

**CEL**

**NEC's 4-PIN SOP**  
**LOW OFF-STATE LEAKAGE CURRENT**  
**1-ch OPTICAL COUPLED MOS FET**

**PS7200U-1A****FEATURES**

- **LOW OFF-STATE LEAKAGE CURRENT:**  
 $I_{\text{off}} = 0.1 \text{ nA TYP.}$
- **BREAK DOWN VOLTAGE:**  
 $V_L = 80 \text{ V}$
- **HIGH-SPEED TURN-ON TIME:**  
 $t_{\text{on}} = 0.05 \text{ ms TYP}$
- **LOW OUTPUT CAPACITANCE:**  
 $C_{\text{out}} = 2.3 \text{ pF TYP.}$
- **C × R:**  
 $C \times R = 40 \text{ pF} \cdot \Omega$
- **1 CHANNEL TYPE:**  
 1a Output
- **DESIGNED FOR AC/DC SWITCHING LINE CHANGER**
- **SMALL AND THIN PACKAGE:**  
 4-pin SOP, Height = 2.1 mm
- **LOW OFFSET VOLTAGE**
- **ORDERING NUMBER OF TAPING PRODUCT:**  
 PS7200U-1A-E3, E4, F3, F4

**DESCRIPTION**

NEC's PS7200U-1A is a low output capacitance solid state relay containing GaAs LEDs on the light emitting side (input side) and MOS FETs on the output side.

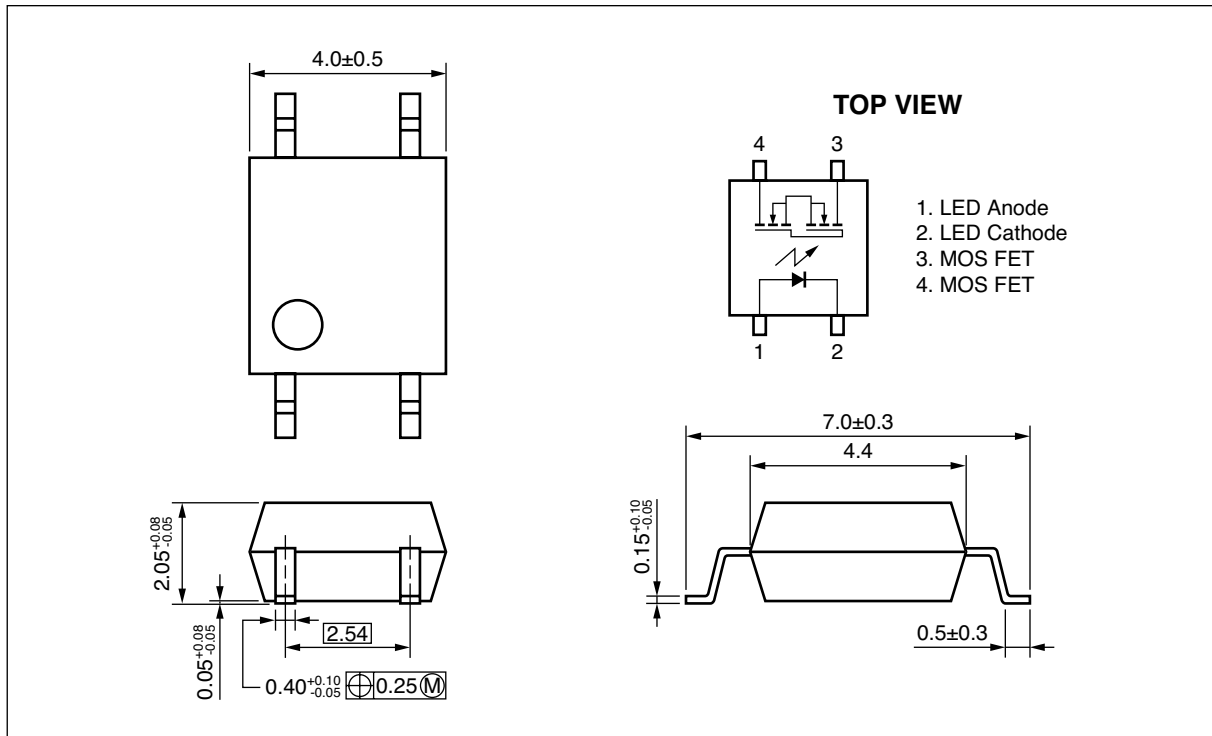
It is suitable for high-frequency signal control, due to its extremely low off-state leakage current, low output capacitance, and high-speed turn-on time.

**APPLICATIONS**

- **Measurement Equipment**

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)



**ORDERING INFORMATION**

| PART NUMBER   | ORDER NUMBER    | SOLDER PLATING SPECIFICATION | PACKING STYLE                |
|---------------|-----------------|------------------------------|------------------------------|
| PS7200U-1A    | PS7200U-1A      | Solder<br>contains lead      | Magazine case 100 pcs        |
| PS7200U-1A-E3 | PS7200U-1A-E3   |                              | Embossed Tape 900 pcs/reel   |
| PS7200U-1A-E4 | PS7200U-1A-E4   |                              | Embossed Tape 3 500 pcs/reel |
| PS7200U-1A-F3 | PS7200U-1A-F3   |                              |                              |
| PS7200U-1A-F4 | PS7200U-1A-F4   |                              |                              |
| PS7200U-1A    | PS7200U-1A-A    | Pb-Free                      | Magazine case 100 pcs        |
| PS7200U-1A-E3 | PS7200U-1A-E3-A |                              | Embossed Tape 900 pcs/reel   |
| PS7200U-1A-E4 | PS7200U-1A-E4-A |                              | Embossed Tape 3 500 pcs/reel |
| PS7200U-1A-F3 | PS7200U-1A-F3-A |                              |                              |
| PS7200U-1A-F4 | PS7200U-1A-F4-A |                              |                              |

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

| PARAMETER                     |  | SYMBOL           | RATINGS     | UNIT    |
|-------------------------------|--|------------------|-------------|---------|
| <b>Diode</b>                  | 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      |
|                               | Peak Forward Current *1                    | I <sub>FP</sub>  | 1           | A       |
| <b>MOS FET</b>                | Break Down Voltage                         | V <sub>L</sub>   | 80          | V       |
|                               | Continuous Load Current                    | I <sub>L</sub>   | 40          | mA      |
|                               | Pulse Load Current*2<br>(AC/DC Connection) | I <sub>LP</sub>  | 80          | mA      |
|                               | Power Dissipation                          | P <sub>D</sub>   | 300         | mW      |
| Isolation Voltage *3          |  | BV               | 1 500       | Vr.m.s. |
| Total Power Dissipation       |  | P <sub>T</sub>   | 350         | mW      |
| Operating Ambient Temperature |  | T <sub>A</sub>   | -40 to +85  | °C      |
| Storage Temperature           |  | T <sub>stg</sub> | -40 to +100 | °C      |

\*1 PW = 100 μs, Duty Cycle = 1%

\*2 PW = 100 ms, 1 shot

\*3 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.

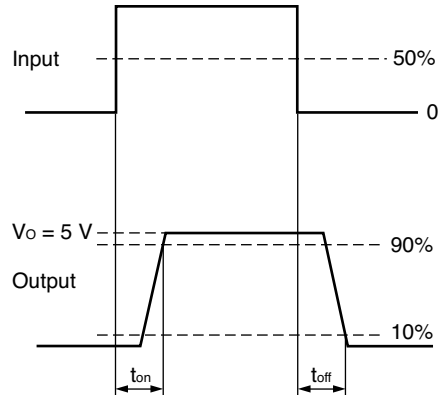
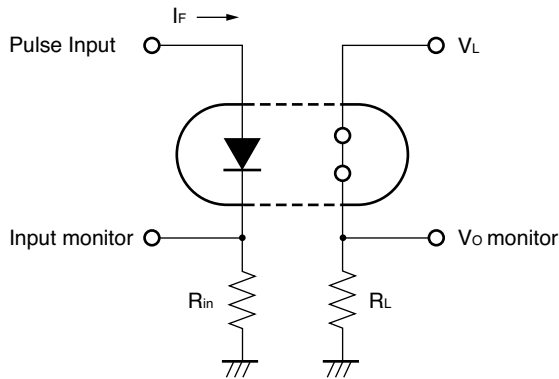
**RECOMMENDED OPERATING CONDITIONS** (TA = 25°C)

| PARAMETER             | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|-----------------------|--------|------|------|------|------|
| LED Operating Current | IF     | 2    | 10   | 20   | mA   |
| LED Off Voltage       | VF     | 0    |      | 0.5  | V    |

**ELECTRICAL CHARACTERISTICS** (TA = 25°C)

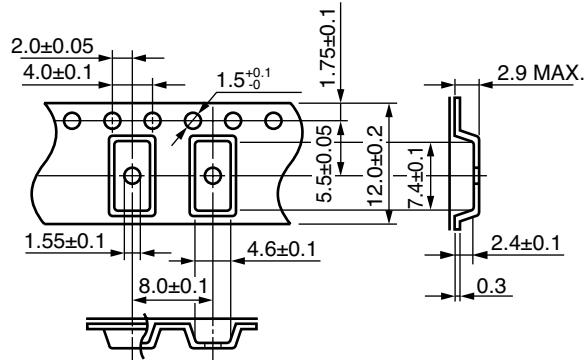
| PARAMETER      |                           | SYMBOL | CONDITIONS                                      | MIN.            | TYP. | MAX. | UNIT |
|----------------|---------------------------|--------|---|-----------------|------|------|------|
| <b>Diode</b>   | Forward Voltage           | VF     | IF = 5 mA                                       |                 | 1.1  | 1.3  | V    |
|                | Reverse Current           | IR     | VR = 5 V  |                 | 0.01 | 5.0  | μA   |
| <b>MOS FET</b> | Off-state Leakage Current | ILoff  | Vb = 80 V                                       |                 | 0.1  | 1.0  | nA   |
|                | Output Capacitance        | Cout   | Vb = 0 V, f = 1 MHz                             |                 | 2.3  | 3.5  | pF   |
| <b>Coupled</b> | LED On-state Current      | IFon   | IL = ±40 mA                                     |                 |      | 2.0  | mA   |
|                | On-state Resistance       | Ron    | IF = 5 mA, IL = ±40 mA                          |                 | 17   | 25   | Ω    |
|                | Turn-on Time*1            | ton    | IF = 5 mA, VL = 5 V, RL = 500 Ω,<br>PW ≥ 0.5 ms |                 | 0.05 | 0.5  | ms   |
|                | Turn-off Time*1           | toff   |   |                 | 0.15 | 0.5  |      |
|                | Isolation Resistance      | RI-o   | VI-o = 1.0 kVDC                                 | 10 <sup>9</sup> |      |      | Ω    |
|                | Isolation Capacitance     | CI-o   | V = 0 V, f = 1 MHz                              |                 | 0.3  |      | pF   |

\*1 Test Circuit for Switching Time

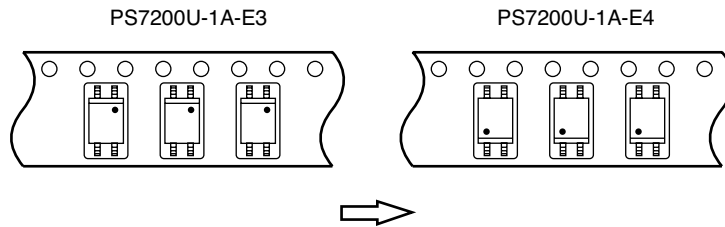


**TAPING SPECIFICATIONS** (mm)

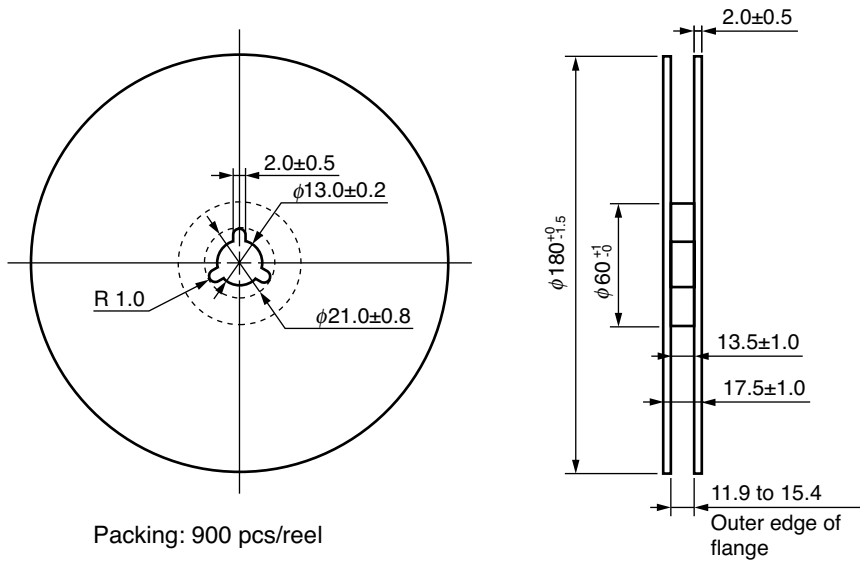
Outline and Dimensions (Tape)



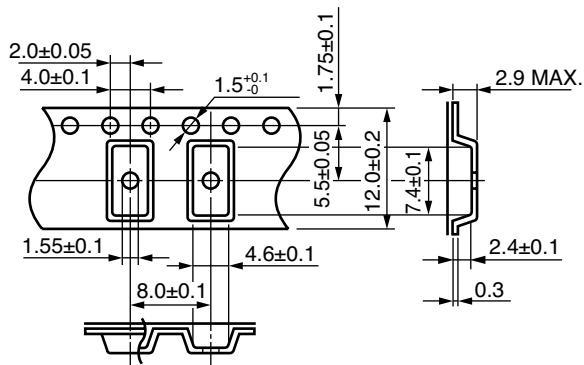
Tape Direction



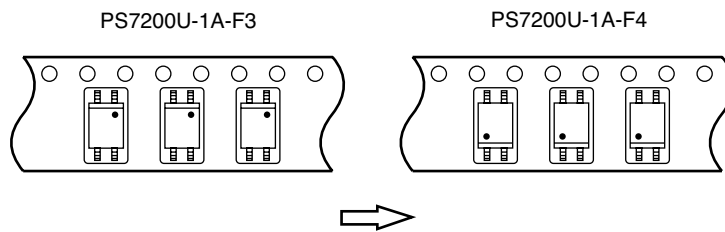
Outline and Dimensions (Reel)



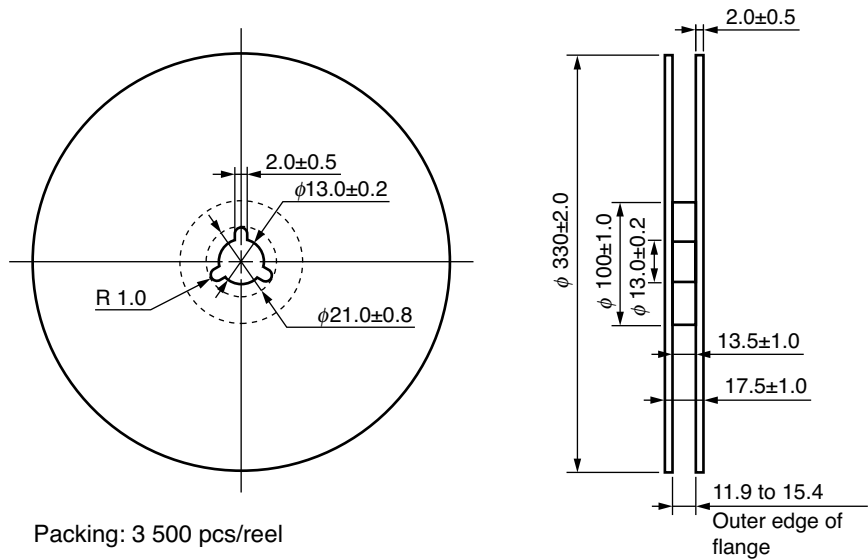
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



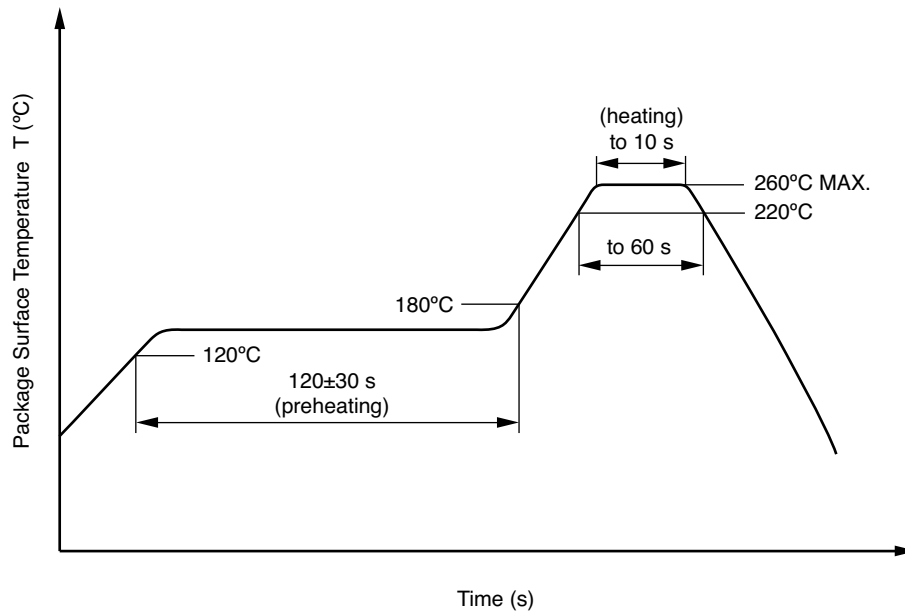
## NOTES ON HANDLING

### 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
- 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.

## USAGE CAUTIONS

1. Protect against static electricity when handling.
2. Avoid storage at a high temperature and high humidity.

### Life Support Applications

These NEC products are not intended for use in life support devices, appliances, or systems where the malfunction of these products can reasonably be expected to result in personal injury. The customers of CEL using or selling these products for use in such applications do so at their own risk and agree to fully indemnify CEL for all damages resulting from such improper use or sale.

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