

PS2506-1, PS2506L-1

R08DS0197EJ0101 Rev.1.01 Nov 4, 2022

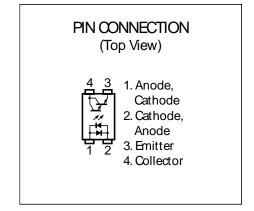
HIGH ISOLATION VOLTAGE AC INPUT, DARLINGTON TRANSISTOR TYPE

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 , $t_f = 100 \mu s$ TYP.)
- Embossed tape product: PS2506L-1-F3: 2 000 pcs/reel
- Pb-free product
- Safety standards
 - UL approved: UL1577, Double protection

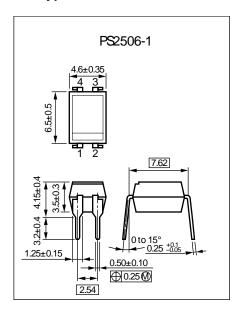


APPLICATIONS

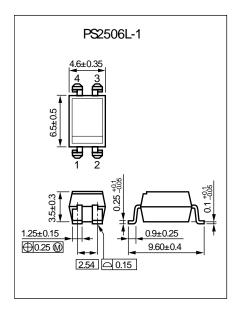
- Power supply
- Telephone/FAX
- FA/OA equipment
- Programmable logic controller

PACKAGE DIMENSIONS (UNIT: mm)

DIP Type



Lead Bending Type For Surface Mount

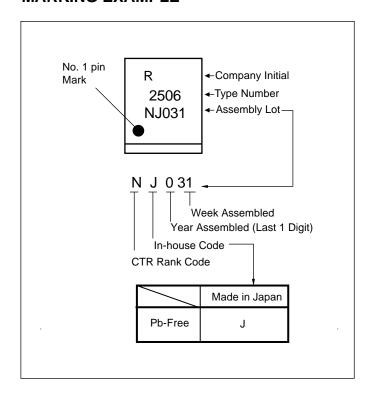


Weight (4-pin DIP) : 0.26 g (TYP.)

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	Embassed Tops 2 000	Magazine case 100 pcs	Standard Products	PS2506-1	
PS2506L-1	PS2506L-1-A			(UL Approved)	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 ($T_A = 25$ °C, unless otherwise specified)

Parameter		Symbol	Ratings	Unit	
Diode	Forward Current (DC)	lF	±80	mA	
	Power Dissipation Derating	∆P _D /°C	1.5	mW/°C	
	Power Dissipation	P _D	150	mW	
	Peak Forward Current*1	I _{FP}	±1	Α	
Transistor	Collector to Emitter Voltage	Vceo	40	٧	
	Emitter to Collector Voltage	V _{ECO}	6	٧	
	Collector Current	lc	200	mA	
	Power Dissipation Derating	ΔP _C /°C	2.0	mW/°C	
	Power Dissipation	Pc	200	mW	
Isolation Vo	Isolation Voltage*2		5 000	Vr.m.s.	
Operating Ambient Temperature		T _A	-55 to +100	°C	
Storage Temperature		T _{stg}	-55 to +150	°C	

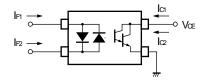
Note: *1. PW = 100 μ s, Duty Cycle = 1 %

^{*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.

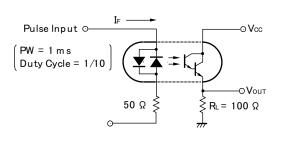
ELECTRICAL CHARACTERISTICS ($T_A = 25$ °C)

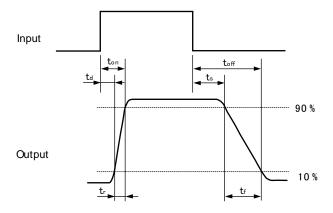
	Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	VF	IF = ±10 mA		1.17	1.4	V
	Terminal Capacitance	Ct	V = 0 V, f = 1.0 MHz		100		pF
Transistor	Collector to Emitter Dark Current	Iceo	Vce = 40 V, IF = 0 mA			400	nA
Coupled	Current Transfer Ratio (Ic/IF)	CTR	IF = ±1 mA, VcE = 2 V	200	2 000		%
	CTR Ratio *1	CTR1/ CTR2	I _F = 1 mA, V _{CE} = 2 V	0.3	1.0	3.0	
	Collector Saturation Voltage	VCE (sat)	IF = ±1 mA, Ic = 2 mA			1.0	V
	Isolation Resistance	Rı-o	Vi-o = 1.0 kVpc	10 ¹¹			Ω
	Isolation Capacitance	C _{I-O}	V = 0 V, f = 1.0 MHz		0.5		pF
	Rise Time *2	tr	$Vcc = 10 \text{ V}, \text{ Ic} = 2 \text{ mA}, \text{ RL} = 100 \Omega$		100		μs
	Fall Time *2	t f			100		

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

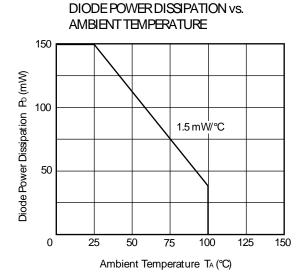


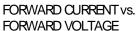
*2. Test Circuit for Switching Time

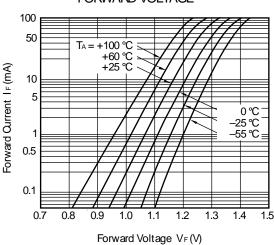




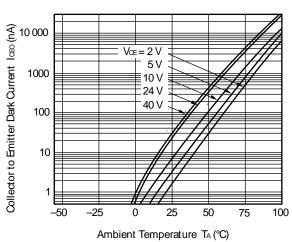
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise specified)





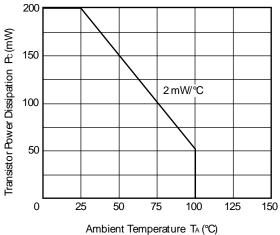


COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE

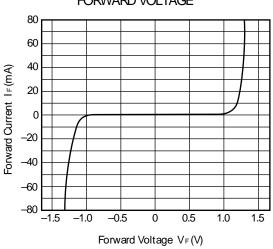


Remark The graphs indicate nominal characteristics.

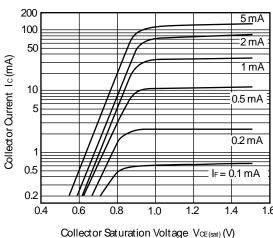
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



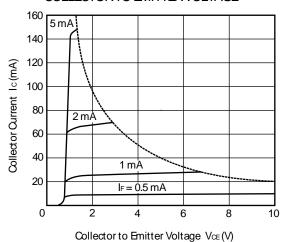
FORWARD CURRENT vs. FORWARD VOLTAGE



COLLECTOR CURRENT vs. **COLLECTOR SATURATION VOLTAGE**

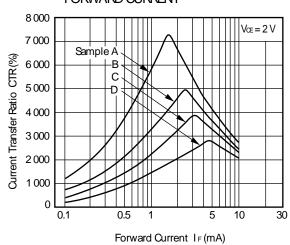


COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE

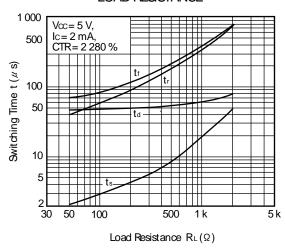


Conector to Emitter voltage VCE(V

CURRENT TRANSFER RATIO vs. FORWARD CURRENT

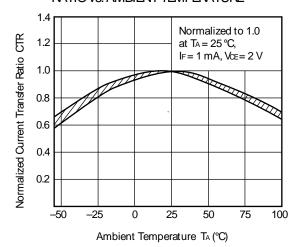


SWITCHING TIME vs. LOAD RESISTANCE

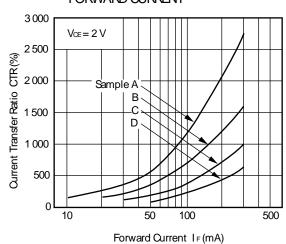


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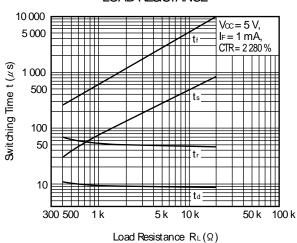
NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE



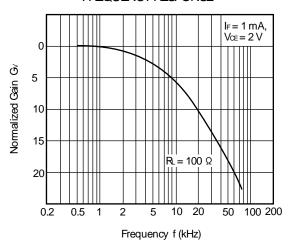
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



SWITCHING TIME vs. LOAD RESISTANCE



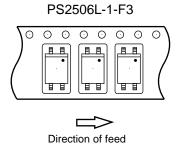
FREQUENCY RESPONSE



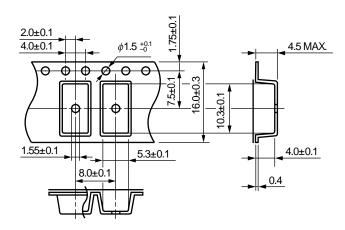
Remark The graphs indicate nominal characteristics.

TAPING SPECIFICATIONS (UNIT: mm)

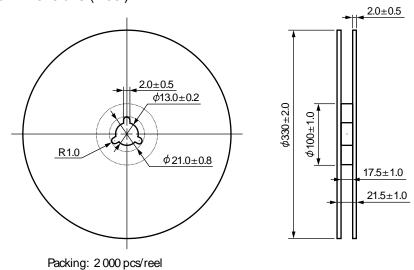




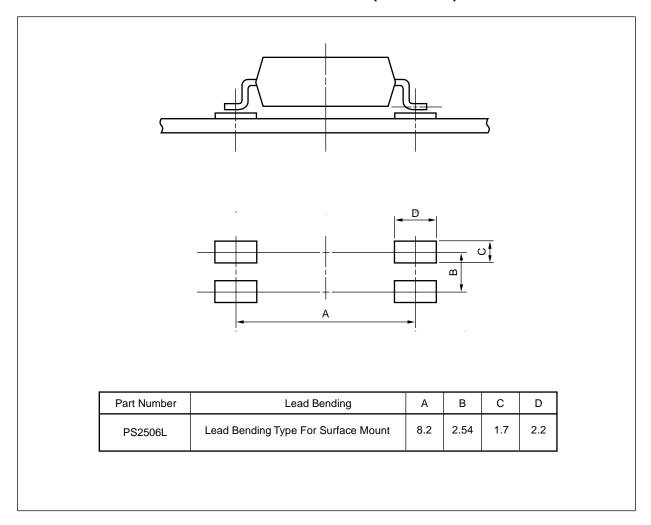
Outline and Dimensions (Tape)



Outline and Dimensions (Reel)



RECOMMENDED MOUNT PAD DIMENSIONS (UNIT: mm)



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)

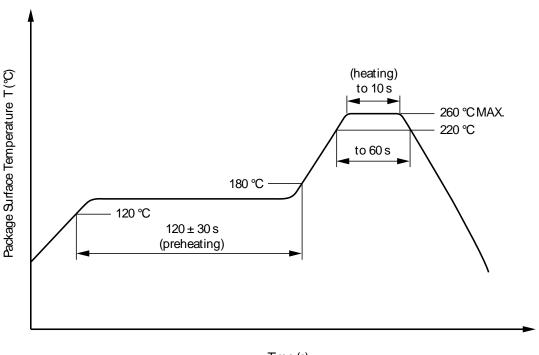
Time of peak reflow temperature
 Time of temperature higher than 220 °C
 60 seconds or less

• Time to preheat temperature from 120 to 180 $^{\circ}$ C 120 \pm 30 s • Number of reflows

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



Time (s)

(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
 Flux
 One (Allowed to be dipped in solder including plastic mold portion.)
 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)
Time (per one side)
350 °C or below
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
 Fixing/Coating
 Avoid cleaning with Freon- or halogen-based (chlorinated etc.) solvents.
 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.
- 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.

Caution

GaAs Products

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.

- 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.
 - 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.
- 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.
- Do not burn, destroy, cut, crush, or chemically dissolve the product.
- Do not lick the product or i any way allow it to enter the mouth.

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