



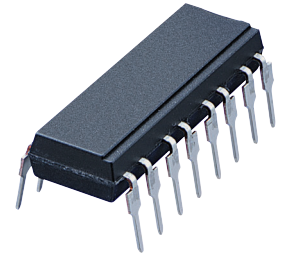
THE DATASHEET OF PC844X



PC844X Series

DIP 16pin (4-channel) AC Input Photocoupler

*1-channel package type is also available.
(model No. **PC814X Series**)



■ Description

PC844X Series contains an IRED optically coupled to a phototransistor.

It is packaged in a 4-channel 16pin DIP.

Input-output isolation voltage(rms) is 5.0kV.

Collector-emitter voltage is 80V(*) and CTR is 20% to 300% at input current of $\pm 1\text{mA}$.

■ Features

1. 16pin DIP 4-channel package
2. Double transfer mold package (Ideal for Flow Soldering)
3. AC input type
4. High collector-emitter voltage ($V_{\text{CEO}} : 80\text{V}^{(*)}$)
5. Current transfer ratio
(CTR : MIN. 20% at $I_{\text{F}} = \pm 1\text{mA}$, $V_{\text{CE}} = 5\text{V}$)
6. High isolation voltage between input and output
($V_{\text{iso(rms)}} : 5.0\text{kV}$)

(*) Up to Date code "P7" (July 2002) $V_{\text{CEO}} : 35\text{V}$.
From the production Date code "J5" (May 1997) to "P7" (July 2002), however the products were screened by $BV_{\text{CEO}} \geq 70\text{V}$.

■ Agency approvals/Compliance

1. Recognized by UL1577, file No. E64380 (as model No. **PC844**)
2. Package resin : UL flammability grade (94V-0)

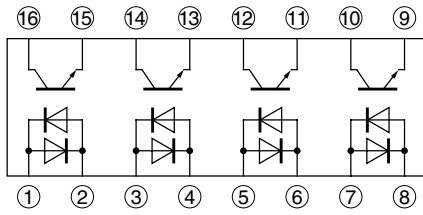
■ Applications

1. Programmable controllers
2. Telephone sets, telephone exchangers
3. System appliances
4. Signal transmission between circuits of different potentials and impedances

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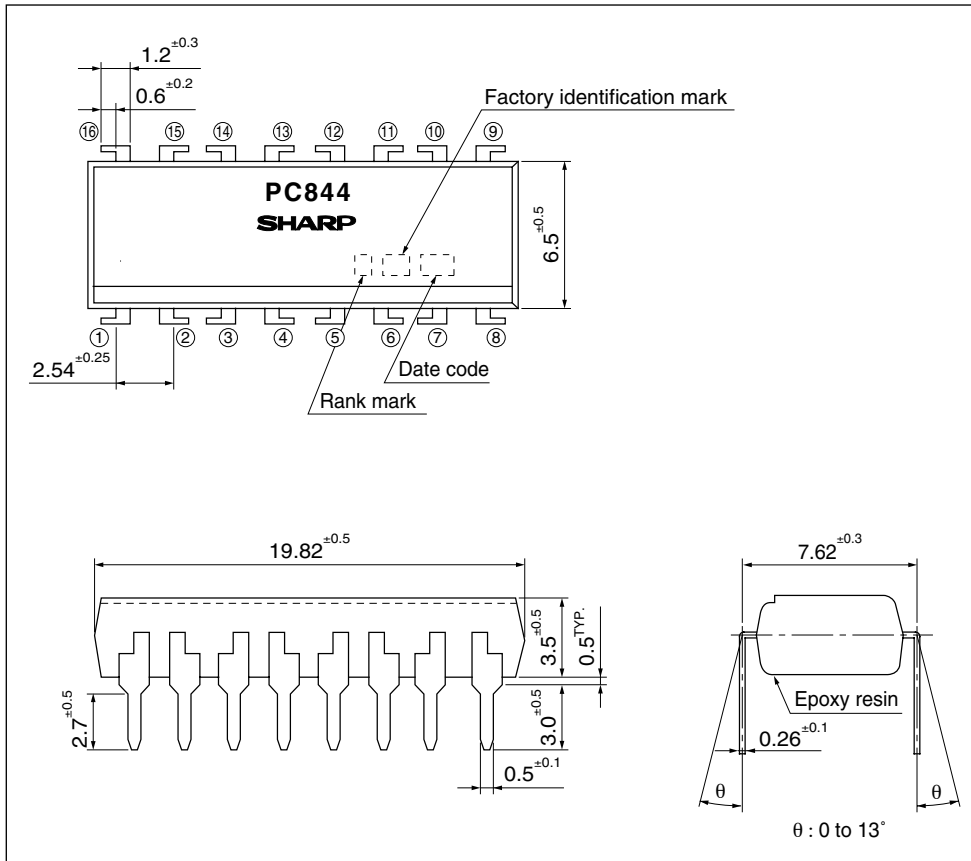
Internal Connection Diagram



- ①③⑤⑦ Anode/Cathode
- ②④⑥⑧ Cathode/Anode
- ⑨⑪⑬⑮ Emitter
- ⑩⑫⑭⑯ Collector

Outline Dimensions

(Unit : mm)







Product mass : approx. 1.0g

Date code (2 digit)

| 1st digit | | | | 2nd digit | |
|--------------------|------|------|------|---------------------|------|
| Year of production | | | | Month of production | |
| A.D. | Mark | A.D. | Mark | Month | Mark |
| 1990 | A | 2002 | P | January | 1 |
| 1991 | B | 2003 | R | February | 2 |
| 1992 | C | 2004 | S | March | 3 |
| 1993 | D | 2005 | T | April | 4 |
| 1994 | E | 2006 | U | May | 5 |
| 1995 | F | 2007 | V | June | 6 |
| 1996 | H | 2008 | W | July | 7 |
| 1997 | J | 2009 | X | August | 8 |
| 1998 | K | 2010 | A | September | 9 |
| 1999 | L | 2011 | B | October | O |
| 2000 | M | 2012 | C | November | N |
| 2001 | N | ∴ | ∴ | December | D |

repeats in a 20 year cycle

Factory identification mark

| Factory identification Mark | Country of origin |
|---|-------------------|
| no mark | Japan |
|  | |
|  | Indonesia |
|  | Philippines |
|  | China |

* This factory marking is for identification purpose only.
Please contact the local SHARP sales representative to see the actual status of the production.

Rank mark

Refer to the Model Line-up table

■ Absolute Maximum Ratings (T_a=25°C)

| | Parameter | Symbol | Rating | Unit |
|--------|-----------------------------|------------------------|-------------|------|
| Input | Forward current | I _F | ±50 | mA |
| | *1 Peak forward current | I _{FM} | ±1 | A |
| | Reverse voltage | V _R | 6 | V |
| | Power dissipation | P | 70 | mW |
| Output | Collector-emitter voltage | V _{CEO} | *4 80 | V |
| | Emitter-collector voltage | V _{ECO} | 6 | V |
| | Collector current | I _C | 50 | mA |
| | Collector power dissipation | P _C | 150 | mW |
| | Total power dissipation | P _{tot} | 200 | mW |
| | *2 Isolation voltage | V _{iso (rms)} | 5.0 | kV |
| | Operating temperature | T _{opr} | -30 to +100 | °C |
| | Storage temperature | T _{stg} | -55 to +125 | °C |
| | *3 Soldering temperature | T _{sol} | 260 | °C |

*1 Pulse width ≤ 100μs, Duty ratio : 0.001

*2 40 to 60%RH, AC for 1 minute, f = 60Hz

*3 For 10s

*4 Up to Date code "P7" (July 2002) V_{CEO} : 35V.

■ Electro-optical Characteristics (T_a=25°C)

| | Parameter | Symbol | Conditions | MIN. | TYP. | MAX. | Unit | |
|--------------------------|--------------------------------------|-----------------------|--|--|--------------------|------|------|----|
| Input | Forward voltage | V _F | I _F =±20mA | - | 1.2 | 1.4 | V | |
| | Peak forward voltage | V _{FM} | I _{FM} =±0.5V | - | - | 3.0 | V | |
| | Terminal capacitance | C _t | V=0, f=1kHz | - | 50 | 250 | pF | |
| Output | Collector dark current | I _{CEO} | V _{CE} =50V, I _F =0 | - | - | 100 | nA | |
| | Collector-emitter breakdown voltage | BV _{CEO} | I _C =0.1mA, I _F =0 | *5 80 | - | - | V | |
| | Emitter-collector breakdown voltage | BV _{ECO} | I _E =10μA, I _F =0 | 6 | - | - | V | |
| Transfer characteristics | Collector current | I _C | I _F =±1mA, V _{CE} =5V | 0.2 | - | 3.0 | mA | |
| | Collector-emitter saturation voltage | V _{CE (sat)} | I _F =±20mA, I _C =1mA | - | 0.1 | 0.2 | V | |
| | Isolation resistance | R _{ISO} | DC500V, 40 to 60%RH | 5×10 ¹⁰ | 1×10 ¹¹ | - | Ω | |
| | Floating capacitance | C _f | V=0, f=1MHz | - | 0.6 | 1.0 | pF | |
| | Cut-off frequency | f _c | V _{CE} =5V, I _C =2mA, R _L =100Ω, -3dB | 15 | 80 | - | kHz | |
| | Response time | Rise time | t _r | V _{CE} =2V, I _C =2mA, R _L =100Ω | - | 4 | 18 | μs |
| | | Fall time | t _f | | - | 3 | 18 | μs |

*5 From the production Date code "J5" (May 1997) to "P7" (July 2002), however the products were screened by BV_{CEO} ≥ 70V.

■ Model Line-up

| 包装形態 | スリーブ | ランクマーク | I _C [mA] (I _F =±1.0mA, V _{CE} =5V, T _a =25°C) |
|-----------|----------------|--------|--|
| | 25個/スリーブ | | |
| Model No. | PC844X | 有り又は無し | 0.2 to 3.0 |
| | PC844X1 | A | 0.5 to 1.5 |

Please contact a local SHARP sales representative to inquire about production status and Lead-Free options.

Fig.1 Forward Current vs. Ambient Temperature

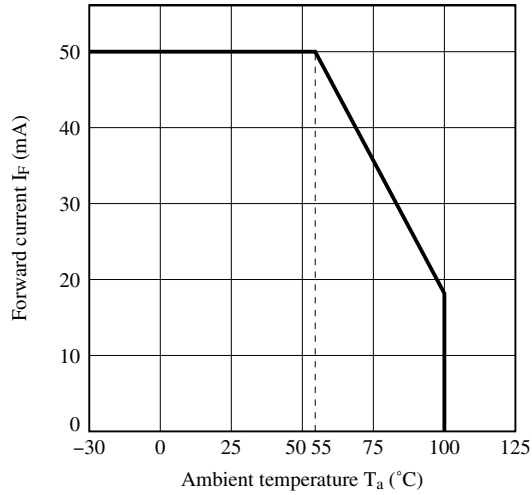


Fig.2 Diode Power Dissipation vs. Ambient Temperature

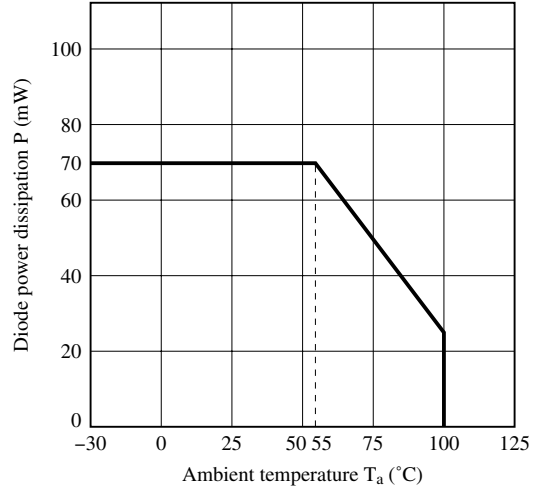


Fig.3 Collector Power Dissipation vs. Ambient Temperature

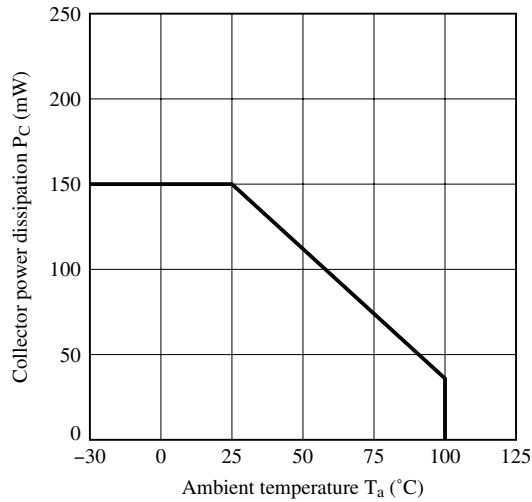


Fig.4 Total Power Dissipation vs. Ambient Temperature

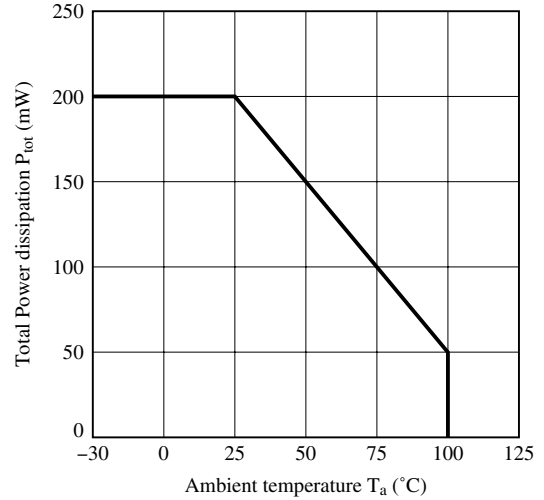


Fig.5 Peak Forward Current vs. Duty Ratio

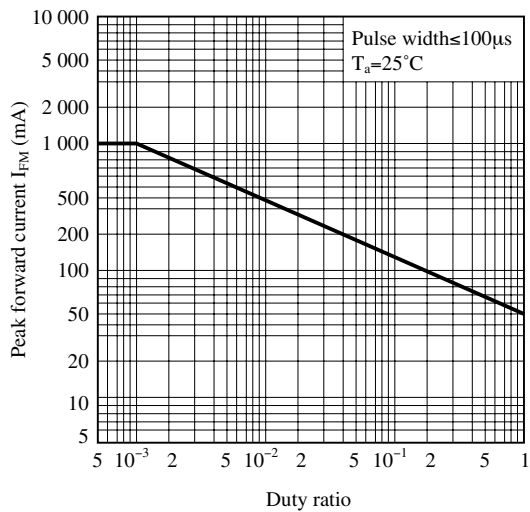


Fig.6 Forward Current vs. Forward Voltage

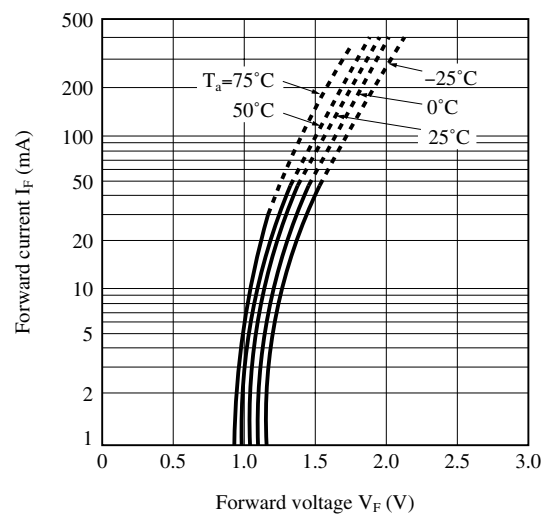


Fig.7 Current Transfer Ratio vs. Forward Current

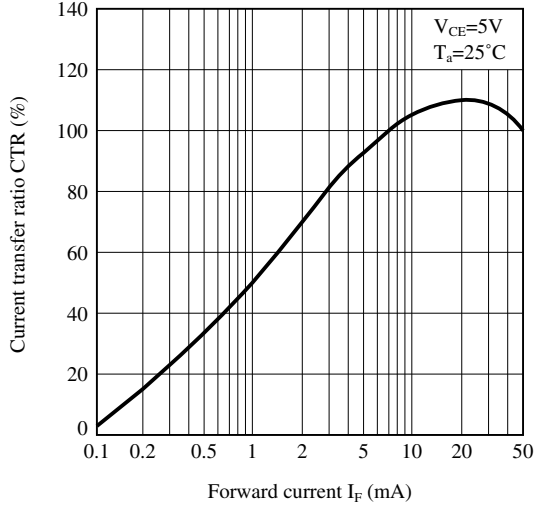


Fig.8 Collector Current vs. Collector-emitter Voltage

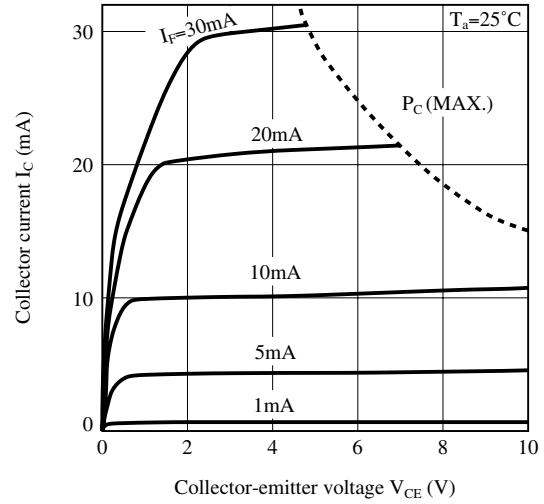


Fig.9 Relative Current Transfer Ratio vs. Ambient Temperature

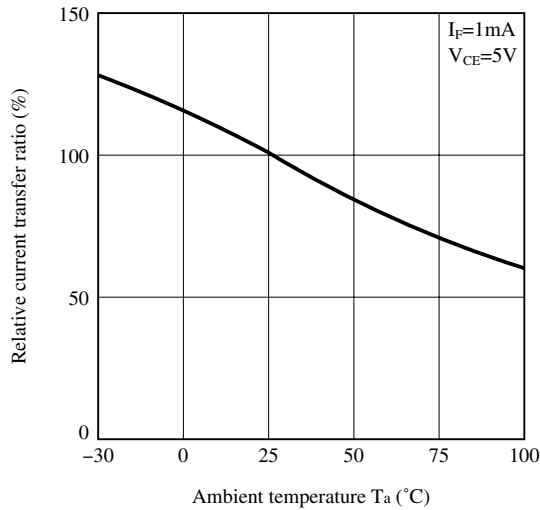


Fig.10 Collector - emitter Saturation Voltage vs. Ambient Temperature

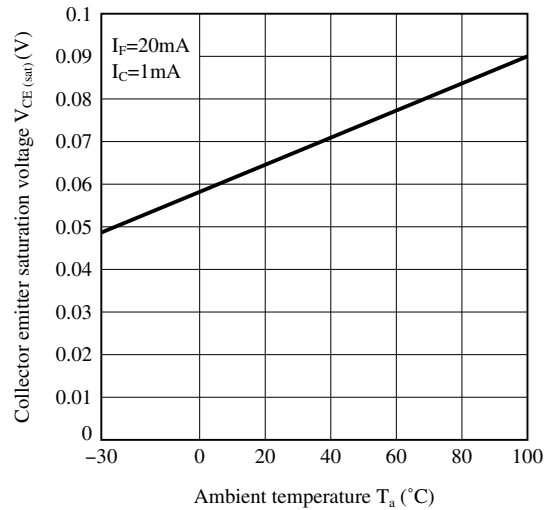


Fig.11 Collector Dark Current vs. Ambient Temperature

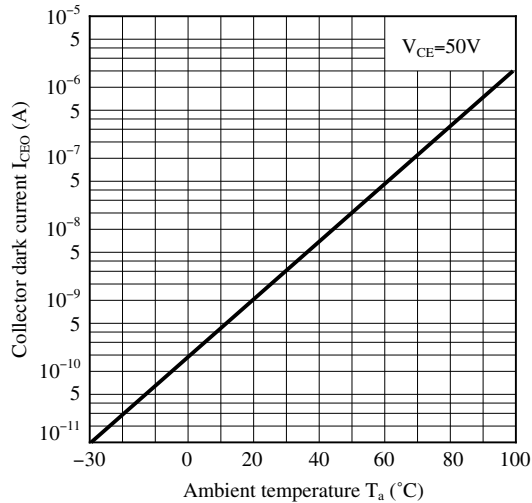


Fig.12 Collector-emitter Saturation Voltage vs. Forward Current

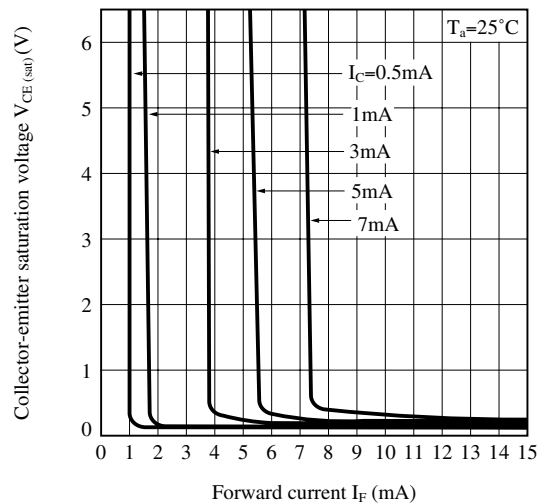


Fig.13 Response Time vs. Load Resistance

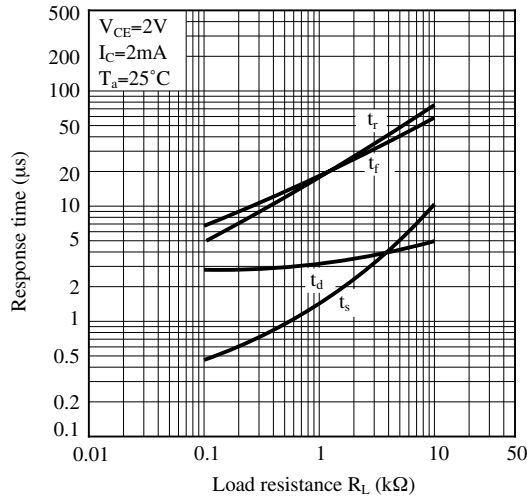
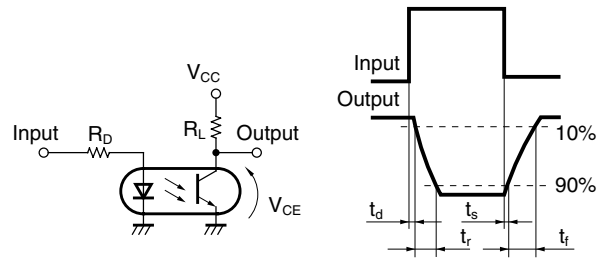


Fig.14 Test Circuit for Response Time



Please refer to the conditions in Fig.13.

Fig.15 Frequency Response

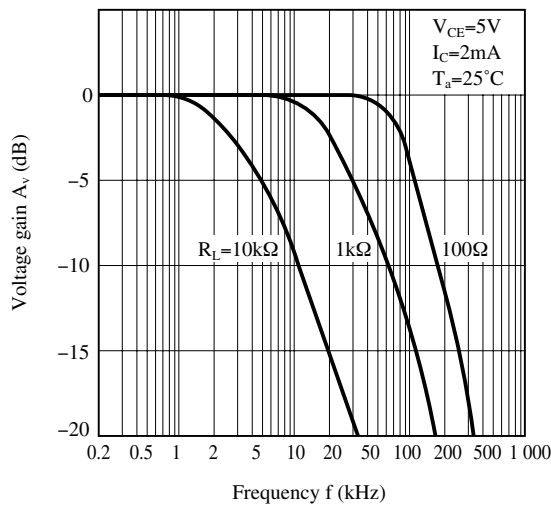
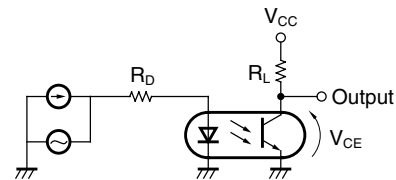


Fig.16 Test Circuit for Frequency Response



Please refer to the conditions in Fig.15.

Remarks : Please be aware that all data in the graph are just for reference and not for guarantee.

■ Design Considerations**● Design guide**

While operating at $I_F < 1.0\text{mA}$, CTR variation may increase.
Please make design considering this fact.

This product is not designed against irradiation and incorporates non-coherent IRED.

● Degradation

In general, the emission of the IRED used in photocouplers will degrade over time.
In the case of long term operation, please take the general IRED degradation (50% degradation over 5years)
into the design consideration.

■ Manufacturing Guidelines**● Soldering Method****Flow Soldering :**

Due to SHARP's double transfer mold construction submersion in flow solder bath is allowed under the below listed guidelines.

Flow soldering should be completed below 270°C and within 10s.

Preheating is within the bounds of 100 to 150°C and 30 to 80s.

Please don't solder more than twice.

Hand soldering

Hand soldering should be completed within 3s when the point of solder iron is below 400°C.

Please don't solder more than twice.

Other notices

Please test the soldering method in actual condition and make sure the soldering works fine, since the impact on the junction between the device and PCB varies depending on the tooling and soldering conditions.

● Cleaning instructions**Solvent cleaning:**

Solvent temperature should be 45°C or below Immersion time should be 3minutes or less

Ultrasonic cleaning:

The impact on the device varies depending on the size of the cleaning bath, ultrasonic output, cleaning time, size of PCB and mounting method of the device.

Therefore, please make sure the device withstands the ultrasonic cleaning in actual conditions in advance of mass production.

Recommended solvent materials:

Ethyl alcohol, Methyl alcohol and Isopropyl alcohol

In case the other type of solvent materials are intended to be used, please make sure they work fine in actual using conditions since some materials may erode the packaging resin.

● Presence of ODC

This product shall not contain the following materials.

And they are not used in the production process for this device.

Regulation substances:CFCs, Halon, Carbon tetrachloride, 1.1.1-Trichloroethane (Methylchloroform)

Specific brominated flame retardants such as the PBBOs and PBBs are not used in this product at all.

■ **Package specification**

● **Sleeve package**

Package materials

Sleeve : HIPS (with anti-static material)

Stopper : Styrene-Elastomer

Package method

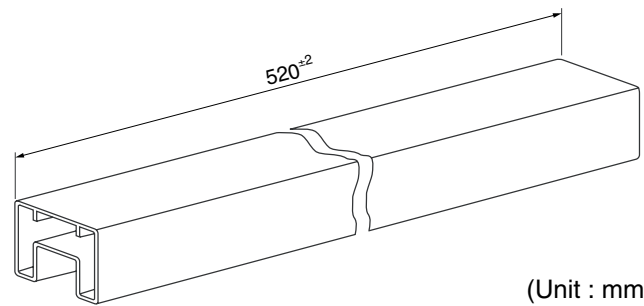
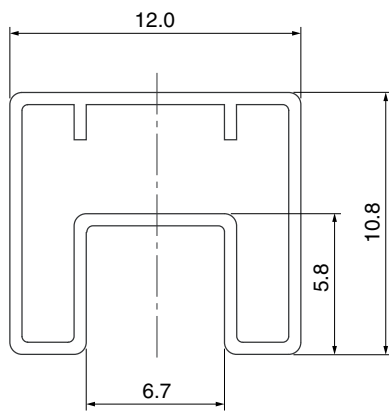
MAX. 25pcs of products shall be packaged in a sleeve. Both ends shall be closed by tabbed and tabless stoppers.

The product shall be arranged in the sleeve with its primary side mark on the tabless stopper side.

MAX. 20 sleeves in one case.

Sleeve outline dimensions

Through-Hole



■ Important Notices

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- Personal computers
- Office automation equipment
- Telecommunication equipment [terminal]
- Test and measurement equipment
- Industrial control
- Audio visual equipment
- Consumer electronics

(ii) Measures such as fail-safe function and redundant design should be taken to ensure reliability and safety when SHARP devices are used for or in connection

with equipment that requires higher reliability such as:

- Transportation control and safety equipment (i.e., aircraft, trains, automobiles, etc.)
- Traffic signals
- Gas leakage sensor breakers
- Alarm equipment
- Various safety devices, etc.

(iii) SHARP devices shall not be used for or in connection with equipment that requires an extremely high level of reliability and safety such as:

- Space applications
- Telecommunication equipment [trunk lines]
- Nuclear power control equipment
- Medical and other life support equipment (e.g., scuba).



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