DATA SHEET

NEC

PHOTOCOUPLER

PS2506-1,-2,-4, PS2506L-1,-2,-4

HIGH ISOLATION VOLTAGE AC INPUT, DARLINGTON TRANSISTOR TYPE MULTI PHOTOCOUPLER SERIES

–NEPOC™ Series–

DESCRIPTION

The PS2506-1, -2, -4 and PS2506L-1, -2, -4 are optically coupled isolators containing a GaAs light emitting diode and an NPN silicon darlington connected phototransistor.

The PS2506-1, -2, -4 are in a plastic DIP (Dual In-line Package) and the PS2506L-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 current transfer ratio (CTR = 2 000 % TYP.)
- High-speed switching (t_r, t_f = 100 μs TYP.)
- Ordering number of tape product: PS2506L-1-E3, E4, F3, F4, PS2506L-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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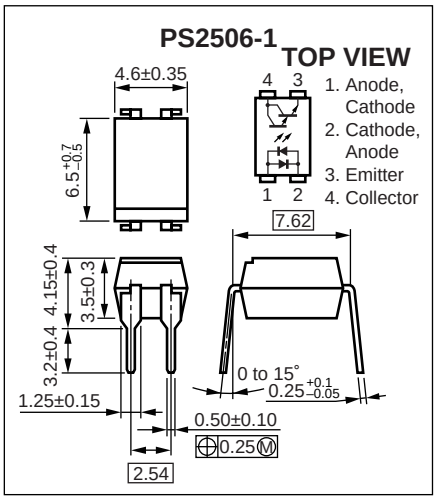
Date Published March 2001 NS CP(K)
Printed in Japan

The mark ★ shows major revised points.

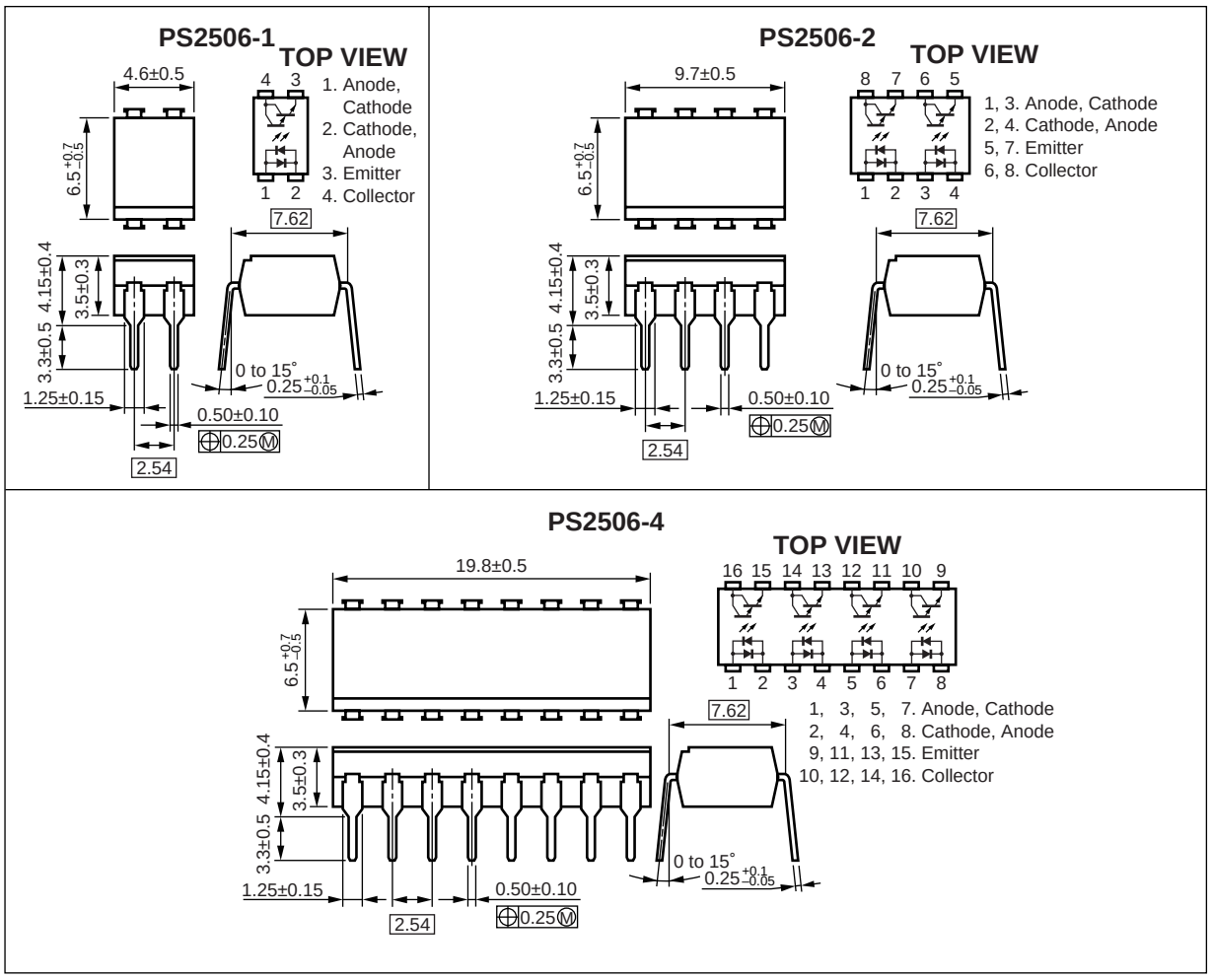
★ PACKAGE DIMENSIONS (UNIT : mm)

DIP Type (New package)

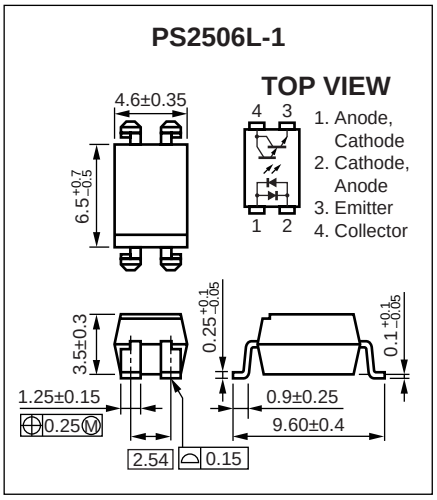


Caution New package 1-ch only

DIP Type

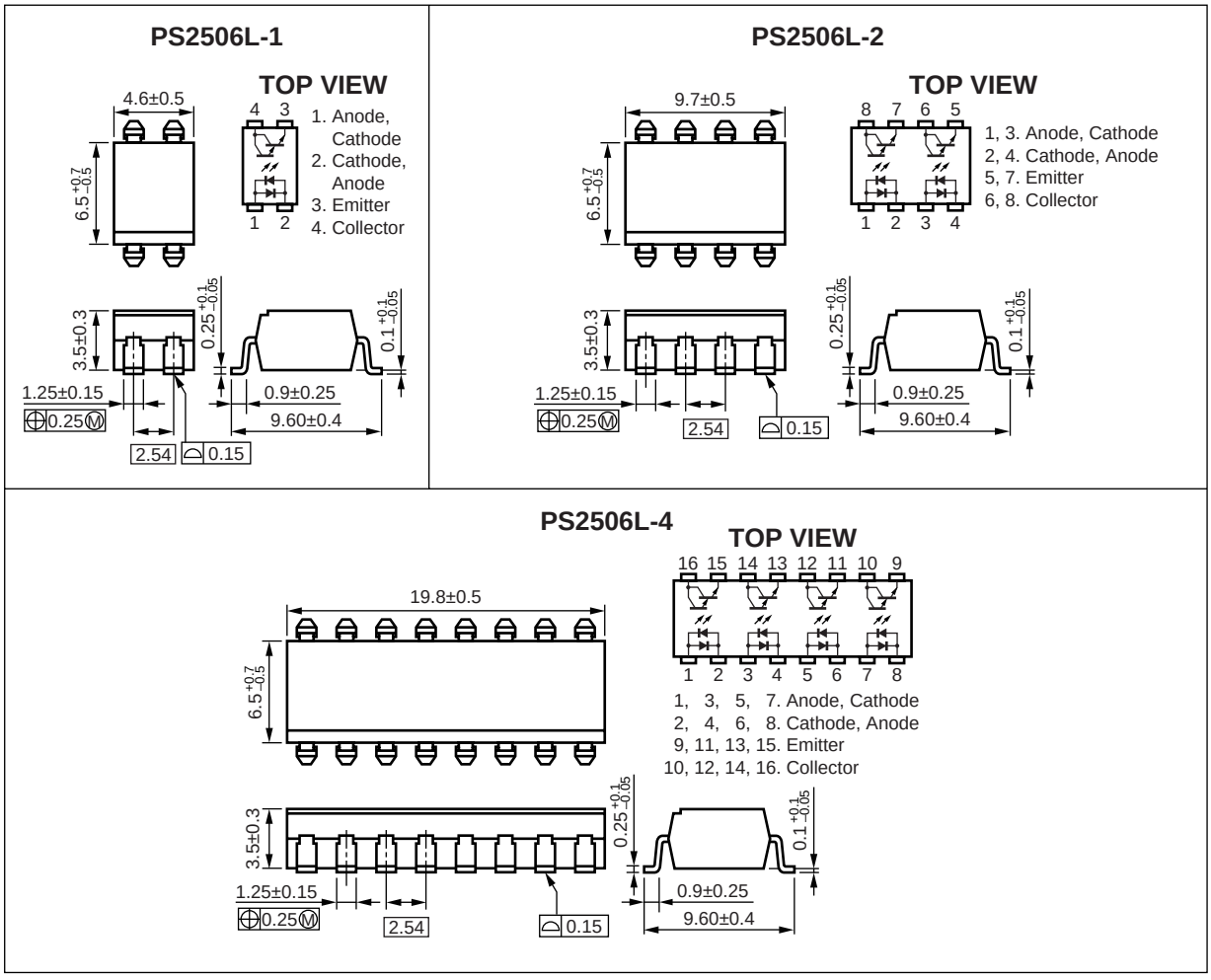


Lead Bending Type (New package)



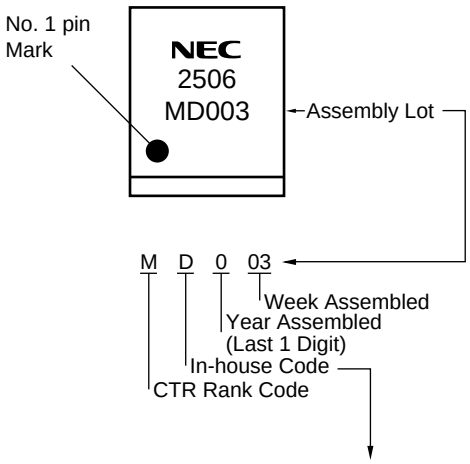
Caution New package 1-ch only

Lead Bending Type



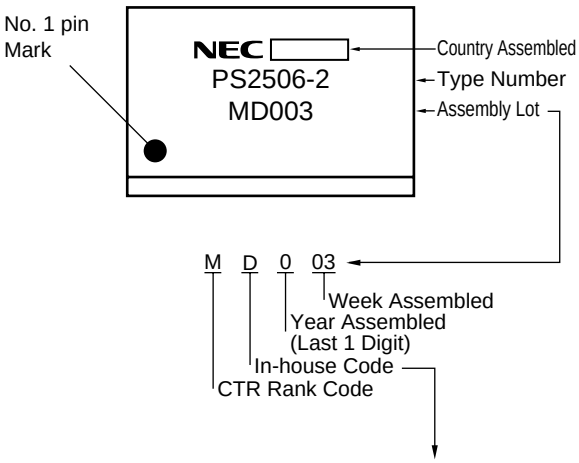
★ **MARKING EXAMPLE**

PS2506-1



Package	Made in Japan	Made in Taiwan
Standard PKG	D	
New PKG	E	

PS2506-2, -4



Package	Made in Japan	Made in Taiwan
Standard PKG	D	
New PKG		

★ ORDERING INFORMATION

Part Number	Package	Packing Style	Application Part Number*1
PS2506-1	4-pin DIP	Magazine case 100 pcs	PS2506-1
PS2506L-1			
PS2506L-1-E3		Embossed Tape 1 000 pcs/reel	
PS2506L-1-E4			
PS2506L-1-F3		Embossed Tape 2 000 pcs/reel	
PS2506L-1-F4			
PS2506-2	8-pin DIP	Magazine case 45 pcs	PS2506-2
PS2506L-2			
PS2506L-2-E3		Embossed Tape 1 000 pcs/reel	
PS2506L-2-E4			
PS2506-4	16-pin DIP	Magazine case 20 pcs	PS2506-4
PS2506L-4			

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

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

Parameter		Symbol	Ratings		Unit
			PS2506-1, PS2506L-1	PS2506-2,-4 PS2506L-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}	40		V
	Emitter to Collector Voltage	V_{ECO}	6		V
	Collector Current	I_C	200	160	mA/ch
	Power Dissipation Derating	ΔP_C/°C	2.0	1.6	mW/°C
	Power Dissipation	P_C	200	160	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

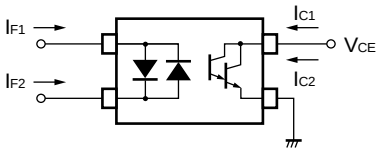
***1** PW = 100 μs, Duty Cycle = 1 %

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

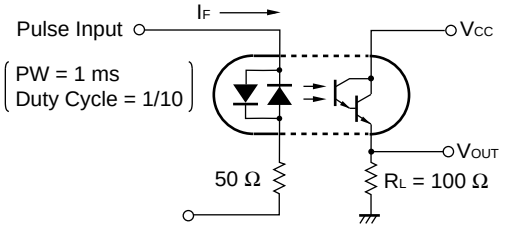
ELECTRICAL CHARACTERISTICS (T_A = 25 ºC)

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} = 40 V, I_F = 0 mA			400	nA
Coupled	Current Transfer Ratio (I_C/I_F)	CTR	I_F = ±1 mA, V_{CE} = 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	$V_{CE(sat)}$	I_F = ±1 mA, I_C = 2 mA			1.0	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		100		μs
	Fall Time*2	t_f			100		

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

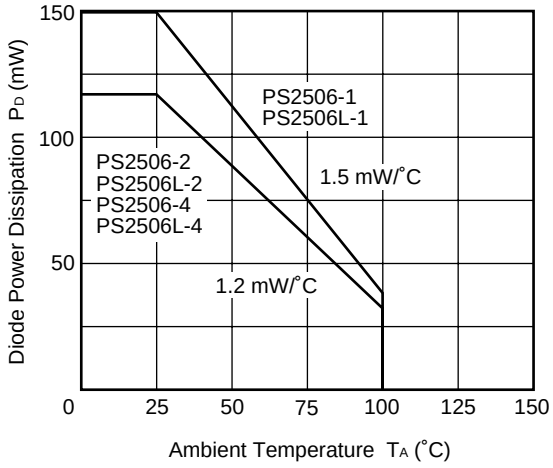


***2** Test circuit for switching time

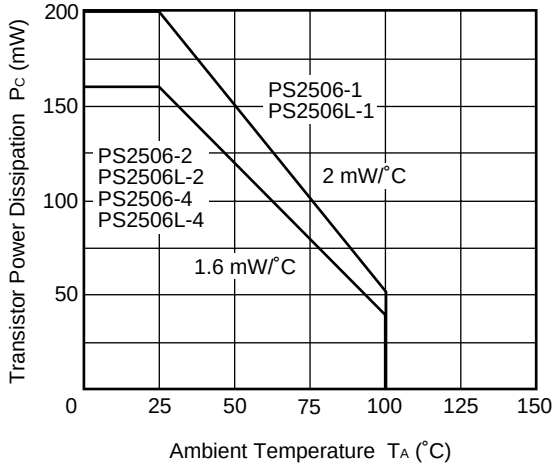


TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise specified)

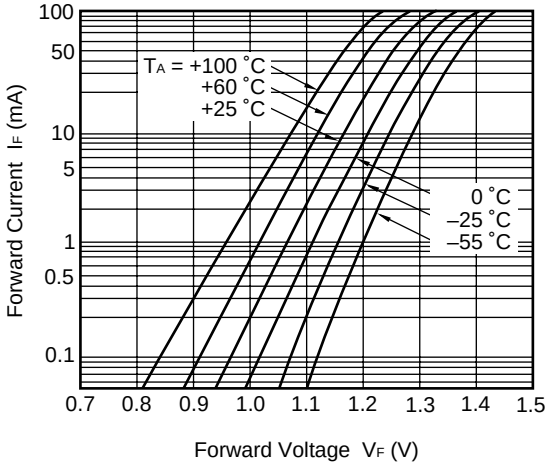
DIODE POWER DISSIPATION vs. AMBIENT TEMPERATURE



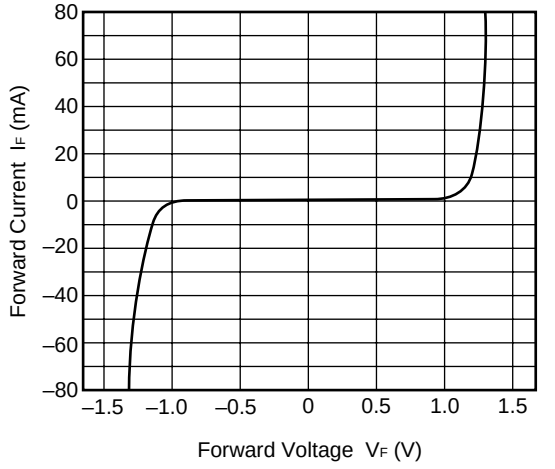
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



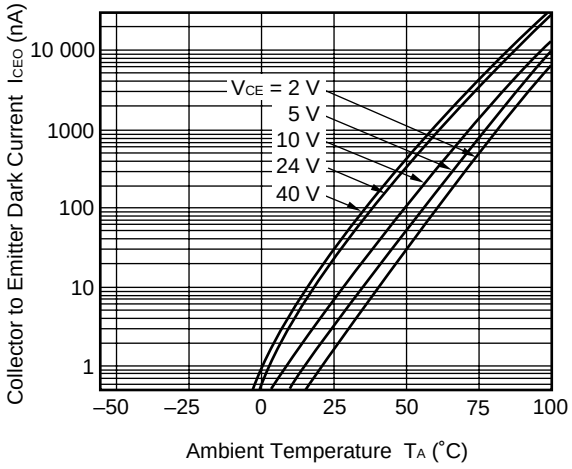
FORWARD CURRENT vs. FORWARD VOLTAGE



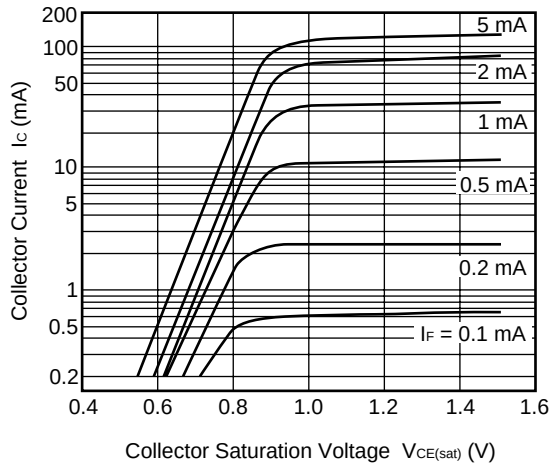
FORWARD CURRENT vs. FORWARD VOLTAGE



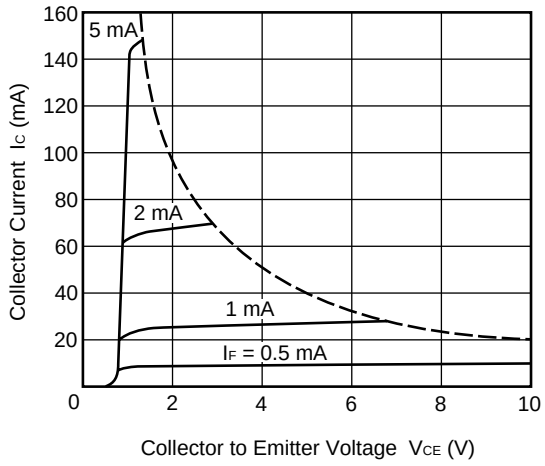
COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE



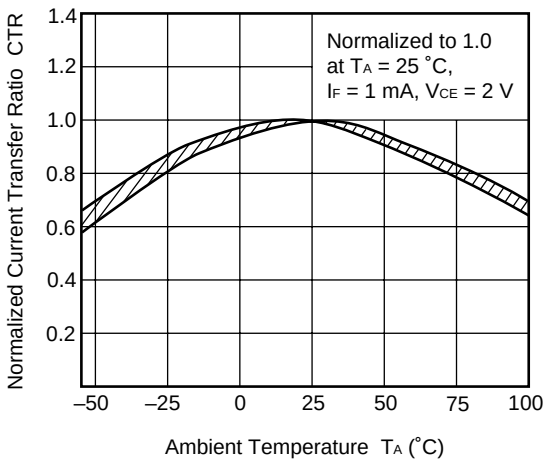
COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE



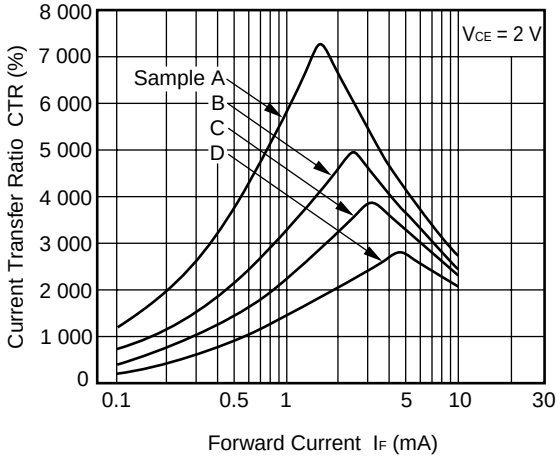
COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE



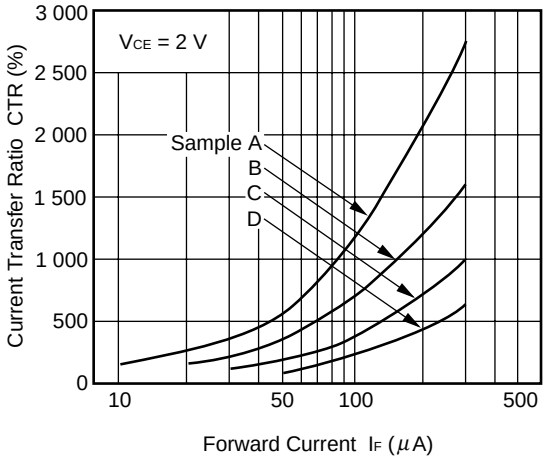
NORMALIZED CURRENT TRANSFER
RATIO vs. AMBIENT TEMPERATURE



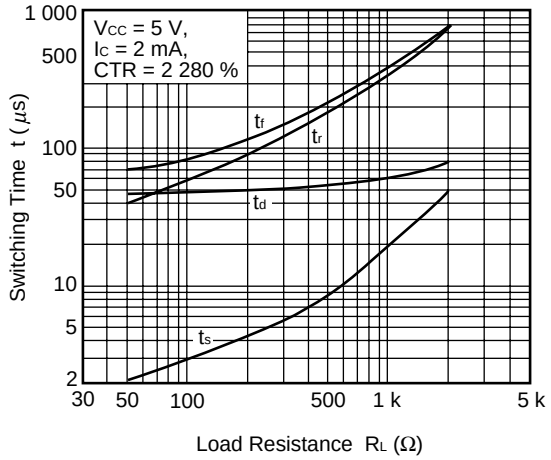
CURRENT TRANSFER RATIO vs.
FORWARD CURRENT



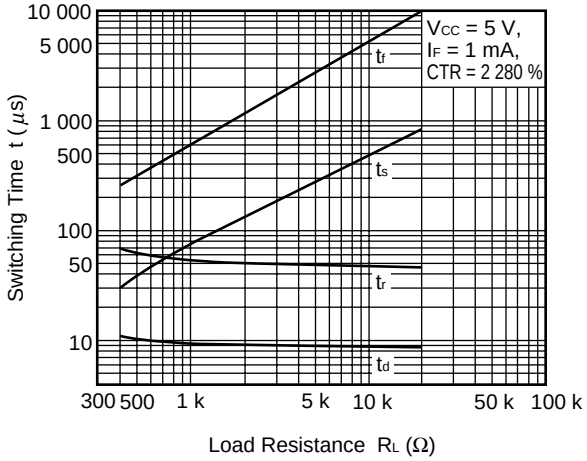
CURRENT TRANSFER RATIO vs.
FORWARD CURRENT



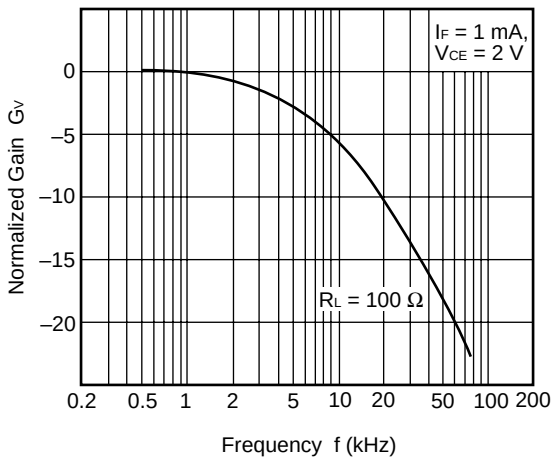
SWITCHING TIME vs.
LOAD RESISTANCE



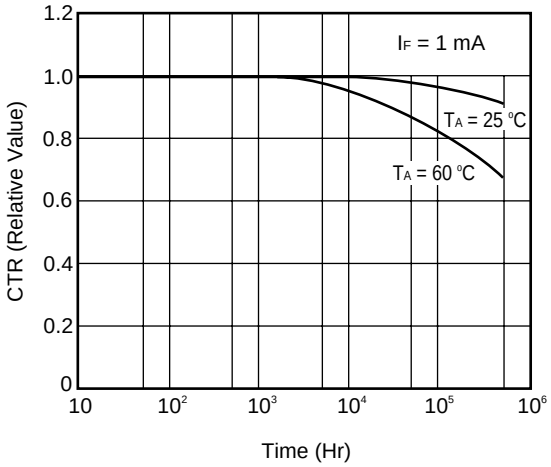
SWITCHING TIME vs.
LOAD RESISTANCE



FREQUENCY RESPONSE



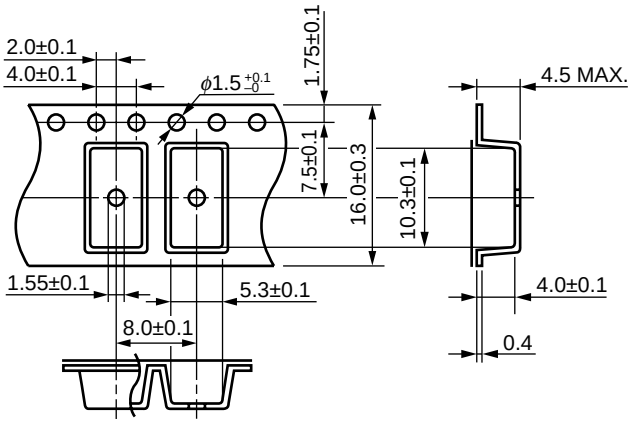
LONG TERM CTR DEGRADATION



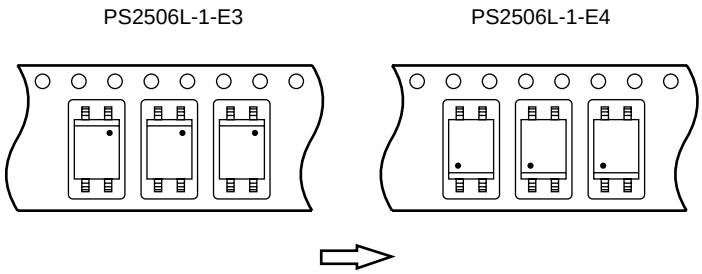
Remark The graphs indicate nominal characteristics.

★ **TAPING SPECIFICATIONS (UNIT : mm)**

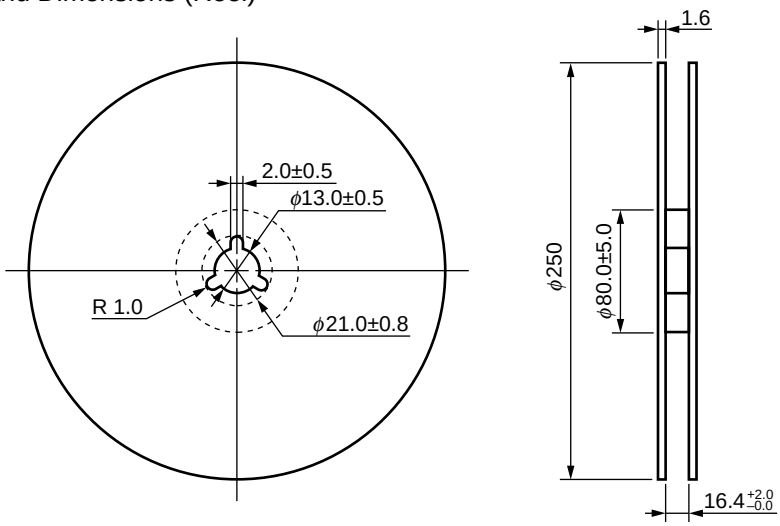
Outline and Dimensions (Tape)



Tape Direction

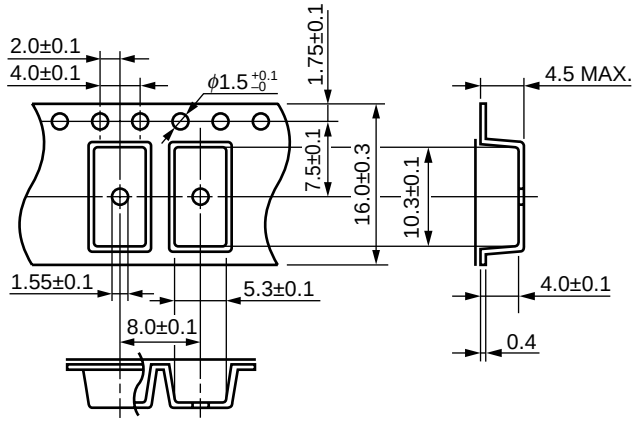


Outline and Dimensions (Reel)



Packing: 1 000 pcs/reel

Outline and Dimensions (Tape)



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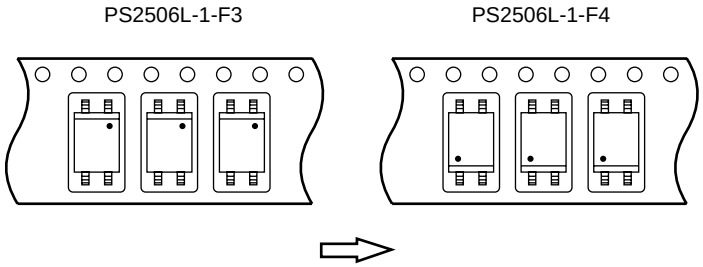
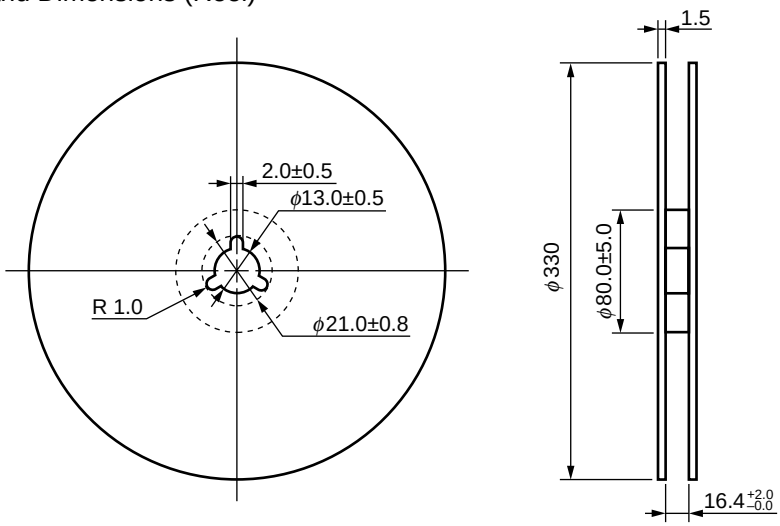
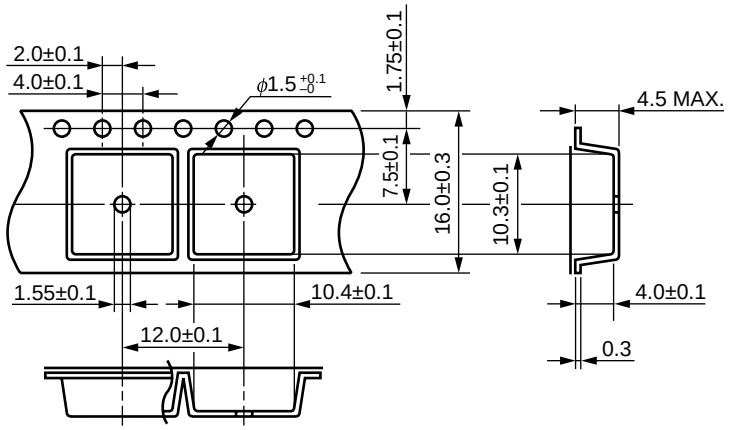


Outline and Dimensions (Reel)

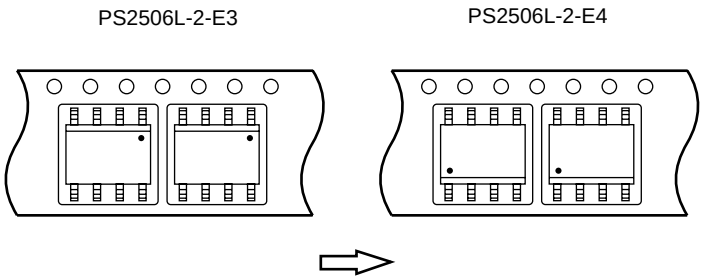


Packing: 2 000 pcs/reel

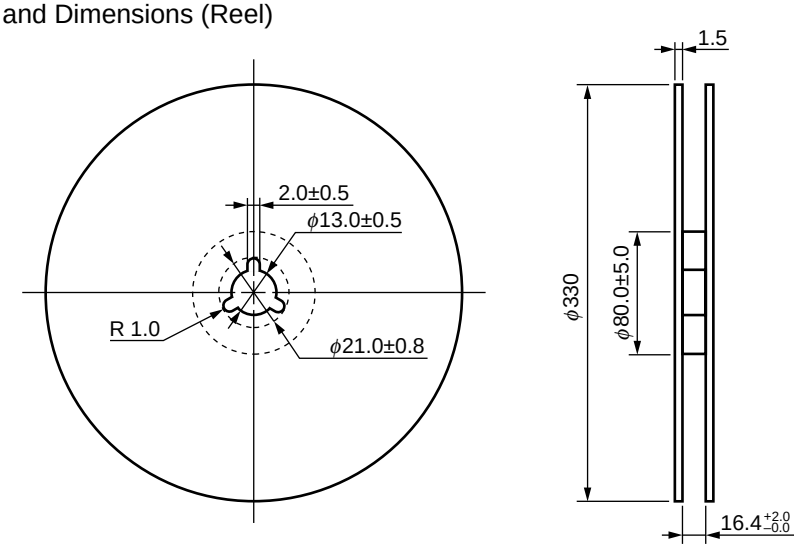
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



Packing: 1 000 pcs/reel

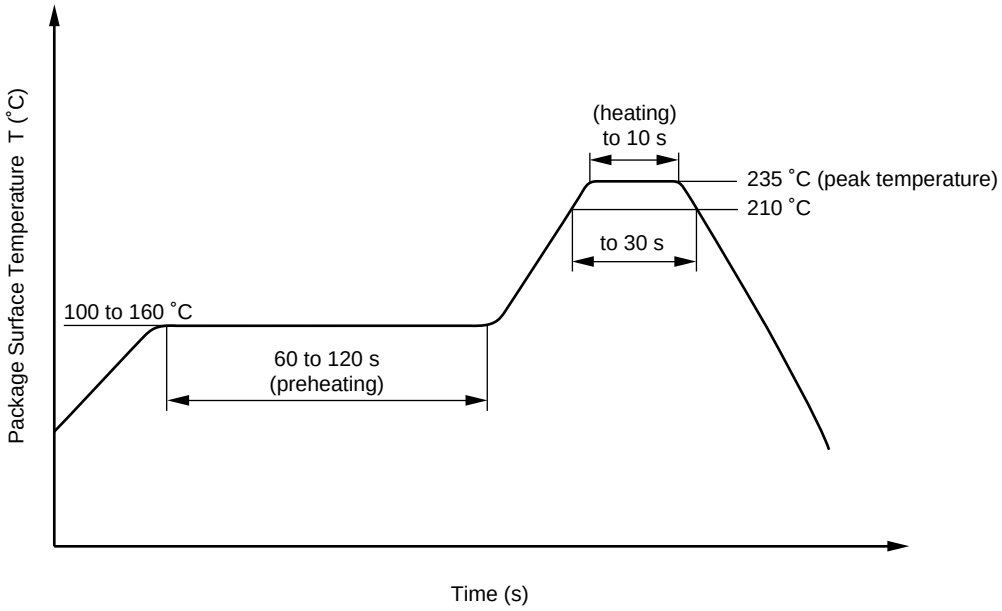
★ NOTES ON HANDLING

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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M8E 00.4