

**HIGH ISOLATION VOLTAGE  
4-PIN SOP PHOTOCOUPLER**

–NEPOC™ Series–

**DESCRIPTION**

The PS2861-1 is an optically coupled isolator containing a GaAs light emitting diode and an NPN silicon phototransistor.

The PS2861-1 meets insulation thickness 0.4 mm and BSI's insulation supplementary approved.

The package has shield effect to cut off ambient light, and is mounted in a plastic SOP (Small Outline Package) for high density applications.

**FEATURES**

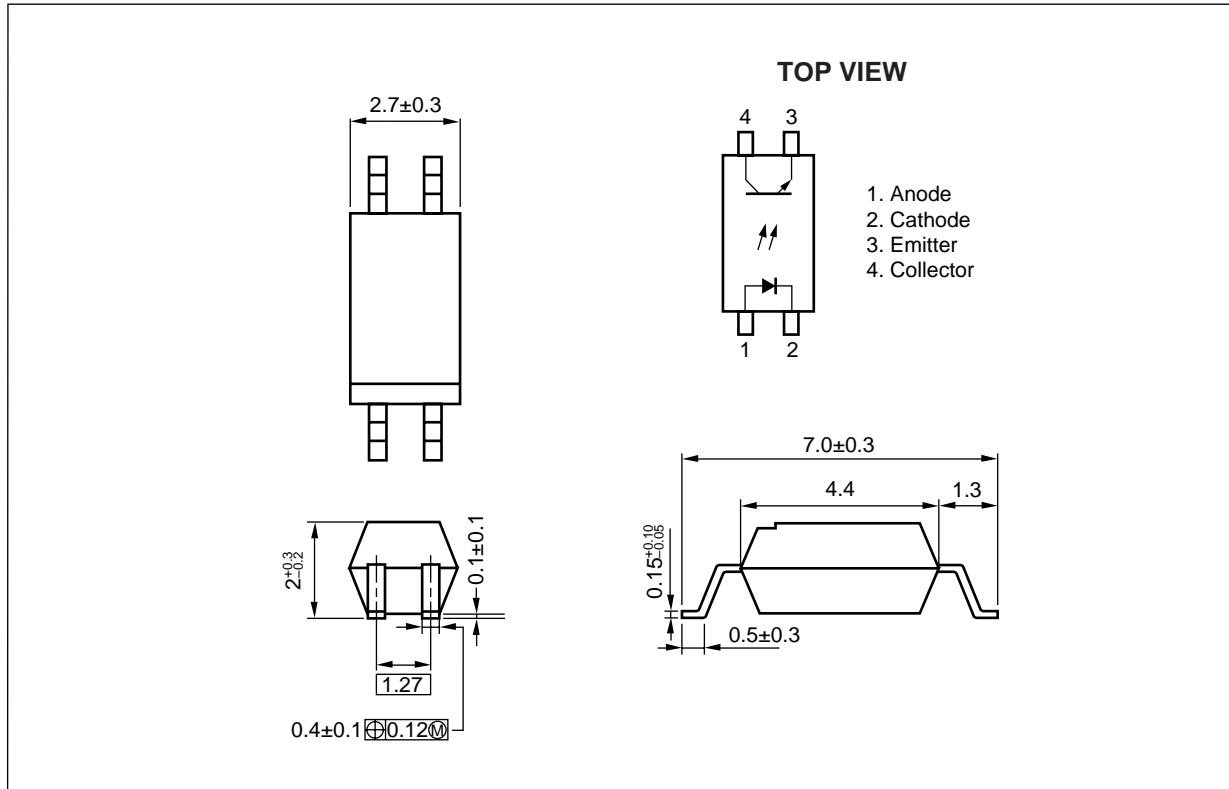
- Isolation distance (0.4 mm MIN.)
- High isolation voltage (BV = 2 500 Vr.m.s.)
- SOP (Small Outline Package) type
- High-speed switching ( $t_r = 4 \mu s$  TYP.,  $t_f = 5 \mu s$  TYP.)
- Ordering number of tape product: PS2861-1-F3, F4
- Safety standards: PS2861-1
  - UL approved: File No. E72422 (S)
  - BSI approved: No. 8514, 8515

**APPLICATIONS**

- Modem
- Programmable logic controllers
- Power supply

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

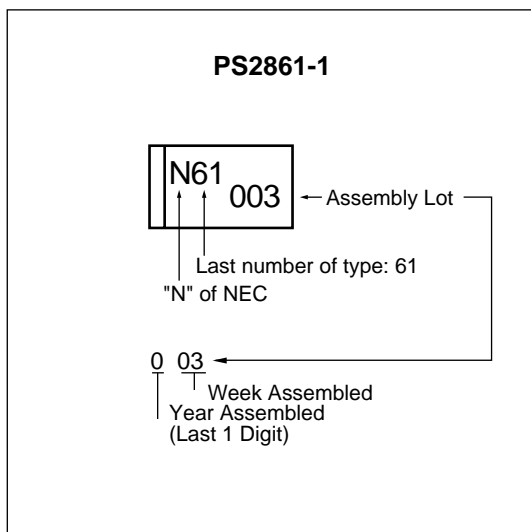
PACKAGE DIMENSIONS (UNIT: mm)



PHOTOCOUPLER CONSTRUCTION

Parameter	Unit (MIN.)
Air Distance	4.5 mm
Creepage Distance	4.5 mm
Isolation Distance	0.4 mm

★ MARKING



**ORDERING INFORMATION**

Part Number	Package	Packing Style	Application Part Number <sup>*1</sup>
PS2861-1	4-pin SOP	Magazine case 100 pcs	PS2861-1
PS2861-1-F3		Embossed Tape 3 500 pcs/reel	
PS2861-1-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 (DC)	I <sub>F</sub>	50	mA
	Reverse Voltage	V <sub>R</sub>	6	V
	Power Dissipation Derating	ΔP <sub>D</sub> /°C	0.6	mW/°C
	Power Dissipation	P <sub>D</sub>	60	mW
	Peak Forward Current <sup>*1</sup>	I <sub>FP</sub>	1.0	A
Transistor	Collector to Emitter Voltage	V <sub>CEO</sub>	40	V
	Emitter to Collector Voltage	V <sub>ECO</sub>	5	V
	Collector Current	I <sub>C</sub>	40	mA
	Power Dissipation Derating	ΔP <sub>C</sub> /°C	1.2	mW/°C
	Power Dissipation	P <sub>C</sub>	120	mW
Isolation Voltage <sup>*2</sup>		BV	2 500	Vr.m.s.
Operating Ambient Temperature		T <sub>A</sub>	-55 to +100	°C
Storage Temperature		T <sub>stg</sub>	-55 to +150	°C

\*1 PW = 100 μs, Duty Cycle = 1 %

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

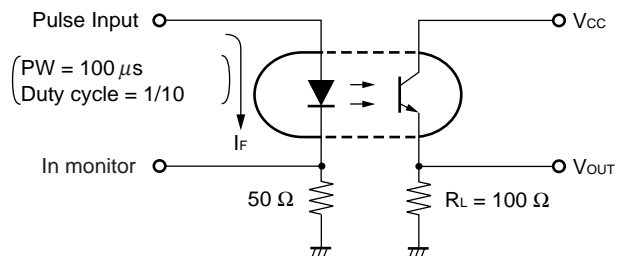
**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C)**

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V <sub>F</sub>	I <sub>F</sub> = 5 mA		1.1	1.4	V
	Reverse Current	I <sub>R</sub>	V <sub>R</sub> = 5 V			5	μA
	Terminal Capacitance	C <sub>t</sub>	V = 0 V, f = 1 MHz		15		pF
Transistor	Collector to Emitter Dark Current	I <sub>CEO</sub>	I <sub>F</sub> = 0 mA, V <sub>CE</sub> = 40 V			100	nA
Coupled	Current Transfer Ratio (I <sub>c</sub> /I <sub>F</sub> ) <sup>*1</sup>	CTR	I <sub>F</sub> = 5 mA, V <sub>CE</sub> = 5 V	50	200	400	%
	Collector Saturation Voltage	V <sub>CE(sat)</sub>	I <sub>F</sub> = 10 mA, I <sub>c</sub> = 2 mA			0.3	V
	Isolation Resistance	R <sub>I-O</sub>	V <sub>I-O</sub> = 1 kV <sub>DC</sub>	10 <sup>11</sup>			Ω
	Isolation Capacitance	C <sub>I-O</sub>	V = 0 V, f = 1 MHz		0.4		pF
	Rise Time <sup>*2</sup>	t <sub>r</sub>	V <sub>CC</sub> = 5 V, I <sub>c</sub> = 2 mA, R <sub>L</sub> = 100 Ω		4		μs
	Fall Time <sup>*2</sup>	t <sub>f</sub>			5		

**\*1 CTR rank**

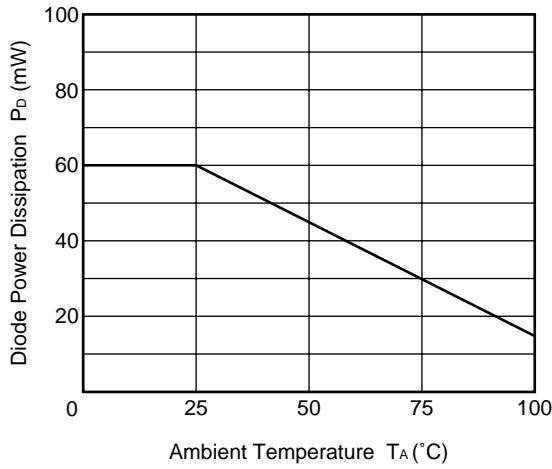
- K: 200 to 400 (%)
- L: 100 to 300 (%)
- M: 50 to 150 (%)
- N: 50 to 400 (%)

**\*2 Test circuit for switching time**

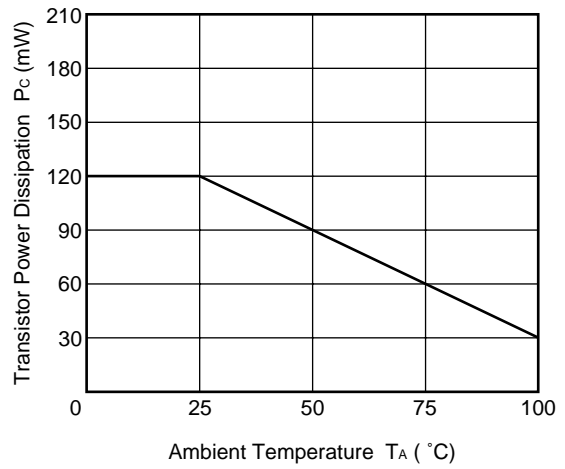


TYPICAL CHARACTERISTICS ( $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise specified)

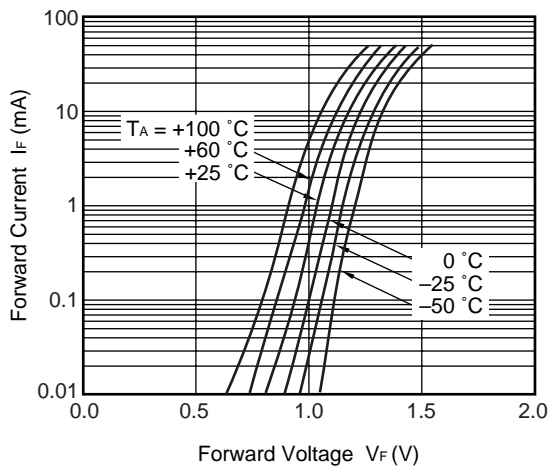
DIODE POWER DISSIPATION vs. AMBIENT TEMPERATURE



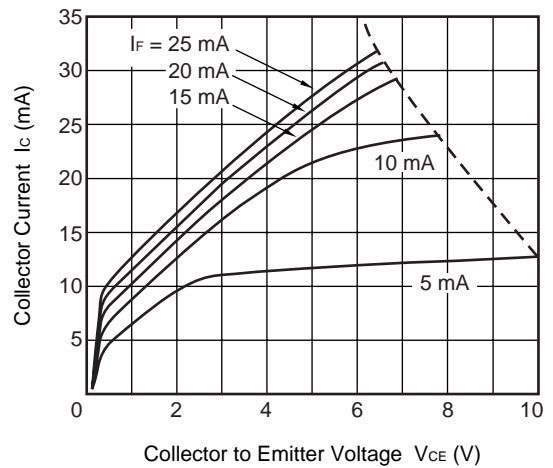
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



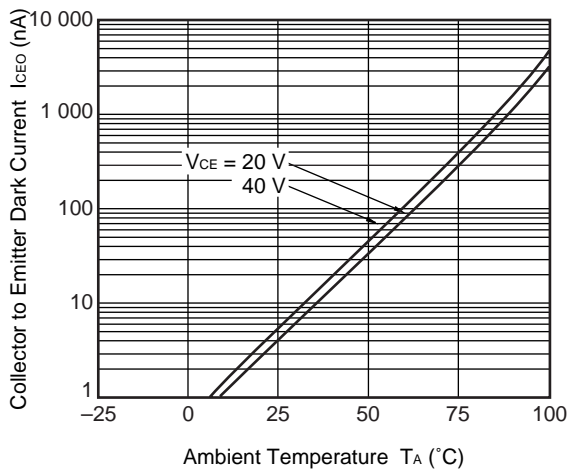
FORWARD CURRENT vs. FORWARD VOLTAGE



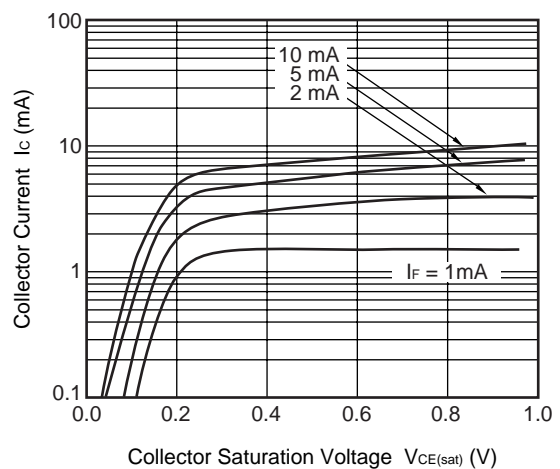
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



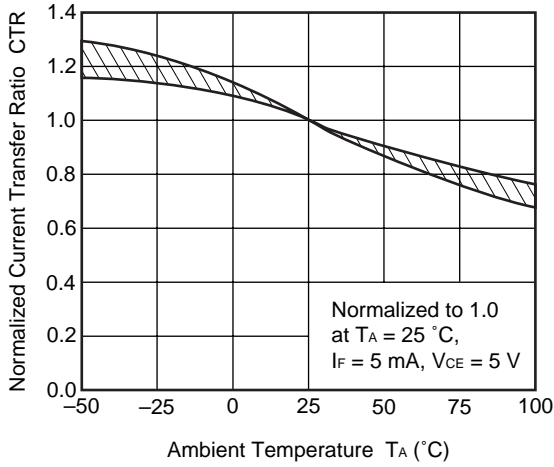
COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE



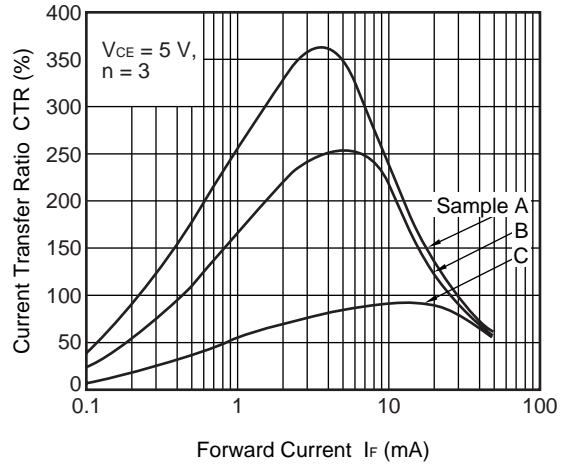
COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE



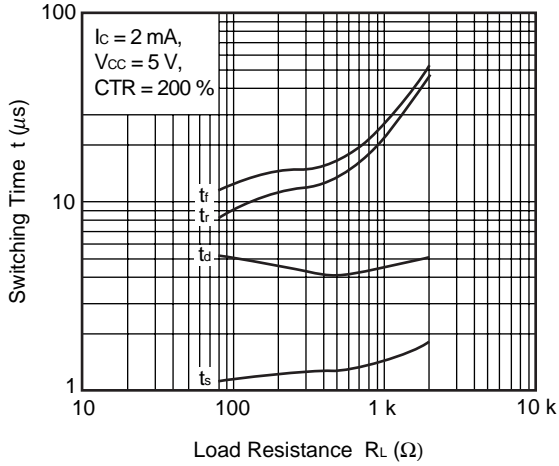
NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE



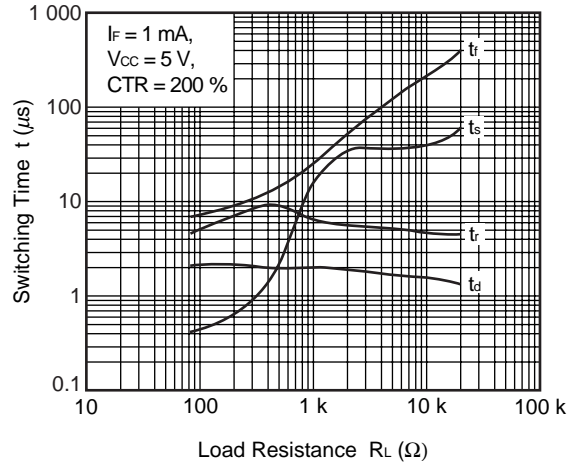
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



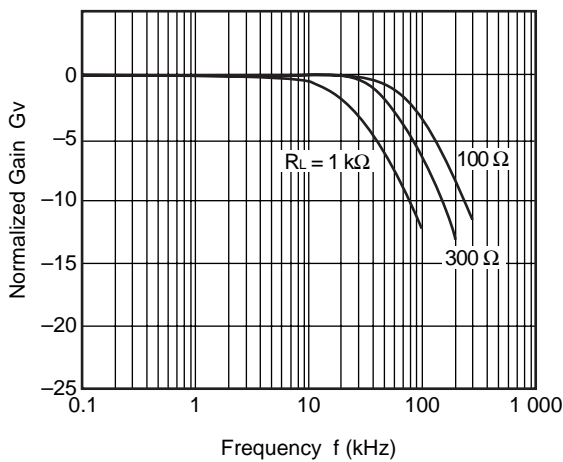
SWITCHING TIME vs. LOAD RESISTANCE



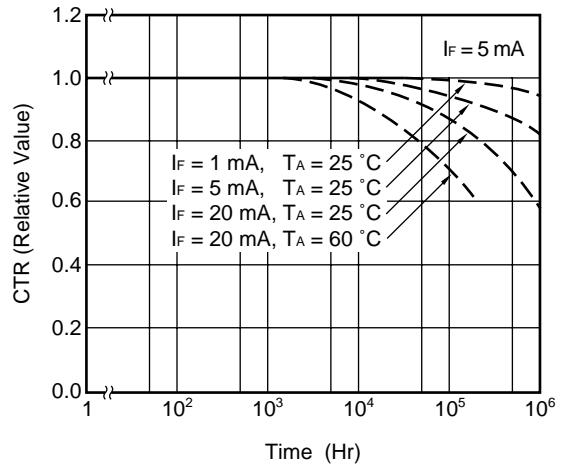
SWITCHING TIME vs. LOAD RESISTANCE



FREQUENCY RESPONSE



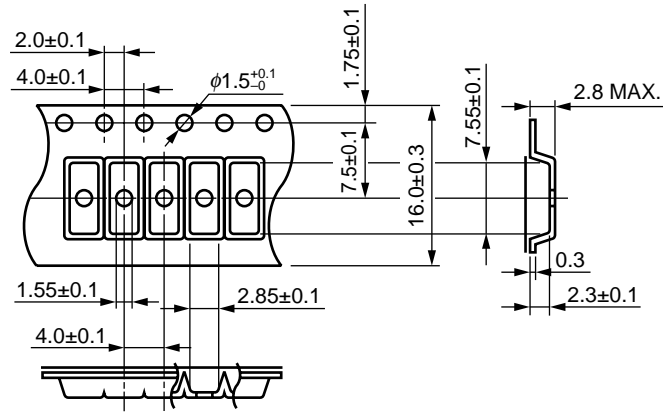
LONG TERM CTR DEGRADATION



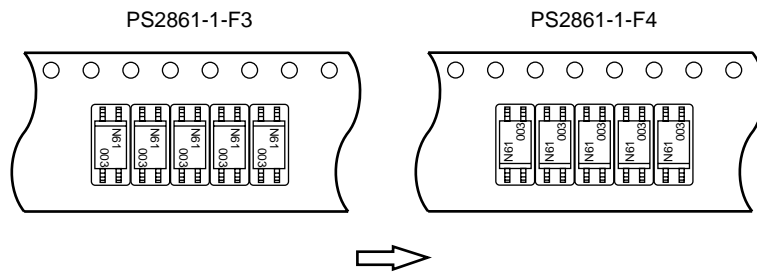
**Remark** The graphs indicate nominal characteristics.

★ TAPING SPECIFICATIONS (UNIT: mm)

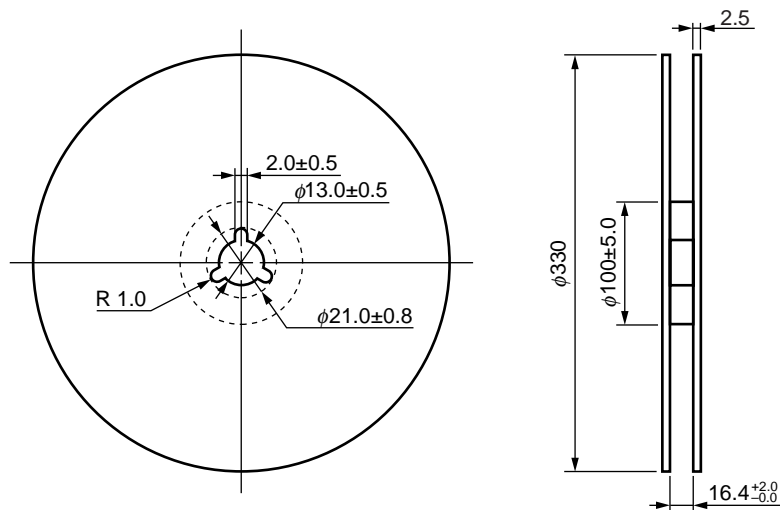
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



Packing: 3 500 pcs/reel

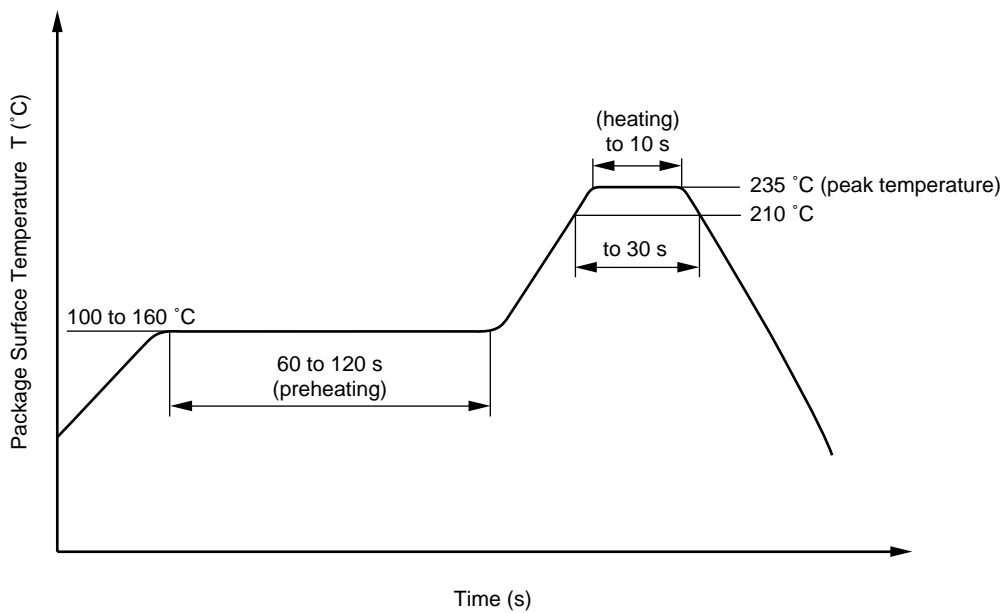
**NOTES ON HANDLING**

**1. 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) Dip soldering**

- Temperature 260 °C or below (molten solder temperature)
- Time 10 seconds or less
- Number of times One (Allowed to be dipped in solder including plastic mold portion.)
- Flux Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt % is recommended.)

**(3) Cautions**

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

**2. Cautions regarding noise**

Be aware that when voltage is applied suddenly between the photocoupler's input and output or between corrector-emitters at startup, the output side may enter the on state, even if the voltage is within the absolute maximum ratings.



[MEMO]

[MEMO]

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## CAUTION

**Within this device there exists GaAs (Gallium Arsenide) material which is a harmful substance if ingested. Please do not under any circumstances break the hermetic seal.**

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