

**AC INPUT RESPONSE
HIGH COLLECTOR TO EMITTER VOLTAGE TYPE
SOP MULTI PHOTOCOUPLER SERIES**

–NEPOC™ Series–

DESCRIPTION

The PS2707-1, PS2707-2, PS2707-4 are optically coupled isolators containing GaAs light emitting diodes and an NPN silicon phototransistor.

Each is mounted in a plastic SOP (Small Outline Package) for high density applications.

This package has shield effect to cut off ambient light.

FEATURES

- AC input response
- High collector to emitter voltage ($V_{CEO} = 120\text{ V}$)
- High isolation voltage ($BV = 3\ 750\text{ Vr.m.s.}$)
- Small and thin (SOP) package
- High-speed switching ($t_r, t_f = 10\ \mu\text{s TYP.}$)
- Ordering number of taping product (1-ch only): PS2707-1-E3, E4, F3, F4
- UL approved: File No. E72422 (S)
- VDE0884 approved (Option)

★ **APPLICATIONS**

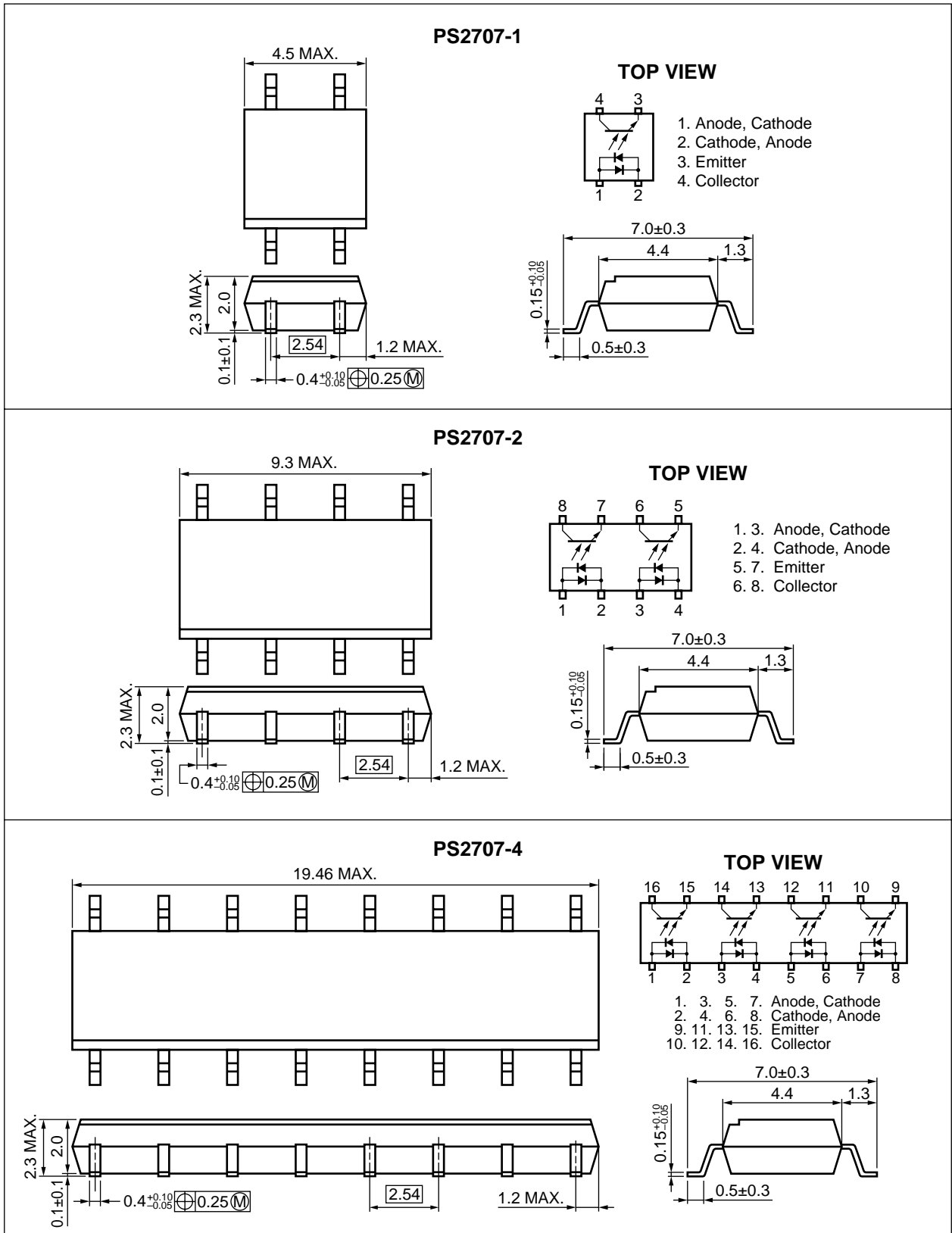
- Hybrid IC
- Telephone/FAX
- FA/OA equipment
- Programmable logic controllers

ORDERING INFORMATION

| Part Number | Package | Safety Standard Approval |
|-------------|------------|--|
| PS2707-1 | 4-pin SOP | Standard specification products • UL approved |
| PS2707-2 | 8-pin SOP | |
| PS2707-4 | 16-pin SOP | |
| PS2707-1-V | 4-pin SOP | VDE0884 specification products (Option) |
| PS2707-2-V | 8-pin SOP | |
| PS2707-4-V | 16-pin SOP | |

The information in this document is subject to change without notice. Before using this document, please confirm that this is the latest version.
Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

PACKAGE DIMENSIONS (in millimeters)



PS2707-4

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

| Parameter | | Symbol | Ratings | | Unit |
|--------------------------------|-----------------------------------|---------------------|-------------|-----------------------|---------|
| | | | PS2707-1 | PS2707-2, PS2707-4 | |
| Diode | Forward Current (DC) | I _F | ± 50 | | mA |
| | Power Dissipation Derating | ΔP _D /°C | 0.8 | | mW/°C |
| | Power Dissipation | P _D | 80 | | mW/ch |
| | Peak Forward Current ¹ | I _{FP} | ± 1 | | A |
| Transistor | Collector to Emitter Voltage | V _{CEO} | 120 | | V |
| | Emitter to Collector Voltage | V _{ECO} | 6 | | V |
| | Collector Current | I _C | 30 | | mA/ch |
| | Power Dissipation Derating | ΔP _C /°C | 1.5 | 1.2 | mW/°C |
| | Power Dissipation | P _C | 150 | 120 | mW/ch |
| Isolation Voltage ² | | BV | 3 750 | | Vr.m.s. |
| Operating Ambient Temperature | | T _A | -55 to +100 | | °C |
| Storage Temperature | | T _{stg} | -55 to +150 | | °C |

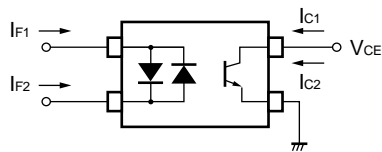
*1 PW = 100 μs, Duty Cycle = 1 %

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

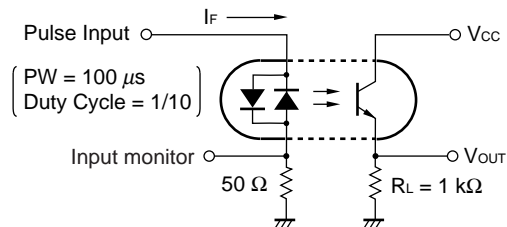
ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

| Parameter | | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|------------|--|----------------------|---|------------------|------|------|------|
| Diode | Forward Voltage | V _F | I _F = ± 5 mA | | 1.1 | 1.4 | V |
| | Terminal Capacitance | C _t | V = 0 V, f = 1 MHz | | 60 | | pF |
| Transistor | Collector to Emitter Current | I _{CEO} | I _F = 0 mA, V _{CE} = 120 V | | | 100 | nA |
| Coupled | Current Transfer Ratio (I _c /I _F) | CTR | I _F = ± 5 mA, V _{CE} = 5 V | 50 | 150 | 400 | % |
| | | | I _F = ± 1 mA, V _{CE} = 5 V | 10 | 80 | | |
| | CTR Ratio ^{*1} | CTR1/CTR2 | I _F = ± 5 mA, V _{CE} = 5 V | 0.3 | 1.0 | 3.0 | |
| | 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 kV _{DC} | 10 ¹¹ | | | Ω |
| | Isolation Capacitance | C _{I-O} | V = 0 V, f = 1 MHz | | 0.4 | | pF |
| | Rise Time ^{*2} | t _r | V _{CC} = 5 V, I _c = 2 mA, R _L = 1 kΩ | | 10 | | μs |
| | Fall Time ^{*2} | t _f | | | 10 | | |

*1 CTR1 = I_{c1}/I_{F1}, CTR2 = I_{c2}/I_{F2}

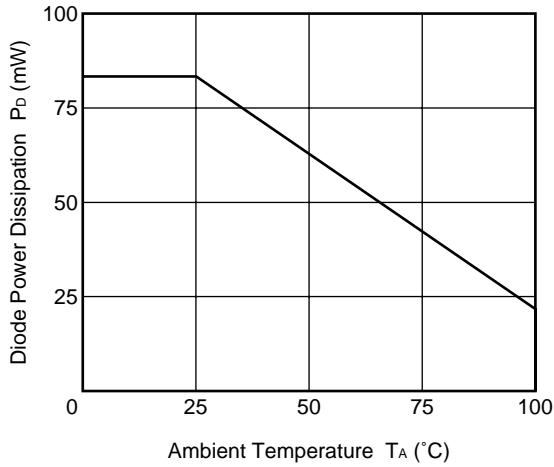


★ *2 Test circuit for switching time

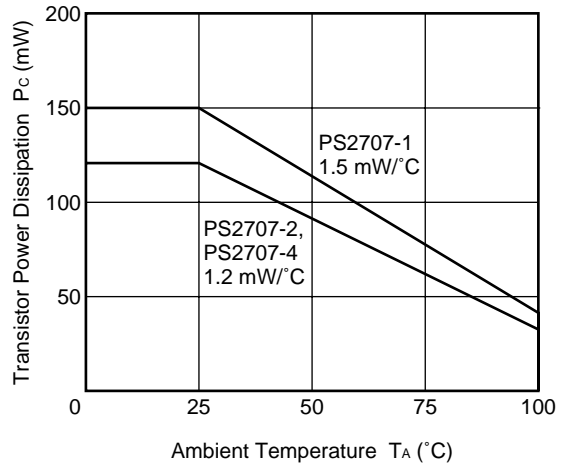


★ TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise specified)

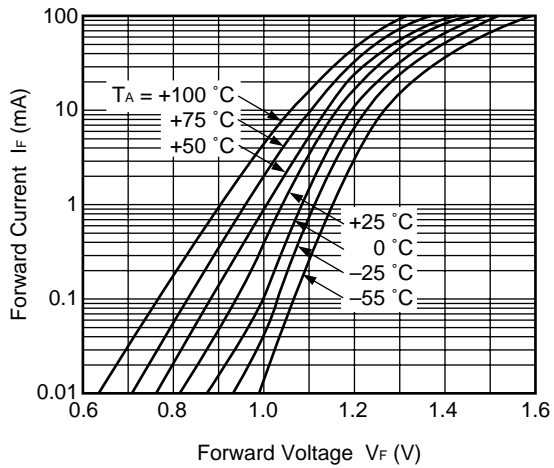
DIODE POWER DISSIPATION vs. AMBIENT TEMPERATURE



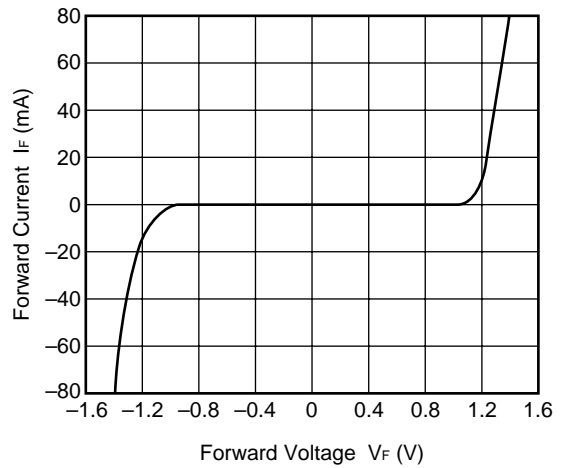
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



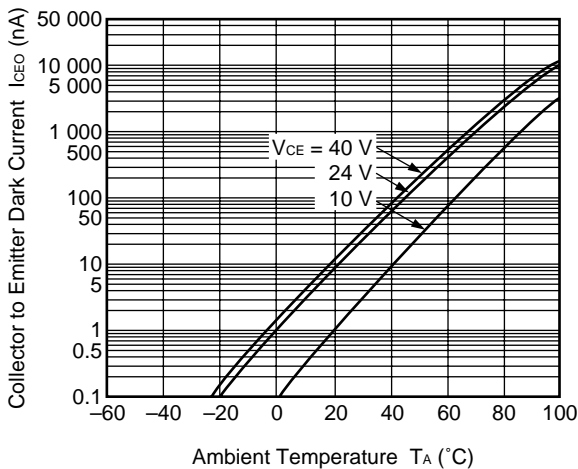
FORWARD CURRENT vs. FORWARD VOLTAGE



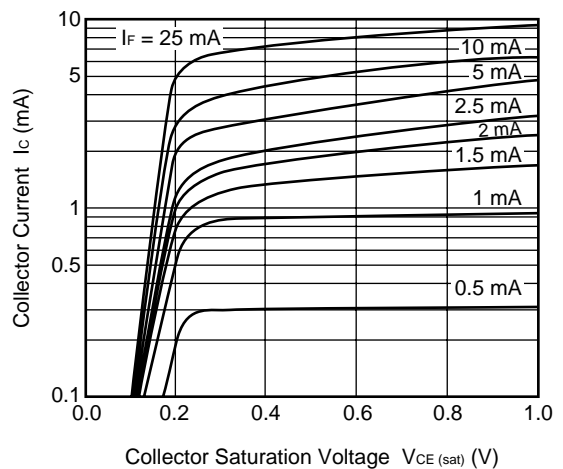
FORWARD CURRENT vs. FORWARD VOLTAGE



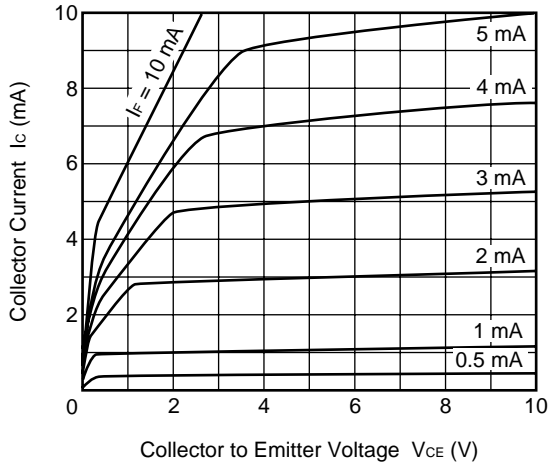
COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE



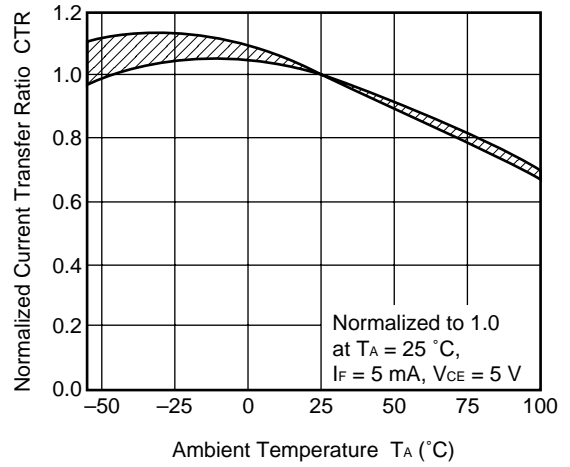
COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE



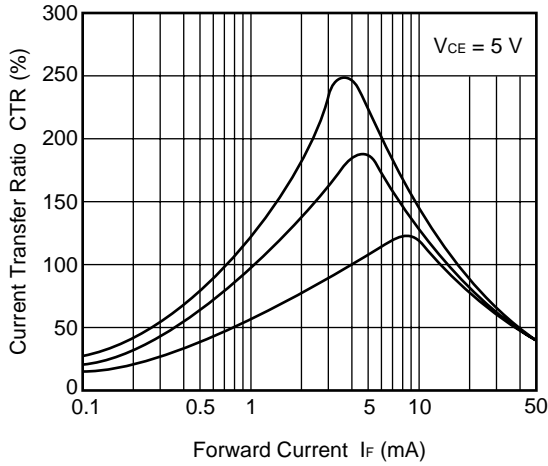
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



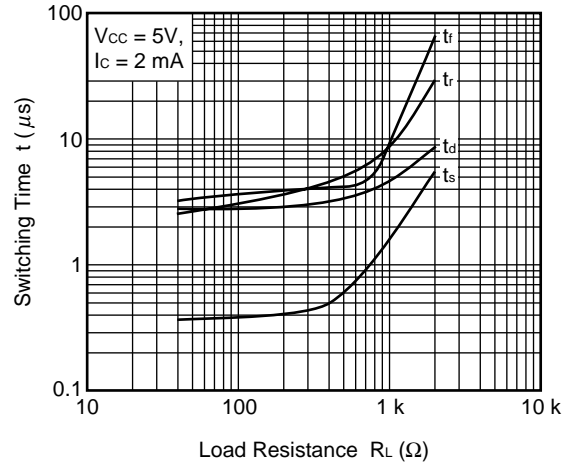
NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE



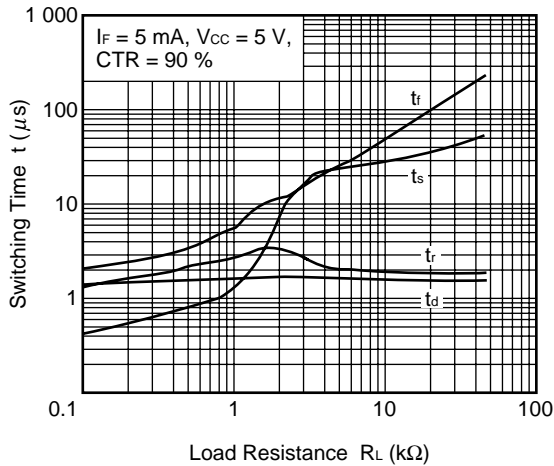
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



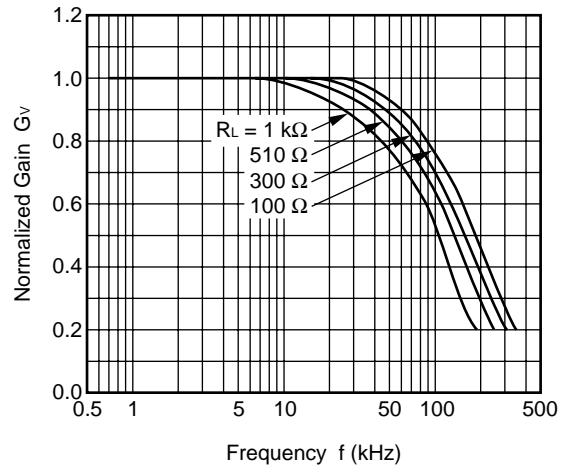
SWITCHING TIME vs. LOAD RESISTANCE

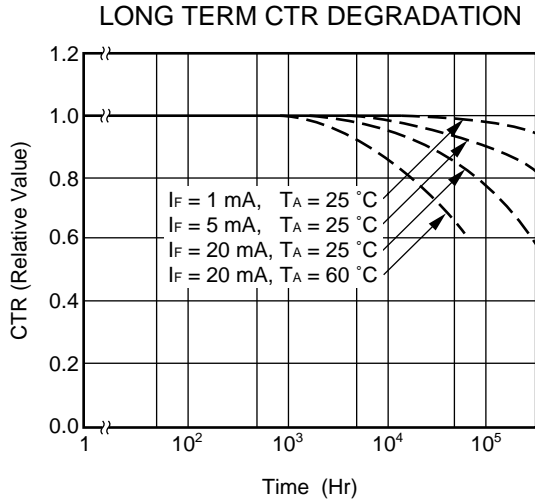


SWITCHING TIME vs. LOAD RESISTANCE



FREQUENCY RESPONSE

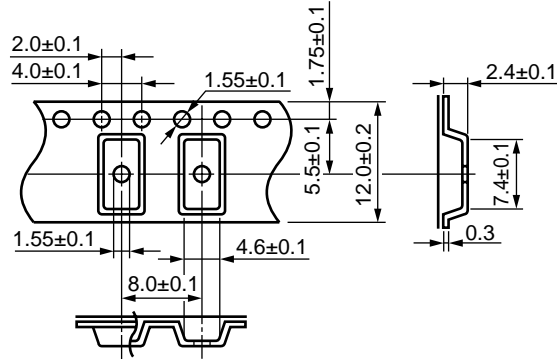




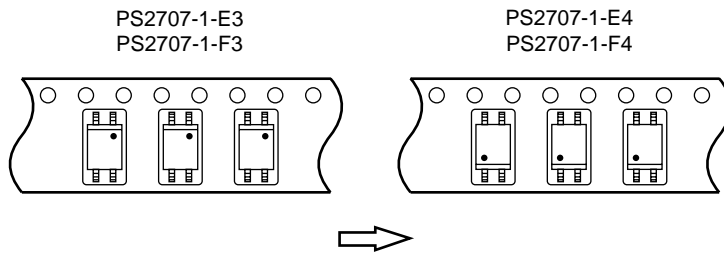
Remark The graphs indicate nominal characteristics.

★ TAPING SPECIFICATIONS (in millimeters)

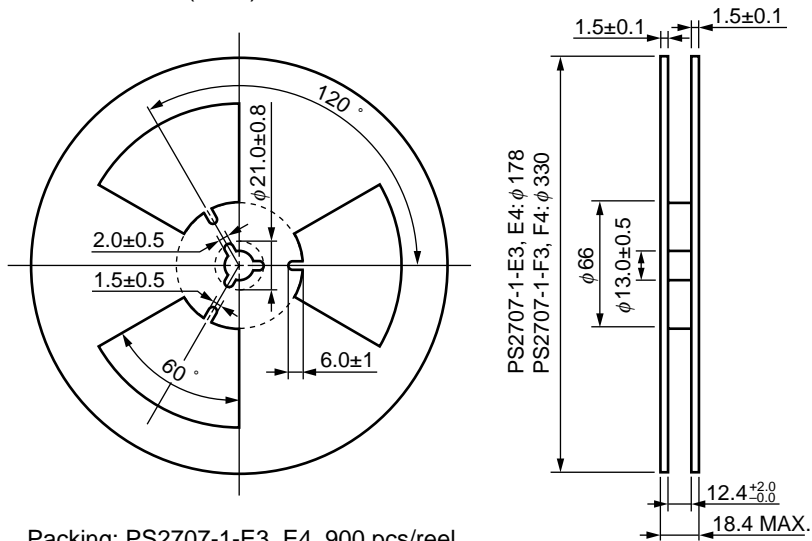
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



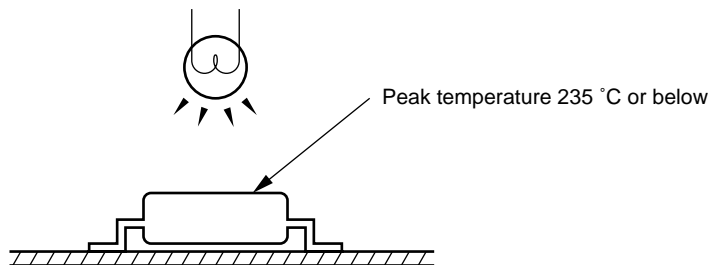
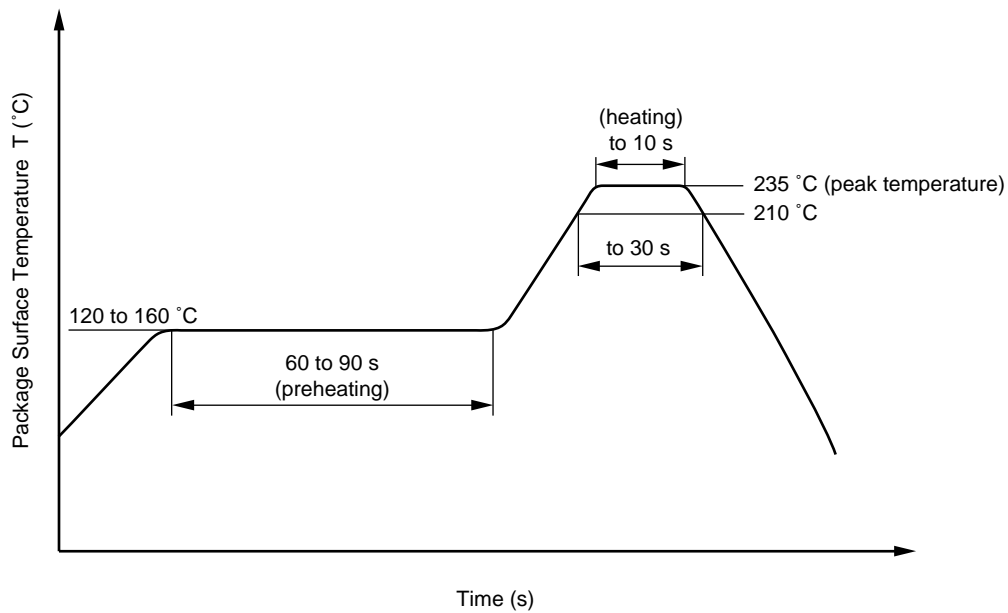
Packing: PS2707-1-E3, E4 900 pcs/reel
 PS2707-1-F3, F4 3 500 pcs/reel

★ **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



(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.)

(3) Cautions

- Fluxes
Avoid removing the residual flux with freon-based and chlorine-based cleaning solvent.

SPECIFICATION OF VDE MARKS LICENSE DOCUMENT (VDE0884)

| 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) $U_{pr} = 1.2 \times U_{IORM}, P_d < 5$ pC | U_{IORM} U_{pr} | 710 850 | V_{peak} V_{peak} |
| Test voltage (partial discharge test, procedure b for random test) $U_{pr} = 1.6 \times U_{IORM}, P_d < 5$ pC | U_{pr} | 1 140 | V_{peak} |
| Highest permissible overvoltage | U_{TR} | 6 000 | V_{peak} |
| Degree of pollution (DIN VDE 0109) | | 2 | |
| Clearance distance | | > 5 | mm |
| Creepage distance | | > 5 | 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 $I_F, P_{si} = 0$) Power (output or total power dissipation) Isolation resistance $V_{IO} = 500$ V dc at $T_A = 175$ °C (T_{si}) | T_{si} I_{si} P_{si} Ris MIN. | 150 200 300 10^9 | °C mA mW Ω |

[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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 - Special: Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)
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