

**1 Mbps HIGH CMR ANALOG OUTPUT TYPE**  
**5-PIN SOP PHOTOCOUPLER**

–NEPOC Series–

**DESCRIPTION**

The PS8101 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**

- Wave soldering (260°C, 10 s, One)
- High common mode transient immunity ( $C_{MH}$ ,  $C_{ML} = \pm 10 \text{ kV}/\mu\text{s}$  MIN.)
- High supply voltage ( $V_{CC} = 35 \text{ V}$ )
- High isolation voltage ( $BV = 2\,500 \text{ V r.m.s.}$ )
- High-speed response ( $t_{PHL} = 0.8 \mu\text{s}$  MAX.,  $t_{PLH} = 1.2 \mu\text{s}$  MAX.)
- Ordering number of taping product: PS8101-F3, F4: 2 500 pcs/reel

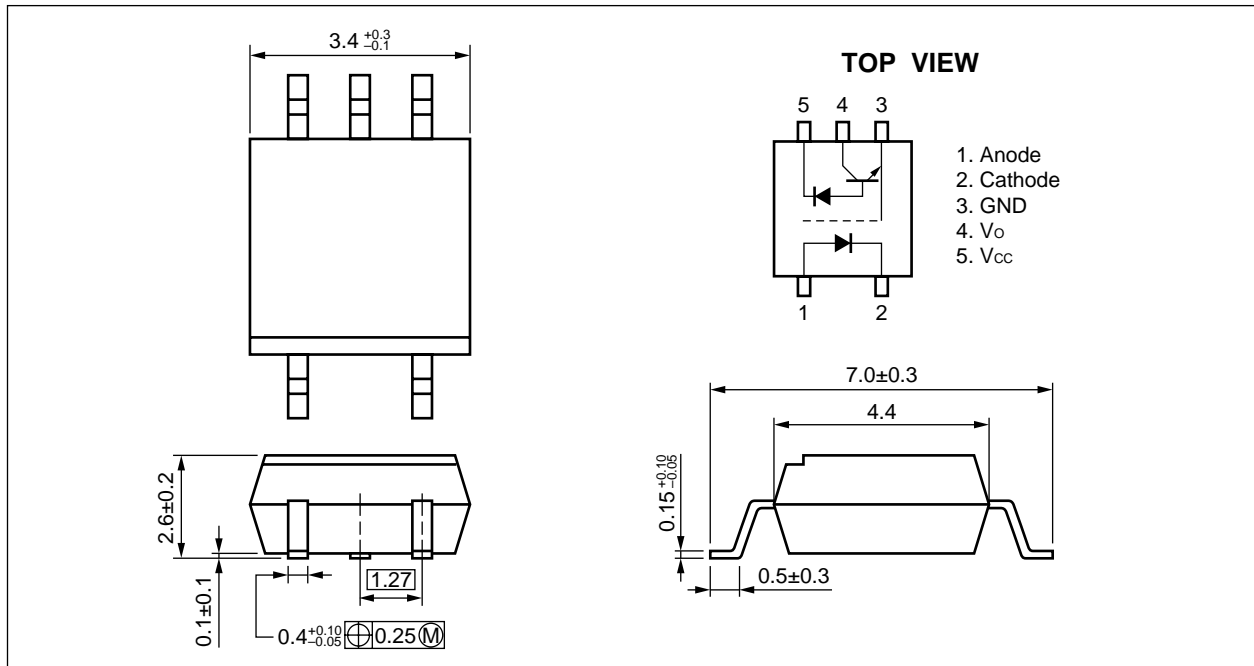
**APPLICATIONS**

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

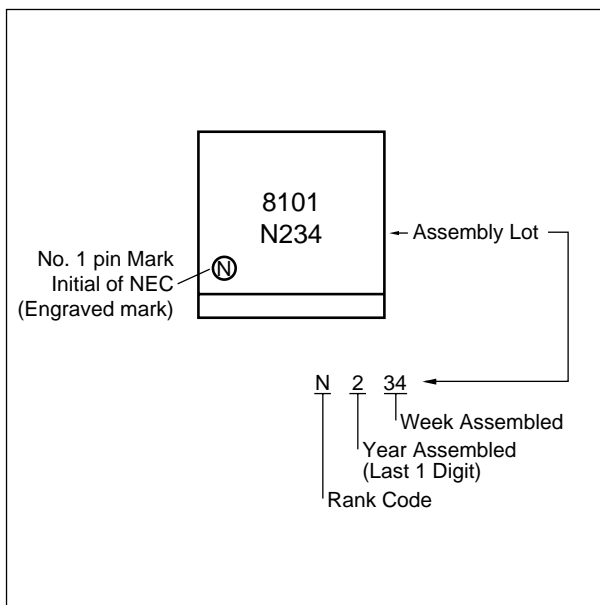
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PACKAGE DIMENSIONS (UNIT: mm)



MARKING EXAMPLE



# ORDERING INFORMATION

Part Number	Package	Packing Style	Application Part Number <sup>*1</sup>
PS8101	5-pin SOP	20 pcs (Tape 20 pcs cut)	PS8101
PS8101-F3		Embossed Tape 2 500 pcs/reel	
PS8101-F4			

<sup>\*1</sup> 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>	25	mA
	Reverse Voltage	V <sub>R</sub>	5.0	V
	Power Dissipation <sup>*1</sup>	P <sub>D</sub>	45	mW
Detector	Supply Voltage	V <sub>CC</sub>	35	V
	Output Voltage	V <sub>O</sub>	35	V
	Output Current	I <sub>O</sub>	8.0	mA
	Power Dissipation <sup>*2</sup>	P <sub>C</sub>	100	mW
Isolation Voltage <sup>*3</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 +125	°C

<sup>\*1</sup> Reduced to 0.45 mW/°C at T<sub>A</sub> = 25°C or more.

<sup>\*2</sup> Reduced to 1.00 mW/°C at T<sub>A</sub> = 25°C or more.

<sup>\*3</sup> 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, unless otherwise specified)**

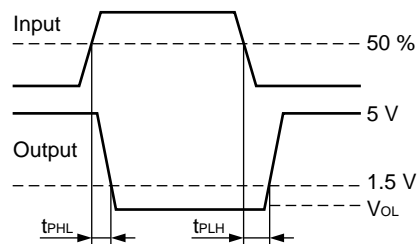
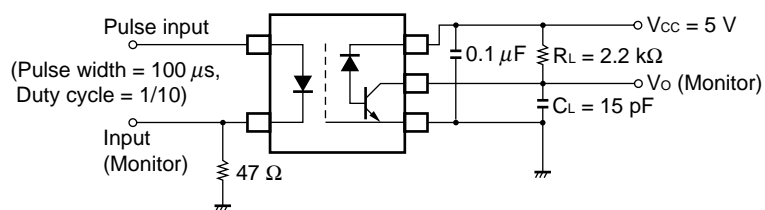
Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V <sub>F</sub>	I <sub>F</sub> = 16 mA		1.7	2.2	V
	Reverse Current	I <sub>R</sub>	V <sub>R</sub> = 3 V			10	μA
	Forward Voltage Temperature Coefficient	ΔV <sub>F</sub> /ΔT	I <sub>F</sub> = 16 mA		-2.1		mV/°C
	Terminal Capacitance	C <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		3	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> = 30 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>O</sub> = 1.2 mA		0.1	0.4	V
	Low Level Supply Current	I <sub>CCL</sub>	I <sub>F</sub> = 16 mA, V <sub>O</sub> = open, V <sub>CC</sub> = 30 V		50		μA
	High Level Supply Current	I <sub>CCH</sub>	I <sub>F</sub> = 0 mA, V <sub>O</sub> = open, V <sub>CC</sub> = 30 V		0.01	2	
Coupled	Current Transfer Ratio <sup>*1</sup>	CTR	I <sub>F</sub> = 16 mA, V <sub>CC</sub> = 4.5 V, V <sub>O</sub> = 0.4 V	15	20	35	%
	Isolation Resistance	R <sub>I-O</sub>	V <sub>I-O</sub> = 1 kV <sub>DC</sub> , RH = 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> = 2.2 kΩ, C <sub>L</sub> = 15 pF		0.5	0.8	μs
	Propagation Delay Time (L → H) <sup>2</sup>	t <sub>PLH</sub>			0.6	1.2	
	Common Mode Transient Immunity at High Level Output <sup>3</sup>	C <sub>MH</sub>	I <sub>F</sub> = 0 mA, V <sub>CC</sub> = 5 V, R <sub>L</sub> = 4.1 kΩ, V <sub>CM</sub> = 1.5 kV	10			kV/μs
	Common Mode Transient Immunity at Low Level Output <sup>3</sup>	C <sub>ML</sub>	I <sub>F</sub> = 16 mA, V <sub>CC</sub> = 5 V, R <sub>L</sub> = 4.1 kΩ, V <sub>CM</sub> = 1.5 kV	-10			

\*1 CTR rank

K : 20 to 35 (%)

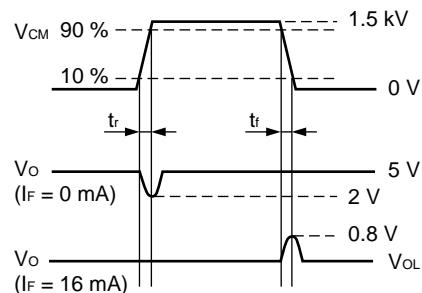
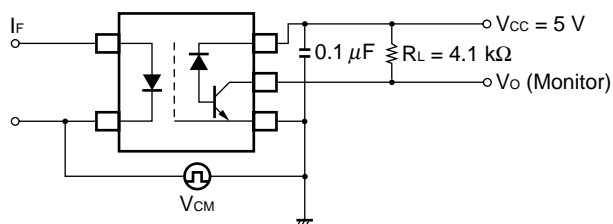
N : 15 to 35 (%)

**\*2 Test circuit for propagation delay time**



$C_L$  is approximately 15 pF which includes probe and stray wiring capacitance

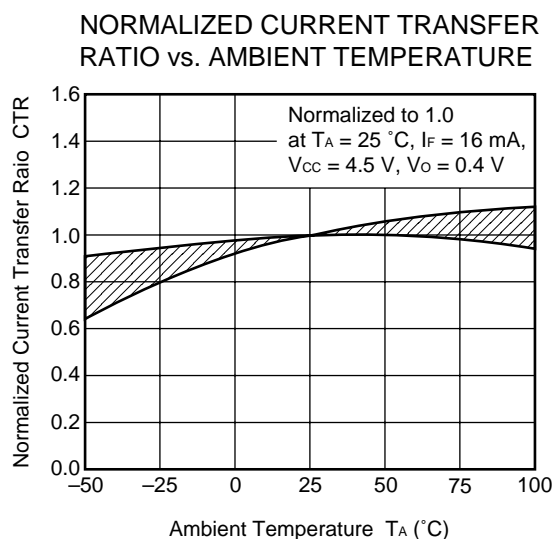
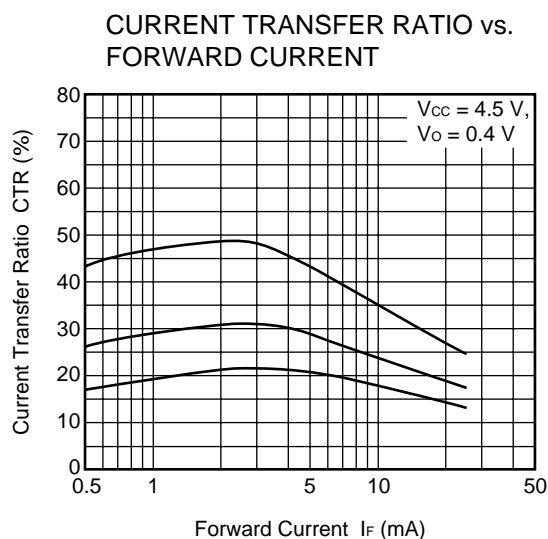
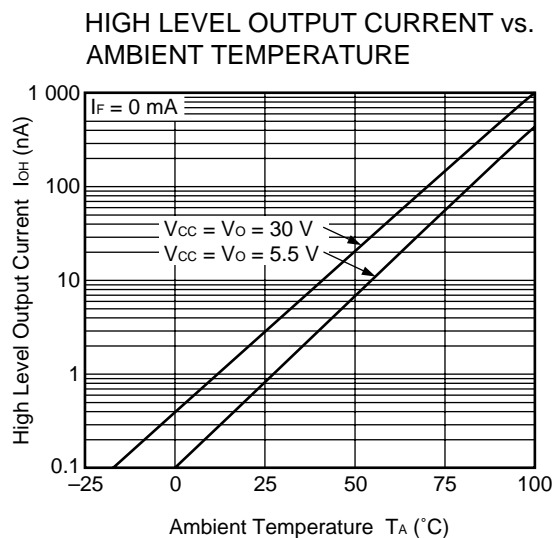
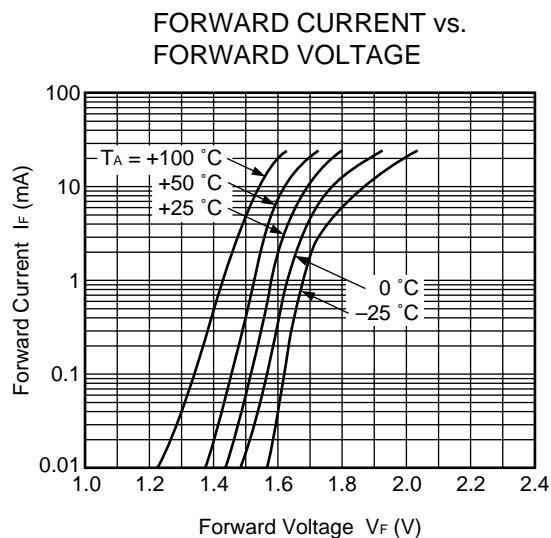
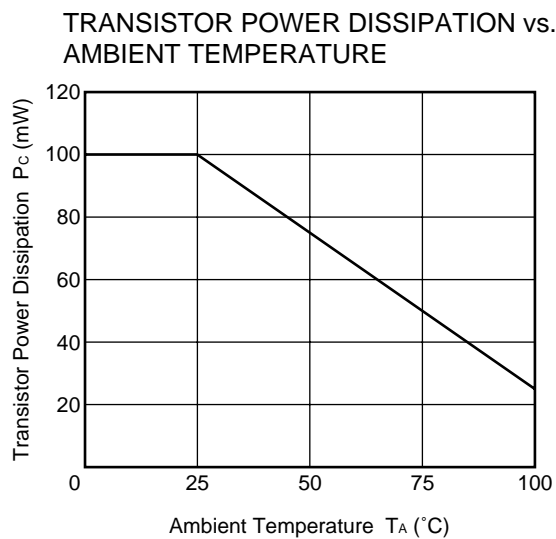
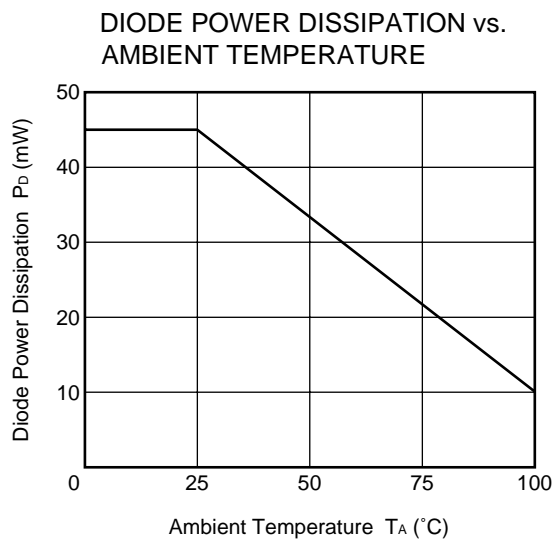
**\*3 Test circuit for common mode transient immunity**



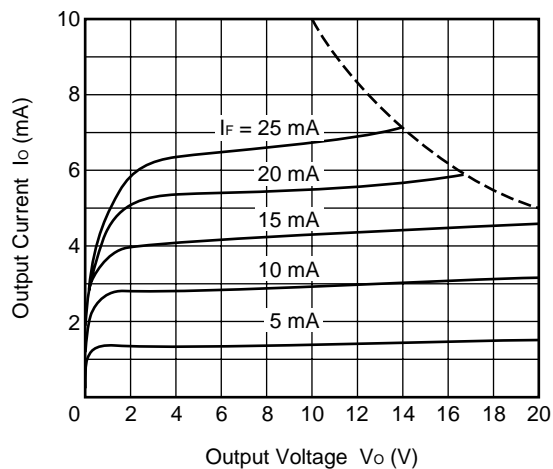
**USAGE CAUTIONS**

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 0.1  $\mu$ F is used between  $V_{CC}$  and GND near device. Also, ensure that the distance between the leads of the photocoupler and capacitor is no more than 10 mm.
3. Avoid storage at a high temperature and high humidity.

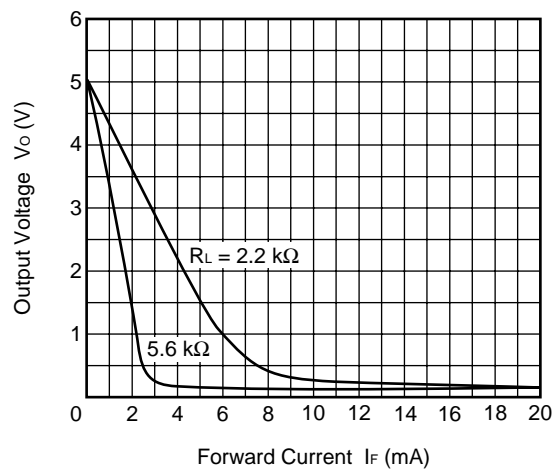
**TYPICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ , unless otherwise specified)**



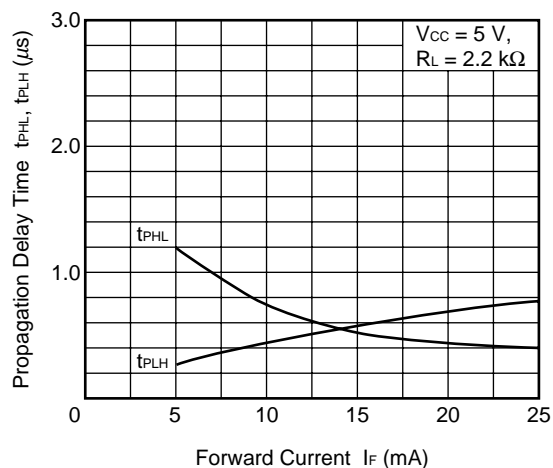
OUTPUT CURRENT vs.  
OUTPUT VOLTAGE



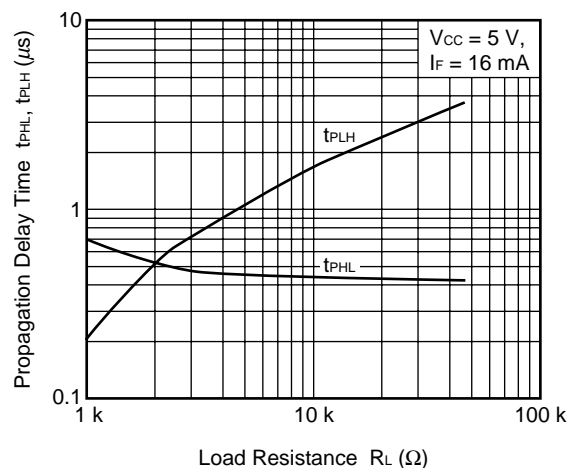
OUTPUT VOLTAGE vs.  
FORWARD CURRENT



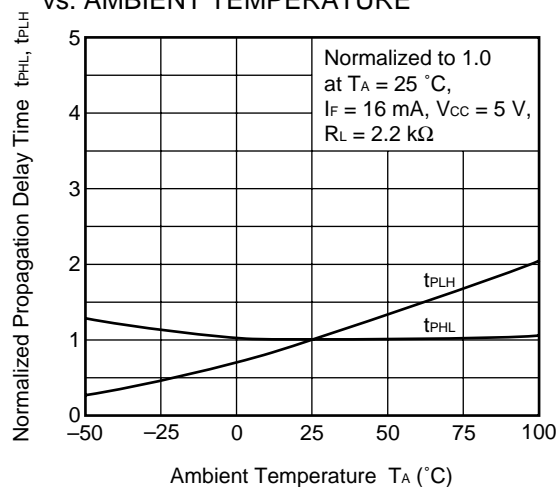
PROPAGATION DELAY TIME vs.  
FORWARD CURRENT



PROPAGATION DELAY TIME vs.  
LOAD RESISTANCE



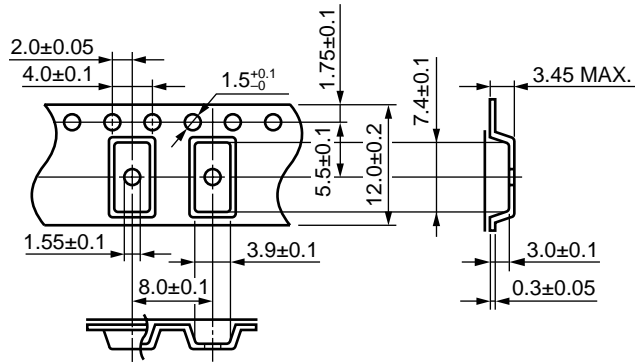
NORMALIZED PROPAGATION DELAY TIME  
vs. AMBIENT TEMPERATURE



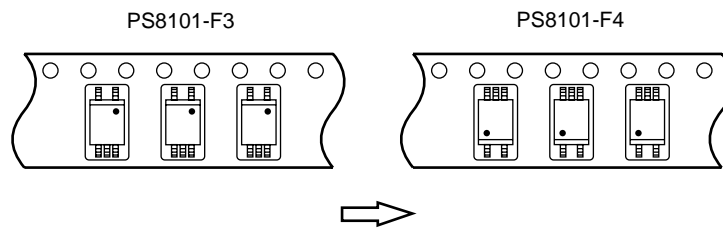
**Remark** The graphs indicate nominal characteristics.

TAPING SPECIFICATIONS (UNIT: mm)

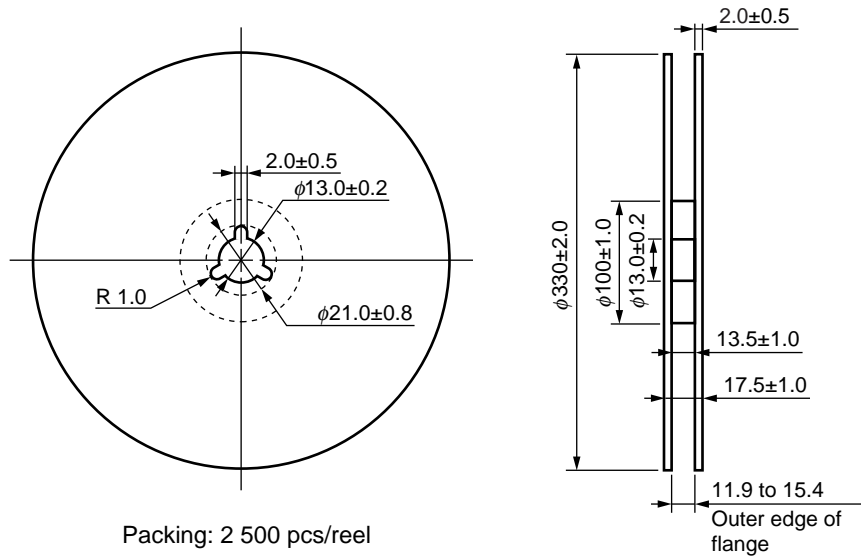
Outline and Dimensions (Tape)



Taping Direction



Outline and Dimensions (Reel)



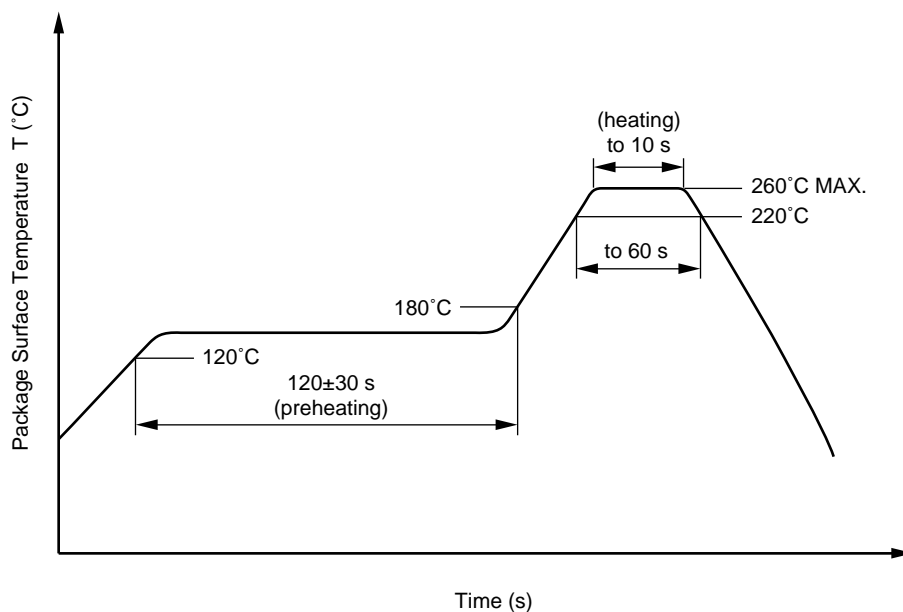
## NOTES ON HANDLING

### 1. Recommended soldering conditions

#### (1) Infrared reflow soldering

- Peak reflow temperature 260°C or below (package surface temperature)
- Time of peak reflow temperature 10 seconds or less
- Time of temperature higher than 220°C 60 seconds or less
- Time to preheat temperature from 120 to 180°C 120±30 s
- 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) Wave soldering

- Temperature 260°C or below (molten solder temperature)
- Time 10 seconds or less
- Preheating conditions 120°C or below (package surface temperature)
- 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 collector-emitters at startup, the output side may enter the on state, even if the voltage is within the absolute maximum ratings.

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M8E 00.4-0110

**SAFETY INFORMATION ON THIS PRODUCT**

<b>Caution</b>	GaAs Products	<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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► For further information, please contact

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