DATA SHEET

NEC

PHOTOCOUPLER

# PS2521-1,-2,-4,PS2521L-1,-2,-4

## LARGE FORWARD INPUT TYPE HIGH ISOLATION VOLTAGE MULTI PHOTOCOUPLER SIRIES

–NEPOC™ Series–

### DESCRIPTION

The PS2521-1, -2, -4 and PS2521L-1, -2, -4 are optically coupled isolators containing a GaAs light emitting diode and an NPN silicon phototransistor.

The PS2521-1, -2, -4 are in a plastic DIP (Dual In-line Package) and the PS2521L-1, -2, -4 are lead bending type (Gull-wing) for surface mount.

### FEATURES

- Large forward input current ($I_F$ = 150 mA)
- High Isolation voltage (BV = 5 000 Vr.m.s.)
- High collector to emitter voltage ($V_{CEO}$ = 80 V)
- High-speed switching ($t_r$ = 3 $\mu$s TYP., $t_f$ = 5 $\mu$s TYP.)
- Ordering number of taping product: PS2521L-1-E3, E4, F3, F4, PS2521L-2-E3, E4
- UL approved: File No. E72422 (S)

### ★ APPLICATIONS

- Exchange equipment
- FAX/MODEM
- LCR adapter

**The information in this document is subject to change without notice.**

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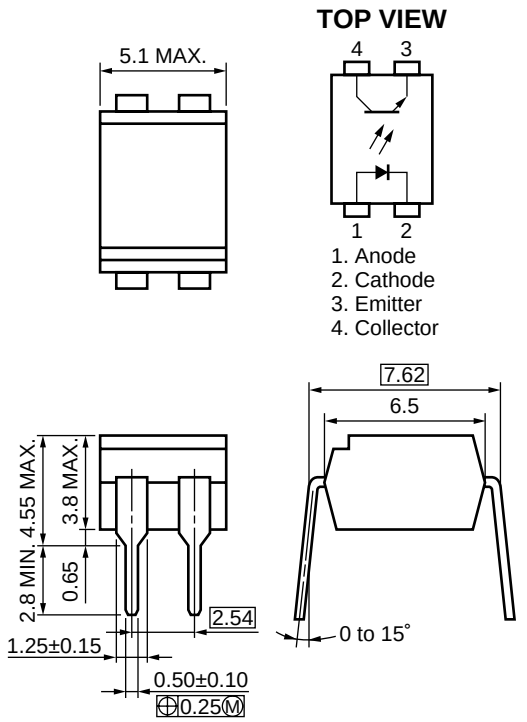
Printed in Japan

**The mark ★ shows major revised points.**

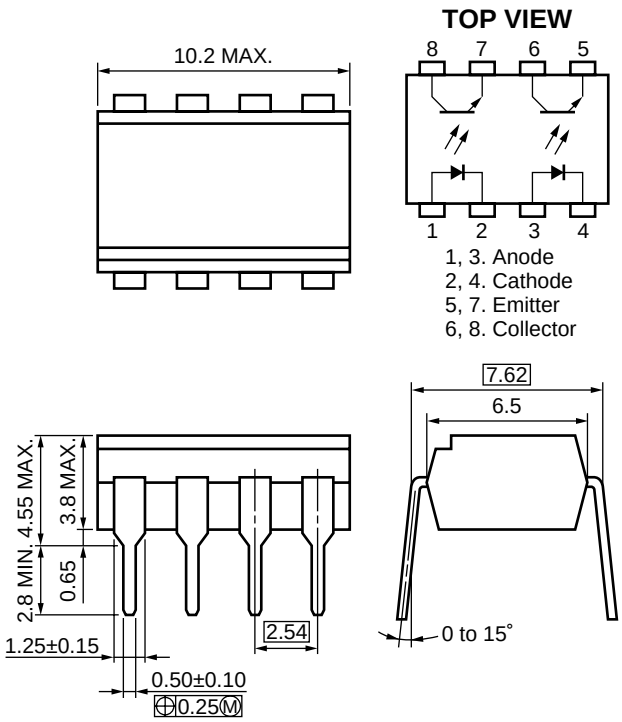
★ **PACKAGE DIMENSIONS (in millimeters)**

**DIP type**

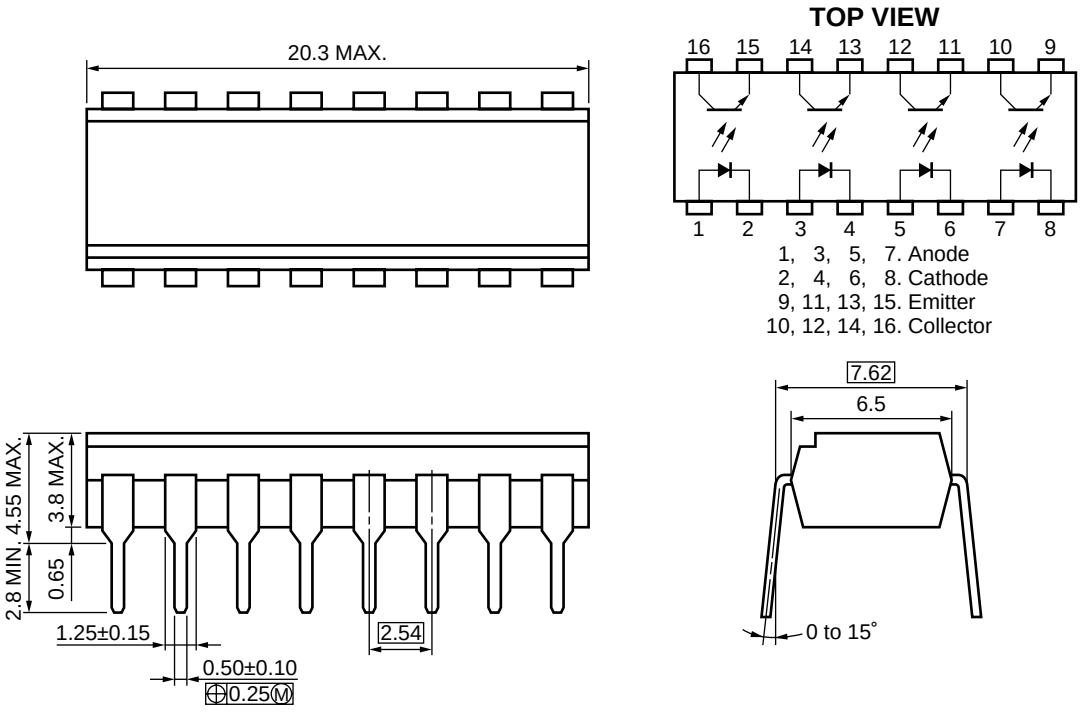
**PS2521-1**




**PS2521-2**

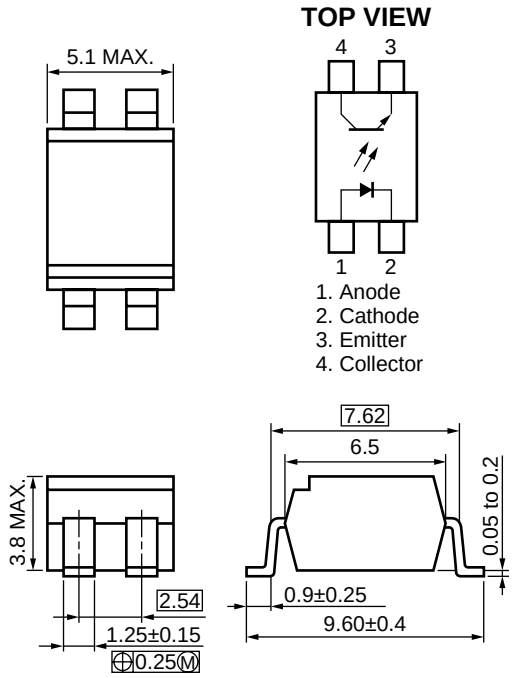



**PS2521-4**

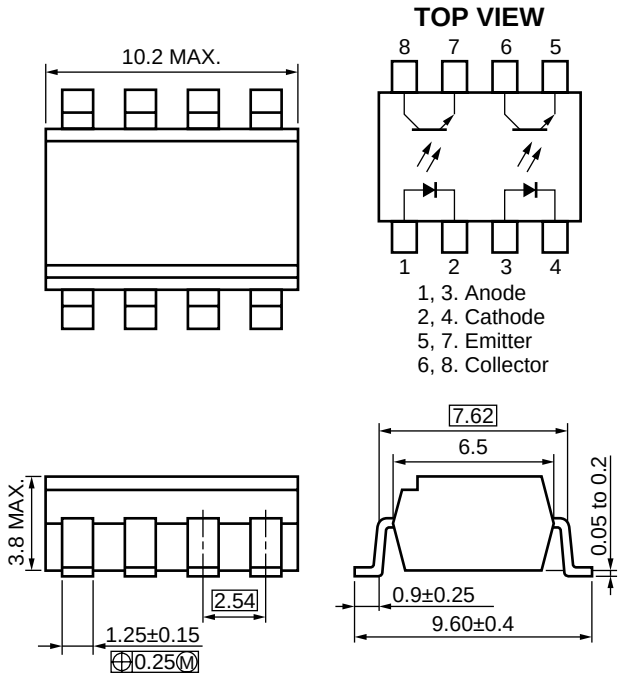


**Lead bending type**

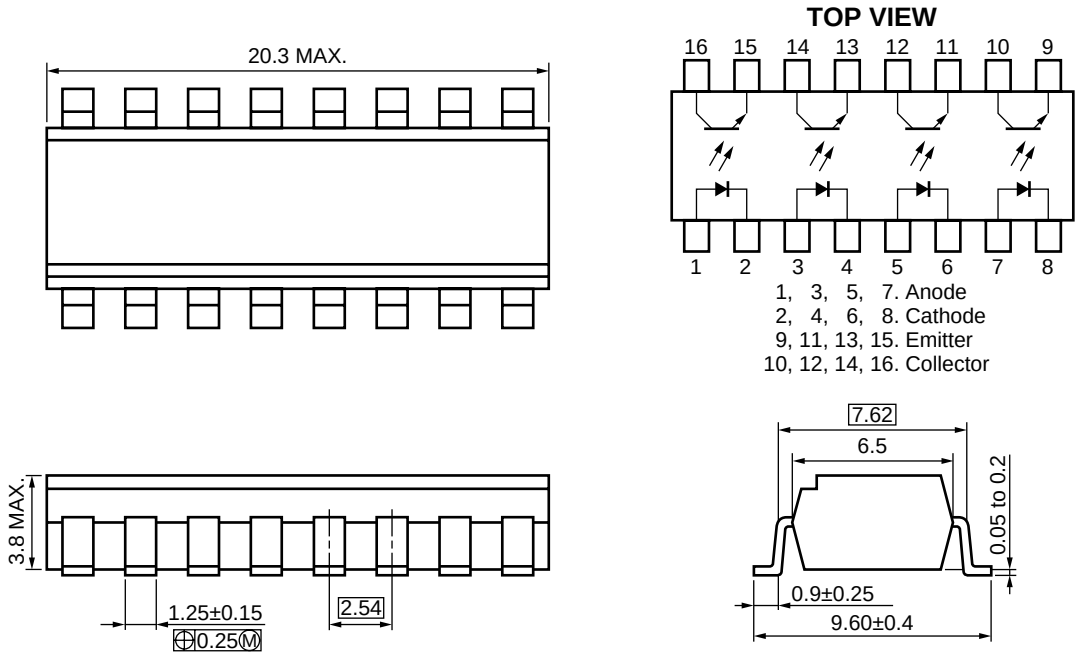
**PS2521L-1**




**PS2521L-2**




**PS2521L-4**



**ABSOLUTE MAXIMUM RATINGS ($T_A$ = 25 °C, unless otherwise specified)**

| Parameter | | Symbol | Ratings | | Unit |
|---|---|---|---|---|---|
| | | | PS2521-1, PS2521L-1 | PS2521-2, -4, PS2521L-2, -4 | |
| Diode | Forward Current (DC) | $I_F$ | 150 | | mA |
| | Reverse Voltage | $V_R$ | 6.0 | | V |
| | Power Dissipation Derating | $\Delta P_D$/°C | 2.5 | 2.0 | mW/°C |
| | Power Dissipation | $P_D$ | 250 | 200 | mW/ch |
| | Peak Forward Current *1 | $I_{FP}$ | 1 | | A |
| Transistor | Collector to Emitter Voltage | $V_{CEO}$ | 80 | | V |
| | Emitter to Collector Voltage | $V_{ECO}$ | 6 | | V |
| | Collector Current | $I_C$ | 50 | | mA/ch |
| | Power Dissipation Derating | $\Delta P_C$/°C | 1.5 | 1.2 | mW/°C |
| | Power Dissipation | $P_C$ | 150 | 120 | mW/ch |
| 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 |

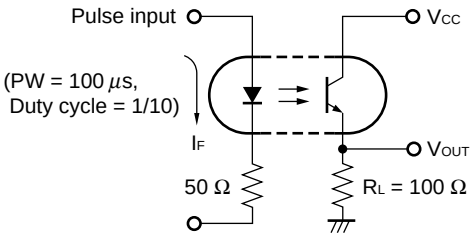
***1** PW = 100 $\mu$s, Duty Cycle = 1 %

***2** AC voltage for 1 minute at $T_A$ = 25 °C, RH = 60 % between input and output

## ELECTRICAL CHARACTERISTICS ($T_A$ = 25 °C)

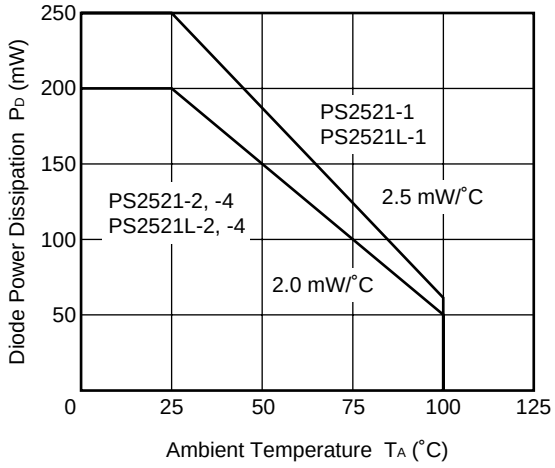
| Parameter | | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|---|---|---|---|---|---|---|---|
| Diode | Forward Voltage | $V_F$ | $I_F$ = 100 mA | | 1.3 | 1.7 | V |
| | Reverse Current | $I_R$ | $V_R$ = 5 V | | | 5 | μA |
| | Terminal Capacitance | $C_t$ | V = 0 V, f = 1.0 MHz | | 70 | | pF |
| Transistor | Collector to Emitter Dark Current | $I_{CEO}$ | $V_{CE}$ = 80 V, $I_F$ = 0 mA | | | 100 | nA |
| Coupled | Current Transfer Ratio | CTR | $I_F$ = 100 mA, $V_{CE}$ = 3 V | 20 | | 80 | % |
| | Collector Saturation Voltage | $V_{CE (sat)}$ | $I_F$ = 100 mA, $I_C$ = 4 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 | | 0.6 | | pF |
| | Rise Time *1 | $t_r$ | $V_{CC}$ = 10 V, $I_C$ = 2 mA, $R_L$ = 100 Ω | | 3 | | μs |
| | Fall Time *1 | $t_f$ | | | 5 | | |

***1** Test circuit for switching time

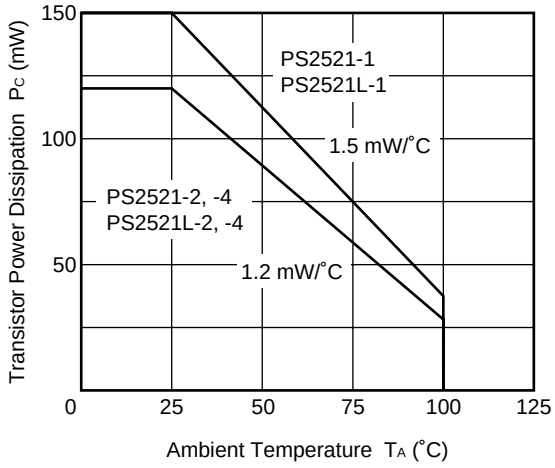


★ **TYPICAL CHARACTERISTICS ($T_A$ = 25 °C, unless otherwise specified)**

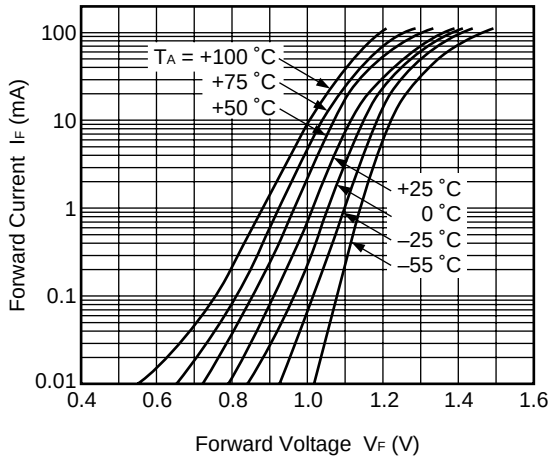
DIODE POWER DISSIPATION vs. AMBIENT TEMPERATURE



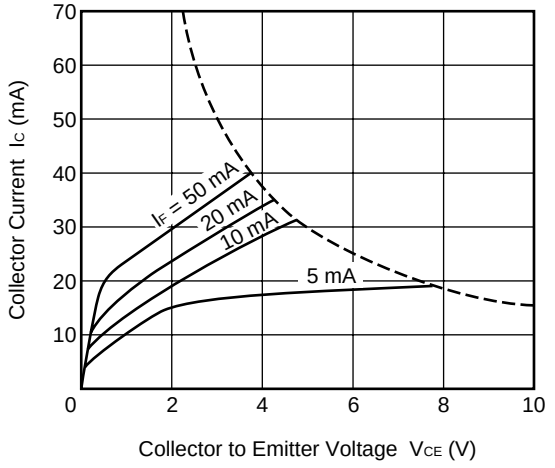

TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



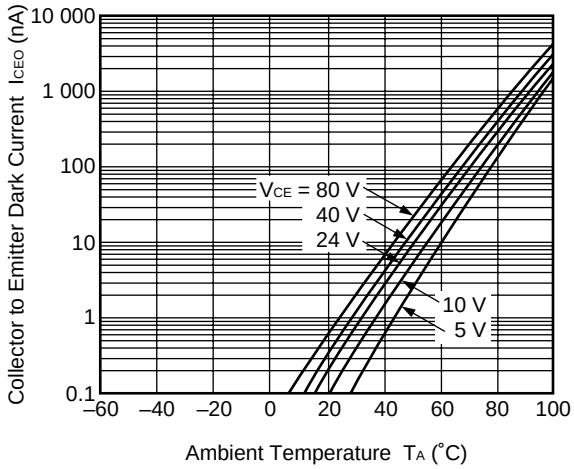

FORWARD CURRENT vs. FORWARD VOLTAGE



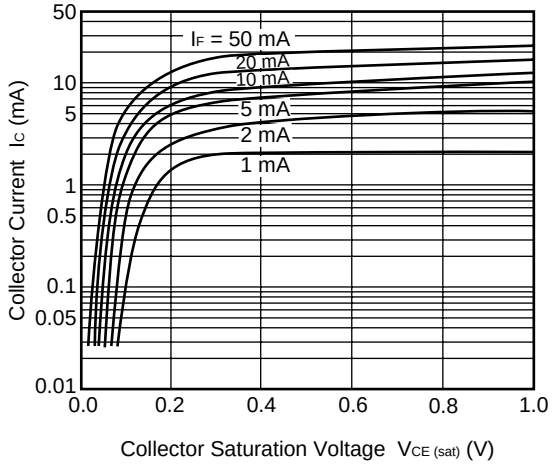

COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



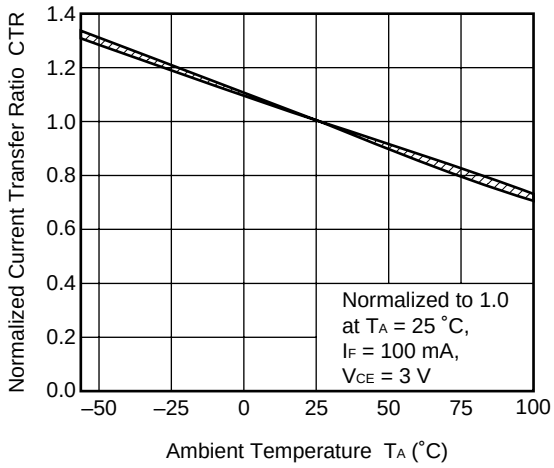

COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE



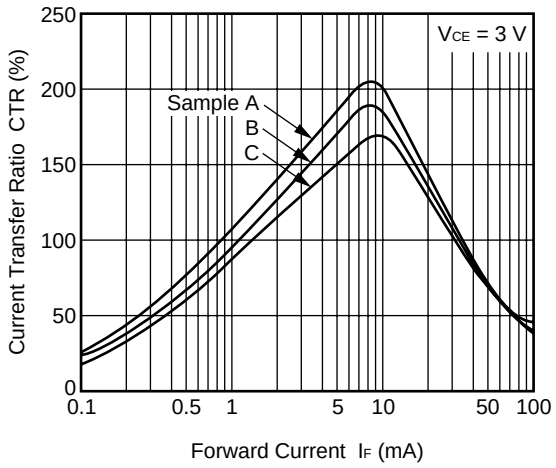

COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE



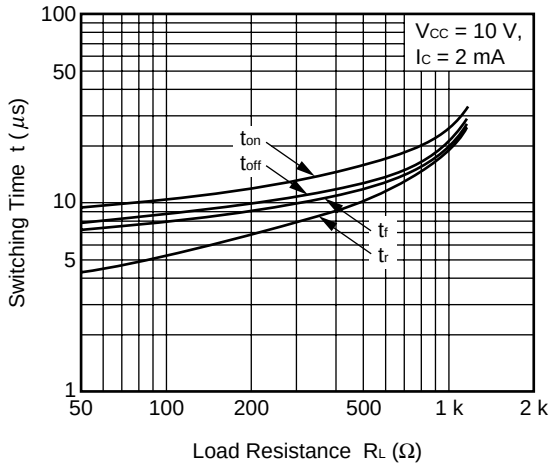
NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE



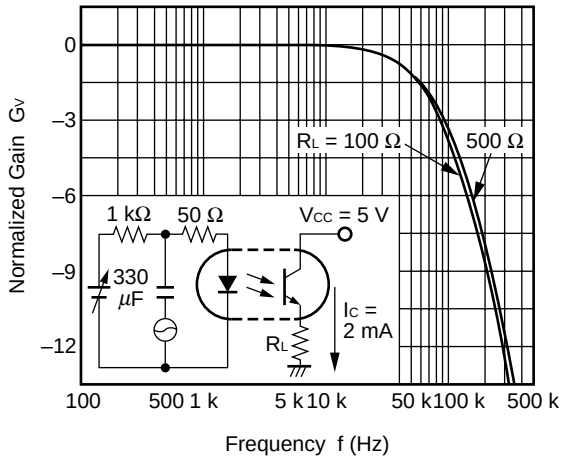

CURRENT TRANSFER RATIO vs. FORWARD CURRENT



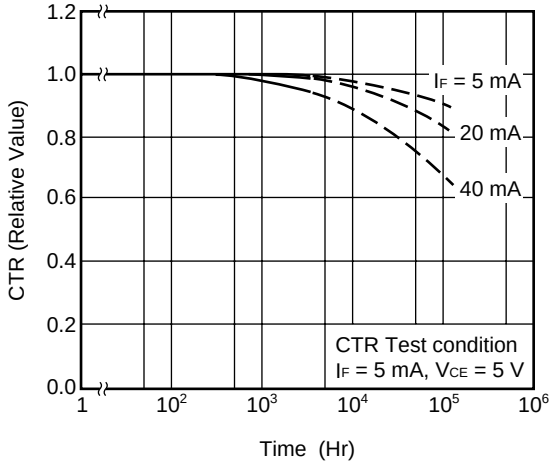

SWITCHING TIME vs. LOAD RESISTANCE




FREQUENCY RESPONSE



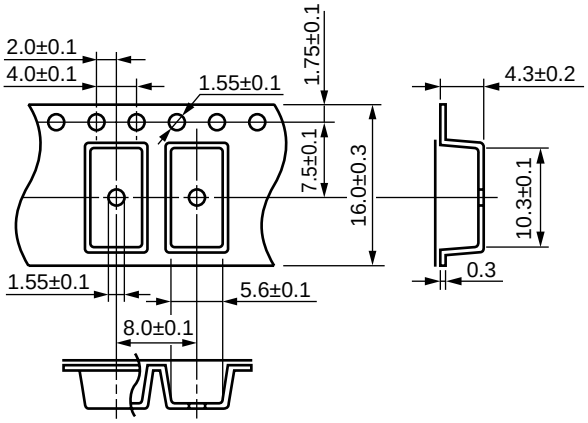

LONG TERM CTR DEGRADATION



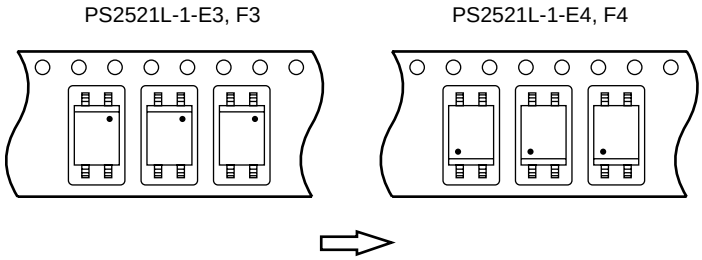

**Remark** The measurement of TYPICAL CHARACTERISTICS are only for reference, not guaranteed.

★ **TAPING SPECIFICATIONS (in millimeters)**

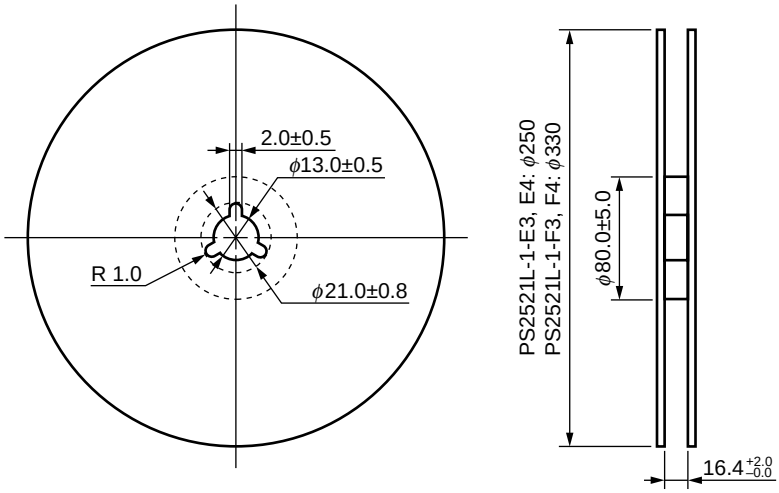
Outline and Dimensions (Tape)




Tape Direction

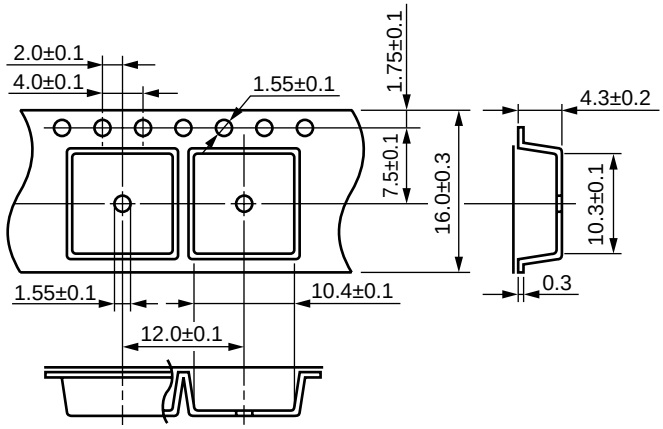



Outline and Dimensions (Reel)

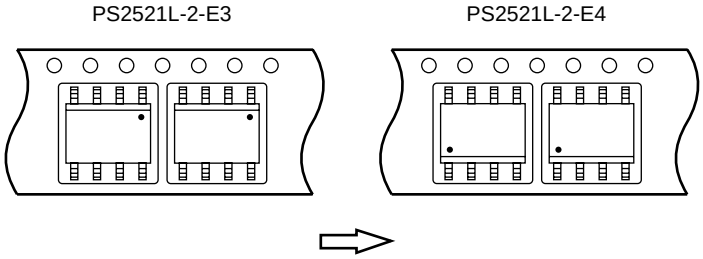



Packing: PS2521L-1-E3, E4 1 000 pcs/reel
PS2521L-1-F3, F4 2 000 pcs/reel

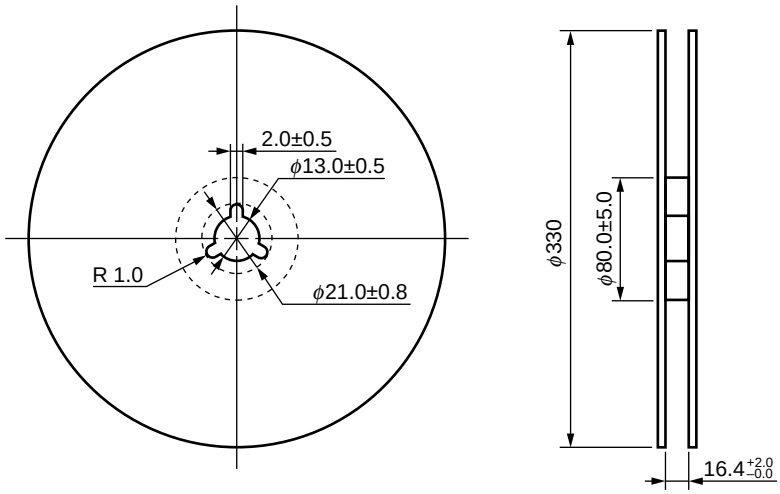
Outline and Dimensions (Tape)




Tape Direction




Outline and Dimensions (Reel)



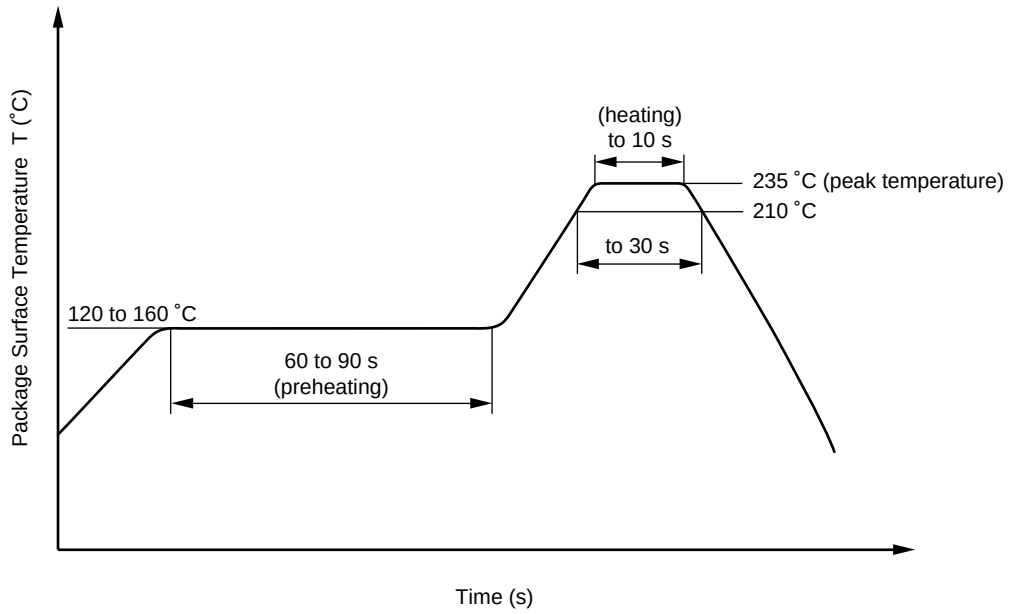

Packing: 1 000 pcs/reel

## RECOMMENDED SOLDERING CONDITIONS

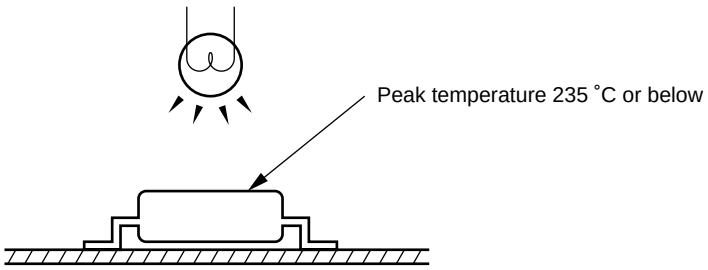
**(1) Infrared reflow soldering**

- Peak reflow temperature — 235 °C (package surface temperature)
- Time of temperature higher than 210 °C — 30 seconds or less
- 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




**Caution Please avoid to removed the residual flux by water after the first reflow processes.**




**(2) Dip soldering**

- Temperature — 260 °C or below (molten solder temperature)
- Time — 10 seconds or less
- Number of times — One
- Flux — Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt % is recommended.)

**[MEMO]**

## CAUTION

**Within this device there exists GaAs (Gallium Arsenide) material which is a harmful substance if ingested. Please do not under any circumstances break the hermetic seal.**

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