

To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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PS2506-1, PS2506L-1

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

—NEPOC Series—

DESCRIPTION

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

The PS2506-1 is in a plastic DIP (Dual In-line Package) and the PS2506L-1 is lead bending type (Gull-wing) for surface mount.

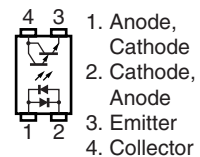
FEATURES

- AC input response
- High isolation voltage ($BV = 5\,000\text{ V r.m.s.}$)
- High current transfer ratio ($CTR = 2\,000\%$ TYP.)
- High-speed switching ($t_r, t_f = 100\ \mu\text{s}$ TYP.)
- <R> • Ordering number of tape product: PS2506L-1-F3: 2 000 pcs/reel
- Safety standards
 - UL approved: No. E72422

APPLICATIONS

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

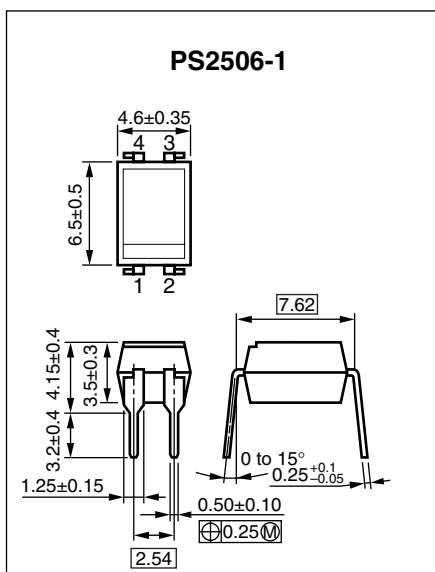
PIN CONNECTION (Top View)



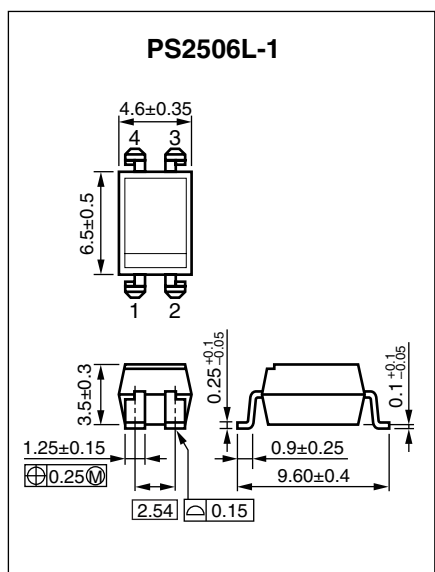
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<R> PACKAGE DIMENSIONS (UNIT : mm)

DIP Type



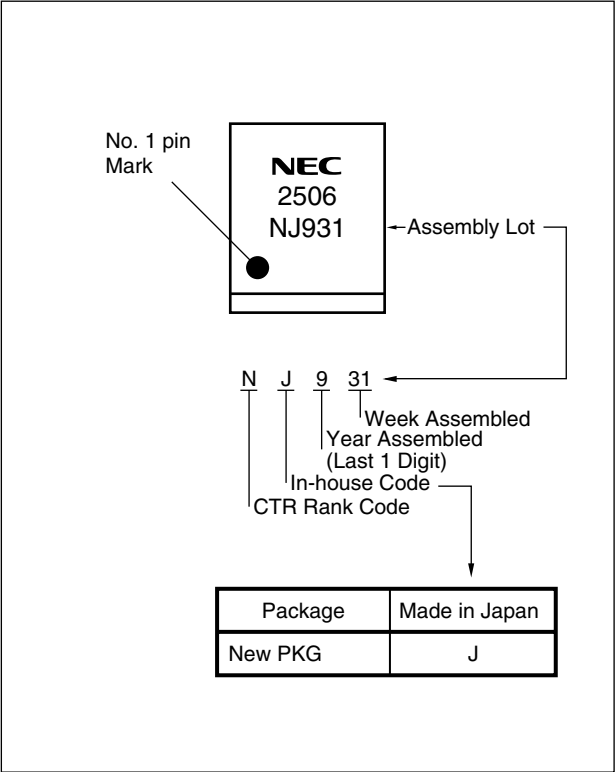
Lead Bending Type



<R> PHOTOCOUPLER CONSTRUCTION

Parameter	Unit (MIN.)
Air Distance	7 mm
Outer Creepage Distance	7 mm
Inner Creepage Distance	3.5 mm
Isolation Thickness	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}
PS2506-1	PS2506-1-A	Pb-Free	Magazine case 100 pcs	Standard products (UL Approved)	PS2506-1
PS2506L-1	PS2506L-1-A				
PS2506L-1-F3	PS2506L-1-F3-A		Embossed Tape 2 000 pcs/reel		

*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
Diode	Forward Current (DC)	I _F	±80	mA
	Power Dissipation Derating	ΔP _D /°C	1.5	mW/°C
	Power Dissipation	P _D	150	mW
	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	mA
	Power Dissipation Derating	ΔP _C /°C	2.0	mW/°C
	Power Dissipation	P _C	200	mW
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

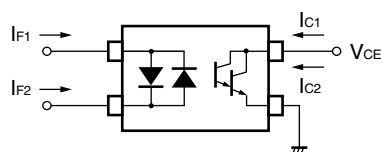
*1 PW = 100 μs, Duty Cycle = 1%

*2 AC voltage for 1 minute at T_A = 25°C, RH = 60% between input and output.
Pins 1-2 shorted together, 3-4 shorted together.

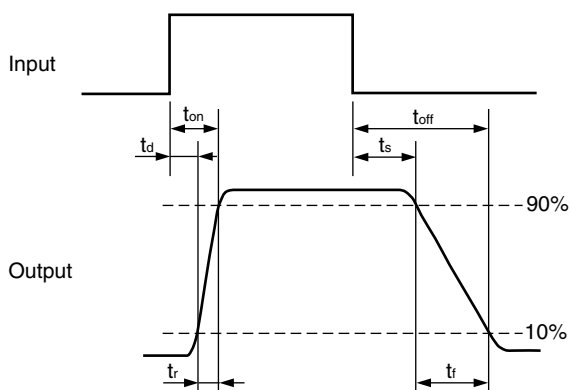
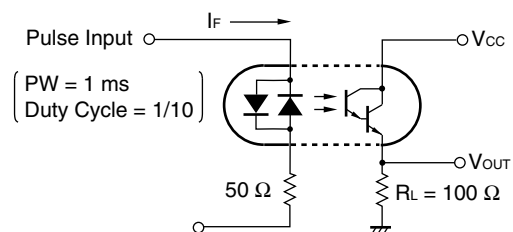
ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V_F	$I_F = \pm 10 \text{ mA}$		1.17	1.4	V
	Terminal Capacitance	C_t	$V = 0 \text{ V}, f = 1.0 \text{ MHz}$		100		pF
Transistor	Collector to Emitter Dark Current	I_{CEO}	$V_{CE} = 40 \text{ V}, I_F = 0 \text{ mA}$			400	nA
Coupled	Current Transfer Ratio (I_C/I_F)	CTR	$I_F = \pm 1 \text{ mA}, V_{CE} = 2 \text{ V}$	200	2 000		%
	CTR Ratio ^{*1}	$\text{CTR1}/\text{CTR2}$	$I_F = 1 \text{ mA}, V_{CE} = 2 \text{ V}$	0.3	1.0	3.0	
	Collector Saturation Voltage	$V_{CE(\text{sat})}$	$I_F = \pm 1 \text{ mA}, I_C = 2 \text{ mA}$			1.0	V
	Isolation Resistance	R_{I-O}	$V_{I-O} = 1.0 \text{ kV}_{DC}$	10^{11}			Ω
	Isolation Capacitance	C_{I-O}	$V = 0 \text{ V}, f = 1.0 \text{ MHz}$		0.5		pF
	Rise Time ^{*2}	t_r	$V_{CC} = 10 \text{ V}, I_C = 2 \text{ mA}, R_L = 100 \Omega$		100		μs
	Fall Time ^{*2}	t_f			100		

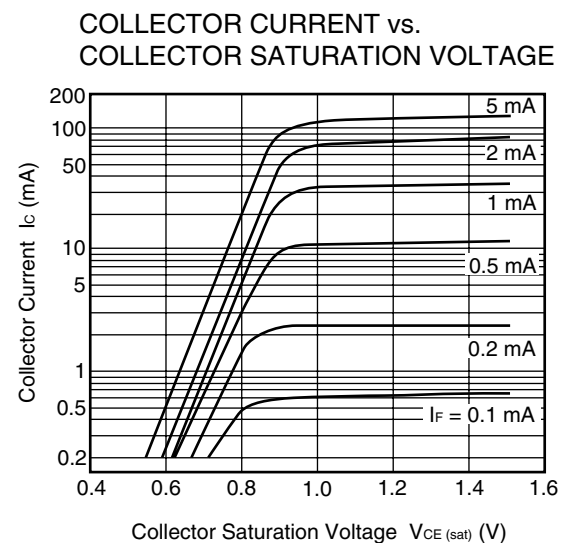
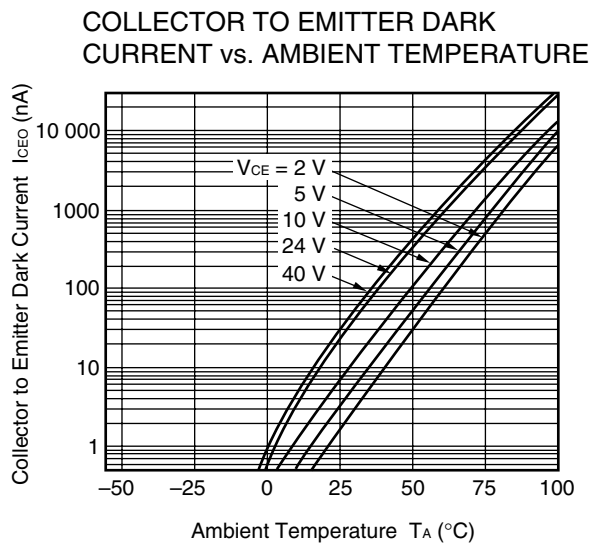
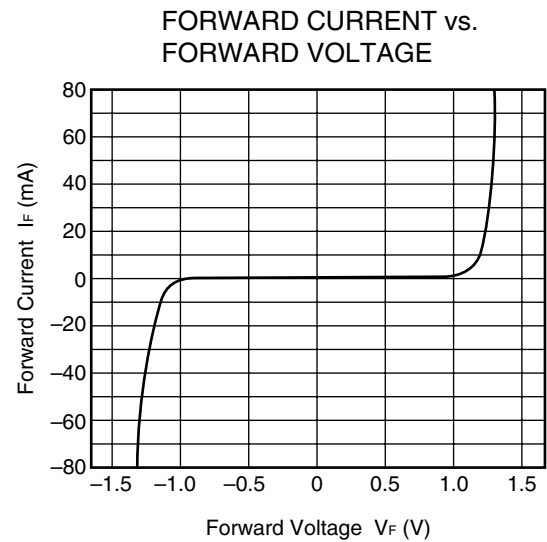
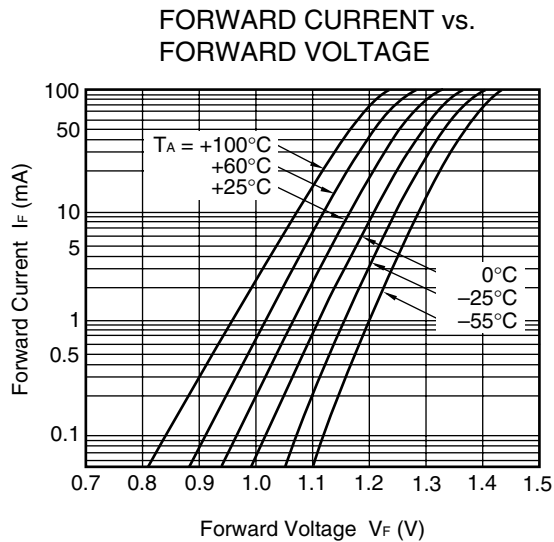
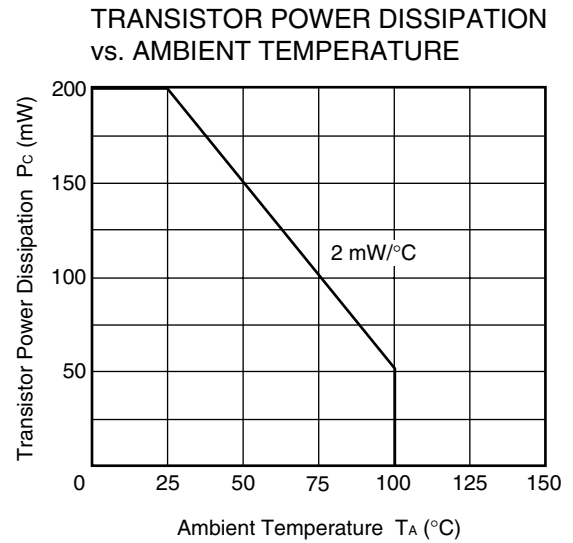
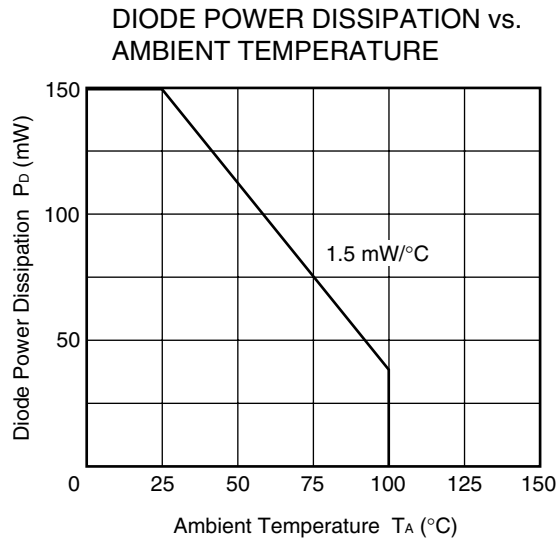
*1 $\text{CTR1} = I_{C1}/I_{F1}$, $\text{CTR2} = I_{C2}/I_{F2}$



*2 Test circuit for switching time

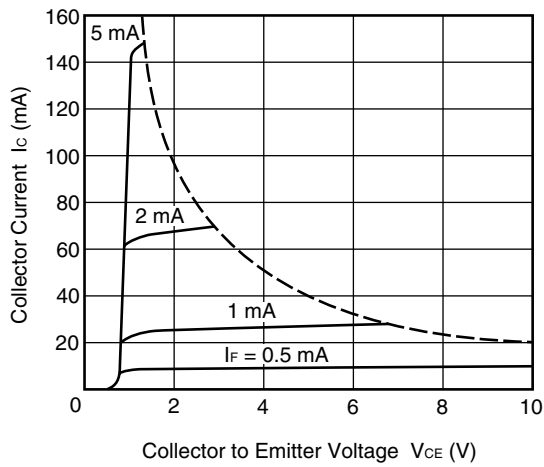


TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise specified)

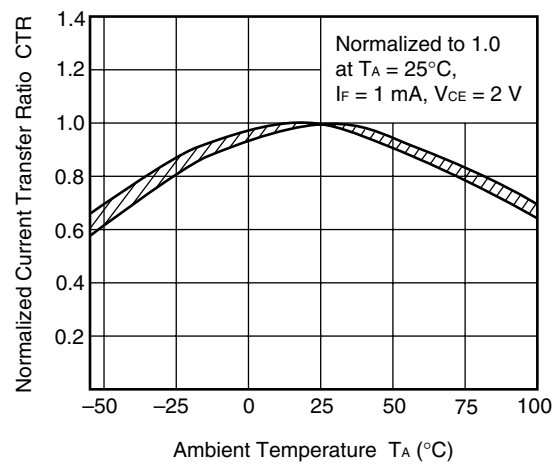


Remark The graphs indicate nominal characteristics.

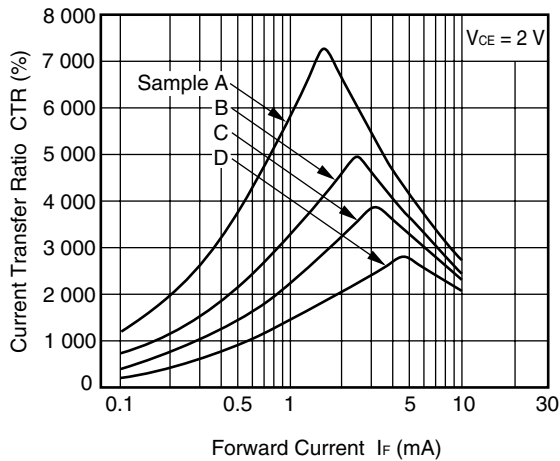
COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE



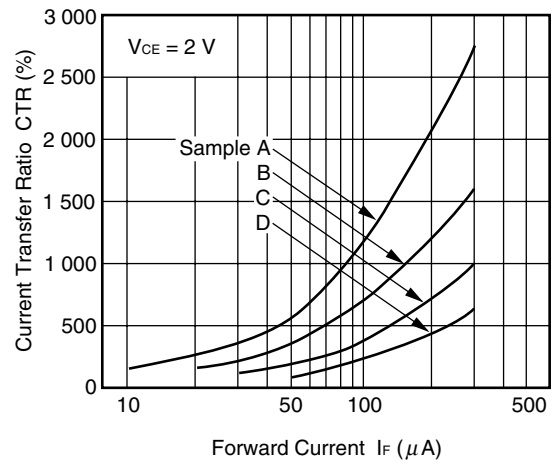
NORMALIZED CURRENT TRANSFER
RATIO vs. AMBIENT TEMPERATURE



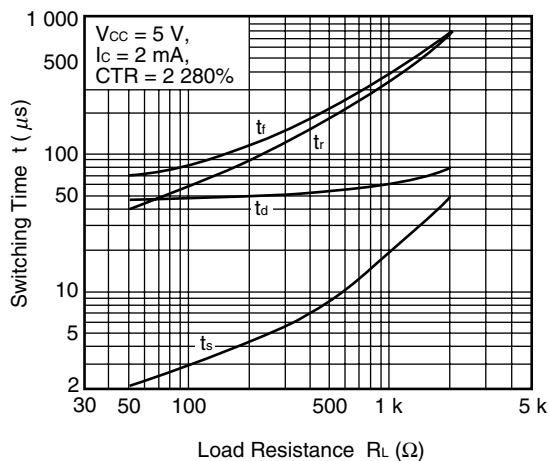
CURRENT TRANSFER RATIO vs.
FORWARD CURRENT



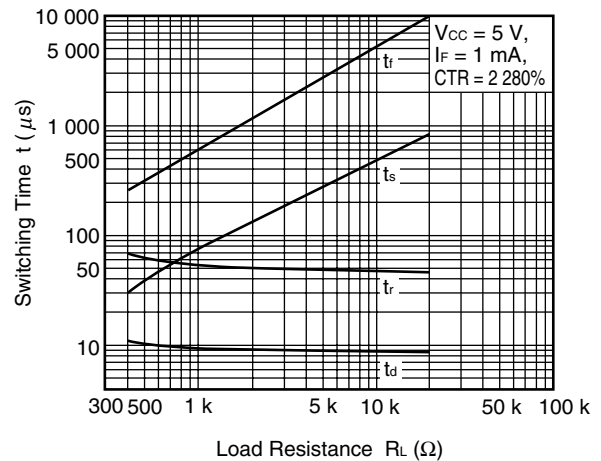
CURRENT TRANSFER RATIO vs.
FORWARD CURRENT



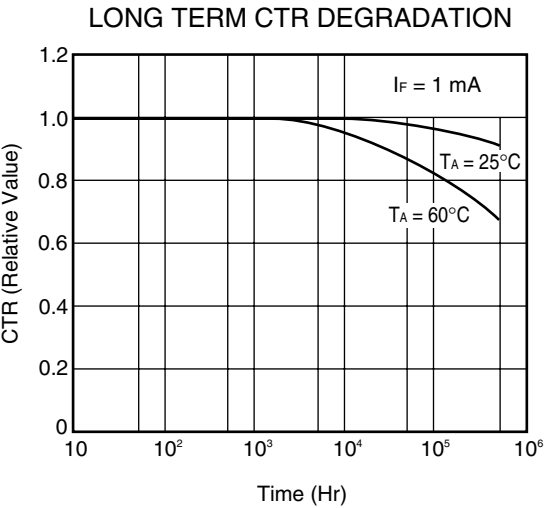
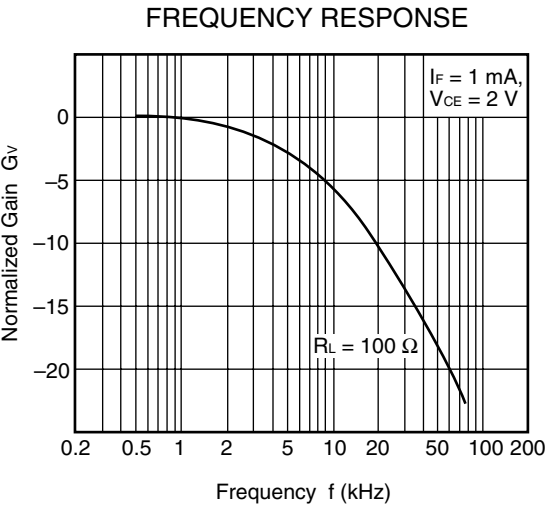
SWITCHING TIME vs.
LOAD RESISTANCE



SWITCHING TIME vs.
LOAD RESISTANCE



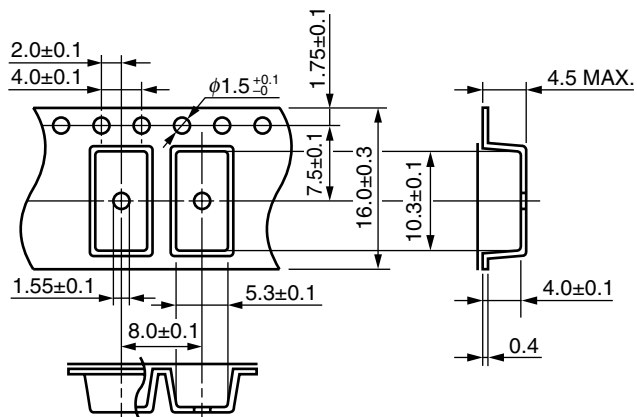
Remark The graphs indicate nominal characteristics.



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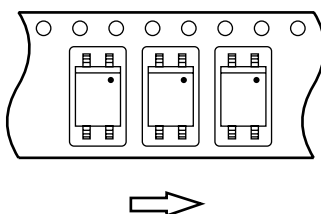
<R> TAPING SPECIFICATIONS (UNIT : mm)

Outline and Dimensions (Tape)

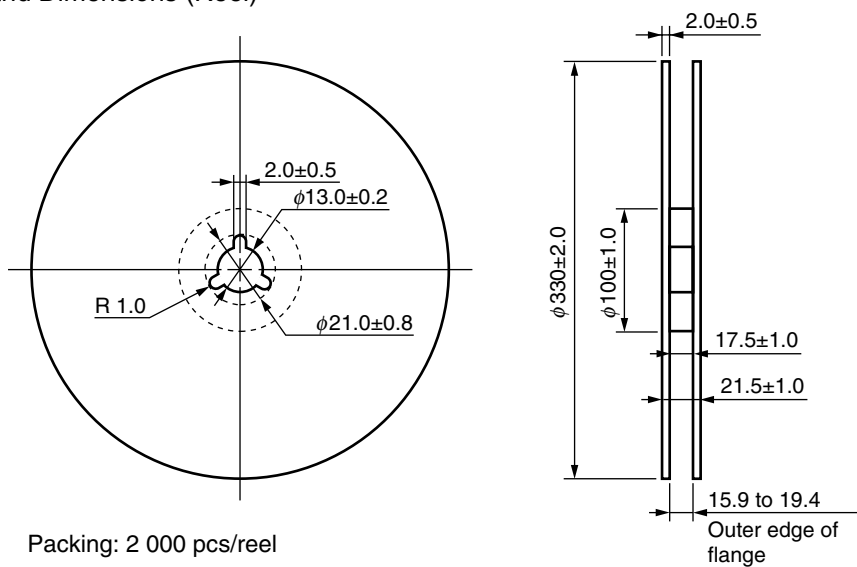


Tape Direction

PS2506L-1-F3



Outline and Dimensions (Reel)



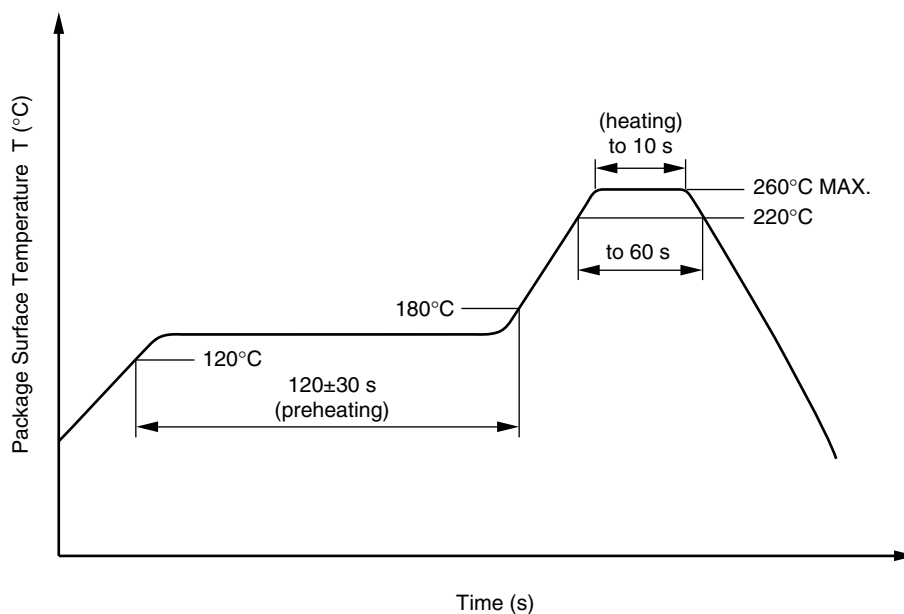
NOTES ON HANDLING

1. Recommended soldering conditions

(1) Infrared reflow soldering

- Peak reflow temperature 260°C or below (package surface temperature)
- Time of peak reflow temperature 10 seconds or less
- Time of temperature higher than 220°C 60 seconds or less
- Time to preheat temperature from 120 to 180°C 120±30 s
- 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) 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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M8E0904E

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