NEC

PHOTOCOUPLER
PS2561B-1,PS2561BL-1
PS2561BL1-1,PS2561BL2-1

DIP PHOTOCOUPLER
OPERATING AMBIENT TEMPERATURE 110°C

–NEPOC Series–

DESCRIPTION

The PS2561B-1 is an optically coupled isolator containing a GaAs light emitting diode and an NPN silicon phototransistor.

The PS2561B-1 is in a plastic DIP (Dual In-line Package) and the PS2561BL-1 is lead bending type (Gull-wing) for surface mount.

The PS2561BL1-1 is lead bending type for long creepage distance.

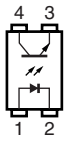
The PS2561BL2-1 is lead bending type for long creepage distance (Gull-wing) for surface mount.

FEATURES

★ • Operating ambient temperature: 110°C
- High Isolation voltage (BV = 5 000 Vr.m.s.)
- High collector to emitter voltage (V_{CEO} = 80 V)
- High current transfer ratio (CTR = 200% TYP.)
- High-speed switching (t_r = 3 μs TYP., t_f = 5 μs TYP.)
- Ordering number of taping product: PS2561BL-1-E3, E4, F3, F4
  : PS2561BL2-1-E3, E4
- Pb-Free product

★ • Safety standards
  - UL approved: File No. E72422
  - CSA approved: No. CA 101391
  - BSI approved: No. 7112/7420
  - SEMKO approved: No. 408808
  - NEMKO approved: No. P04202822
  - DEMKO approved: No. 312926
  - FIMKO approved: No. FI 21008
  - DIN EN60747-5-2 (VDE0884 Part2) approved: No. 40008862 (Option)

PIN CONNECTION
(Top View)



1. Anode
2. Cathode
3. Emitter
4. Collector

APPLICATIONS

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

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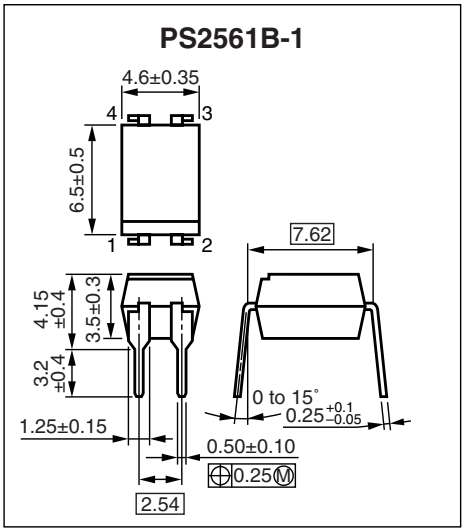
Date Published September 2005 CP(K)
Printed in Japan

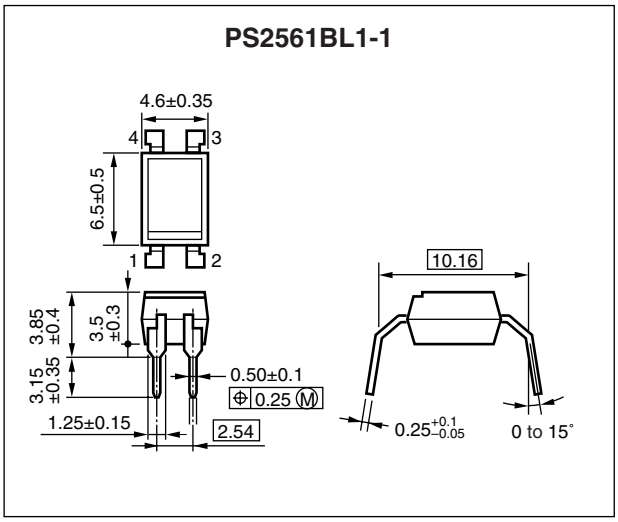
The mark ★ shows major revised points.

★ PACKAGE DIMENSIONS (UNIT : mm)

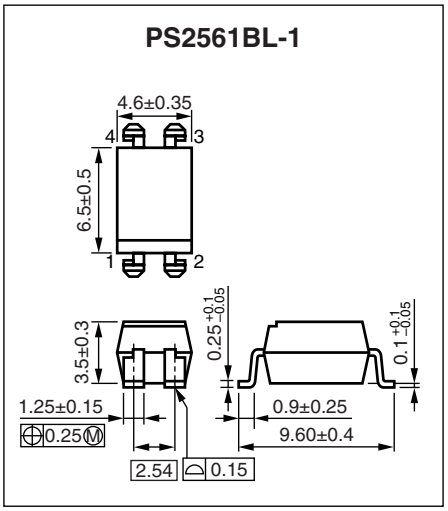
DIP Type



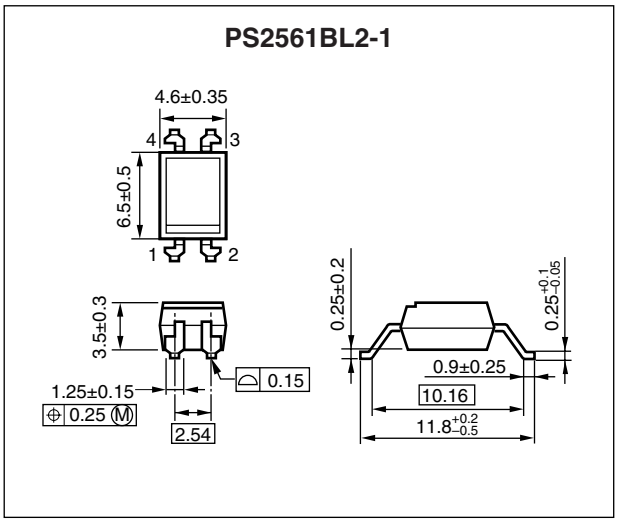
Long Creepage Distance



Lead Bending Type

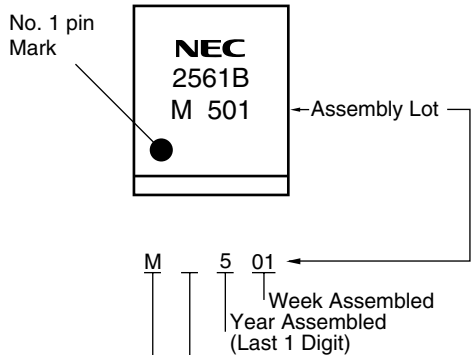


Long Creepage Distance (Gull-Wing)



★ **MARKING EXAMPLE**

PS2561B-1



Package	Solder Plating Specification	Made in Japan
New PKG	Pb-Free	J

★ ORDERING INFORMATION

Part Number	Order Number	Solder Plating Specification	Packing Style	Safety Standard Approval	Application Part Number*1
PS2561B-1	PS2561B-1-A	Pb-Free	Magazine case 100 pcs	Standard products (UL, CSA, BSI, NEMKO, DEMKO, SEMKO, FIMKO approved)	PS2561B-1
PS2561BL-1	PS2561BL-1-A				
PS2561BL1-1	PS2561BL1-1-A				
PS2561BL2-1	PS2561BL2-1-A				
PS2561BL-1-E3	PS2561BL-1-E3-A		Embossed Tape 1 000 pcs/reel		
PS2561BL-1-E4	PS2561BL-1-E4-A				
PS2561BL-1-F3	PS2561BL-1-F3-A		Embossed Tape 2 000 pcs/reel		
PS2561BL-1-F4	PS2561BL-1-F4-A				
PS2561BL2-1-E3	PS2561BL2-1-E3-A		Embossed Tape 1 000 pcs/reel		
PS2561BL2-1-E4	PS2561BL2-1-E4-A				
PS2561B-1-V	PS2561B-1-V-A		Magazine case 100 pcs	DIN EN60747-5-2 (VDE0884 Part2) approved (Option)	
PS2561BL-1-V	PS2561BL-1-V-A				
PS2561BL1-1-V	PS2561BL1-1-V-A				
PS2561BL2-1-V	PS2561BL2-1-V-A				
PS2561BL-1-V-E3	PS2561BL-1-V-E3-A		Embossed Tape 1 000 pcs/reel		
PS2561BL-1-V-E4	PS2561BL-1-V-E4-A				
PS2561BL-1-V-F3	PS2561BL-1-V-F3-A		Embossed Tape 2 000 pcs/reel		
PS2561BL-1-V-F4	PS2561BL-1-V-F4-A				
PS2561BL2-1-V-E3	PS2561BL2-1-V-E3-A		Embossed Tape 1 000 pcs/reel		
PS2561BL2-1-V-E4	PS2561BL2-1-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	Reverse Voltage	V_R	6	V
	Forward Current (DC)	I_F	40	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}	80	V
	Emitter to Collector Voltage	V_{ECO}	7	V
	Collector Current	I_C	50	mA
	Power Dissipation Derating	ΔP_C/°C	1.5	mW/°C
	Power Dissipation	P_C	150	mW
Isolation Voltage*2		BV	5 000	Vr.m.s.
Operating Ambient Temperature		T_A	–55 to +110	°C
Storage Temperature		T_{stg}	–55 to +150	°C

***1** PW = 100 μs, Duty Cycle = 1%

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

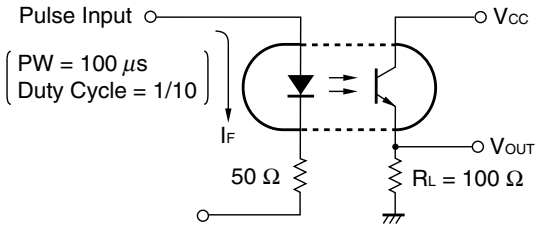
★ ELECTRICAL CHARACTERISTICS (T_A = 25°C)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V_F	I_F = 10 mA		1.17	1.4	V
	Reverse Current	I_R	V_R = 5 V			5	μA
	Terminal Capacitance	C_t	V = 0 V, f = 1.0 MHz		50		pF
Transistor	Collector to Emitter Dark Current	I_{CEO}	V_{CE} = 48 V, I_F = 0 mA			100	nA
Coupled	Current Transfer Ratio (I_C/I_F)*1	CTR	I_F = 5 mA, V_{CE} = 5 V	100	200	400	%
			I_F = 1 mA, V_{CE} = 5 V	50	100		
	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** CTR rank

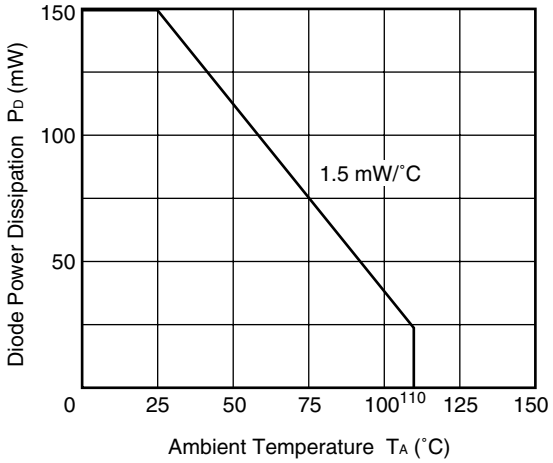
CTR Rank	CTR (%)	Conditions
Q	100 to 200	I_F = 5 mA, V_{CE} = 5 V
	50 and larger	I_F = 1 mA, V_{CE} = 5 V
W	130 to 260	I_F = 5 mA, V_{CE} = 5 V
	70 and larger	I_F = 1 mA, V_{CE} = 5 V
D	100 to 300	I_F = 5 mA, V_{CE} = 5 V
	50 and larger	I_F = 1 mA, V_{CE} = 5 V
L	200 to 400	I_F = 5 mA, V_{CE} = 5 V
	100 and larger	I_F = 1 mA, V_{CE} = 5 V
N	100 to 400	I_F = 5 mA, V_{CE} = 5 V
	50 and larger	I_F = 1 mA, V_{CE} = 5 V

***2** Test circuit for switching time

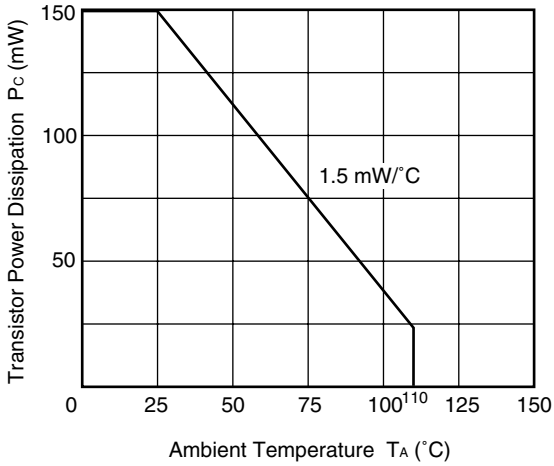


★ TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise specified)

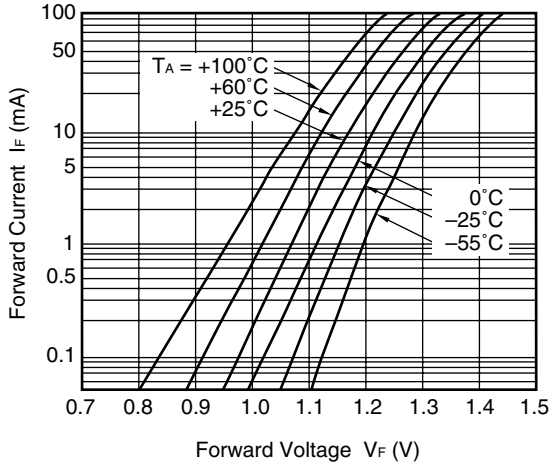
DIODE POWER DISSIPATION vs. AMBIENT TEMPERATURE



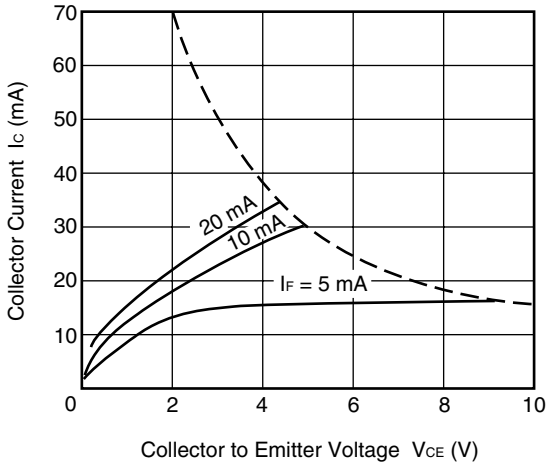
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



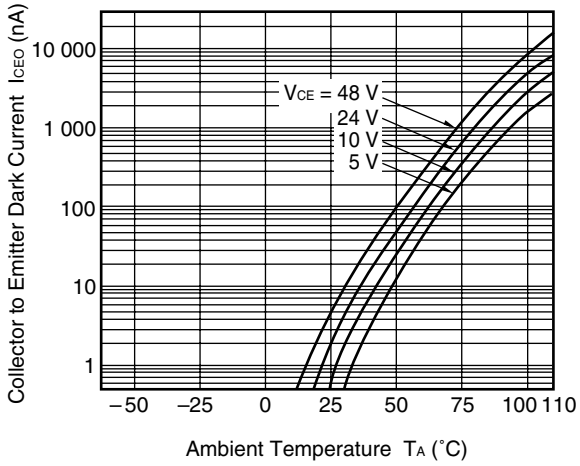
FORWARD CURRENT vs. FORWARD VOLTAGE



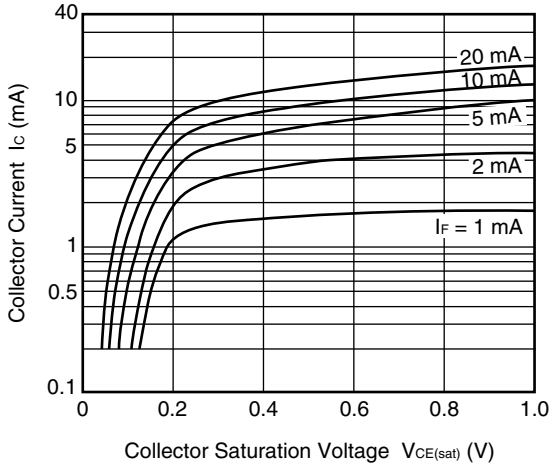
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE

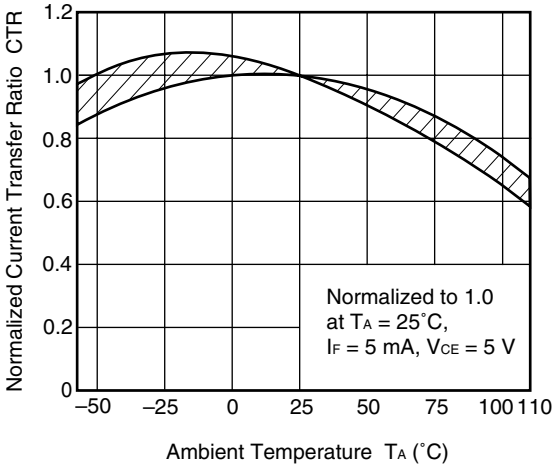


COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE

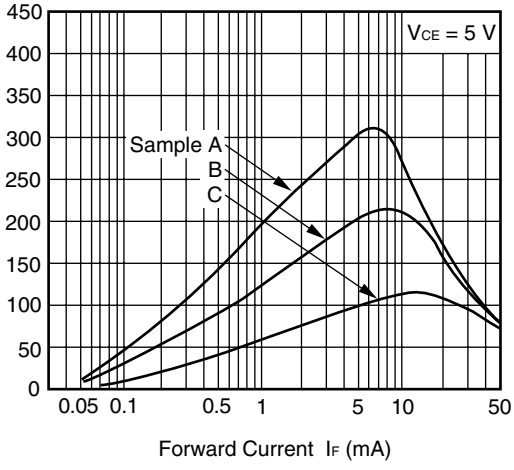


Remark The graphs indicate nominal characteristics.

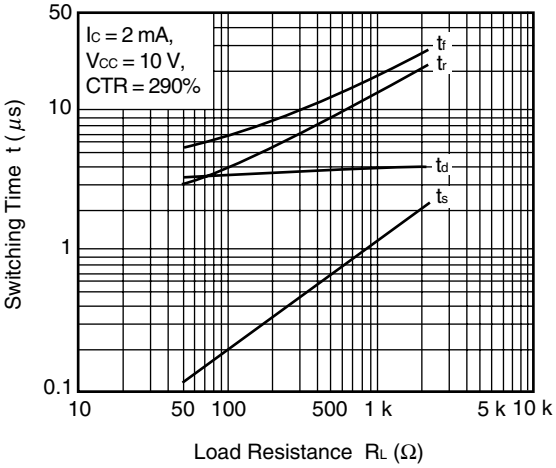
NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE



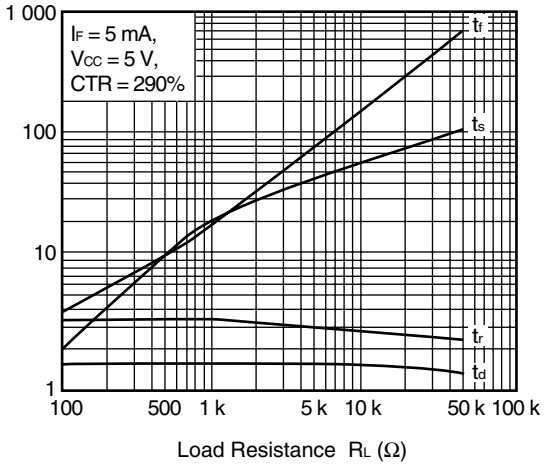
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



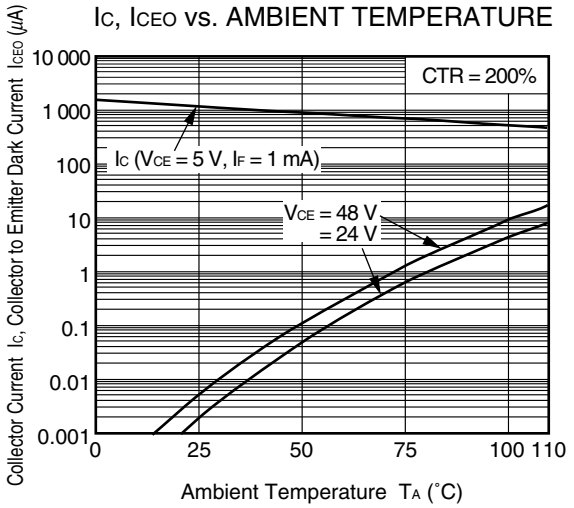
SWITCHING TIME vs. LOAD RESISTANCE



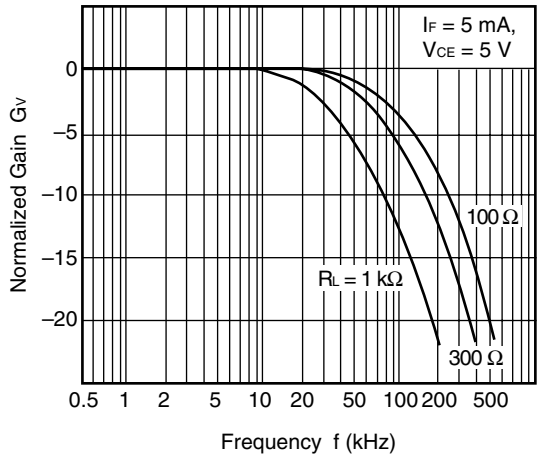
SWITCHING TIME vs. LOAD RESISTANCE



IC, ICEO vs. AMBIENT TEMPERATURE

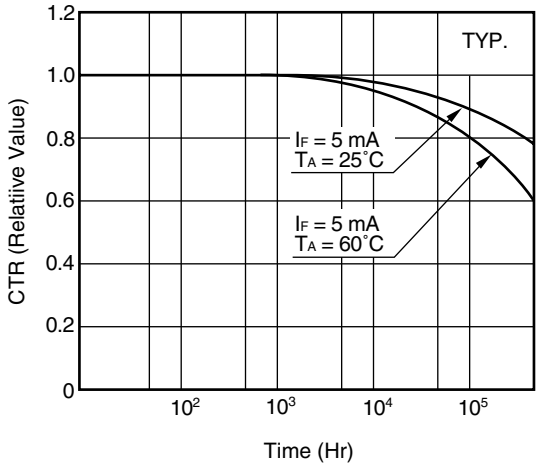


FREQUENCY RESPONSE



Remark The graphs indicate nominal characteristics.

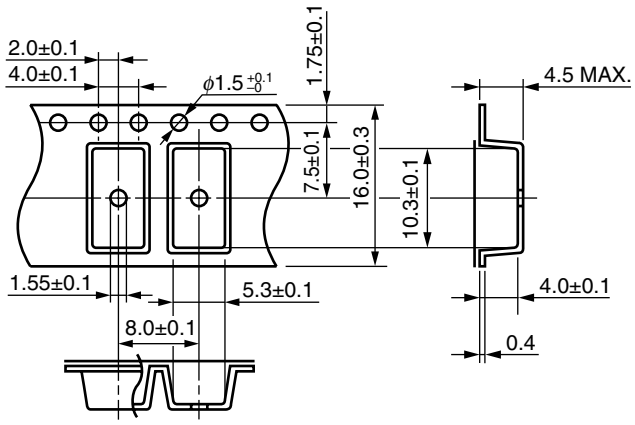
LONG TERM CTR DEGRADATION



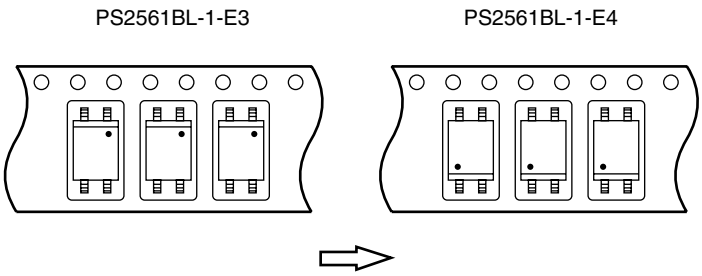
Remark The graph indicates nominal characteristics.

TAPING SPECIFICATIONS (UNIT : mm)

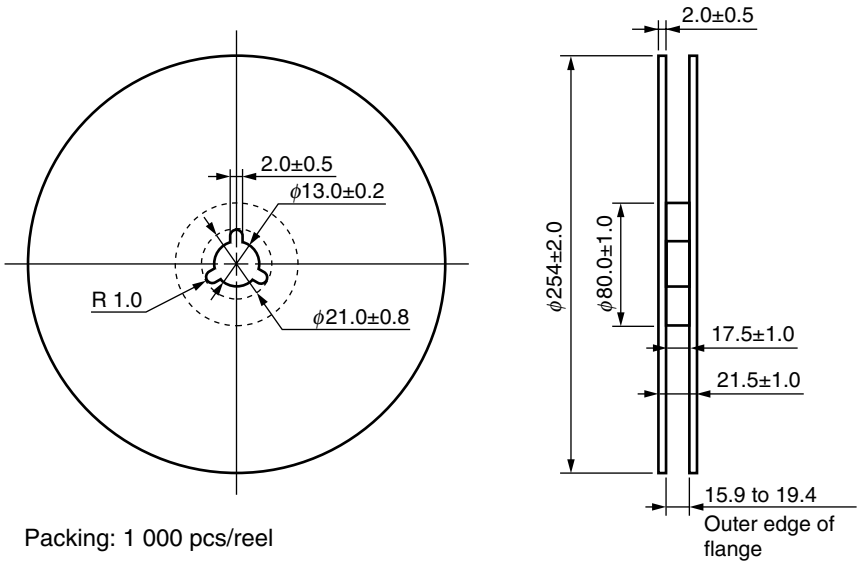
Outline and Dimensions (Tape)



Tape Direction

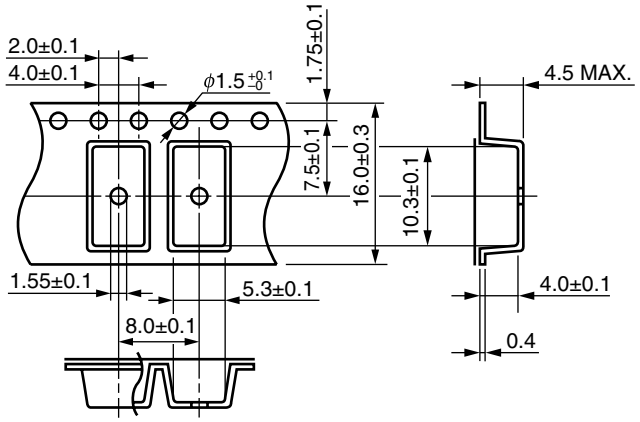


Outline and Dimensions (Reel)



Packing: 1 000 pcs/reel

Outline and Dimensions (Tape)



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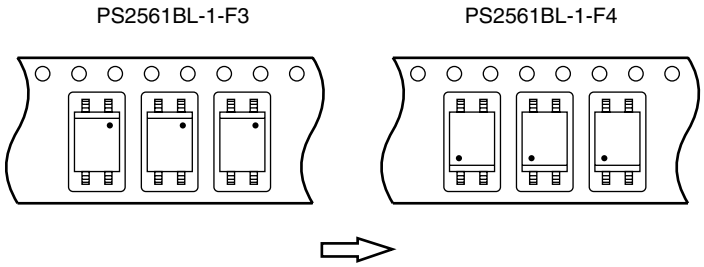
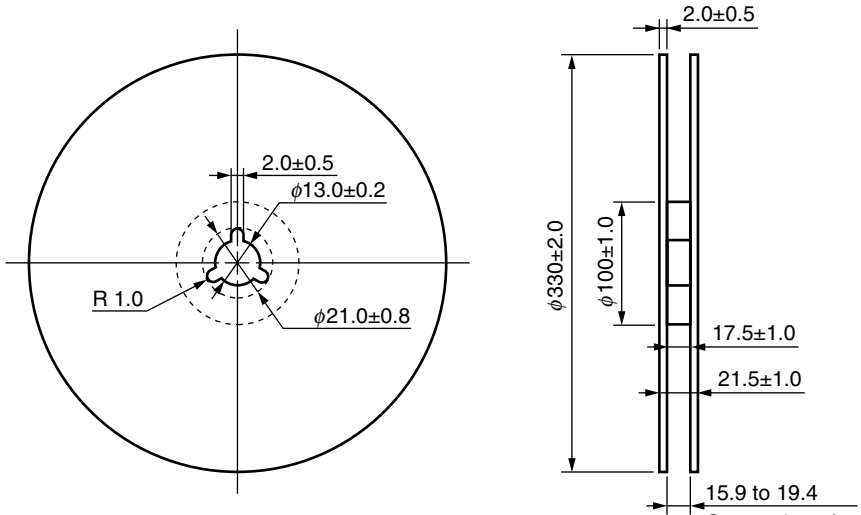
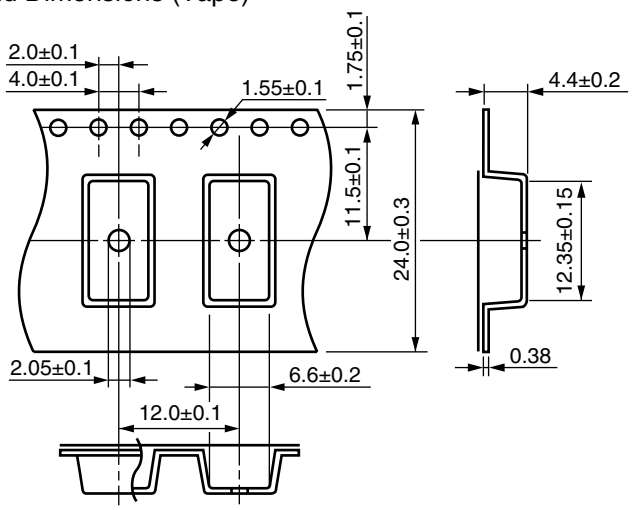


Outline and Dimensions (Reel)

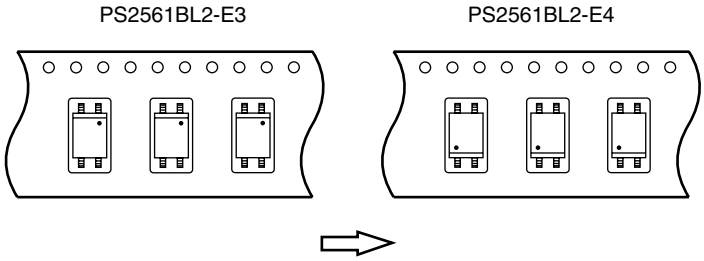


Packing: 2 000 pcs/reel

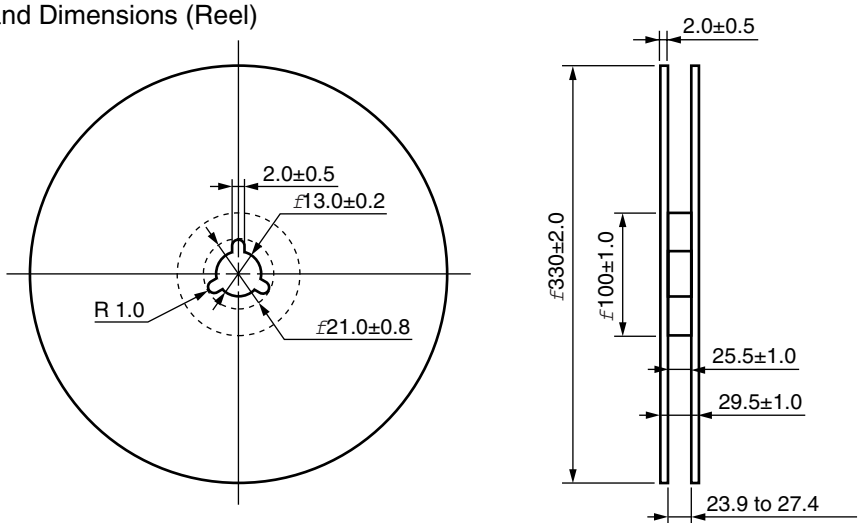
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



Packing: 1 000 pcs/reel

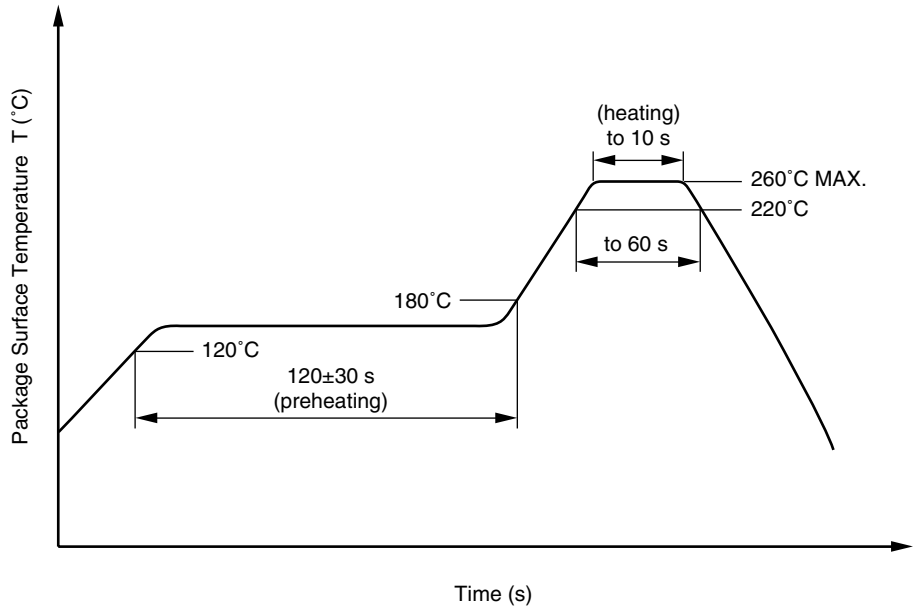
NOTES ON HANDLING

1. Recommended soldering conditions

(1) Infrared reflow soldering

- Peak reflow temperature — 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 corrector-emitters at startup, the output side may enter the on state, even if the voltage is within the absolute maximum ratings.

USAGE CAUTIONS

1. Protect against static electricity when handling.
2. Avoid storage at a high temperature and high humidity.

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  (2) "NEC semiconductor products" means any semiconductor product developed or manufactured by or for NEC (as defined above).

M8E 00.4-0110

Caution GaAs Products	This product uses gallium arsenide (GaAs). GaAs vapor and powder are hazardous to human health if inhaled or ingested, so please observe the following points. • Follow related laws and ordinances when disposing of the product. If there are no applicable laws and/or ordinances, dispose of the product as recommended below. 1. Commission a disposal company able to (with a license to) collect, transport and dispose of materials that contain arsenic and other such industrial waste materials. 2. Exclude the product from general industrial waste and household garbage, and ensure that the product is controlled (as industrial waste subject to special control) up until final disposal. • Do not burn, destroy, cut, crush, or chemically dissolve the product. • Do not lick the product or in any way allow it to enter the mouth.

▶**For further information, please contact**

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