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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(Note 2) “Renesas Electronics product(s)” means any product developed or manufactured by or for Renesas Electronics.

Phase-out/Discontinued

PHOTOCOUPLER

PS2566-1,PS2566L-1,PS2566L1-1,PS2566L2-1

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

–NEPOC Series–

★ **DESCRIPTION**

The PS2566-1 is optically coupled isolators containing GaAs light emitting diodes and an NPN silicon darlington connected phototransistor.

The PS2566-1 is in a plastic DIP (Dual In-line Package) and the PS2566L-1 is lead bending type (Gull-wing) for surface mount.

The PS2566L1-1 is lead bending type for long creepage distance.

The PS2566L2-1 is lead bending type for long creepage distance (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 taping product: PS2566L-1-E3, E4, F3, F4, PS2566L2-1-E3, E4
- ★ • Safety standards
  - UL approved: File No. E72422
  - CSA approved: No. CA 101391
  - BSI approved: No. 7112/7420
  - SEMKO approved: No. 303059
  - NEMKO approved: No. P03200272
  - DEMKO approved: No. 312341
  - FIMKO approved: No. FI 10620
  - DIN EN60747-5-2 (VDE0884 Part2) approved (Option)

APPLICATIONS

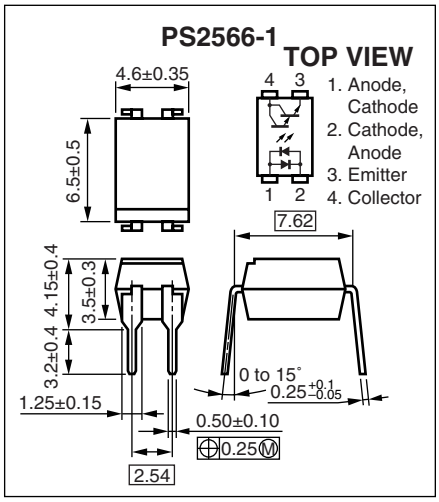
- Telephone/FAX.
- FA/OA equipment
- Programmable logic controller

Document No. PN10237EJ03V0DS (3rd edition)
Date Published March 2006 CP(K)
Printed in Japan

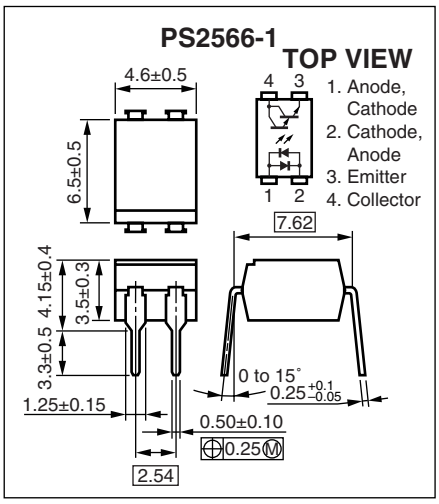
The mark ★ shows major revised points.

★ **PACKAGE DIMENSIONS (UNIT : mm)**

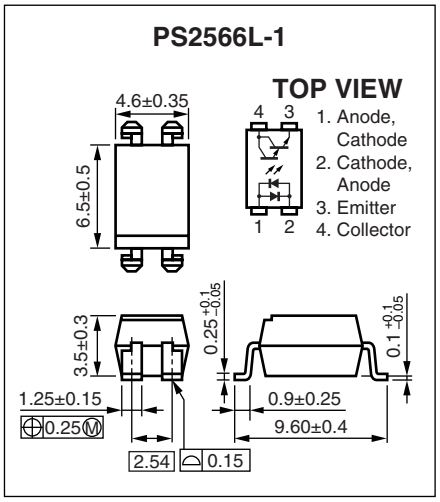
DIP Type (New package)



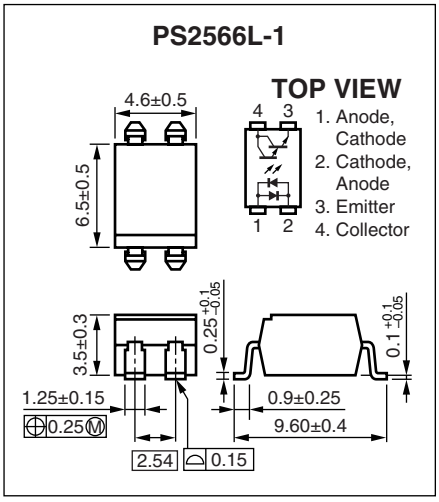
DIP Type



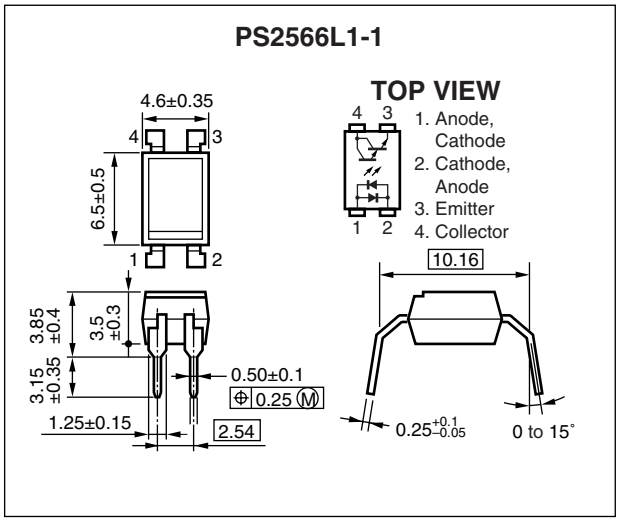
Lead Bending Type (New package)



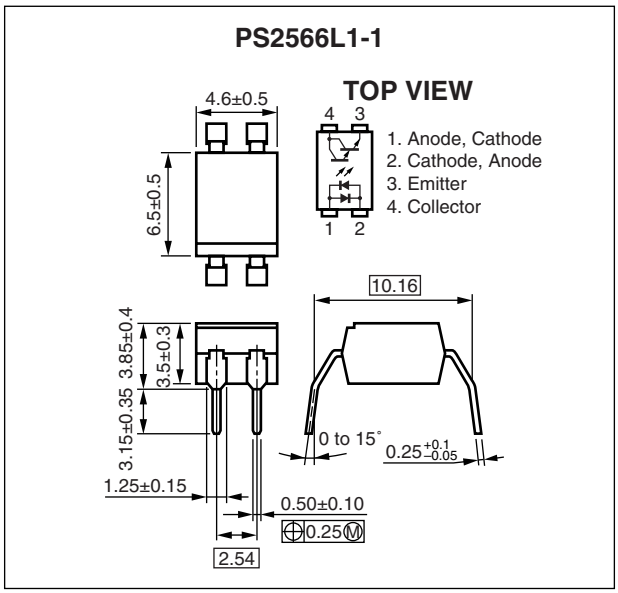
Lead Bending Type



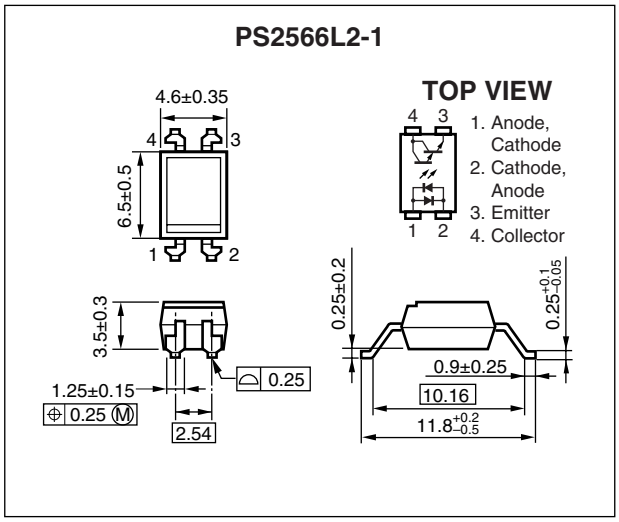
Lead Bending Type For Long Creepage Distance (New Package)



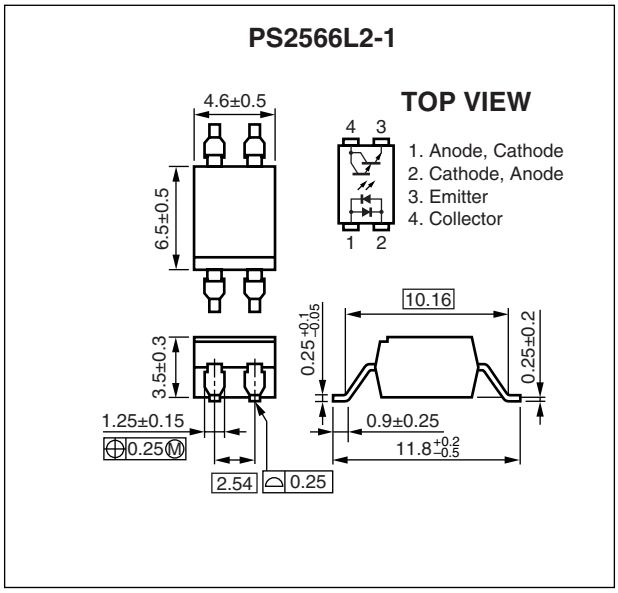
Lead Bending Type For Long Creepage Distance



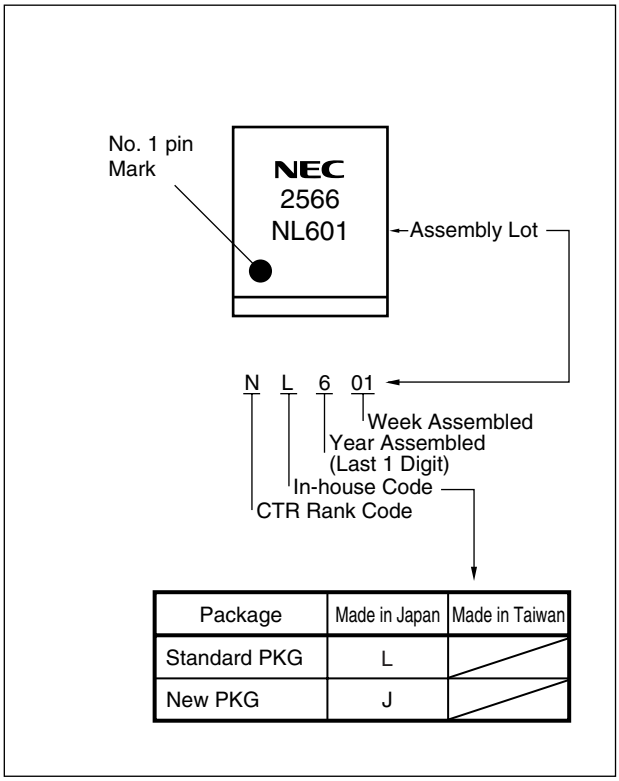
Lead Bending Type For Long Creepage Distance (Gull-Wing) (New Package)



Lead Bending Type For Long Creepage Distance (Gull-Wing)



★ **MARKING EXAMPLE**



Package	Made in Japan	Made in Taiwan
Standard PKG	L	
New PKG	J	

★ ORDERING INFORMATION

Part Number	Order Number	Solder Plating Specification	Packing Style	Safety Standard Approval	Application Part Number *1
PS2566-1	PS2566-1-A	Pb-Free	Magazine case 100 pcs	Standard products (UL, CSA, BSI, NEMKO, SEMKO, DEMKO, FIMKO approved)	PS2566-1
PS2566L-1	PS2566L-1-A				
PS2566L1-1	PS2566L1-1-A				
PS2566L2-1	PS2566L2-1-A				
PS2566L-1-E3	PS2566L-1-E3-A		Embossed Tape 1 000 pcs/reel		
PS2566L-1-E4	PS2566L-1-E4-A				
PS2566L-1-F3	PS2566L-1-F3-A		Embossed Tape 2 000 pcs/reel		
PS2566L-1-F4	PS2566L-1-F4-A				
PS2566L2-1-E3	PS2566L2-1-E3-A		Embossed Tape 1 000 pcs/reel		
PS2566L2-1-E4	PS2566L2-1-E4-A				
PS2566-1-V	PS2566-1-V-A		Magazine case 100 pcs	DIN EN60747-5-2 (VDE0884 Part2) approved products (option)	
PS2566L-1-V	PS2566L-1-V-A				
PS2566L1-1-V	PS2566L1-1-V-A				
PS2566L2-1-V	PS2566L2-1-V-A				
PS2566L-1-V-E3	PS2566L-1-V-E3-A		Embossed Tape 1 000 pcs/reel		
PS2566L-1-V-E4	PS2566L-1-V-E4-A				
PS2566L-1-V-F3	PS2566L-1-V-F3-A		Embossed Tape 2 000 pcs/reel		
PS2566L-1-V-F4	PS2566L-1-V-F4-A				
PS2566L2-1-V-E3	PS2566L2-1-V-E3-A		Embossed Tape 1 000 pcs/reel		
PS2566L2-1-V-E4	PS2566L2-1-V-E4-A				

***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

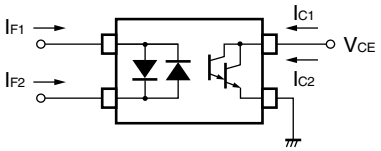
***1** PW = 100 μs, Duty Cycle = 1%

***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.

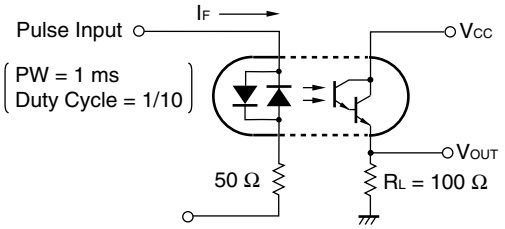
ELECTRICAL CHARACTERISTICS (T_A = 25°C)

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} = 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 = 10 mA, R_L = 100 Ω		100		μs
	Fall Time*2	t_f			100		

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

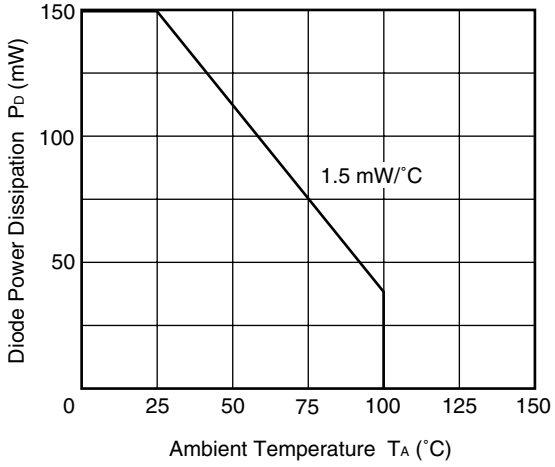


***2** Test circuit for switching time

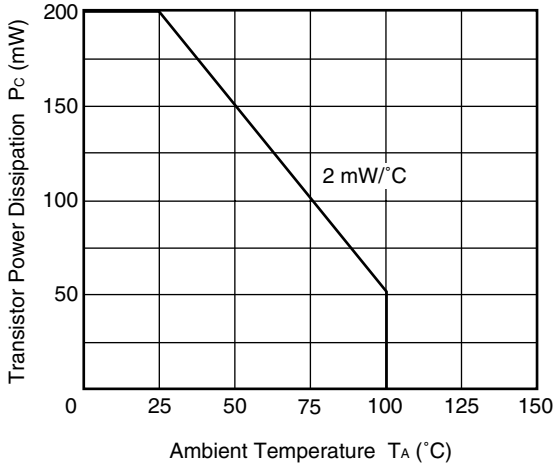


★ **TYPICAL CHARACTERISTICS (T_A = 25°C, unless otherwise specified)**

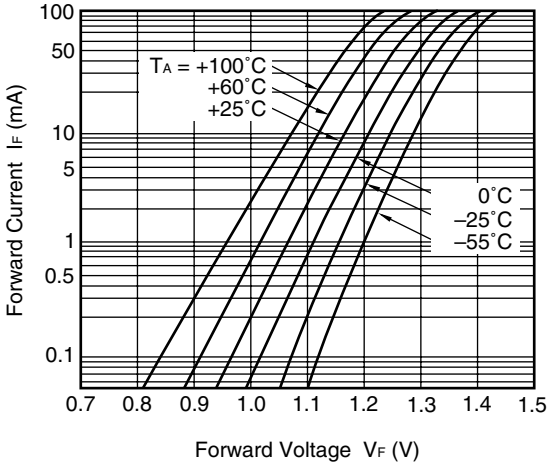
DIODE POWER DISSIPATION vs. AMBIENT TEMPERATURE



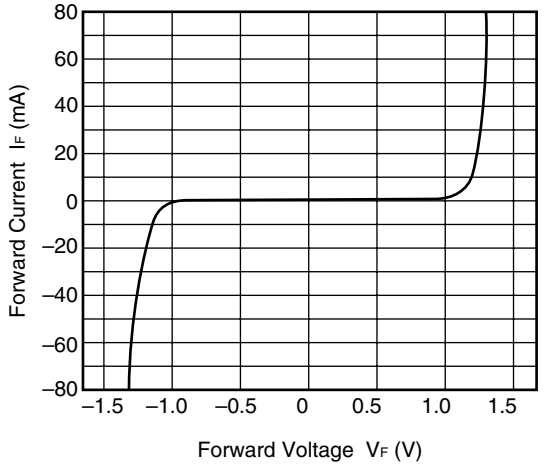
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



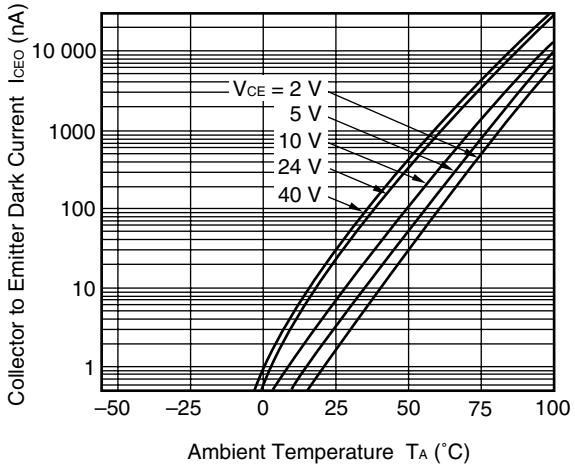
FORWARD CURRENT vs. FORWARD VOLTAGE



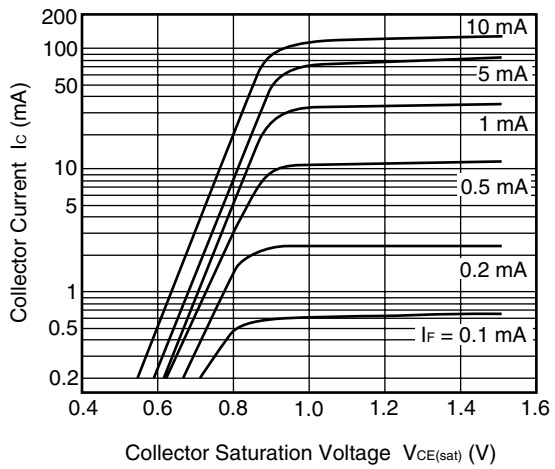
FORWARD CURRENT vs. FORWARD VOLTAGE



COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE

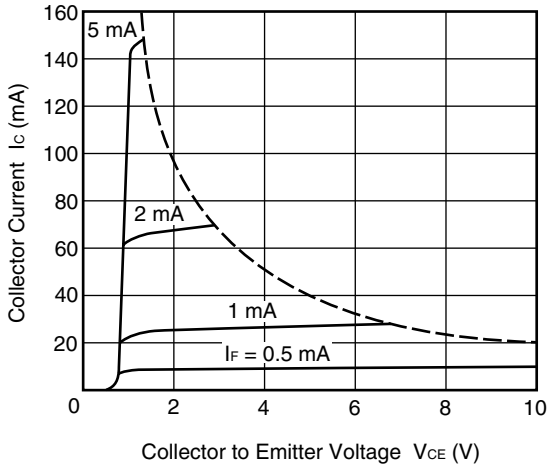


COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE

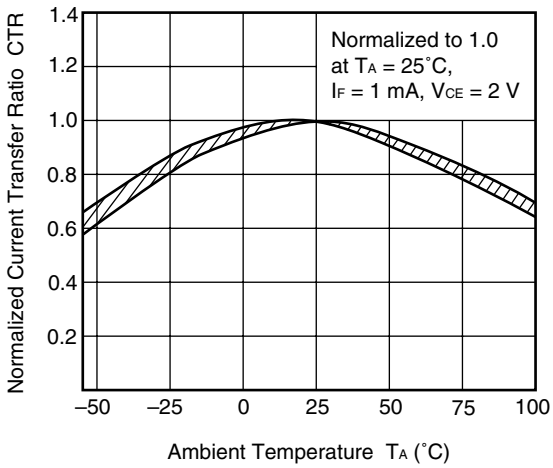


Remark The graphs indicate nominal characteristics.

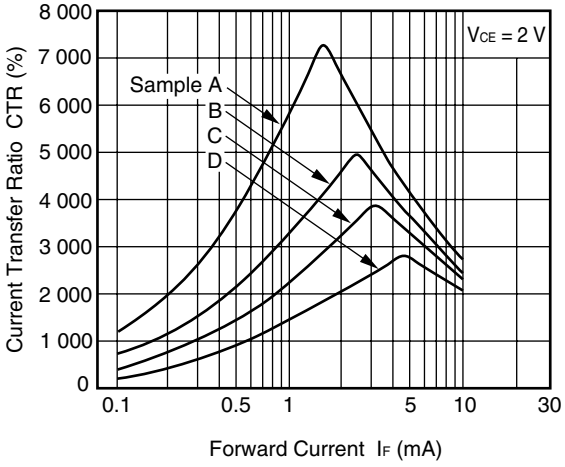
COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE



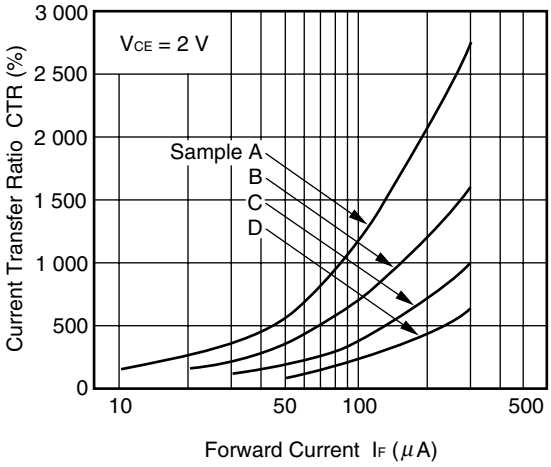
NORMALIZED CURRENT TRANSFER
RATIO vs. AMBIENT TEMPERATURE



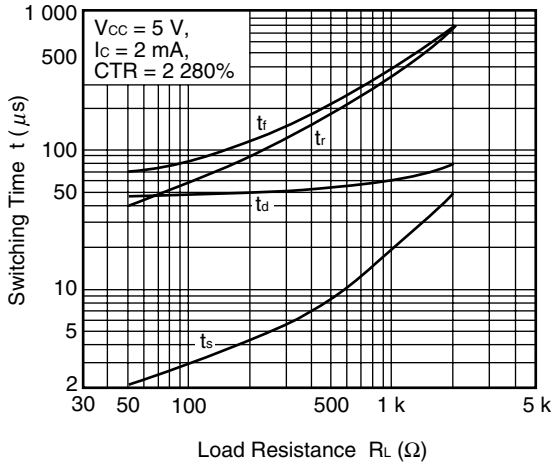
CURRENT TRANSFER RATIO vs.
FORWARD CURRENT



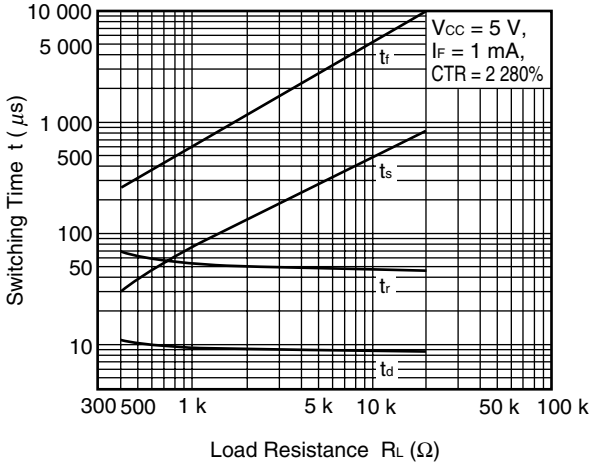
CURRENT TRANSFER RATIO vs.
FORWARD CURRENT



SWITCHING TIME vs.
LOAD RESISTANCE

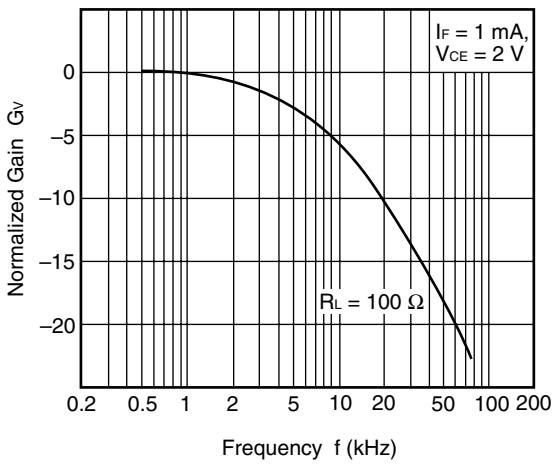


SWITCHING TIME vs.
LOAD RESISTANCE

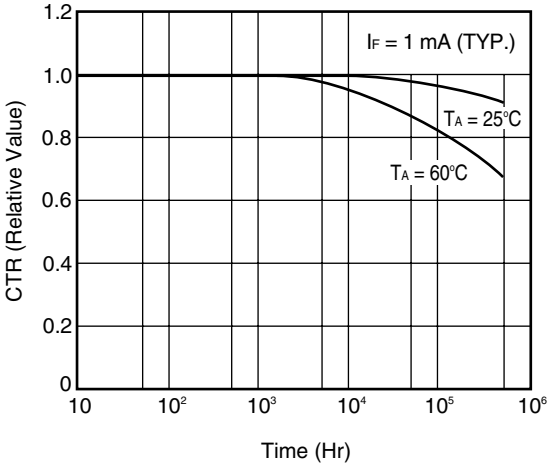


Remark The graphs indicate nominal characteristics.

FREQUENCY RESPONSE



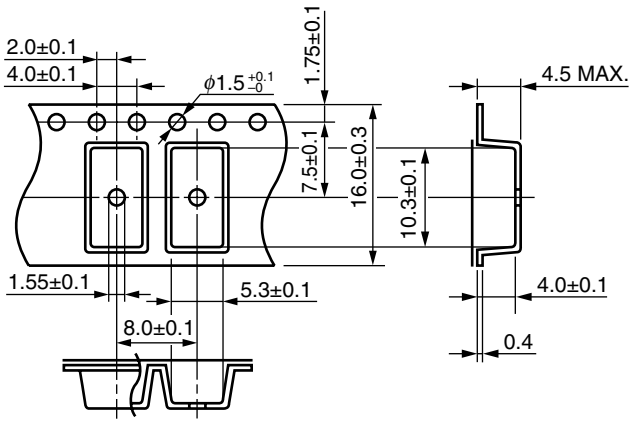
LONG TERM CTR DEGRADATION



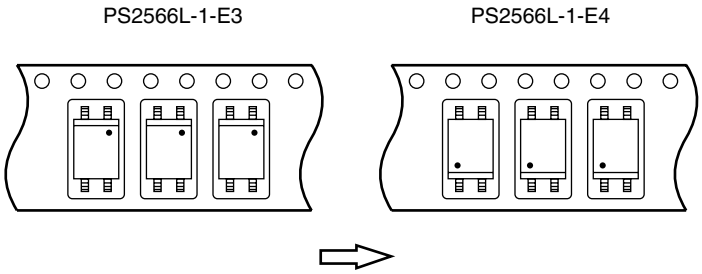
Remark The graphs indicate nominal characteristics.

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

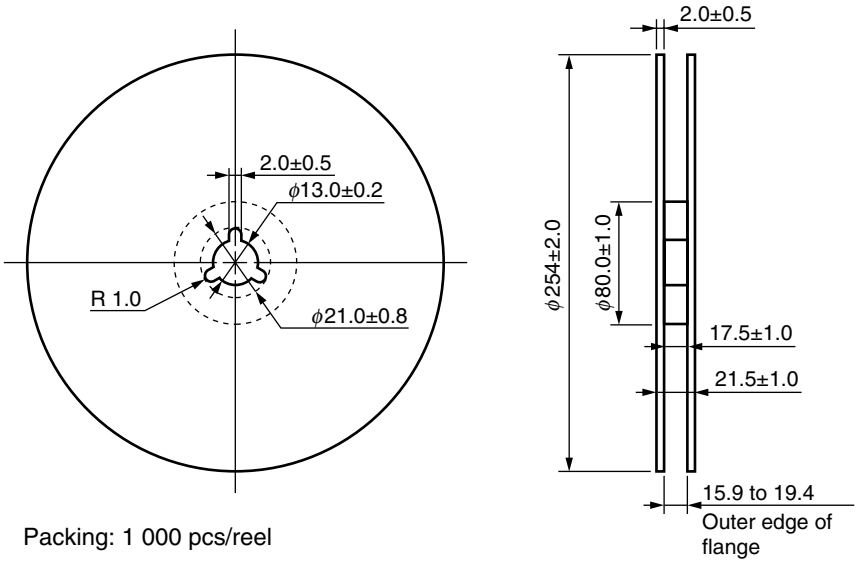
Outline and Dimensions (Tape)



Tape Direction

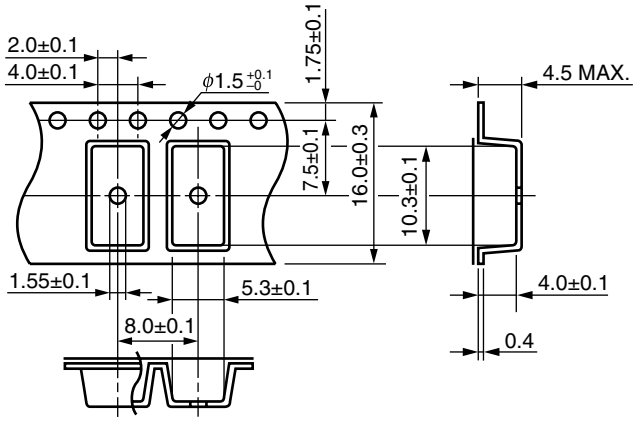


Outline and Dimensions (Reel)

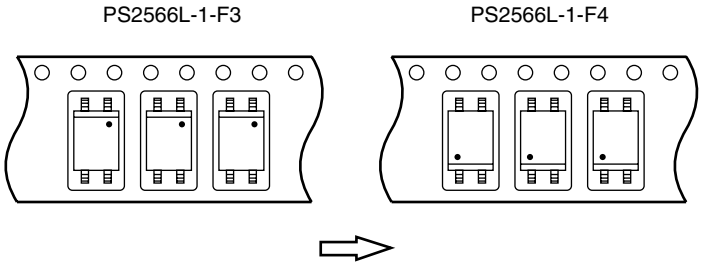


Packing: 1 000 pcs/reel

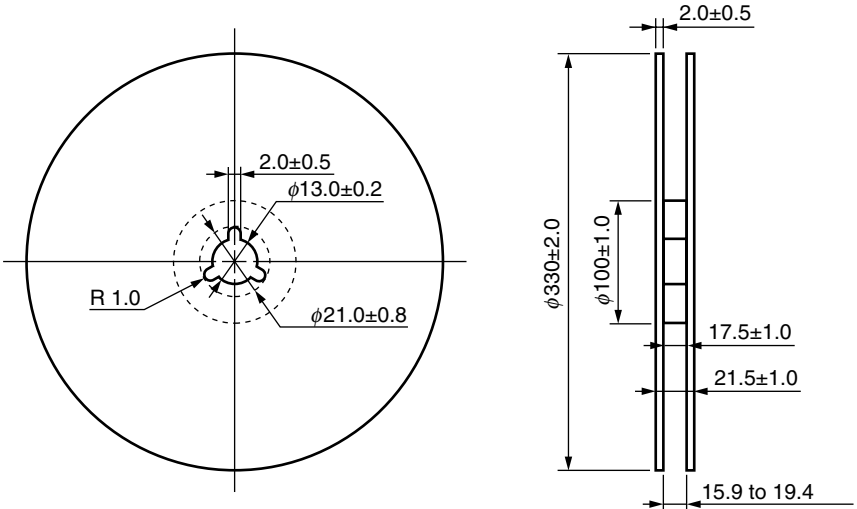
Outline and Dimensions (Tape)



Tape Direction

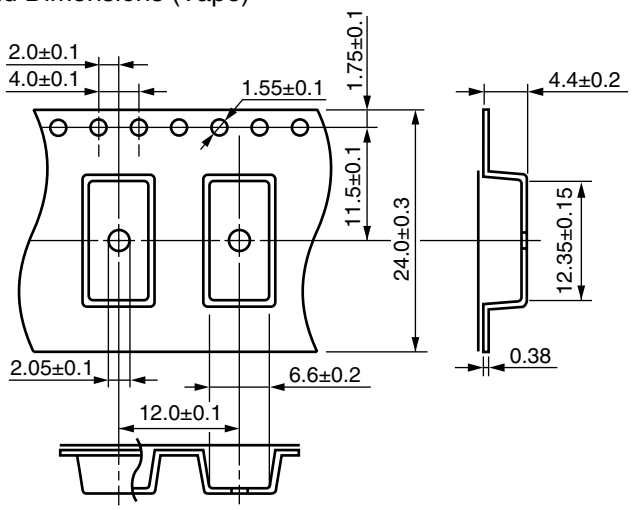


Outline and Dimensions (Reel)

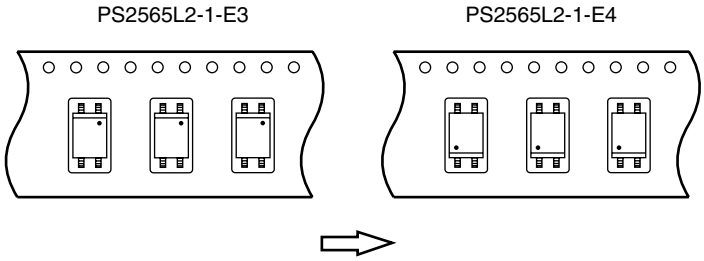


Packing: 2 000 pcs/reel

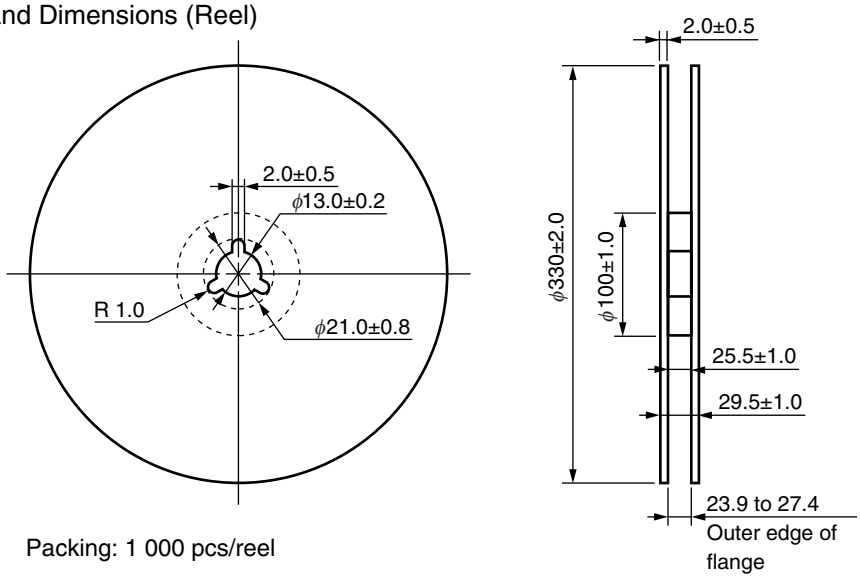
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



Packing: 1 000 pcs/reel

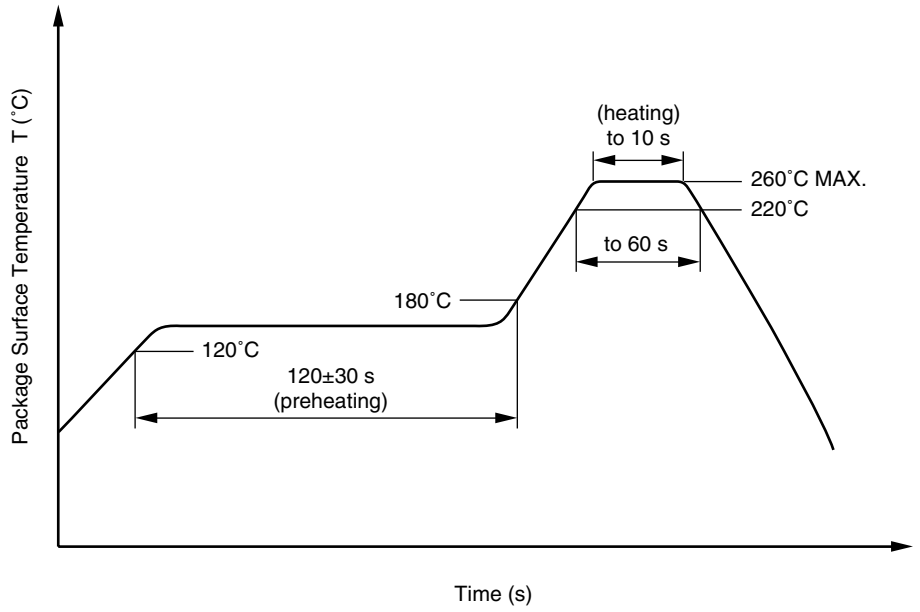
NOTES ON HANDLING

1. Recommended soldering conditions

(1) Infrared reflow soldering

• Peak reflow temperature	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.

SPECIFICATION OF VDE MARKS LICENSE DOCUMENT

Parameter	Symbol	Speck	Unit
Application classification (DIN VDE 0109) for rated line voltages ≤ 300 Vr.m.s. for rated line voltages ≤ 600 Vr.m.s.		 IV III	
Climatic test class (DIN IEC 68 Teil 1/09.80)		55/100/21	
Dielectric strength maximum operating isolation voltage Test voltage (partial discharge test, procedure a for type test and random test) U_{pr} = 1.2 × U_{IORM}, P_d < 5 pC	 U_{IORM} U_{pr}	 890 1 068	 V_{peak} V_{peak}
Test voltage (partial discharge test, procedure b for all devices test) U_{pr} = 1.6 × U_{IORM}, P_d < 5 pC	U_{pr}	1 424	V_{peak}
Highest permissible overvoltage	U_{TR}	8 000	V_{peak}
Degree of pollution (DIN VDE 0109)		2	
Clearance distance		> 7.0	mm
Creepage distance		> 7.0	mm
Comparative tracking index (DIN IEC 112/VDE 0303 part 1)	CTI	175	
Material group (DIN VDE 0109)		III a	
Storage temperature range	T_{stg}	–55 to +150	°C
Operating temperature range	T_A	–55 to +100	°C
Isolation resistance, minimum value V_{IO} = 500 V dc at T_A = 25°C V_{IO} = 500 V dc at T_A MAX. at least 100°C	 Ris MIN. Ris MIN.	 10^{12} 10^{11}	 Ω Ω
Safety maximum ratings (maximum permissible in case of fault, see thermal derating curve) Package temperature Current (input current I_F, Psi = 0) Power (output or total power dissipation) Isolation resistance V_{IO} = 500 V dc at T_A = 175°C (Tsi)	 Tsi Isi Psi Ris MIN.	 175 400 700 10^{9}	 °C mA mW Ω

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M8E 00.4-0110

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▶**For further information, please contact**

NEC Compound Semiconductor Devices, Ltd. **http://www.ncsd.necel.com/**
E-mail: salesinfo@ml.ncsd.necel.com (sales and general)
techinfo@ml.ncsd.necel.com (technical)
Sales Division TEL: +81-44-435-1573 FAX: +81-44-435-1579

NEC Compound Semiconductor Devices Hong Kong Limited
E-mail: ncsd-hk@elhk.nec.com.hk (sales, technical and general)
Hong Kong Head Office TEL: +852-3107-7303 FAX: +852-3107-7309
Taipei Branch Office TEL: +886-2-8712-0478 FAX: +886-2-2545-3859
Korea Branch Office TEL: +82-2-558-2120 FAX: +82-2-558-5209

NEC Electronics (Europe) GmbH **http://www.ee.nec.de/**
TEL: +49-211-6503-0 FAX: +49-211-6503-1327

California Eastern Laboratories, Inc. **http://www.cel.com/**
TEL: +1-408-988-3500 FAX: +1-408-988-0279