

DATA SHEET

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.

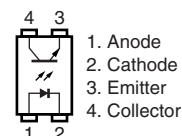
The PS2561BL1-1 is lead bending type for long creepage distance.

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 ($V_{CE0} = 80$ V)
- High current transfer ratio (CTR = 200% TYP.)
- High-speed switching ($t_r = 3 \mu\text{s}$ TYP., $t_f = 5 \mu\text{s}$ 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)



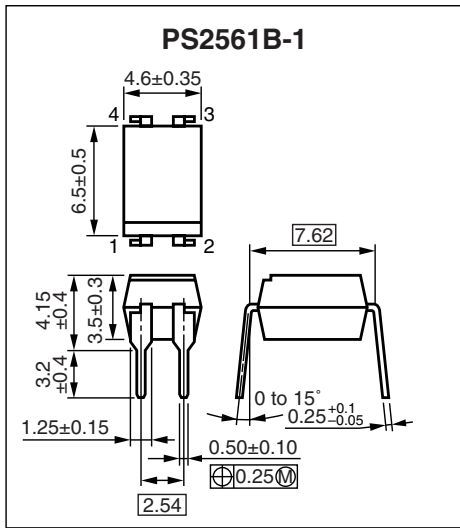
APPLICATIONS

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

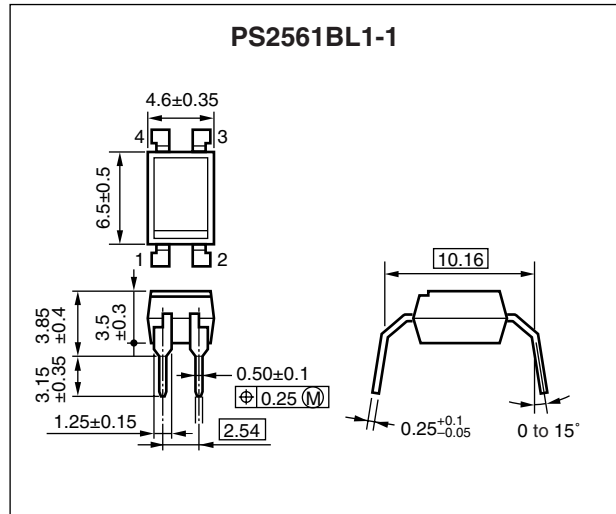
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PACKAGE DIMENSIONS (UNIT : mm)

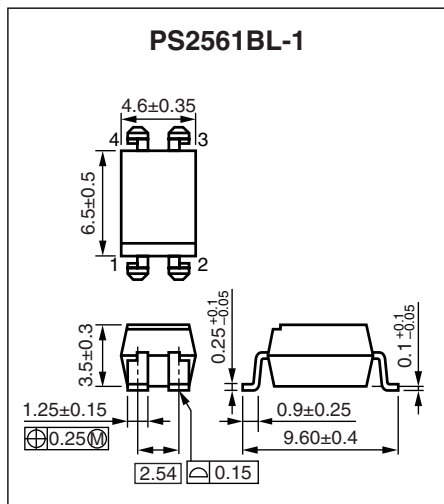
DIP Type



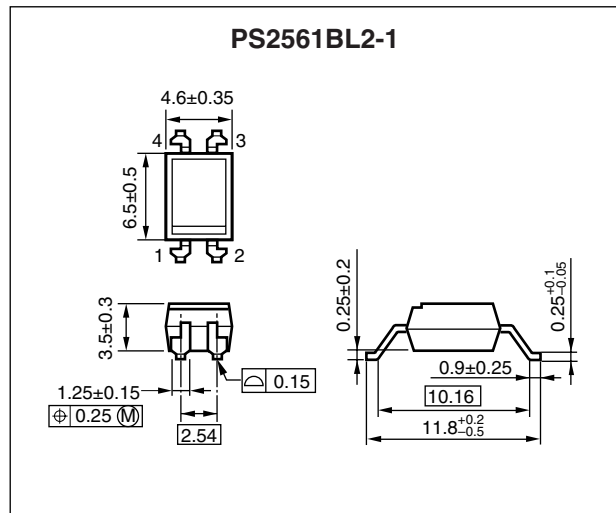
Long Creepage Distance



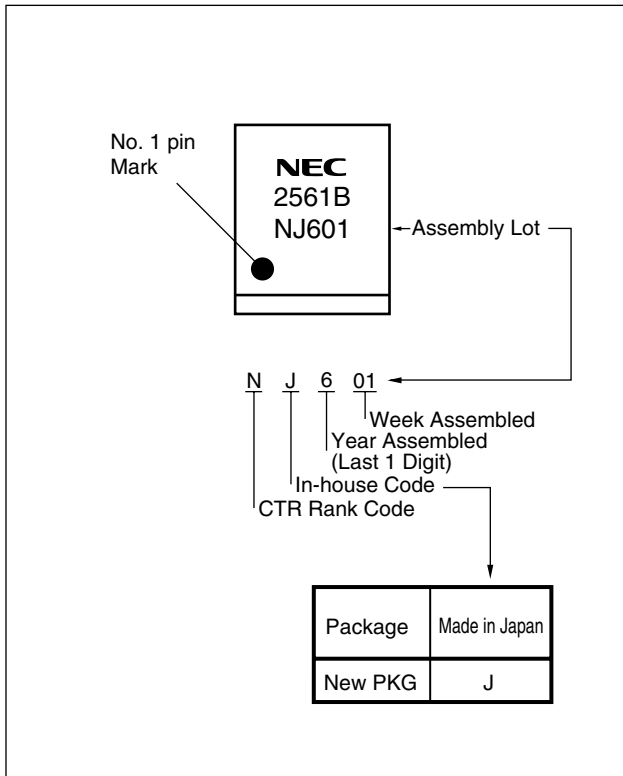
Lead Bending Type



Long Creepage Distance (Gull-Wing)



★ MARKING EXAMPLE



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 T_A = 25°C, RH = 60% between input and output.
Pins 1-2 shorted together, 3-4 shorted together.

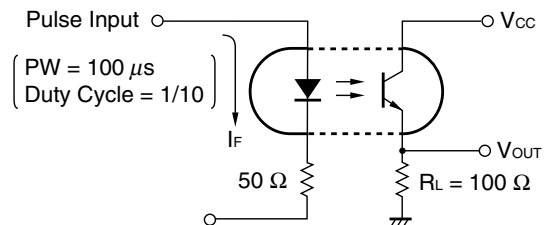
ELECTRICAL CHARACTERISTICS (T_A = 25°C)

| Parameter | | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|------------|--|----------------------|---|------------------|------|------|------|
| Diode | Forward Voltage | V _F | I _F = 10 mA | | 1.17 | 1.4 | V |
| | 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 | | |

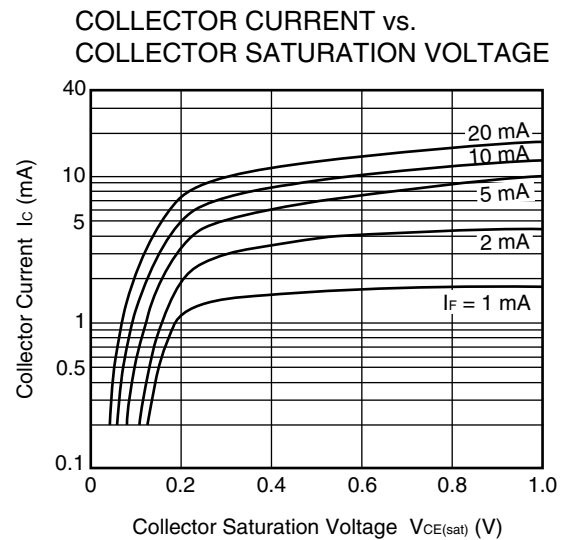
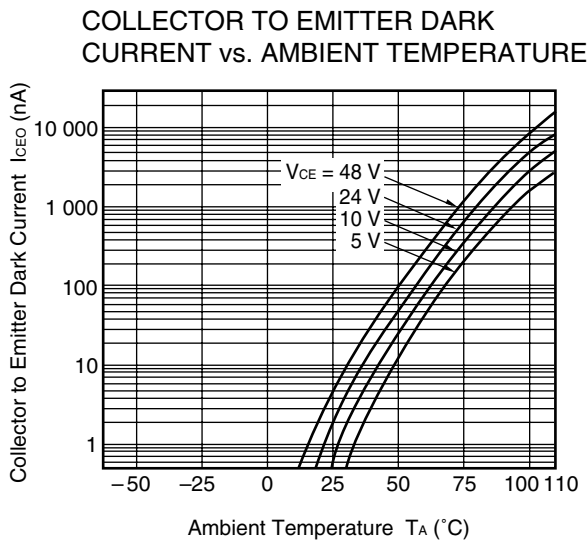
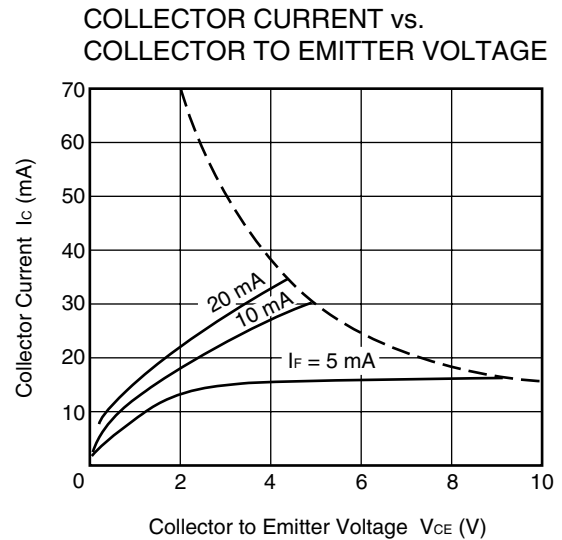
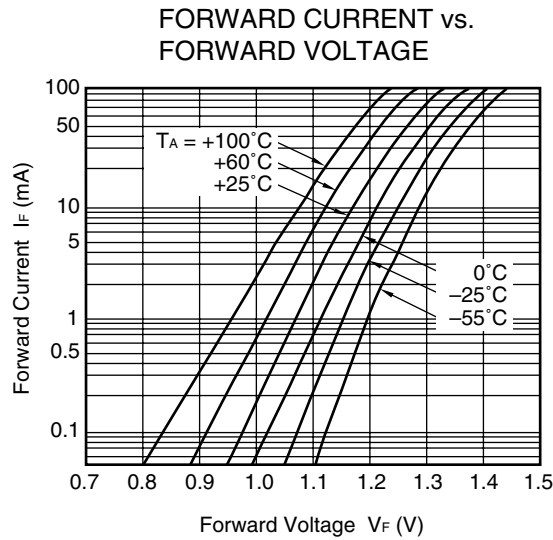
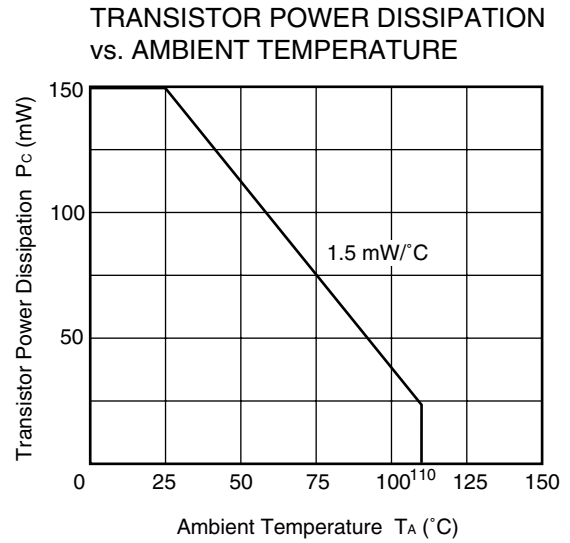
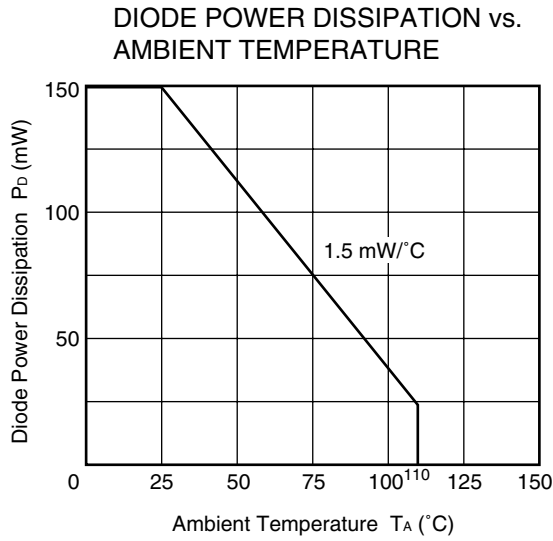
*1 CTR rank

| 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

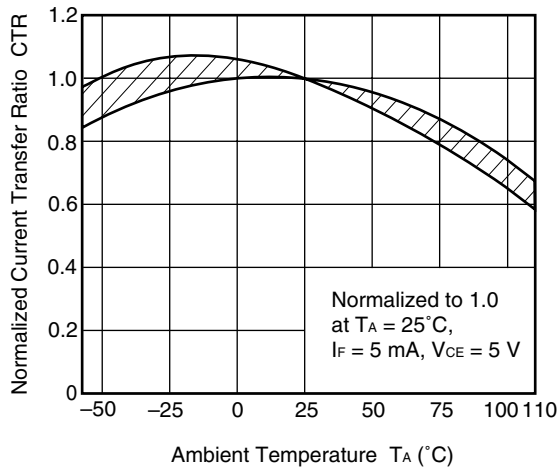


TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise specified)

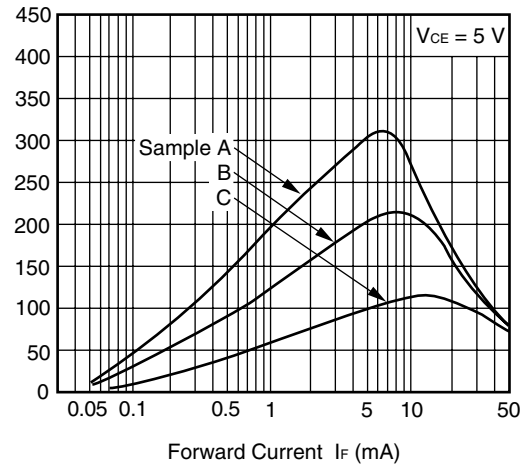


Remark The graphs indicate nominal characteristics.

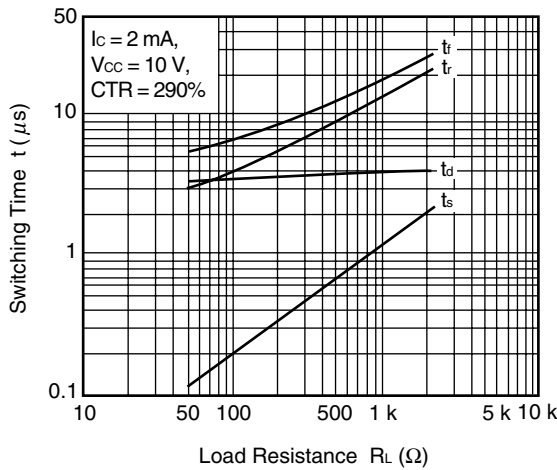
NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE



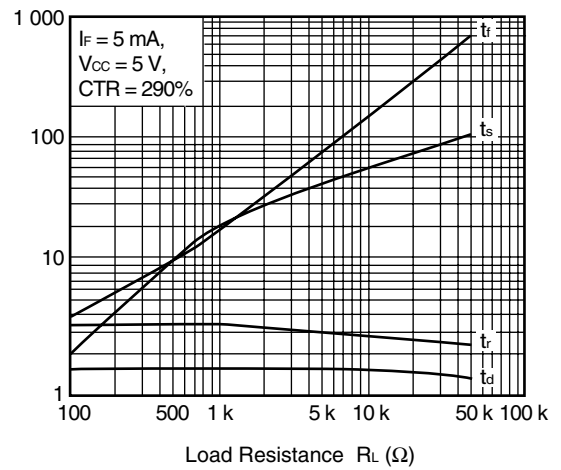
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



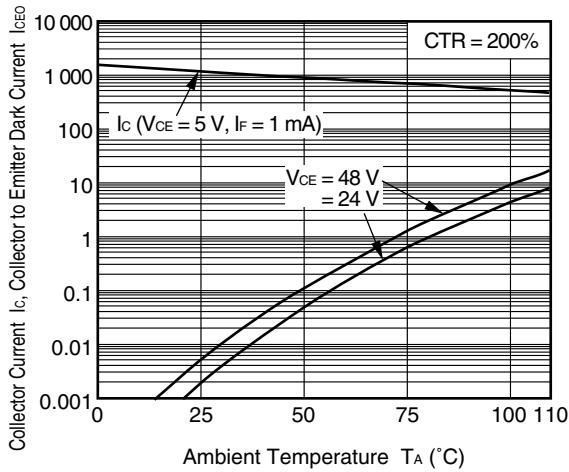
SWITCHING TIME vs. LOAD RESISTANCE



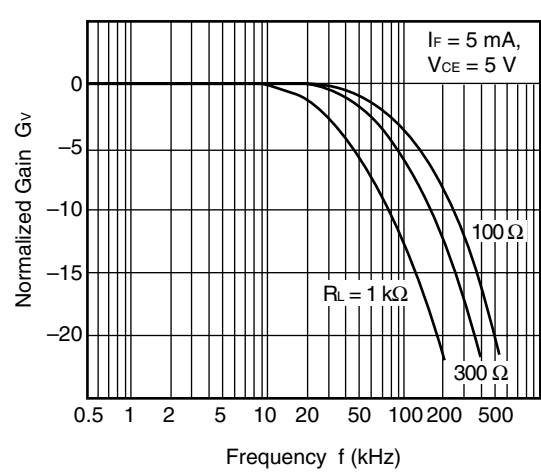
SWITCHING TIME vs. LOAD RESISTANCE



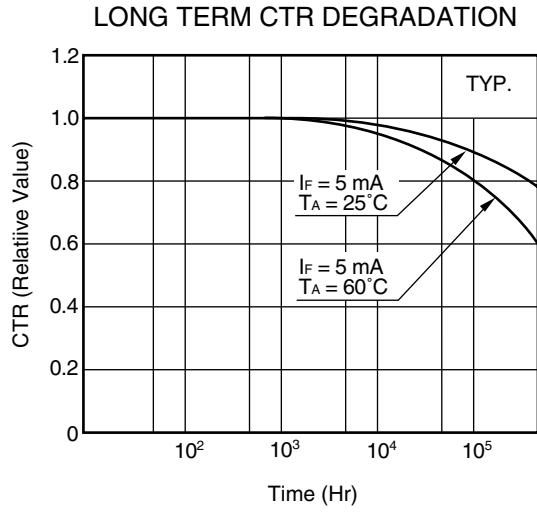
IC, ICEO vs. AMBIENT TEMPERATURE



FREQUENCY RESPONSE



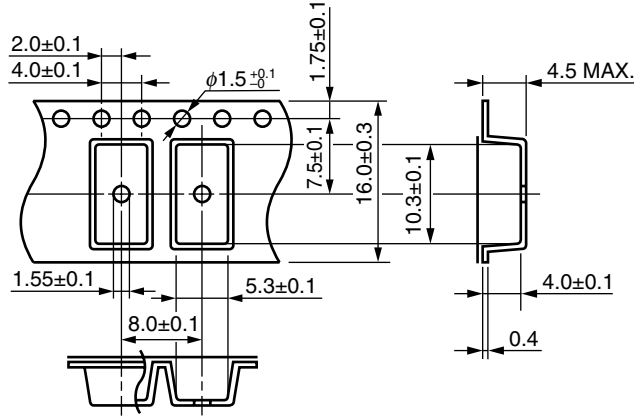
Remark The graphs indicate nominal characteristics.



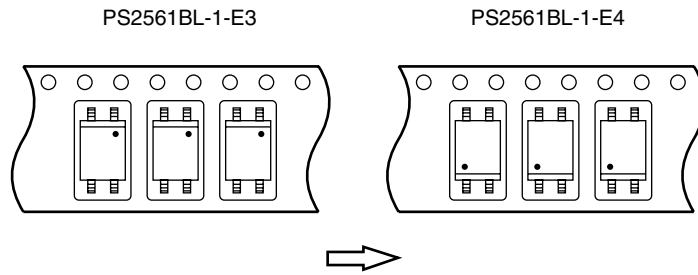
Remark The graph indicates nominal characteristics.

TAPING SPECIFICATIONS (UNIT : mm)

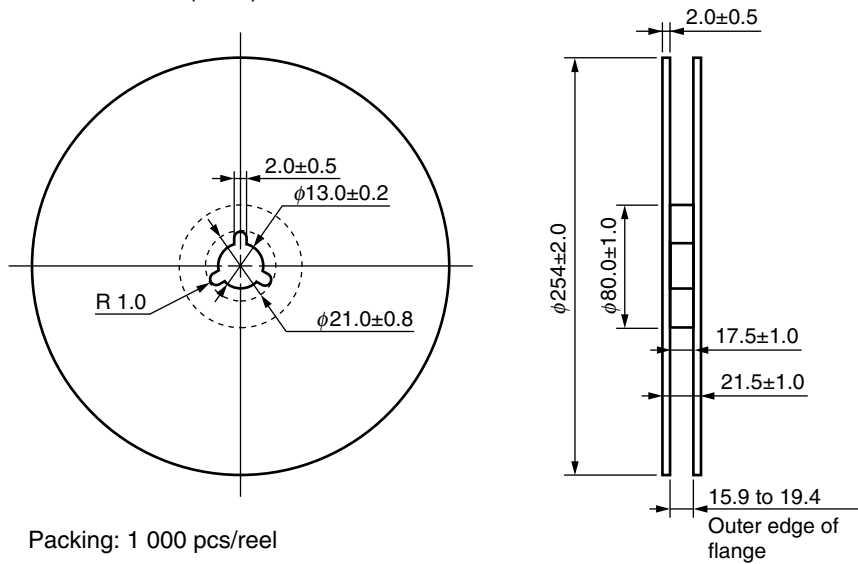
Outline and Dimensions (Tape)



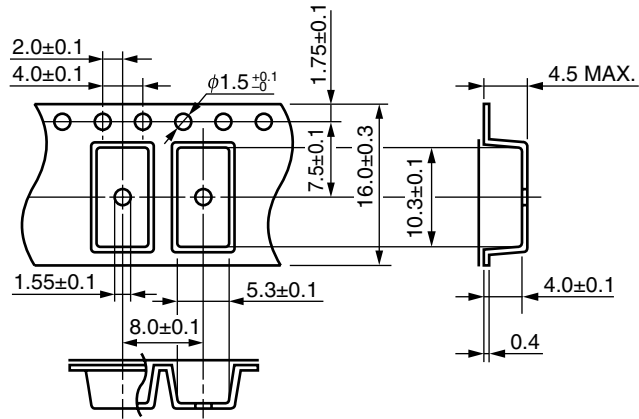
Tape Direction



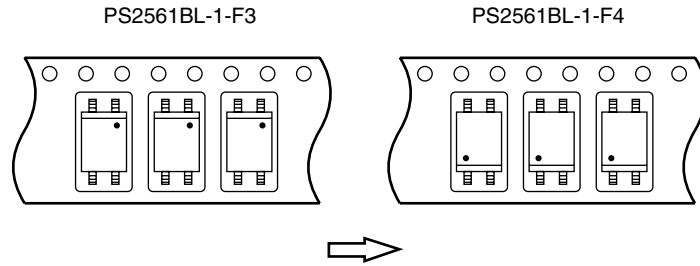
Outline and Dimensions (Reel)



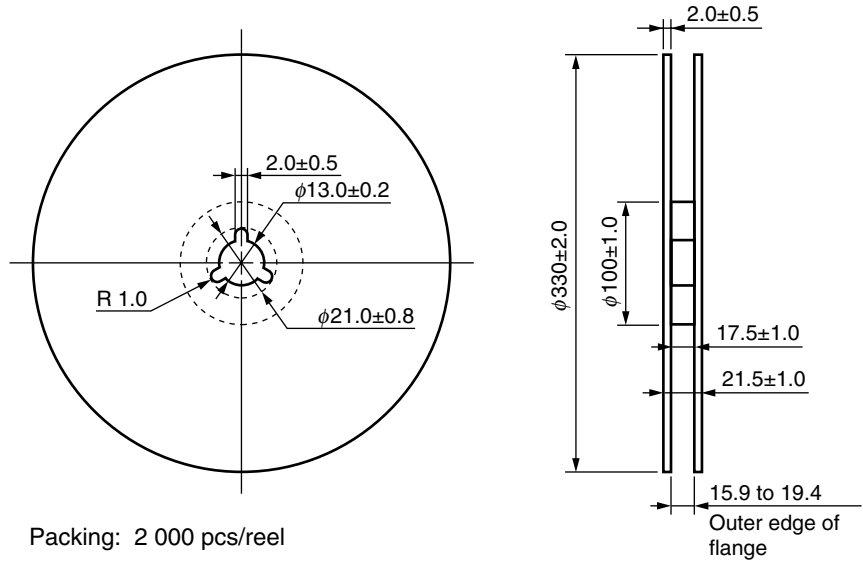
Outline and Dimensions (Tape)



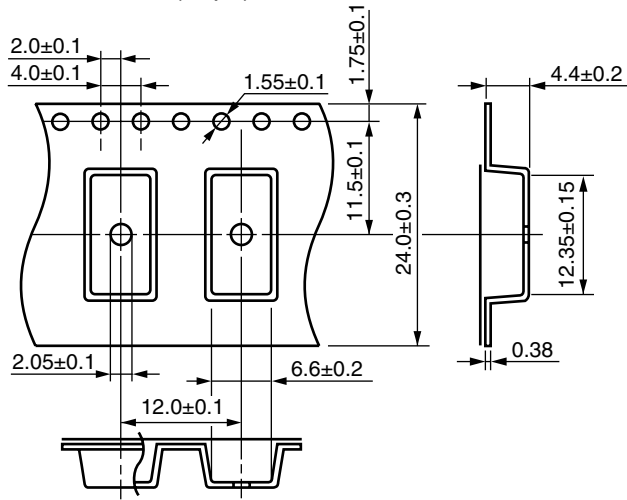
Tape Direction



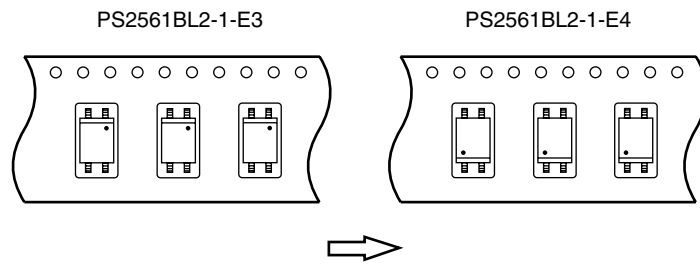
Outline and Dimensions (Reel)



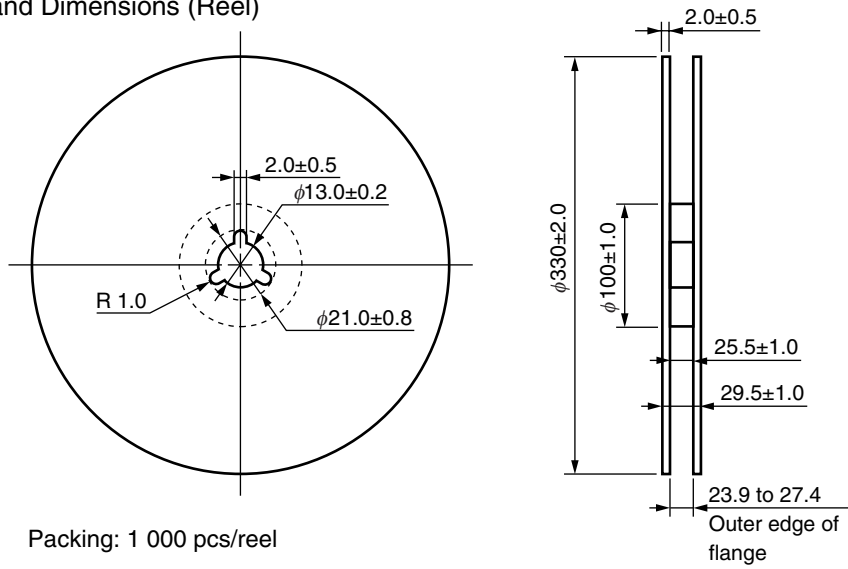
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



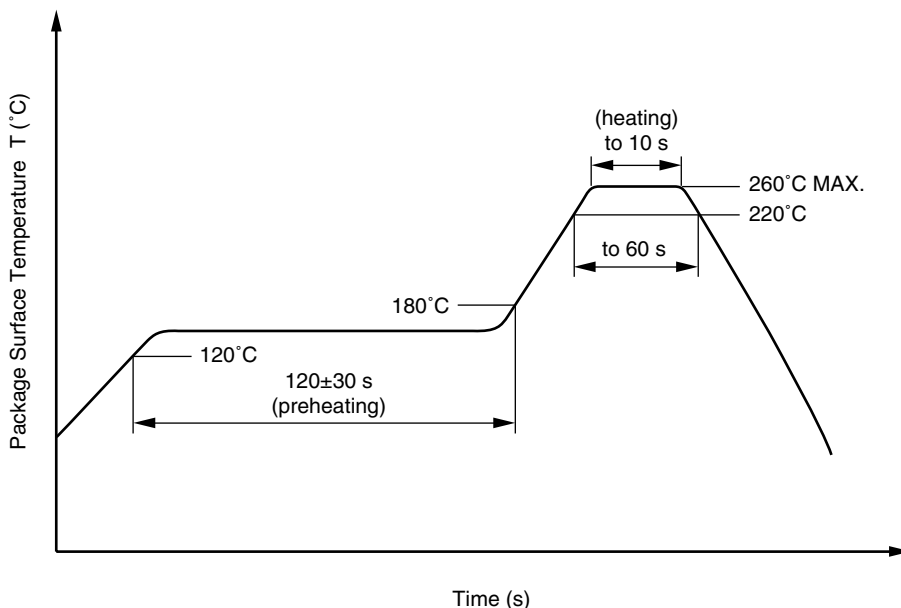
NOTES ON HANDLING

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 corrector-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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M8E 00.4-0110

| | | |
|-----------------------|----------------------|---|
| <p>Caution</p> | <p>GaAs Products</p> | <p>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.</p> <ul style="list-style-type: none"> • 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. <ol style="list-style-type: none"> 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**

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