

PHOTOCOUPLER PS2502-1,-4,PS2502L-1,-4

HIGH ISOLATION VOLTAGE DARLINGTON TRANSISTOR TYPE MULTI PHOTOCOUPLER SERIES

-NEPOC Series-

DESCRIPTION

The PS2502-1, -4 and PS2502L-1, -4 are optically coupled isolators containing a GaAs light emitting diode and an NPN silicon darlington connected phototransistor.

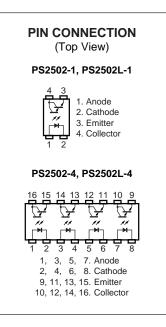
The PS2502-1, -4 are in a plastic DIP (Dual In-line Package) and the PS2502L-1, -4 are lead bending type (Gullwing) for surface mount.

FEATURES

- High isolation voltage (BV = 5 000 Vr.m.s.)
- High current transfer ratio (CTR = 2 000% TYP.)
- High-speed switching (tr, tr = 100 μ s TYP.)
- <R> Ordering number of tape product: PS2502L-1-F3: 2 000 pcs/reel
 - · Safety standards
 - UL approved: No. E72422

APPLICATIONS

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



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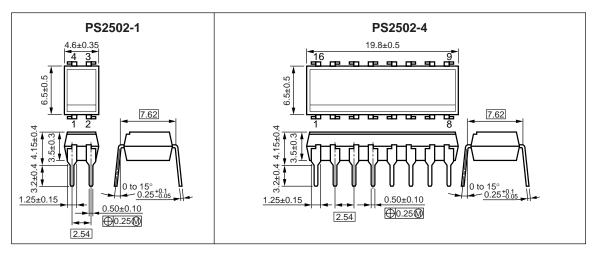
The mark <R> shows major revised points.

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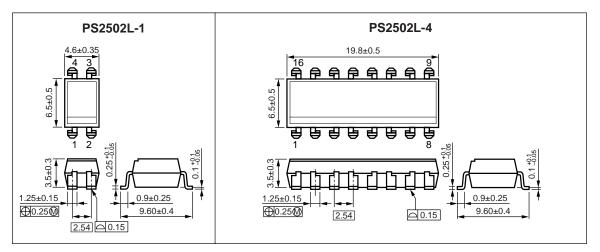
The revised points can be easily searched by copying an "<R>" in the PDF file and specifying it in the "Find what:" field.

<R> PACKAGE DIMENSIONS (UNIT : mm)

DIP Type



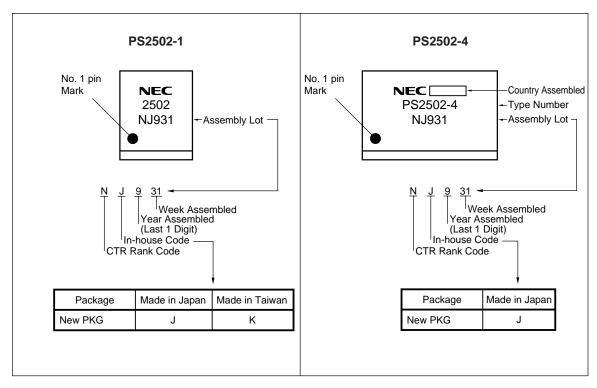
Lead Bending Type



<R> PHOTOCOUPLER CONSTRUCTION

Parameter	Unit (MIN.)
Air Distance	7 mm
Outer Creepage Distance	7 mm
Inner Creepage Distance	3.5 mm
Isolation Distance	0.3 mm

<R> MARKING EXAMPLE



<R> ORDERING INFORMATION

Part Number	Order Number	Solder Plating Specification	Packing Style	Safety Standard Approval	Application Part Number*1
PS2502-1	PS2502-1-A	Pb-Free	Magazine case 100 pcs	Standard products	PS2502-1
PS2502L-1	PS2502L-1-A			(UL Approved)	
PS2502L-1-F3	PS2502L-1-F3-A		Embossed Tape 2 000 pcs/reel		
PS2502-4	PS2502-4-A		Magazine case 20 pcs		PS2502-4
PS2502L-4	PS2502L-4-A				

*1 For the application of the Safety Standard, following part number should be used.

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

Parameter		Symbol	Ratings		Unit
			PS2502-1, PS2502L-1	PS2502-4, PS2502L-4	
Diode	Reverse Voltage	VR	6	3	V
	Forward Current (DC)	lf	8	0	mA/ch
	Power Dissipation Derating	⊿Po/°C	1.5	1.2	mW/°C
	Power Dissipation	PD	150	120	mW/ch
	Peak Forward Current ^{*1}	IFP	1		A/ch
Transistor	Collector to Emitter Voltage	Vceo	40		V
	Emitter to Collector Voltage	Veco	6		V
	Collector Current	lc	200	160	mA/ch
	Power Dissipation Derating	⊿Pc/°C	2.0	1.6	mW/°C
	Power Dissipation	Pc	200	160	mW/ch
Isolation Voltage ^{*2}		BV	5 000		Vr.m.s.
Operating Ambient Temperature		TA	–55 to +100		°C
Storage Temperature		Tstg	-55 to +150		°C

***1** PW = 100 μs, Duty Cycle = 1%

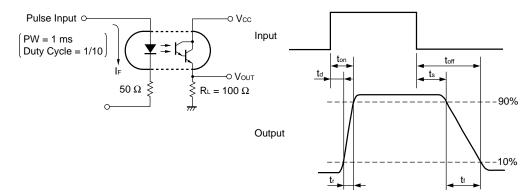
*2 AC voltage for 1 minute at $T_A = 25^{\circ}$ C, RH = 60% between input and output. Pins 1-2 shorted together, 3-4 shorted together (PS2502-1, PS2502L-1). Pins 1-8 shorted together, 9-16 shorted together (PS2502-4, PS2502L-4).

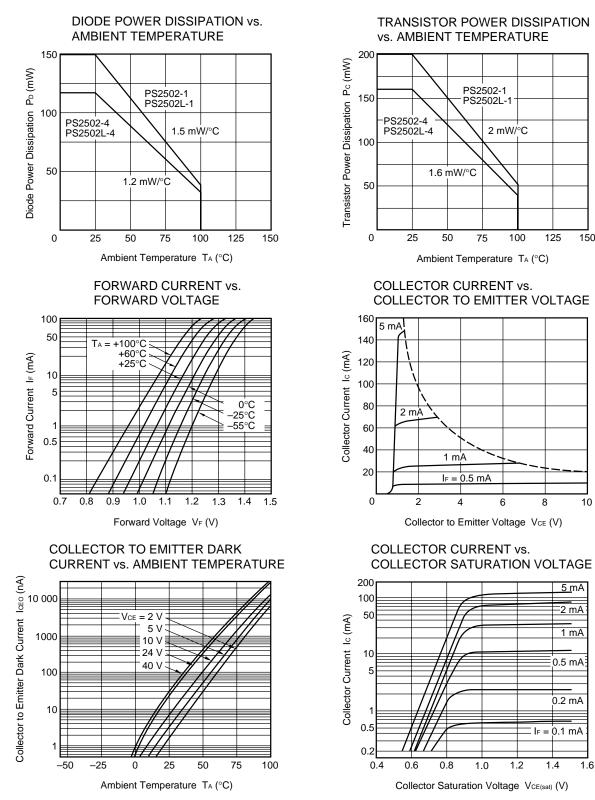
	Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	VF	IF = 10 mA		1.17	1.4	V
	Reverse Current	Ir	V _R = 5 V			5	μA
	Terminal Capacitance	Ct	V = 0 V, f = 1.0 MHz		50		pF
Transistor	Collector to Emitter Dark Current	ICEO	$V_{CE} = 40 \text{ V}, \text{ IF} = 0 \text{ mA}$			400	nA
Coupled	Current Transfer Ratio (Ic/IF) ^{*1}	CTR	IF = 1 mA, VCE = 2 V	200	2 000		%
	Collector Saturation Voltage	VCE(sat)	IF = 1 mA, Ic = 2 mA			1.0	V
	Isolation Resistance	R⊦o	VI-O = 1.0 kVDC	10 ¹¹			Ω
	Isolation Capacitance	CI-O	V = 0 V, f = 1.0 MHz		0.5		pF
	Rise Time ^{*2}	tr	V_{CC} = 10 V, Ic = 2 mA, RL = 100 Ω		100		μS
	Fall Time ^{*2}	tr			100		

ELECTRICAL CHARACTERISTICS ($T_A = 25^{\circ}C$)

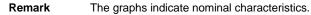
*1 CTR rank (only PS2502-1, PS2502L-1)

- K : 2 000 to (%)
- L : 700 to 3 400 (%)
- M : 200 to 1 000 (%)
- *2 Test circuit for switching time

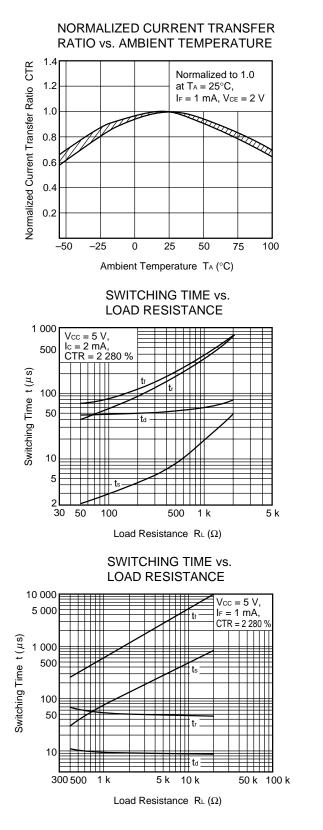


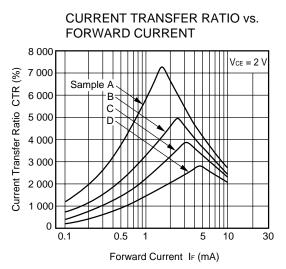


TYPICAL CHARACTERISTICS (TA = 25°C, unless otherwise specified)

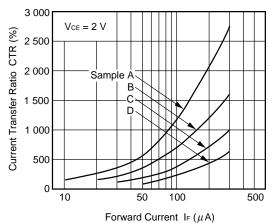


Data Sheet PN10226EJ04V0DS

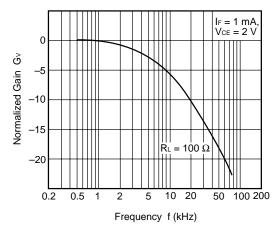




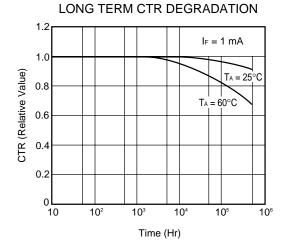
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



FREQUENCY RESPONSE



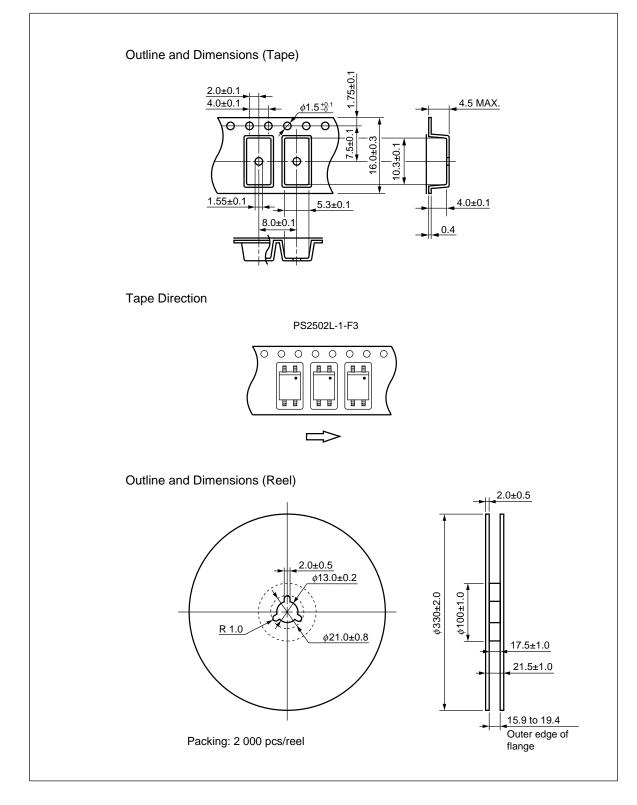
Remark The graphs indicate nominal characteristics.



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Data Sheet PN10226EJ04V0DS

<R> TAPING SPECIFICATIONS (UNIT : mm)



NOTES ON HANDLING

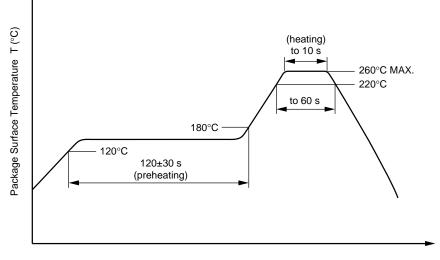
1. Recommended soldering conditions

(1) Infrared reflow soldering

- Peak reflow temperature
- Time of peak reflow temperature
- Time of temperature higher than 220°C
- Time to preheat temperature from 120 to 180°C
- Number of reflows
- Flux

260°C or below (package surface temperature) 10 seconds or less 60 seconds or less 120±30 s Three 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 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 (each pins)	3 seconds or less
• Flux	Rosin flux containing small amount of chlorine (The flux with a
	maximum chlorine content of 0.2 Wt% is recommended.)

- (a) Soldering of leads should be made at the point 1.5 to 2.0 mm from the root of the lead.
- (b) Please be sure that the temperature of the package would not be heated over 100°C.

(4) 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 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.

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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.
	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 in any way allow it to enter the mouth.