DATA SHEET

NEC

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 Vr.m.s.)
- High collector to emitter voltage (V_{CEO} = 80 V)
- High-speed switching (t_r = 3 μs TYP., t_f = 5 μs TYP.)
- Ordering number of taping product: PS2505L-1-E3, E4, F3, F4, PS2505L-2-E3, E4
- UL approved: File No. E72422 (S)

APPLICATIONS

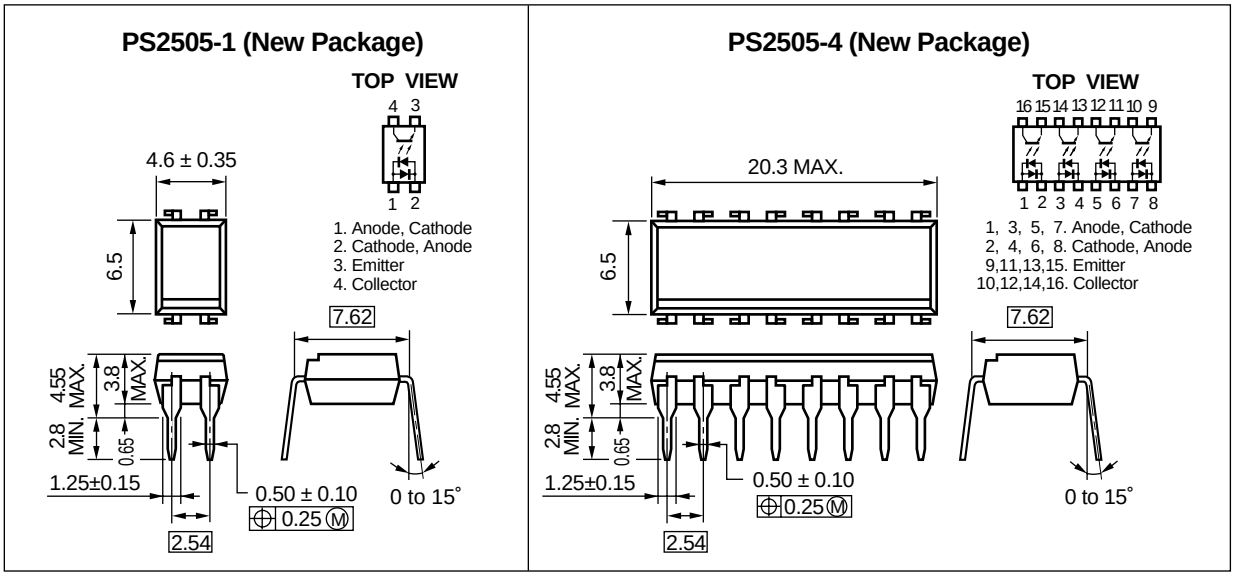
- Power supply
- Telephone/FAX.
- FA/OA equipment
- Programmable logic controller

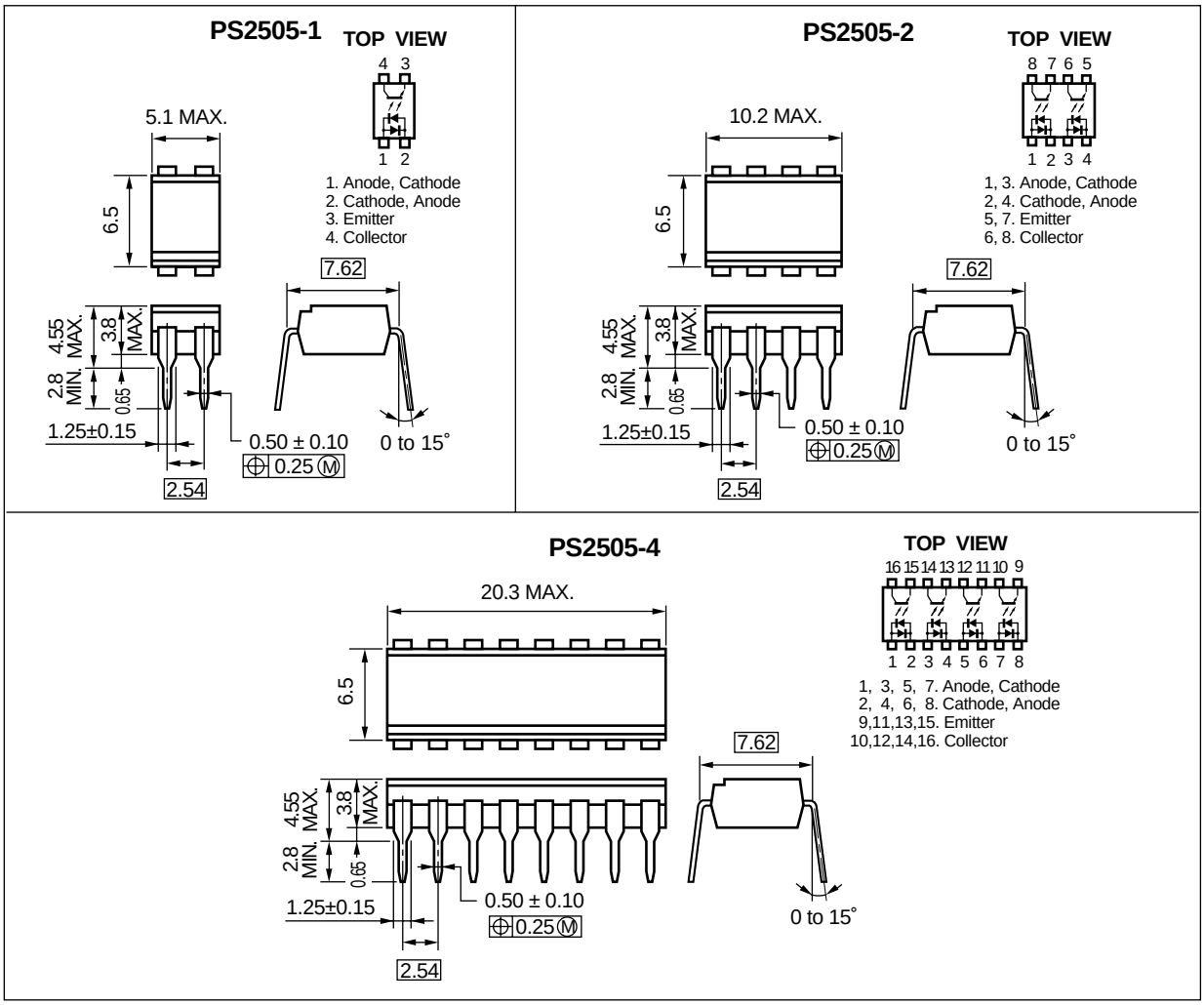
Document No. P10958EJ6V0DS00 (6th edition)
Date Published April 1998 NS CP(K)
Printed in Japan

The mark ★ shows major revised points.

★ **PACKAGE DIMENSIONS (in millimeters)**

DIP Type

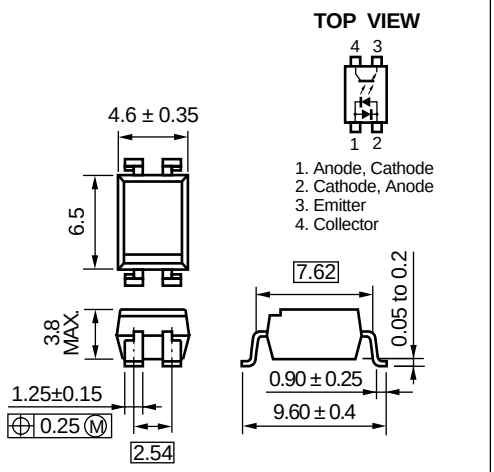




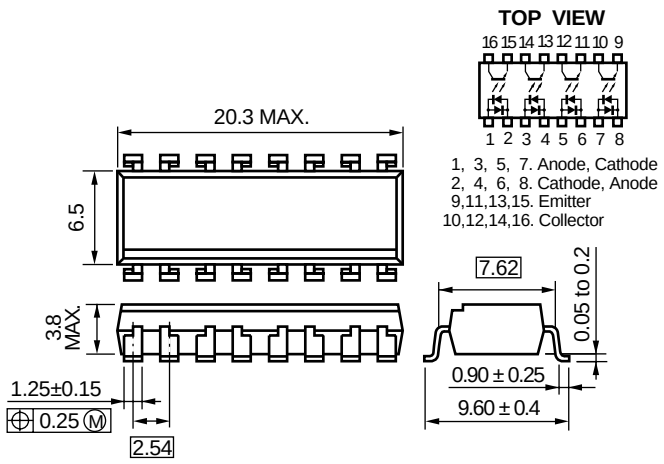
Caution New package 1-ch, 4-ch only

Lead Bending Type

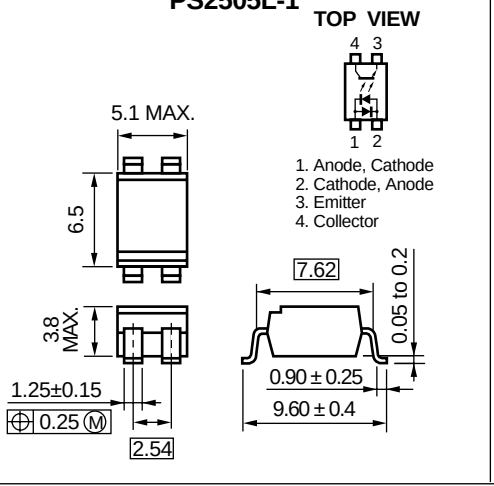
PS2505L-1 (New Package)



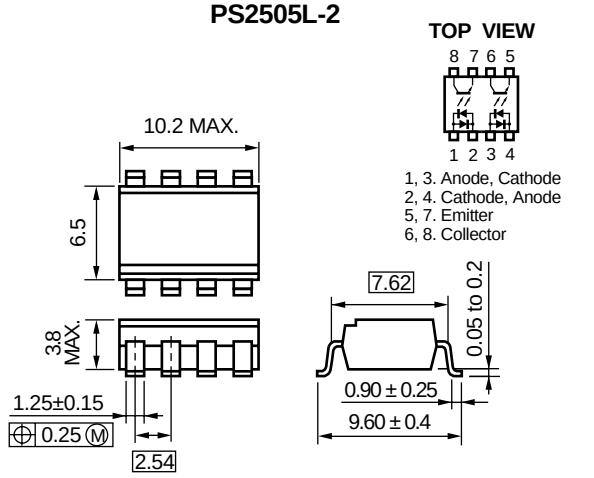
PS2505L-4 (New Package)



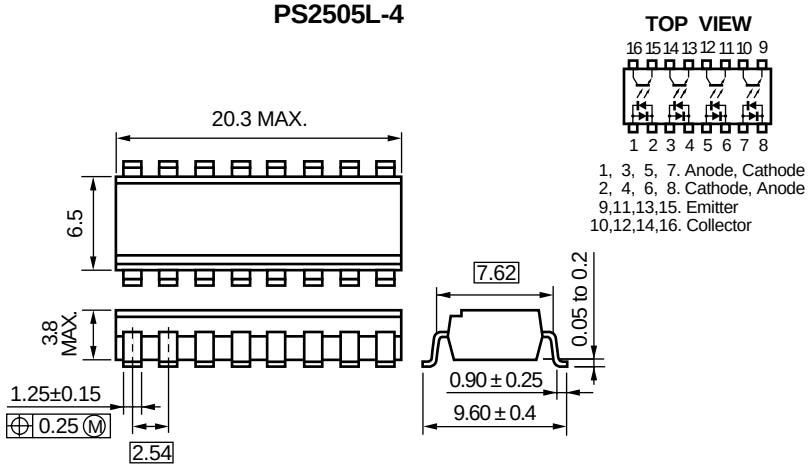
PS2505L-1



PS2505L-2



PS2505L-4



Caution New package 1-ch, 4-ch only

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

Parameter		Symbol	Ratings		Unit
			PS2505-1, PS2505L-1	PS2505-2,-4 PS2505L-2,-4	
Diode	Forward Current (DC)	I_F	±80		mA
	Power Dissipation Derating	ΔP_D/°C	1.5	1.2	mW/°C
	Power Dissipation	P_D	150	120	mW/ch
	Peak Forward Current *1	I_{FP}	±1		A
Transistor	Collector to Emitter Voltage	V_{CEO}	80		V
	Emitter to Collector Voltage	V_{ECO}	7		V
	Collector Current	I_C	50		mA/ch
	Power Dissipation Derating	ΔP_C/°C	1.5	1.2	mW/°C
	Power Dissipation	P_C	150	120	mW/ch
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

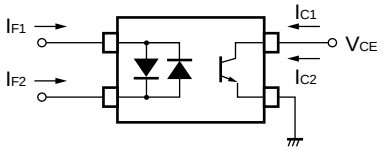
***1** PW = 100 μs, Duty Cycle = 1 %

***2** AC voltage for 1 minute at T_A = 25 °C, RH = 60 % between input and output

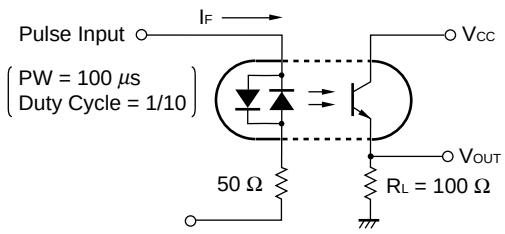
ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

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} = 80 V, I_F = 0 mA			100	nA
Coupled	Current Transfer Ratio (I_C/I_F)	CTR	I_F = ±5 mA, V_{CE} = 5 V	80	300	600	%
	CTR Ratio *1	CTR1/ CTR2	I_F = 5 mA, V_{CE} = 5 V	0.3	1.0	3.0	
	Collector Saturation Voltage	$V_{CE (sat)}$	I_F = ±10 mA, I_C = 2 mA			0.3	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		3		μs
	Fall Time *2	t_f			5		

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

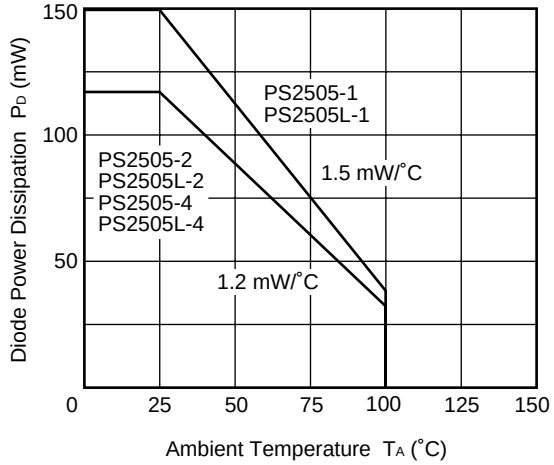


***2** Test circuit for switching time

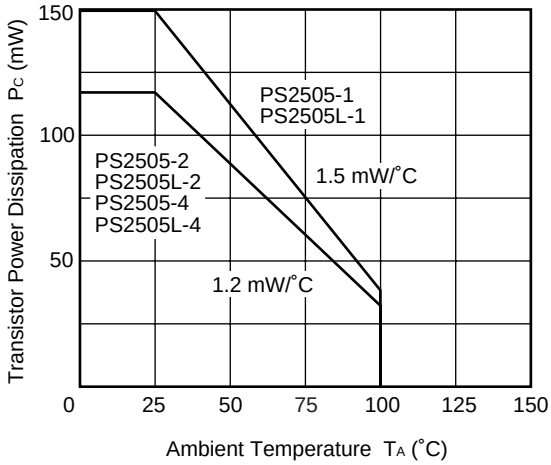


TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise specified)

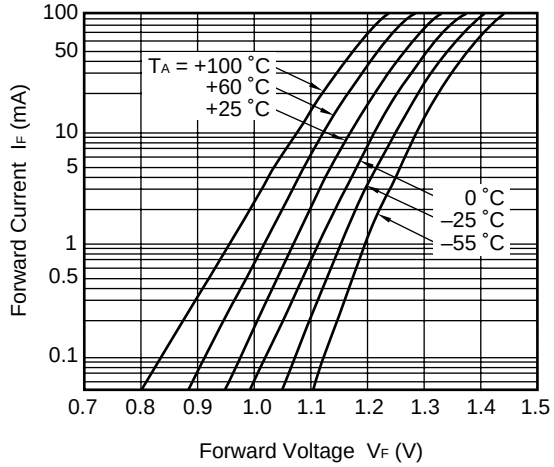
DIODE POWER DISSIPATION vs. AMBIENT TEMPERATURE



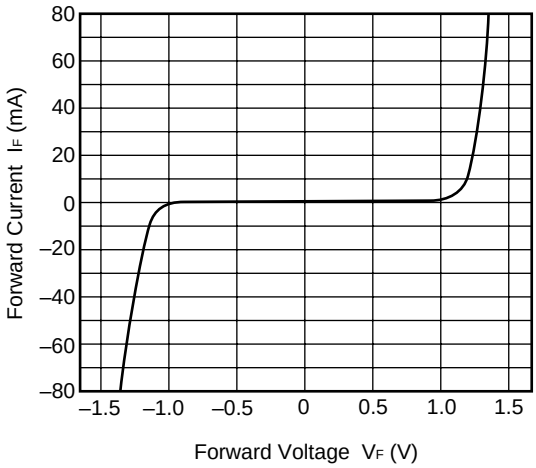
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



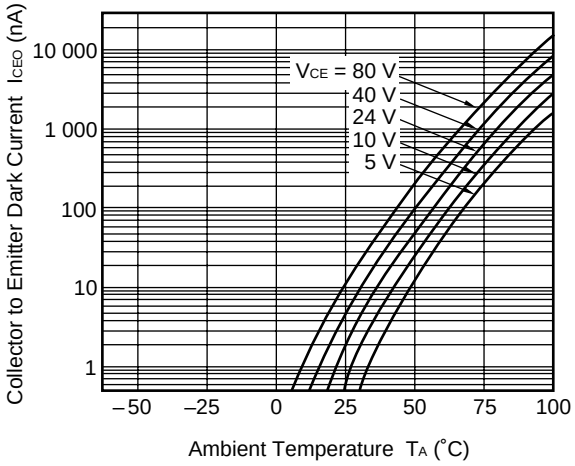
FORWARD CURRENT vs. FORWARD VOLTAGE



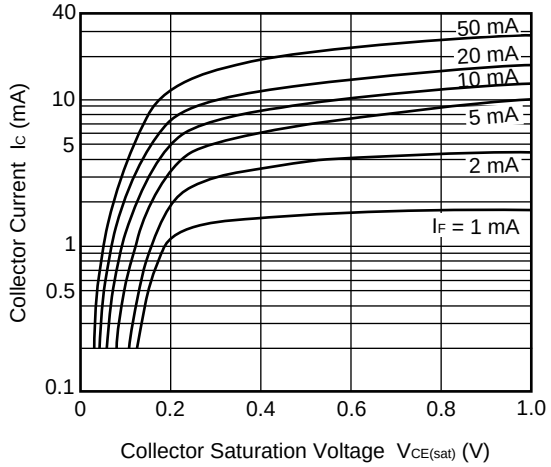
FORWARD CURRENT vs. FORWARD VOLTAGE



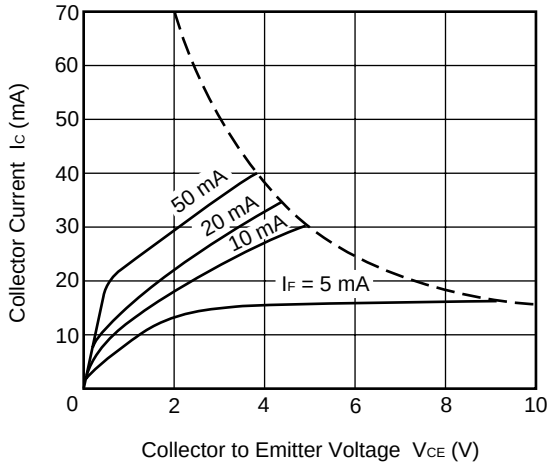
COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE



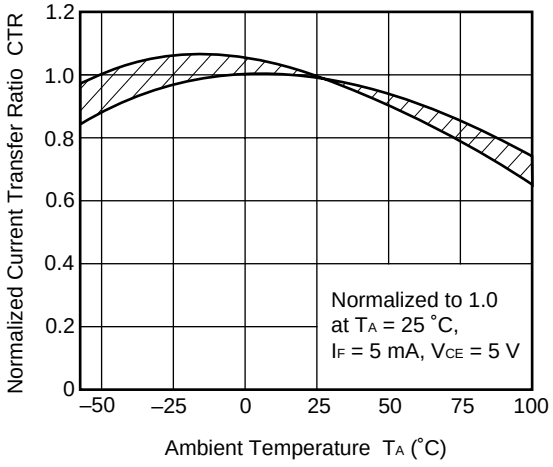
COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE



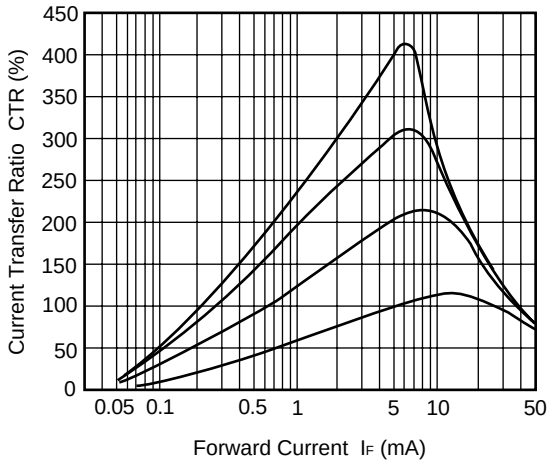
COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE



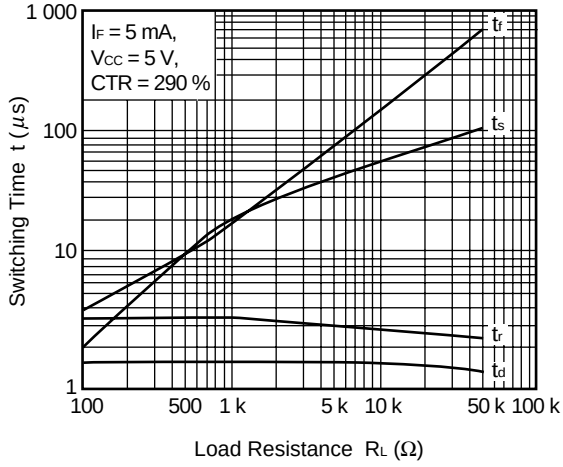
NORMALIZED CURRENT TRANSFER
RATIO vs. AMBIENT TEMPERATURE



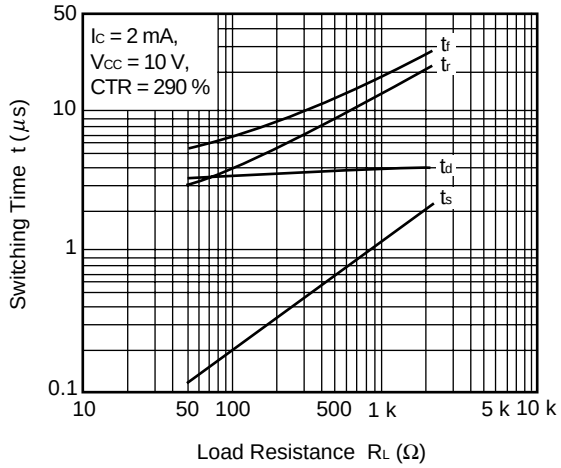
CURRENT TRANSFER RATIO vs.
FORWARD CURRENT



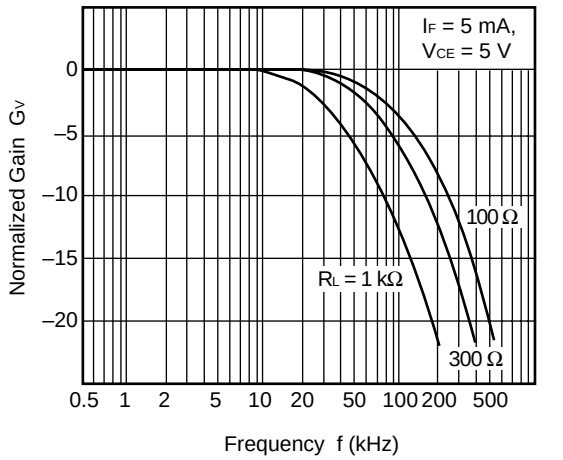
SWITCHING TIME vs.
LOAD RESISTANCE



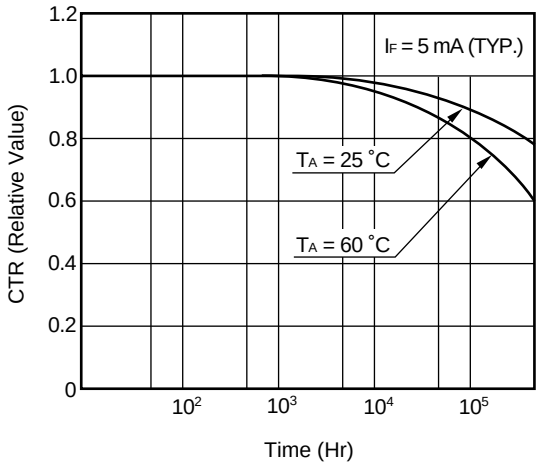
SWITCHING TIME vs.
LOAD RESISTANCE



FREQUENCY RESPONSE



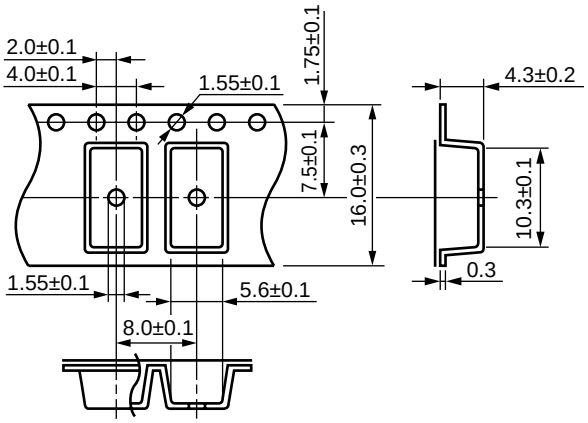
LONG TERM CTR DEGRADATION



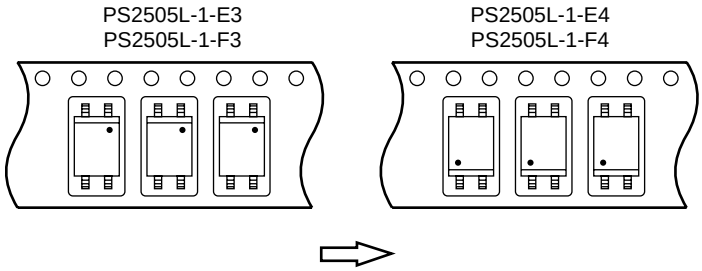
Remark The graphs indicate nominal characteristics.

TAPING SPECIFICATIONS (in millimeters)

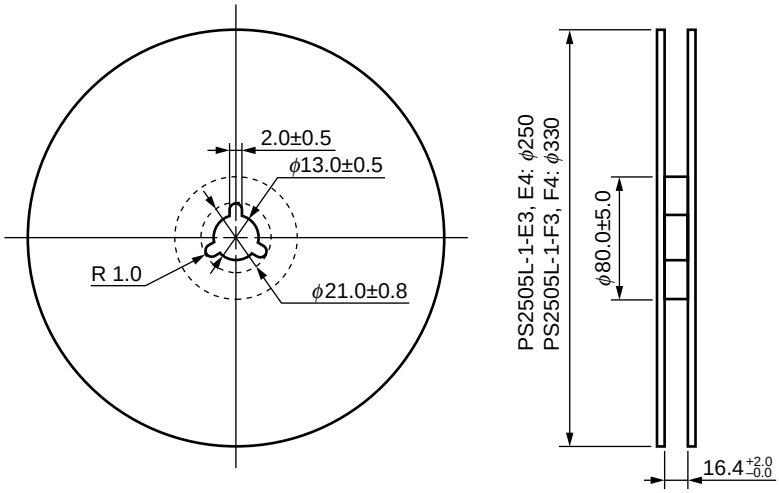
Outline and Dimensions (Tape)



Tape Direction

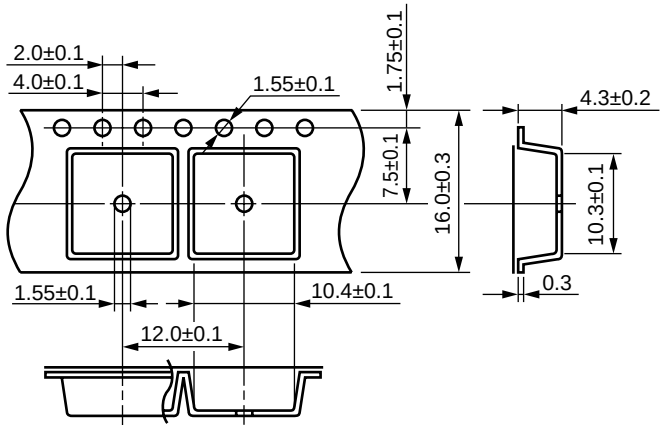


Outline and Dimensions (Reel)

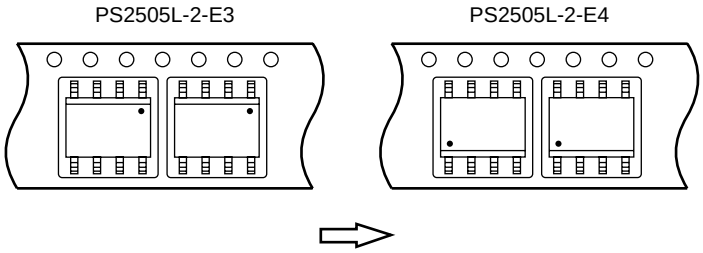


Packing: PS2505L-1-E3, E4 1 000 pcs/reel
PS2505L-1-F3, F4 2 000 pcs/reel

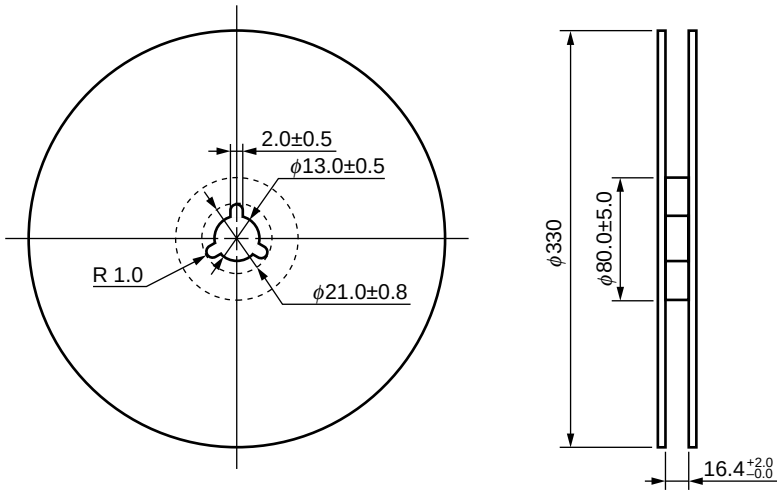
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



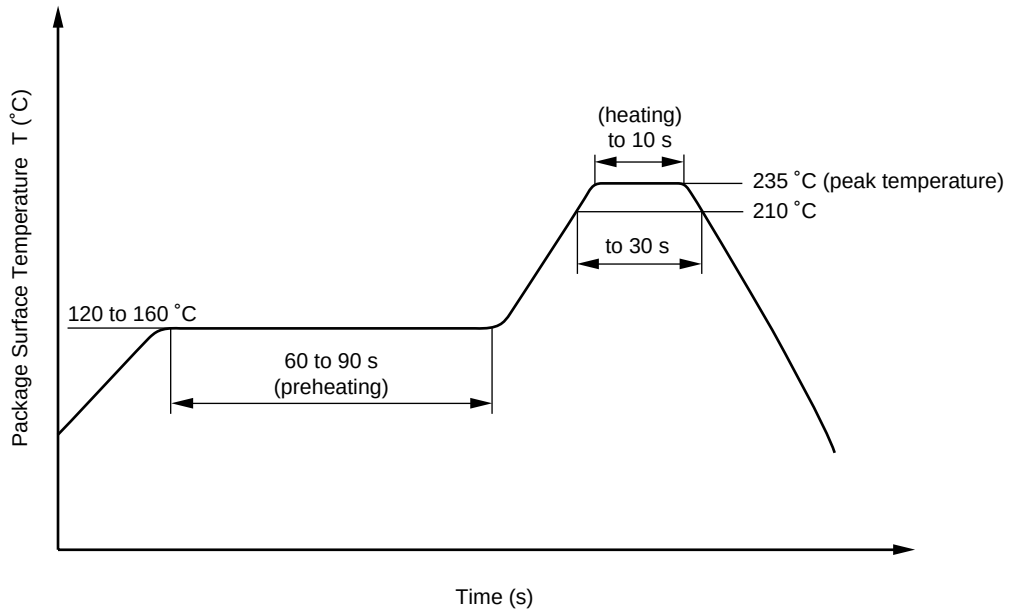
Packing: 1 000 pcs/reel

RECOMMENDED SOLDERING CONDITIONS

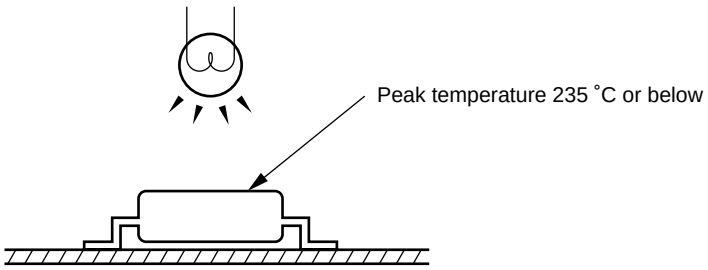
(1) Infrared reflow soldering

- 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 Avoid removing the residual flux with chlorine-based cleaning solvent after a reflow process.



(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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M4 96.5