NEC

Solid State Relay
OCMOS FET

# PS7214-1A

## 4-PIN SOP, 1.0 Ω LOW ON-STATE RESISTANCE
## 1-ch Optical Coupled MOS FET

### DESCRIPTION

The PS7214-1A is a low on-state resistance solid state relay containing a GaAs LED on the input side and MOS FETs on the output side.

It is suitable for PLC, etc. because of its large continuous load current and low on-state resistance.

### FEATURES

- Low on-state resistance ($R_{on}$ = 1.0 Ω TYP.)
- Large continuous load current ($I_L$ = 400 mA)
- 1 channel type (1 a output)
- Designed for AC/DC switching line changer
- Small and thin package (4-pin SOP, Height = 2.1 mm)
- High isolation voltage (BV = 1 500 Vr.m.s.)
- Low offset voltage
- Ordering number of taping product: PS7214-1A-E3, E4, F3, F4

### APPLICATIONS

- Measurement equipment
- FA equipment



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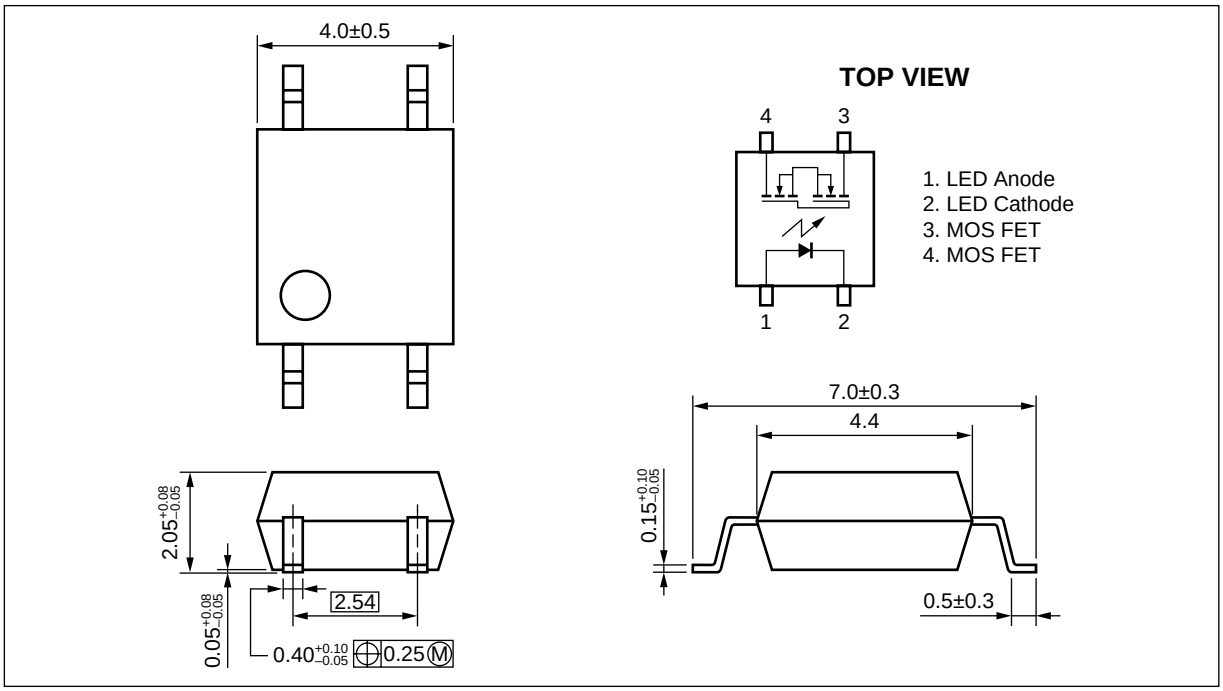
**The mark ★ shows major revised points.**

**PACKAGE DIMENSIONS (Unit: mm)**



## ORDERING INFORMATION

| Part Number | Package | Packing Style | Application Part Number[*1] |
|---|---|---|---|
| PS7214-1A | 4-pin SOP | Magazine case 100 pcs | PS7214-1A |
| PS7214-1A-E3 | | Embossed Tape 900 pcs/reel | |
| PS7214-1A-E4 | | | |
| PS7214-1A-F3 | | Embossed Tape 3 500 pcs/reel | |
| PS7214-1A-F4 | | | |

***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 | Forward Current (DC) | $I_F$ | 50 | mA |
| | Reverse Voltage | $V_R$ | 5.0 | V |
| | Power Dissipation | $P_D$ | 50 | mW |
| | Peak Forward Current[*1] | $I_{FP}$ | 1 | A |
| MOS FET | Break Down Voltage | $V_L$ | 100 | V |
| | Continuous Load Current | $I_L$ | 400 | mA |
| | Pulse Load Current[*2] (AC/DC Connection) | $I_{LP}$ | 0.8 | A |
| | Power Dissipation | $P_D$ | 300 | mW |
| Isolation Voltage[*3] | | BV | 1 500 | Vr.m.s. |
| Total Power Dissipation | | $P_T$ | 350 | mW |
| Operating Ambient Temperature | | $T_A$ | –40 to +85 | °C |
| Storage Temperature | | $T_{stg}$ | –40 to +100 | °C |

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

***2** PW = 100 ms, 1 shot

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

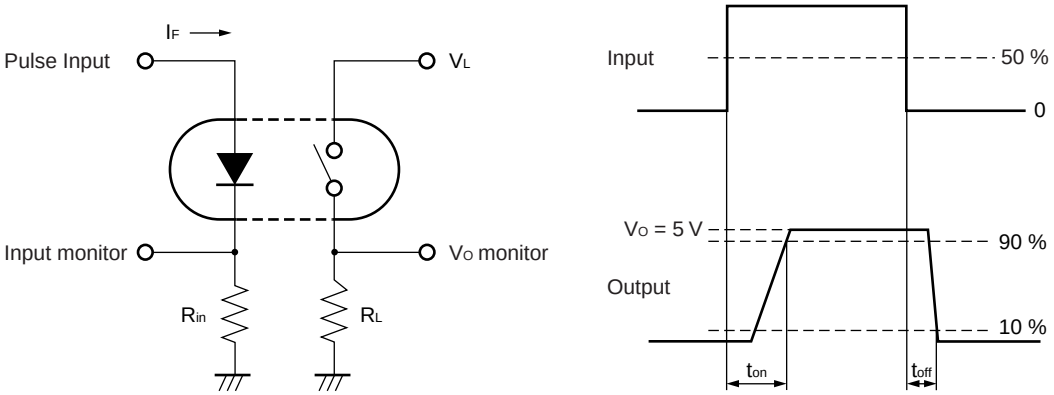
## RECOMMENDED OPERATING CONDITIONS ($T_A$ = 25 °C)

| Parameter | Symbol | MIN. | TYP. | MAX. | Unit |
|---|---|---|---|---|---|
| LED Operating Current | $I_F$ | 2 | 10 | 20 | mA |
| LED Off Voltage | $V_F$ | 0 | | 0.5 | V |

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

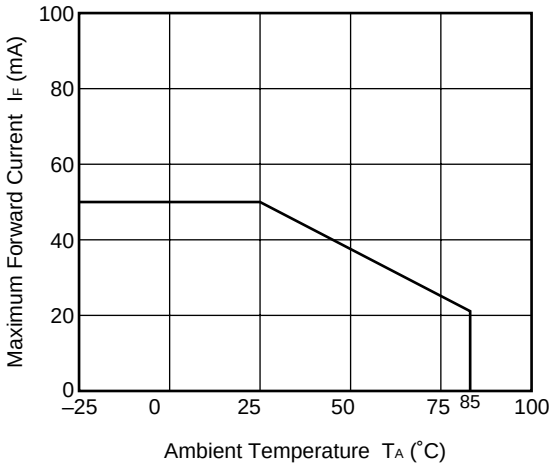
| Parameter | | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|---|---|---|---|---|---|---|---|
| Diode | Forward Voltage | $V_F$ | $I_F$ = 10 mA | | 1.2 | 1.4 | V |
| | Reverse Current | $I_R$ | $V_R$ = 5 V | | | 5.0 | μA |
| MOS FET | Off-state Leakage Current | $I_{Loff}$ | $V_D$ = 100 V | | | 1.0 | μA |
| | Output Capacitance | $C_{out}$ | $V_D$ = 0 V, f = 1 MHz | | 120 | | pF |
| Coupled | LED On-state Current | $I_{Fon}$ | $I_L$ = 400 mA | | | 2.0 | mA |
| | On-state Resistance | $R_{on}$ | $I_F$ = 10 mA, $I_L$ = 400 mA, t ≤ 10 ms | | 1.0 | 1.2 | Ω |
| | Turn-on Time*1 | $t_{on}$ | $I_F$ = 10 mA, $V_O$ = 5 V, $R_L$ = 500 Ω, | | 1.3 | 2.0 | ms |
| | Turn-off Time*1 | $t_{off}$ | PW ≥ 10 ms | | 0.1 | 1.0 | |
| | Isolation Resistance | $R_{I-O}$ | $V_{I-O}$ = 1.0 $kV_{DC}$ | $10^9$ | | | Ω |
| | Isolation Capacitance | $C_{I-O}$ | V = 0 V, f = 1 MHz | | 0.5 | | pF |

***1** Test Circuit for Switching Time

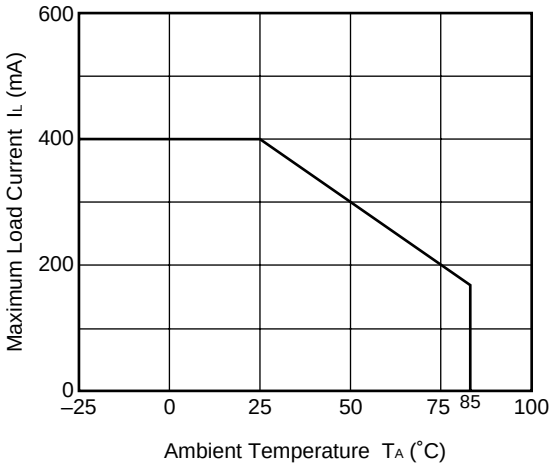


**TYPICAL CHARACTERISTICS ($T_A$ = 25 °C, unless otherwise specified)**

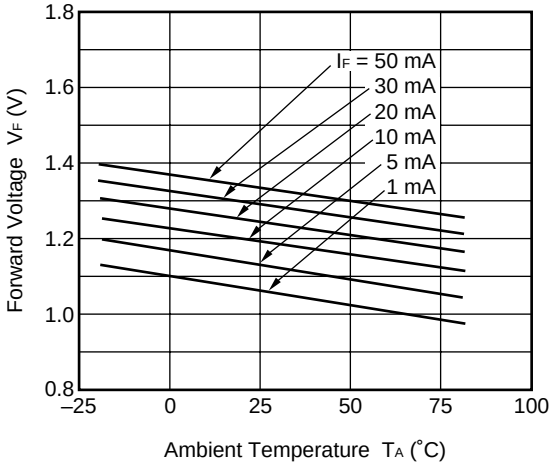
MAXIMUM FORWARD CURRENT vs. AMBIENT TEMPERATURE



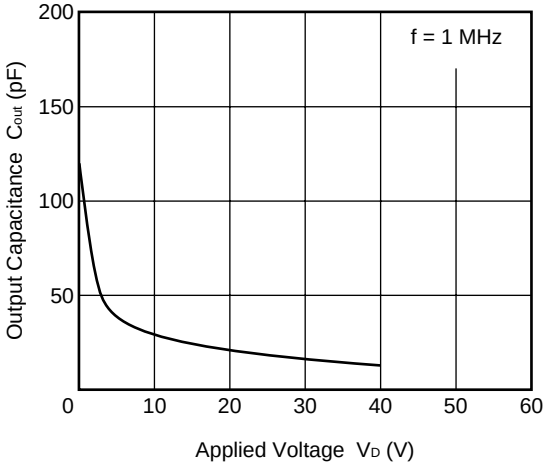

MAXIMUM LOAD CURRENT vs. AMBIENT TEMPERATURE



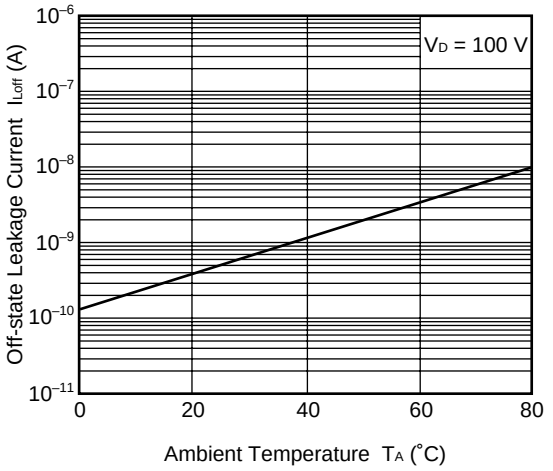

FORWARD VOLTAGE vs. AMBIENT TEMPERATURE



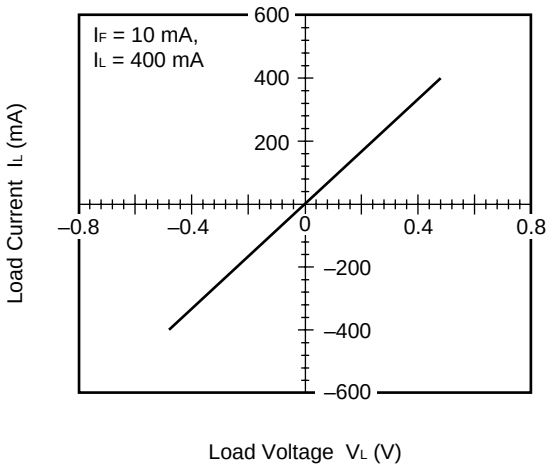

OUTPUT CAPACITANCE vs. APPLIED VOLTAGE



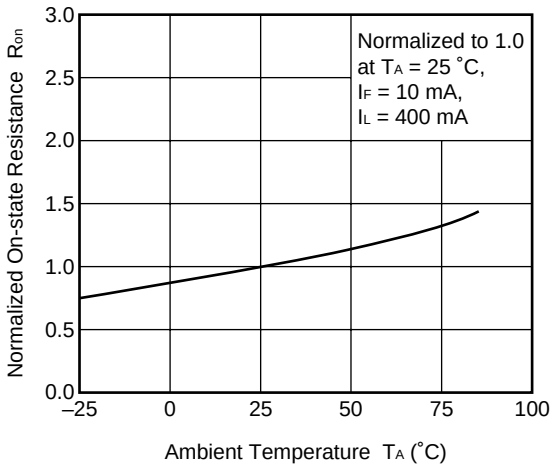

OFF-STATE LEAKAGE CURRENT vs. AMBIENT TEMPERATURE



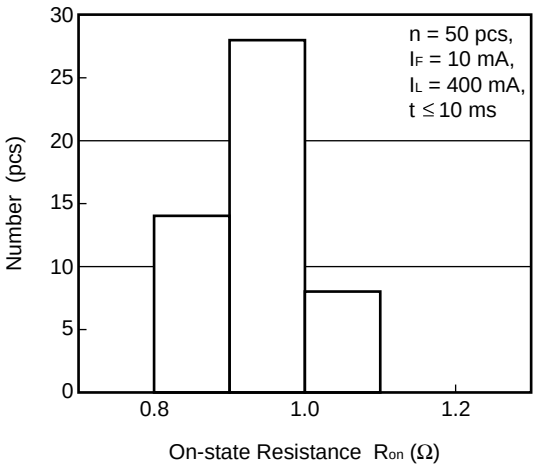

LOAD CURRENT vs. LOAD VOLTAGE



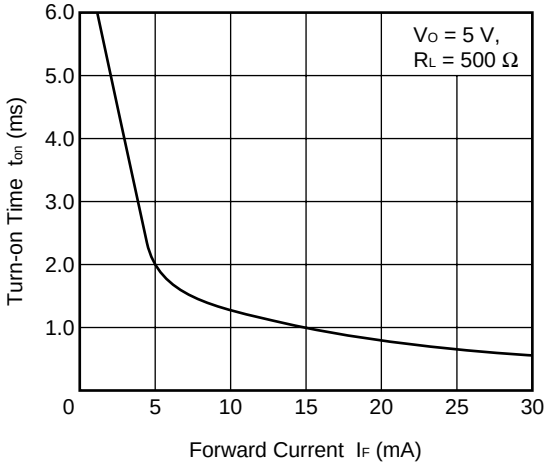
NORMALIZED ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE



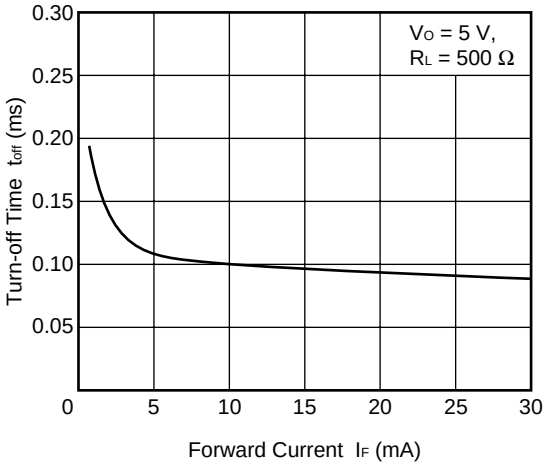

ON-STATE RESISTANCE DISTRIBUTION



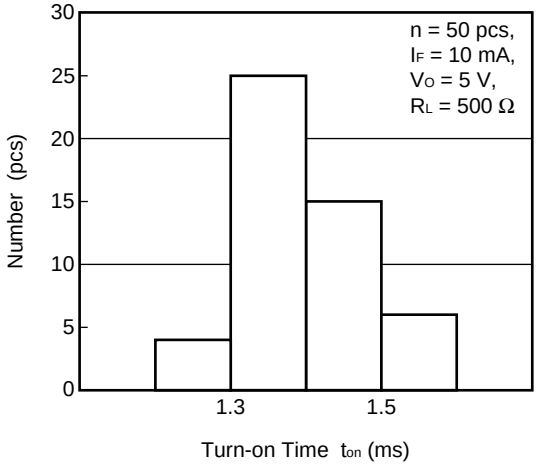

TURN-ON TIME vs. FORWARD CURRENT



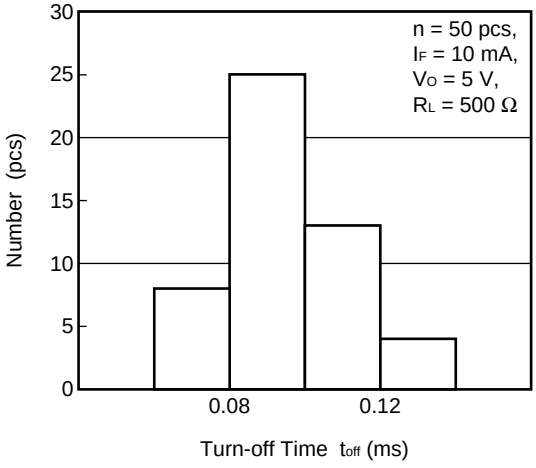

TURN-OFF TIME vs. FORWARD CURRENT



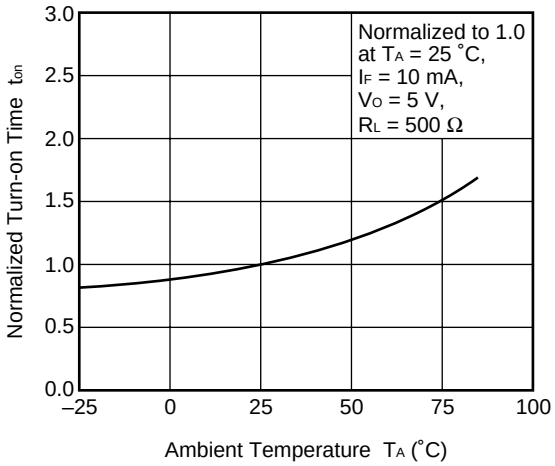

TURN-ON TIME DISTRIBUTION



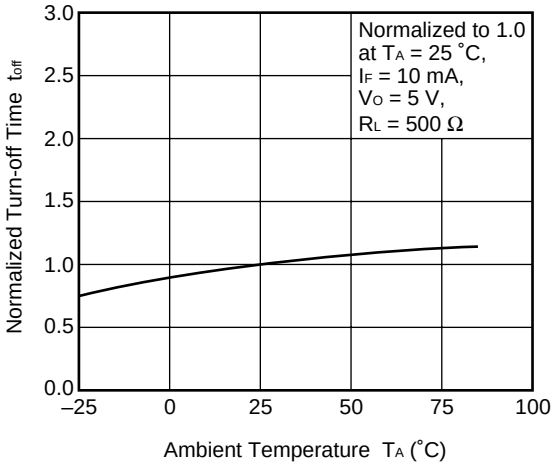

TURN-OFF TIME DISTRIBUTION



NORMALIZED TURN-ON TIME vs.
AMBIENT TEMPERATURE



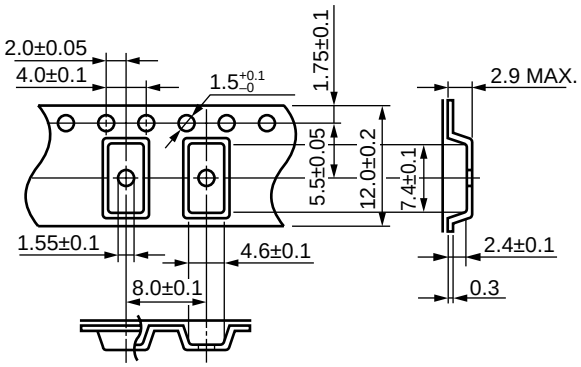

NORMALIZED TURN-OFF TIME vs.
AMBIENT TEMPERATURE



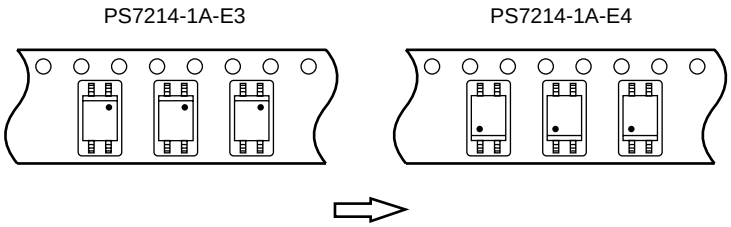

**Remark** The graphs indicate nominal characteristics.

★ **TAPING SPECIFICATIONS (in millimeters)**

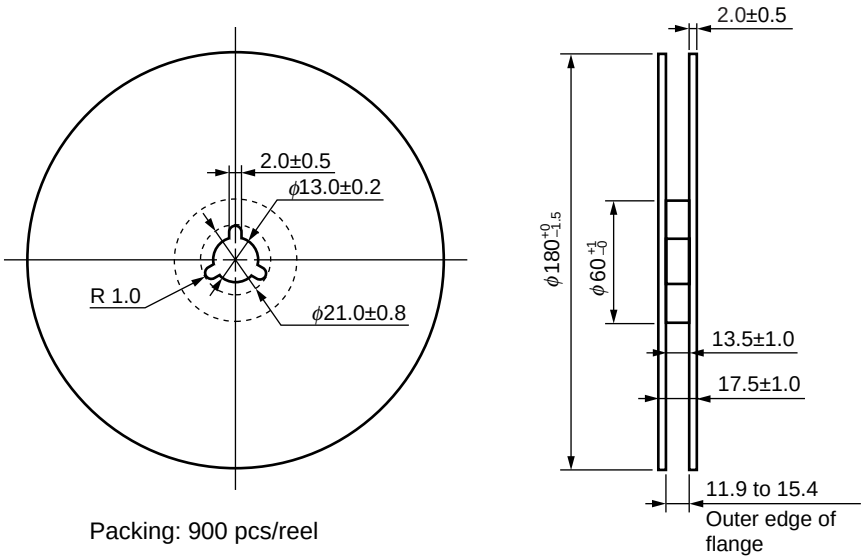
Outline and Dimensions (Tape)




Tape Direction

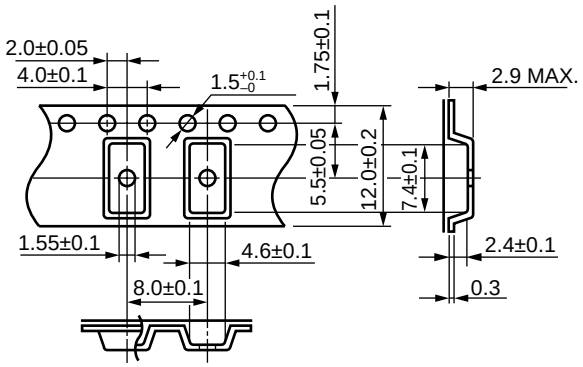



Outline and Dimensions (Reel)

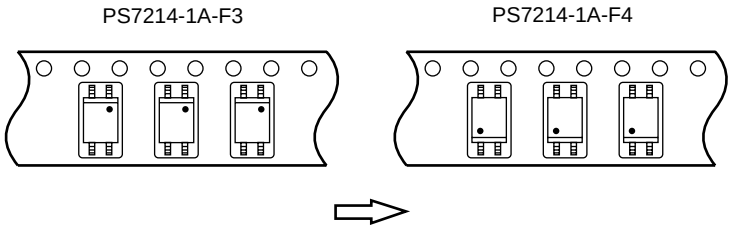



Packing: 900 pcs/reel

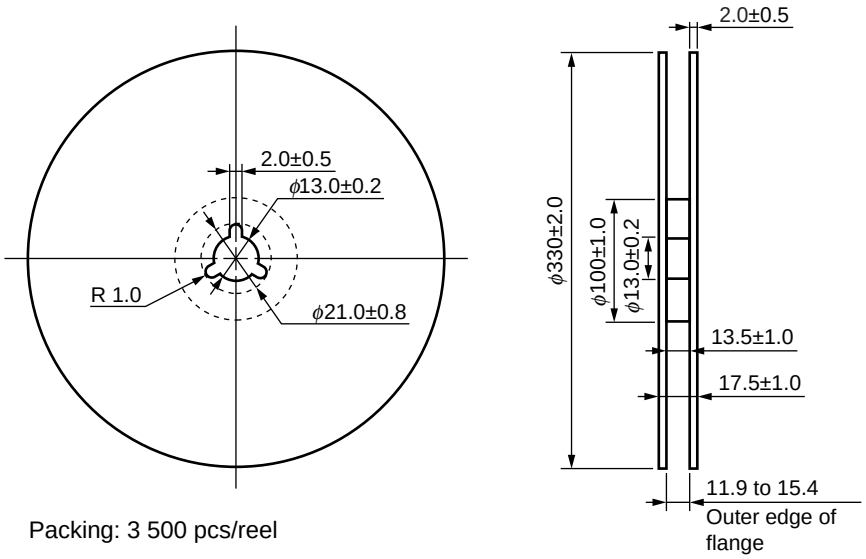
Outline and Dimensions (Tape)




Tape Direction




Outline and Dimensions (Reel)



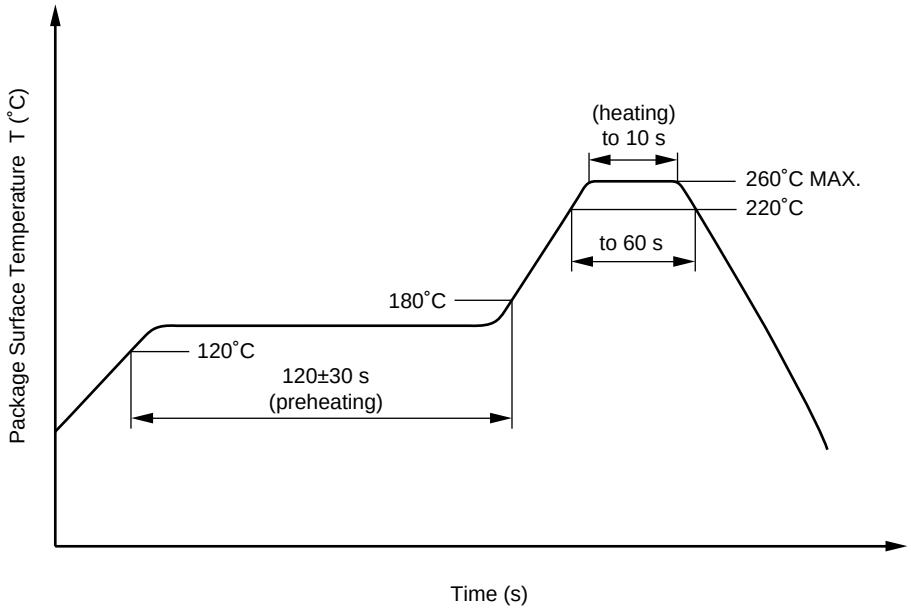

Packing: 3 500 pcs/reel

## ★ 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 |
| • 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.

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M8E 00.4-0110

## SAFETY INFORMATION ON THIS PRODUCT

| | |
|---|---|
| **Caution** GaAs Products | The product contains gallium arsenide, GaAs.<br>GaAs vapor and powder are hazardous to human health if inhaled or ingested.<br>• Do not destroy or burn the product.<br>• Do not cut or cleave off any part of the product.<br>• Do not crush or chemically dissolve the product.<br>• Do not put the product in the mouth.<br>Follow related laws and ordinances for disposal. The product should be excluded from general industrial waste or household garbage. |

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