

**HIGH ISOLATION VOLTAGE  
DARLINGTON TRANSISTOR TYPE  
MULTI PHOTOCOUPLER SERIES**

-NEPOC™ Series-

**DESCRIPTION**

The PS2502-1, -2, -4 and PS2502L-1, -2, -4 are optically coupled isolators containing a GaAs light emitting diode and an NPN silicon darlington connected phototransistor.

The PS2502-1, -2, -4 are in a plastic DIP (Dual In-line Package) and the PS2502L-1, -2, -4 are lead bending type (Gull-wing) for surface mount.

**FEATURES**

- 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.)
- Taping product number (PS2502L-1-E3, E4, F3, F4)  
(PS2502L-2-E3, E4)
- UL approved (File No. E72422 (S) )

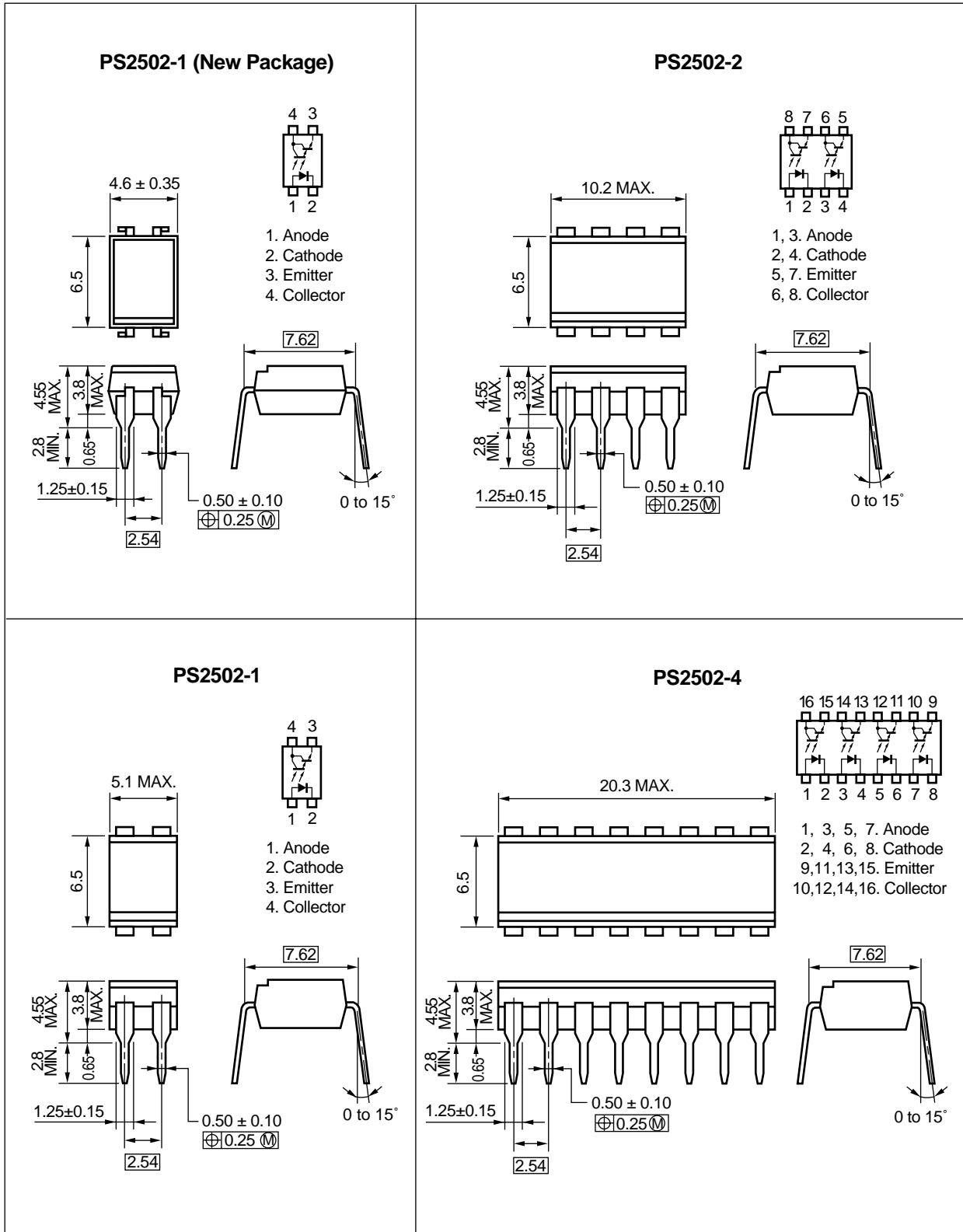
**APPLICATIONS**

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

The information in this document is subject to change without notice.

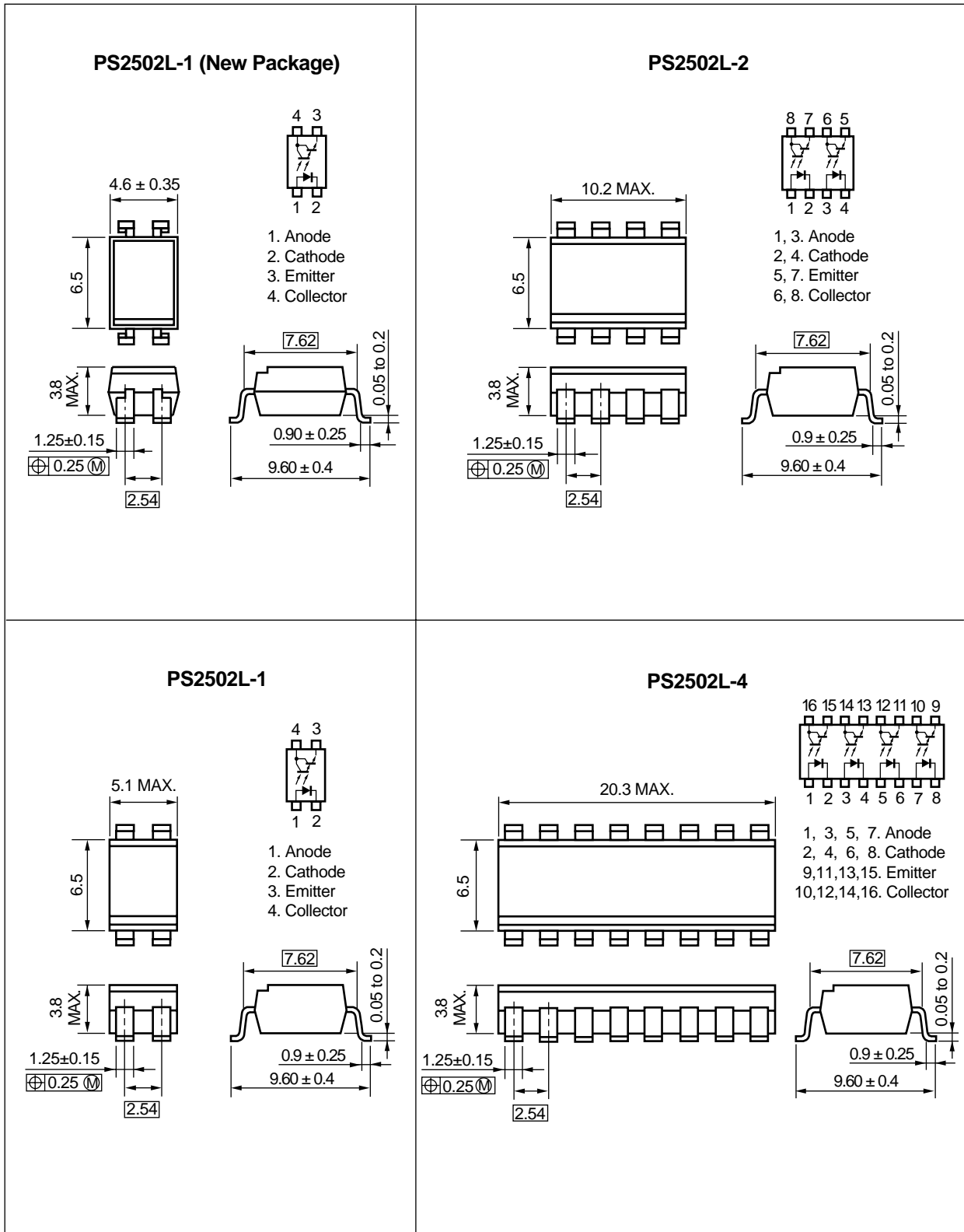
★ PACKAGE DIMENSIONS (in millimeters)

DIP Type



Caution New package 1-ch only

Lead Bending Type



Caution New package 1-ch only

**ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25 °C, unless otherwise specified)**

Parameter	Symbol	Ratings		Unit	
		PS2502-1, PS2502L-1	PS2502-2,-4 PS2502L-2,-4		
Diode	Reverse Voltage	V <sub>R</sub>	6		V
	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>	40		V
	Emitter to Collector Voltage	V <sub>ECO</sub>	6		V
	Collector Current	I <sub>C</sub>	200	160	mA/ch
	Power Dissipation Derating	ΔP <sub>C</sub> /°C	2.0	1.6	mW/°C
	Power Dissipation	P <sub>C</sub>	200	160	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>stg</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
	Reverse Current	I <sub>R</sub>	V <sub>R</sub> = 5 V			5	μA
	Terminal Capacitance	C <sub>t</sub>	V = 0 V, f = 1.0 MHz		50		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 <sup>*1</sup>	CTR	I <sub>F</sub> = 1 mA, V <sub>CE</sub> = 2 V		200	2 000	%
	Collector Saturation Voltage	V <sub>CE(sat)</sub>	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		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			100	μs
	Fall Time <sup>*2</sup>	t <sub>f</sub>				100	

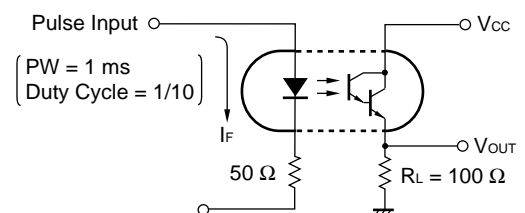
\*1 CTR rank (only PS2502-1, PS2502L-1)

K : 2 000 to (%)

L : 700 to 3 400 (%)

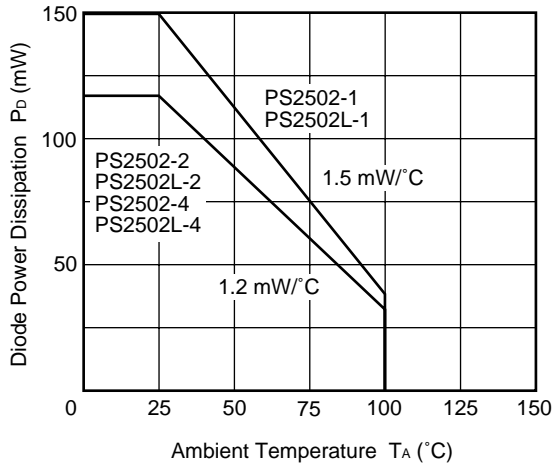
M : 200 to 1 000 (%)

\*2 Test circuit for switching time

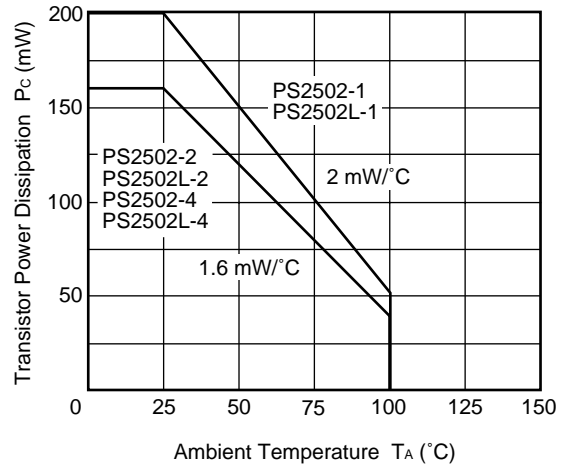


★ TYPICAL CHARACTERISTICS ( $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise specified)

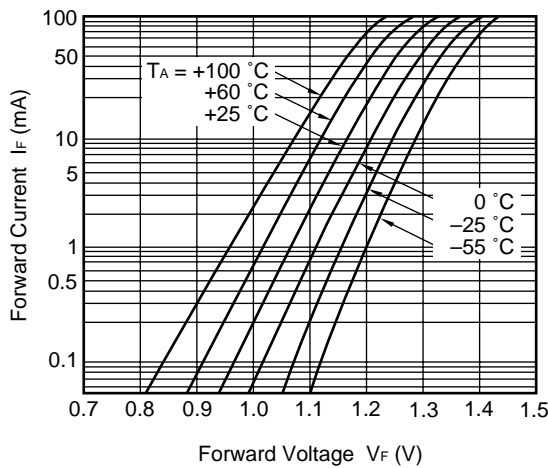
DIODE POWER DISSIPATION vs. AMBIENT TEMPERATURE



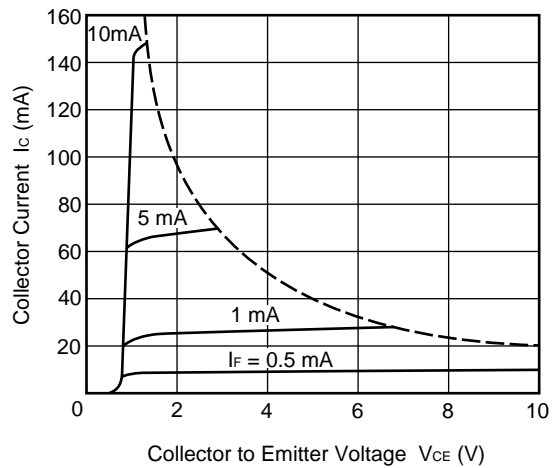
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



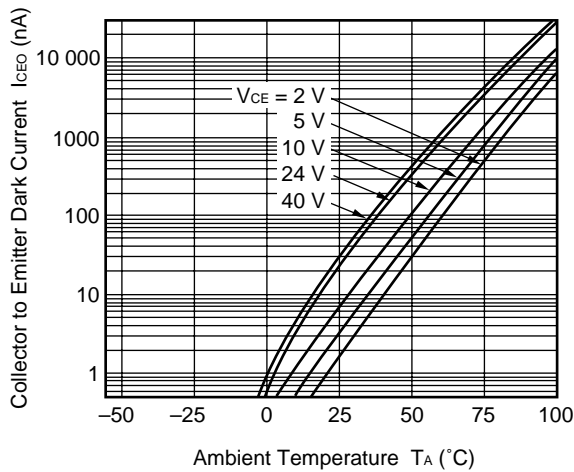
FORWARD CURRENT vs. FORWARD VOLTAGE



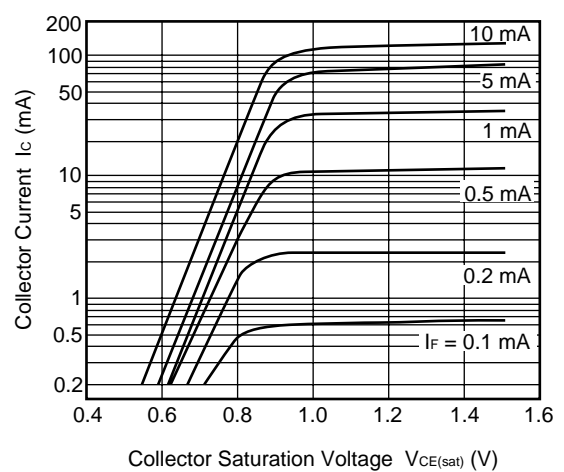
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



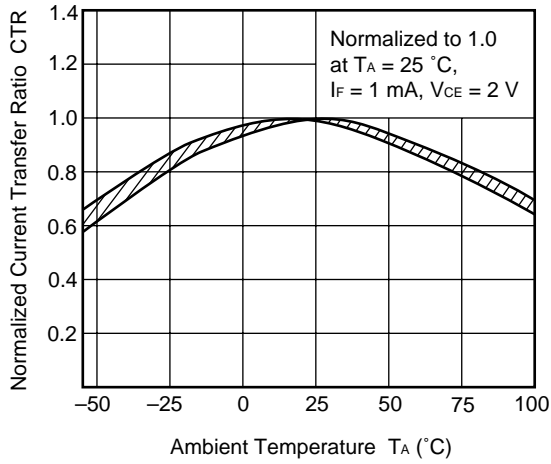
COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE



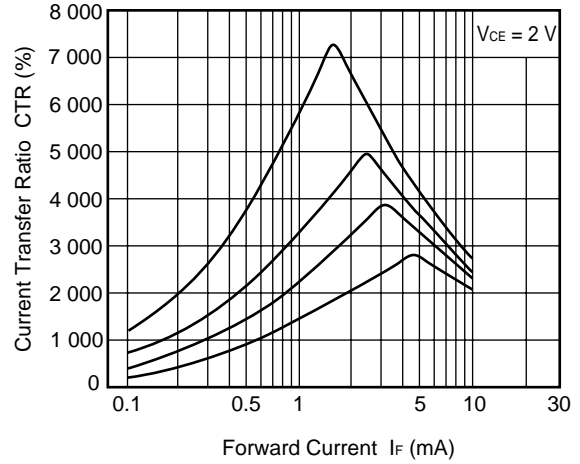
COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE



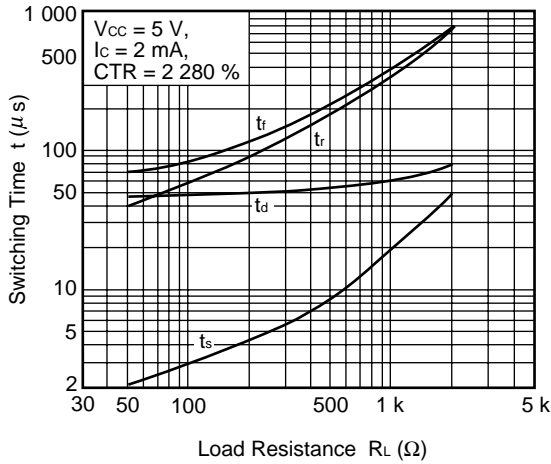
NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE



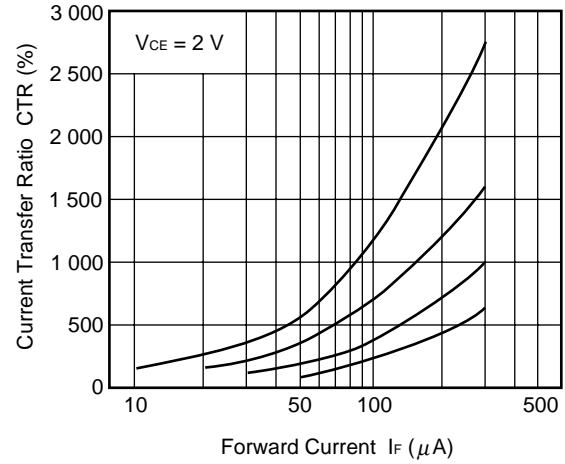
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



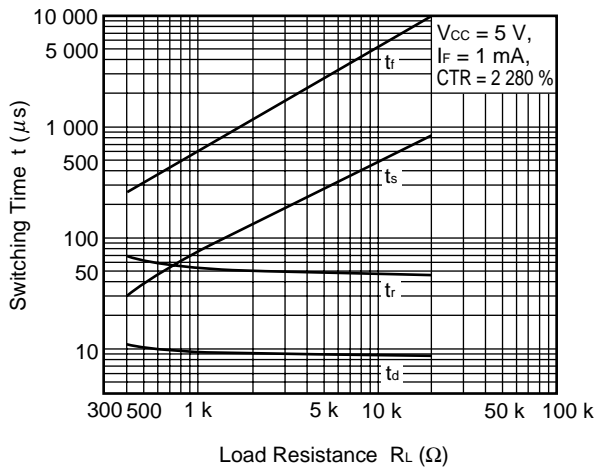
SWITCHING TIME vs. LOAD RESISTANCE



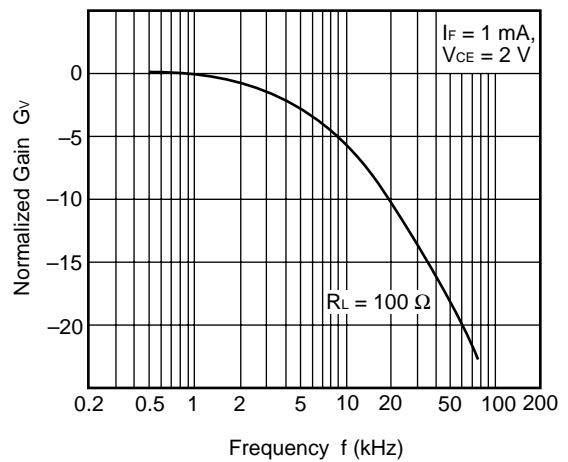
CURRENT TRANSFER RATIO vs. FORWARD CURRENT

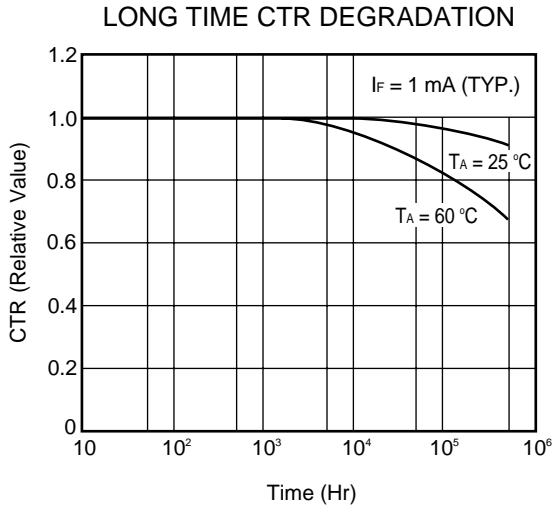


SWITCHING TIME vs. LOAD RESISTANCE



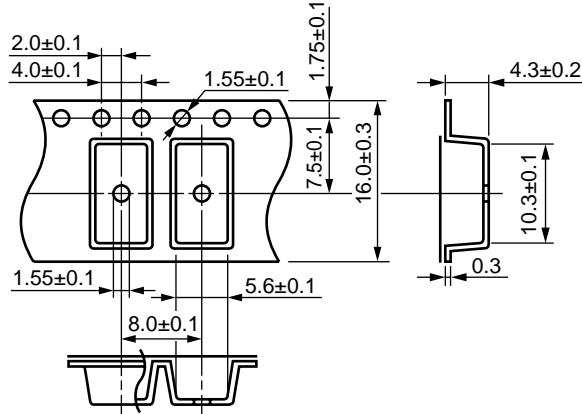
FREQUENCY RESPONSE



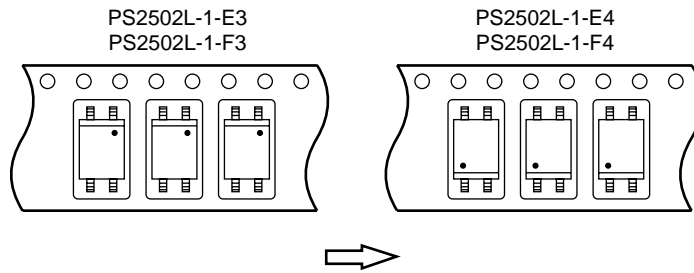


★ TAPING SPECIFICATIONS (in millimeters)

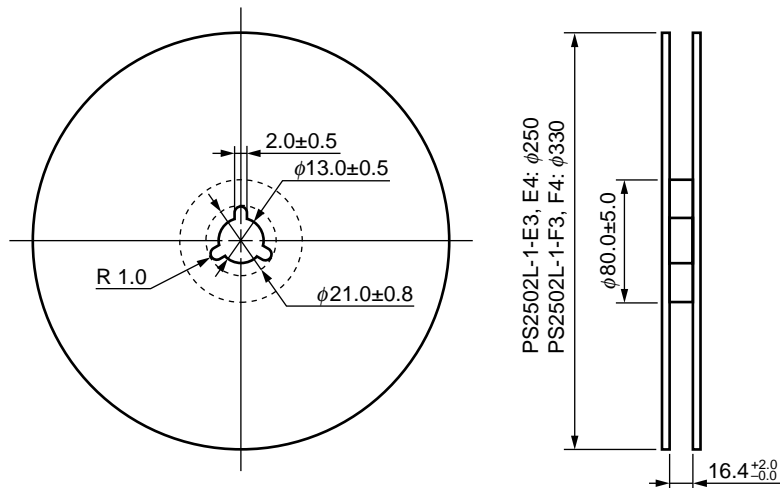
Outline and Dimensions (Tape)



Taping Direction



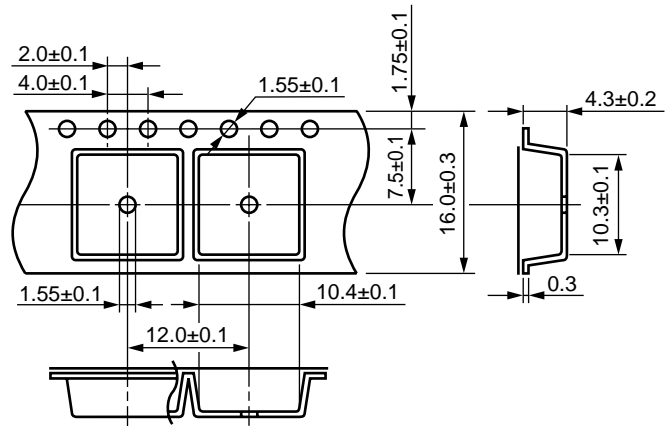
Outline and Dimensions (Reel)



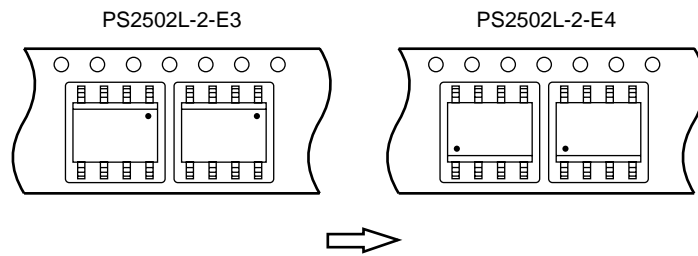
Packing: PS2502L-1-E3, E4 1 000 pcs/reel  
 PS2502L-1-F3, F4 2 000 pcs/reel



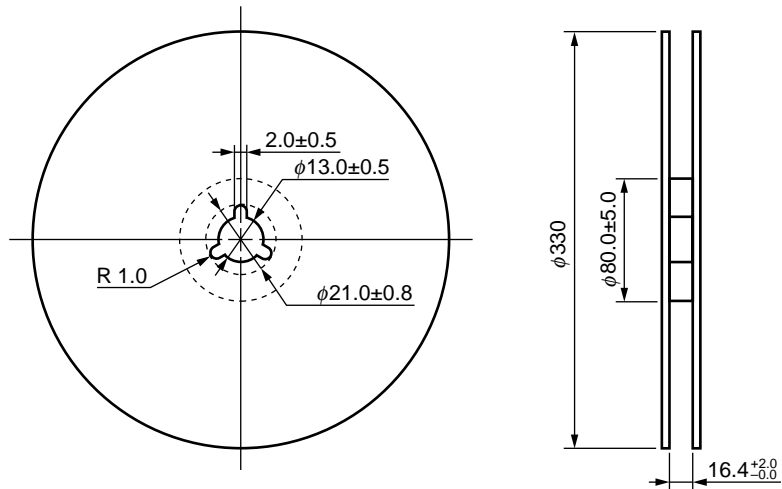
Outline and Dimensions (Tape)



Taping Direction



Outline and Dimensions (Reel)



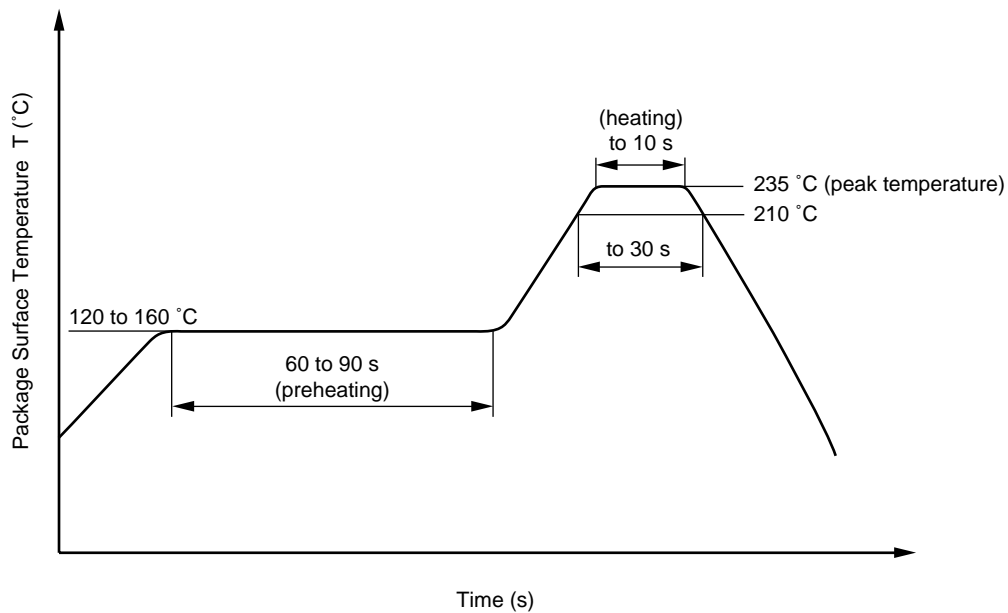
Packing: 1 000 pcs/reel

★ RECOMMENDED SOLDERING CONDITIONS

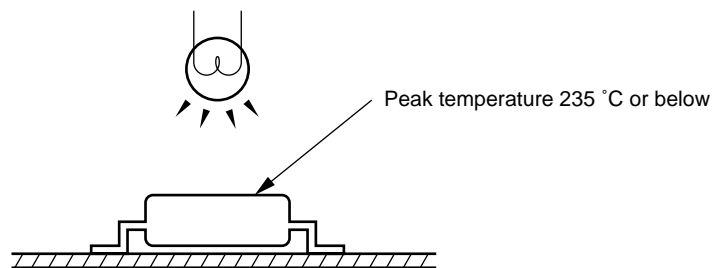
(1) Infrared reflow soldering

- Peak reflow temperature 235 °C (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



**Caution** Please avoid to removed the residual flux by water after the first reflow processes.



(2) Dip soldering

- Temperature 260 °C or below (molten solder temperature)
- Time 10 seconds or less
- Number of times One
- Flux Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt % is recommended.)

[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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Anti-radioactive design is not implemented in this product.