PS2506-1, PS2506L-1

R08DS0197EJ0101
Rev.1.01
Nov 4, 2022

HIGH ISOLATION VOLTAGE AC INPUT, DARLINGTON TRANSISTOR TYPE

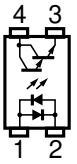
DESCRIPTION

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 Vr.m.s.)
- High current transfer ratio (CTR = 2 000 % TYP.)
- High-speed switching (t_r, t_f = 100 μs TYP.)
- Embossed tape product: PS2506L-1-F3: 2 000 pcs/reel
- Pb-free product
- Safety standards
    - UL approved: UL1577, Double protection

PIN CONNECTION
(Top View)



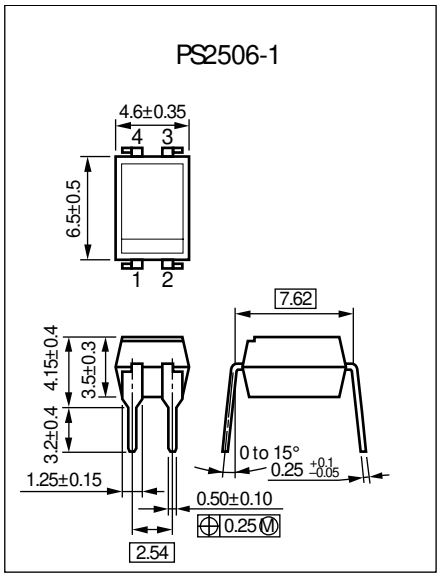
1. Anode, Cathode
2. Cathode, Anode
3. Emitter
4. Collector

APPLICATIONS

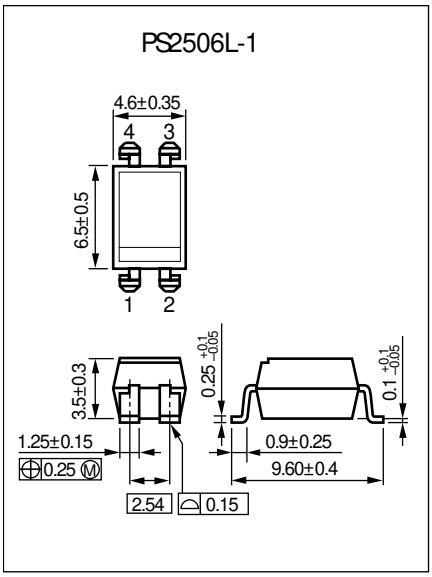
- Power supply
- Telephone/FAX
- FA/OA equipment
- Programmable logic controller

PACKAGE DIMENSIONS (UNIT: mm)

DIP Type



Lead Bending Type For Surface Mount

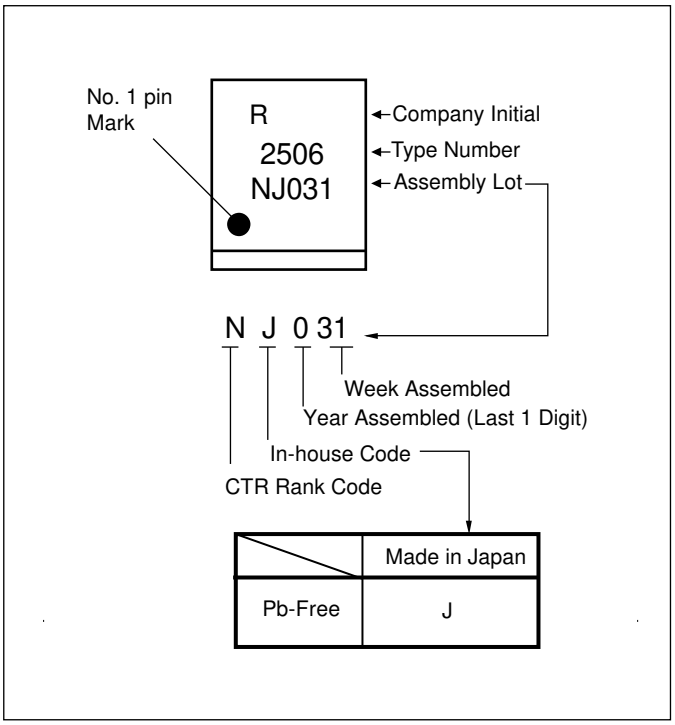


Weight (4-pin DIP) : 0.26 g (TYP.)

PHOTOCOUPLER 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 *1
PS2506-1	PS2506-1-A	Pb-Free	Magazine case 100 pcs	Standard Products (UL Approved)	PS2506-1
PS2506L-1	PS2506L-1-A				PS2506L-1
PS2506L-1-F3	PS2506L-1-F3-A		Embossed Tape 2 000 pcs/reel		PS2506L-1

Notes: *1. For the application of the safety standard, the following part number should be used.

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C, unless otherwise specified)

Parameter		Symbol	Ratings	Unit
Diode	Forward Current (DC)	I_F	±80	mA
	Power Dissipation Derating	ΔP_D/°C	1.5	mW/°C
	Power Dissipation	P_D	150	mW
	Peak Forward Current*1	I_{FP}	±1	A
Transistor	Collector to Emitter Voltage	V_{CEO}	40	V
	Emitter to Collector Voltage	V_{ECO}	6	V
	Collector Current	I_C	200	mA
	Power Dissipation Derating	ΔP_C/°C	2.0	mW/°C
	Power Dissipation	P_C	200	mW
Isolation Voltage*2		BV	5 000	Vr.m.s.
Operating Ambient Temperature		T_A	–55 to +100	°C
Storage Temperature		T_{stg}	–55 to +150	°C

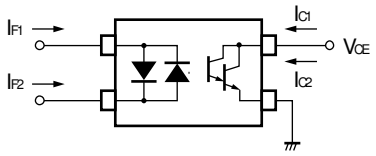
Note: *1. PW = 100 μs, Duty Cycle = 1 %

*2. AC voltage for 1 minute at T_A = 25 °C, RH = 60 % between input and output.
Pins 1-2 shorted together, 3-4 shorted together.

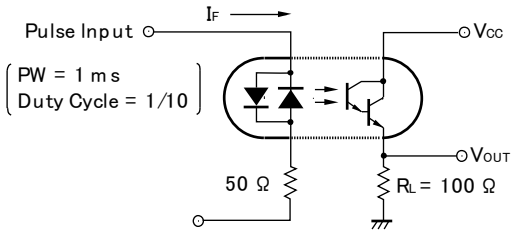
ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

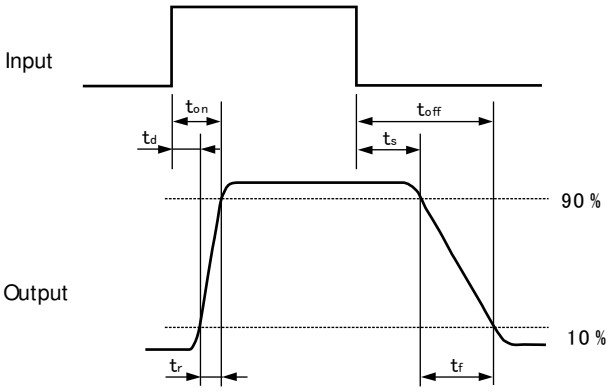
Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V_F	I_F = ±10 mA		1.17	1.4	V
	Terminal Capacitance	C_t	V = 0 V, f = 1.0 MHz		100		pF
Transistor	Collector to Emitter Dark Current	I_{CEO}	V_{CE} = 40 V, I_F = 0 mA			400	nA
Coupled	Current Transfer Ratio (I_C/I_F)	CTR	I_F = ±1 mA, V_{CE} = 2 V	200	2 000		%
	CTR Ratio *1	CTR1/ CTR2	I_F = 1 mA, V_{CE} = 2 V	0.3	1.0	3.0	
	Collector Saturation Voltage	$V_{CE (sat)}$	I_F = ±1 mA, I_C = 2 mA			1.0	V
	Isolation Resistance	R_{I-O}	V_{I-O} = 1.0 kV$_{DC}$	10^{11}			Ω
	Isolation Capacitance	C_{I-O}	V = 0 V, f = 1.0 MHz		0.5		pF
	Rise Time *2	t_r	V_{CC} = 10 V, I_C = 2 mA, R_L = 100 Ω		100		µs
	Fall Time *2	t_f			100		

Note: *1. CTR1 = I_{C1}/I_{F1}, CTR2 = I_{C2}/I_{F2}



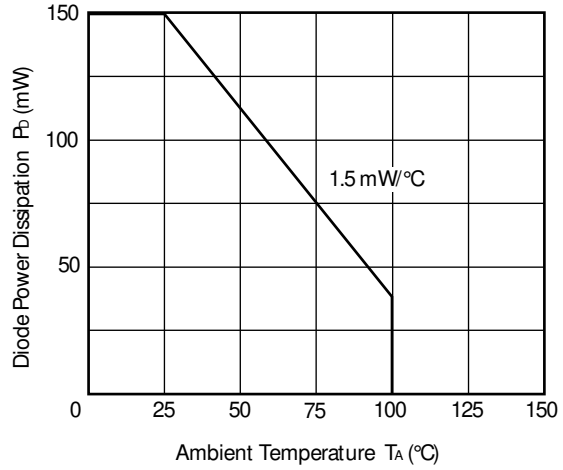
*2. Test Circuit for Switching Time



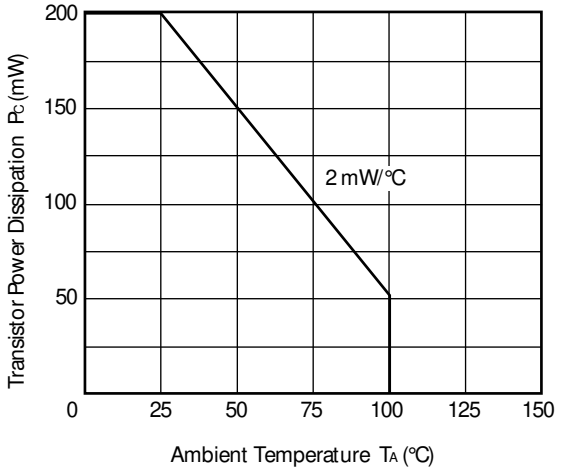


TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise specified)

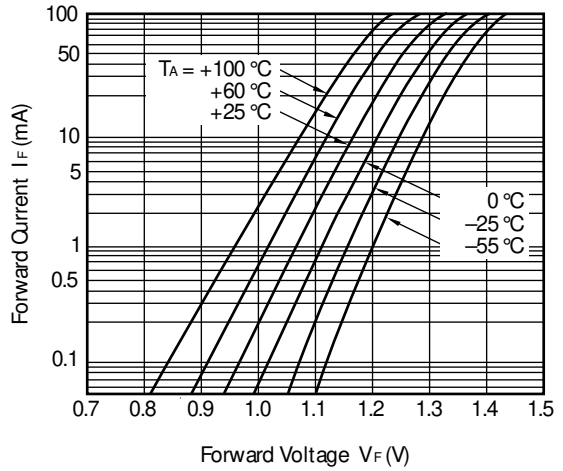
DIODE POWER DISSIPATION vs. AMBIENT TEMPERATURE



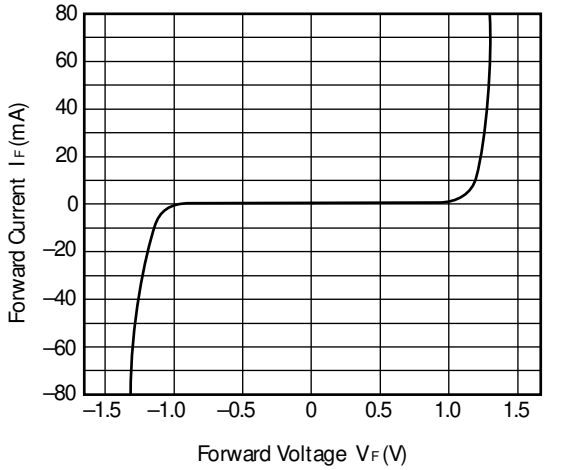
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



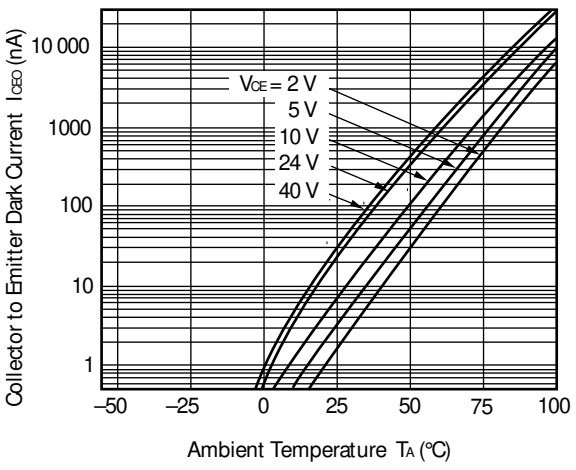
FORWARD CURRENT vs. FORWARD VOLTAGE



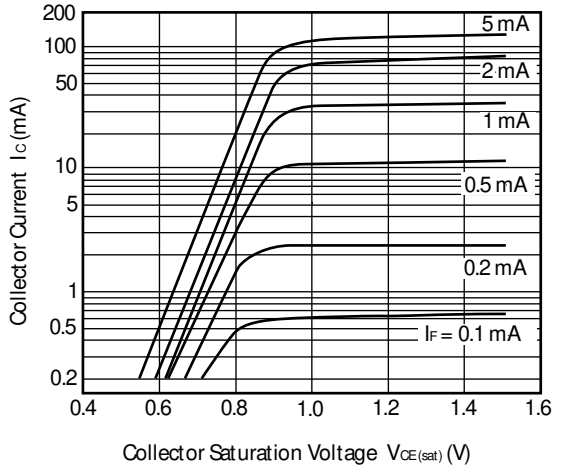
FORWARD CURRENT vs. FORWARD VOLTAGE



COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE

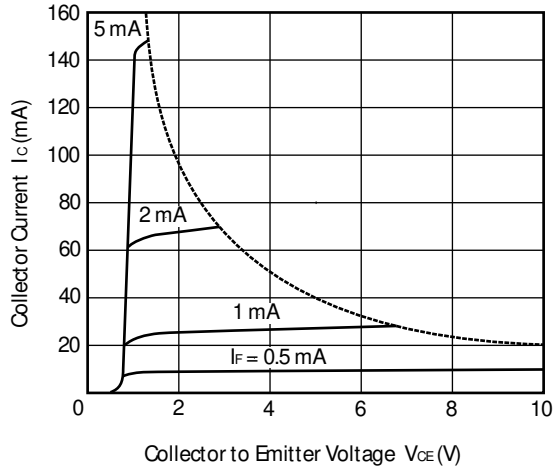


COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE

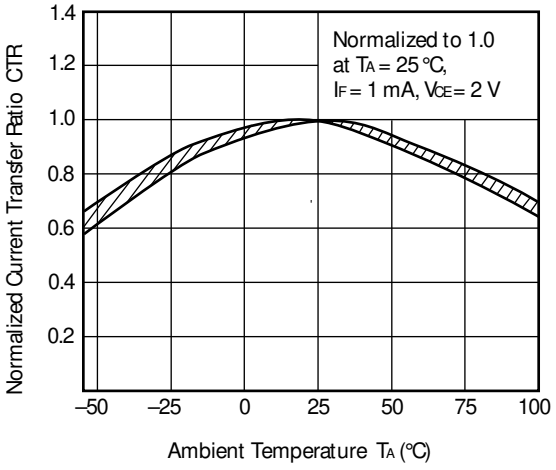


Remark The graphs indicate nominal characteristics.

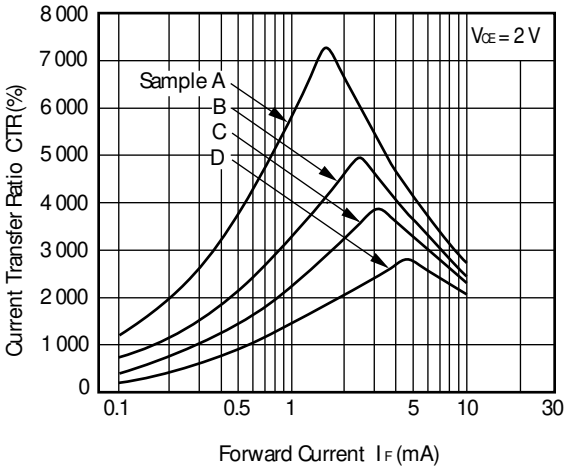
COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE



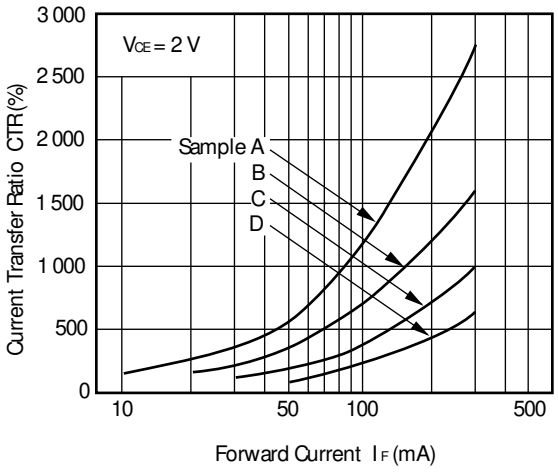
NORMALIZED CURRENT TRANSFER
RATIO vs. AMBIENT TEMPERATURE



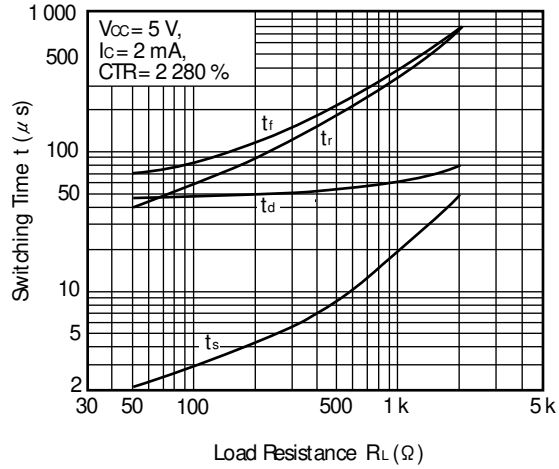
CURRENT TRANSFER RATIO vs.
FORWARD CURRENT



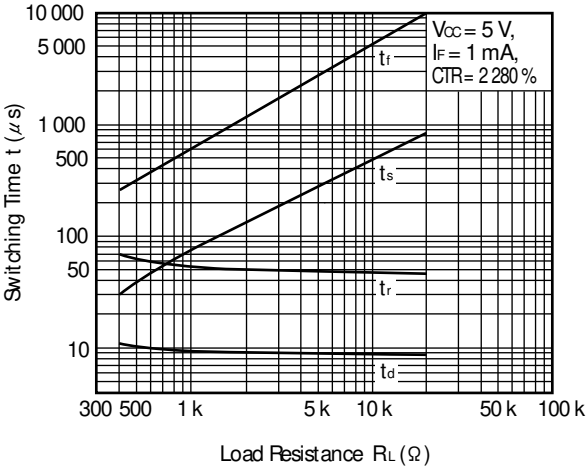
CURRENT TRANSFER RATIO vs.
FORWARD CURRENT



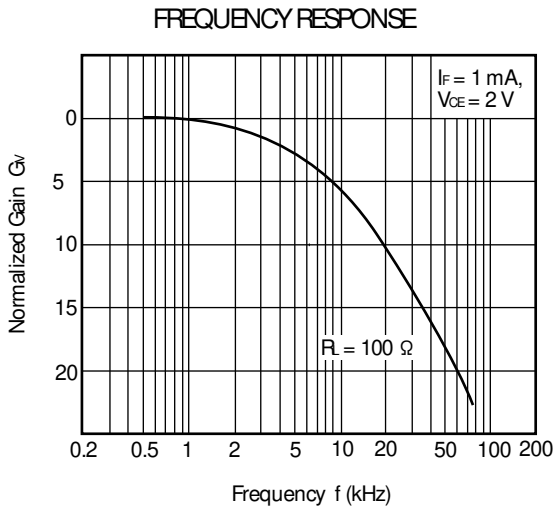
SWITCHING TIME vs.
LOAD RESISTANCE



SWITCHING TIME vs.
LOAD RESISTANCE



Remark The graphs indicate nominal characteristics.

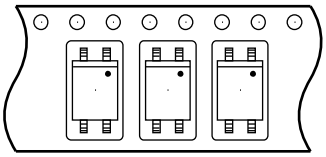


Remark The graphs indicate nominal characteristics.

TAPING SPECIFICATIONS (UNIT: mm)

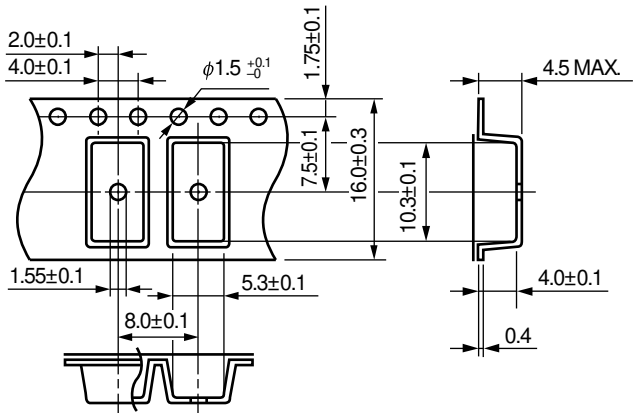
Taping Direction

PS2506L-1-F3

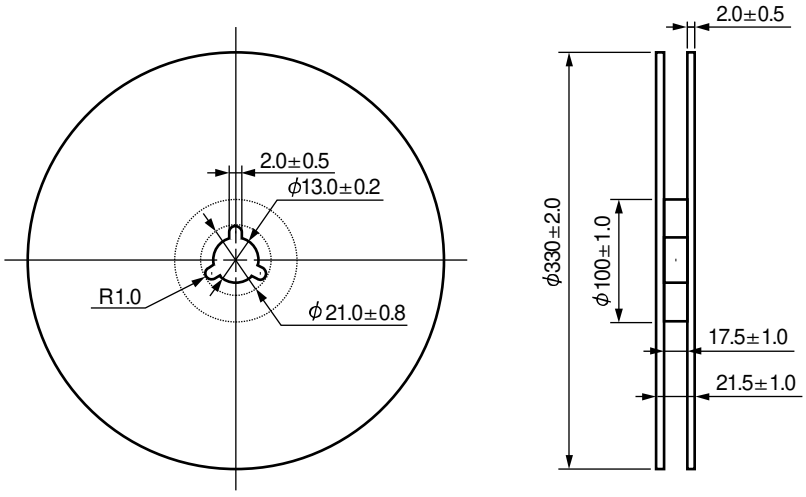


Direction of feed

Outline and Dimensions (Tape)

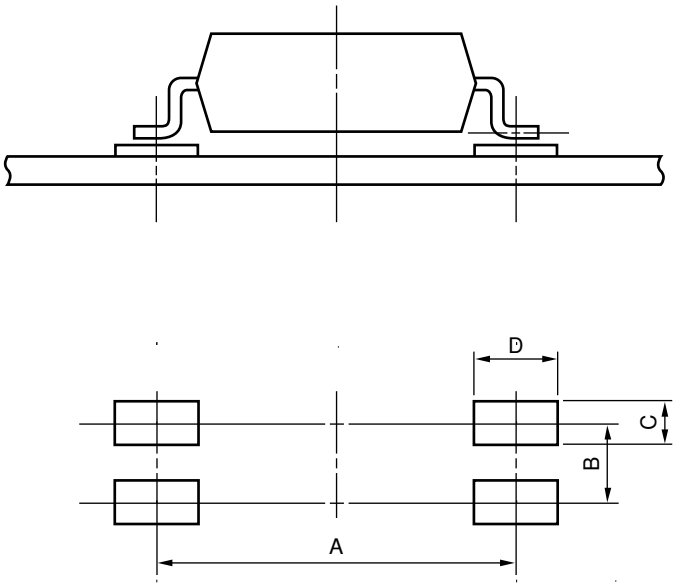


Outline and Dimensions (Reel)



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.

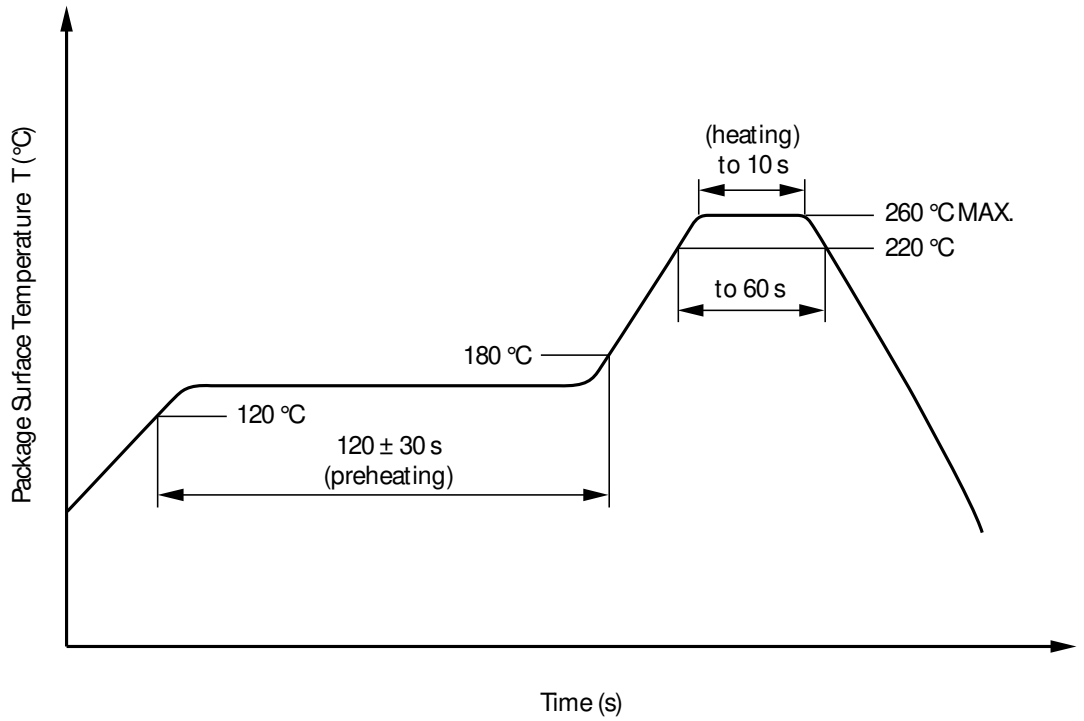
NOTES ON HANDLING

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.

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