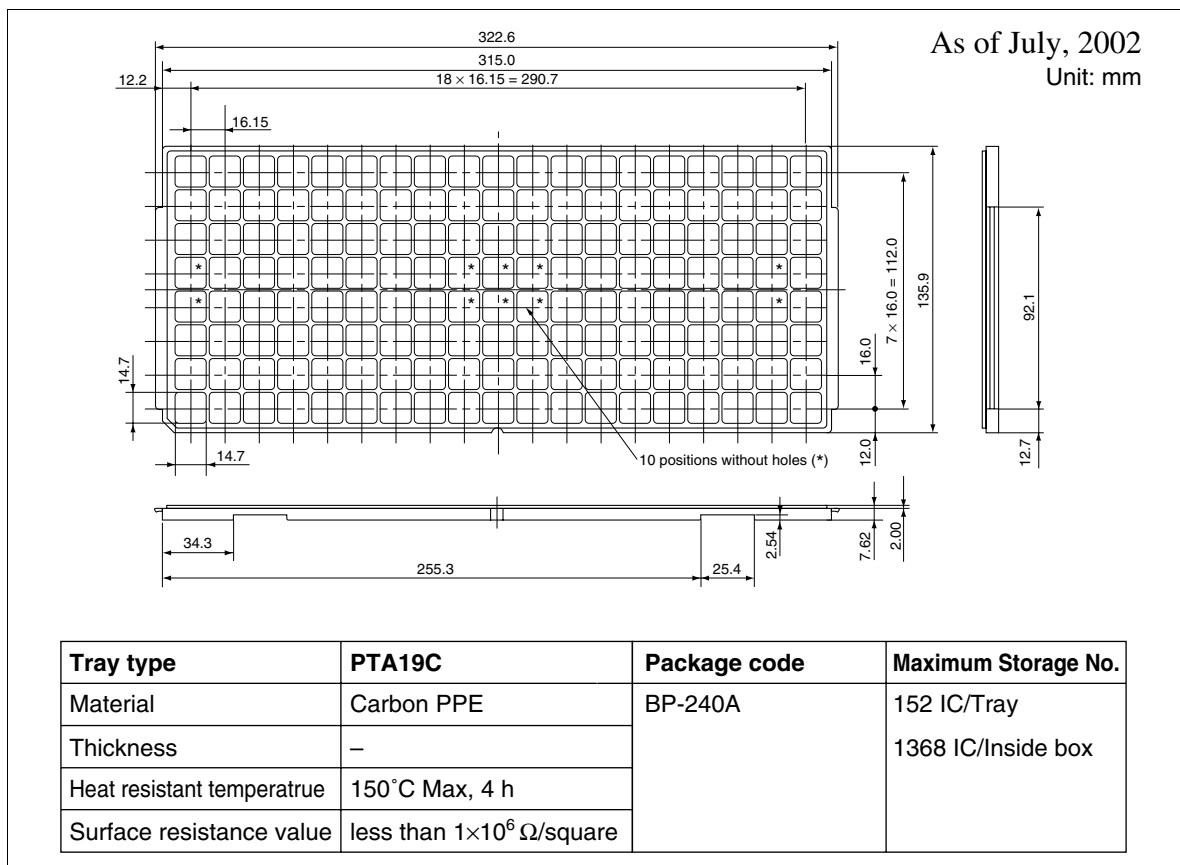
As of July, 2002
Unit: mm

Tray type	PTA61C	Package code	Maximum Storage No.
Material	Carbon PPE	BP-256C	198 IC/Tray
Thickness	—		1782 IC/Inside box
Heat resistant temperature	150°C Max, 4 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



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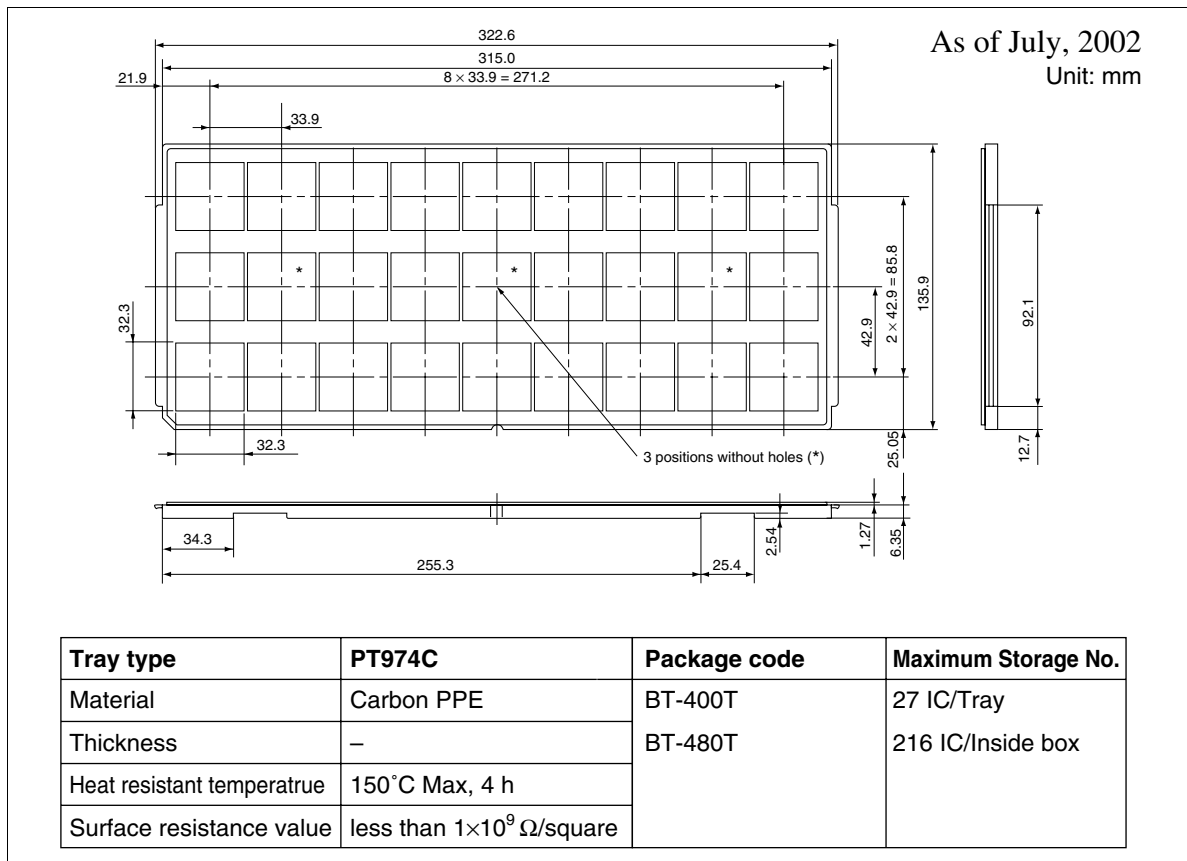
10. HLFBGA



Tray type	PT975C	Package code	Maximum Storage No.
Material	Carbon PPE	BT-352T	60 IC/Tray
Thickness	—		480 IC/Inside box
Heat resistant temperature	150°C Max, 4 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

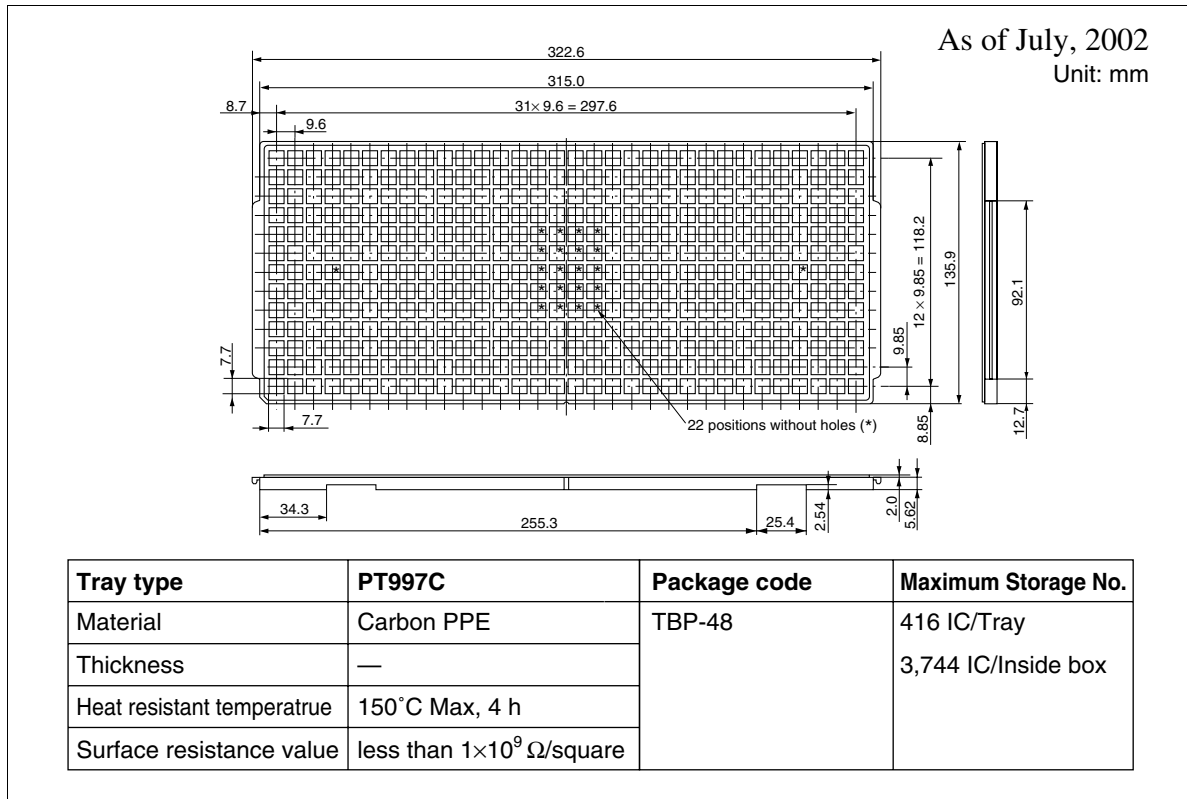
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

11. HBGA

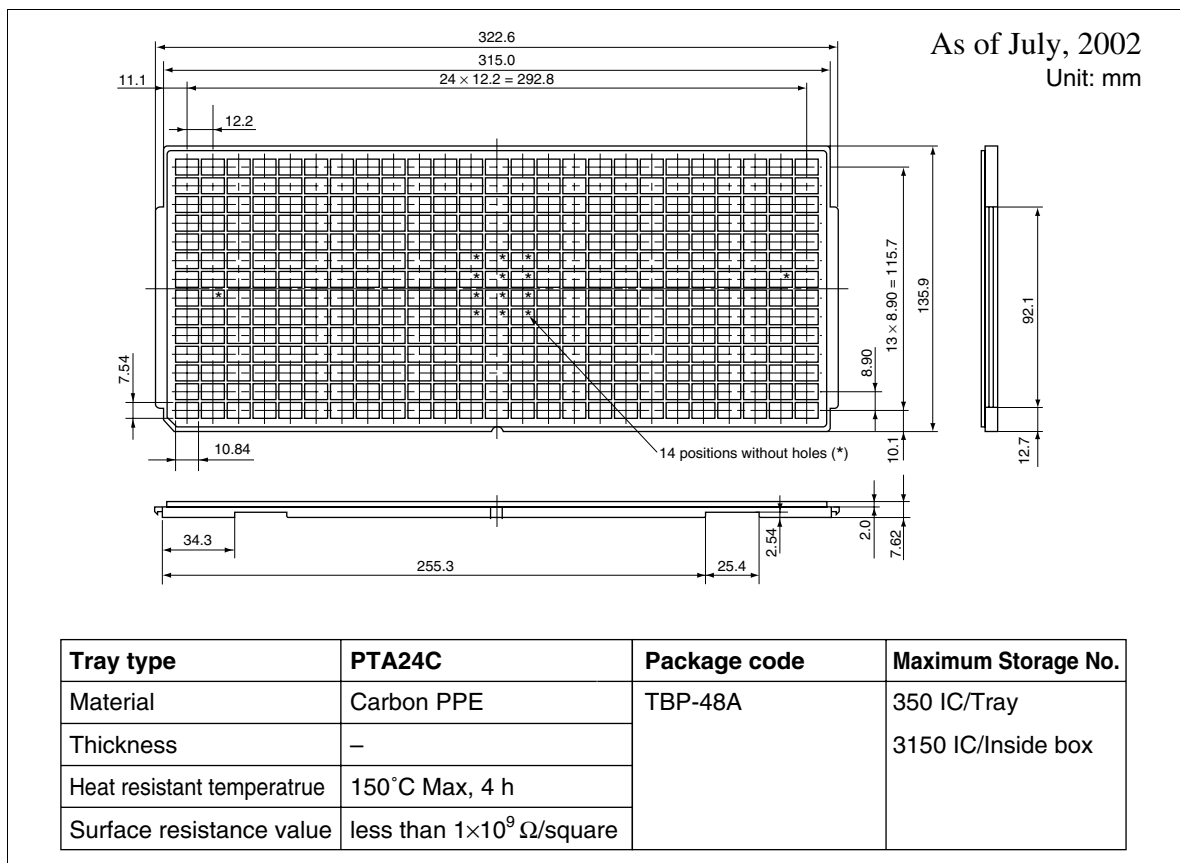


The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

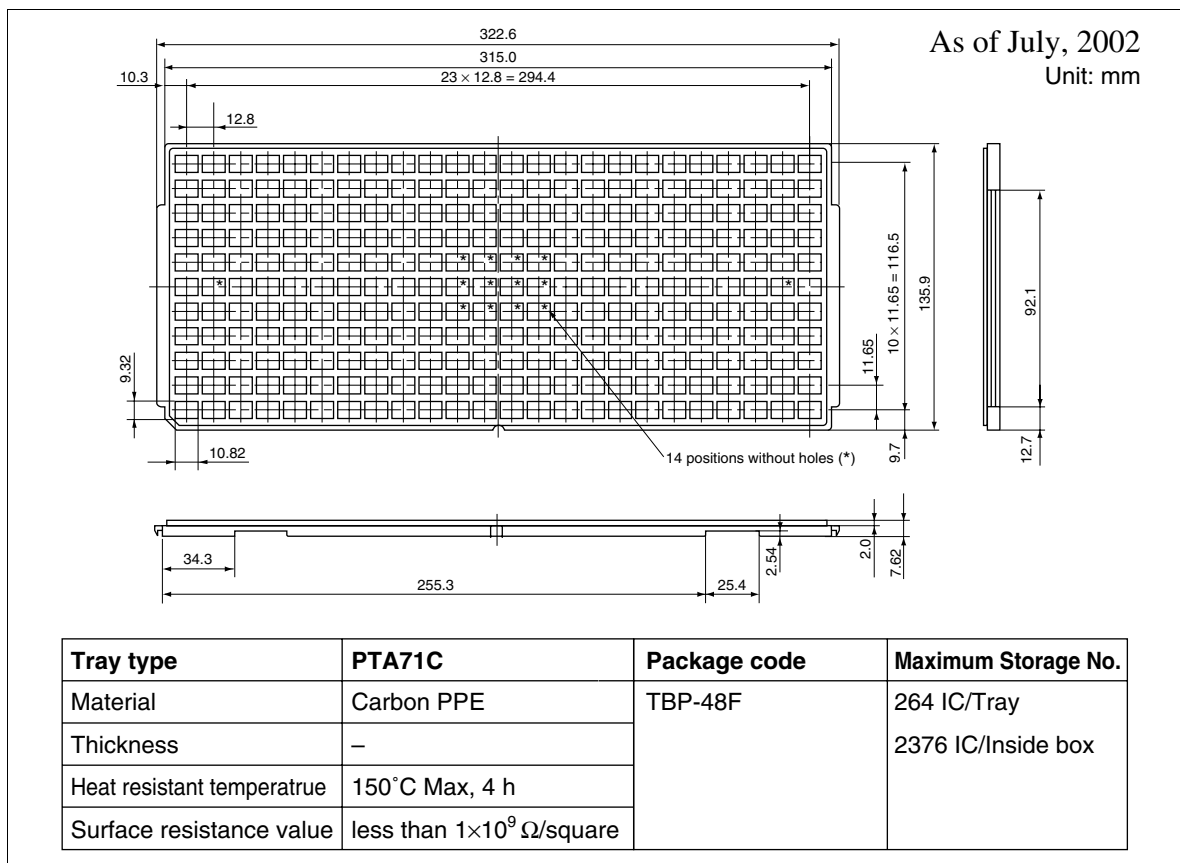
12. TFBGA



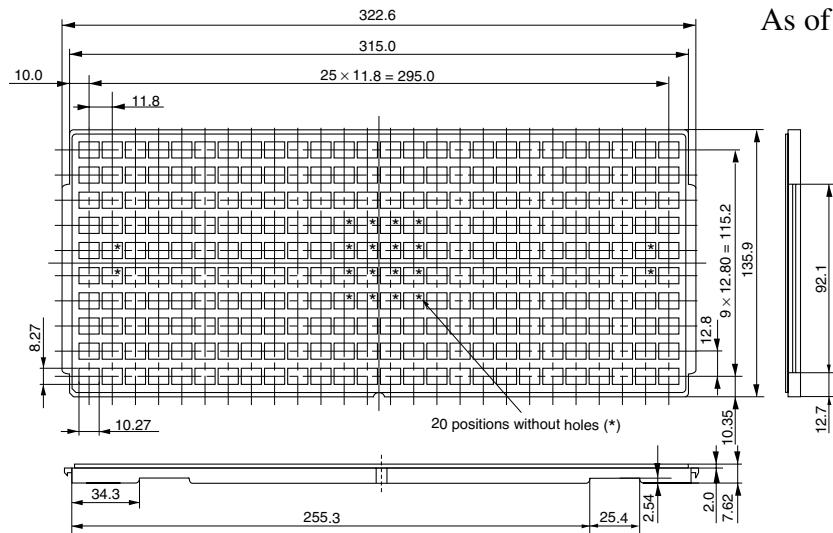
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



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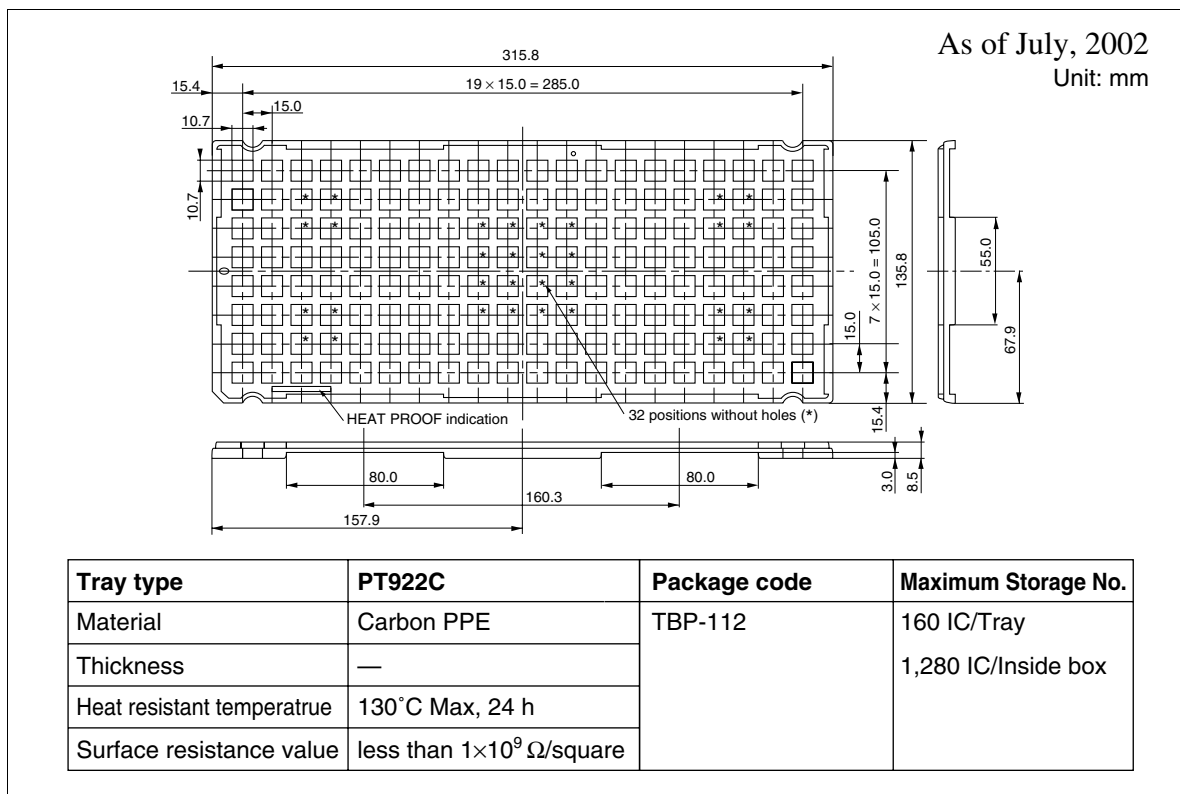
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



As of July, 2002
Unit: mm

Tray type	PTA47C	Package code	Maximum Storage No.
Material	Carbon PPE	TBP-65	260 IC/Tray
Thickness	—		2340 IC/Inside box
Heat resistant temperature	150°C Max, 4 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

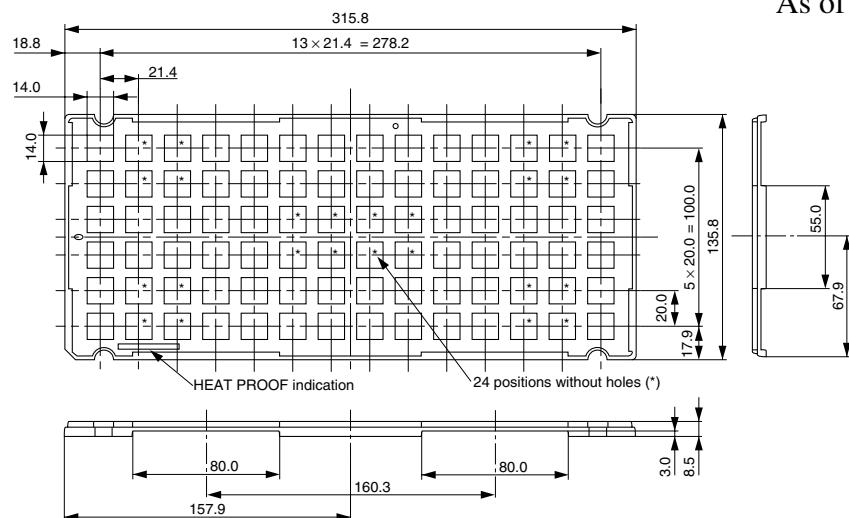
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

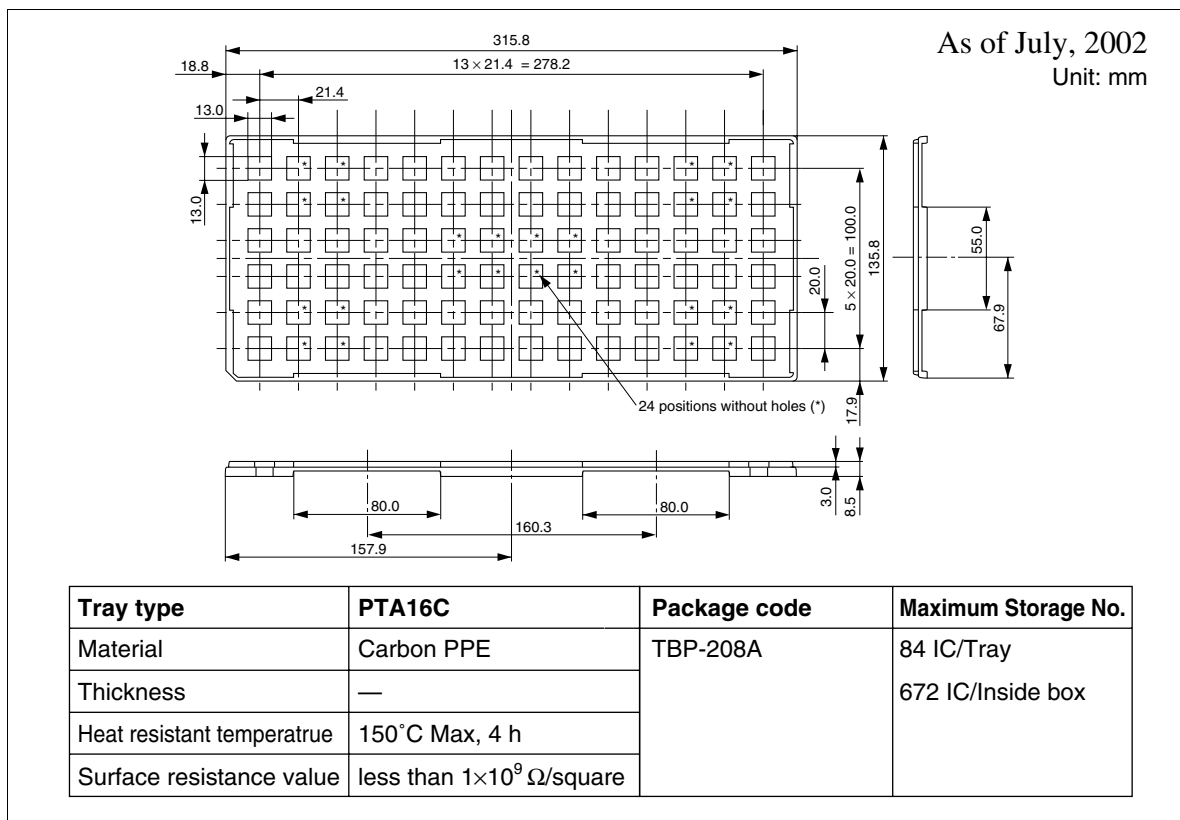
As of July, 2002

Unit: mm

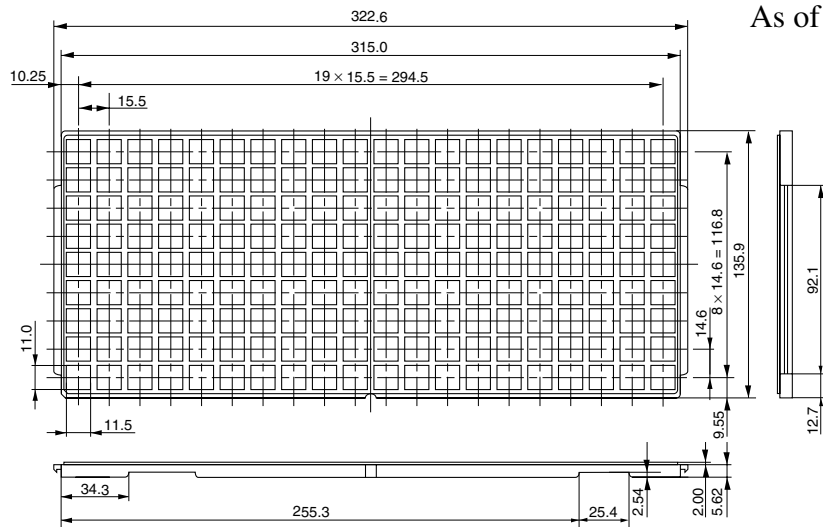


Tray type	PT939CM	Package code	Maximum Storage No.
Material	Carbon PPE	TBP-176	84 IC/Tray
Thickness	—		672 IC/Inside box
Heat resistant temperature	130°C Max, 24 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



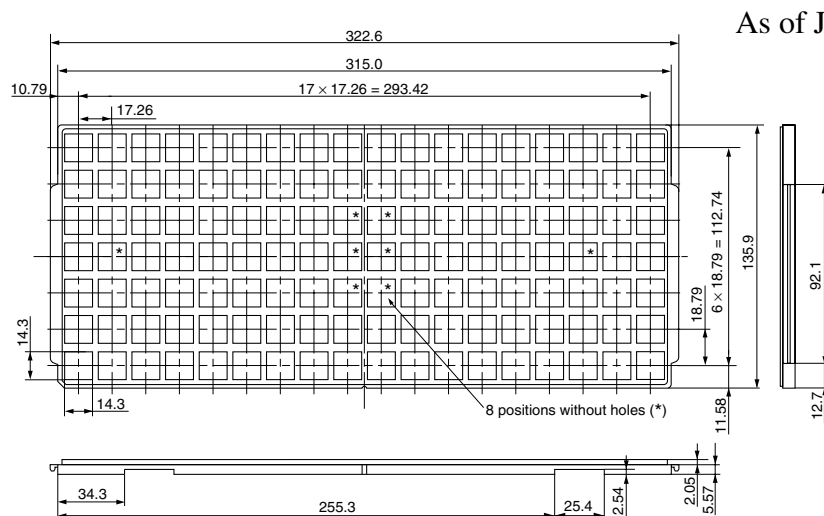
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



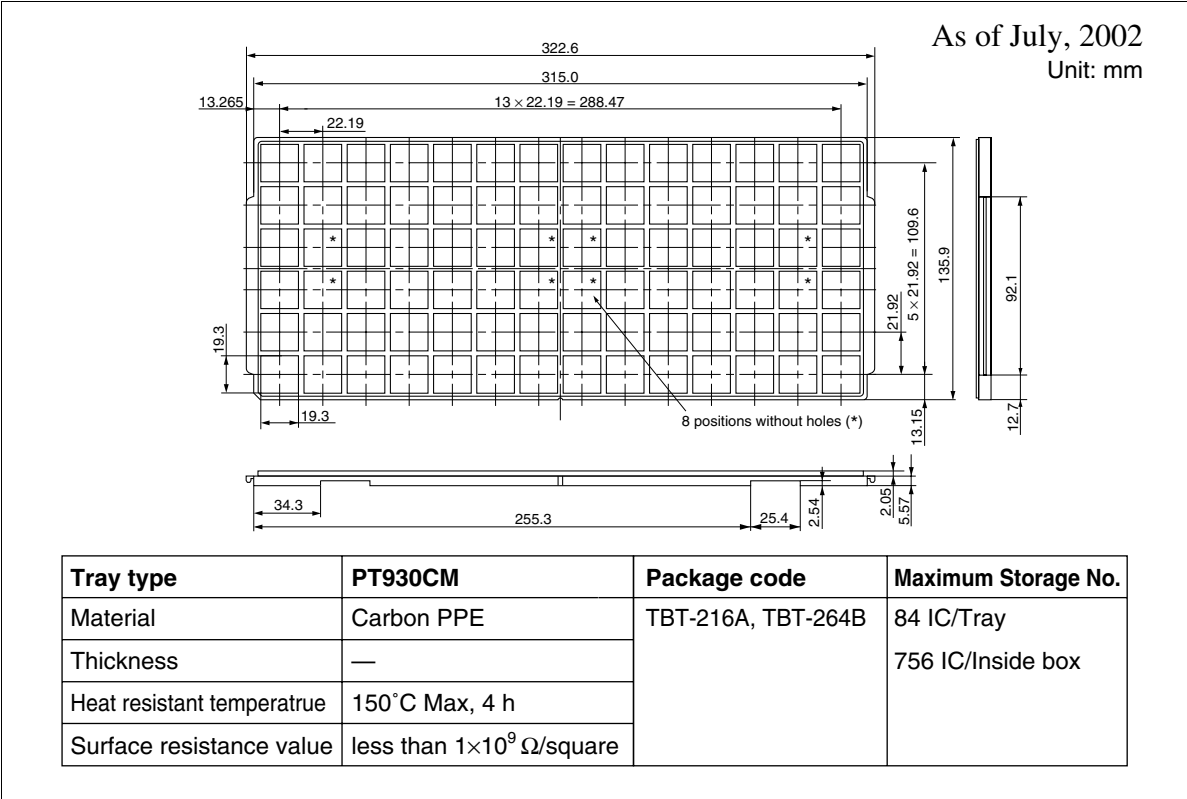
As of July, 2002
Unit: mm

Tray type	PT989C	Package code	Maximum Storage No.
Material	Carbon PPE	TBT-54, TBT-54R,	180 IC/Tray
Thickness	—	TBT-54A, TBT-54AR	1,620 IC/Inside box
Heat resistant temperature	150°C Max, 4 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

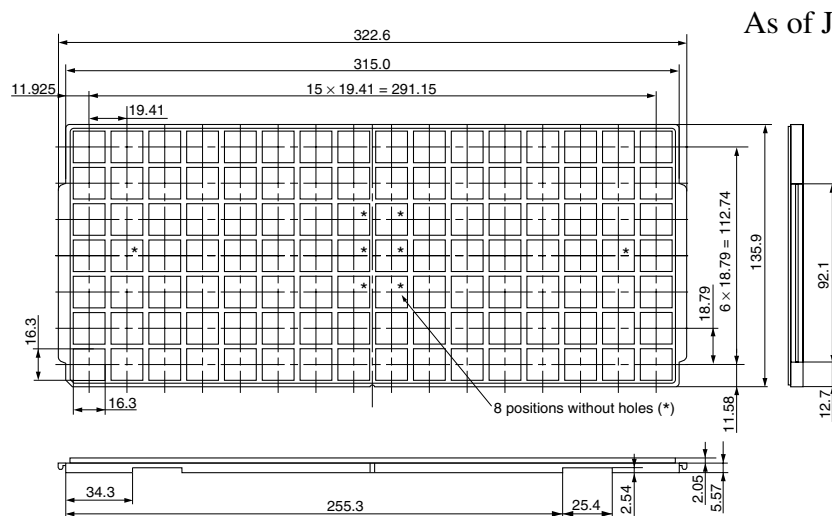
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.



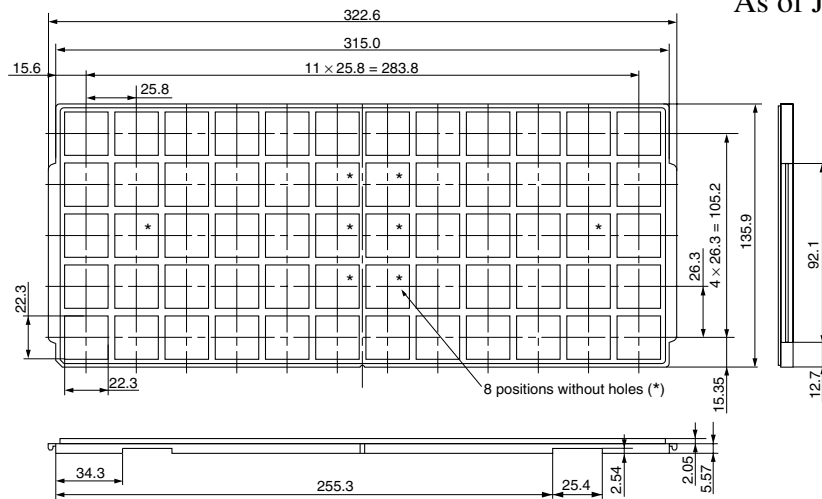
Tray type	PT929CM	Package code	Maximum Storage No.
Material	Carbon PPE	TBT-184A	126 IC/Tray
Thickness	—		1,134 IC/Inside box
Heat resistant temperature	150°C Max, 4 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office. However, for the TBT-264B in which lead-free pins were originally used, V is not added to the end of the package code.



Tray type	PT928CM	Package code	Maximum Storage No.
Material	Carbon PPE	TBT-216B	112 IC/Tray
Thickness	—		1,008 IC/Inside box
Heat resistant temperature	150°C Max, 4 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

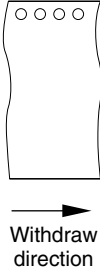
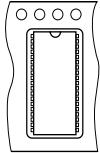
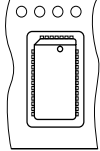
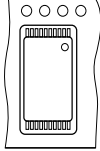
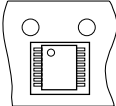
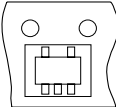
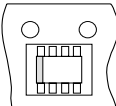
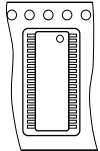


Tray type	PT947C	Package code	Maximum Storage No.
Material	Carbon PPE	TBT-264A	60 IC/Tray
Thickness	—		540 IC/Inside box
Heat resistant temperature	150°C Max, 4 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

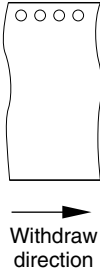
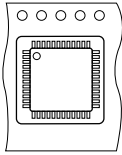
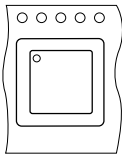
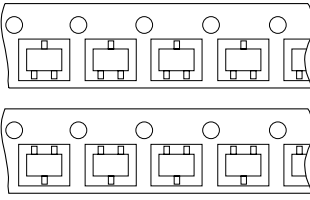
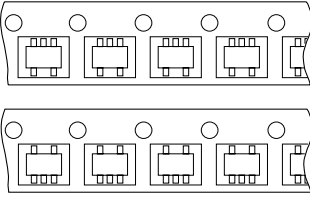
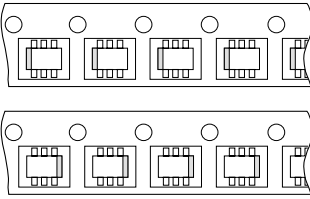
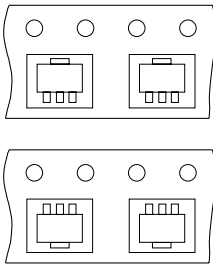
4.3.3 Emboss Type Taping for IC

- Package inserting method (Hitachi standard)

Package		
SOJ		
QFJ		
TSOP (I)		
SOP TSOP (II) HSOP SSOP TSSOP HTSSOP HSOI		
V-SON		
VSSOP		
TSOP (II) Reverse bend* ¹		

Note: 1. "R" is added to the end of the Hitachi code for this package type.

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Package	
QFP LQFP TQFP HQFP HLQFP HTQFP P-VQFN	
BGA LFBGA TFBGA	
MPAK	
CMPAK-5 MPAK-5	
CMPAK-6 TFBGA	
UPAK	

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm

The diagram illustrates the mechanical specifications of a tape package. It shows a cross-section of the tape with a 'Cover Tape' and a 'K0' dimension. The main view shows a sequence of components with dimensions: A0, B0, P, 4.0, 2.0, E, F, W, D1, and a hole diameter of 1.5. An arrow indicates the 'Tape withdraw direction'.

Package code	W	P	A0	B0	K0	E	F	D1	Maximum storage No.	Reel type
FP-8D, 8DC	12	8	6.6	5.3	2.3	1.75	5.5	1.5	2,500 IC/reel	B
FP-8DB	12	8	6.4	5.5	2.1	1.75	5.5	1.5	2,500 IC/reel	B
FP-8DF	16	12	8.3	6.8	3.3	1.75	7.5	1.6	1,500 IC/reel	A
FP-14DA, DAV	16	12	8.5	10.3	2.7	1.75	7.5	1.6	2,000 IC/reel	B
FP-14DNV	16	8	6.5	9.5	2.1	1.75	7.5	1.5	2,500 IC/reel	B
FP-16DA, DAV	16	12	8.5	10.3	2.7	1.75	7.5	1.6	2,000 IC/reel	B
FP-16DC	16	12	8.5	10.3	2.7	1.75	7.5	1.6	1,500 IC/reel	B
FP-16DNV	16	8	6.5	10.3	2.1	1.75	7.5	1.5	2,500 IC/reel	B
FP-20DA, DAV, 20DE	24	12	8.5	12.8	2.7	1.75	11.5	2.2	2,000 IC/reel	B
FP-20DBV	24	12	10.68	13.04	3.0	1.75	11.5	2.05	1,000 IC/reel	B
FP-24DB	24	16	12.5	16.3	3.2	1.75	11.5	2.0	1,000 IC/reel	B
FP-24DSA	16	12	8.5	8.6	2.7	1.75	7.5	1.6	2,000 IC/reel	B
FP-28TB, 40, 40A, 40B, 48C	16.0	12.0	9.75	9.75	1.5	1.75	7.5	1.55	2,000 IC/reel	A
FP-56, 56A, 56B, 56C	24.0	16.0	13.6	13.6	2.3	1.75	11.5	2.05	1,000 IC/reel	A
FP-64E	24	16	12.2	12.2	2.2	1.75	11.5	2.0	1,000 IC/reel	A
FP-48TB, FP-80E, 80H, 80K, 80N	24.0	20.0	18.0	18.0	2.8	1.75	11.5	2.05	800 IC/reel	A
FP-80TA	24	20	16.8	16.8	1.5	1.75	11.5	2.05	1,500 IC/reel	B
TFP-28DB	24	12	8.2	13.5	1.65	1.75	11.5	2.0	1,000 IC/reel	A
TFP-32DA	24	12	8.6	14.4	1.65	1.75	11.5	2.05	1,000 IC/reel	A
TFP-56A	16	12	9.2	9.2	1.2	1.75	7.5	1.55	2,500 IC/reel	B
TFP-64B, 64C, 64FV, 64TA	24	16	12.2	12.2	1.6	1.75	11.5	2.05	2,000 IC/reel	B
TFP-80C	24	24	14.5	14.5	1.3	1.75	11.5	2.0	1,000 IC/reel	A
TFP-100B	24	24	16.35	16.35	1.3	1.75	11.5	2.0	1,000 IC/reel	A
TTP-8DA	12	8	6.9	3.6	1.7	1.75	5.5	1.5	3,000 IC/reel	B
TTP-8DB	8	4	2.25	3.4	1.0	1.75	3.5	1.05	3,000 IC/reel	C

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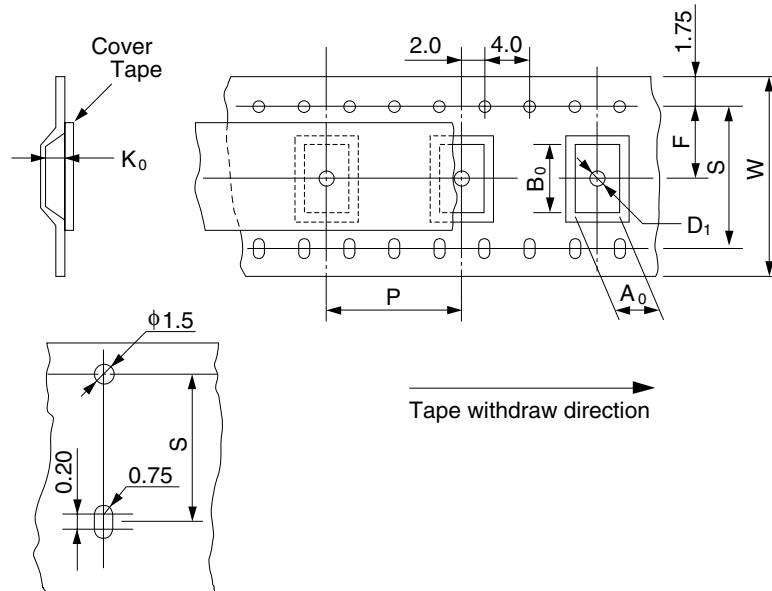
Package code	W	P	A0	B0	K0	E	F	D1	Maximum storage No.	Reel type
TTP-14D, DV, 16DA,DAV	12	8	6.5	5.1	1.5	1.75	5.5	1.6	2,000 IC/reel	B
TTP-20DA, DAV	16	8	6.5	6.7	1.5	1.75	7.5	1.6	2,000 IC/reel	B
TTP-24DB, DBV	16	12	6.5	8.0	1.5	1.75	7.5	1.6	1,000 IC/reel	B
TTP-48DB, DBV	24	12	8.6	13	1.8	1.75	11.5	1.6	1,000 IC/reel	B
TTP-48DEV	24	12	6.5	9.8	1.5	1.75	11.5	1.6	1,000 IC/reel	B
TTP-56DA, DAV, 56DT	24	12	8.6	14.6	1.65	1.75	11.5	2.05	1,000 IC/reel	B
TTP-56DBV	24	12	6.5	11.4	1.5	1.75	11.5	1.6	1,000 IC/reel	B
TTP-80DV, 64DV	24	12	8.55	17.5	1.55	1.75	11.5	2.0	1,000 IC/reel	B
CP-24D	24	12	8.9	16.3	4.15	1.75	11.5	2.0	1,000 IC/reel	A
CP-28DN	24	12	9.0	18.6	4.2	1.75	11.5	2.0	1,000 IC/reel	A
CP-18	24	12	8.5	13.8	3.6	1.75	11.5	1.55	1,000 IC/reel	A
TNP-5D	8	4	1.75	1.75	0.9	1.75	3.5	1.0	3,000 IC/reel	C
TNP-14	12	8	4.4	4.2	1.2	1.75	5.65	1.6	2,000 IC/reel	B
TNP-16AV	12	8	3.3	3.3	0.9	1.75	5.5	1.5	2,000 IC/reel	B
TNP-24AV	12	8	4.3	5.3	1.2	1.75	5.5	1.6	2,000 IC/reel	B
BP-72A	24	12	7.6	11.6	2.0	1.75	11.5	2.0	2,000 IC/reel	A
BP-240A	24	24	13.3	13.3	2.4	1.75	11.5	2.0	1,000 IC/reel	A
BP-256C	24	16	11.25	11.25	2.5	1.75	11.5	2.0	1,000 IC/reel	A
TBP-65	16	12	7.2	9.2	1.7	1.75	7.5	1.6	2,000 IC/reel	A
TBP-208A	24	16	12.3	12.3	2.0	1.75	11.5	2.0	1,000 IC/reel	A
CMPAK-5 CMPAK-6	8.0	4.0	2.25	2.45	1.1	1.75	3.5	1.05	3,000 IC/reel	C
MPAK	8.0	4.0	3.1	3.2	1.25	1.75	3.5	1.1	3,000 IC/reel 12,000 IC/reel	C
MPAK-5	8.0	4.0	3.3	3.3	1.5	1.75	3.5	1.05	3,000 IC/reel	C
UPAK	12.0	8.0	4.8	4.4	1.7	1.5	5.65	1.6	1,000 IC/reel 4,000 IC/reel	C

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

2. Emboss tape: Tape width 32 to 44 mm

As of July, 2002

Unit: mm

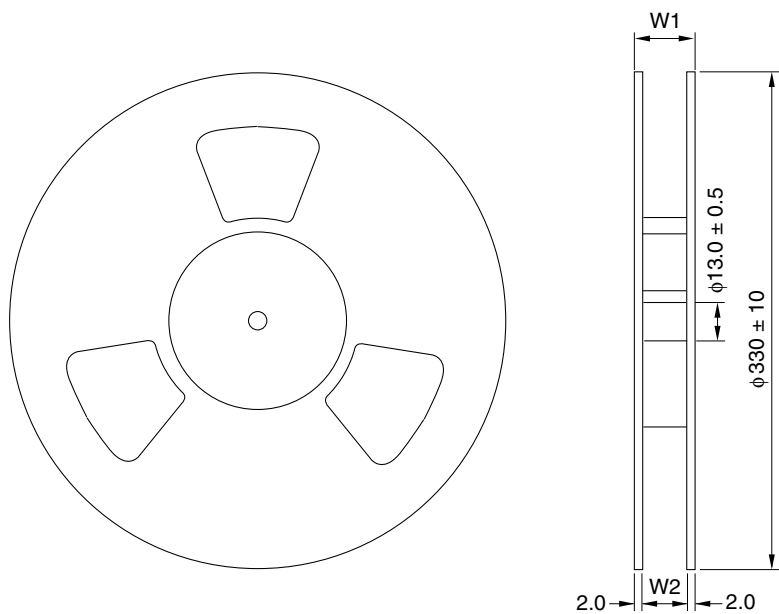


Package code	W	P	A0	B0	K0	F	S	D1	Maximum storage No.	Reel type
FP-26DT, 26DTA	32	16	13.0	20.1	2.9	14.2	28.4	2.2	1,000 IC/reel	A
FP-32D	32	16	14.65	21.15	3.55	14.2	28.4	2.05	1,000 IC/reel	A
FP-40D	44	24	14.7	26.3	3.1	20.2	40.4	2.0	750 IC/reel	A
CP-32DB	32	16	11.55	21.45	4.05	14.2	28.4	2.05	1,000 IC/reel	A
CP-36D	32	16	11.55	23.85	4.15	14.2	28.4	2.05	1,000 IC/reel	A
CP-44D	44	16	11.65	29.2	4.05	20.2	40.4	2.05	750 IC/reel	A
CP-44	32	24	17.85	17.85	4.95	14.2	28.4	2.05	500 IC/reel	A
CP-52	32	24	20.55	20.5	5.35	14.2	28.4	2.05	500 IC/reel	A
CP-68	44	32	26.0	25.9	4.9	20.2	40.4	2.05	250 IC/reel	A
CP-84	44	36	30.9	30.8	4.9	20.2	40.4	2.05	250 IC/reel	A
TFP-48DA	32	16	12.6	20.4	1.6	14.2	28.4	2.0	1,000 IC/reel	A
TTP-44DB TTP-44DE	32	16	12.05	18.95	1.65	14.2	28.4	2.05	1,000 IC/reel	A
TTP-32D, 32DR	32	16	12.2	21.75	1.85	14.2	28.4	2.05	1,000 IC/reel	A
MP-26DT	32	12	10.45	19.4	3.0	14.2	28.4	2.2	1,000 IC/reel	A
BP-119E	32	20	14.3	22.3	2.7	14.2	28.4	2.05	800 IC/reel	A

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Reel type : A

As of July, 2002
Unit: mm



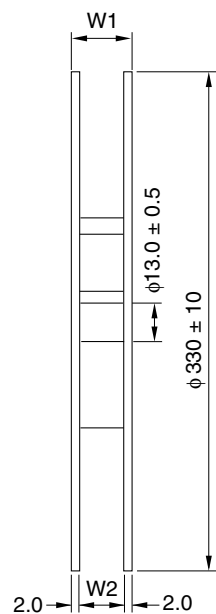
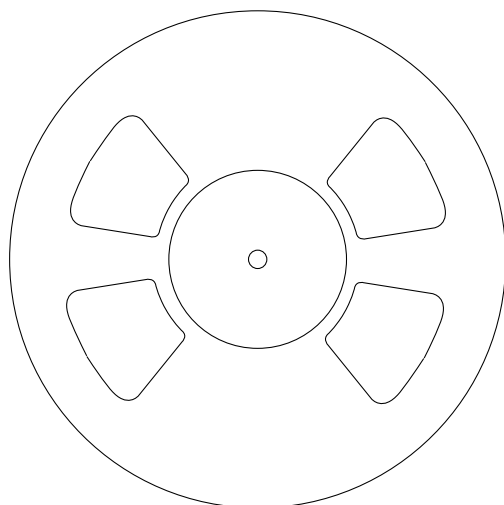
Tape width : W	W1	W2
16	20.4	16.4
24	28.4	24.4
32	36.4	32.4
44	48.4	44.4

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Reel type : B

As of July, 2002

Unit: mm

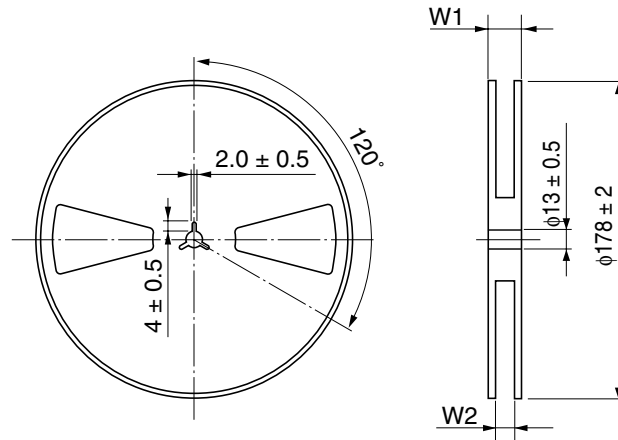


Tape width : W	W1	W2
12	17.4	13.4
16	21.4	17.4
24	29.4	25.4

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Reel type : C

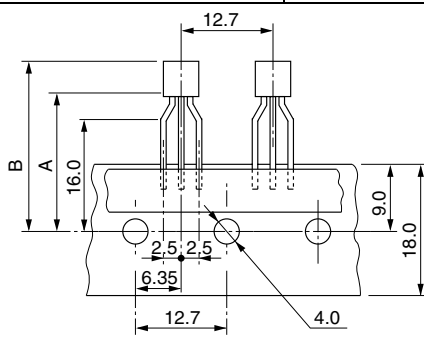
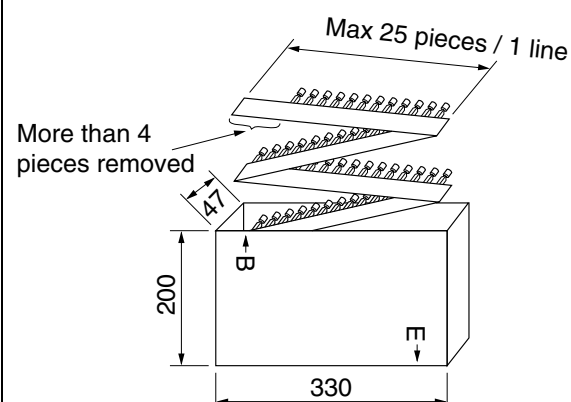
As of July, 2002
Unit: mm



Tape width : W	W1	W2
8	13.0	9.0
12	17.0	13.0

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

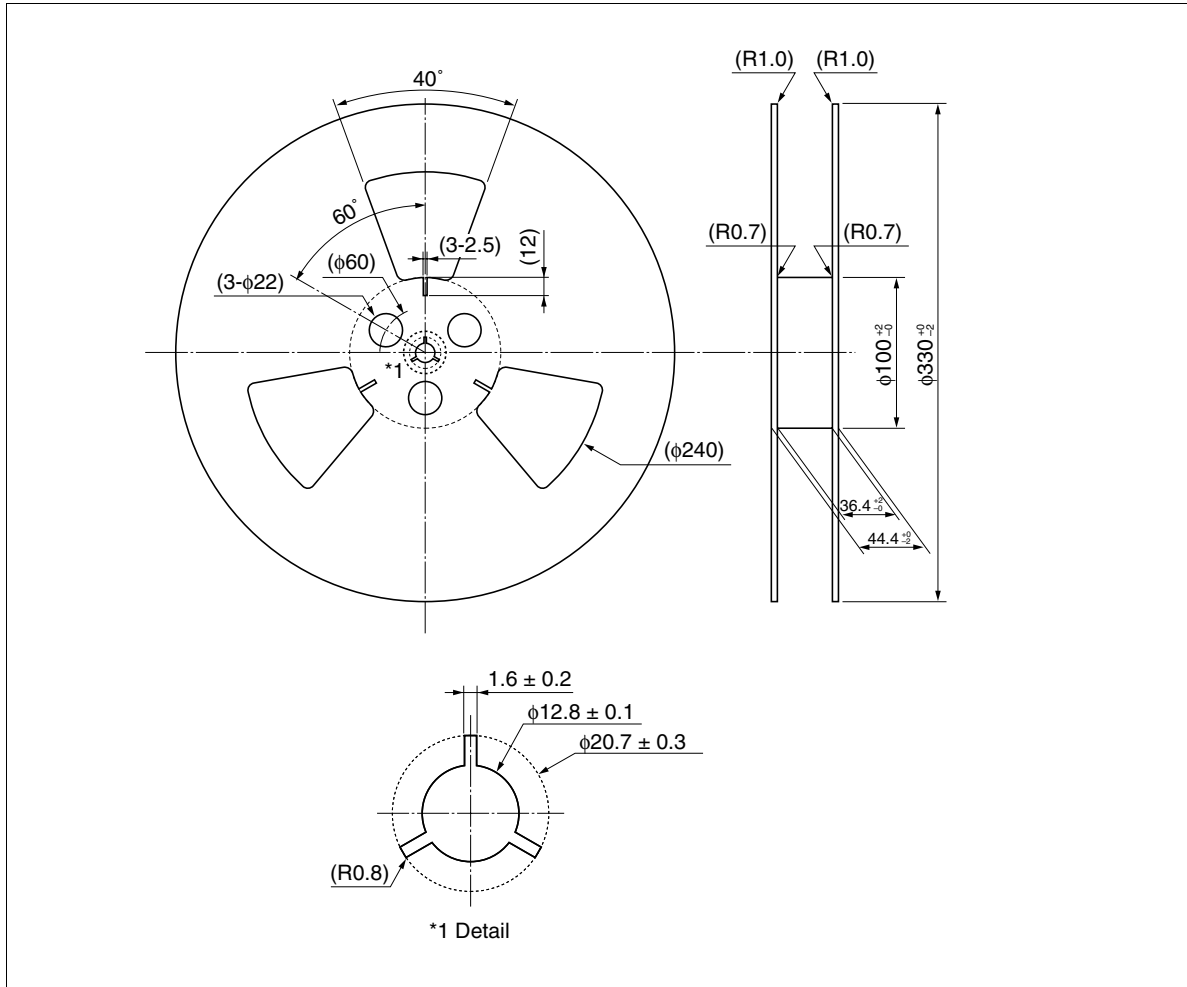
4.3.4 Radial Type Taping for IC

Taping	Package Code	Form and Dimensions	Appearance	Quantity									
AMMO Pack	TO-92(1) TO-92 Mod	<div><table><tr><td></td><td>TO-92(1)</td><td>TO-92Mod</td></tr><tr><td>A</td><td>19.0</td><td>19.0</td></tr><tr><td>B</td><td>25.0 max</td><td>28.0 max</td></tr></table></div>		TO-92(1)	TO-92Mod	A	19.0	19.0	B	25.0 max	28.0 max		2500 pcs
	TO-92(1)	TO-92Mod											
A	19.0	19.0											
B	25.0 max	28.0 max											
		<div></div>											

4.4 Packing Specifications for IC Packages for Smartcard

4.4.1 Reel for KP-8

- Reel dimensions



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

4.5 Packing Specifications for Flash Card

4.5.1 Tray for MultiMediaCard™

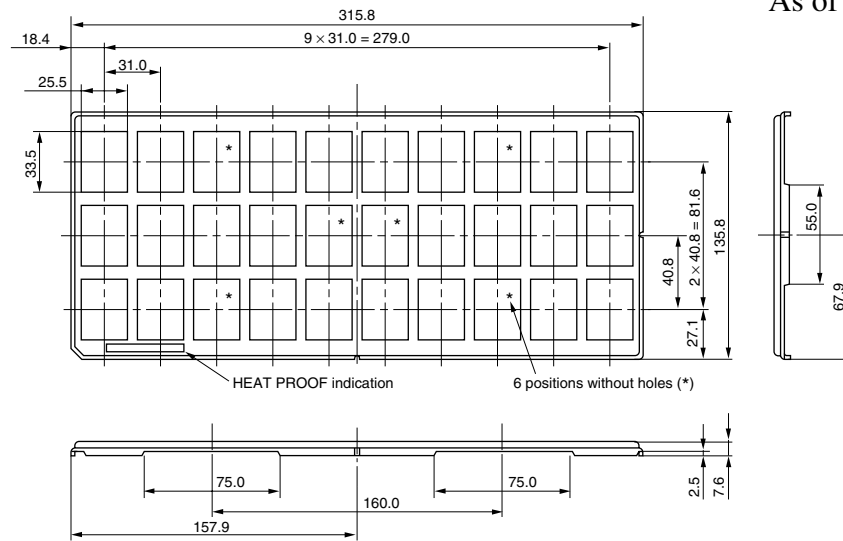
- Tray materials

In this document, tray materials are abbreviated as follows.

Tray material	Abbreviation
Polyphenylene ether	PPE

- In this document, standard type of tray is shown.

As of July, 2002
Unit: mm

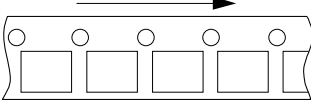
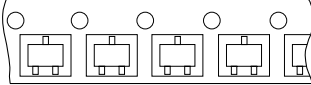
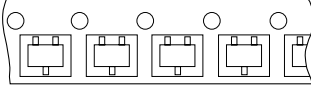
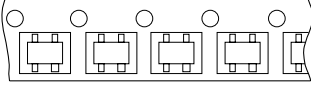
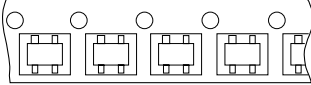
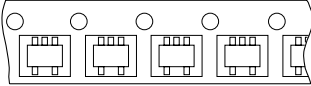
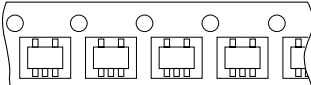
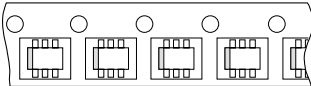
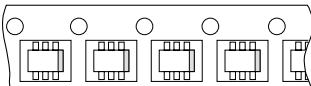


Tray type	PTA04C	Package	Maximum Storage No.
Material	Carbon PPE	MultiMediaCard™	30 IC/Tray
Thickness	—		300 IC/Inside box
Heat resistant temperature	130°C Max, 24 h		
Surface resistance value	less than $1 \times 10^9 \Omega/\text{square}$		

4.6 Packing Specifications for Transistors

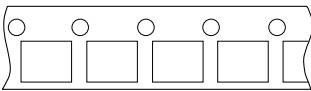
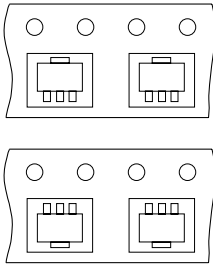
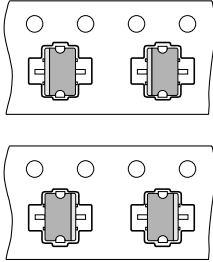
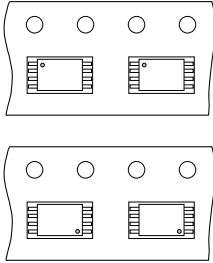
4.6.1 Emboss Type Taping for Transistors

- Package inserting method (Hitachi standard)

Package	<div style="text-align: center;"> Withdraw direction  </div>
MFPAK SMPAK CMPAK MPAK (T)	 
CMPAK-4 (T) MPAK-4	 
CMPAK-5 (T) MPAK-5	 
EMFPAK-6 SMFPAK-6 CMPAK-6 CMFPAK-6 MPAK-6 TSOP-6	 

Note: '(T)' in MPAK(T), CMPAK-4(T), CMPAK-5(T) indicates transistor packages.
However, '(T)' is omitted in each product's document.

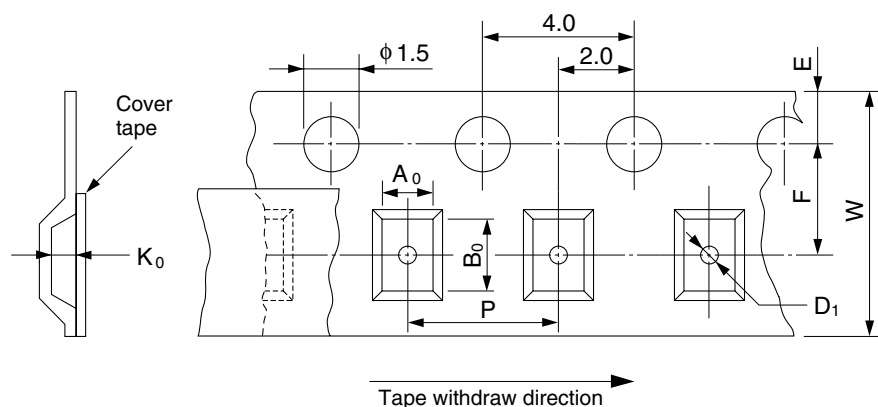
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Package	<div style="text-align: center;"> Withdraw direction  </div>
UPAK DPAK(S) LDPAK(S)-(1)	<div style="text-align: center;">  </div>
RP8P	<div style="text-align: center;">  </div>
FP-8DA TTP-8D	<div style="text-align: center;">  </div>

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

1. Emboss type dimensions

As of July, 2002
Unit: mm



Package code	W	P	Ao	Bo	Ko	E	F	D1	Maximum storage No.
EMFPAK-6	8.0	4.0	1.45	1.3	0.6	1.75	3.5	0.5	5,000 TRS/reel
MFPAK	8.0	2.0	1.55	1.4	0.7	1.75	3.5	0.5	9,000 TRS/reel
SMPAK	8.0	4.0	1.85	1.9	0.95	1.75	3.5	0.8	3,000 TRS/reel
SMFPAK-6	8.0	4.0	2.25	2.45	1.1	1.75	3.5	1.05	5,000 TRS/reel
CMPAK	8.0	4.0	2.4	2.35	1.15	1.75	3.5	1.1	3,000 TRS/reel
CMPAK-4 (T) CMPAK-5 (T) CMPAK-6 CMFPAK-6	8.0	4.0	2.25	2.45	1.1	1.75	3.5	1.05	3,000 TRS/reel
MPAK (T)	8.0	4.0	3.1	3.2	1.25	1.75	3.5	1.1	3,000 TRS/reel 12,000 TRS/reel
MPAK-4	8.0	4.0	3.0	3.1	1.2	1.75	3.5	1.1	3,000 TRS/reel 12,000 TRS/reel
MPAK-5 MPAK-6 TSOP-6	8.0	4.0	3.3	3.3	1.5	1.75	3.5	1.05	3,000 TRS/reel
UPAK	12.0	8.0	4.8	4.4	1.7	1.5	5.65	1.6	1,000 TRS/reel 4,000 TRS/reel
RP8P	12.0	8.0	6.9	6.4	1.5	1.75	5.5	1.7	1,000 TRS/reel 3,000 TRS/reel
FP-8DA	12.0	8.0	6.6	5.0	2.0	1.75	5.5	1.5	2,500 TRS/reel
TTP-8D	12.0	8.0	6.6	3.3	1.7	1.75	5.5	1.5	2,500 TRS/reel
DPAK(S)	16.0	8.0	6.8	10.6	3.0	1.75	7.5	1.8	3,000 TRS/reel
LDDPAK(S)-(1)	24.0	12.0	10.8	13.9	4.8	1.75	11.5	2.0	1,000 TRS/reel
LFPK	12.0	8.0	6.9	5.3	1.7	1.75	5.5	1.5	2,500 TRS/reel

Note: '(T)' in CMPAK-4(T), CMPAK-5(T), MPAK (T) indicates transistor packages.

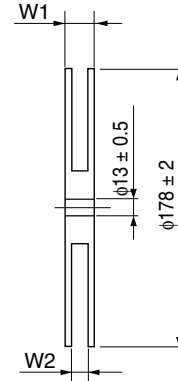
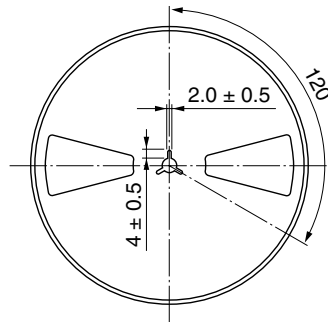
However, '(T)' is omitted in each product's document.

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office. However, for the LFPK in which lead-free pins were originally used, V is not added to the end of the package code.

As of July, 2002
Unit: mm

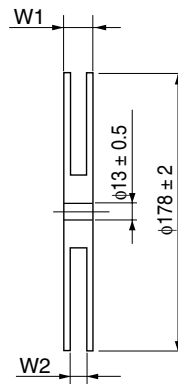
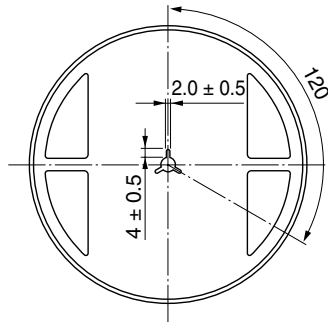
Reel type A

Package code	Tape width	W1	W2
EMFPAK-6	8	13.0	9.0
MFPAK			
SMPAK			
SMFPAK-6			
CMPAK			
CMPAK-4 (T)			
CMPAK-5 (T)			
CMPAK-6			
CMFPAK-6			
MPAK (T)			
MPAK-4			
MPAK-5			
MPAK-6			
TSOP-6			
UPAK	12	17.0	13.0



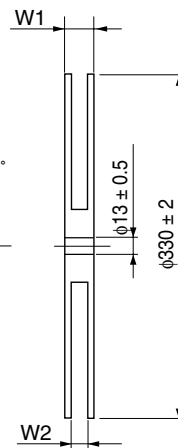
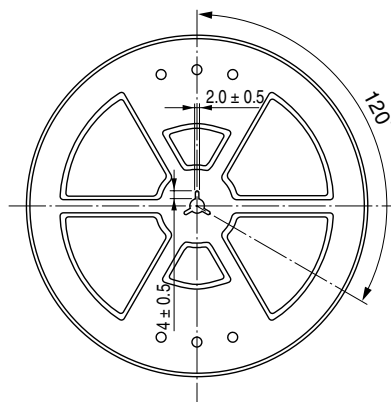
Reel type B

Package code	Tape width	W1	W2
MPAK-5	8	11.4	9.0
MPAK-6			
UPAK	12	15.4	13.0
RP8P			



Reel type C

Package code	Tape width	W1	W2
MPAK (T)	8	13.5	9.5
MPAK-4			
UPAK	12	17.5	13.5
RP8P			



Note: 'T' in CMPAK-4(T), CMPAK-5(T), MPAK(T) indicates transistor packages.

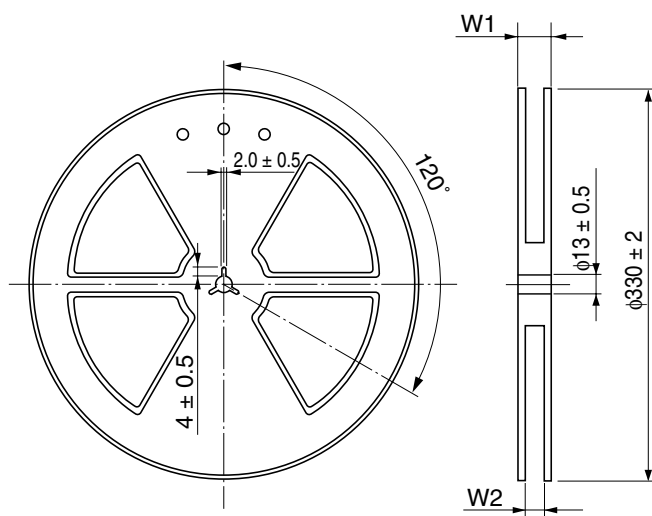
However, 'T' is omitted in each product's document.

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm

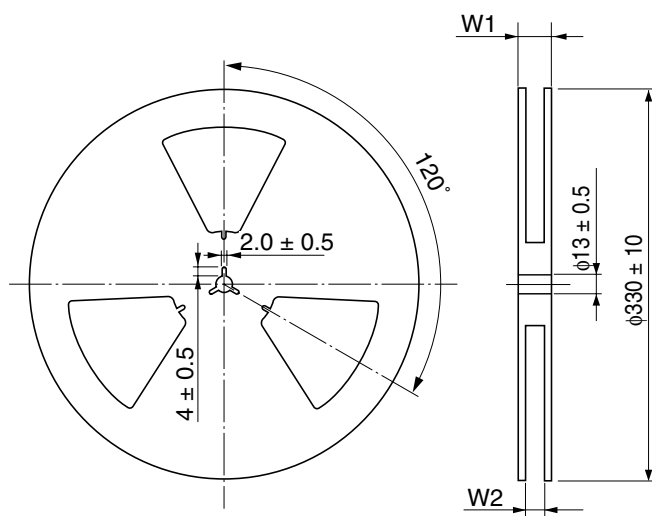
Reel type D

Package code	Tape width	W1	W2
TTP-8D	12	17.4	13.4
FP-8DA			
LFP-8DA			



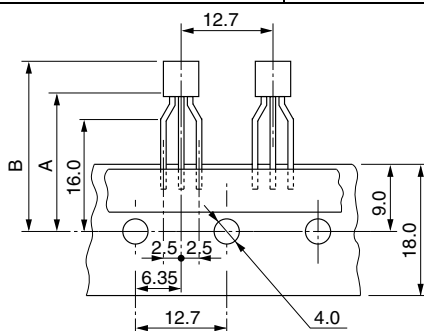
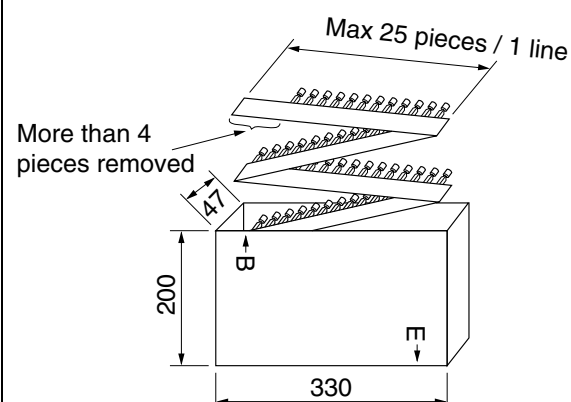
Reel type E

Package code	Tape width	W1	W2
DPAK(S)	16	21.5	17.5
LDP-8(S)-(1)	24	29.5	25.5



The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office. However, for the LFP-8DA in which lead-free pins were originally used, V is not added to the end of the package code.

4.6.2 Radial Type Taping for Transistors

Taping	Package Code	Form and Dimensions	Appearance	Quantity												
AMMO Pack	SPAK TO-92(1) TO-92(2) TO-92 Mod	<div><table><tr><td></td><td>SPAK</td><td>TO-92(1) TO-92(2)</td><td>TO-92Mod</td></tr><tr><td>A</td><td>19.7</td><td>19.0</td><td>19.0</td></tr><tr><td>B</td><td>23.5 max</td><td>25.0 max</td><td>28.0 max</td></tr></table></div>		SPAK	TO-92(1) TO-92(2)	TO-92Mod	A	19.7	19.0	19.0	B	23.5 max	25.0 max	28.0 max		2500 pcs
	SPAK	TO-92(1) TO-92(2)	TO-92Mod													
A	19.7	19.0	19.0													
B	23.5 max	25.0 max	28.0 max													
		<div><p>Max 25 pieces / 1 line</p><p>More than 4 pieces removed</p><p>47</p><p>200</p><p>330</p><p>B</p><p>E</p></div>														

4.6.3 Magazines for Transistor Array Packages

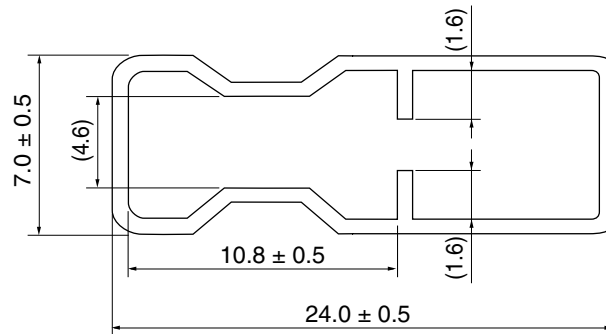
- Magazine material

In this document, magazine materials are abbreviated as follows.

Magazine material	Abbreviation
Polyvinyl chloride	PVC

- In this document, standard types of magazines are shown.

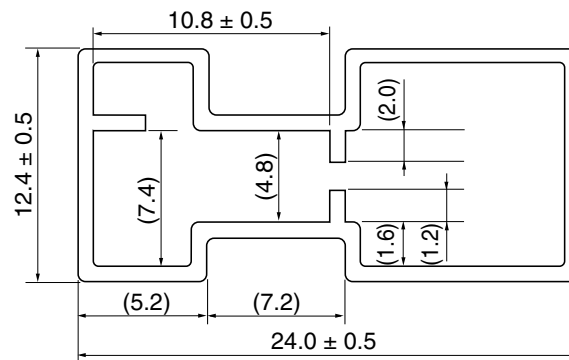
As of July, 2002
Unit: mm



Magazine type	PM462SA	Package code	Maximum Storage No.
Material	PVC	SP-10	20 TRS/Magazine
Thickness	0.7 ± 0.2 mm	SP-12	17 TRS/Magazine
Length	550 ± 2 mm		
Dimensional tolerance	—		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

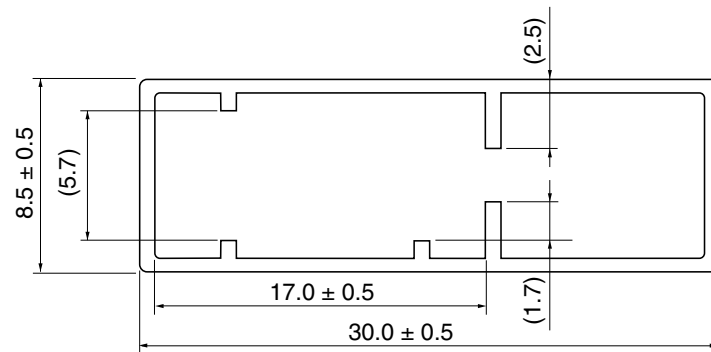
As of July, 2002
Unit: mm



Magazine type	PM462FA	Package code	Maximum Storage No.
Material	PVC	SP-10	20 TRS/Magazine
Thickness	0.8 ± 0.2 mm	SP-12	17 TRS/Magazine
Length	550 ± 2 mm		
Dimensional tolerance	—		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

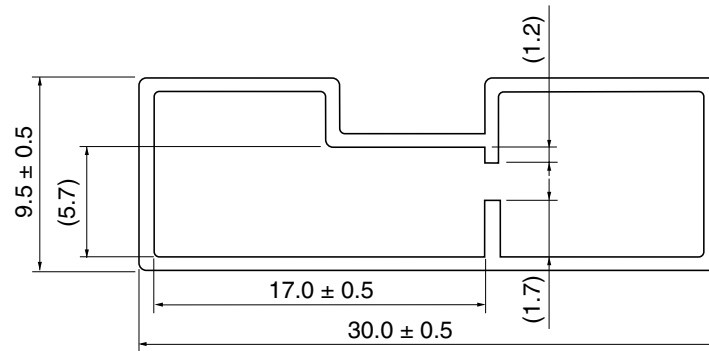
As of July, 2002
Unit: mm



Magazine type	PM479	Package code	Maximum Storage No.
Material	PVC	SP-12TA	15 TRS/Magazine
Thickness	0.7 ± 0.2 mm		
Length	510 ± 2 mm		
Dimensional tolerance	—		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm



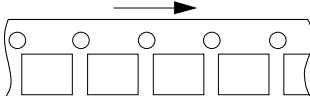
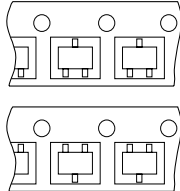
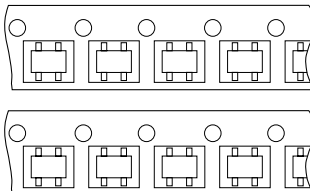
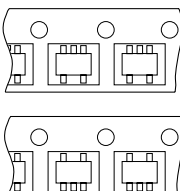
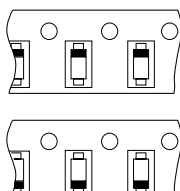
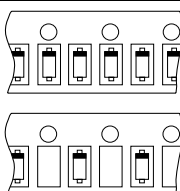
Magazine type	PM525	Package code	Maximum Storage No.
Material	PVC	SP-12TA	15 TRS/Magazine
Thickness	0.7 ± 0.2 mm		
Length	510 ± 2 mm		
Dimensional tolerance	—		

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

4.7 Packing Specifications for Diodes

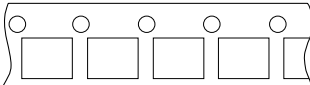
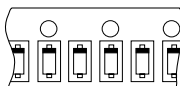
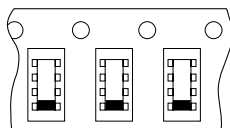
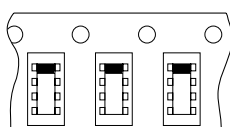
4.7.1 Emboss Type Taping for Diodes

- Package Inserting Method (Hitachi standard)

Package	<div style="text-align: center;"> Withdraw direction  </div>
CMPAK MPAK (D) MFPAK	
CMPAK-4 (D)	
MPAK-5 CMPAK-5 (D) VSON-5	
LLD SRP URP	
UFP	

Note: '(D)' in CMPAK-4(D), CMPAK-5(D), MPAK(D) indicates diode packages.
However, '(D)' is omitted in each product's document.

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Package	<div data-bbox="820 199 1128 325"> <p>Withdraw direction →</p>  </div>
SFP EFP	<div data-bbox="885 346 1063 430">  </div>
MOP	<div data-bbox="860 451 1088 577">  </div> <div data-bbox="860 598 1088 724">  </div>

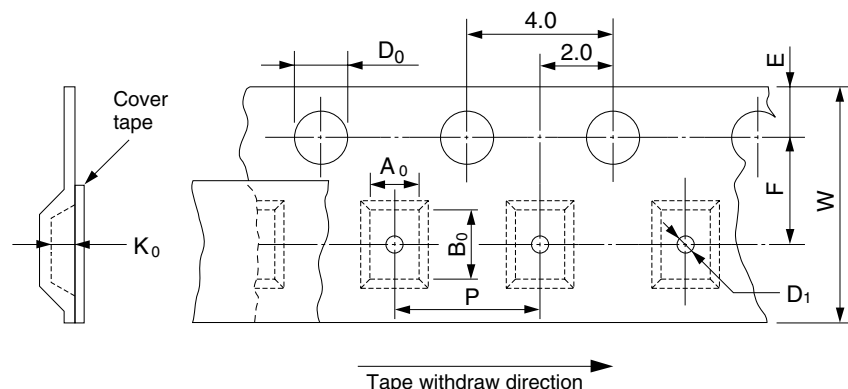
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

1. Emboss type taping dimensions

- Refer to P.456 to P.460 for the details of dimensions.

As of July, 2002

Unit: mm



Package code	W	P	Ao	Bo	Ko	E	F	D0	D1	Maximum storage No.
MPAK (D)	8.0	4.0	3.1	3.3	1.4	1.75	3.5	1.5	1.1	3,000 PCS/reel 12,000 PCS/reel
MPAK-5	8.0	4.0	3.3	3.3	1.5	1.75	3.5	1.55	1.05	3,000 PCS/reel
CMPAK	8.0	4.0	2.3	2.65	1.25	1.75	3.5	1.55	1.05	3,000 PCS/reel
CMPAK-4 (D)	8.0	4.0	2.3	2.4	1.15	1.75	3.5	1.55	1.05	3,000 PCS/reel
CMPAK-5 (D)	8.0	4.0	2.05	2.25	1.1	1.75	3.5	1.55	1.05	3,000 PCS/reel
VSON-5	8.0	4.0	1.75	1.75	0.90	1.75	3.5	1.5	1.0	3,000 PCS/reel
MFPAK	8.0	2.0	1.55	1.4	0.7	1.75	3.5	1.55	0.4	9,000 PCS/reel
SRP	8.0	4.0	1.9	4.1	1.35	1.55	3.5	1.5	1.1	3,000 PCS/reel
URP	8.0	4.0	1.5	2.9	1.25	1.75	3.5	1.5	1.1	3,000 PCS/reel 10,000 PCS/reel
LLD	8.0	4.0	1.7	3.7	1.55	1.75	3.5	1.5	1.0	2,500 PCS/reel
UFP	8.0	2.0	1.0	1.85	0.73	1.75	3.5	1.55	0.5	4,000 PCS/reel 8,000 PCS/reel
SFP	8.0	2.0	1.12	1.65	0.6	1.75	3.5	1.55	0.5	8,000 PCS/reel
EFP	8.0	2.0	0.67	1.1	0.56	1.75	3.5	1.55	0.5	10,000 PCS/reel
MOP	12.0	4.0	3.25	5.0	1.35	1.75	5.5	1.5	1.1	3,000 PCS/reel

Note: '(D)' in CMPAK-4(D), CMPAK-5 (D), MPAK (D) indicates diode packages.

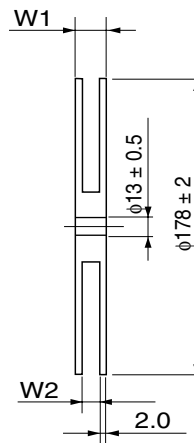
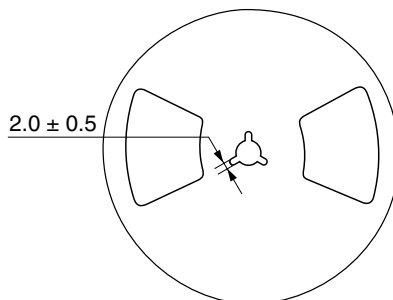
However, '(D)' is omitted in each product's document.

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm

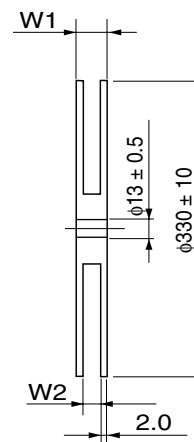
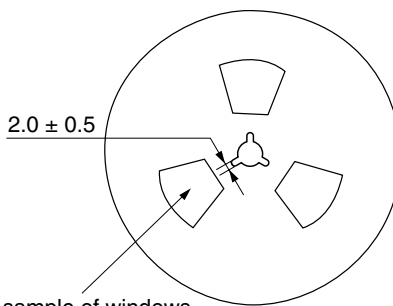
Reel type A

Package code	Tape width	W1	W2
CMPAK	8	14	10
CMPAK-4 (D)			
CMPAK-5 (D)			
MPAK (D)			
MPAK-5			
VSON-5			
SRP			
URP			
LLD			
UFP			
SFP			
EFP			
MOP	12	18	14



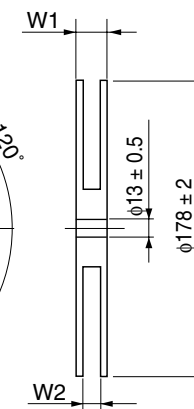
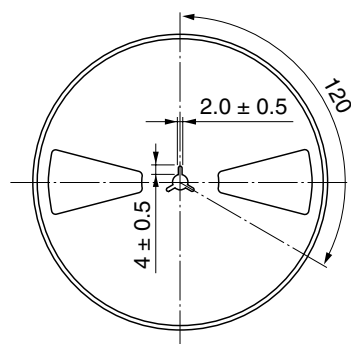
Reel type B

Package code	Tape width	W1	W2
MPAK	8	14	10



Reel type C

Package code	Tape width	W1	W2
MFPAK	8	13.0	9.0



Note: '(D)' in CMPAK-4(D), CMPAK-5(D), MPAK(D) indicates diode packages.
However, '(D)' is omitted in each product's document.

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

- Taping Specifications for Diodes

As of July, 2002 Unit: mm, (): reference value	
Package	Specification
LLD	<p>Top view dimensions: $\phi 1.5^{+0.1}_{-0.05}$, 4.0 ± 0.1, 1.75 ± 0.1, 8.0 ± 0.2, 2.0 ± 0.05, 3.5 ± 0.1, 4.0 ± 0.1, (5.6).</p> <p>Side view dimensions: 0.25 ± 0.05, (1.55), $(\phi 1.0)$, (3.7).</p> <p>Labels: Device, Cover tape, Carrier tape.</p>
MPAK (D)	<p>Top view dimensions: $\phi 1.5^{+0.1}_{-0}$, 4.0 ± 0.1, 1.75 ± 0.1, 8.0 ± 0.2, 2.0 ± 0.05, 3.5 ± 0.1, 4.0 ± 0.1, (5.6).</p> <p>Side view dimensions: 0.25 ± 0.05, (1.4), $(\phi 1.1)$, (3.3).</p> <p>Labels: Device, Cover tape, Carrier tape.</p>
MPAK-5	<p>Top view dimensions: $\phi 1.55 \pm 0.10$, 4.0 ± 0.1, 1.75 ± 0.1, 8.0 ± 0.2, 2.0 ± 0.05, 3.5 ± 0.1, 4.0 ± 0.1, (5.6).</p> <p>Side view dimensions: 0.25 ± 0.05, (1.5), $(\phi 1.05)$, (3.3).</p> <p>Labels: Device, Cover tape, Carrier tape.</p>

Note: '(D)' in MPAK (D) indicates diode packages.
However, '(D)' is omitted in each product's document.

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm, (): reference value

Package	Specification
CMPAK	
CMPAK-4(D)	
CMPAK-5 (D)	

Note: 'D' in CMPAK-4(D) and CMPAK-5(D) indicates diode packages.
However, 'D' is omitted in each product's document.

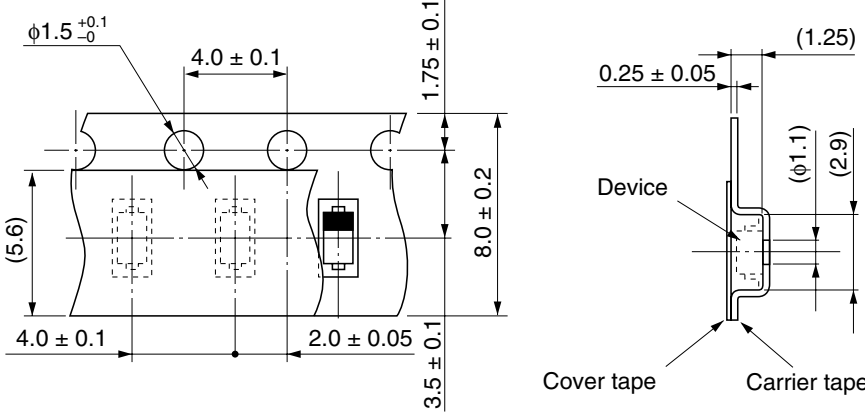
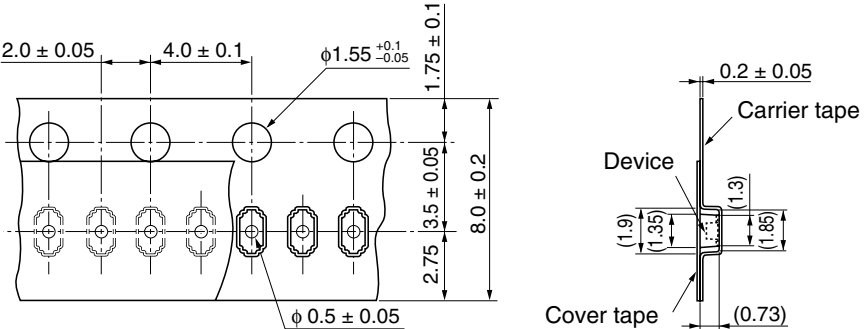
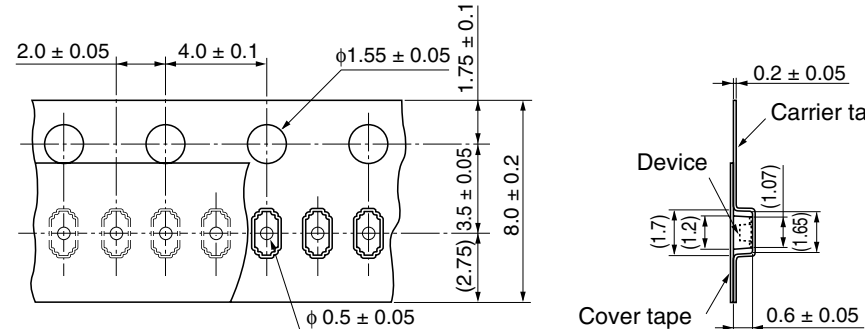
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm, (): reference value

Package	Specification
VSON-5	
MFPAK	
SRP	

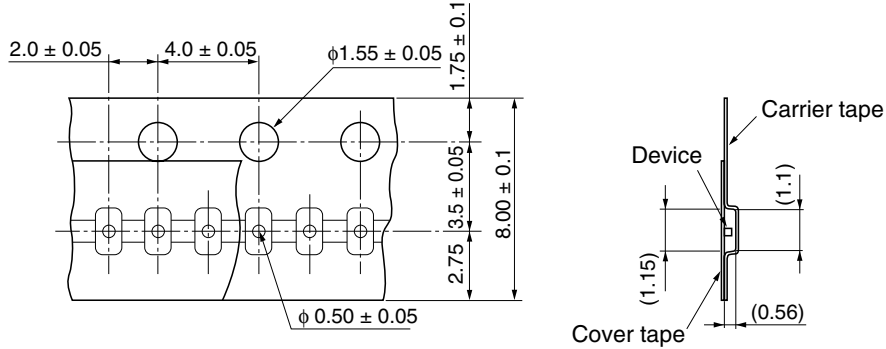
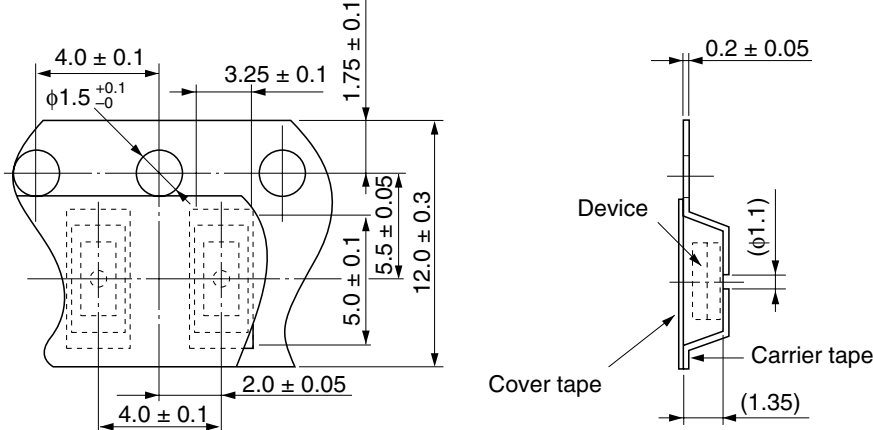
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm, (): reference value

Package	Specification
URP	 <p>Top view dimensions: $\phi 1.5^{+0.1}_{-0}$, 4.0 ± 0.1, 1.75 ± 0.1, 8.0 ± 0.2, 4.0 ± 0.1, 2.0 ± 0.05, 3.5 ± 0.1, (5.6).</p> <p>Side view dimensions: 0.25 ± 0.05, (1.25), $(\phi 1.1)$, (2.9).</p> <p>Labels: Device, Cover tape, Carrier tape.</p>
UFP	 <p>Top view dimensions: 2.0 ± 0.05, 4.0 ± 0.1, $\phi 1.55^{+0.1}_{-0.05}$, 1.75 ± 0.1, 8.0 ± 0.2, 2.75, 3.5 ± 0.05, $\phi 0.5 \pm 0.05$.</p> <p>Side view dimensions: 0.2 ± 0.05, (1.9), (1.35), (1.3), (1.85), (0.73).</p> <p>Labels: Device, Carrier tape, Cover tape.</p>
SFP	 <p>Top view dimensions: 2.0 ± 0.05, 4.0 ± 0.1, $\phi 1.55 \pm 0.05$, 1.75 ± 0.1, 8.0 ± 0.2, (2.75), 3.5 ± 0.05, $\phi 0.5 \pm 0.05$.</p> <p>Side view dimensions: 0.2 ± 0.05, (1.7), (1.2), (1.07), (1.65), 0.6 ± 0.05.</p> <p>Labels: Device, Carrier tape, Cover tape.</p>

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

As of July, 2002
Unit: mm, (): reference value

Package	Specification
EFP	 <p>Top view dimensions: 2.0 ± 0.05, 4.0 ± 0.05, $\phi 1.55 \pm 0.05$, 1.75 ± 0.1, 2.75, 3.5 ± 0.05, 8.00 ± 0.1, $\phi 0.50 \pm 0.05$.</p> <p>Side view dimensions: Carrier tape, Device, Cover tape, (1.1), (1.15), (0.56).</p>
MOP	 <p>Top view dimensions: 4.0 ± 0.1, $\phi 1.5^{+0.1}_{-0}$, 3.25 ± 0.1, 1.75 ± 0.1, 5.0 ± 0.1, 5.5 ± 0.05, 12.0 ± 0.3, 2.0 ± 0.05, 4.0 ± 0.1.</p> <p>Side view dimensions: 0.2 ± 0.05, Device, Cover tape, Carrier tape, $(\phi 1.1)$, (1.35).</p>

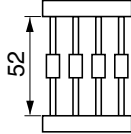
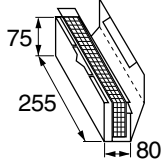
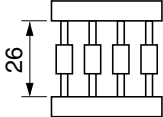
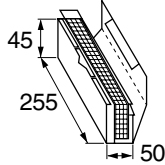
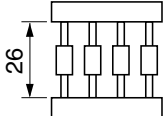
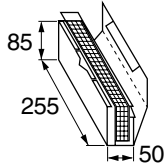
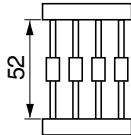
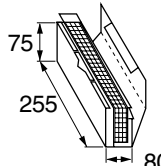
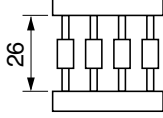
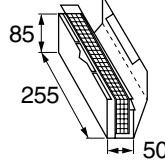
The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

4.7.2 Axial Taping for Diodes

See a) Taping dimensions, for details of form and dimensions.

As of July, 2002

Unit: mm

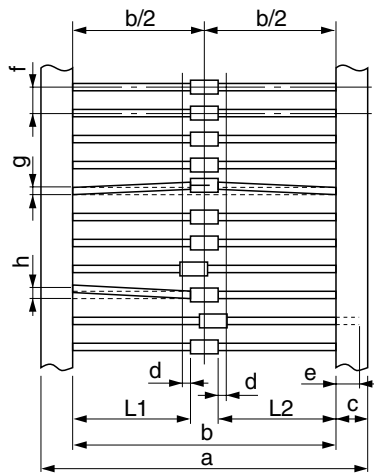
Taping	Symbol	Package Code	Form and Dimensions	Appearance	Quantity
AMMO Pack	TA* ¹	DO-35 MHD	Division I 		5,000 pcs
	TD	DO-35 MHD	Division II 		2,500 pcs
	TE* ¹	DO-35 MHD	Division III...TE 		5,000 pcs
	TK* ¹	DO-41	Division I 		2,500 pcs
	TN* ¹	DO-41	Division IV 		2,500 pcs

Note: 1. Recommended taping specifications.

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

a) Taping dimensions

As of July, 2002
Unit: mm



Symbol	Taping Dimensions Division			
	I	II	III	IV
a	64 ± 1.5	38 ± 1.5	$38 + 1.5/-1.0$	38 ± 2
b	52.4 ± 1.2	$26 + 1.2/-0$	$26 + 0.5/-0$	26 ± 1.2
c	6 ± 0.5	←	6 ± 0.4	6 ± 0.5
d	± 0.5	± 0.5	± 0.2	± 0.5
e	3.2 min	←	←	←
f	5.0 ± 0.38	5.0 ± 0.38	5 ± 0.3	5.0 ± 0.38
g	± 1.0	1.0 max	± 0.5	± 1.0
h	1.0 max	←	←	←
L1-L2	1.0 max	1.0 max	0.4 max	1.0 max
EIAJ CODE	TA21(R)	TA11(R)	—	—

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

4.7.3 Radial Type Taping for Diodes

As of July, 2002

Unit: mm

Taping	Symbol	Package Code	Form and Dimensions	Appearance	Quantity
AMMO Pack	RE* ²	DO-35			4,000 pcs
	RF				
	RG				
	RH				
	RX* ²	MHD			2,500 pcs 4,000 pcs
	RY				

Notes: 1. Dimensions are based on EIAJ RC-1008A vertical taping shape C specifications.
2. Recommended taping specifications.

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

a) Taping symbols

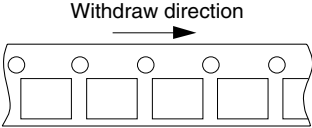
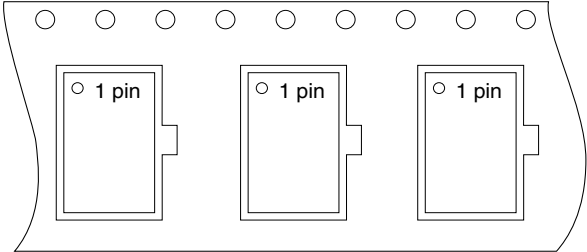
Radial taping takes the following symbols according to forming shape, cathode position, packing method and direction of withdrawl.

Packing Method	Taping Symbol	Cathode Position		Withdrawl Direction	
		Top	Botton	Right	Left
AMMO pack	RE	Δ		Δ	
	RF		Δ	Δ	
	RG	Δ			Δ
	RH		Δ		Δ
	RX	When withdrawn to the side with the F printed on it form the glass body packing: RX protrudes from the cathode RY protrudes from the anode.			
	RY				

4.8 **Packing Specifications for Modules**

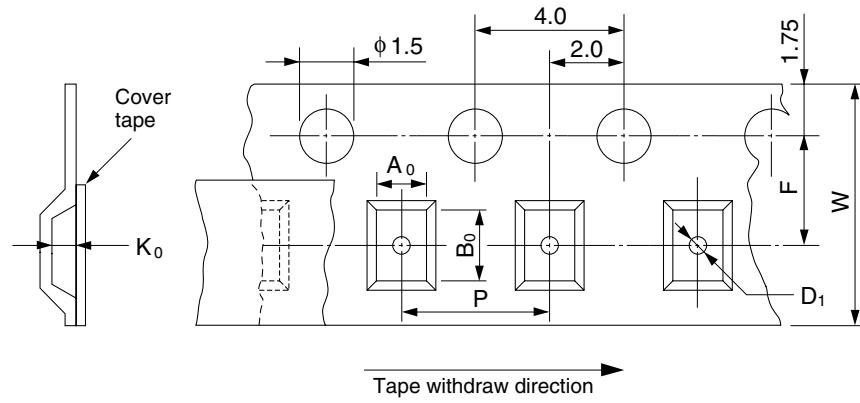
4.8.1 **Emboss Type Taping for Modules**

- Package Inserting Method (Hitachi standard)

Package	
RF-O-12 RF-Or RF-Q	

1. Emboss tape: Tape width 24 mm

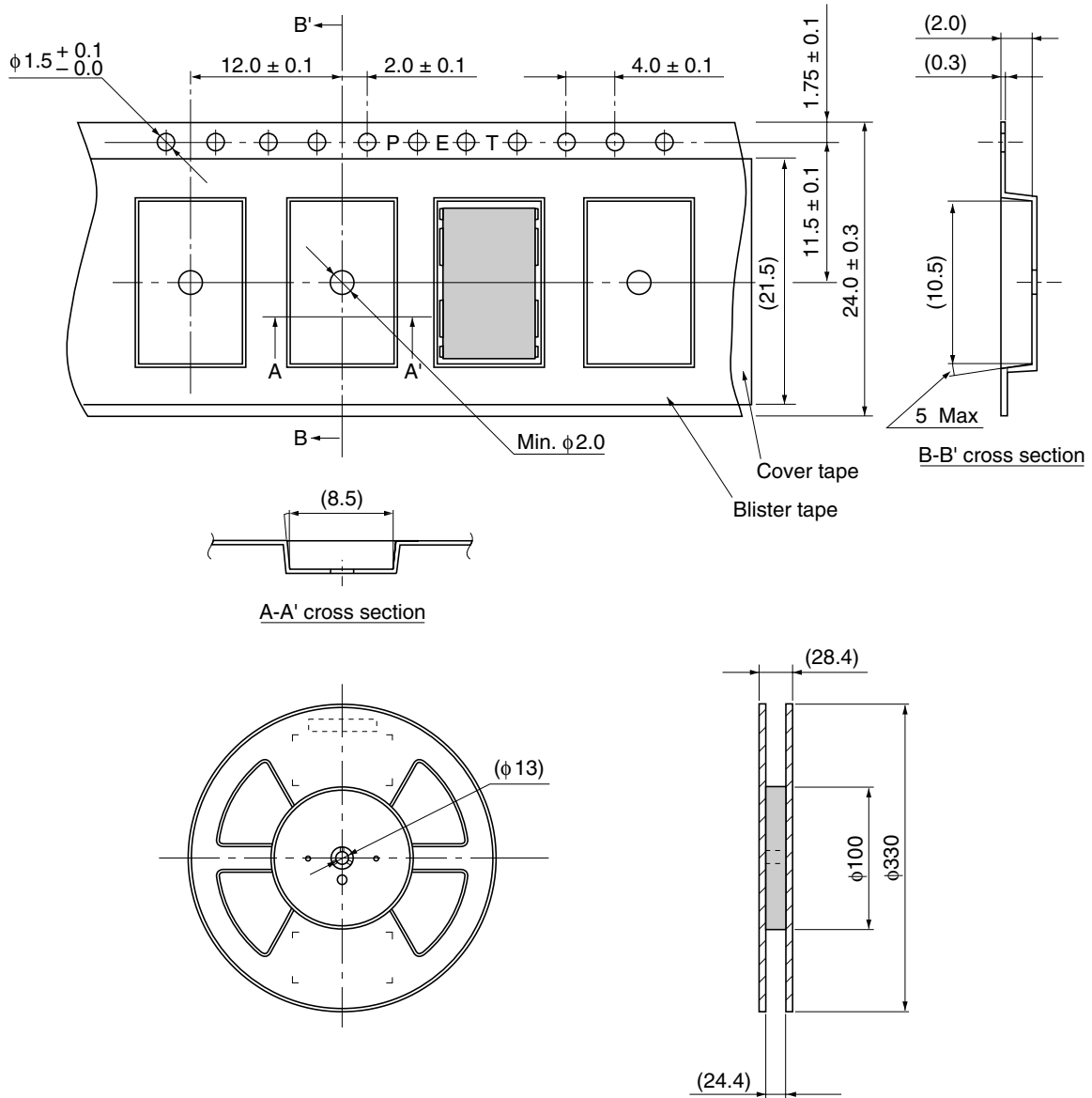
As of July, 2002
Unit: mm



Package code	W	P	A_0	B_0	K_0	F	D_1	Maximum storage No.
RF-Q	24	12	8.5	10.5	2.0	11.5	2.0	2,000 IC/reel
RF-O-12, RF-Or	24	16	11.5	14.25	2.2	11.5	2.0	1,500 IC/reel

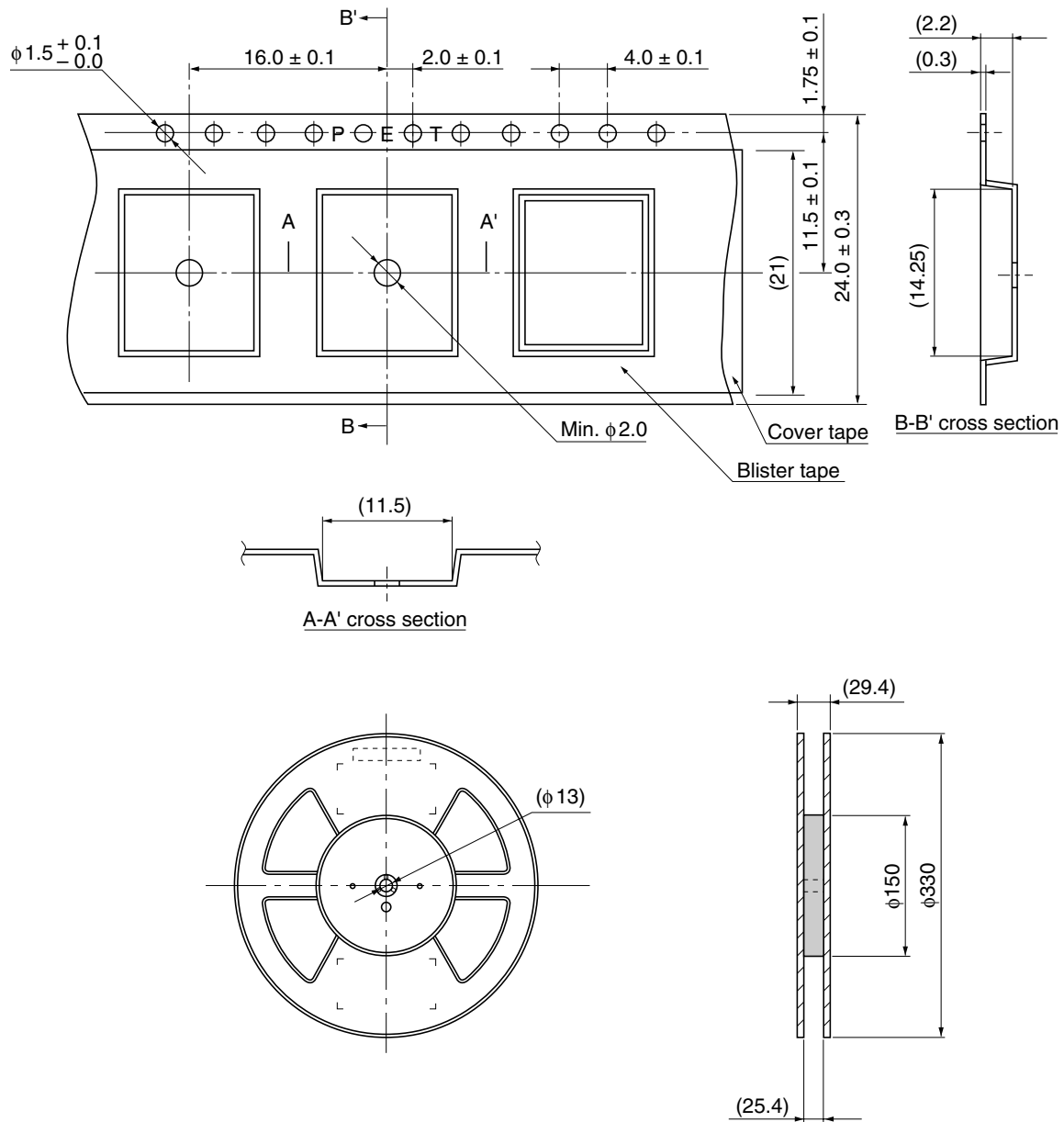
2. Tape and Reel for RF-Q Package

As of July, 2002
Unit: mm, (): reference value



3. Tape and Reel for RF-O-12, RF-Or Package

As of July, 2002
Unit: mm, (): reference value



Section 5 Sockets for Evaluation of Characteristics

The sockets indicated below have been prepared as evaluation sockets. Those wishing to know the details concerning the sockets for each package may contact the socket manufacturers, and check out that those sockets are available or not for your products before buying them.

5.1 Sockets for IC Packages

Package name	Package code	Socket No.	Type	Maker
DIP	DP-7	IC37NRB-0803-G4	Pin insertion	Yamaichi Electronics
	DP-8	IC37NRB-0803-G4	Pin insertion	Yamaichi Electronics
	DP-8B	IC37NRB-0803-G4	Pin insertion	Yamaichi Electronics
	DP-14	IC91-1403-G4	Pin insertion	Yamaichi Electronics
	DP-16	IC37NRB-1603-G4	Pin insertion	Yamaichi Electronics
		633-2160311	Pin insertion	Wells-CTI
	DP-16C	IC37NRB-1603-G4	Pin insertion	Yamaichi Electronics
	DP-16E	IC37NRB-1603-G4	Pin insertion	Yamaichi Electronics
		633-2160311	Pin insertion	Wells-CTI
	DP-20N	633-2200311	Pin insertion	Wells-CTI
		IC37NRB-2003-G4	Pin insertion	Yamaichi Electronics
	DP-24	IC37NRB-2406-G4	Pin insertion	Yamaichi Electronics
		633-8240311	Pin insertion	Wells-CTI
	DP-24N	IC37NRB-2403-G4	Pin insertion	Yamaichi Electronics
	DP-24NC	IC37NRB-2403-G4	Pin insertion	Yamaichi Electronics
	DP-28	IC37NRB-2806-G4	Pin insertion	Yamaichi Electronics
		633-8280311-001	Pin insertion	Wells-CTI
	DP-32	633-8320311-001	Pin insertion	Wells-CTI
		IC37NRB-3206-G4	Pin insertion	Yamaichi Electronics
	DP-40	IC37NRB-4006-G4	Pin insertion	Yamaichi Electronics
		633-8400311-001	Pin insertion	Wells-CTI
	DP-42	IC37NRB-4206-G4	Pin insertion	Yamaichi Electronics
		633-8420311-001	Pin insertion	Wells-CTI
	DP-48	633-8480311-001	Pin insertion	Wells-CTI
		IC37NRB-4806-G4	Pin insertion	Yamaichi Electronics
SDIP	DP-22NS	IC59-2203	Pin insertion	Yamaichi Electronics
	DP-28S	IC-7620-2804-G4	Pin insertion	Yamaichi Electronics
		623-1280316-003	Pin insertion	Wells-CTI
	DP-30S	IC59-3004-G4	Pin insertion	Yamaichi Electronics
	DP-42S	IC7620-4206-G4	Pin insertion	Yamaichi Electronics

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Package name	Package code	Socket No.	Type	Maker
SDIP	DP-42S	623-7420316-003	Pin insertion	Wells-CTI
	DP-42SA	IC59-4206-G4	Pin insertion	Yamaichi Electronics
	DP-56SA	IC-226-1	Pin insertion	Yamaichi Electronics
	DP-64S	IC121-64075-G4	Pin insertion	Yamaichi Electronics
		623-9640316-003	Pin insertion	Wells-CTI
	DP-90S	IC121-9009-G4	Pin insertion	Yamaichi Electronics
G-DIP	DG-28	IC37NRB-2806-G4	Pin insertion	Yamaichi Electronics
	DG-32	IC37NRB-3206-G4	Pin insertion	Yamaichi Electronics
	DG-32A	IC37NRB-3206-G4	Pin insertion	Yamaichi Electronics
	DG-40A	IC37NRB-4006-G4	Pin insertion	Yamaichi Electronics
C-SDIP	DC-64S	IC121-64075-G4	Pin insertion	Yamaichi Electronics
SIP	SP-3T	SMT-8103	Pin insertion	Yamaichi Electronics
	SP-5TB	SMT-26320	Pin insertion	Yamaichi Electronics
	SP-7	IC-66-7 #2	Pin insertion	Yamaichi Electronics
	SP-15TA	IC39-1511-G4	Pin insertion	Yamaichi Electronics
	SP-15TF	ZIP-15-2.54-01Q	Pin insertion	Enplas Semiconductor Peripheral
	SP-16	IC39-1601-G4	Pin insertion	Yamaichi Electronics
	SP-16TA	IC-241-1	Pin insertion	Yamaichi Electronics
	SP-23TA	IC39-2304-G4	Pin insertion	Yamaichi Electronics
	SP-23TB	IC39-2304-G4	Pin insertion	Yamaichi Electronics
	SP-23TD	IC70-2313-G4	Pin insertion	Yamaichi Electronics
	SP-23TE	SMT-30721	Pin insertion	Yamaichi Electronics
	SP-28TA	SMT-37721	Pin insertion	Yamaichi Electronics
PGA	PC-68	NP89-10007, KS-7468	Zero insertion	Yamaichi Electronics
	PC-135	NP89-19601, KS-7529	Zero insertion	Yamaichi Electronics
SOP	FP-8D	IC51-0162-272-2	Clam shell	Yamaichi Electronics
	FP-8DB	652B0082211-002	Open top	Wells-CTI
		PJ00827-296	Clam shell	Micronics Japan
	FP-8DC	IC51-0162-1035	Clam shell	Yamaichi Electronics
	FP-14DA	IC51-0142-1013	Clam shell	Yamaichi Electronics
	FP-14DAV	IC51-0142-1013	Clam shell	Yamaichi Electronics
	FP-14DNV	IC51-0162-272-3	Clam shell	Yamaichi Electronics
	FP-16DA	IC51-164, KS-14280	Clam shell	Yamaichi Electronics
	FP-16DAV	IC51-164, KS-14280	Clam shell	Yamaichi Electronics
	FP-16DNV	IC51-0162-272-3	Clam shell	Yamaichi Electronics
		IC51-0162-1035	Clam shell	Yamaichi Electronics

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office. However, for the DG-28, DG-32, DG-32A, DG-40A and DC-64S in which lead-free pins were originally used, V is not added to the end of the package code.

Package name	Package code	Socket No.	Type	Maker
SOP	FP-20DA	IC51-0202-164	Clam shell	Yamaichi Electronics
	FP-20DAV	IC51-0202-164	Clam shell	Yamaichi Electronics
	FP-20DBV	2206158	Clam shell	Sumitomo 3M
	FP-24D	IC51-0282-153	Clam shell	Yamaichi Electronics
	FP-24DB	IC51-0282-153	Clam shell	Yamaichi Electronics
	FP-28D	FP-28-1.27-17A	Clam shell	Enplas Semiconductor Peripheral
		IC51-0282-153	Clam shell	Yamaichi Electronics
		CSP028-008	Open top	Texas Instruments
		652E0282211	Open top	Wells-CTI
	FP-32D	FP-32-1.27-10	Clam shell	Enplas Semiconductor Peripheral
		IC51-0322-667	Clam shell	Yamaichi Electronics
		CSP032-019	Open top	Texas Instruments
		652E0322211	Open top	Wells-CTI
	FP-40D	IC51-0402-1197	Clam shell	Yamaichi Electronics
		652F0402211	Open top	Wells-CTI
TSOP (I)	TFP-28DB	OTS-28-0.55-03	Open top	Enplas Semiconductor Peripheral
		648-1282211-A01	Open top	Wells-CTI
		IC162-0282-030N-2	Open top	Yamaichi Electronics
	TFP-32DA	OTS-32-0.5-01	Open top	Enplas Semiconductor Peripheral
		IC51-0322-1031-1	Clam shell	Yamaichi Electronics
		648A0322211-A01	Open top	Wells-CTI
	TFP-32DC	IC162-0322-053N	Open top	Yamaichi Electronics
		648B0322211	Open top	Wells-CTI
TSOP (II)	TTP-32D	IC235-0322-255N	Open top	Yamaichi Electronics
		OTS-32-1.27-18	Open top	Enplas Semiconductor Peripheral
		CTP032-083AB	Open top	Texas Instruments
		674C0322216CE08	Open top	Wells-CTI
	TTP-32DR	IC235-0322-255N	Open top	Yamaichi Electronics
		OTS-32-1.27-18	Open top	Enplas Semiconductor Peripheral
		CTP032-083AB	Open top	Texas Instruments
		674C0322216CE08	Open top	Wells-CTI
	TTP-44DB	OTS-44-0.8-13	Open top	Enplas Semiconductor Peripheral

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Package name	Package code	Socket No.	Type	Maker
TSOP (II)	TTP-44DB	IC235-0442-207N	Open top	Yamaichi Electronics
		CTP044-104AB	Open top	Texas Instruments
		674C1442215HE08	Open top	Wells-CTI
	TTP-44DE	OTS-44-0.8-13	Open top	Enplas Semiconductor Peripheral
		IC235-0442-207N	Open top	Yamaichi Electronics
		CTP044-104AB	Open top	Texas Instruments
		674C1442215HE08	Open top	Wells-CTI
	TTP-48/40DA	OTS-40(48)-0.8-03	Open top	Enplas Semiconductor Peripheral
		TS4-040080-023	Open top	CHICHIBU FUJI
HSOP	FP-16DC	IC51-164, KS-14280	Clam shell	Yamaichi Electronics
	FP-20DE	IC51-0202-164	Clam shell	Yamaichi Electronics
	FP-26DT	IC51-0442-1070	Clam shell	Yamaichi Electronics
	FP-26DTA	IC51-0442-1070	Clam shell	Yamaichi Electronics
SSOP	FP-24DSA	IC51-0302-1370	Clam shell	Yamaichi Electronics
	FP-30D	IC51-0302-1370	Clam shell	Yamaichi Electronics
TSSOP	TTP-8DA	IC51-0082-2031	Clam shell	Yamaichi Electronics
	TTP-14D	IC51-0162-911	Clam shell	Yamaichi Electronics
	TTP-14DV	IC51-0162-911	Clam shell	Yamaichi Electronics
	TTP-16DA	IC51-0162-911	Clam shell	Yamaichi Electronics
	TTP-16DAV	IC51-0162-911	Clam shell	Yamaichi Electronics
	TTP-20DA	IC51-0202-912	Clam shell	Yamaichi Electronics
	TTP-20DAV	IC51-0202-912	Clam shell	Yamaichi Electronics
	TTP-24DB	IC51-0242-1341	Clam shell	Yamaichi Electronics
		PJ02465-290	Clip on	Micronics Japan
	TTP-24DBV	IC51-0242-1341	Clam shell	Yamaichi Electronics
	TTP-48DB	IC51-0482-1513	Clam shell	Yamaichi Electronics
		PJ04805-145	Clam shell	Micronics Japan
	TTP-48DBV	IC51-0482-1513	Clam shell	Yamaichi Electronics
	TTP-56DA	IC51-0562-1514	Clam shell	Yamaichi Electronics
		PJ05605-033	Clam shell	Micronics Japan
		PJ05605-176	Clip on	Micronics Japan
	TTP-56DAV	IC51-0562-1514	Clam shell	Yamaichi Electronics
	TTP-80DV	FP-80-0.4-01-000	Clam shell	Enplas Semiconductor Peripheral
HTSSOP	TTP-56DT	IC51-0562-1514	Clam shell	Yamaichi Electronics
VSSOP	TTP-8DB	SMT-47621	Cover less	Yamaichi Electronics

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Package name	Package code	Socket No.	Type	Maker
QFP	FP-44A	IC51-0444-954-4	Clam shell	Yamaichi Electronics
	FP-54	IC51-0544-517-4	Clam shell	Yamaichi Electronics
	FP-54A	IC51-0544-517-4	Clam shell	Yamaichi Electronics
	FP-56	IC51-0564-1304	Clam shell	Yamaichi Electronics
	FP-56A	IC51-0564-1304	Clam shell	Yamaichi Electronics
	FP-60	IC51-0604-497-3	Clam shell	Yamaichi Electronics
	FP-60A	IC51-0604-497-3	Clam shell	Yamaichi Electronics
	FP-64	FPQ-64-1.0-11	Clam shell	Enplas Semiconductor Peripheral
		IC51-0644-472-4	Clam shell	Yamaichi Electronics
	FP-64A	FPQ-64-0.8-10A	Clam shell	Enplas Semiconductor Peripheral
		IC51-0644-692-5(VA)	Clam shell	Yamaichi Electronics
	FP-64B	IC51-0644-472-4	Clam shell	Yamaichi Electronics
	FP-64C	IC51-0644-1518	Clam shell	Yamaichi Electronics
	FP-64H	IC51-0644-692-5	Clam shell	Yamaichi Electronics
		7014-064-X-08	Open top	Wells-CTI
	FP-80	FPQ-80-0.8-17	Clam shell	Enplas Semiconductor Peripheral
		IC51-0804-1200-3	Clam shell	Yamaichi Electronics
		QP1-080080-242	Clam shell	CHICHIBU FUJI
	FP-80A	FPQ-80-0.65-11	Clam shell	Enplas Semiconductor Peripheral
		IC51-0804-956-4	Clam shell	Yamaichi Electronics
		QP1-080065-241	Clam shell	CHICHIBU FUJI
	FP-80B	IC51-0804-1200-3	Clam shell	Yamaichi Electronics
	FP-80C	IC51-0804-1200-4	Clam shell	Yamaichi Electronics
	FP-80E	IC51-0804-956-4	Clam shell	Yamaichi Electronics
		FPQ-80-0.65-11	Clam shell	Enplas Semiconductor Peripheral
	FP-80H	IC51-0804-956-4	Clam shell	Yamaichi Electronics
		FPQ-80-0.65-11	Clam shell	Enplas Semiconductor Peripheral
		QP1-080065-241	Clam shell	CHICHIBU FUJI
	FP-80Q	IC51-0804-956-4	Clam shell	Yamaichi Electronics
		7014-080-X-08	Open top	Wells-CTI
	FP-88	FPQ-88-0.8-02	Clam shell	Enplas Semiconductor Peripheral
		IC51-0884-999-3(VA)	Clam shell	Yamaichi Electronics

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Package name	Package code	Socket No.	Type	Maker
QFP	FP-100	IC51-1004-552-3	Clam shell	Yamaichi Electronics
	FP-100A	FPQ-100-0.65-30	Clam shell	Enplas Semiconductor Peripheral
		IC51-1004-552-3	Clam shell	Yamaichi Electronics
		CQF100-025	Open top	Texas Instruments
	FP-100B	FPQ-100-0.5-01	Clam shell	Enplas Semiconductor Peripheral
		IC51-1004-958-3	Clam shell	Yamaichi Electronics
		QP1-100050-240	Clam shell	CHICHIBU FUJI
	FP-100F	IC51-1004-958-3	Clam shell	Yamaichi Electronics
		FPQ-100-0.5-01	Clam shell	Enplas Semiconductor Peripheral
		QP1-100050-240	Clam shell	CHICHIBU FUJI
	FP-100M	IC51-1004-958-3	Clam shell	Yamaichi Electronics
		7014-100-X-08	Open top	Wells-CTI
		FPQ-100-0.5-01	Clam shell	Enplas Semiconductor Peripheral
	FP-112	IC51-1124-1036-3	Clam shell	Yamaichi Electronics
		FPQ-112-0.65-03	Clam shell	Enplas Semiconductor Peripheral
	FP-112B	FPQ-112-0.65-03	Clam shell	Enplas Semiconductor Peripheral
		IC51-1124-1036-3	Clam shell	Yamaichi Electronics
	FP-128	IC51-1284-1433-16	Clam shell	Yamaichi Electronics
	FP-128B	IC51-1284-1433-16	Clam shell	Yamaichi Electronics
	FP-136	FPQ-136-0.8-04	Clam shell	Enplas Semiconductor Peripheral
	FP-144G	FPQ-144-0.5-05	Clam shell	Enplas Semiconductor Peripheral
		IC51-1444-1354	Clam shell	Yamaichi Electronics
	FP-144J	FPQ-144-0.5-05	Clam shell	Enplas Semiconductor Peripheral
		IC51-1444-1354	Clam shell	Yamaichi Electronics
	FP-160H	IC51-1604-845-*	Clam shell	Yamaichi Electronics
		FPQ-160(168)-0.65-05	Clam shell	Enplas Semiconductor Peripheral
	FP-168	FPQ-168-0.65-05	Clam shell	Enplas Semiconductor Peripheral
	FP-168B	FPQ-168-0.65-05	Clam shell	Enplas Semiconductor Peripheral

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Package name	Package code	Socket No.	Type	Maker
QFP	FP-208	IC51-2084-1052-6	Clam shell	Yamaichi Electronics
		IC201-2084-001N-K-2(VA)	Open top	Yamaichi Electronics
	FP-208A	IC51-2084-1052-11	Clam shell	Yamaichi Electronics
		FPQ-208-0.5-14	Clam shell	Enplas Semiconductor Peripheral
		IC201-2084-029N	Open top	Yamaichi Electronics
	FP-240	IC51-1655, AC-04206	Clam shell	Yamaichi Electronics
		IC234-2404-030N	Open top	Yamaichi Electronics
	FP-256	IC234-2564-070N-K	Open top	Yamaichi Electronics
		QFP11T256-001	Clam shell	Yamaichi Electronics
	FP-256F	IC51-2564-1668-18	Clam shell	Yamaichi Electronics
	FP-256H	QFP11T256-001	Clam shell	Yamaichi Electronics
		IC234-2564-070N-K	Open top	Yamaichi Electronics
	FP-296	IC51-2964-1892	Clam shell	Yamaichi Electronics
LQFP	FP-40	IC51-0404-1511	Clam shell	Yamaichi Electronics
	FP-40B	IC51-0404-1511	Clam shell	Yamaichi Electronics
	FP-48C	IC51-0484-1517	Clam shell	Yamaichi Electronics
		PJ04805-267	Clip on	Micronics Japan
	FP-48F	QP1-048065-319	Clam shell	CHICHIBU FUJI
	FP-64E	FPQ-64-0.5-06	Clam shell	Enplas Semiconductor Peripheral
	FP-100H	IC51-1004-814-16	Clam shell	Yamaichi Electronics
		OTQ-100-0.65-08	Open top	Enplas Semiconductor Peripheral
	FP-144F	IC51-1444-1354-19	Clam shell	Yamaichi Electronics
		IC234-1444-007N	Open top	Yamaichi Electronics
		FPQ-144-0.5-06	Clam shell	Enplas Semiconductor Peripheral
	FP-144H	FPQ-144-0.5-06	Clam shell	Enplas Semiconductor Peripheral
		IC51-1444-1354-19	Clam shell	Yamaichi Electronics
		IC234-1444-007N	Open top	Yamaichi Electronics
	FP-176	IC51-1764-1505-12	Clam shell	Yamaichi Electronics
		IC234-1764-005N-K	Open top	Yamaichi Electronics
		OTQ-176-0.5-01	Open top	Enplas Semiconductor Peripheral
		QP1-176050-278	Clam shell	CHICHIBU FUJI
	FP-176A	IC51-1764-1995-4	Clam shell	Yamaichi Electronics

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Package name	Package code	Socket No.	Type	Maker
LQFP	FP-176C	OTQ-176-0.5-01	Open top	Enplas Semiconductor Peripheral
		QP1-176050-278	Clam shell	CHICHIBU FUJI
	FP-208C	IC51-2084-1052-36	Clam shell	Yamaichi Electronics
	FP-216	IC234-2164-066N-K	Open top	Yamaichi Electronics
TQFP	TFP-56A	QFP11T056-001	Clam shell	Yamaichi Electronics
		PJ05605-031	Clip on	Micronics Japan
	TFP-64B	QP1-064050-108	Clam shell	CHICHIBU FUJI
		QP4-064050-002-A	Open top	CHICHIBU FUJI
	TFP-64C	QP1-064050-108	Clam shell	CHICHIBU FUJI
		QP4-064050-002-A	Open top	CHICHIBU FUJI
	TFP-64E	FPQ-64-0.5-06	Clam shell	Enplas Semiconductor Peripheral
	TFP-64FV	QP1-064050-108	Clam shell	CHICHIBU FUJI
		QP4-064050-002-A	Open top	CHICHIBU FUJI
	TFP-80	IC51-0804-1311-2	Clam shell	Yamaichi Electronics
		FPQ-80-0.65-13	Clam shell	Enplas Semiconductor Peripheral
	TFP-80C	IC234-0804-011N	Open top	Yamaichi Electronics
		FPQ-80-0.5-05	Clam shell	Enplas Semiconductor Peripheral
		QP1-080050-052	Clam shell	CHICHIBU FUJI
	TFP-80F	FPQ-80-0.65-14	Clam shell	Enplas Semiconductor Peripheral
	TFP-100B	FPQ-100-0.5-21	Clam shell	Enplas Semiconductor Peripheral
		QP1-100050-249	Clam shell	CHICHIBU FUJI
	TFP-100C	FPQ-100-0.5-21	Clam shell	Enplas Semiconductor Peripheral
		QP1-100050-249	Clam shell	CHICHIBU FUJI
	TFP-100G	IC51-1004-1919-14	Clam shell	Yamaichi Electronics
	TFP-100JV	IC51-1004-809-6	Clam shell	Yamaichi Electronics
		FPQ-100-0.5-22	Clam shell	Enplas Semiconductor Peripheral
	TFP-120	IC51-1204-1657-3	Clam shell	Yamaichi Electronics
		FPQ-120(128)-0.4-03	Clam shell	Enplas Semiconductor Peripheral
	TFP-144	FPQ-144-0.4-02	Clam shell	Enplas Semiconductor Peripheral
		QFP11T144-001	Clam shell	Yamaichi Electronics

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Package name	Package code	Socket No.	Type	Maker
HQFP	FP-48TB	IC51-0804-956-4	Clam shell	Yamaichi Electronics
	FP-56B	IC51-0564-1304	Clam shell	Yamaichi Electronics
	FP-56C	IC51-0564-1304	Clam shell	Yamaichi Electronics
	FP-64TA	QP1-064065-277	Clam shell	Unitechno
		QP1-064065-277	Clam shell	CHICHIBU FUJI
	FP-80K	IC51-0804-956-4	Clam shell	Yamaichi Electronics
		FPQ-80-0.65-11	Clam shell	Enplas Semiconductor Peripheral
	FP-80M	IC51-0804-1200-3	Clam shell	Yamaichi Electronics
	FP-80N	IC51-0804-956-4	Clam shell	Yamaichi Electronics
		FPQ-80-0.65-11	Clam shell	Enplas Semiconductor Peripheral
	FP-100K	IC51-1004-958-3	Clam shell	Yamaichi Electronics
		FPQ-100-0.5-01	Clam shell	Enplas Semiconductor Peripheral
	FP-100L	FPQ-100-0.65-30	Clam shell	Enplas Semiconductor Peripheral
		IC51-1004-552-3	Clam shell	Yamaichi Electronics
		CQF100-025	Open top	Texas Instruments
		QP1-100065-243	Clam shell	CHICHIBU FUJI
	FP-100Q	FPQ-100-0.65-30	Clam shell	Enplas Semiconductor Peripheral
		IC51-1004-552-3	Clam shell	Yamaichi Electronics
		CQF100-025	Open top	Texas Instruments
		QP1-100065-243	Clam shell	CHICHIBU FUJI
	FP-120A	QFP11T120-001	Clam shell	Yamaichi Electronics
	FP-160J	IC51-1604-845-*	Clam shell	Yamaichi Electronics
	FP-160K	IC51-1604-845-*	Clam shell	Yamaichi Electronics
	FP-208E	FPQ-208-0.5-14	Clam shell	Enplas Semiconductor Peripheral
		IC51-2084-1052-11	Clam shell	Yamaichi Electronics
	FP-240B	IC51-1655.AC-04206	Clam shell	Yamaichi Electronics
		IC234-2404-030N	Open top	Yamaichi Electronics
	FP-256G	IC51-2564-1668-18	Clam shell	Yamaichi Electronics
	FP-296B	IC51-2964-1892	Clam shell	Yamaichi Electronics
HLQFP	FP-28TB	IC51-0404-1511	Clam shell	Yamaichi Electronics
	FP-40A	IC51-0404-1511	Clam shell	Yamaichi Electronics
	FP-80F	IC51-0804-808	Clam shell	Yamaichi Electronics
		FPQ-80-0.5-07	Clam shell	Enplas Semiconductor Peripheral

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Package name	Package code	Socket No.	Type	Maker
HLQFP	FP-80TA	QP1-080050-200	Clam shell	CHICHIBU FUJI
HTQFP	TFP-52T	QP1-064050-108	Clam shell	CHICHIBU FUJI
	TFP-64T	QP1-100050-115	Clam shell	CHICHIBU FUJI
	TFP-64TA	QP1-064050-108	Clam shell	CHICHIBU FUJI
		IC51-0644-807-11	Clam shell	Yamaichi Electronics
		IC51-0644-807-8	Clam shell	Yamaichi Electronics
	TFP-100F	FPQ-100-0.5-21	Clam shell	Enplas Semiconductor Peripheral
		QP1-100050-249	Clam shell	CHICHIBU FUJI
SOJ	CP-24D	IC100-2403-G	insertion	Yamaichi Electronics
	CP-28DN	SOJ-28-1.27-06AC	insertion	Enplas Semiconductor Peripheral
		IC100-2803-G	insertion	Yamaichi Electronics
		CSJT028-37B71	Open top	Texas Instruments
	CP-32DB	IC100-3204-G	insertion	Yamaichi Electronics
		CSJT032B37B71	Open top	Texas Instruments
		SOJ-32-1.27-07	insertion	Enplas Semiconductor Peripheral
	CP-36D	IC100-3604-G	insertion	Yamaichi Electronics
		SOJ-36-1.27-01C	insertion	Enplas Semiconductor Peripheral
	CP-44D	IC100-4404-G	insertion	Yamaichi Electronics
		CSJT044B37B60	Open top	Texas Instruments
QFJ(PLCC)	CP-18	647A0181912-001	Open top	Wells-CTI
	CP-44	PLCC-44-1.27-30	Open top	Enplas Semiconductor Peripheral
		647A1441912	Open top	Wells-CTI
		IC51-0444-400	Clam shell	Yamaichi Electronics
	CP-52	PLCC-52-1.27-30	Open top	Enplas Semiconductor Peripheral
		IC51-0524-411-1	Clam shell	Yamaichi Electronics
		647A1521912	Open top	Wells-CTI
	CP-68	PLCC-68-1.27-30	Open top	Enplas Semiconductor Peripheral
		IC51-0684-390-1	Clam shell	Yamaichi Electronics
		647A1681912	Open top	Wells-CTI
	CP-84	PLCC-84-1.27-30	Open top	Enplas Semiconductor Peripheral
		IC51-0844-401-1	Clam shell	Yamaichi Electronics

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Package name	Package code	Socket No.	Type	Maker
QFJ(PLCC)	CP-84	647A1841912	Open top	Wells-CTI
HSOI	MP-26DT	IC51-0442-1070	Clam shell	Yamaichi Electronics
P-VSON	TNP-5D	SMT-45221	Clam shell	Yamaichi Electronics
P-VQFN	TNP-14	PJ01204-064	Clip on	Micronics Japan
	TNP-24AV	PJ02405-028	Clam shell	Micronics Japan
		PJ02405-088	Clip on	Micronics Japan
BGA	BP-108	CBG119-037-1	Open top	Texas Instruments
		NP276-15334-*.AC-27867	Open top	Yamaichi Electronics
	BP-119A	654119128010705	Clam shell	Wells-CTI
		NP276-11935-*	Open top	Yamaichi Electronics
		2119-9020-1501	Open top	Sumitomo 3M
		BGA-119(153)-1.27-01A	Clam shell	Enplas Semiconductor Peripheral
	BP-119C	NP276-11935	Open top	Yamaichi Electronics
	BP-119E	NP276-11935	Open top	Yamaichi Electronics
	BP-256	655256427010902	Clam shell	Wells-CTI
		NP276-37206, AC-03327	Open top	Yamaichi Electronics
		BGA-256(441)-1.27-01	Clam shell	Enplas Semiconductor Peripheral
		2256-9030-01-1501	Open top	Sumitomo 3M
	BP-256A	NP276-37206.AC-03327	Open top	Yamaichi Electronics
LFBGA	BP-72A	CBG064-077J	Open top	Texas Instruments
		OTB-64(120)-0.8-01	Open top	Enplas Semiconductor Peripheral
	BP-72B	CBG064-077AF	Open top	Texas Instruments
		OTB-64(120)-0.8-03	Open top	Enplas Semiconductor Peripheral
	BP-90A	NP351-090-150-*	Open top	Yamaichi Electronics
		OTB-90(150)-0.8-03	Open top	Enplas Semiconductor Peripheral
	BP-112	NP351-11215-*	Open top	Yamaichi Electronics
	BP-240A	NP351-240-195-*	Open top	Yamaichi Electronics
		OTB-240(625)-0.65-02	Open top	Enplas Semiconductor Peripheral
	BP-256B	IC51-2564-1668-13	Clam shell	Yamaichi Electronics
	BP-264	NP351-264-140-1	Open top	Yamaichi Electronics
		OTB-264(289)-0.8-05	Open top	Enplas Semiconductor Peripheral

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Package name	Package code	Socket No.	Type	Maker
LFBGA	BP-336	OTB-336(484)-0.8-09	Open top	Enplas Semiconductor Peripheral
HBGA	BT-400T	NP352-40025	Open top	Yamaichi Electronics
	BT-480T	NP352-480-91	Open top	Yamaichi Electronics
HLFBGA	BT-352T	NP351-35258-1	Open top	Yamaichi Electronics
TFBGA	TBP-48	NP291-04846-P-2	Open top	Yamaichi Electronics
	TBP-48A	NP291-04856-P-2	Open top	Yamaichi Electronics
	TBP-65	OTB-72(120)-0.8-05	Open top	Enplas Semiconductor Peripheral
	TBP-112	NP351-11215-1	Open top	Yamaichi Electronics
		2112-9017-xx-xxx1	Open top	Sumitomo 3M
		OTB-112(225)-0.8-02	Open top	Enplas Semiconductor Peripheral
	TBP-176	NP351-17635-1	Open top	Yamaichi Electronics
		OTB-176(289)-0.8-06	Open top	Enplas Semiconductor Peripheral
	TBP-208A	NP378-20812	Open top	Yamaichi Electronics
	TBT-54	OTB-54(108)-0.8-01	Open top	Enplas Semiconductor Peripheral
		NP367-05420-*	Open top	Yamaichi Electronics
	TBT-54R	OTB-54(108)-0.8-01	Open top	Enplas Semiconductor Peripheral
		NP367-05420-*	Open top	Yamaichi Electronics
	TBT-54A	OTB-54(108)-0.8-01	Open top	Enplas Semiconductor Peripheral
		NP367-05420-*	Open top	Yamaichi Electronics
	TBT-54AR	OTB-54(108)-0.8-01	Open top	Enplas Semiconductor Peripheral
		NP367-05420-*	Open top	Yamaichi Electronics
	TBT-216A	NP351-21653-1	Open top	Yamaichi Electronics
		2216-9032-81-1401	Open top	Sumitomo 3M
		OTB-216(484)-0.8-01	Open top	Enplas Semiconductor Peripheral
	TBT-216B	BGA-216(288)-0.5-02	Clam shell	Enplas Semiconductor Peripheral
	TBT-264A	NP351-26457-1	Open top	Yamaichi Electronics
		2264-9038-81-1401	Open top	Sumitomo 3M
	TBT-264B	NP284-26409P-2	Open top	Yamaichi Electronics
CMPAK	CMPAK-5	PJ00565-217	Handler only	Micronics Japan
	CMPAK-6	PJ00565-217	Handler only	Micronics Japan

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office. However, for the TBT-216B and TBT-264B in which lead-free pins were originally used, V is not added to the end of the package code.

The sockets indicated below have been prepared as mounting sockets.

Package name	Package code	Socket No.	Type	Maker
QFP	FP-64A	IC149-064-*08-*5	Surface mount	Yamaichi Electronics
	FP-80B	IC149-080-*12-*5	Surface mount	Yamaichi Electronics
	FP-80A	IC149-080-*17-*5	Surface mount	Yamaichi Electronics
HQFP	FP-120A	IC149-120-*77-*5	Surface mount	Yamaichi Electronics

5.2 Sockets for Transistor Packages

Package	Socket No.	Type	Maker
LDBAK(L)	SMT-6012-HT	Pin insertion	Yamaichi Electronics
MFPK	PJ00300-107	Handler only	Micronics Japan
	PJ00300-302	Handler only	Micronics Japan
SMPK	PJ00300-295	Handler only	Micronics Japan
SMFPK-6	PJ00605-220	Handler only	Micronics Japan
CMFK-5(T)	PJ00565-217	Handler only	Micronics Japan
CMFK-6	PJ00565-217	Handler only	Micronics Japan

5.3 Precautions for Handling Sockets

1. The intervals of the leads of dual in-line packages extend depending on the board dimensions 7.62mm (300 mil), 10.16mm (400 mil), 15.24mm (600 mil), 22.86mm (900 mil) (except for ceramic DIP). Sometimes, the mouth of the socket and the tip of the lead do not conform and insertion is difficult. A suitable jig should be used for inserting ICs and for extracting them.
2. When soldering must be performed with the IC inserted in the IC socket, use a soldering iron with high insulation resistance. Caution should be exercised so that IC is not damaged by the leakage current of the soldering iron.
3. The IC socket should be used within its heat resistance temperature (125°C)

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

5.4 Methods of Purchasing Sockets

If you want more detailed information about each socket and the purchase of sockets, please inquire at one of the following agencies.

Contacts:

- Yamaichi Electronics Co., Ltd.

Office	Address	Telephone	Facsimile
Yamaichi Electronics Co., Ltd.	3-28-7 Nakamagome, Ohta-ku, Tokyo 143-8515 Japan	03-3778-6104	03-3778-6176
Yamaichi Electronics U.S.A., Inc.[YEU]	2235 Zanker Road, San Jose, California 95131, U.S.A.	408-456-0797	408-456-0799
Yamaichi Electronics Singapore Pte Ltd. [YES]	51 Cuppage Road #04-01/02, Starhub Center, SINGAPORE 229469	7340060	7355567
Yamaichi Electronics Deutschland GmbH[YED]	Karl-Schmid-Strasse 9, D-81829 München, Germany Postfach 82 09 05, D-81809 München	89-45109-0	89-45109-110
Yamaichi Electronics Taiwan Co., Ltd. [TYE]	6F-8, No. 142, Sec. 3, Min Chuan E. Rd., Taipei, Taiwan, R.O.C.	02-2546-0507	02-2546-0509
Yamaichi Electronics Hong Kong Ltd. [YEH]	Room 713 7/F Tower II Grand Central Plaza, 138 Shatin Rural Committee Road, Shatin, N.T., HONG KONG	2687-1968	2601-9681
Asia Yamaichi Electronics Inc.[AYE]	3rd F1.Ilsock Bldg., 162-2 Samsong-Dong, Kangham-Gu, Seoul, 135-091 KOREA	43-877-3361	43-877-3360

- Wells-CTI

Office	Address	Telephone	Facsimile
Wells-CTI K.K.	6F Paleana Bldg. 2-2-15, Shin-Yokohama Kohoku-ku Yokohama City 222-0003 Japan	045-473-9881	045-473-9884
Wells-CTI	3502 North olive Rord South Bend, IN 46628 United States of America.	219-287-5941	219-287-0356

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

- Texas Instruments

Office	Address	Telephone	Facsimile
Texas Instruments Japan Ltd.	Nishi-Shinjuku Mitsui Bldg., 6-24-1, Nishi-Shinjuku, Shinjuku-ku, Tokyo 160-8366, Japan	03-4331-2472	03-4331-3228
Texas Instruments Singapore (PTE) Ltd.	83 Clemenceau Avenue#07-00 Shell HouseUnited Engineers Square Singapore 239920	833-6007	833-6063
Texas Instruments Hong Kong Ltd.	15F, Tower 2, The Gateway 25-27 Canton Road Kowloon, Hong Kong	2956-7288	2956-2200
Texas Instruments Korea Ltd.	29th Floor Trade Tower 159 Samsung-Dong, Kangnam-ku Seoul, Korea	02-551-2928	02-551-3211
Texas Instruments Malaysia Sdn Bed.	1, Lorong Enggang 33, Ampang 54200, Kuala Lumpur Malaysia	03-456-7077 (direct)	03-457-9966
Texas Instruments Inc.	34 Forest Street, Attleboro Ma 02703, U.S.A.	508-236-5216 (direct)	508-236-5200
Texas Instruments Italia Spa	Via John F. Kennedy 141 81031 Aversa, Italy	81-8151-210	81-8151-343

- Sumitomo 3M Ltd.

Office	Address	Telephone	Facsimile
Sumitomo 3M Ltd.	33-1, Tamagawadai 2-chome, Setagaya-ku Tokyo 158-8583, Japan	03-3709-8388	03-5716-7612
3M Co.Ltd.	6801 River Place Blvd. Austin, TX 78726-9000 U.S.A	800-328-0411	800-932-9373
3M Hong Kong Ltd.	Victoria Centre, 5th Floor 15 Watson Road Causeway Bay, Hong Kong	852-2806-6111	852-2807-1308
3M Korea Ltd.	22nd Floor, Daehan Investment Trust Bldg. 27-3 Yoido-Dong YongdungPo-ku, Seoul 150-010, Korea	82-2-3771-4129	82-2-2761-6393
3M Singapore Pte., Ltd.	9 Tagore Lane Singapore 2678Republic of Singapore	65-454-8611	65-553-0914
3M Taiwan Ltd.	13th Floor, Lotus Bldg. 136, SEC 3, Jen Ai Rd. Taipei, 10628 Taiwan, R.O.C.	886-2-704-9011	886-2-754-9104
Suomen 3M Oy	Sinimaentie 6 FIN-02630 Postbox 26FIN-02631 Espoo, Finland	358-0-52521	358-9-520-664
3M France	Blvd. de L'Oise F-95006 Cergy Pontoise, Cedex, France	331-3031-6161	331-3031-6176
3M Deutschland GMBH	Carl-Schurz-Strasse 1 P.O. Box 100422 D41453 Neuss, Germany	49-2131-14-2237	49-2131-14-2658
3M Norge A/S	Hvamveien 6, P.O Box 100 2013 Skjetten, Norway	47-63-84-85-00	47-63-84-17-88
3M Svenska AB	Bollstanaesvaegen 3 S-191 89 Sollentuna, Sweden	46-8-92-2100	46-8-754-5537

The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code. For applied products, contact the Hitachi sales office.

Office	Address	Telephone	Facsimile
3M (Schweiz) AG	Eggstrasse 93 Postfach 8803 Ruschlikon Switzerland	41-1-724-9090	41-1-724-9336
3M U.K. PLC	3MHouse-P.O. Box 1, Market Place Bracknell, Berkshire RG12 1JU England	44-1-344-858000	44-1-344-858278

- Enplas

Office	Address	Telephone	Facsimile
Enplas Semiconductor Peripheral	8F, Kojima MN Bldg., 2-15-1 Dote-cho, Saitama City, Saitama 330-0801, Japan	81-48-643-7676	81-48-643-7671
Enplas Tesco, Inc.	765 North Mary Avenue, Suite 904, Sunnyvale, CA. 94085-2909, U.S.A.	1-408-749-8124	1-408-749-8125
Enplas Tesco, Inc. East Coast Sales Office	73 Sherburne Road, Pelham, NH. 03076, U.S.A.	1-603-635-7526	1-603-635-7738
Enplas (Korea), Inc.	306 B/D No. DA, Song-Nam Factories Town, 145 Yatap-Dong, Bun Dang-Gu, Songnam-City, Kyungki-Do, 463-070, Korea	82-31-707-1071	82-31-703-9757
Hy-Cad Systems & Engineering Pte., Ltd.	146B PAYA LEBAR ROAD #02-01 ACE BUILDING SINGAPORE 409017	65-288-6123	65-288-6496
Enplas Hy-Cad Electronic (Shanghai) Co., Ltd.	FLOOR1, STANDAR INDUSTRIAL BUILDING 3, NO.253 AI DU ROAD, SHANGHAI WAIGAOQIAO FREE TRADE ZONE, SHANGHAI 200131 P.R.C	86-21-5046-1685	86-21-5046-1448
Nikad Electronics Limited	Buchanan House, Malthouse Square, Princes Risborough, Bucks HP27 9AQ, England	44-1844-347350	44-1844-347360
Enplas HN Technology Corporation	ROOM 5E, NO.97, SEC.3, TAICHUNG HARBOR ROAD, TAICHUNG, TAIWAN R.O.C	886-42-3586763	886-42-3588968
Enplas HN Technology Corporation	3FL., NO.110, HSIN TAI ROAD, CHUPEI CITY, HSIN-CHU HSIEN, TAIWAN R.O.C	886-3-5537676	886-3-5519644

- CHICHIBU FUJI CO., LTD

Office	Address	Telephone	Facsimile
CHICHIBU FUJI CO., LTD	755-1 Ogano, Ogano-Machi, Chichibu- Gun, Saitama-Pref, 368-0193 Japan	0494-75-1213	0494-75-2442

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- Unitechno Inc.

Office	Address	Telephone	Facsimile
UNITECHNO SINGAPORE PTE LTD	No.10 Bukit Pasoh Road, Singapore 089824	2262033	2231060
UNITECHNO MALAYSIA REP OFFICE	No. 69A, 1st Flor, Jalan SS21/37, Damansare Utama, 47400 Petaling Jaya.	03-7187898	03-7192018
UNITECHNO HONG KONG SALES REP OFFICE	Flat A22, 13/F., 1046 King, Road, Quarry Bay, Hong Kong	2-90231657	2-25906553
SING WAY CORPORATION	Rm 1207. No. 142, Sec. 3, Min Chhuan Road, Taiwan R.O.C	2-27191123	2-27185972
NEPENTHE DISTRIBUTION INC.	2479E. Sayshore Road, Suite 800, Palo Alto, CA 94303	650-496-6666	650-856-8650
GLYN GMBH & CO. KG	Am Wortzgarten 8, D65510 Idstein/Taunus	(49) 6126-590-232	(49) 6126-590-132
POLYMODE LTD.	Innovation House, Beam heath Way nantwich CW5 6PQ, United Kingdom	+44 (0) 1270-621150	+44 (0) 1270-621151

- Micronics Japan Co., Ltd.

Office	Address	Telephone	Facsimile
Micronics Japan Co., Ltd. San Jose Branch	1310 Tully Road, Suite 105, San Jose, CA 95122, U.S.A.	+1-408-971-7388	+1-408-971-7389
Aps Sales & Service GmbH	Gutenbergstrasse1, D-82178 Puchheim Munchen, Germany	+49-89-863-3373	+49-89-863-4001
DEMCO TRADING Co., Ltd. (DTL)	MIWON Building #610, 43 Yoido-Dong, YoungDungPo-Gu, Seoul, 150-010, KOREA	+82-2-780-9388	+82-2-784-2400
CHAIN-LOGIC INTERNATIONAL Corp. (CLIC)	No. 155, Chung-Ho St., Chu-Pei City, Hsinchu Hsiang, Taiwan, R.O.C.	+886-3-551771	+886-3-5518381
ZMC TECHNOLOGIES PTE. LTD.	1020, Tai Seng Avenue, #03-3510/3512, Tai Seng Industrial Estate. Singapore 534416	+65-6285-1159	+65-6382-3096

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