

**HIGH-SPEED (200 kbps) ANALOG OUTPUT TYPE  
5-PIN SOP PHOTOCOUPLER**

–NEPOC Series–

**DESCRIPTION**

The PS8703 is an optically coupled isolator containing a GaAlAs LED on the light emitting diode (input side) and a PIN photodiode and a high-speed amplifier transistor on the output side on one chip.

This is a plastic SOP (Small Out-line Package) type for high density applications.

**FEATURES**

- Wide operating  $V_{CC}$  range ( $V_{CC} = -0.5$  to  $+15$  V)
- High isolation voltage ( $BV = 2\,500$  V r.m.s.)
- High-speed response ( $t_{PHL}$ ,  $t_{PLH} = 5$   $\mu$ s MAX. (@ $R_L = 4.1$  k $\Omega$ )
- Ordering number of taping product: PS8703-F3, F4

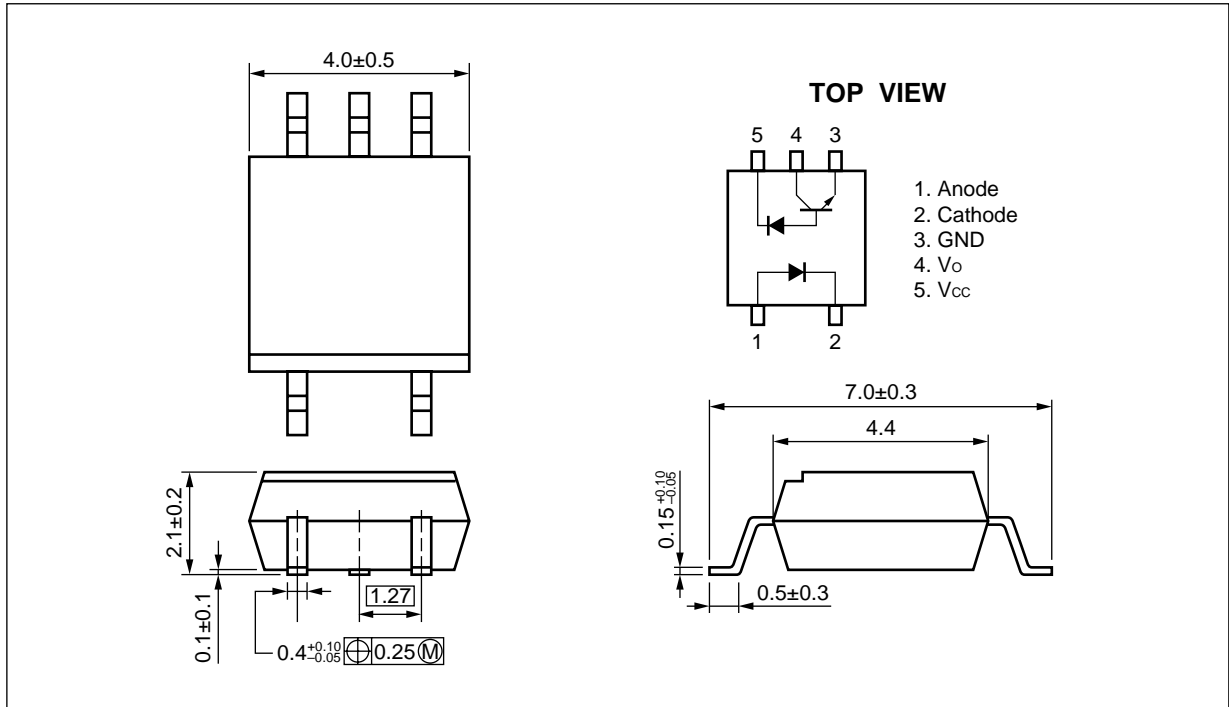
**APPLICATIONS**

- Computer and peripheral manufactures
- General purpose inverter
- Substitutions for relays and pulse transformers
- Power supply

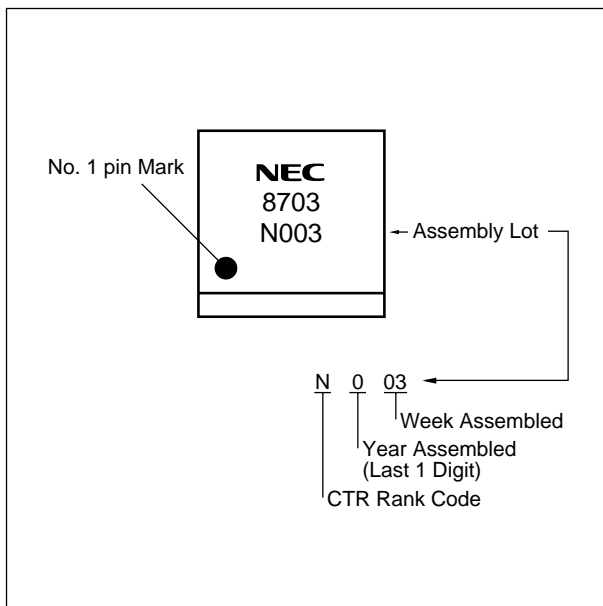
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Not all devices/types available in every country. Please check with local NEC Compound Semiconductor Devices representative for availability and additional information.

PACKAGE DIMENSIONS (UNIT: mm)



MARKING



**ORDERING INFORMATION**

Part Number	Package	Packing Style	Application Part Number <sup>*1</sup>
PS8703	5-pin SOP	Magazine case 100 pcs	PS8703
PS8703-F3		Embossed Tape 3 500 pcs/reel	
PS8703-F4			

\*1 For the application of the Safety Standard, following part number should be used.

**ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25°C, unless otherwise specified)**

Parameter		Symbol	Ratings	Unit
Diode	Forward Current	I <sub>F</sub>	50	mA
	Reverse Voltage	V <sub>R</sub>	5	V
Detector	Supply Voltage	V <sub>CC</sub>	-0.5 to +15	V
	Output Voltage	V <sub>O</sub>	-0.5 to +15	V
	Output Current	I <sub>O</sub>	8	mA
	Power Dissipation <sup>*1</sup>	P <sub>C</sub>	80	mW
Isolation Voltage <sup>*2</sup>		BV	2 500	Vr.m.s.
Operating Ambient Temperature		T <sub>A</sub>	-40 to +100	°C
Storage Temperature		T <sub>stg</sub>	-55 to +125	°C

\*1 Applies to output pin V<sub>O</sub>. Reduced to 0.8 mW/°C at T<sub>A</sub> = 25°C or more.

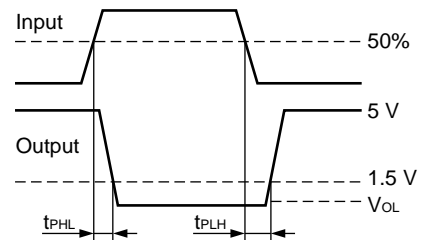
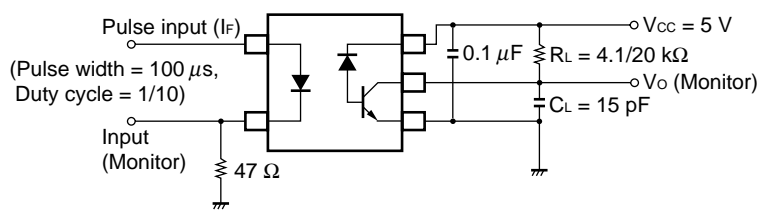
\*2 AC voltage for 1 minute at T<sub>A</sub> = 25°C, RH = 60% between input and output.

**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)**

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
★ Diode	Forward Voltage	V <sub>F</sub>	I <sub>F</sub> = 16 mA		1.2	1.5	V
	Reverse Current	I <sub>R</sub>	V <sub>R</sub> = 3 V			10	μA
	Terminal Capacitance	C <sub>t</sub>	V = 0 V, f = 1 MHz		30		pF
★ Detector	High Level Output Current	I <sub>OH</sub> (1)	I <sub>F</sub> = 0 mA, V <sub>CC</sub> = V <sub>O</sub> = 5.5 V		7	500	nA
	High Level Output Current	I <sub>OH</sub> (2)	I <sub>F</sub> = 0 mA, V <sub>CC</sub> = V <sub>O</sub> = 15 V			100	μA
	Low Level Output Voltage	V <sub>OL</sub>	I <sub>F</sub> = 16 mA, V <sub>CC</sub> = 4.5 V, I <sub>OL</sub> = 1.1 mA		0.1	0.4	V
	High Level Supply Current	I <sub>CCH</sub>	I <sub>F</sub> = 0 mA, V <sub>O</sub> = open, V <sub>CC</sub> = 15 V		0.01	1	μA
	Low Level Supply Current	I <sub>CCL</sub>	I <sub>F</sub> = 16 mA, V <sub>O</sub> = open, V <sub>CC</sub> = 15 V		150	800	
★ Coupled	Current Transfer Ratio (I <sub>c</sub> /I <sub>F</sub> ) <sup>-1</sup>	CTR	I <sub>F</sub> = 16 mA, V <sub>CC</sub> = 4.5 V, V <sub>O</sub> = 0.4 V	10	23	30	%
	Isolation Resistance	R <sub>I-O</sub>	V <sub>I-O</sub> = 1 kV <sub>DC</sub> , R <sub>H</sub> = 40 to 60%	10 <sup>11</sup>			Ω
	Isolation Capacitance	C <sub>I-O</sub>	V = 0 V, f = 1 MHz		0.4		pF
	Propagation Delay Time (H → L) <sup>2</sup>	t <sub>PHL</sub>	I <sub>F</sub> = 16 mA, V <sub>CC</sub> = 5 V, R <sub>L</sub> = 4.1 kΩ, C <sub>L</sub> = 15 pF		1	5	μs
	Propagation Delay Time (L → H) <sup>2</sup>	t <sub>PLH</sub>			2	5	
	Propagation Delay Time (H → L) <sup>2</sup>	t <sub>PHL</sub>	I <sub>F</sub> = 16 mA, V <sub>CC</sub> = 5 V, R <sub>L</sub> = 20 kΩ, C <sub>L</sub> = 15 pF		1	15	
	Propagation Delay Time (L → H) <sup>2</sup>	t <sub>PLH</sub>			7	15	

- ★ \*1 CTR rank  
L : 15 to 30 (%)  
N : 10 to 30 (%)

\*2 Test circuit for propagation delay time



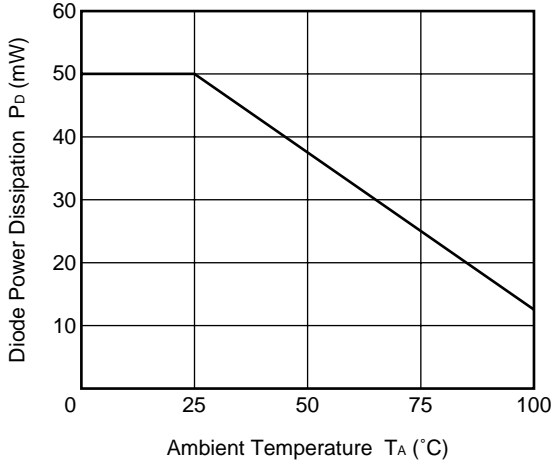
C<sub>L</sub> includes probe and stray wiring capacitance.

**USAGE CAUTIONS**

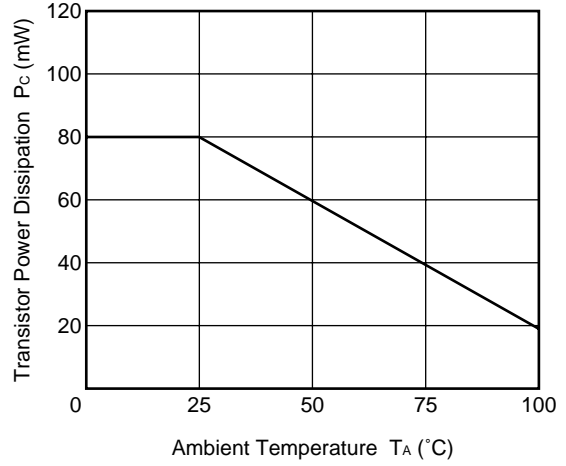
1. This product is weak for static electricity by designed with high-speed integrated circuit so protect against static electricity when handling.
2. By-pass capacitor of more than 0.1 μF is used between V<sub>CC</sub> and GND near device.

★ TYPICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ , unless otherwise specified)

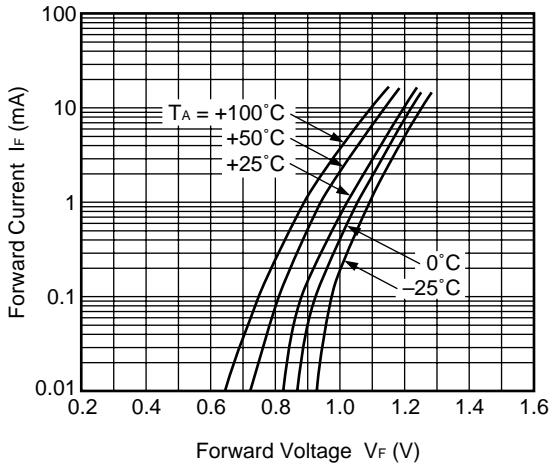
DIODE POWER DISSIPATION vs. AMBIENT TEMPERATURE



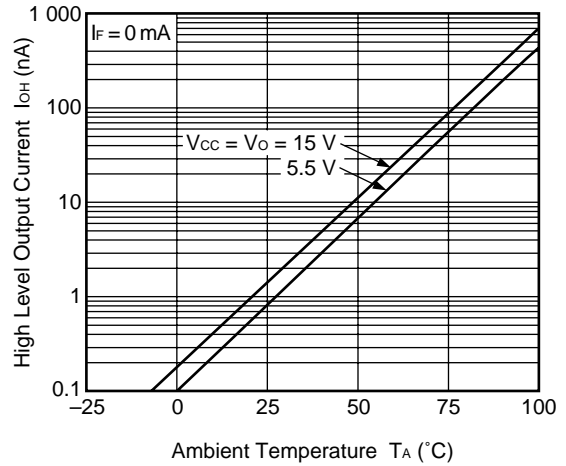
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



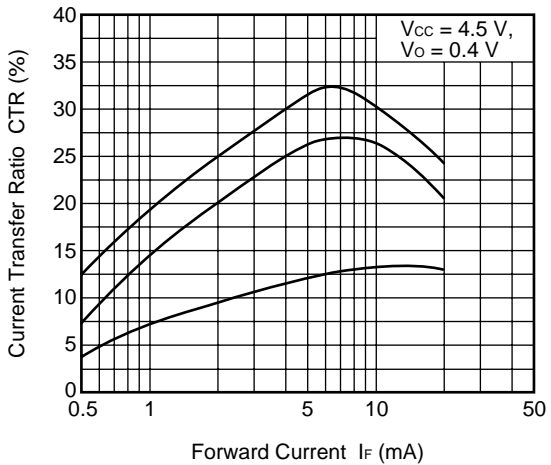
FORWARD CURRENT vs. FORWARD VOLTAGE



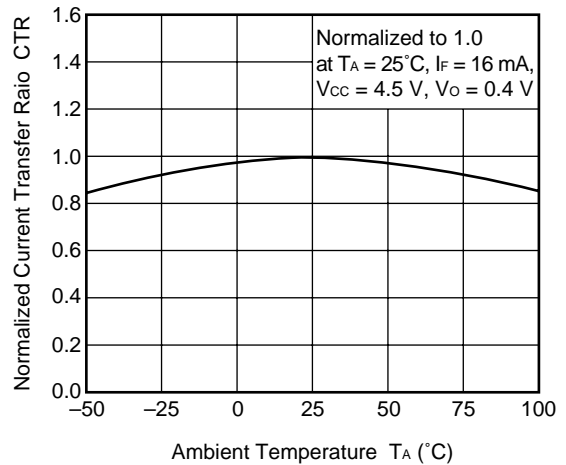
HIGH LEVEL OUTPUT CURRENT vs. AMBIENT TEMPERATURE



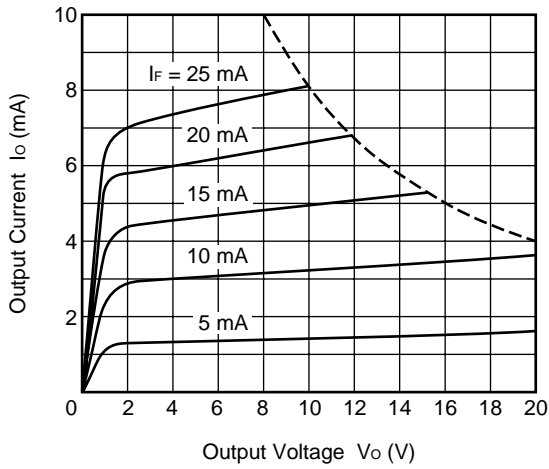
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



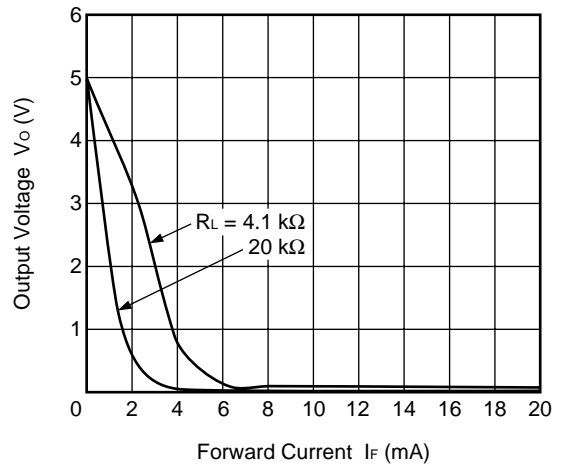
NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE



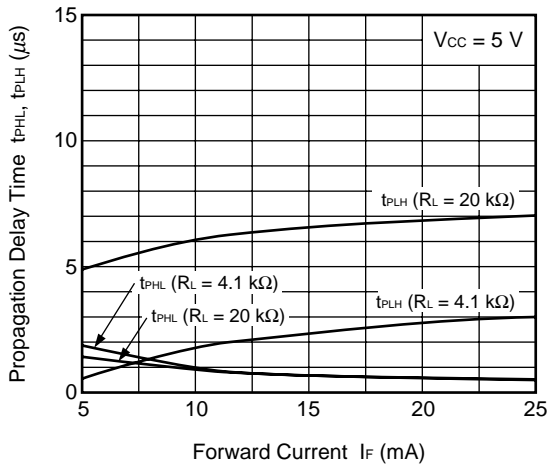
OUTPUT CURRENT vs. OUTPUT VOLTAGE



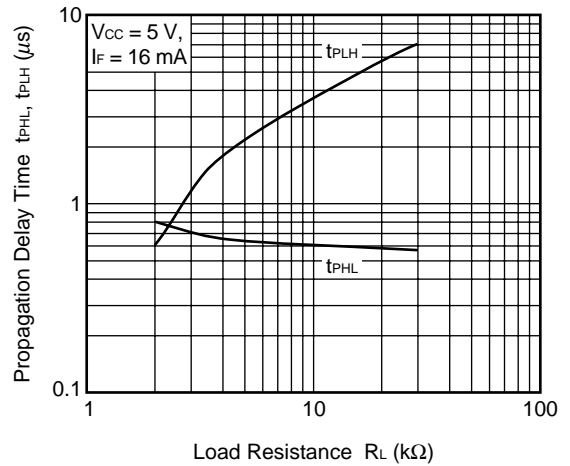
OUTPUT VOLTAGE vs. FORWARD CURRENT



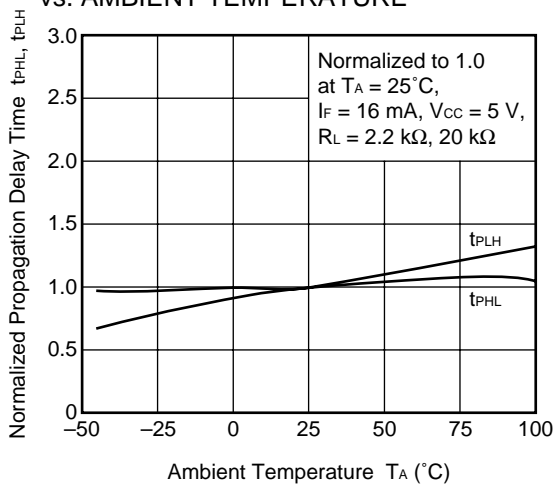
PROPAGATION DELAY TIME vs. FORWARD CURRENT



PROPAGATION DELAY TIME vs. LOAD RESISTANCE



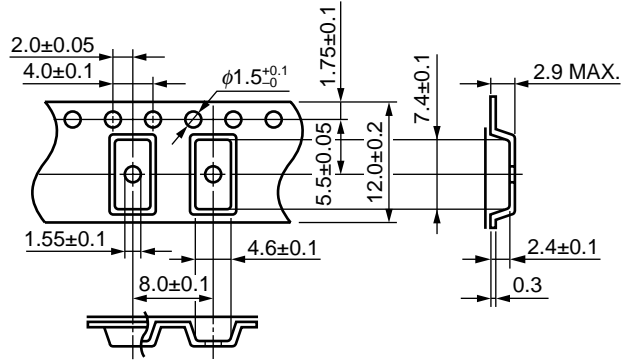
NORMALIZED PROPAGATION DELAY TIME vs. AMBIENT TEMPERATURE



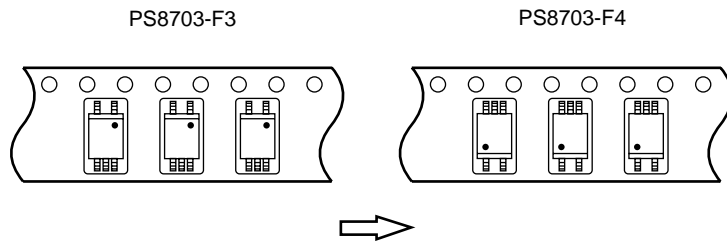
**Remark** The graphs indicate nominal characteristics.

★ TAPING SPECIFICATIONS (UNIT: mm)

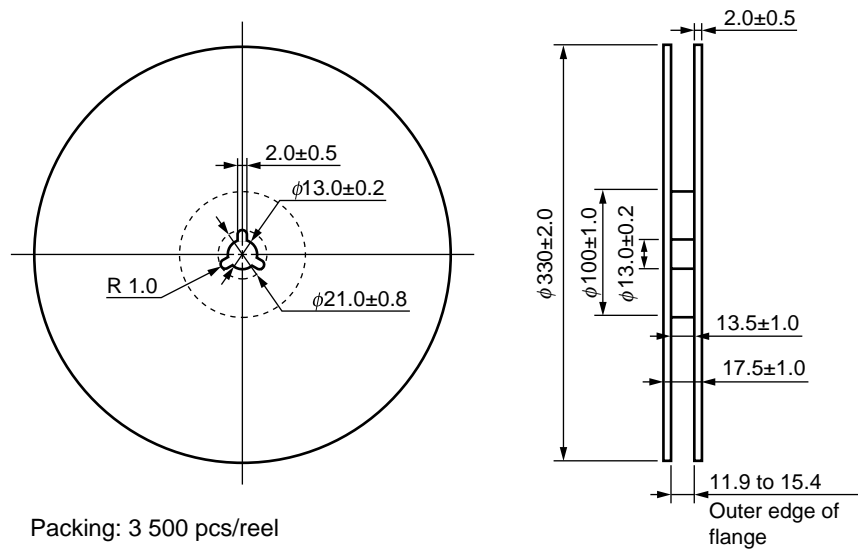
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)

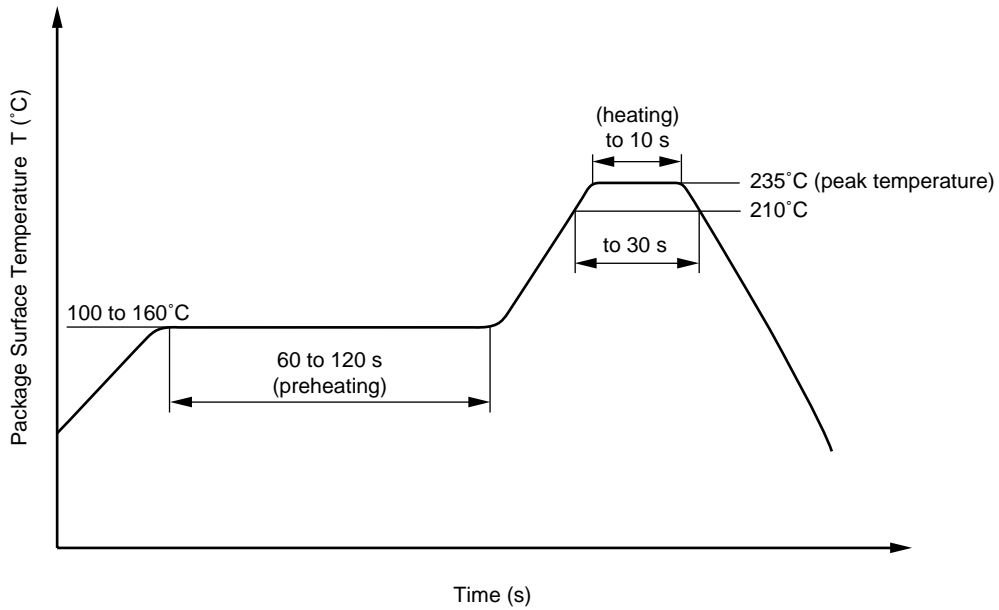


**RECOMMENDED SOLDERING CONDITIONS**

**(1) Infrared reflow soldering**

- Peak reflow temperature 235°C or below (package surface temperature)
- Time of temperature higher than 210°C 30 seconds or less
- Number of reflows Three
- Flux Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt % is recommended.)

Recommended Temperature Profile of Infrared Reflow



**(2) Cautions**

- Fluxes  
Avoid removing the residual flux with freon-based and chlorine-based cleaning solvent.



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M8E 00.4-0110

**SAFETY INFORMATION ON THIS PRODUCT**

<p><b>Caution</b></p>	<p>GaAs Products</p>	<p>The product contains gallium arsenide, GaAs. GaAs vapor and powder are hazardous to human health if inhaled or ingested.</p> <ul style="list-style-type: none"> <li>• Do not destroy or burn the product.</li> <li>• Do not cut or cleave off any part of the product.</li> <li>• Do not crush or chemically dissolve the product.</li> <li>• Do not put the product in the mouth.</li> </ul> <p>Follow related laws and ordinances for disposal. The product should be excluded from general industrial waste or household garbage.</p>
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► **Business issue**

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► **Technical issue**

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