

**PS7113-1A,-2A,PS7113L-1A,-2A****6, 8-PIN DIP, 350 mA CONTINUOUS LOAD CURRENT  
1-ch, 2-ch Optical Coupled MOS FET****DESCRIPTION**

The PS7113-1A, -2A and PS7113L-1A, -2A are solid state relays containing GaAs LEDs on the light emitting side (input side) and MOS FETs on the output side.

They are suitable for analog signal control because of their low offset and high linearity.

The PS7113L-1A, -2A have a surface mount type lead.

**★ FEATURES**

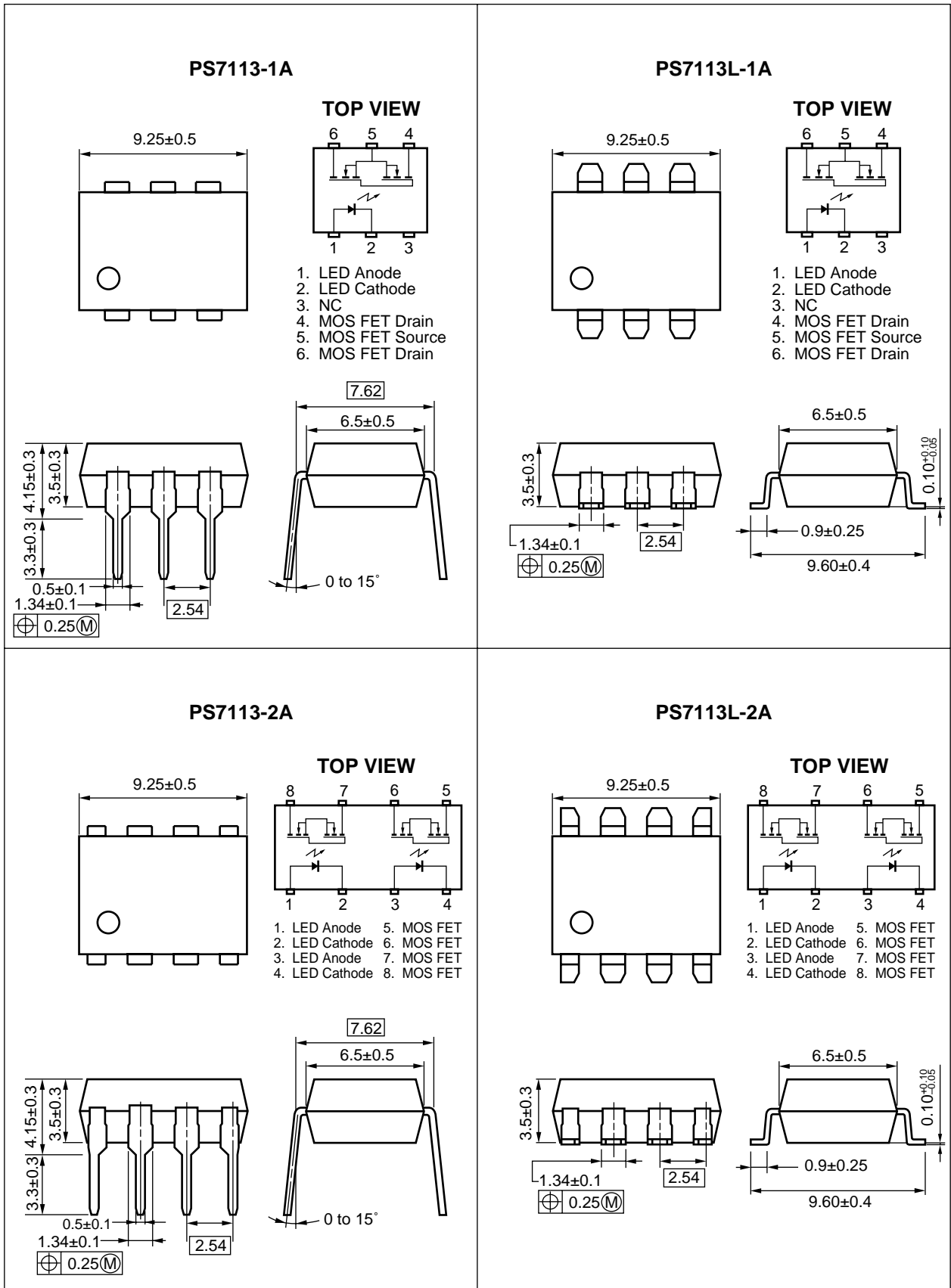
- 1 channel type (1 a output) or 2 channel type (1 a + 1 a output)
- Low LED operating current ( $I_f = 2 \text{ mA}$ )
- Designed for AC/DC switching line changer
- Small package (6, 8-pin DIP)
- Low offset voltage
- PS7113L-1A, -2A: Surface mount type
- UL approved: File No. E72422 (S)
- BSI approved: No. 8245/8246
- CSA approved: No. CA 101391

**APPLICATIONS**

- Exchange equipment
- Measurement equipment
- FA/OA equipment

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Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

PACKAGE DIMENSIONS (in millimeters)



★ **ORDERING INFORMATION**

| Part Number   | Package   | Packing Style                | Application Part Number <sup>*1</sup> |
|---------------|-----------|------------------------------|---------------------------------------|
| PS7113-1A     | 6-pin DIP | Magazine case 50 pcs         | PS7113-1A                             |
| PS7113L-1A    |           |                              | PS7113L-1A                            |
| PS7113L-1A-E3 |           | Embossed Tape 1 000 pcs/reel |                                       |
| PS7113L-1A-E4 |           |                              |                                       |
| PS7113-2A     | 8-pin DIP | Magazine case 50 pcs         | PS7113-2A                             |
| PS7113L-2A    |           |                              | PS7113L-2A                            |
| PS7113L-2A-E3 |           | Embossed Tape 1 000 pcs/reel |                                       |
| PS7113L-2A-E4 |           |                              |                                       |

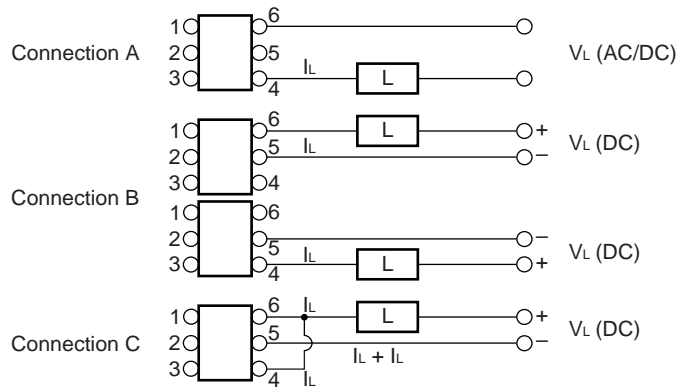
\*1 For the application of the Safety Standard, following part number should be used.

**ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25 °C, unless otherwise specified)**

| Parameter                       |  | Symbol           | Ratings                  |                          | Unit    |
|---------------------------------|--|------------------|--------------------------|--------------------------|---------|
|                                 |  |                  | PS7113-1A,<br>PS7113L-1A | PS7113-2A,<br>PS7113L-2A |         |
| Diode                           | Forward Current (DC)                                   | I <sub>F</sub>   | 50                       |                          | mA      |
|                                 | Reverse Voltage  | V <sub>R</sub>   | 5.0                      |                          | V       |
|                                 | Power Dissipation                                      | P <sub>D</sub>   | 50                       |                          | mW/ch   |
|                                 | Peak Forward Current <sup>*1</sup>                     | I <sub>FP</sub>  | 1                        |                          | A       |
| MOS FET                         | Break Down Voltage                                     | V <sub>L</sub>   | 100                      |                          | V       |
|                                 | Continuous Load Current <sup>*2</sup>                  | Connection A     | 350                      |                          | mA      |
|                                 |  | Connection B     | 450                      | –                        |         |
|                                 |  | Connection C     | 700                      | –                        |         |
|                                 | Pulse Load Current <sup>*3</sup><br>(AC/DC Connection) | I <sub>LP</sub>  | 600                      |                          | mA      |
| Power Dissipation               | P <sub>D</sub>   | 560              | 375                      | mW/ch                    |         |
| Isolation Voltage <sup>*4</sup> |  | BV               | 1 500                    |                          | Vr.m.s. |
| Total Power Dissipation         |  | P <sub>T</sub>   | 610                      | 850                      | mW      |
| Operating Ambient Temperature   |  | T <sub>A</sub>   | –40 to +80               |                          | °C      |
| Storage Temperature             |  | T <sub>stg</sub> | –40 to +100              |                          | °C      |

\*1 PW = 100 μs, Duty Cycle = 1 %

\*2 Conditions: I<sub>F</sub> ≥ 2 mA. The following types of load connections are available.



\*3 PW = 100 ms, 1 shot

\*4 AC voltage for 1 minute at T<sub>A</sub> = 25 °C, RH = 60 % between input and output

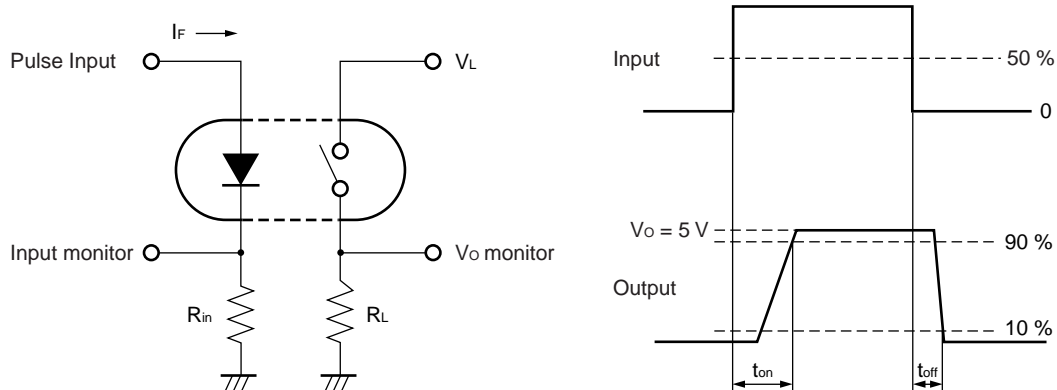
RECOMMENDED OPERATING CONDITIONS (T<sub>A</sub> = 25 °C)

| Parameter             | Symbol         | MIN. | TYP. | MAX. | Unit |
|-----------------------|----------------|------|------|------|------|
| LED Operating Current | I <sub>F</sub> | 2    | 10   | 20   | mA   |
| LED Off Voltage       | V <sub>F</sub> | 0    |      | 0.5  | V    |

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

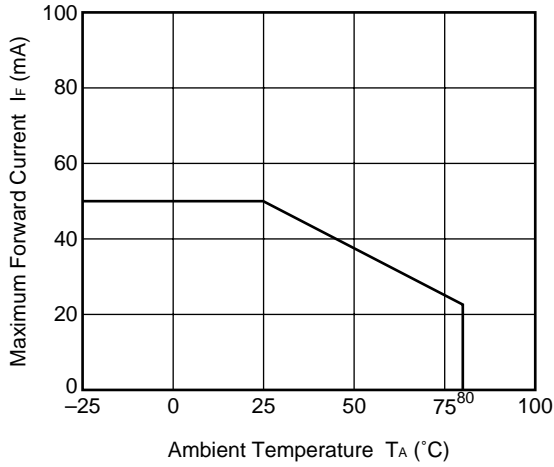
| Parameter |                           | Symbol            | Conditions   | MIN.            | TYP. | MAX. | Unit  |
|-----------|---------------------------|-------------------|--|-----------------|------|------|-------|
| Diode     | Forward Voltage           | V <sub>F</sub>    | I <sub>F</sub> = 10 mA                                     |                 | 1.2  | 1.4  | V     |
|           | Reverse Current           | I <sub>R</sub>    | V <sub>R</sub> = 5 V                                       |                 |      | 5.0  | μA    |
| MOS FET   | Off-state Leakage Current | I <sub>Loff</sub> | V <sub>D</sub> = 100 V                                     |                 | 0.03 | 1.0  | μA    |
|           | Output Capacitance        | C <sub>out</sub>  | V <sub>D</sub> = 0 V, f = 1 MHz                            |                 | 250  |      | pF/ch |
| Coupled   | LED On-state Current      | I <sub>Fon</sub>  | I <sub>L</sub> = 350 mA                                    |                 |      | 2.0  | mA    |
|           | On-state Resistance       | R <sub>on1</sub>  | I <sub>F</sub> = 10 mA, I <sub>L</sub> = 10 mA             |                 | 0.9  | 2.5  | Ω     |
|           |                           | R <sub>on2</sub>  | I <sub>F</sub> = 10 mA, I <sub>L</sub> = 350 mA, t ≤ 10 ms |                 |      |      |       |
|           | Turn-on Time *1           | t <sub>on</sub>   | I <sub>F</sub> = 10 mA, V <sub>O</sub> = 5 V, PW ≥ 10 ms   |                 | 1.3  | 3.0  | ms    |
|           | Turn-off Time *1          | t <sub>off</sub>  |  |                 | 0.06 | 0.2  |       |
|           | Isolation Resistance      | R <sub>I-O</sub>  | V <sub>I-O</sub> = 1.0 kV <sub>DC</sub>                    | 10 <sup>9</sup> |      |      | Ω     |
|           | Isolation Capacitance     | C <sub>I-O</sub>  | V = 0 V, f = 1 MHz   |                 | 1.1  |      | pF/ch |

\*1 Test Circuit for Switching Time

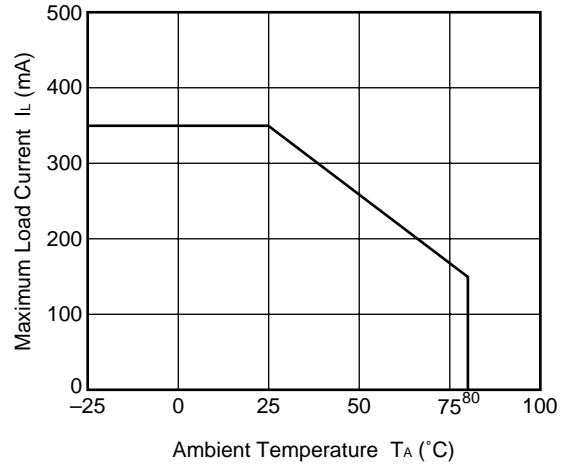


★ TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C, unless otherwise specified)

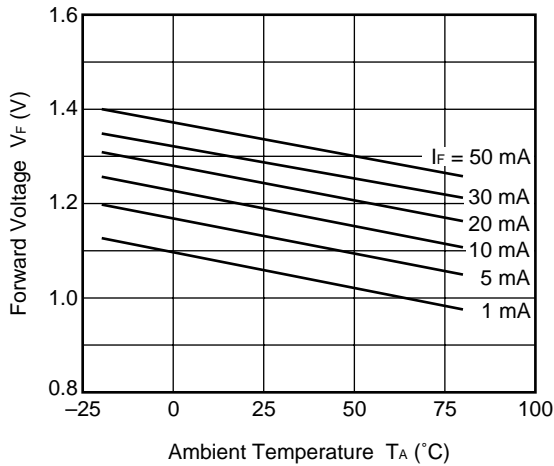
MAXIMUM FORWARD CURRENT vs. AMBIENT TEMPERATURE



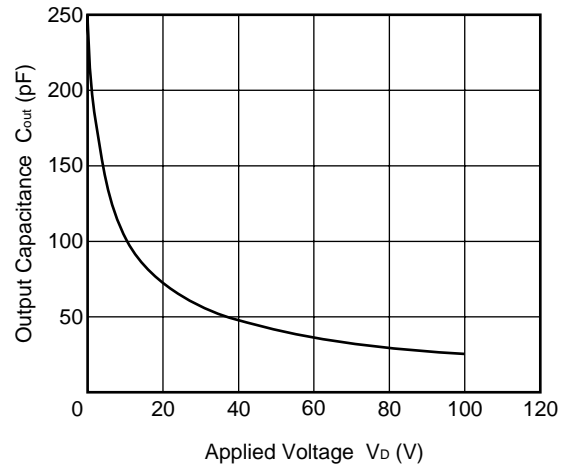
MAXIMUM LOAD CURRENT vs. AMBIENT TEMPERATURE



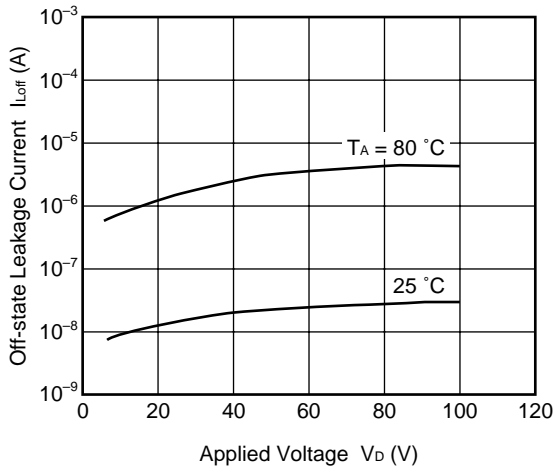
FORWARD VOLTAGE vs. AMBIENT TEMPERATURE



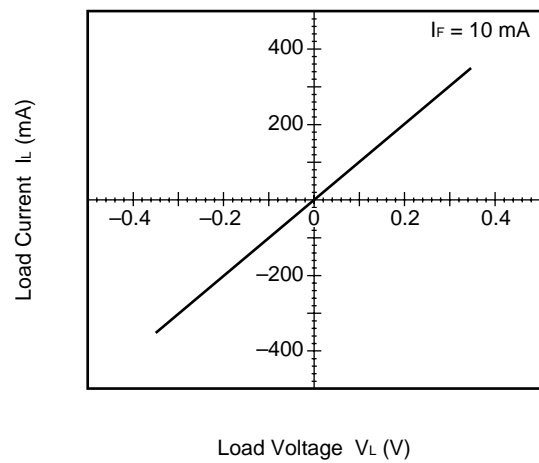
OUTPUT CAPACITANCE vs. APPLIED VOLTAGE



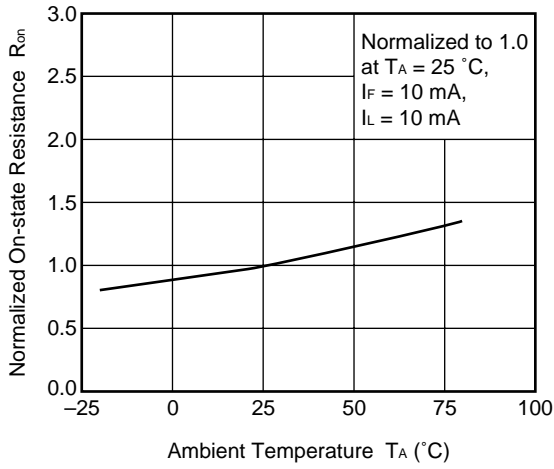
OFF-STATE LEAKAGE CURRENT vs. APPLIED VOLTAGE



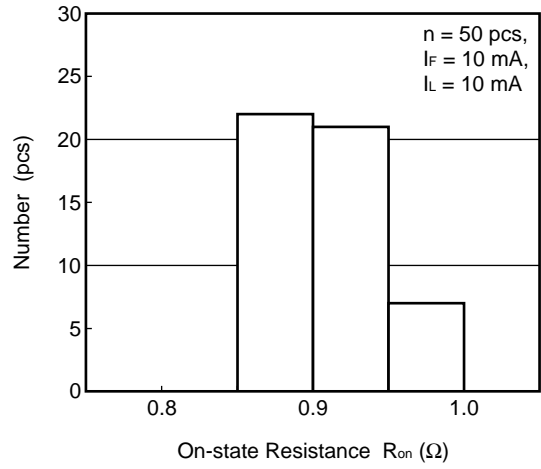
LOAD CURRENT vs. LOAD VOLTAGE



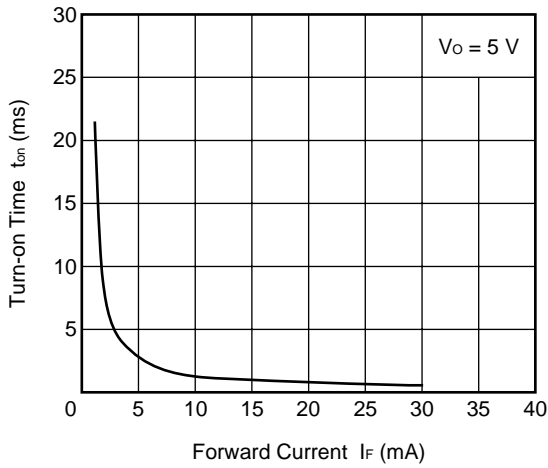
NORMALIZED ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE



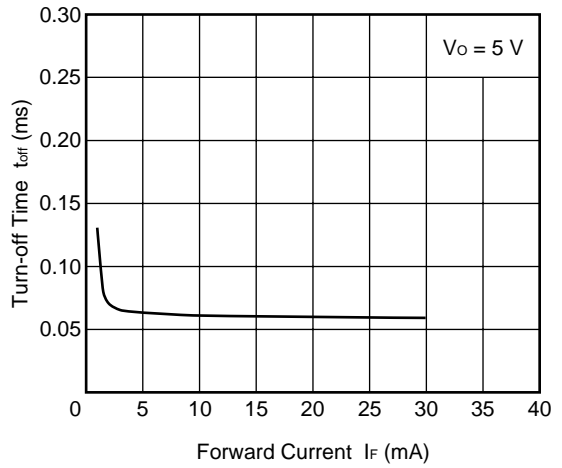
ON-STATE RESISTANCE DISTRIBUTION



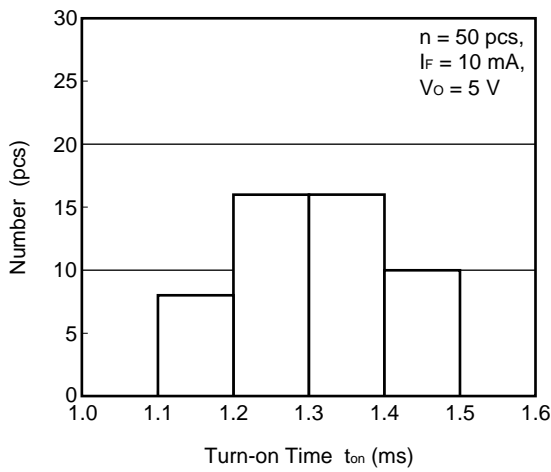
TURN-ON TIME vs. FORWARD CURRENT



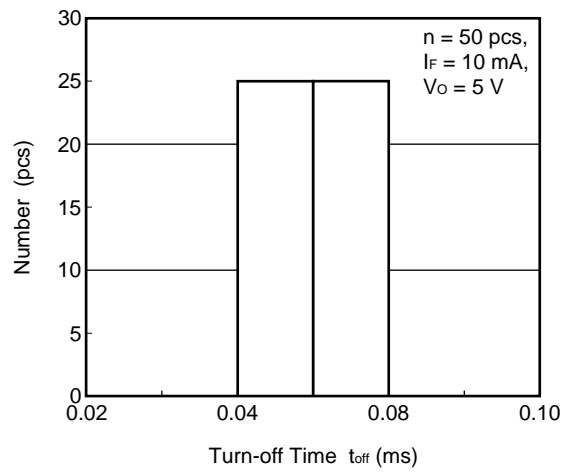
TURN-OFF TIME vs. FORWARD CURRENT



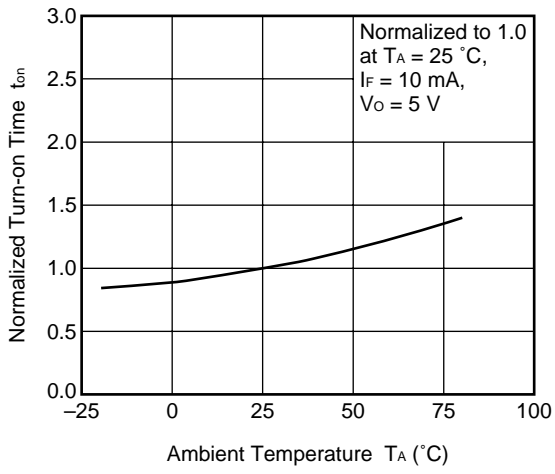
TURN-ON TIME DISTRIBUTION



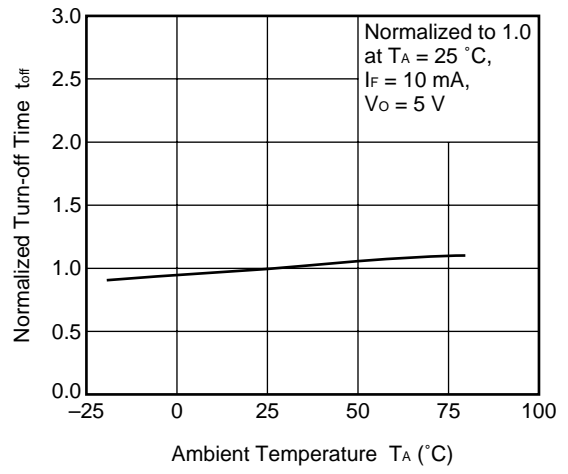
TURN-OFF TIME DISTRIBUTION



NORMALIZED TURN-ON TIME vs. AMBIENT TEMPERATURE



NORMALIZED TURN-OFF TIME vs. AMBIENT TEMPERATURE

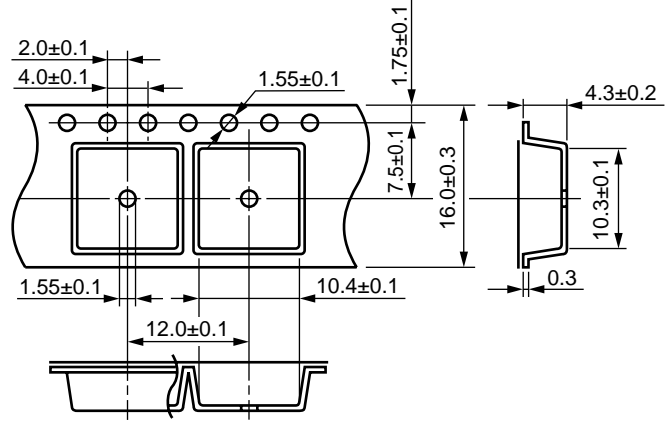


**Remark** The graphs indicate nominal characteristics.

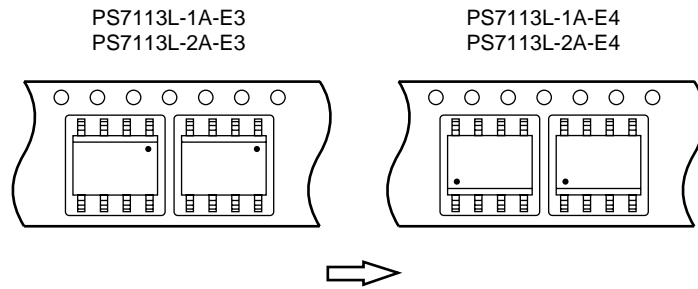


★ TAPING SPECIFICATIONS (in millimeters)

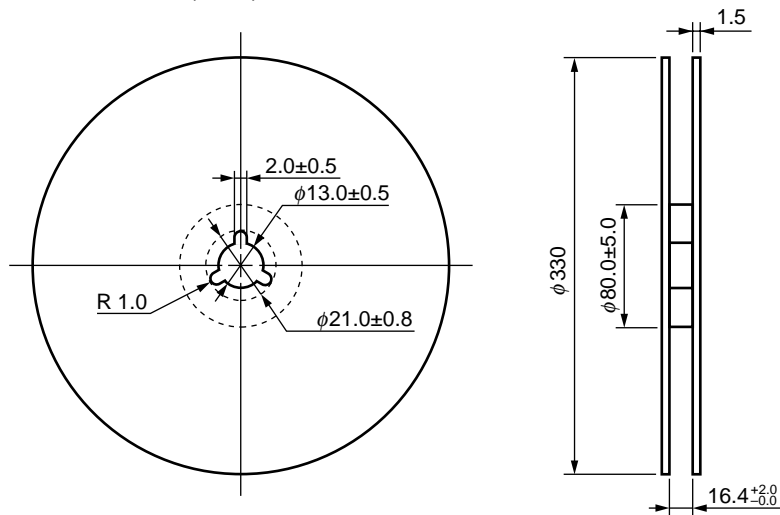
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



Packing: 1 000 pcs/reel

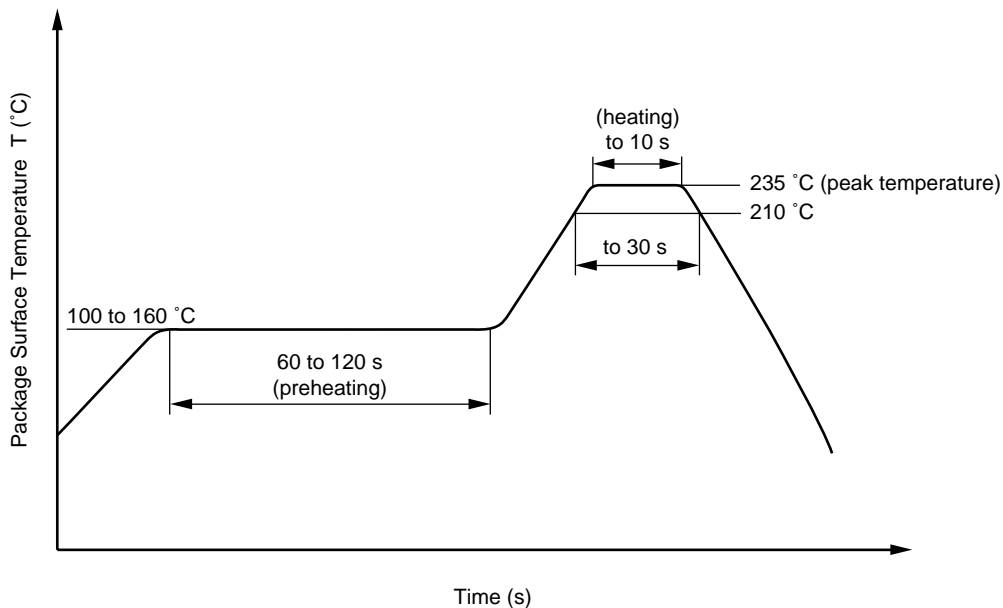
**RECOMMENDED SOLDERING CONDITIONS**

**(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 Two
- 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.

[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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