

# PHOTOCOUPLER

## PS2505-1,-2,-4, PS2505L-1,-2,-4

### HIGH ISOLATION VOLTAGE AC INPUT RESPONSE TYPE MULTI PHOTOCOUPLER SERIES

–NEPOC™ Series–

#### DESCRIPTION

The PS2505-1, -2, -4 and PS2505L-1, -2, -4 are optically coupled isolators containing GaAs light emitting diodes and an NPN silicon phototransistor.

The PS2505-1, -2, -4 are in a plastic DIP (Dual In-line Package) and the PS2505L-1, -2, -4 are lead bending type (Gull-wing) for surface mount.

#### FEATURES

- AC input response
- High isolation voltage ( $BV = 5\,000\text{ V r.m.s.}$ )
- High collector to emitter voltage ( $V_{CE0} = 80\text{ V}$ )
- High-speed switching ( $t_r = 3\ \mu\text{s TYP.}$ ,  $t_f = 5\ \mu\text{s TYP.}$ )
- Ordering number of tape product: PS2505L-1-E3, E4, F3, F4, PS2505L-2-E3, E4
- Safety standards
  - UL approved: File No. E72422 (S)

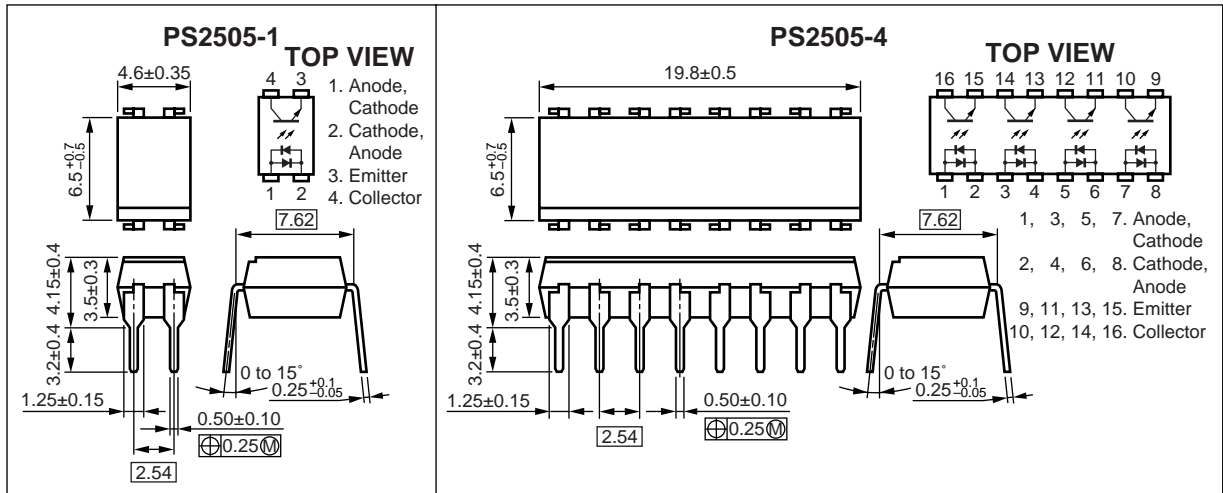
#### APPLICATIONS

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

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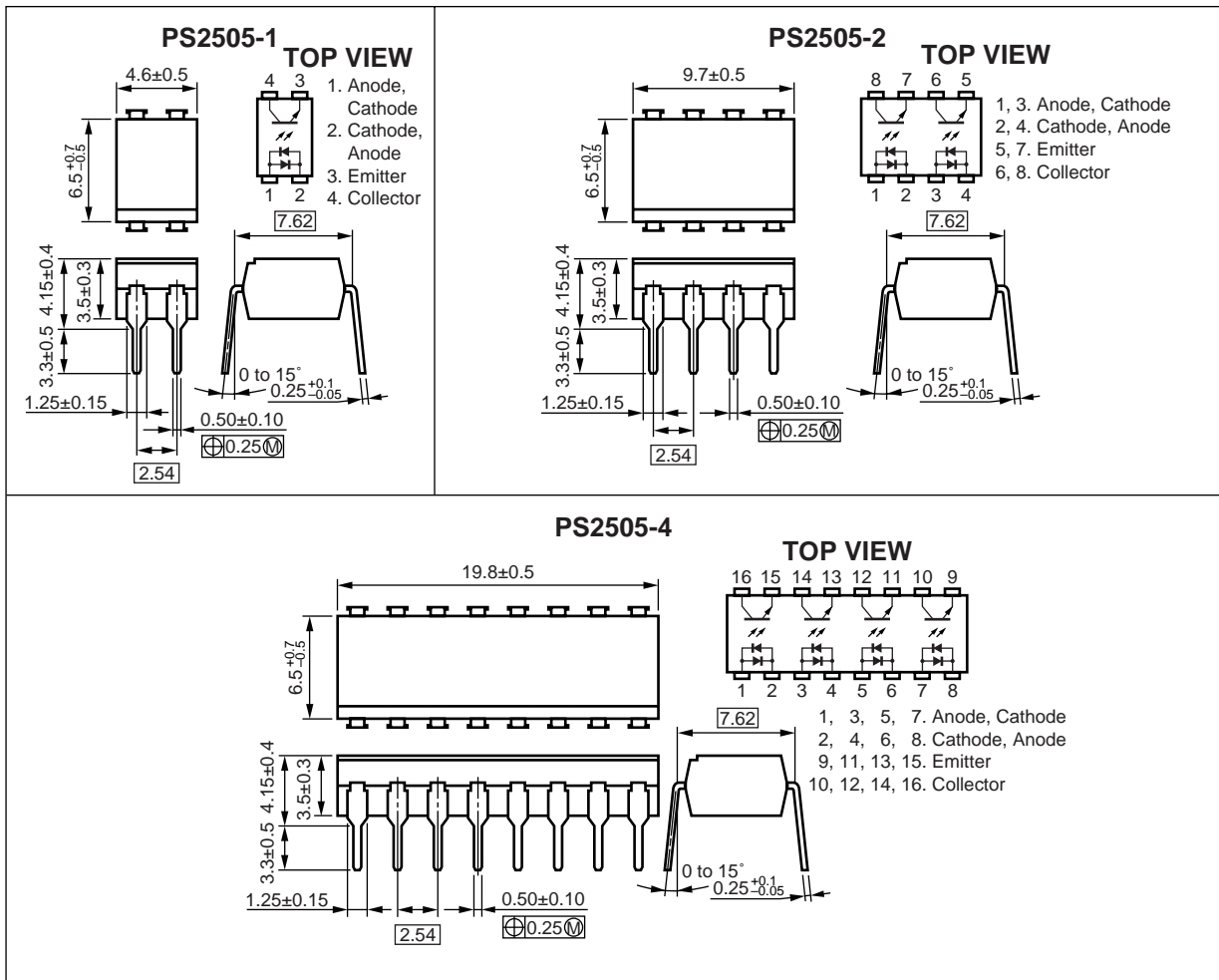
★ PACKAGE DIMENSIONS (UNIT : mm)

DIP Type (New package)

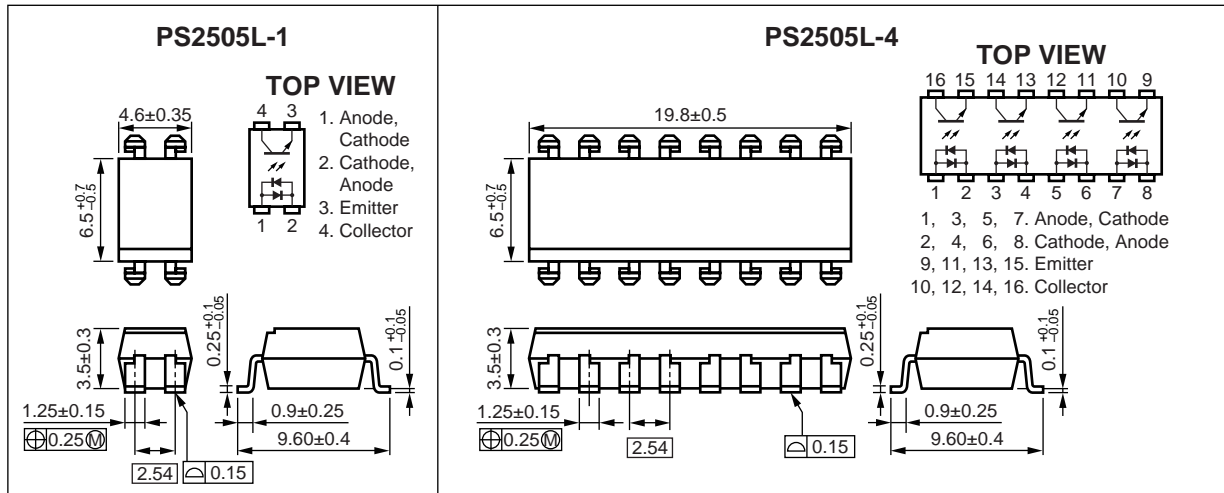


Caution New package 1-ch, 4-ch only

DIP Type

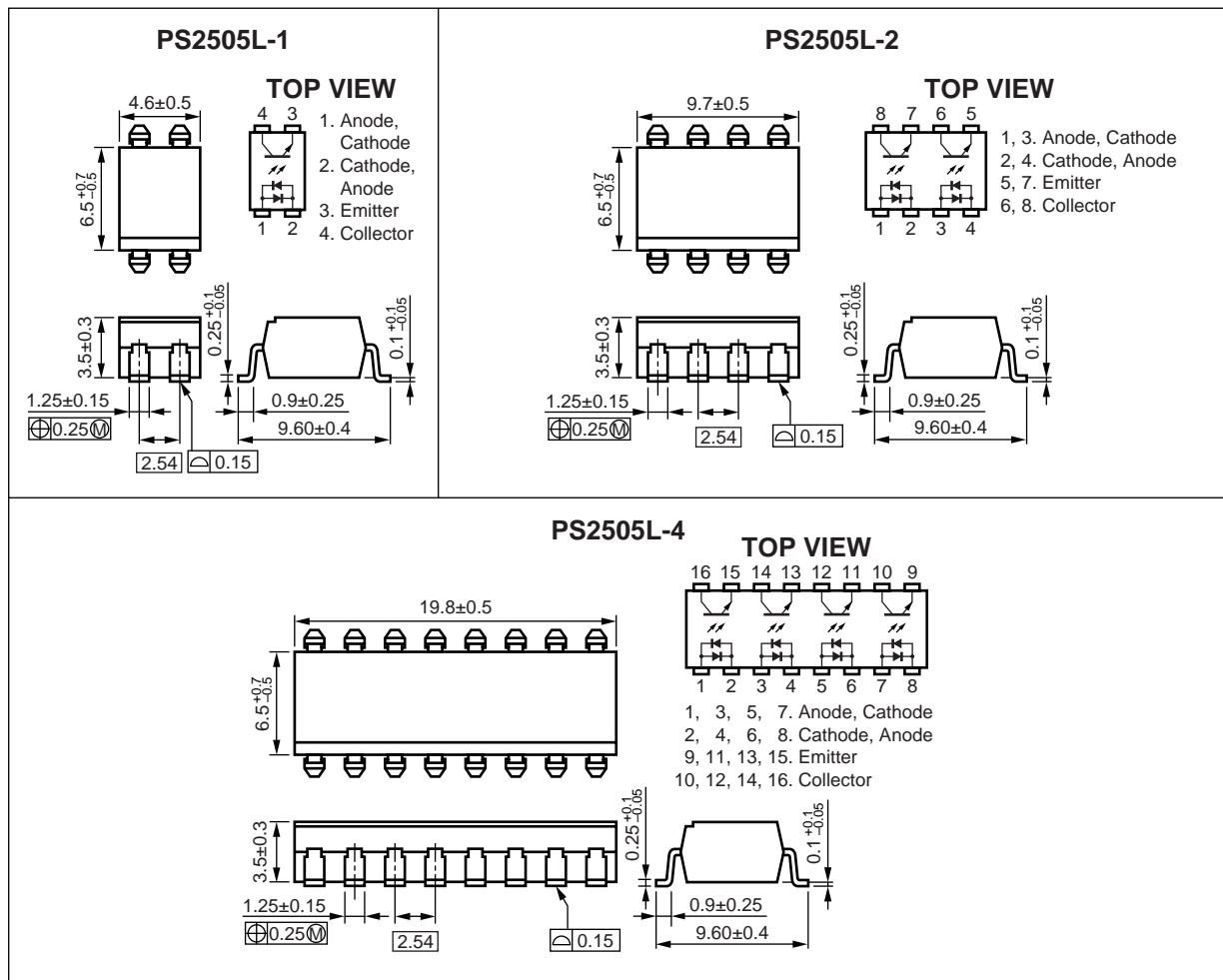


Lead Bending Type (New package)

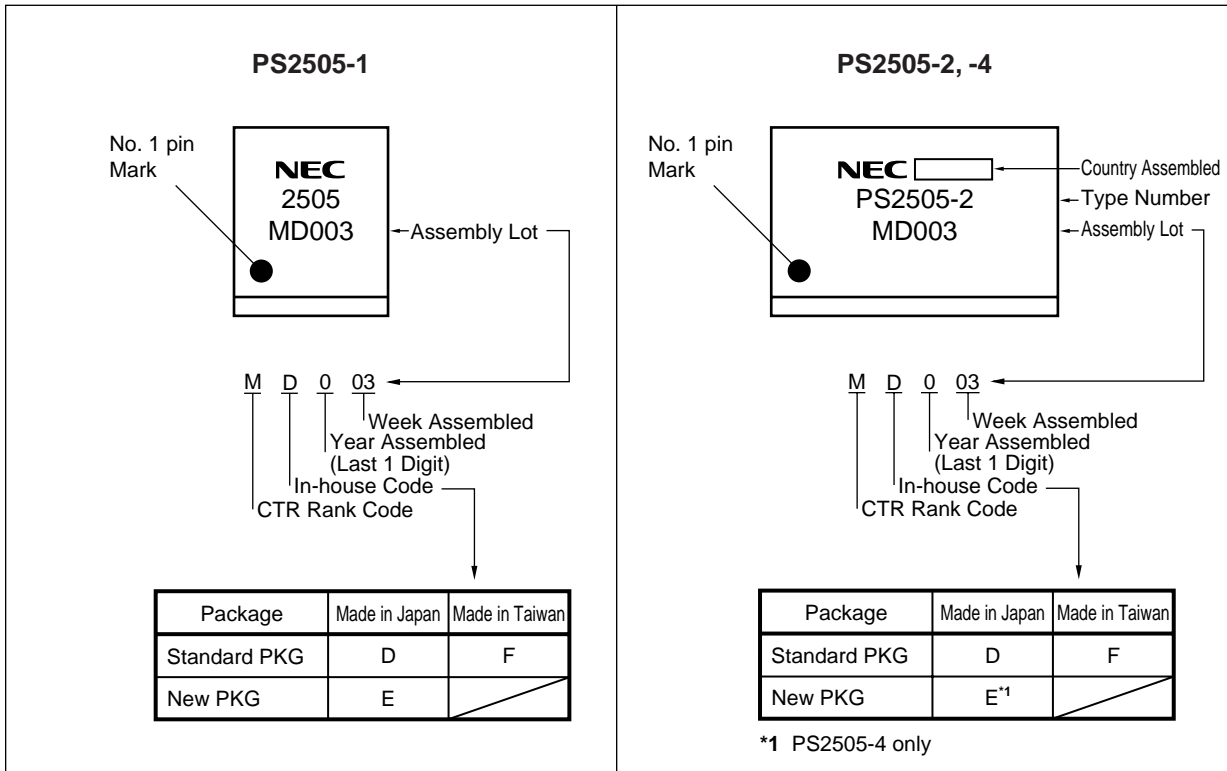


Caution New package 1-ch, 4-ch only

Lead Bending Type



★ MARKING EXAMPLE



★ ORDERING INFORMATION

Part Number	Package	Packing Style	Application Part Number <sup>*1</sup>
PS2505-1	4-pin DIP	Magazine case 100 pcs	PS2505-1
PS2505L-1		Embossed Tape 1 000 pcs/reel	
PS2505L-1-E3			
PS2505L-1-E4			
PS2505L-1-F3			
PS2505L-1-F4		Embossed Tape 2 000 pcs/reel	
PS2505-2	8-pin DIP	Magazine case 45 pcs	PS2505-2
PS2505L-2		Embossed Tape 1 000 pcs/reel	
PS2505L-2-E3			
PS2505L-2-E4			
PS2505-4	16-pin DIP	Magazine case 20 pcs	PS2505-4
PS2505L-4			

\*1 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	
		PS2505-1, PS2505L-1	PS2505-2,-4 PS2505L-2,-4		
Diode	Forward Current (DC)	I <sub>F</sub>	±80		mA
	Power Dissipation Derating	ΔP <sub>D</sub> /°C	1.5	1.2	mW/°C
	Power Dissipation	P <sub>D</sub>	150	120	mW/ch
	Peak Forward Current <sup>*1</sup>	I <sub>FP</sub>	±1		A
Transistor	Collector to Emitter Voltage	V <sub>CEO</sub>	80		V
	Emitter to Collector Voltage	V <sub>ECO</sub>	7		V
	Collector Current	I <sub>C</sub>	50		mA/ch
	Power Dissipation Derating	ΔP <sub>C</sub> /°C	1.5	1.2	mW/°C
	Power Dissipation	P <sub>C</sub>	150	120	mW/ch
Isolation Voltage <sup>*2</sup>	BV	5 000		Vr.m.s.	
Operating Ambient Temperature	T <sub>A</sub>	-55 to +100		°C	
Storage Temperature	T <sub>sig</sub>	-55 to +150		°C	

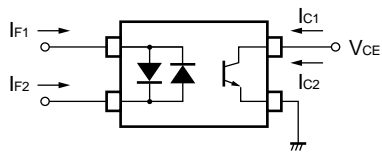
\*1 PW = 100 μs, Duty Cycle = 1 %

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

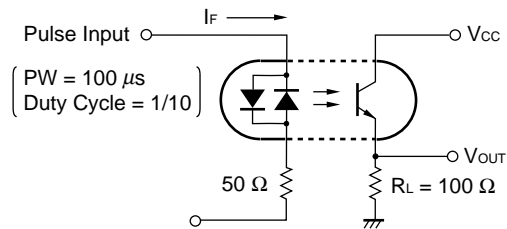
ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C)

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> = 80 V, I <sub>F</sub> = 0 mA			100	nA
Coupled	Current Transfer Ratio (I <sub>c</sub> /I <sub>F</sub> )	CTR	I <sub>F</sub> = ±5 mA, V <sub>CE</sub> = 5 V	80	300	600	%
	CTR Ratio <sup>*1</sup>	CTR1/ CTR2	I <sub>F</sub> = 5 mA, V <sub>CE</sub> = 5 V	0.3	1.0	3.0	
	Collector Saturation Voltage	V <sub>CE(sat)</sub>	I <sub>F</sub> = ±10 mA, I <sub>c</sub> = 2 mA			0.3	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 <sup>*2</sup>	t <sub>r</sub>	V <sub>CC</sub> = 10 V, I <sub>c</sub> = 2 mA, R <sub>L</sub> = 100 Ω		3		μs
	Fall Time <sup>*2</sup>	t <sub>f</sub>			5		

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

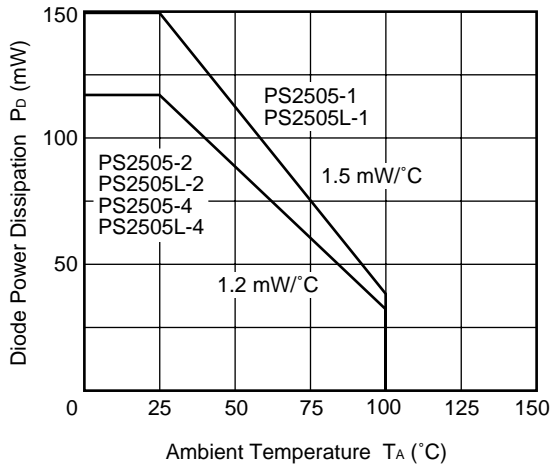


\*2 Test circuit for switching time

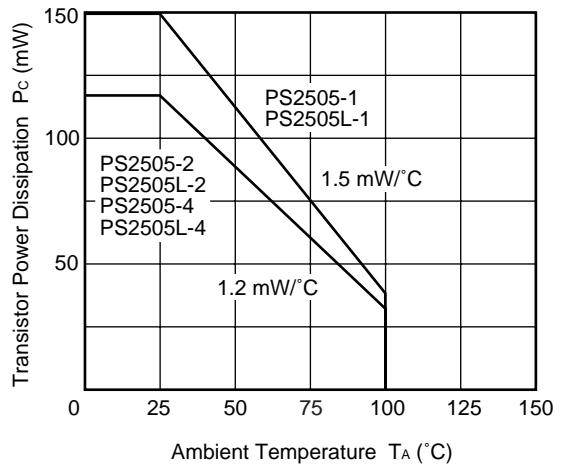


TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C, unless otherwise specified)

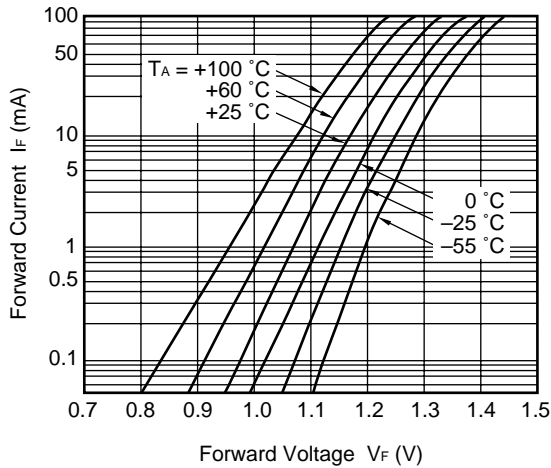
DIODE POWER DISSIPATION vs. AMBIENT TEMPERATURE



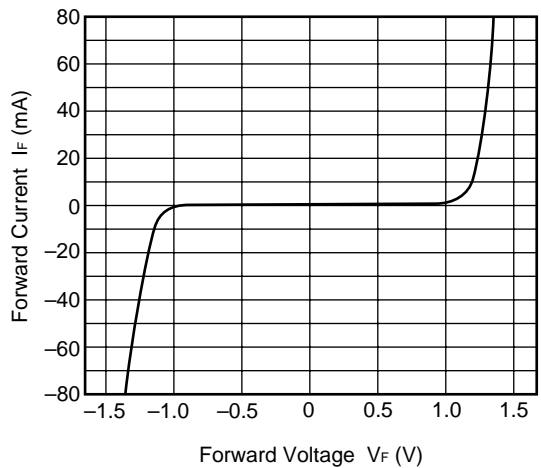
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



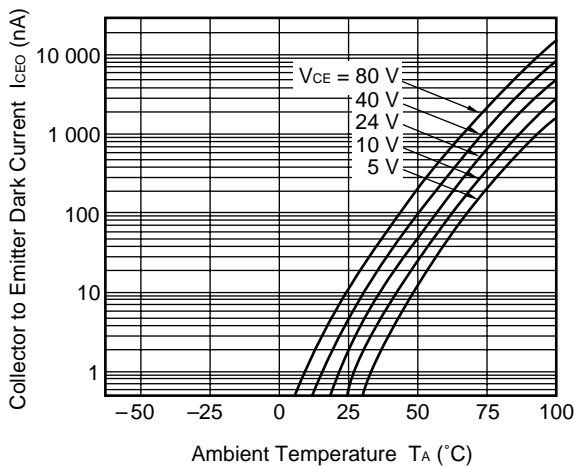
FORWARD CURRENT vs. FORWARD VOLTAGE



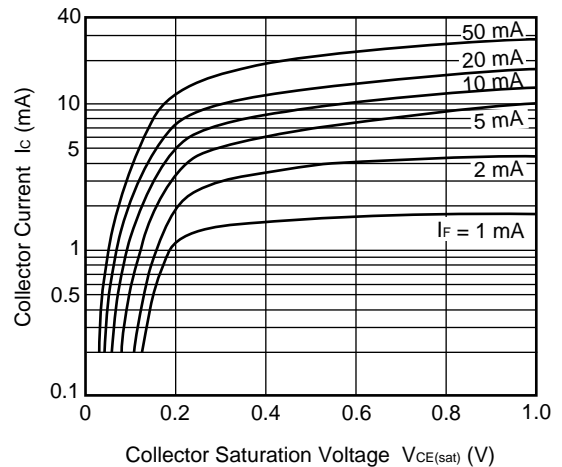
FORWARD CURRENT vs. FORWARD VOLTAGE



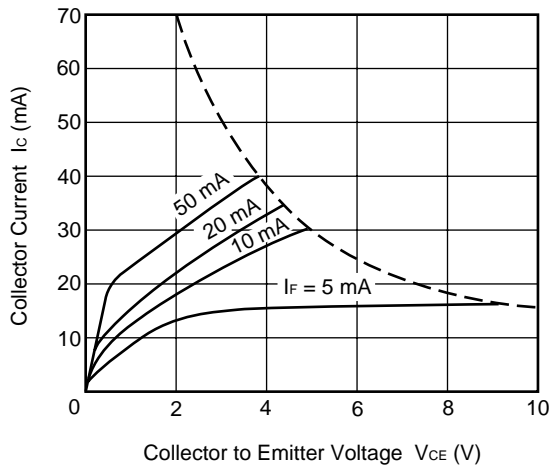
COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE



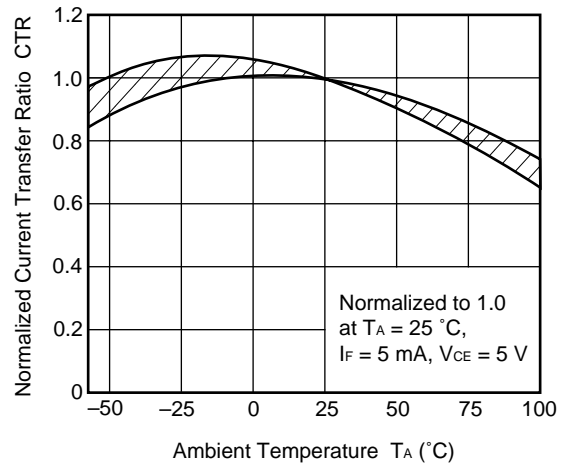
COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE



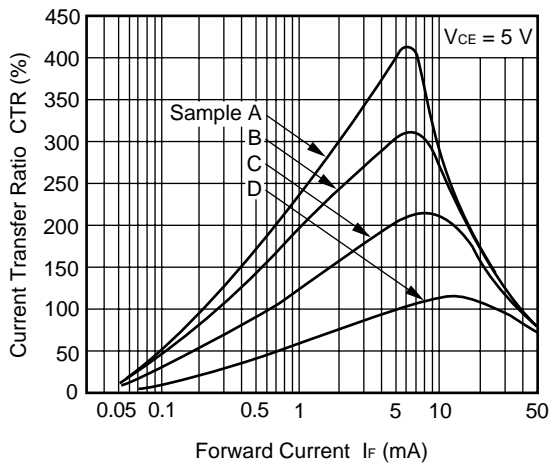
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



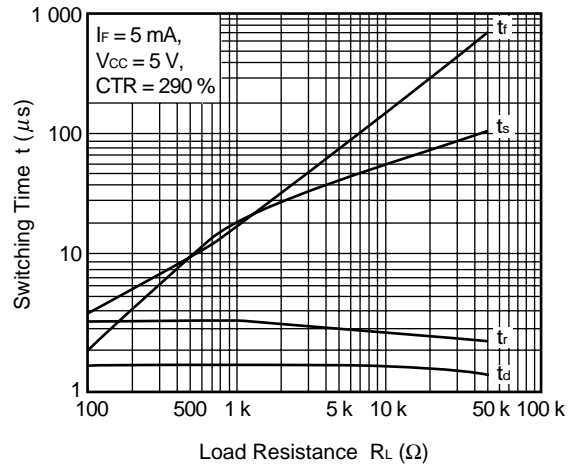
NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE



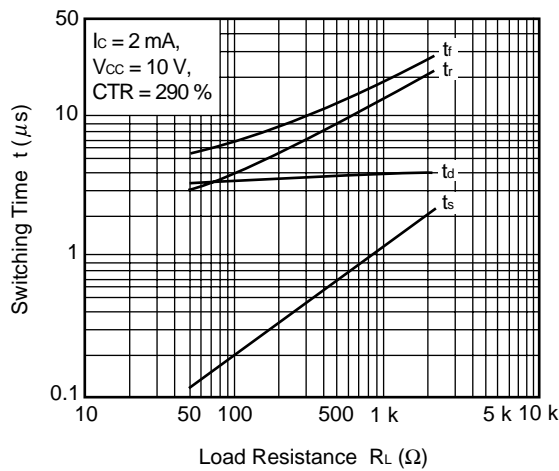
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



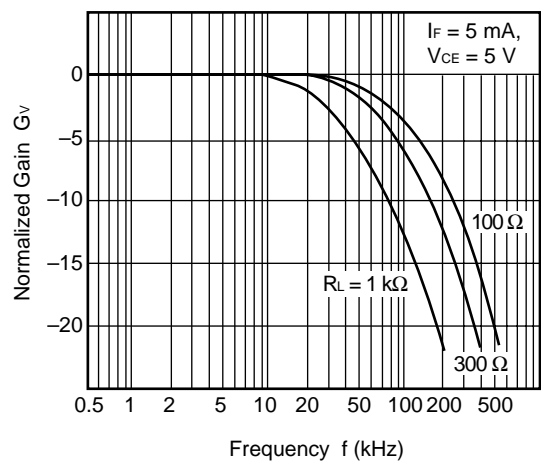
SWITCHING TIME vs. LOAD RESISTANCE



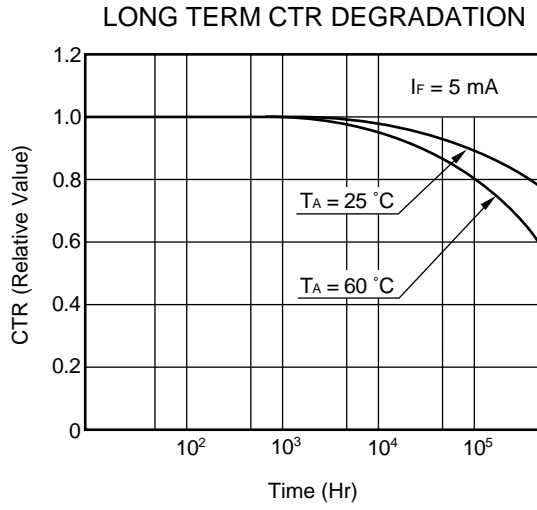
SWITCHING TIME vs. LOAD RESISTANCE



FREQUENCY RESPONSE



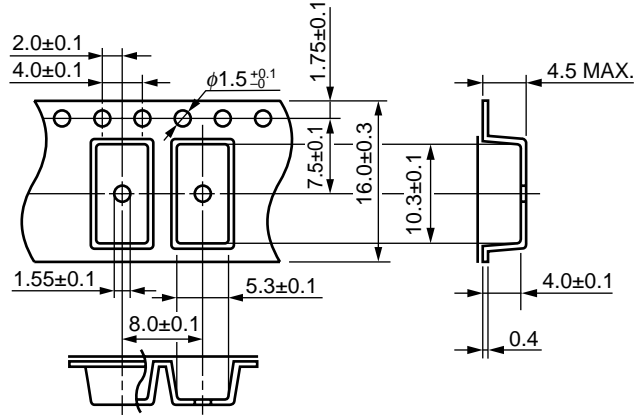




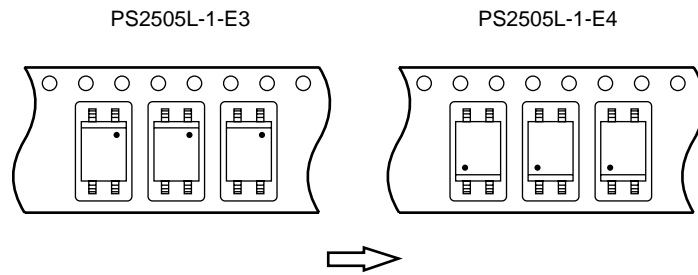
**Remark** The graphs indicate nominal characteristics.

★ TAPING SPECIFICATIONS (UNIT : mm)

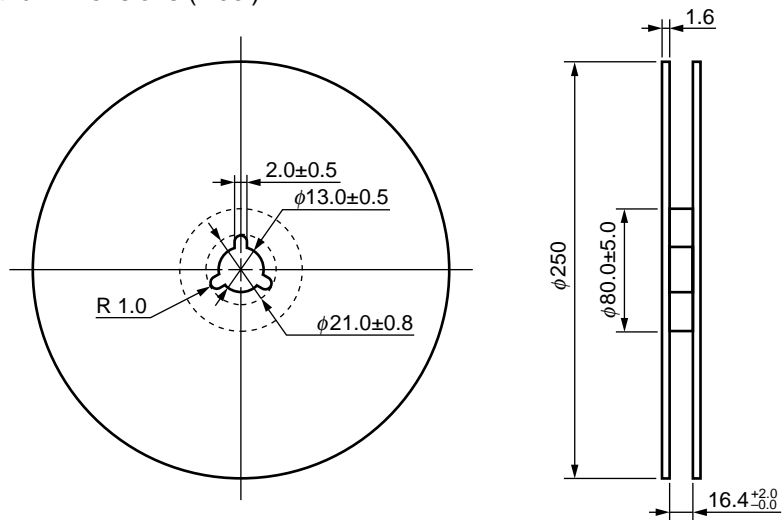
Outline and Dimensions (Tape)



Tape Direction

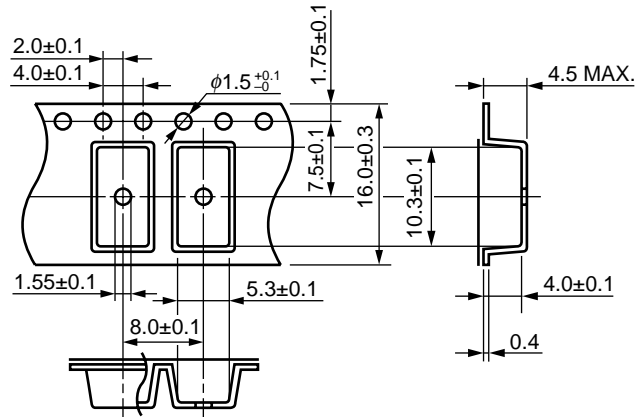


Outline and Dimensions (Reel)

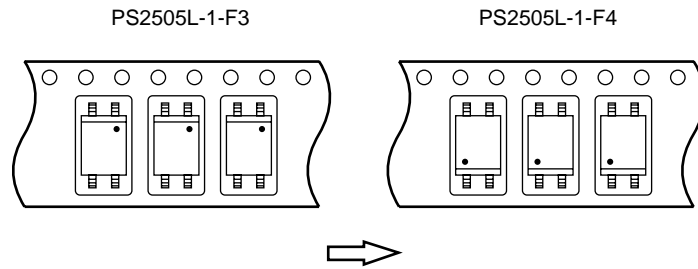


Packing: 1 000 pcs/reel

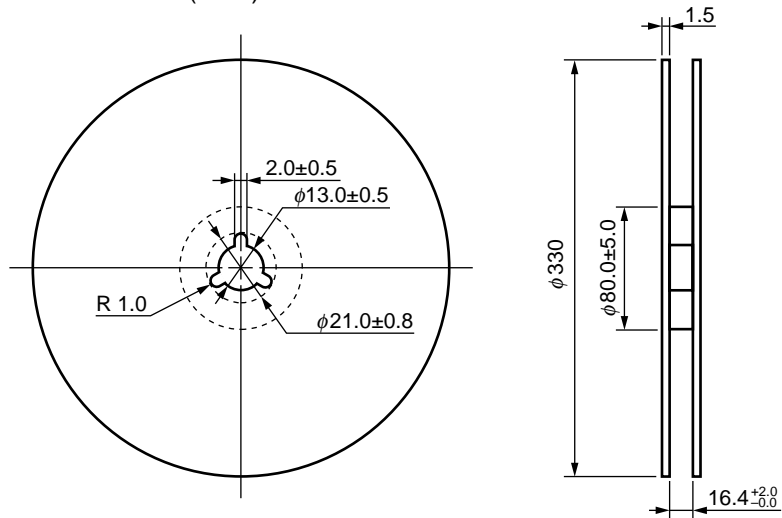
Outline and Dimensions (Tape)



Tape Direction

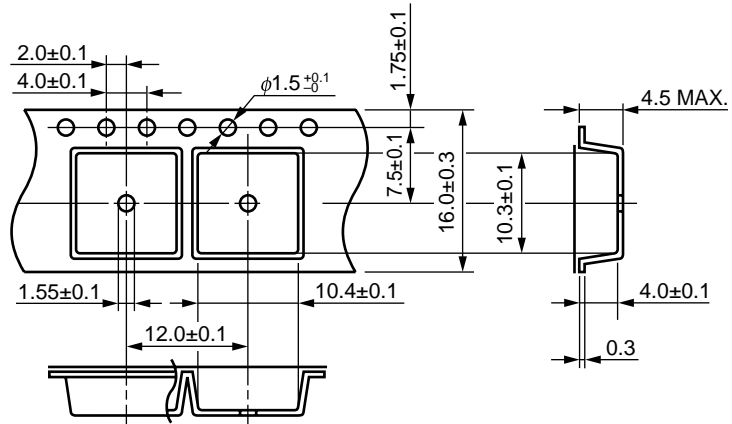


Outline and Dimensions (Reel)

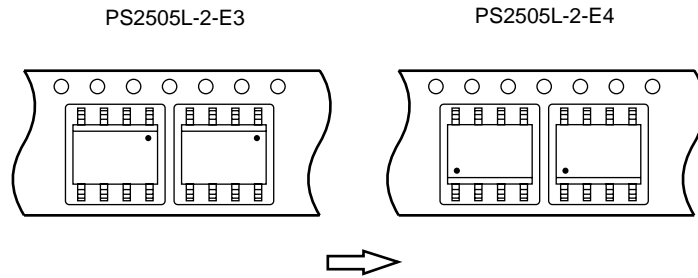


Packing: 2 000 pcs/reel

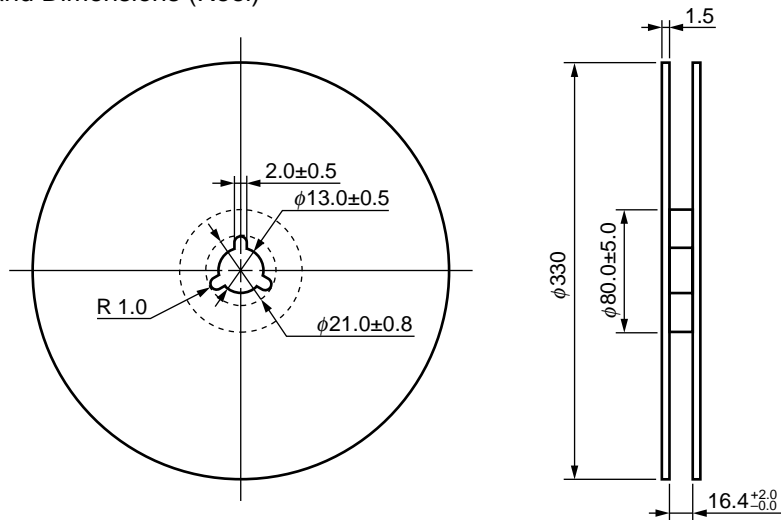
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



Packing: 1 000 pcs/reel

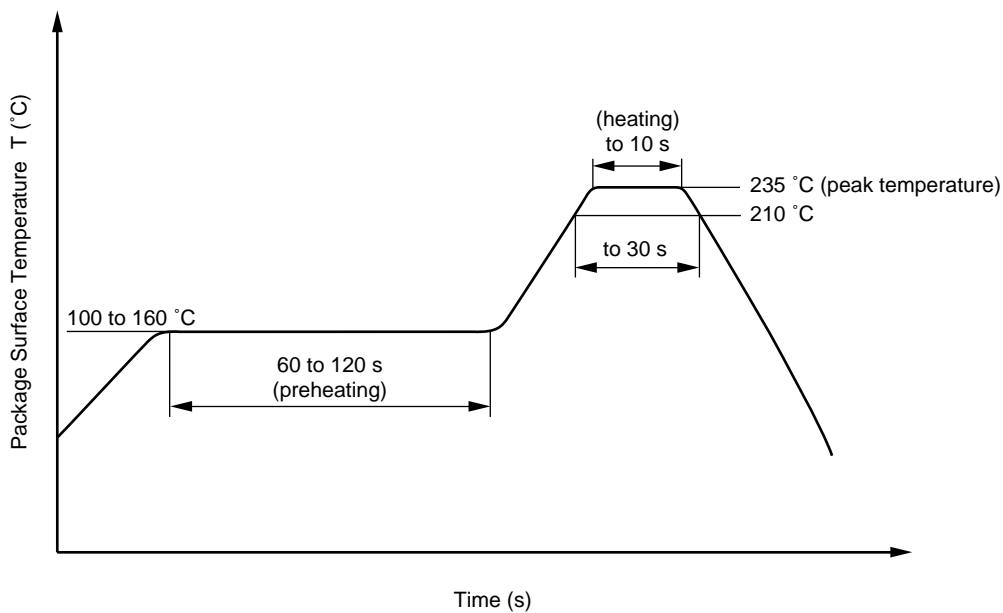
★ NOTES ON HANDLING

1. Recommended soldering conditions

(1) Infrared reflow soldering

- Peak reflow temperature 235 °C or below (package surface temperature)
- Time of temperature higher than 210 °C 30 seconds or less
- 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) Dip soldering

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

[MEMO]

[MEMO]

**CAUTION**

**Within this device there exists GaAs (Gallium Arsenide) material which is a harmful substance if ingested. Please do not under any circumstances break the hermetic seal.**

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