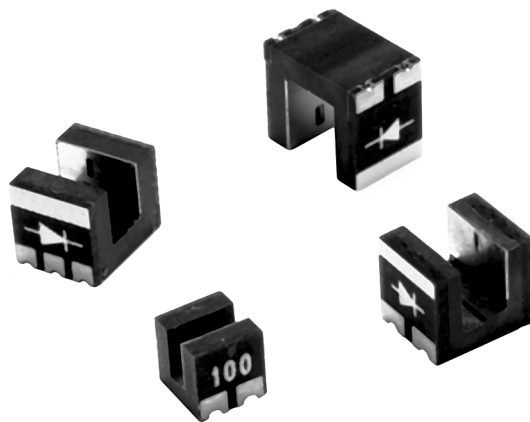






## EE-SX1107/1108/1109/1131

### Ultra-Compact Photomicrosensors with Surface-Mount Design

- Surface mount design, and tape and reel packaging facilitate automated PCB assembly
- Compact size makes these sensors ideal for use in applications with restricted space
- High-resolution sensing with phototransistor output
- Dual channel model that is ideal for encoder applications (EE-SX1131)



### Ordering Information

Appearance	Sensing method	Slot width	Slot depth	Sensing object	Weight	Part number
	Transmissive	1 mm	2 mm	Opaque 0.15 x 0.6 mm min.	0.05 g	<b>EE-SX1107</b>
		2 mm	2.8 mm	Opaque 0.3 x 1.0 mm min.	0.1 g	<b>EE-SX1108</b>
		3 mm	3.5 mm	Opaque 0.5 x 1.0 mm min.	0.1 g	<b>EE-SX1109</b>
	Dual channel transmissive	2 mm	2.8 mm	Opaque 0.3 x 1.0 mm min.	0.1 g	<b>EE-SX1131</b>

# Specifications

## ■ ABSOLUTE MAXIMUM RATING (T<sub>A</sub>=25°C)

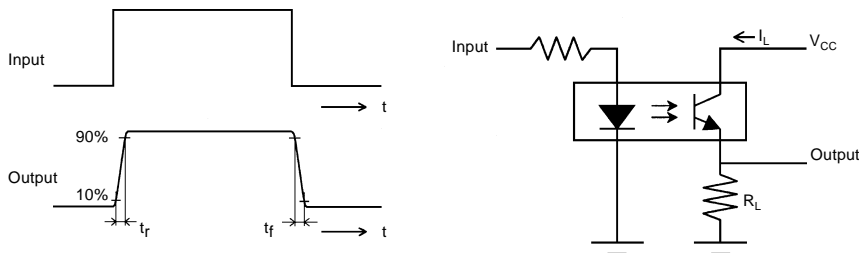
Item		Symbol	Rated value
Emitter	Forward current	I <sub>F</sub>	25 mA (see note)
	Pulse forward current	I <sub>FP</sub>	100 mA (duty: 1/100, pulse width: 0.1 ms)
	Reverse voltage	V <sub>R</sub>	5 V
Detector	Collector-emitter voltage	V <sub>CEO</sub>	20 V
	Emitter-collector voltage	V <sub>ECO</sub>	5 V
	Collector current	I <sub>C</sub>	20 mA
	Collector dissipation	P <sub>C</sub>	75 mW (see note)
Ambient temperature	Operating	T <sub>opr</sub>	-30° to 85°C
	Storage	T <sub>stg</sub>	-40° to 90°C
	Soldering (manual)	T <sub>sol</sub>	300°C (3 second max.)
	Soldering (reflow)	T <sub>sol</sub>	240°C (10 second max)

Note: Refer to Engineering Data if the ambient temperature is not within the normal room temperature range.

## ■ CHARACTERISTICS (T<sub>A</sub>=25°C)

Item		Symbol	Value	Condition
Emitter	Forward voltage	V <sub>F</sub>	1.1 V typ., 1.3 V max.	I <sub>F</sub> = 5 mA
	Reverse current	I <sub>R</sub>	10 μA max.	V <sub>R</sub> = 5 V
	Peak emission wavelength	λ <sub>p</sub> (L)	940 nm typ.	I <sub>F</sub> = 20 mA
Detector	Dark current	I <sub>D</sub>	100 nA max.	V <sub>CE</sub> = 10 V, 0 lx
	Peak spectral sensitivity wavelength	λ <sub>p</sub> (P)	900 nm typ.	—
Combination	Light current (collector-current)	I <sub>L</sub>	50 μA min., 150 μA typ., 500 μA max.	I <sub>F</sub> = 5 mA, V <sub>CE</sub> = 5 V
	Collector-emitter saturation voltage	V <sub>CE</sub> (sat)	0.1 V typ., 0.4 V max.	I <sub>F</sub> = 20 mA, I <sub>L</sub> = 50 μA
	Rising time	t <sub>r</sub>	10 μs typ. (see note)	V <sub>CC</sub> = 5 V, R <sub>L</sub> = 1KΩ
	Falling time	t <sub>f</sub>	10 μs typ. (see note)	I <sub>L</sub> = 100 μA

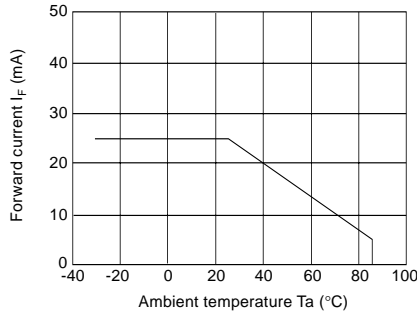
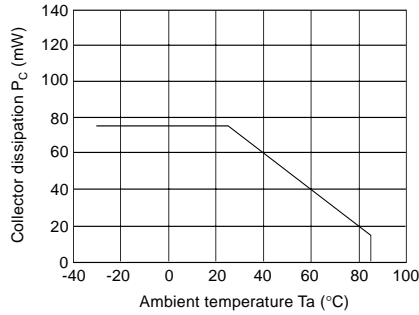
Note: The following figures show the rising time (t<sub>r</sub>) and falling time (t<sub>f</sub>).



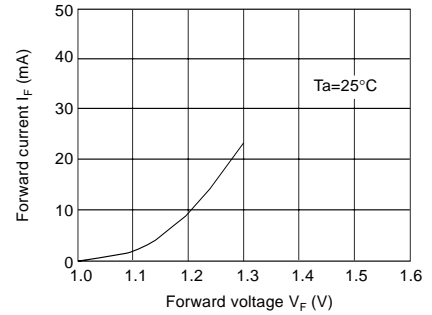
# Engineering Data

Note: The operating conditions of the photomicrosensor must be within the absolute maximum rating ranges.

## TEMPERATURE CHARACTERISTICS

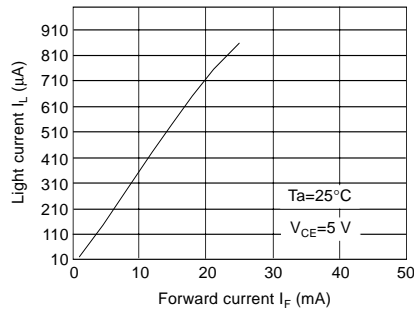


## INPUT CHARACTERISTICS (TYPICAL)

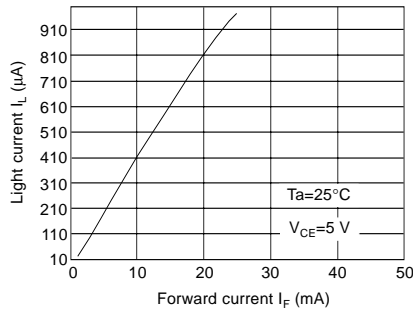


## INPUT/OUTPUT CHARACTERISTICS (TYPICAL)

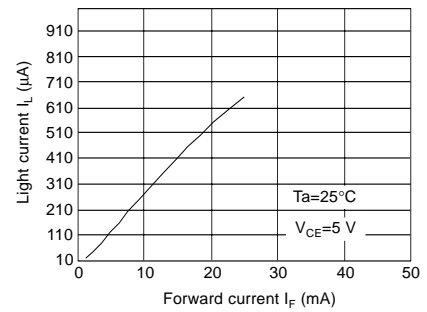
EE-SX1107



EE-SX1108/1131

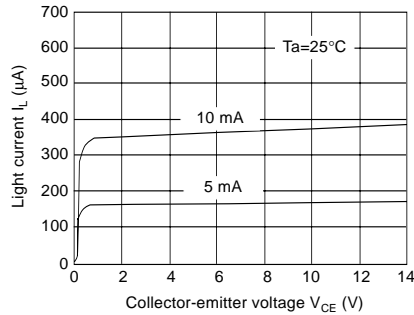


EE-SX1109

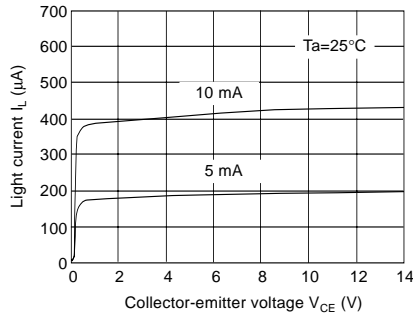


## OUTPUT CHARACTERISTICS (TYPICAL)

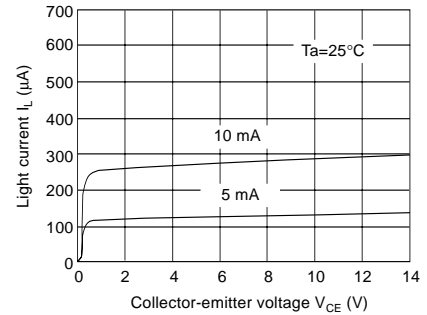
EE-SX1107



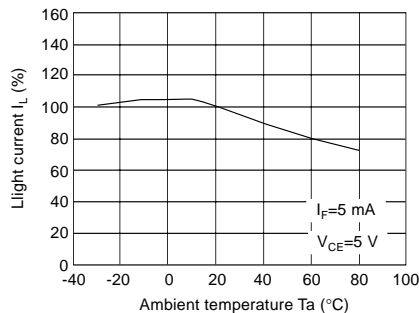
EE-SX1108/1131



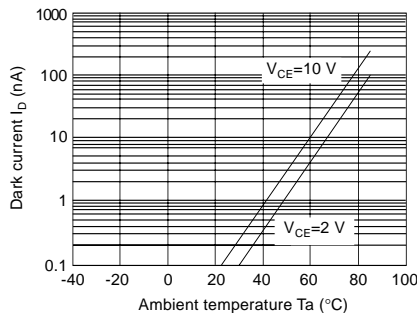
EE-SX1109



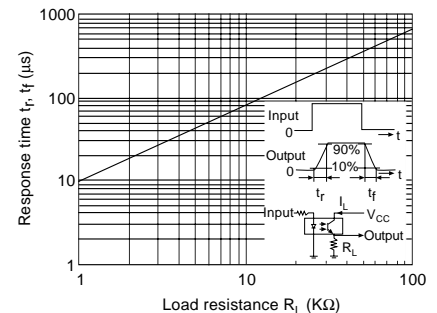
## LIGHT CURRENT TEMPERATURE DEPENDENCY (TYPICAL)



## DARK CURRENT TEMPERATURE DEPENDENCY (TYPICAL)

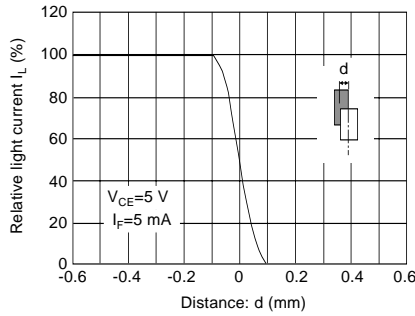
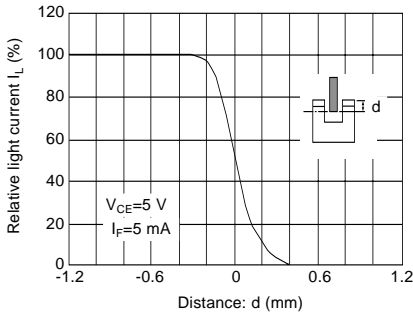


## RESPONSE TIME CHARACTERISTICS (TYPICAL)

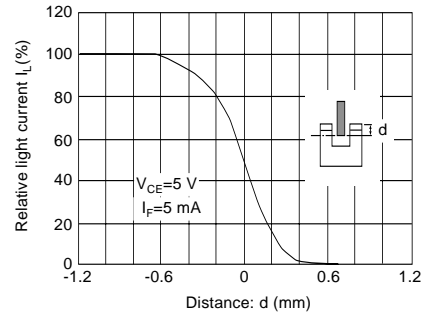


**SENSING POSITION CHARACTERISTICS (TYPICAL)**

**EE-SX1107**

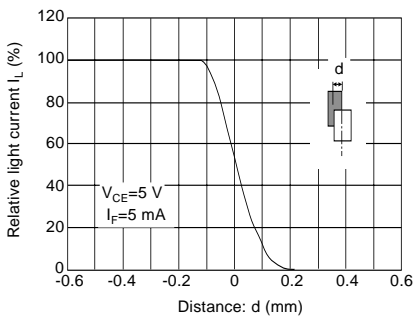


**EE-SX1108/1109/1131**

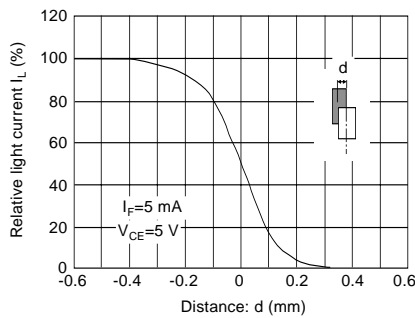


**SENSING POSITION CHARACTERISTICS (TYPICAL)**

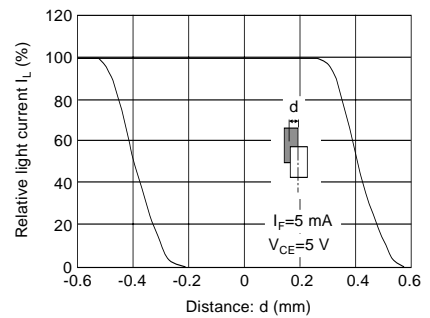
**EE-SX1108**



**EE-SX1109**



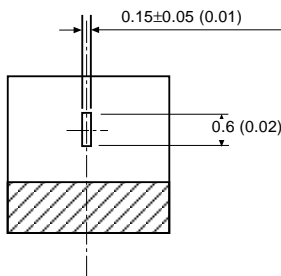
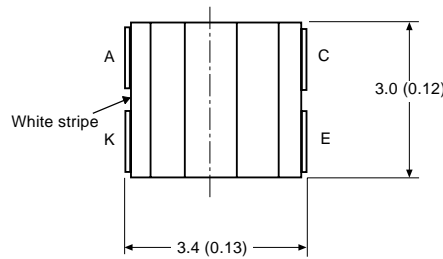
**EE-SX1131**



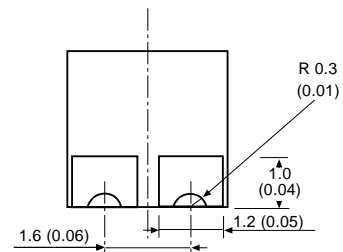
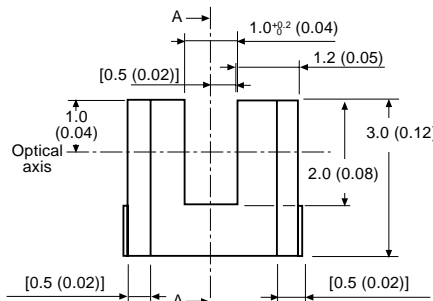
**Dimensions**

Unit: mm (inch)

**EE-SX1107**

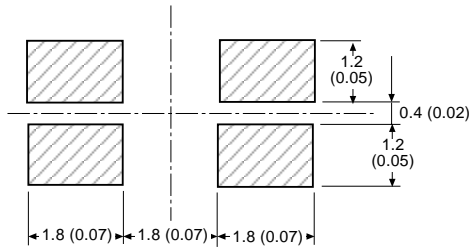


(Cross section AA view)

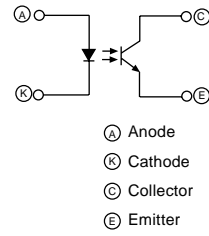


Note: 1. Unless otherwise specified, tolerances are  $\pm 0.15$  mm.  
 2. The values in brackets are relative dimensions.

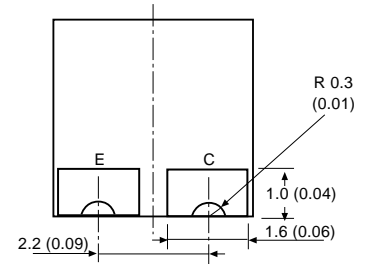
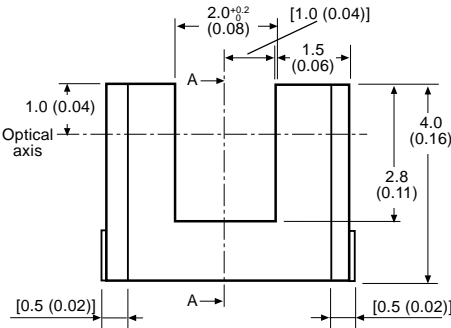
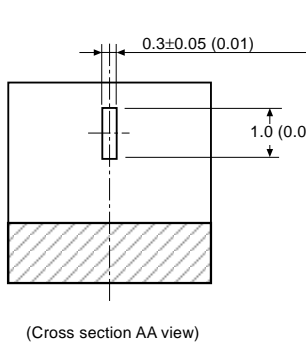
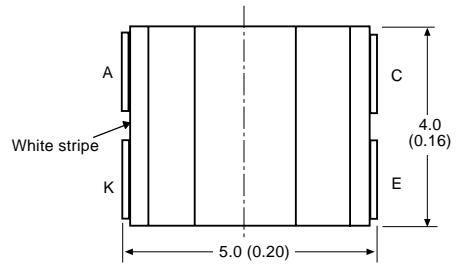
**Recommended soldering pattern**



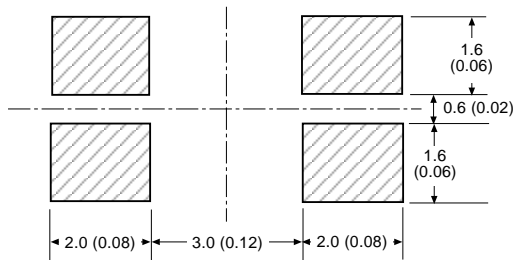
**Pin assignment**



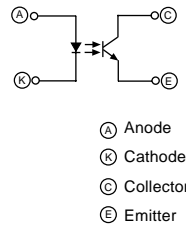
■ **EE-SX1108**



**Recommended soldering pattern**



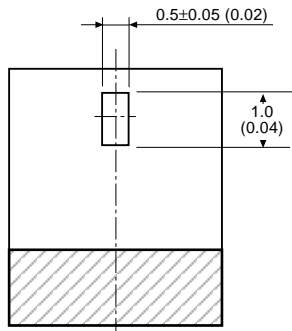
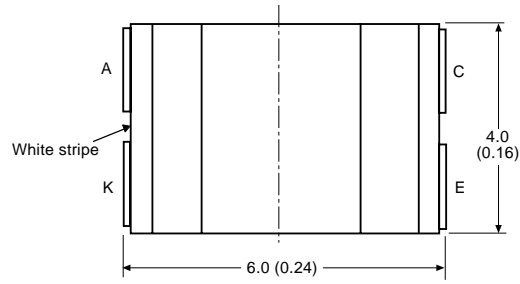
**Pin assignment**



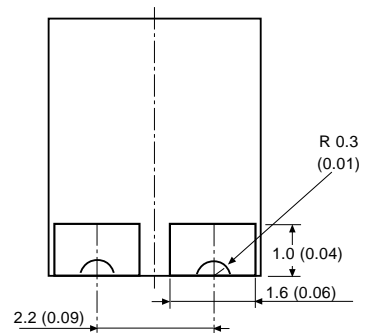
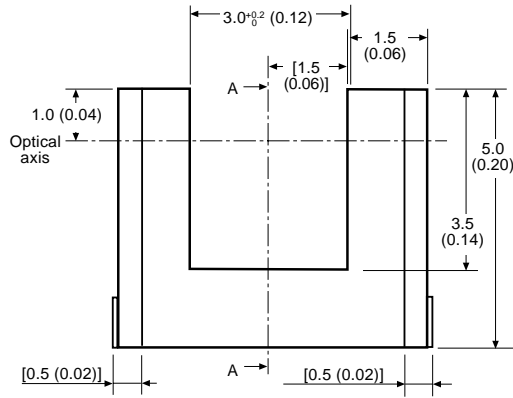
Note: 1. Unless otherwise specified, tolerances are  $\pm 0.15$  mm.  
2. The values in brackets are relative dimensions.

Unit: mm (inch)

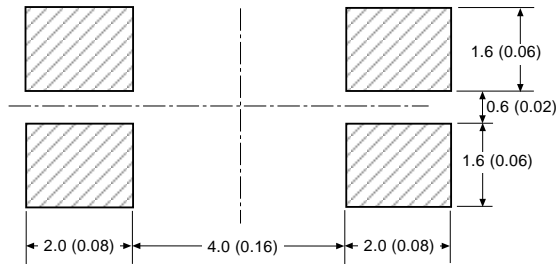
■ EE-SX1109



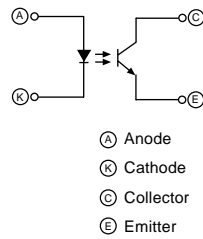
(Cross section AA view)



**Recommended soldering pattern**

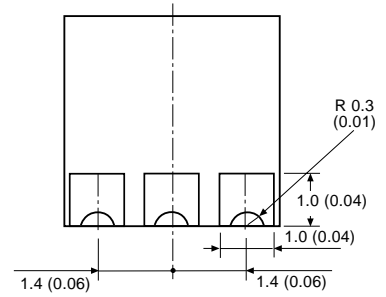
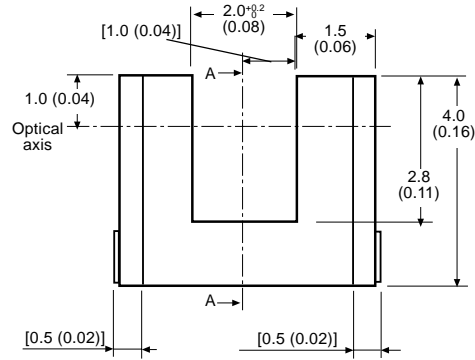
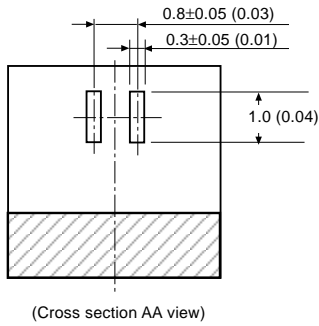
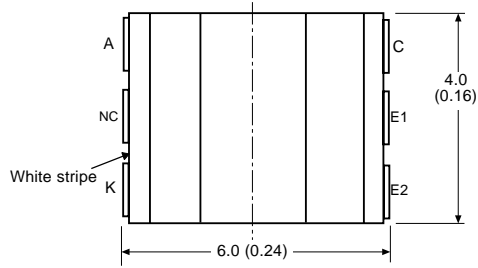


**Pin assignment**

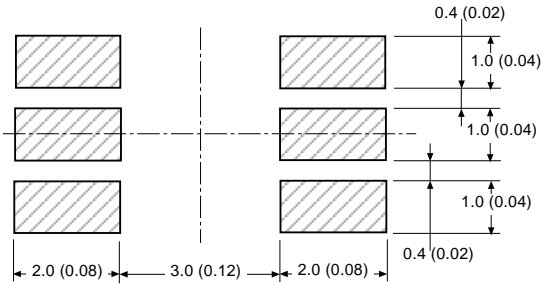


Note: 1. Unless otherwise specified, tolerances are  $\pm 0.15$  mm.  
 2. The values in brackets are relative dimensions.

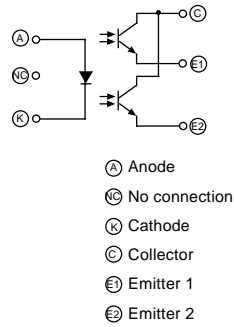
■ EE-SX1131



**Recommended soldering pattern**



**Pin assignment**



Note: 1. Unless otherwise specified, tolerances are  $\pm 0.15$  mm.  
2. The values in brackets are relative dimensions.



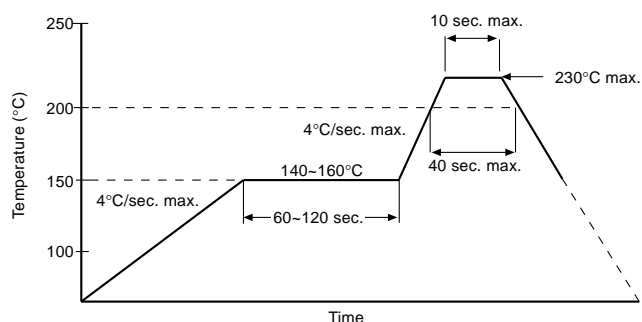


# Precautions

## ■ SOLDERING INFORMATION

### Reflow soldering

- Reflow soldering must be done within 48 hours after opening the aluminum envelope. The component must be stored under 30°C at 80% RH.
- The following soldering paste is recommended:
  - Melting temperature: 178~192°C
  - Composition: Sn 63%, Pb 37%
- Recommended thickness of metal mask is between 0.2 mm and 0.25 mm for screen printing.
- The following chart illustrates the maximum temperature limits for soldering:



### Manual soldering

- "Sn 60" (60% tin and 40% lead) or solder with silver content is recommended.
- Use a soldering iron of less than 25W. The temperature of the iron tip must be kept above 300°C (572°F).
- Solder each land for a maximum of 3 seconds.

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