

# PS2506-1, PS2506L-1

R08DS0197EJ0101

Rev.1.01

HIGH ISOLATION VOLTAGE AC INPUT, DARLINGTON TRANSISTOR TYPE

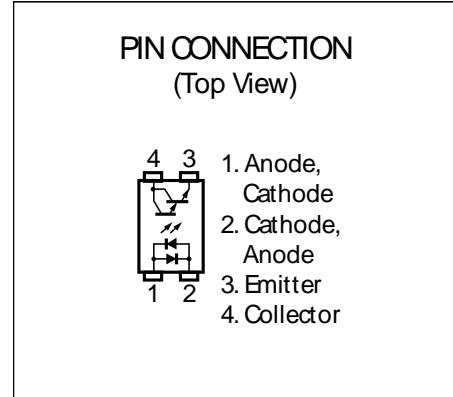
Nov 4, 2022

## DESCRIPTION

The PS2506-1 and PS2506L-1 are optically coupled isolator containing two GaAs light emitting diodes and an NPN silicon Darlington-connected phototransistor. The PS2506-1 is a plastic DIP (Dual In-line Package) model for the pin Insertion mounting and the PS2506L-1 is a Gull-wing lead bending model modified from the PS2506-1 for the surface mounting.

## FEATURES

- AC input response
- High isolation voltage ( $BV = 5\,000\text{ Vr.m.s.}$ )
- High current transfer ratio ( $CTR = 2\,000\%$  TYP.)
- High-speed switching ( $t_r, t_f = 100\text{ }\mu\text{s}$  TYP.)
- Embossed tape product: PS2506L-1-F3: 2 000 pcs/reel
- Pb-free product
- Safety standards
  - UL approved: UL1577, Double protection

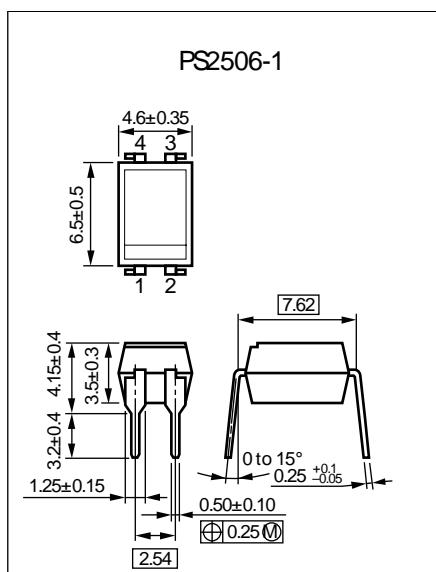


## APPLICATIONS

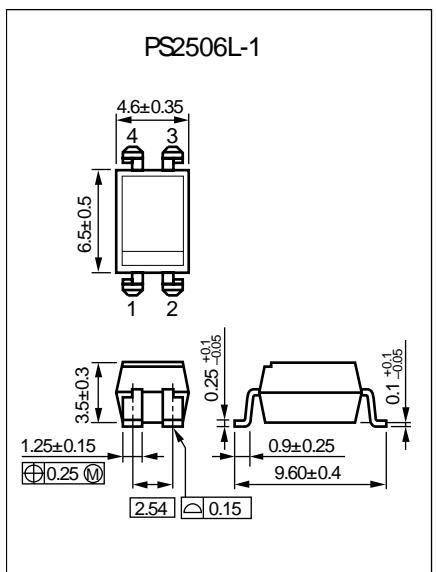
- Power supply
- Telephone/FAX
- FA/OA equipment
- Programmable logic controller

## PACKAGE DIMENSIONS (UNIT: mm)

## DIP Type



## Lead Bending Type For Surface Mount

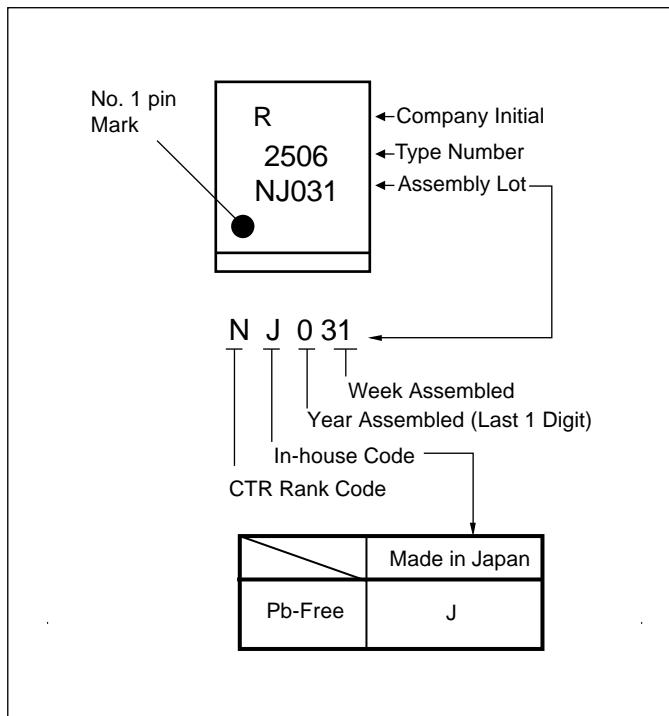


Weight ( 4-pin DIP) : 0.26 g (TYP.)

## PHOTOCOUPLED CONSTRUCTION

Parameter	PS2506-1, PS2506L-1
Air Distance (MIN.)	7 mm
Creepage Distance (MIN.)	7 mm
Isolation Distance (MIN.)	0.4 mm

## MARKING EXAMPLE



## ORDERING INFORMATION

Part Number	Order Number	Solder Plating Specification	Packing Style	Safety Standard Approval	Application Part Number <sup>*1</sup>	
PS2506-1	PS2506-1-A	Pb-Free	Magazine case 100 pcs	Standard Products (UL Approved)	PS2506-1	
PS2506L-1	PS2506L-1-A		Embossed Tape 2 000 pcs/reel		PS2506L-1	
PS2506L-1-F3	PS2506L-1-F3-A				PS2506L-1	

Notes: \*1. For the application of the safety standard, the 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>	±80	mA
	Power Dissipation Derating	ΔP <sub>D</sub> /°C	1.5	mW/°C
	Power Dissipation	P <sub>D</sub>	150	mW
	Peak Forward Current*1	I <sub>FP</sub>	±1	A
Transistor	Collector to Emitter Voltage	V <sub>CEO</sub>	40	V
	Emitter to Collector Voltage	V <sub>ECD</sub>	6	V
	Collector Current	I <sub>C</sub>	200	mA
	Power Dissipation Derating	ΔP <sub>C</sub> /°C	2.0	mW/°C
	Power Dissipation	P <sub>C</sub>	200	mW
Isolation Voltage*2		BV	5 000	Vr.m.s.
Operating Ambient Temperature		T <sub>A</sub>	-55 to +100	°C
Storage Temperature		T <sub>stg</sub>	-55 to +150	°C

Note: \*1. PW = 100 µs, Duty Cycle = 1 %

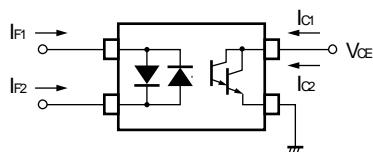
\*2. AC voltage for 1 minute at T<sub>A</sub> = 25 °C, RH = 60 % between input and output.

Pins 1-2 shorted together, 3-4 shorted together.

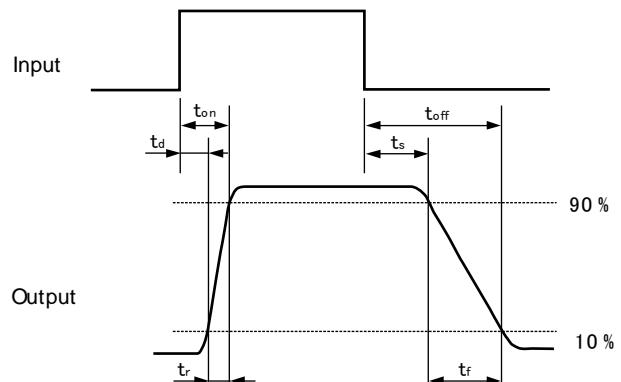
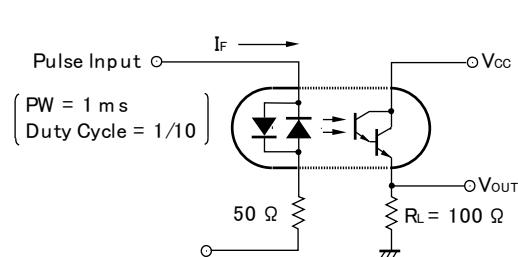
ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C)

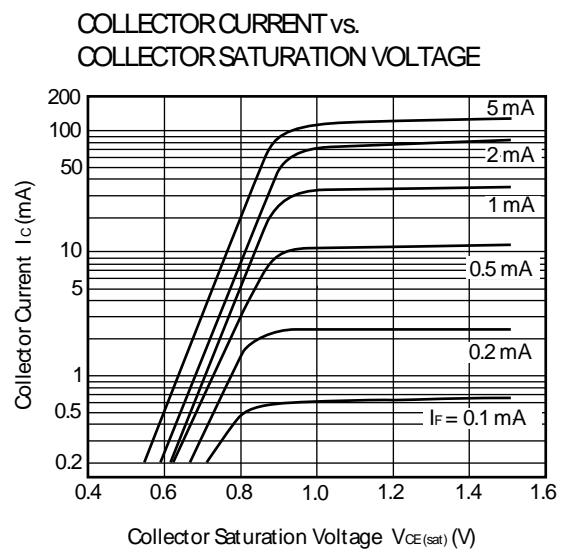
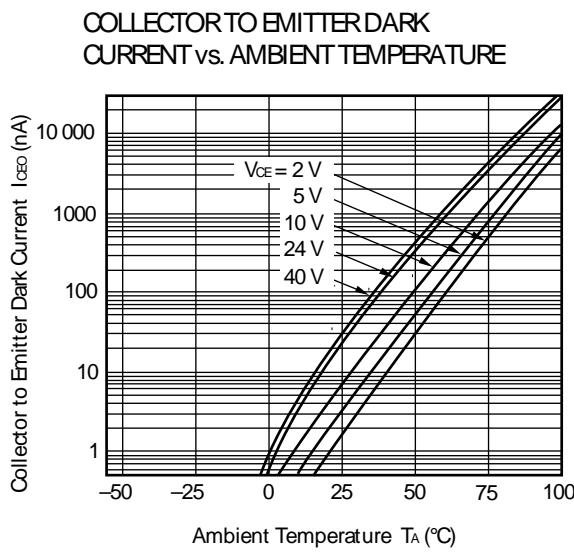
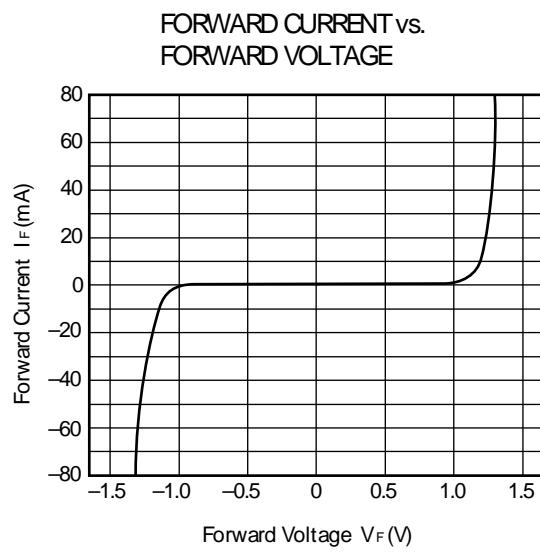
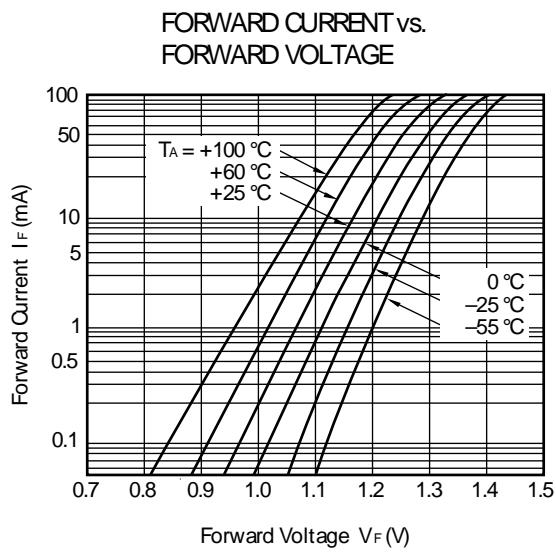
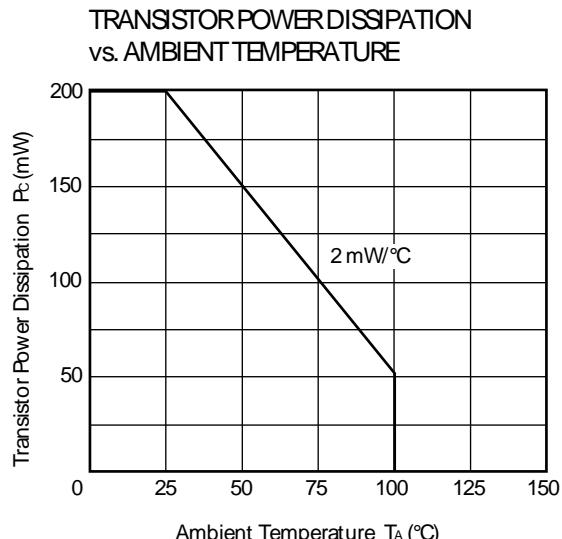
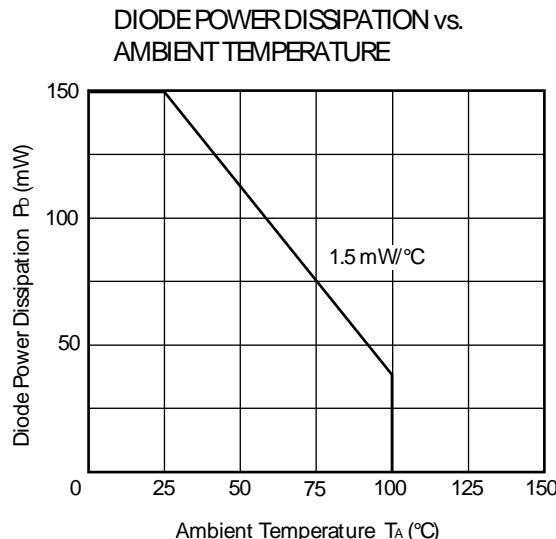
Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V <sub>F</sub>	I <sub>F</sub> = ±10 mA		1.17	1.4	V
	Terminal Capacitance	C <sub>t</sub>	V = 0 V, f = 1.0 MHz		100		pF
Transistor	Collector to Emitter Dark Current	I <sub>CEO</sub>	V <sub>CE</sub> = 40 V, I <sub>F</sub> = 0 mA			400	nA
Coupled	Current Transfer Ratio (I <sub>c</sub> /I <sub>F</sub> )	CTR	I <sub>F</sub> = ±1 mA, V <sub>CE</sub> = 2 V	200	2 000		%
	CTR Ratio *1	CTR1/ CTR2	I <sub>F</sub> = 1 mA, V <sub>CE</sub> = 2 V	0.3	1.0	3.0	
	Collector Saturation Voltage	V <sub>CE</sub> (sat)	I <sub>F</sub> = ±1 mA, I <sub>c</sub> = 2 mA			1.0	V
	Isolation Resistance	R <sub>i-o</sub>	V <sub>i-o</sub> = 1.0 kV <sub>DC</sub>	10 <sup>11</sup>			Ω
	Isolation Capacitance	C <sub>i-o</sub>	V = 0 V, f = 1.0 MHz		0.5		pF
	Rise Time *2	t <sub>r</sub>	V <sub>CC</sub> = 10 V, I <sub>c</sub> = 2 mA, R <sub>L</sub> = 100 Ω		100		μs
	Fall Time *2	t <sub>f</sub>			100		

Note: \*1. CTR1 = I<sub>c1</sub>/I<sub>F1</sub>, CTR2 = I<sub>c2</sub>/I<sub>F2</sub>



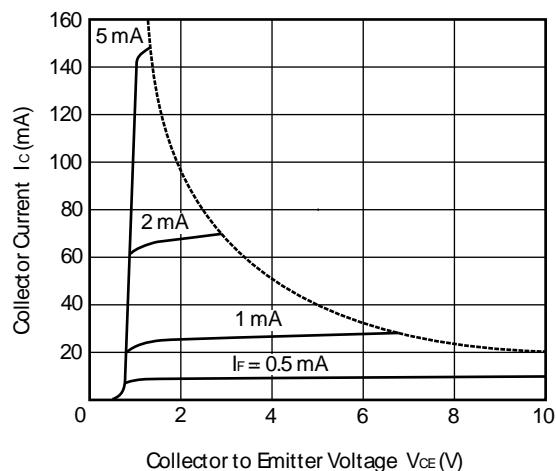
\*2. Test Circuit for Switching Time



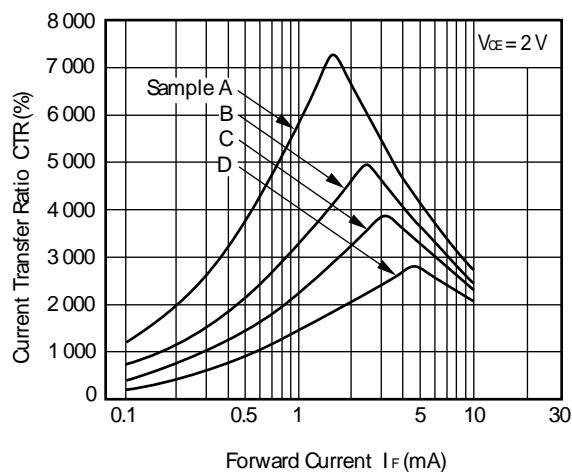
TYPICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ , unless otherwise specified)

**Remark** The graphs indicate nominal characteristics.

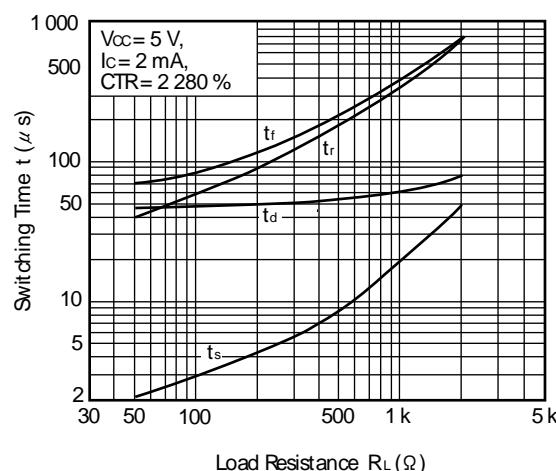
COLLECTOR CURRENT vs.  
COLLECTOR TO Emitter VOLTAGE



CURRENT TRANSFER RATIO vs.  
FORWARD CURRENT

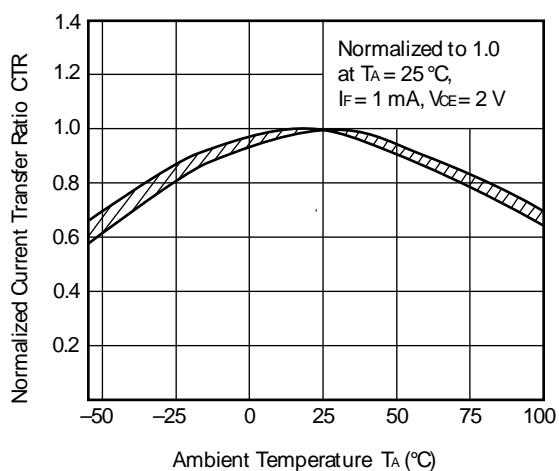


SWITCHING TIME vs.  
LOAD RESISTANCE

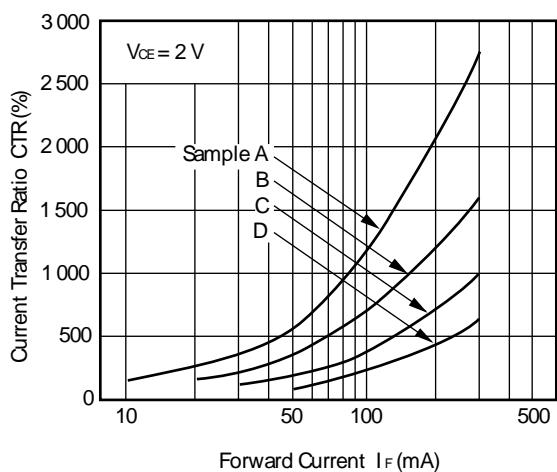


**Remark** The graphs indicate nominal characteristics.

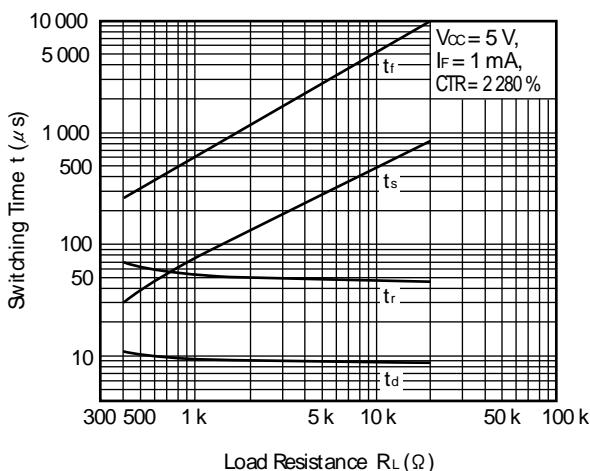
NORMALIZED CURRENT TRANSFER  
RATIO vs. AMBIENT TEMPERATURE

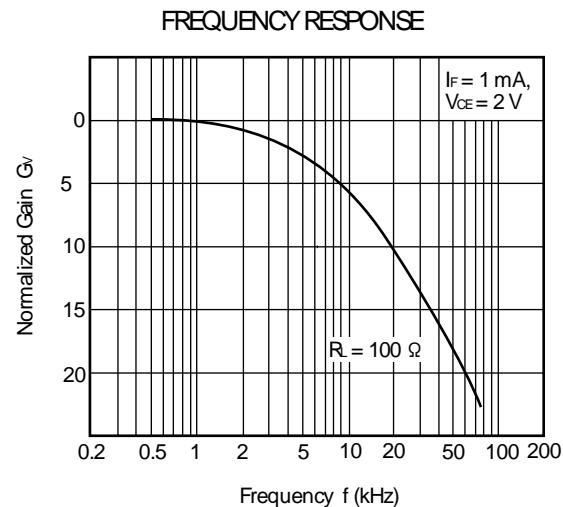


CURRENT TRANSFER RATIO vs.  
FORWARD CURRENT



SWITCHING TIME vs.  
LOAD RESISTANCE



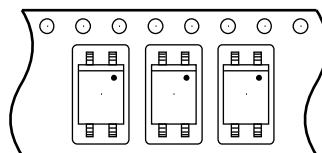


**Remark** The graphs indicate nominal characteristics.

## TAPING SPECIFICATIONS (UNIT: mm)

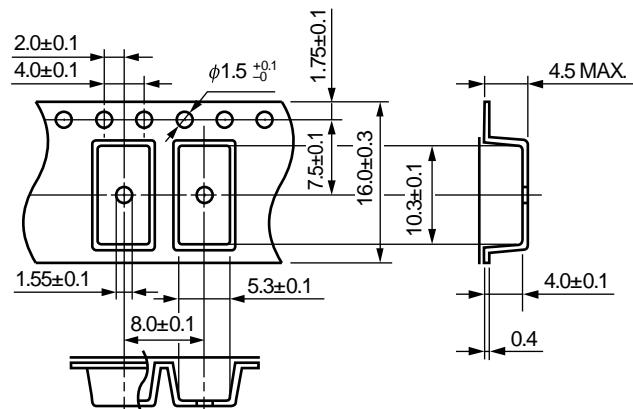
Taping Direction

PS2506L-1-F3

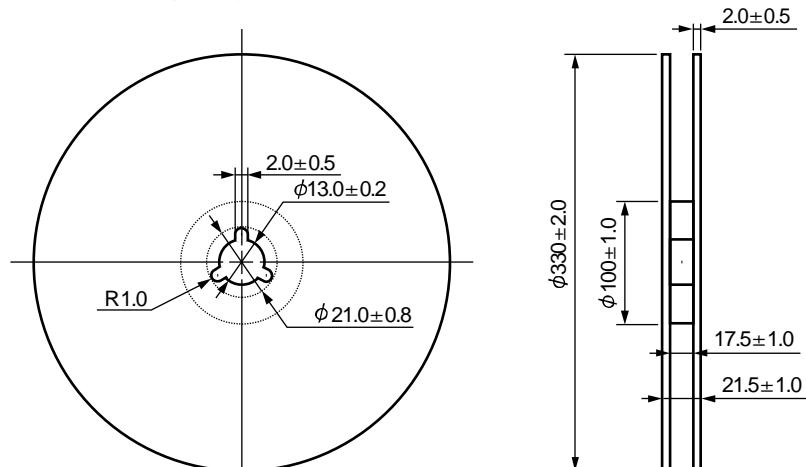


Direction of feed

Outline and Dimensions (Tape)

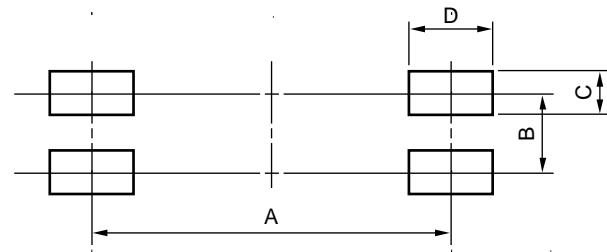
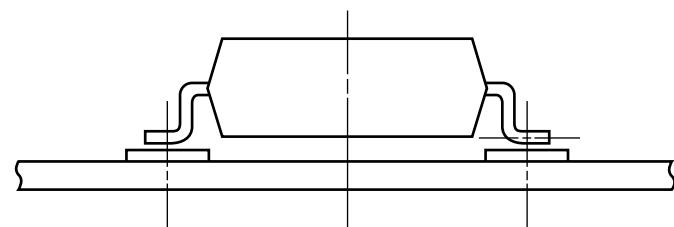


Outline and Dimensions (Reel)



Packing: 2 000 pcs/reel

## RECOMMENDED MOUNT PAD DIMENSIONS (UNIT: mm)



Part Number	Lead Bending	A	B	C	D
PS2506L	Lead Bending Type For Surface Mount	8.2	2.54	1.7	2.2

**Remark** All dimensions in this figure must be evaluated before use.

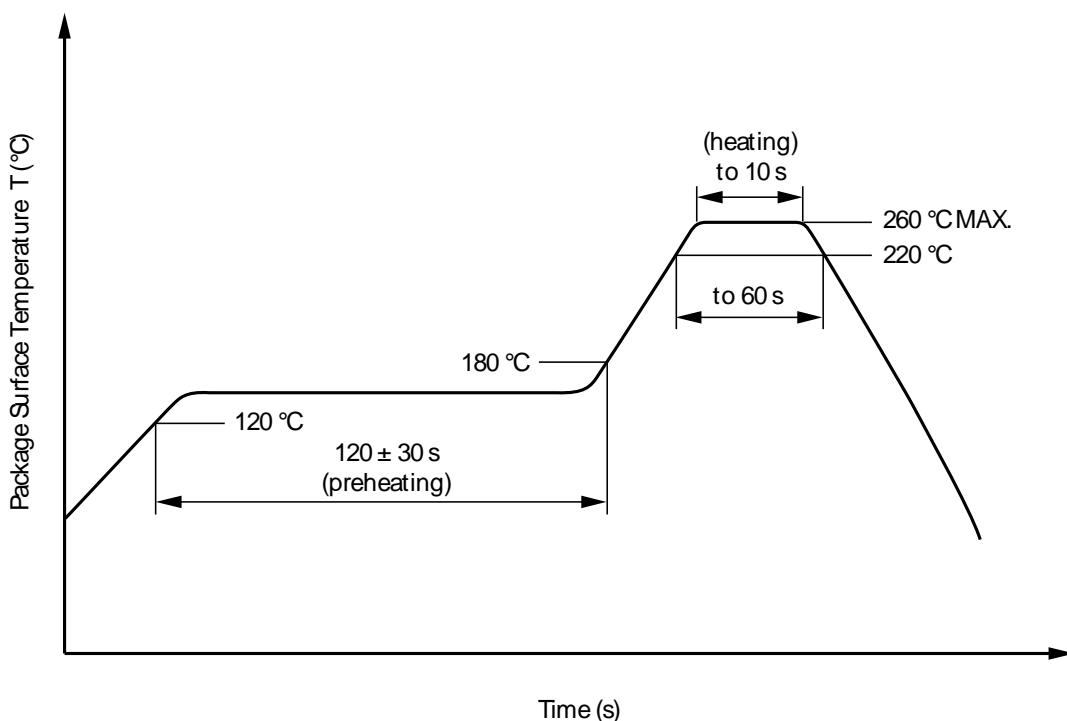
## NOTES ON HANDLING

### 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) Soldering by Soldering Iron

- Peak temperature (lead part temperature) 350 °C or below
- Time (per one side) 3 s or less
- Flux Rosin flux containing small amount of chlorine  
(The flux with a maximum chlorine content of 0.2 Wt% is recommended.)
- Place 1.5 to 2.0 mm or more away from the root of the lead

#### (4) Cautions

- Flux cleaning Avoid cleaning with Freon- or halogen-based (chlorinated etc.) solvents.
- Fixing/Coating Do not use fixing agents or coatings containing halogen-based substances.

**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 transistor may enter the on state, even if the voltage is within the absolute maximum ratings.

**3. Measurement conditions of current transfer ratios (CTR), which differ according to photocoupler**

Check the setting values before use, since the forward current conditions at CTR measurement differ according to product.

When using products other than at the specified forward current, the characteristics curves may differ from the standard curves due to CTR value variations or the like. Therefore, check the characteristics under the actual operating conditions and thoroughly take variations or the like into consideration before use.

## **USAGE CAUTIONS**

1. Protect against static electricity when handling.
2. Avoid storage at a high temperature and high humidity.
3. Avoid cleaning with Freon based or halogen-based (chlorinated etc.) solvents.
4. Do not use fixing agents or coatings containing halogen-based substances.

<b>Caution</b>	GaAs Products	<p>This product uses gallium arsenide (GaAs). GaAs vapor and powder are hazardous to human health if inhaled or ingested, so please observe the following points.</p> <ul style="list-style-type: none"><li>• Follow related laws and ordinances when disposing of the product. If there are no applicable laws and/or ordinances, dispose of the product as recommended below.</li><li>1. Commission a disposal company able to (with a license to) collect, transport and dispose of materials that contain arsenic and other such industrial waste materials.</li><li>2. Exclude the product from general industrial waste and household garbage, and ensure that the product is controlled (as industrial waste subject to special control) up until final disposal.</li><li>• Do not burn, destroy, cut, crush, or chemically dissolve the product.</li><li>• Do not lick the product or in any way allow it to enter the mouth.</li></ul>
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