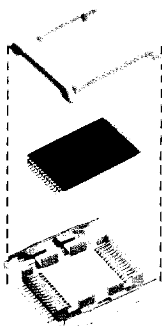
IC SOCKETS FOR THIN SMALL OUTLINE PACKAGE

TSOP SOCKETS



FEATURES

1. Requires no pattern changes when directly mounting an TSOP IC
The foot patterns of Thin SO package IC chips and of the socket are identical. Thus, the sockets can be used from prototyping to initial production, and during actual production the IC chips can be directly mounted to the PC board without any changes to the PC board patterns.

2. Achieves a mounting height of 3mm including the IC's height

3. Protects the soldered parts
The frame holders are designed to prevent peeling, and to protect the soldered parts from any external force. Use the special frame removal tool to remove the frame so that the soldered parts are not subject to external force at that time.

4. Automated mounting compatible
The socket has an open flat construction on its top surface so that it can be picked up by an automated mounting machine using suction for automated mounting. Standard package style is emboss tape and reel (1,000 pcs. per reel)

TSOP is an acronym for Thin Small Outline Package, a kind of surface mount device package.

APPLICATIONS

1. For initial production (prototyping to initial production stages, which use sockets for fast production of a new product)

2. For functional upgrades

3. For expanding ROM or RAM

SPECIFICATIONS

1. Characteristics

<table>
<tr><th colspan="2">Item</th><th>Specifications</th><th>Conditions</th></tr>
<tr><td rowspan="4">Electrical characteristics</td><td>Rated current</td><td>0.1A</td><td>—</td></tr>
<tr><td>Insulation resistance</td><td>Min. 1000MΩ</td><td>Using 100V DC megohmmeter</td></tr>
<tr><td>Breakdown voltage</td><td>60V DC for 1 minute</td><td>Detection current: 1mA</td></tr>
<tr><td>Contact resistance</td><td>Max. 60mΩ (Initial)</td><td>Measured with YHP4328A.</td></tr>
<tr><td rowspan="3">Mechanical characteristics</td><td>Electrical shock resistance</td><td>490m/s² {50G} (3 axises)</td><td>After carrying current (max. 10μA) during the test, no interruption of current longer than 1μs does not occur.</td></tr>
<tr><td>Mechanical shock resistance</td><td>981m/s² {100G} (3 axises)</td><td>Frame does not slip out.</td></tr>
<tr><td>Vibration resistance</td><td>20 to 55Hz, 98m/s² {10G} (3 axises), 2 hours per each axis</td><td>After carrying current (max. 10μA) during the test, no interruption of current longer than 1μs does not occur.</td></tr>
<tr><td rowspan="7">Environmental characteristics</td><td>H_2S</td><td>After test, contact resistance max. 60mΩ</td><td>After 48 hours of exposure to humidity 75 to 80% R.H., temperature 40°C±2°C, concentration 3±1ppm</td></tr>
<tr><td>SO_2</td><td>After test, contact resistance max. 60mΩ</td><td>After 48 hours of exposure to humidity 90 to 95% R.H., temperature 40°C±2°C, concentration 10±3ppm</td></tr>
<tr><td>Humidity</td><td>After test, contact resistance max. 60mΩ, insulation resistance min. 100MΩ</td><td>After 96 hours of exposure to humidity 90 to 95% R.H., temperature 40±2°C</td></tr>
<tr><td>Thermal shock resistance</td><td>After test, contact resistance max. 60mΩ, insulation resistance min. 100MΩ</td><td>After 5 cycles where 1 cycle consists of steps 1 to 4
<table>
<tr><th>Step</th><th>Temperature (°C)</th><th>Time (minutes)</th></tr>
<tr><td>1</td><td>-55^{+0}_{-3}</td><td>30</td></tr>
<tr><td>2</td><td>25^{+10}_{-5}</td><td>Maximum 5</td></tr>
<tr><td>3</td><td>85^{+3}_{-0}</td><td>30</td></tr>
<tr><td>4</td><td>25^{+10}_{-5}</td><td>Maximum 5</td></tr>
</table></td></tr>
<tr><td>Operating temperature</td><td>−55°C to +65°C</td><td>No freezing at low temperatures, Humidity: Max. 85% R.H.</td></tr>
<tr><td rowspan="2">Soldering heat resistance</td><td>Peak temperature of 245°C</td><td>Infrared reflow soldering</td></tr>
<tr><td>300°C within 2 seconds</td><td>Soldering iron</td></tr>
<tr><td colspan="2">Cream solder printing</td><td>Screen thickness: 0.15mm</td><td>—</td></tr>
</table>

2. Materials and surface treatment

Part name		Material	Surface treatment
Molded plastic part	Body	Liquid crystal polymer resin (UL94V-0)	—
	Frame	PPS resin (UL94V-0)	—
Metal part	Contact	Copper alloy	SnPb plating over Ni for contact, SnPb plating over Ni for terminal
	Holder	Copper alloy	SnPb plating over Ni

Ordering Information by Package Style

1. Pack package containing 5 sets (standard)
A standard package containing 5 pairs of sockets and frames is available to prevent terminal damage in transit.
1) Suffix the order number with letter "C".
2) Ordering quantity:
For example, if AXS728609C is ordered for a quantity of 5, you obtain five sets of sockets and frames (one pack).

2. Ordering Information for Socket body and Frame
Supplied in Embossed Tape Packages (Offered for on-demand production.) The part number should be suffixed with the letter "P".
1) Ordering quantity: 1,000 pcs/lot or more. Please consult us for quantities below 1,000 pcs.
2) Sockets and frames should be ordered separately (refer to the following TYPES.)

PRODUCT TYPES

	No. of contacts	Part No.	Packing quantity	
			Pack	Outer carton
Type I	28	AXS728609C	5 pcs. (5 sockets & 5 frames)	1,000 pcs. (200 packs)
	32	AXS732309C		
	40	AXS740309C		
Type II	32	AXS732949C		

Note: TSOP sockets for other type of IC package not included in the list above are available for on-demand production (5,000 pcs/lot or more).

• Socket body

	No. of contacts	Part No.	Packing quantity	
			Inner box	Outer carton
Type I	28	AXS728409P	—	1,000 pcs.
	32	AXS732109P		
	40	AXS740109P		
Type II	32	AXS732749P		

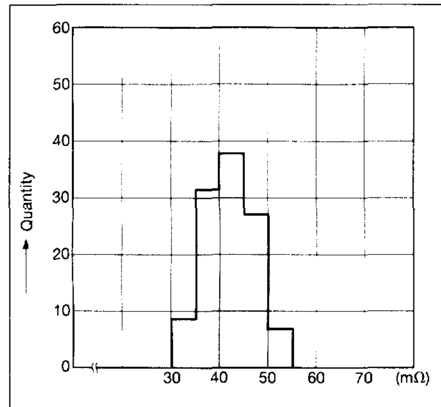
• Frame

	No. of contacts	Part No.	Packing quantity	
			Vinyl package	Outer carton
Type I	28	AXS72850	500 pcs.	1,000 pcs.
	32	AXS73250		
	40	AXS74050		
Type II	32	AXS73254		

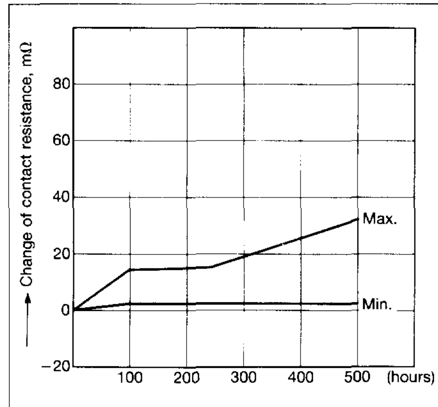
Note) Standard packing: 500 pcs./Vinyl

DATA

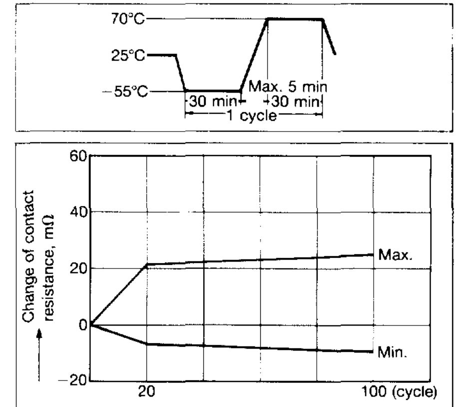
1. Distribution of initial contact resistance
Sample: 112 terminals
(Including conductor resistance of IC lead)



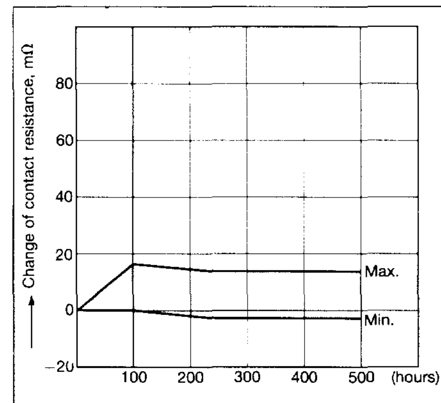
2. Heat resistance test (body and frame are mated)
Sample: 28 contacts, 4 pcs.
Conditions: Ambient temperature 70°C



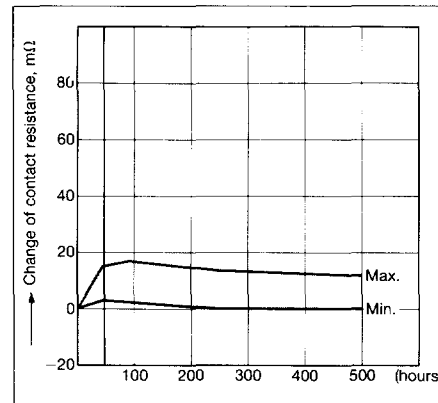
3. Thermal shock test (body and frame are mated)
Sample: 28 contacts, 4 pcs.
Conditions: As shown in figure below



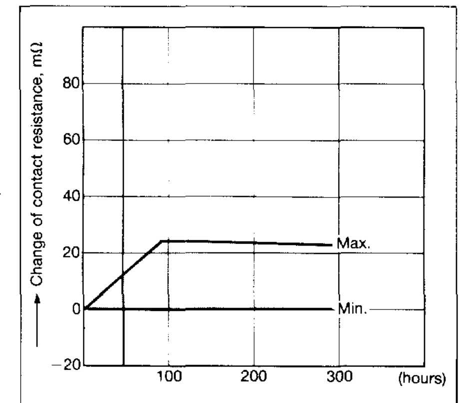
4. Humidity test (body and frame are mated)
Sample: 28 contacts, 4 pcs.
Conditions: Ambient temperature 40°C±2°C, humidity 90 to 95% R.H.



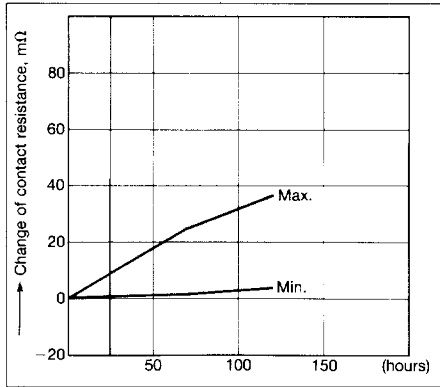
5. SO_2 test (body and frame are mated)
Sample: 28 contacts, 4 pcs.
Conditions: Gas concentration 10ppm±3ppm, temperature 40°C±2°C, humidity 90 to 95% R.H.



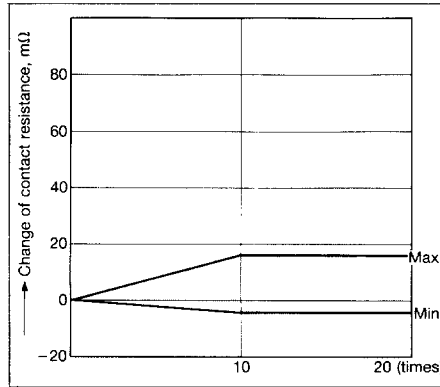
6. H_2S test (body and frame are mated)
Sample: 28 contacts, 4 pcs.
Conditions: Gas concentration 3ppm±1ppm, temperature 40°C±2°C, humidity 75 to 80% R.H.



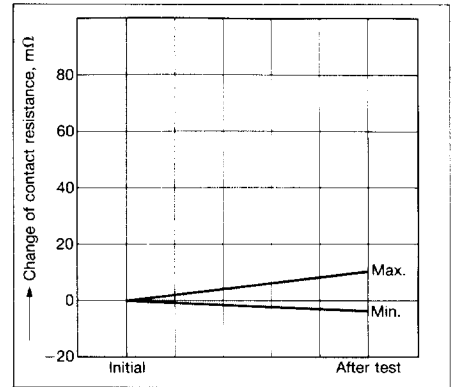
7. Saltwater spray test (body and are mated)
Sample: 28 contacts, 4 pcs.
Conditions: Saltwater concentration 5%±1%, ambient temperature 35°C±1°C, continuous spraying



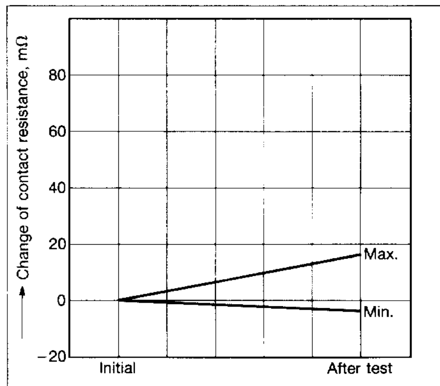
8. Endurance test (IC set product)
Sample: 28 contacts, 4 pcs.
Conditions: Using exclusive tool



9. Vibration test
Sample: 28 contacts, 4 pcs.
Conditions: Vibration; 20 to 55 to 20Hz/min., Accellation; 10G, Direction; 3 axises, Application time; 2 hours per each axis

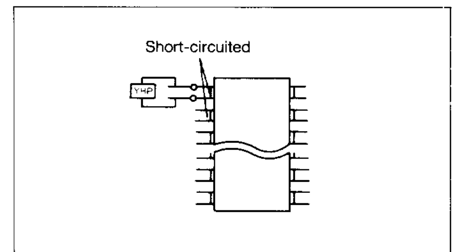


10. Shock test
Sample: 28 contacts, 4 pcs.
Conditions: Shock; 50G, Direction; 3 axises, Application time; 3 times per each axis



CONTACT RESISTANCE MEASUREMENT

The contact resistance cannot be measured one pin at a time since the IC pins have a narrow pitch of 0.55mm. A special IC package, as shown below, was prepared and the contact resistance was measured over two contacts in series. The contact rsistance data given here therefore represents values for two pins.

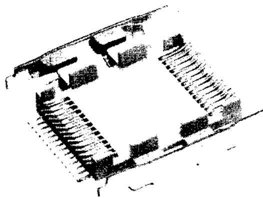


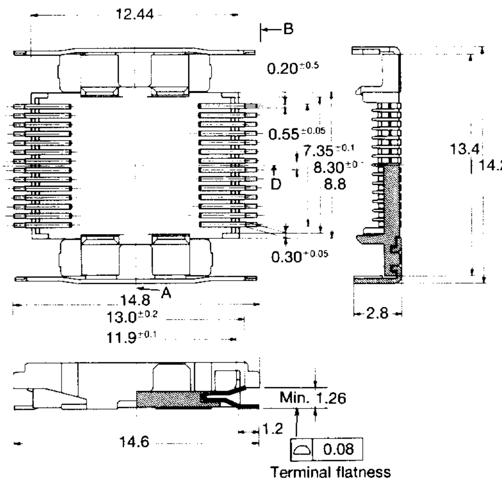
DIMENSIONS

• Type I 28 contact

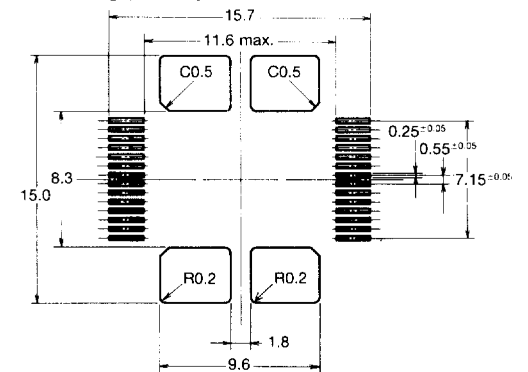
1) Socket body

mm General tolerance ±0.3



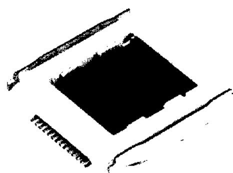


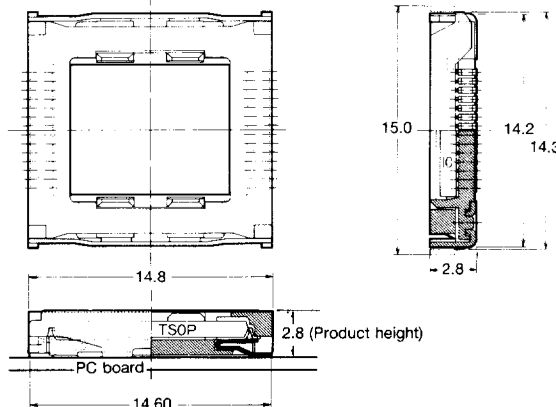
Recommended PC board pattern (mounting pad layout)



2) IC chip mounted on socket body

mm General tolerance ±0.3

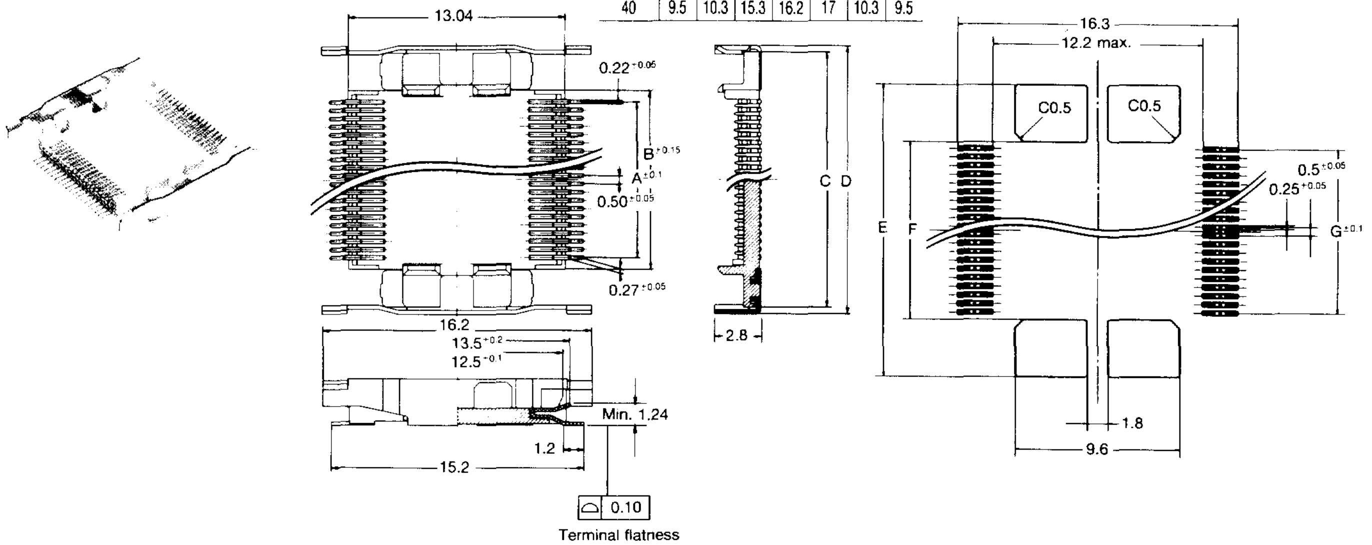




• Type I 32, 40 contacts

mm General tolerance ±0.3

1) Socket body

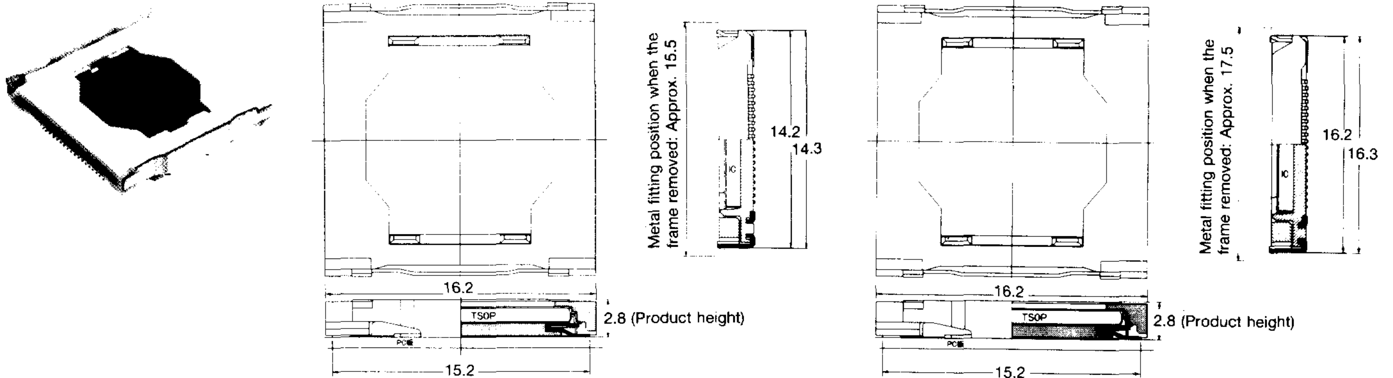


No. of contacts	A	B	C	D	E	F	G
32	7.5	8.3	13.3	14.2	15	8.3	7.5
40	9.5	10.3	15.3	16.2	17	10.3	9.5

2) IC chip mounted on socket body

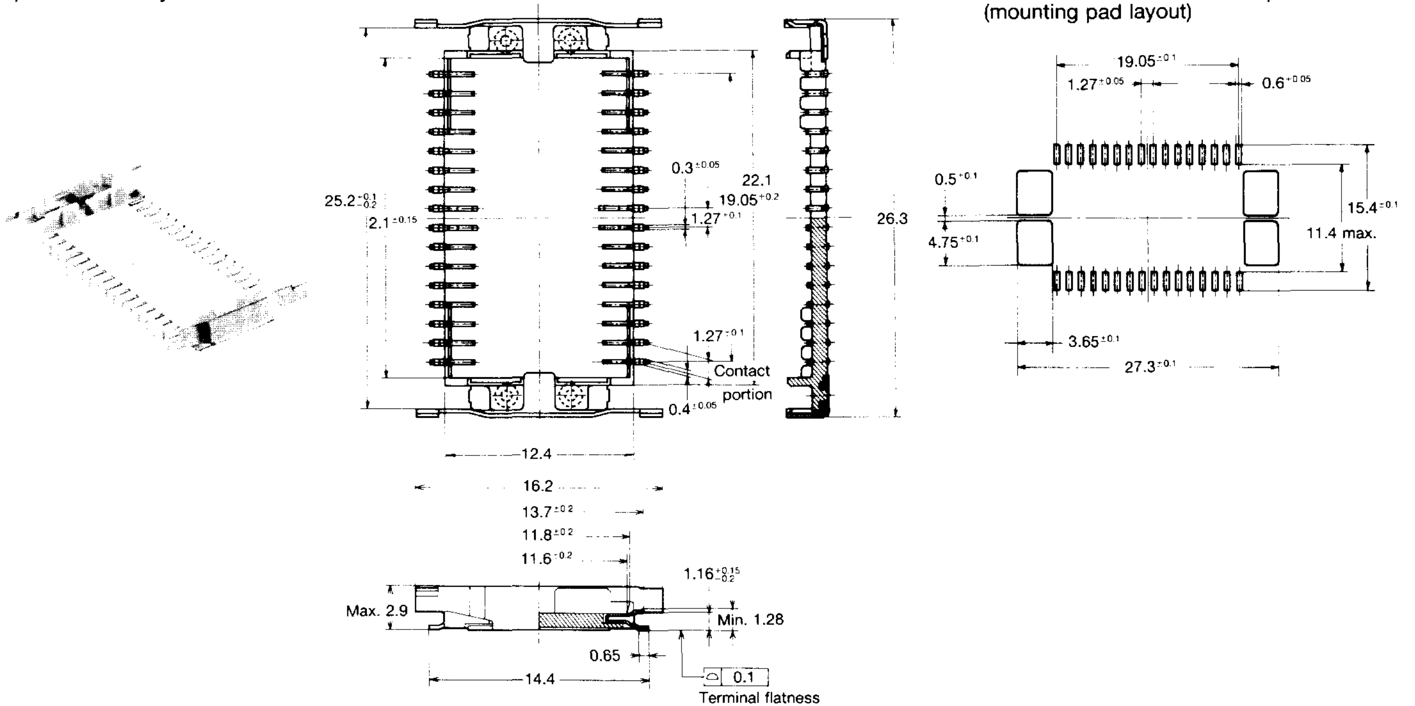
32 contacts

40 contacts



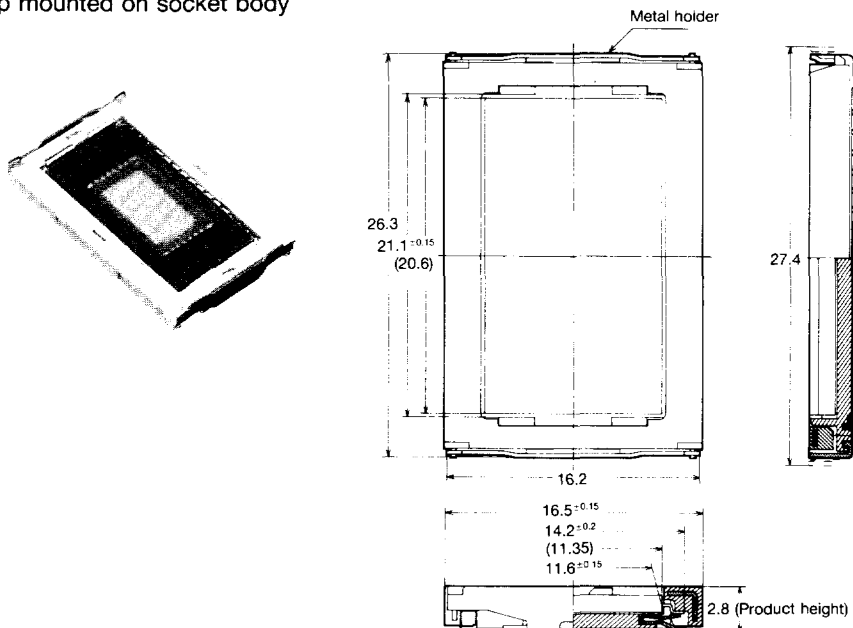
• Type II 32 contacts

1) Socket body



2) IC chip mounted on socket body

mm General tolerance: ±0.3

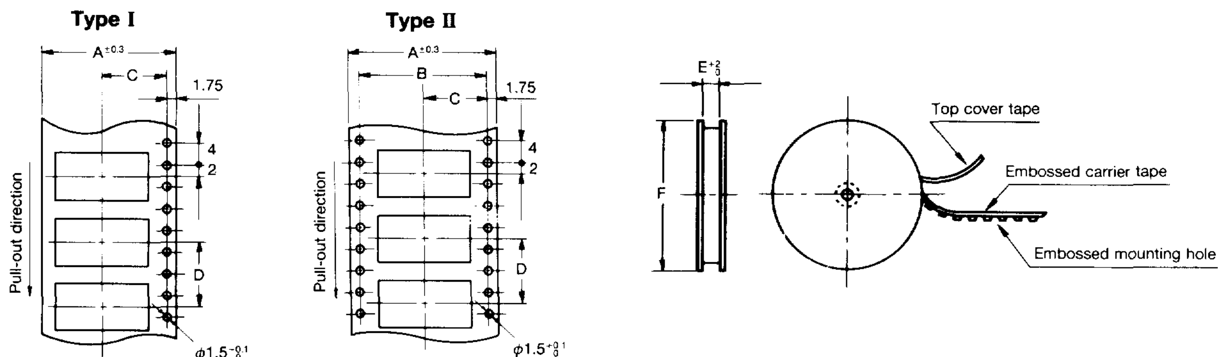


Note) Specifications described in this page are subject to change without notice.
For details, please consult us.

EMBOSS TAPE AND REEL

1. Tape dimensions (Conforming to JIS C 0806-1990)

2. Reel dimensions (Conforming to JIS C 0806-1990)

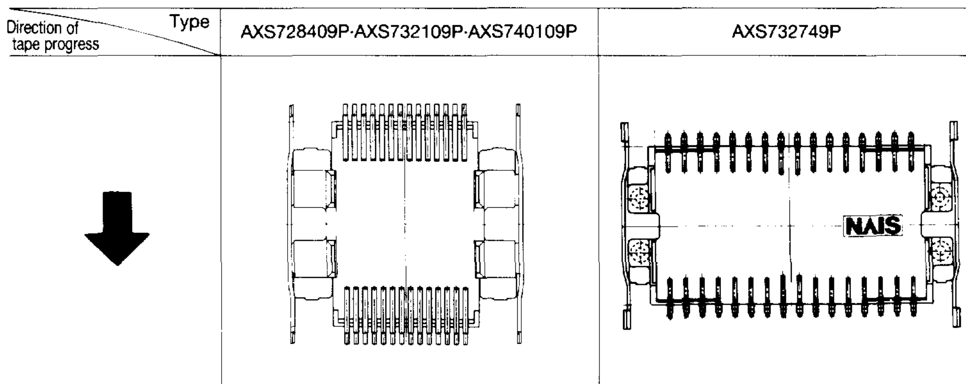


Dimension table (mm)

Part No.	Taping Type	A	B	C	D	E	F	Quantity per reel
AXS728409P	Tape I	24.0	—	11.5	24.0	24.4	φ370	1,000 pcs.
AXS732109P	Tape I	24.0	—	11.5	24.0	24.4	φ370	1,000 pcs.
AXS740109P	Tape I	24.0	—	11.5	24.0	24.4	φ370	1,000 pcs.
AXS732749P	Tape II	44.4	20.2	20.2	24.0	44.0	φ370	1,000 pcs.

Note: In case that the detailed dimensions are needed, please consult us.

Socket orientation with respect to direction of emboss tape progress

Type / Direction of tape progress	AXS728409P·AXS732109P·AXS740109P	AXS732749P
		

Vendor-Classified Compatibility List for TSOP IC Sockets

Type	Type I					Type II
No. of contacts	28 contacts		32 contacts		40 contacts	32 contacts
IC manufacture	MITSUBISHI	FUJITSU	OKI	HITACHI	MITSUBISHI	NEC
Part No.	28P2C-A	FPT-28P-M03	TSOP32-P-814-K	TFP-32DA, TFP-32DAR	40P3J	P32BW-50-525A-1
Terminal pitch	0.55mm		0.5mm			1.27mm

NOTES

1. When an IC is mounted on a socket, irregular IC lead pitch may cause incomplete mounting or damage to the leads. Make sure that all IC leads have the correct pitch.

2. An IC is placed in a specific position on a socket. If any foot of the IC lifts off the socket, reposition the foot before securing the device with the frame.

3. When installing a frame over a socket, hold the frame in a horizontal position and push it down until it is snugly attached with the four corner hooks. After installing the frame, press down on it again to make sure that it is firmly secured with the hooks.

4. When replacing an IC, use our special frame release tool. If the hooks are forcibly pushed apart they may be permanently deformed and the frame will not mount properly again.

5. Do not pull a socket lead with excessive force.

6. Exercise care not to drop sockets onto a hard surface as this may deform or damage the leads, or cause the hooks to drop off.

7. Store in an area free from excessive airborne dust.

8. Do not presolder or place electronic parts under the frame, as this may impede proper frame loading.

Cautions for Soldering

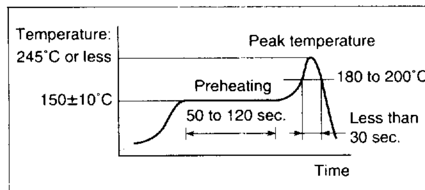
1. Reflow Soldering

(1) Cautions for cream solder printing screen setup:

- The screen should have a thickness of 0.15mm.
- The solder printing area should not exceed the recommended lead pad area.
- Apply solder to the lead pads to which the socket corner hooks will be soldered.

(2) Cautions for the reflow soldering process:

- During reflow soldering, the peak temperature on the PC board surface should not exceed 245°C.
- The following diagram shows the recommended reflow soldering temperature profile:



- When cleaning PCAs in cleaning solvent after soldering, carefully control the contaminants in the solvent to prevent the card contacts from being re-contaminated. Use of vapor cleaning is recommended in the final stage of the cleaning process.

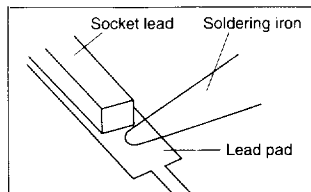
2. Manual Soldering

(1) Preparations

- Use a thin-head soldering iron (approx. 1 mm in diameter).
- Use 0.5mm diameter wire solder containing flux.
- Control the soldering iron temperature to be below 320°C.

(2) Soldering

- It is advisable to solder the socket leads first.
- First put the soldering iron tip on a lead pad to heat up the pad and socket lead, then melt wire solder until solder flows over a length of 0.5 to 1 mm along the lead foot.



- The length of the soldered section on the lead pad should be between 0.5 and 1 mm.
- Complete soldering within 5 seconds per lead.
- Finally, solder the socket corner hooks to their corresponding pads.

(3) Other cautions when soldering

- During soldering, do not apply excessive pressure to socket leads with the soldering iron.
- Exercise care not to contaminate the card contacts with solder flux from the soldering iron tip.
- Make sure that the card contacts are not contaminated with dispersed solder flux.
- Avoid solder mounds on lead feet, which can cause incomplete frame mounting.

3. Correcting Soldering

(1) Removing solder bridges

- Use a flat-tip soldering iron with a 3-mm head diameter.
- Apply solder flux to the spot to be corrected.
- Set the soldering iron temperature between 290°C and 320°C and remove solder bridges in less than 3 seconds each (normally one second should be enough).
- Additional solder is not needed for correction.

(2) Correcting poor soldering

- The procedure and cautions for correcting poor soldering are the same as those described under "Preparation" and "Soldering" in Manual Soldering.