

### 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.

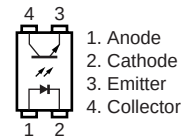
The PS2561BL2-1 is lead bending type for long creepage distance (Gull-wing) for surface mount.

#### FEATURES

- ★ • Operating ambient temperature: 110°C
- High Isolation voltage ( $BV = 5\,000\text{ V r.m.s.}$ )
- High collector to emitter voltage ( $V_{CEO} = 80\text{ V}$ )
- High current transfer ratio ( $CTR = 200\% \text{ TYP.}$ )
- 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)



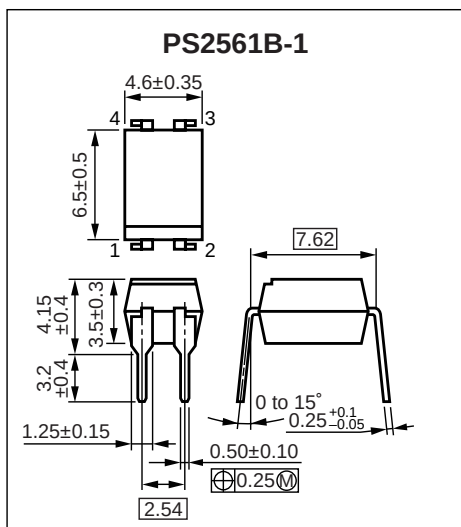
#### APPLICATIONS

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

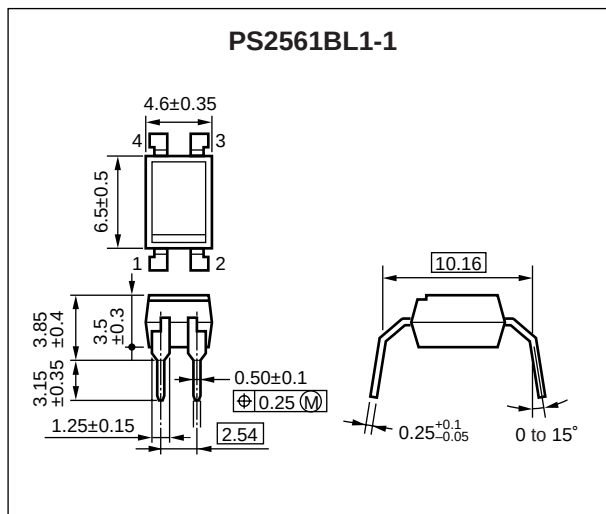
The information in this document is subject to change without notice. Before using this document, please confirm that this is the latest version.

★ PACKAGE DIMENSIONS (UNIT : mm)

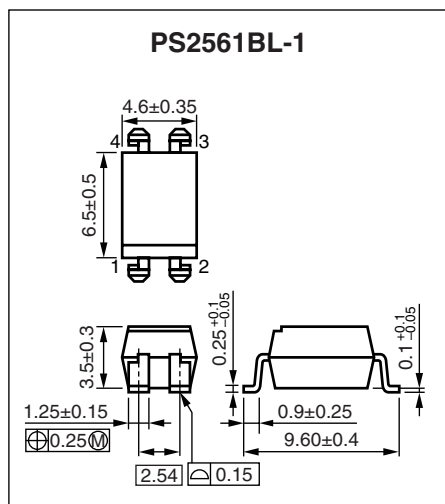
DIP Type



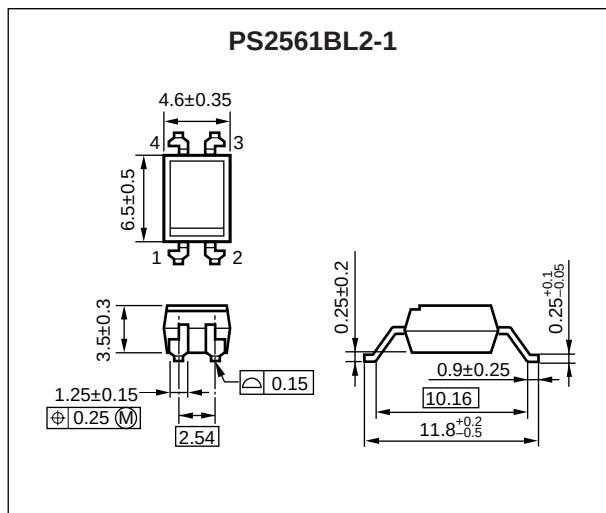
Long Creepage Distance



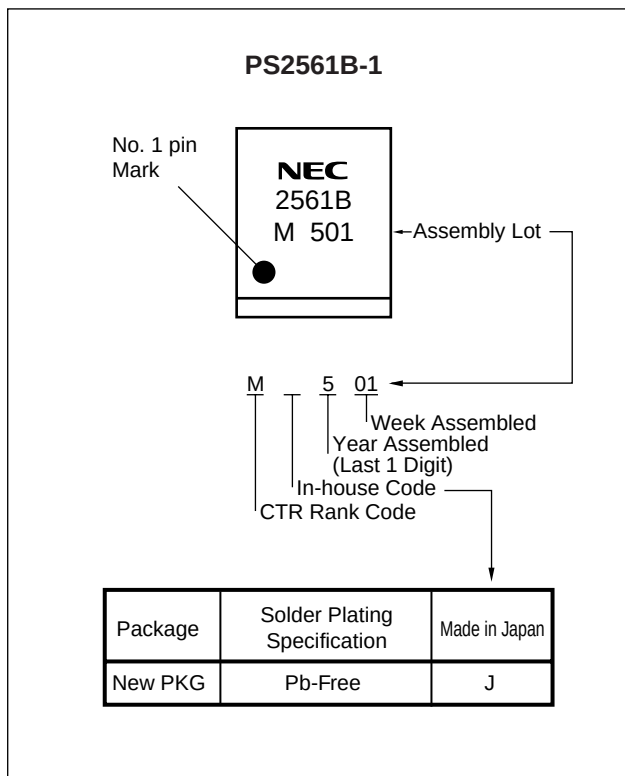
Lead Bending Type



Long Creepage Distance (Gull-Wing)



★ MARKING EXAMPLE



**★ ORDERING INFORMATION**

| Part Number      | Order Number       | Solder Plating Specification | Packing Style                | Safety Standard Approval                                                          | Application Part Number<br>*1 |
|------------------|--------------------|------------------------------|------------------------------|-----------------------------------------------------------------------------------|-------------------------------|
| PS2561B-1        | PS2561B-1-A        | Pb-Free                      | Magazine case 100 pcs        | Standard products<br>(UL, CSA, BSI,<br>NEMKO, DEMKO,<br>SEMKO, FIMKO<br>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<br>(VDE0884 Part2)<br>approved<br>(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<sub>A</sub> = 25°C, unless otherwise specified)**

| Parameter                       |                                    | Symbol              | Ratings     | Unit    |
|---------------------------------|------------------------------------|---------------------|-------------|---------|
| Diode                           | Reverse Voltage                    | V <sub>R</sub>      | 6           | V       |
|                                 | Forward Current (DC)               | I <sub>F</sub>      | 40          | mA      |
|                                 | Power Dissipation Derating         | ΔP <sub>D</sub> /°C | 1.5         | mW/°C   |
|                                 | Power Dissipation                  | P <sub>D</sub>      | 150         | mW      |
|                                 | Peak Forward Current <sup>*1</sup> | I <sub>FP</sub>     | 1           | A       |
| Transistor                      | Collector to Emitter Voltage       | V <sub>CEO</sub>    | 80          | V       |
|                                 | Emitter to Collector Voltage       | V <sub>ECO</sub>    | 7           | V       |
|                                 | Collector Current                  | I <sub>C</sub>      | 50          | mA      |
|                                 | Power Dissipation Derating         | ΔP <sub>C</sub> /°C | 1.5         | mW/°C   |
|                                 | Power Dissipation                  | P <sub>C</sub>      | 150         | mW      |
| Isolation Voltage <sup>*2</sup> |                                    | BV                  | 5 000       | Vr.m.s. |
| Operating Ambient Temperature   |                                    | T <sub>A</sub>      | –55 to +110 | °C      |
| Storage Temperature             |                                    | T <sub>stg</sub>    | –55 to +150 | °C      |

**\*1** PW = 100 μs, Duty Cycle = 1%

**\*2** AC voltage for 1 minute at T<sub>A</sub> = 25°C, RH = 60% between input and output.

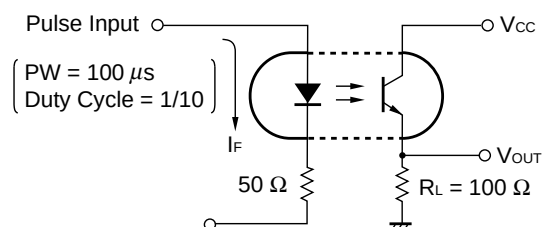
Pins 1-2 shorted together, 3-4 shorted together.

**★ ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)**

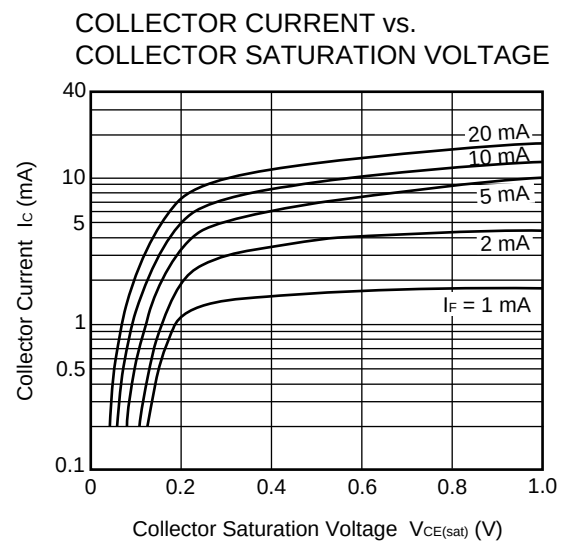
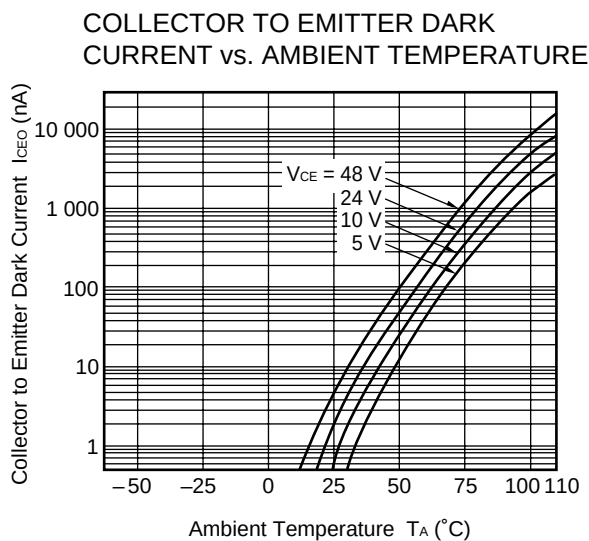
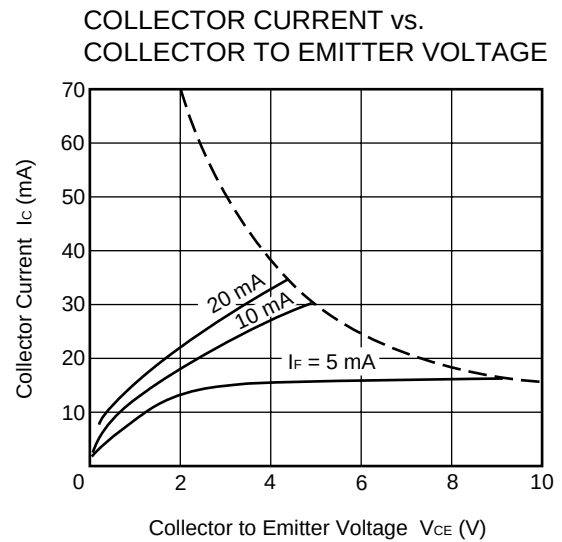
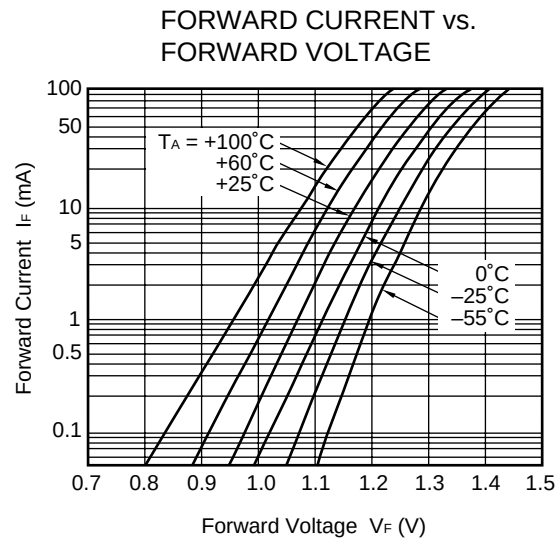
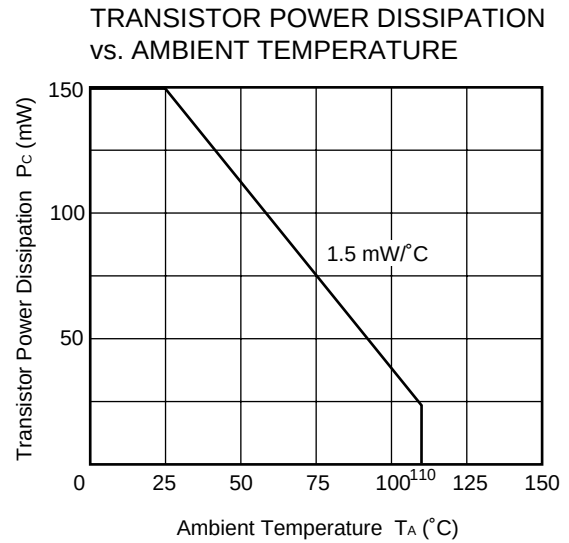
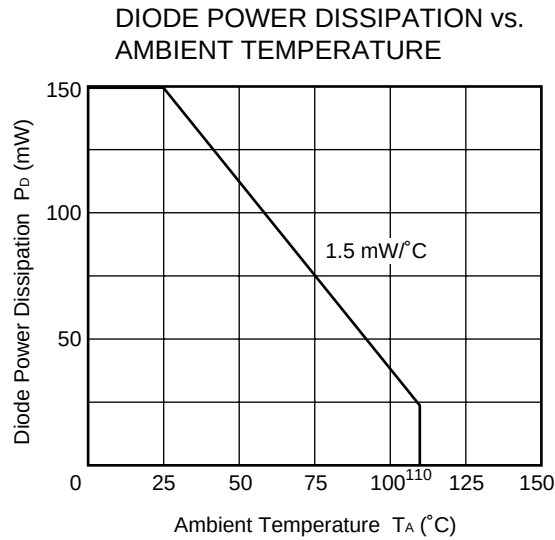
| Parameter  |                                                                        | Symbol               | Conditions                                                            | MIN.             | TYP. | MAX. | Unit |
|------------|------------------------------------------------------------------------|----------------------|-----------------------------------------------------------------------|------------------|------|------|------|
| Diode      | Forward Voltage                                                        | V <sub>F</sub>       | I <sub>F</sub> = 10 mA                                                |                  | 1.17 | 1.4  | V    |
|            | Reverse Current                                                        | I <sub>R</sub>       | V <sub>R</sub> = 5 V                                                  |                  |      | 5    | μA   |
|            | Terminal Capacitance                                                   | C <sub>t</sub>       | V = 0 V, f = 1.0 MHz                                                  |                  | 50   |      | pF   |
| Transistor | Collector to Emitter Dark Current                                      | I <sub>CEO</sub>     | V <sub>CE</sub> = 48 V, I <sub>F</sub> = 0 mA                         |                  |      | 100  | nA   |
| Coupled    | Current Transfer Ratio (I <sub>C</sub> /I <sub>F</sub> )* <sup>1</sup> | CTR                  | I <sub>F</sub> = 5 mA, V <sub>CE</sub> = 5 V                          | 100              | 200  | 400  | %    |
|            |                                                                        |                      | I <sub>F</sub> = 1 mA, V <sub>CE</sub> = 5 V                          | 50               | 100  |      |      |
|            | Collector Saturation Voltage                                           | V <sub>CE(sat)</sub> | I <sub>F</sub> = 10 mA, I <sub>C</sub> = 2 mA                         |                  |      | 0.3  | V    |
|            | Isolation Resistance                                                   | R <sub>I-O</sub>     | V <sub>I-O</sub> = 1.0 kV <sub>DC</sub>                               | 10 <sup>11</sup> |      |      | Ω    |
|            | Isolation Capacitance                                                  | C <sub>I-O</sub>     | V = 0 V, f = 1.0 MHz                                                  |                  | 0.5  |      | pF   |
|            | Rise Time* <sup>2</sup>                                                | t <sub>r</sub>       | V <sub>CC</sub> = 10 V, I <sub>C</sub> = 2 mA, R <sub>L</sub> = 100 Ω |                  | 3    |      | μs   |
|            | Fall Time* <sup>2</sup>                                                | t <sub>f</sub>       |                                                                       |                  | 5    |      |      |

**\*1 CTR rank**

| CTR Rank | CTR (%)        | Conditions                                   |
|----------|----------------|----------------------------------------------|
| Q        | 100 to 200     | I <sub>F</sub> = 5 mA, V <sub>CE</sub> = 5 V |
|          | 50 and larger  | I <sub>F</sub> = 1 mA, V <sub>CE</sub> = 5 V |
| W        | 130 to 260     | I <sub>F</sub> = 5 mA, V <sub>CE</sub> = 5 V |
|          | 70 and larger  | I <sub>F</sub> = 1 mA, V <sub>CE</sub> = 5 V |
| D        | 100 to 300     | I <sub>F</sub> = 5 mA, V <sub>CE</sub> = 5 V |
|          | 50 and larger  | I <sub>F</sub> = 1 mA, V <sub>CE</sub> = 5 V |
| L        | 200 to 400     | I <sub>F</sub> = 5 mA, V <sub>CE</sub> = 5 V |
|          | 100 and larger | I <sub>F</sub> = 1 mA, V <sub>CE</sub> = 5 V |
| N        | 100 to 400     | I <sub>F</sub> = 5 mA, V <sub>CE</sub> = 5 V |
|          | 50 and larger  | I <sub>F</sub> = 1 mA, V <sub>CE</sub> = 5 V |

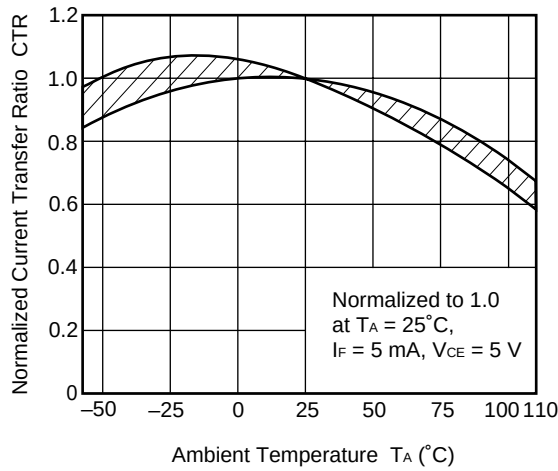
**\*2 Test circuit for switching time**


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

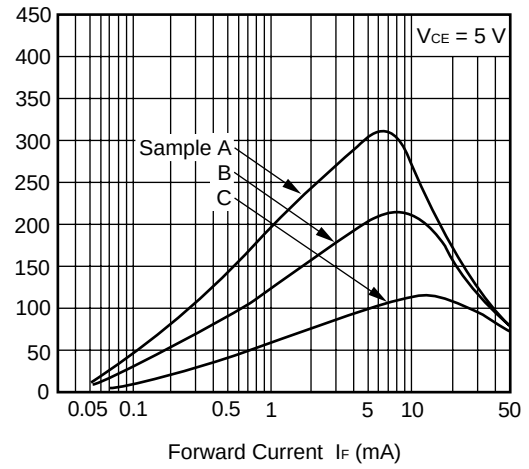


**Remark** The graphs indicate nominal characteristics.

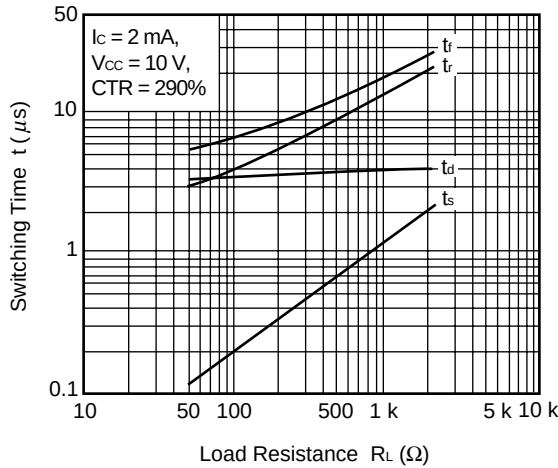
NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE



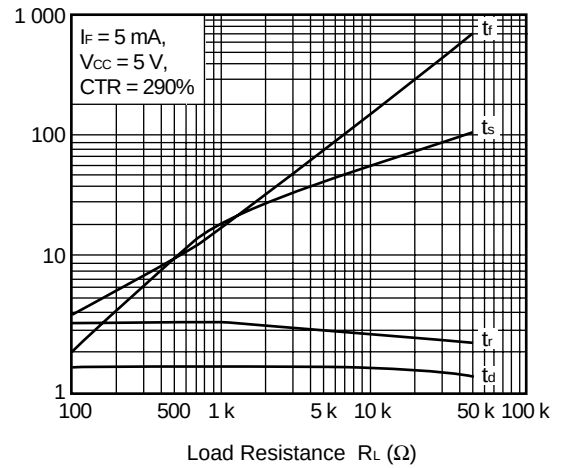
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



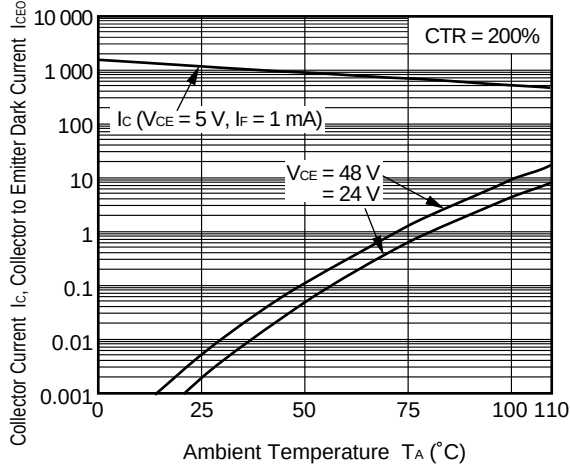
SWITCHING TIME vs. LOAD RESISTANCE



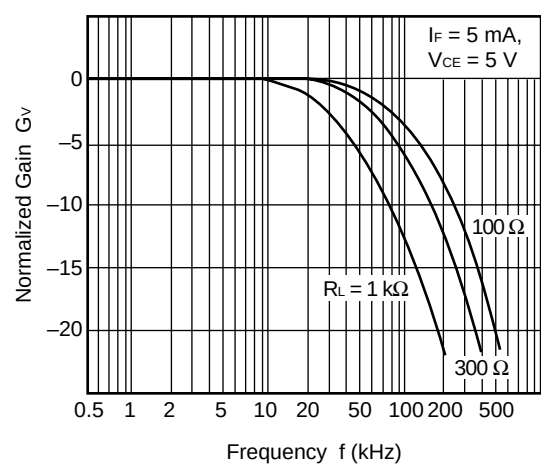
SWITCHING TIME vs. LOAD RESISTANCE



IC, ICEO vs. AMBIENT TEMPERATURE

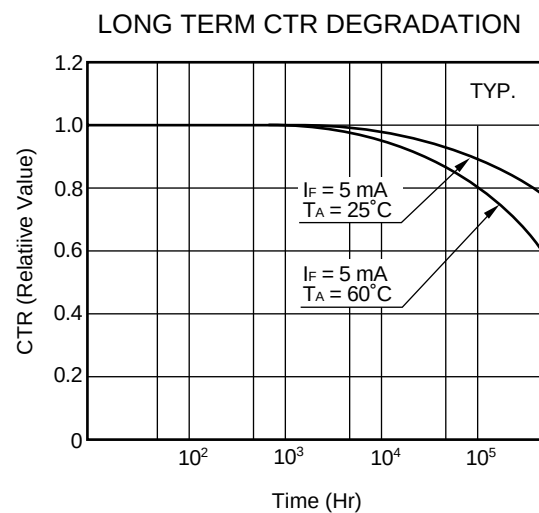


FREQUENCY RESPONSE



**Remark** The graphs indicate nominal characteristics.

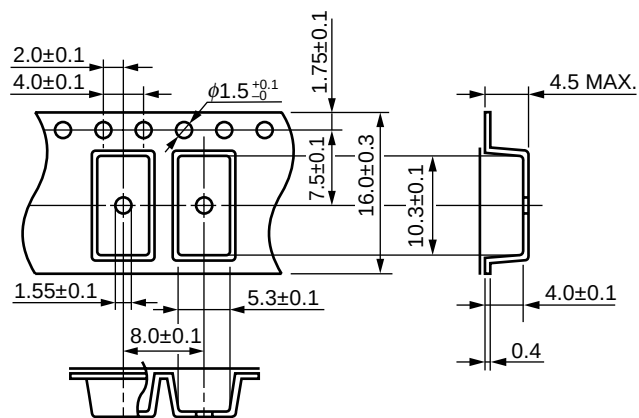




**Remark** The graph indicates nominal characteristics.

**TAPING SPECIFICATIONS (UNIT : mm)**

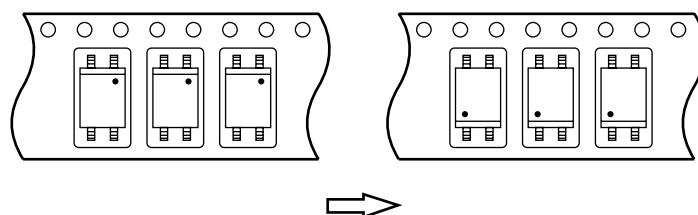
**Outline and Dimensions (Tape)**



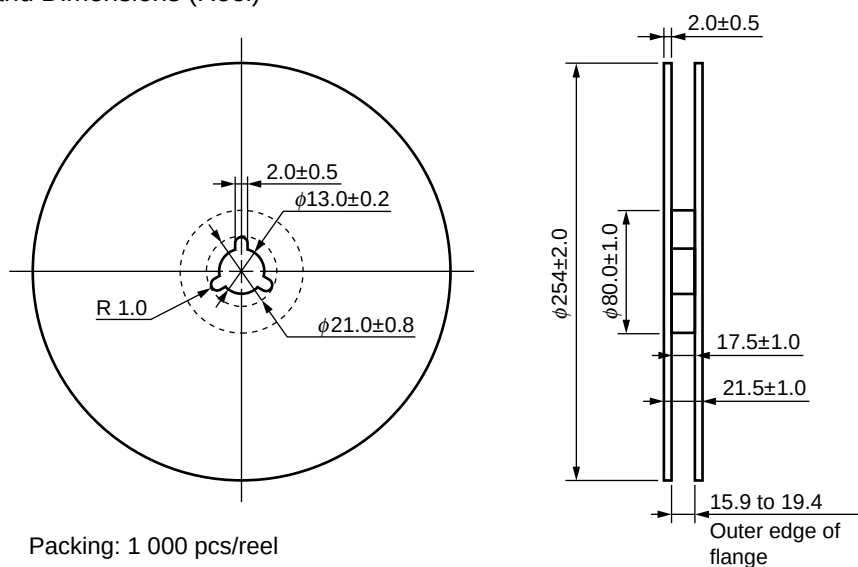
**Tape Direction**

PS2561BL-1-E3

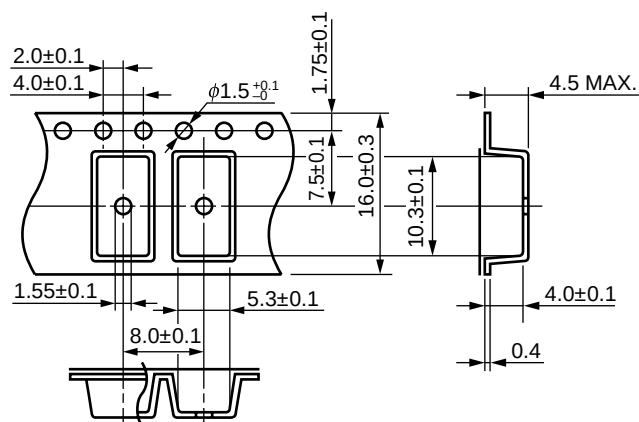
PS2561BL-1-E4



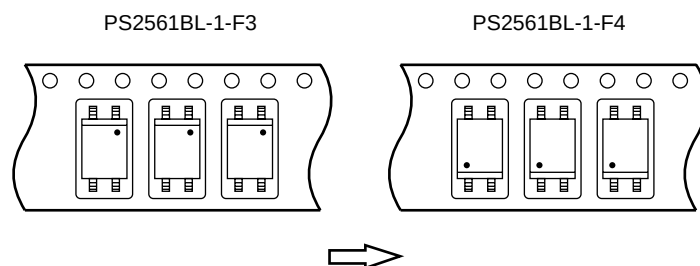
**Outline and Dimensions (Reel)**



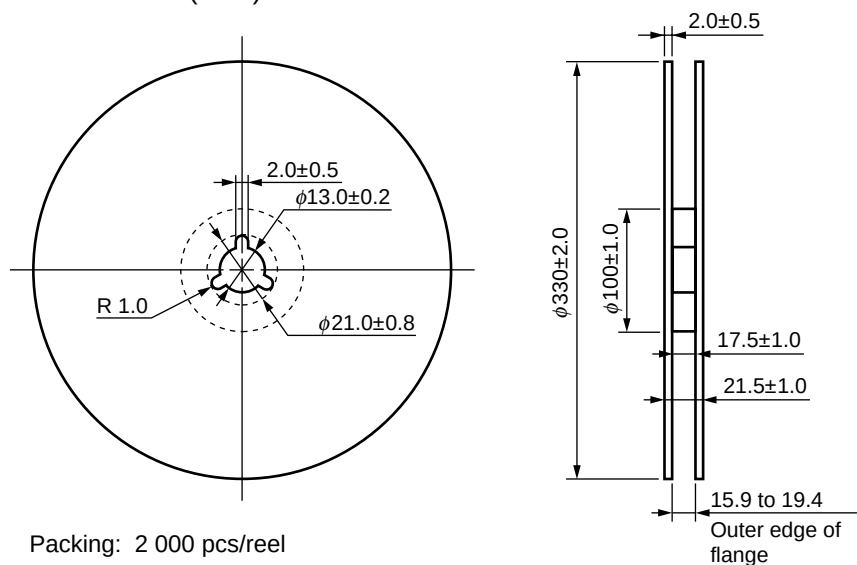
### Outline and Dimensions (Tape)



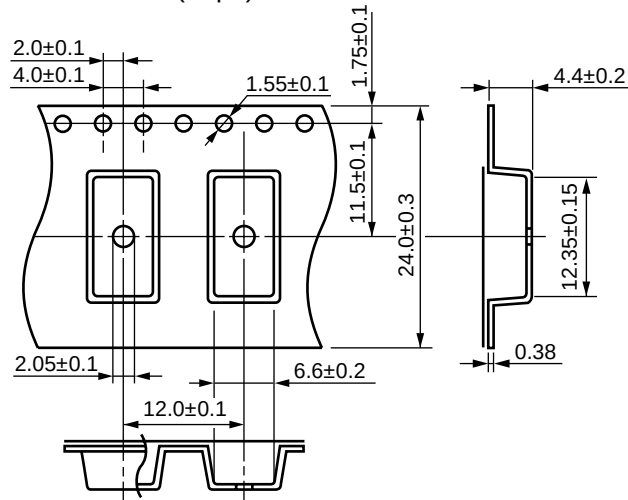
### Tape Direction



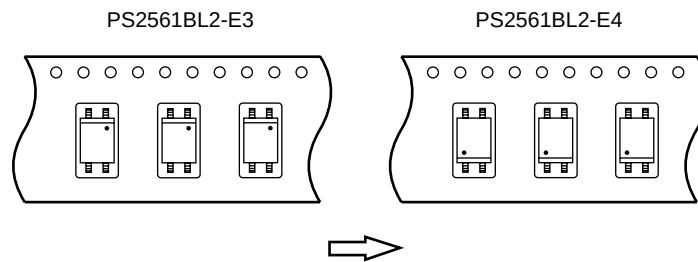
### Outline and Dimensions (Reel)



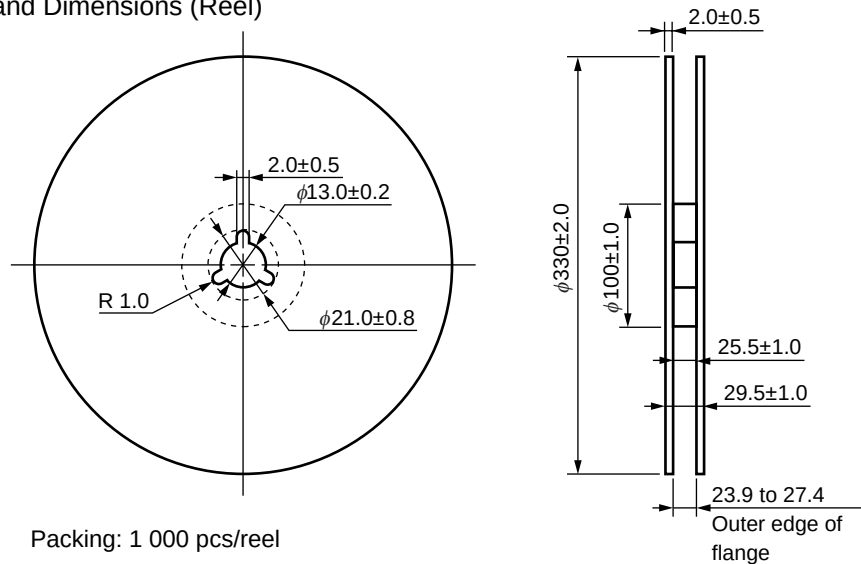
### Outline and Dimensions (Tape)



### Tape Direction



### Outline and Dimensions (Reel)



Packing: 1 000 pcs/reel

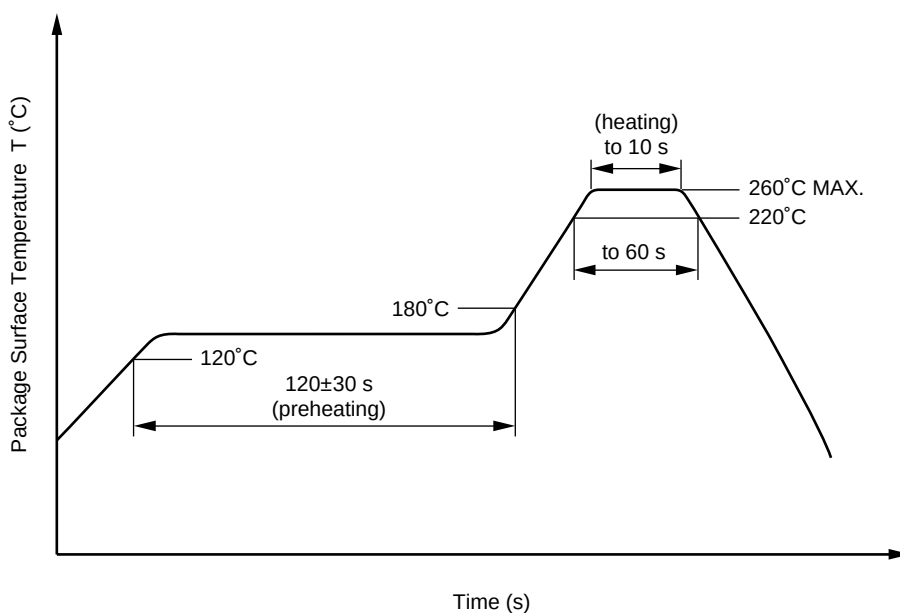
## NOTES ON HANDLING

## 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.

Subject: Compliance with EU Directives

CEL certifies, to its knowledge, that semiconductor and laser products detailed below are compliant with the requirements of European Union (EU) Directive 2002/95/EC Restriction on Use of Hazardous Substances in electrical and electronic equipment (RoHS) and the requirements of EU Directive 2003/11/EC Restriction on Penta and Octa BDE.

CEL Pb-free products have the same base part number with a suffix added. The suffix –A indicates that the device is Pb-free. The –AZ suffix is used to designate devices containing Pb which are exempted from the requirement of RoHS directive (\*). In all cases the devices have Pb-free terminals. All devices with these suffixes meet the requirements of the RoHS directive.

This status is based on CEL's understanding of the EU Directives and knowledge of the materials that go into its products as of the date of disclosure of this information.

| Restricted Substance per RoHS | Concentration Limit per RoHS (values are not yet fixed) | Concentration contained in CEL devices |     |
|-------------------------------|---------------------------------------------------------|----------------------------------------|-----|
|                               |                                                         | -A                                     | -AZ |
| Lead (Pb)                     | < 1000 PPM                                              | Not Detected                           | (*) |
| Mercury                       | < 1000 PPM                                              | Not Detected                           |     |
| Cadmium                       | < 100 PPM                                               | Not Detected                           |     |
| Hexavalent Chromium           | < 1000 PPM                                              | Not Detected                           |     |
| PBB                           | < 1000 PPM                                              | Not Detected                           |     |
| PBDE                          | < 1000 PPM                                              | Not Detected                           |     |

If you should have any additional questions regarding our devices and compliance to environmental standards, please do not hesitate to contact your local representative.

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Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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