

**4-PIN SOP, 1.1 pF LOW OUTPUT CAPACITANCE  
1-ch Optical Coupled MOS FET**

-NEPOC Series-

**DESCRIPTION**

The PS7200R-1A is a low output capacitance solid state relay containing a GaAs LED 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 low  $C \times R$ , low output capacitance, and low off-state leakage current.

**FEATURES**

- Low  $C \times R$  ( $C \times R = 11 \text{ pF} \cdot \Omega$ )
- Low output capacitance ( $C_{\text{out}} = 1.1 \text{ pF TYP.}$ )
- 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 ( $BV = 1\,500 \text{ Vr.m.s.}$ )
- Low offset voltage
- Ordering number of taping product : PS7200R-1A-E3, E4: 900 pcs/reel  
: PS7200R-1A-F3, F4: 3 500 pcs/reel

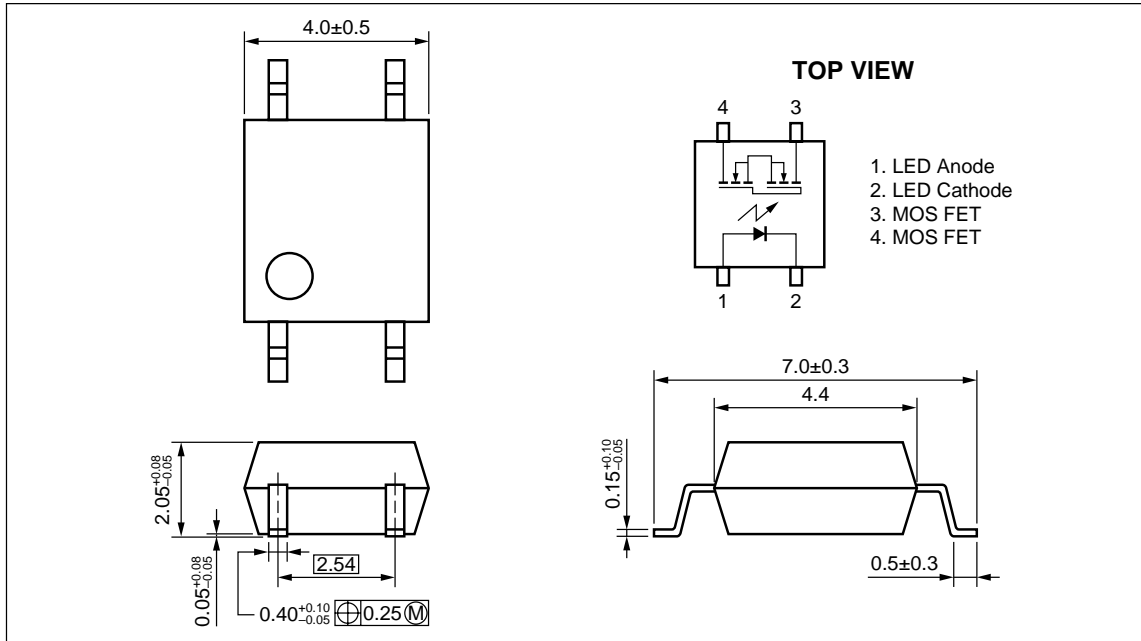
- <R> • Pb-Free product
- <R> • Safety standards
  - UL approved: File No. E72422
  - BSI approved: No. 8241/8242

**APPLICATIONS**

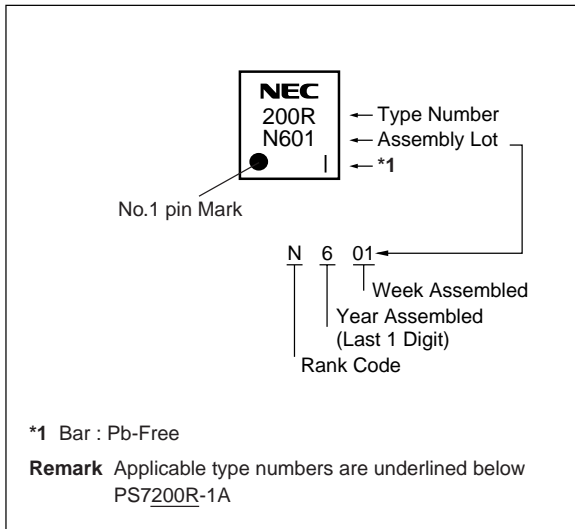
- Measurement equipment

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PACKAGE DIMENSIONS (UNIT: mm)



<R> MARKING EXAMPLE (LASER MARKING)



## &lt;R&gt; ORDERING INFORMATION

Part Number	Order Number	Solder Plating Specification	Packing Style	Safety Standard Approval	Application Part Number <sup>*1</sup>
PS7200R-1A	PS7200R-1A-A	Pb-Free	Magazine case 100 pcs	Standard products (UL, BSI approved)	PS7200R-1A
PS7200R-1A-E3	PS7200R-1A-E3-A		Embossed Tape 900 pcs/reel		
PS7200R-1A-E4	PS7200R-1A-E4-A				
PS7200R-1A-F3	PS7200R-1A-F3-A		Embossed Tape 3 500 pcs/reel		
PS7200R-1A-F4	PS7200R-1A-F4-A				

\*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
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
	Peak Forward Current <sup>*1</sup>	I <sub>FP</sub>	1	A
MOS FET	Break Down Voltage	V <sub>L</sub>	40	V
	Continuous Load Current	I <sub>L</sub>	120	mA
	Pulse Load Current <sup>*2</sup> (AC/DC Connection)	I <sub>LP</sub>	240	mA
	Power Dissipation	P <sub>D</sub>	200	mW
Isolation Voltage <sup>*3</sup>		BV	1 500	Vr.m.s.
Total Power Dissipation		P <sub>T</sub>	250	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.

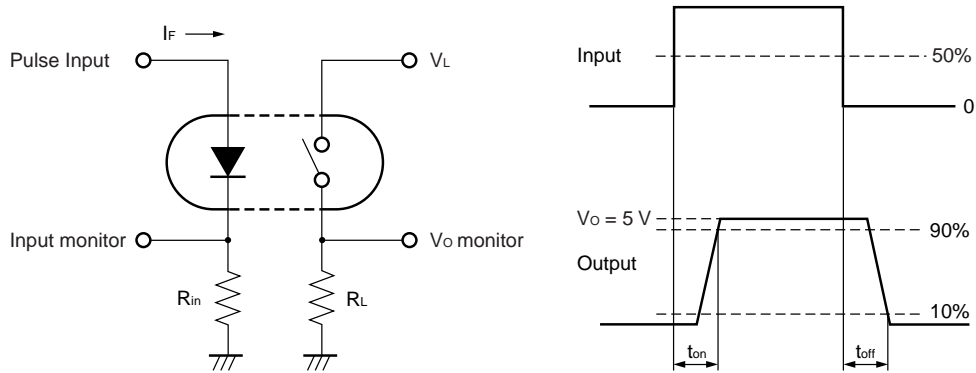
**RECOMMENDED OPERATING CONDITIONS (TA = 25°C)**

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

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

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	$V_F$	$I_F = 10 \text{ mA}$		1.2	1.4	V
	Reverse Current	$I_R$	$V_R = 5 \text{ V}$			5.0	$\mu\text{A}$
MOS FET	Off-state Leakage Current	$I_{\text{off}}$	$V_D = 40 \text{ V}$			10	nA
	Output Capacitance	$C_{\text{out}}$	$V_D = 0 \text{ V}, f = 1 \text{ MHz}$		1.1		pF
Coupled	LED On-state Current	$I_{\text{Fon}}$	$I_L = 120 \text{ mA}$			2.0	mA
	On-state Resistance	$R_{\text{on1}}$	$I_F = 10 \text{ mA}, I_L = 10 \text{ mA}$		10	12.5	$\Omega$
		$R_{\text{on2}}$	$I_F = 10 \text{ mA}, I_L = 120 \text{ mA}, t \leq 10 \text{ ms}$		11	14	
	Turn-on Time <sup>*1,2</sup>	$t_{\text{on}}$	$I_F = 10 \text{ mA}, V_O = 5 \text{ V}, R_L = 500 \Omega,$		0.03	0.5	ms
	Turn-off Time <sup>*1,2</sup>	$t_{\text{off}}$	$PW \geq 10 \text{ ms}$		0.3	1.0	
	Isolation Resistance	$R_{\text{I-O}}$	$V_{\text{I-O}} = 1.0 \text{ kV}_{\text{DC}}$		$10^9$		$\Omega$
Isolation Capacitance	$C_{\text{I-O}}$	$V = 0 \text{ V}, f = 1 \text{ MHz}$			0.3	pF	

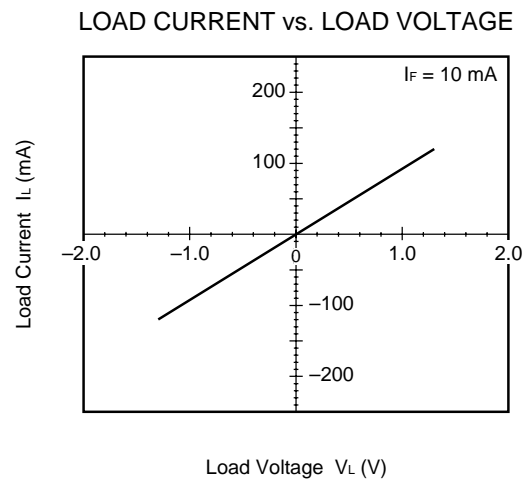
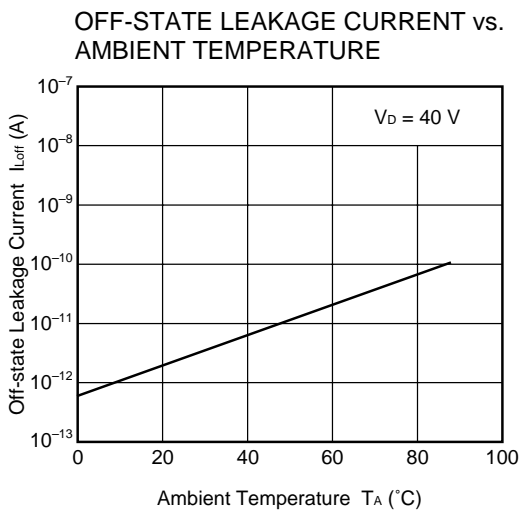
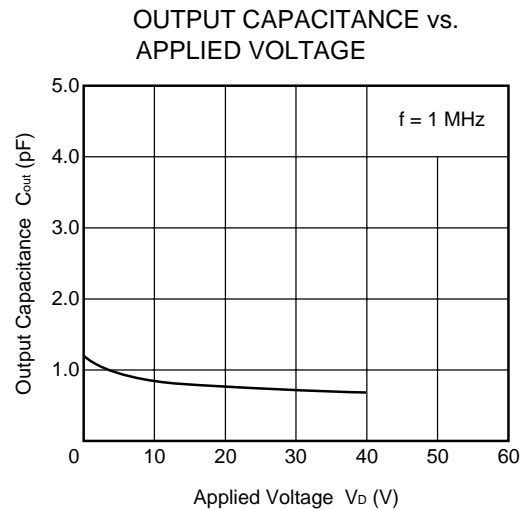
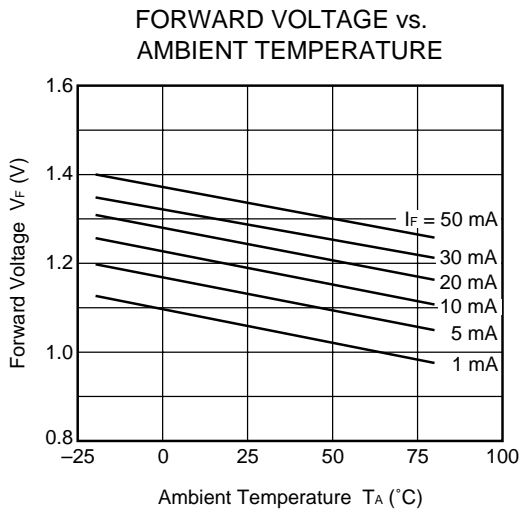
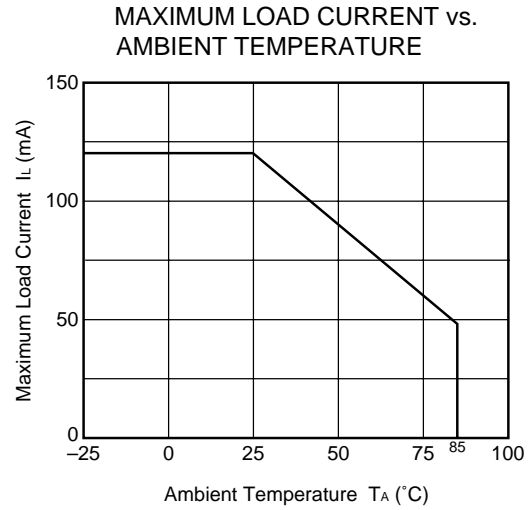
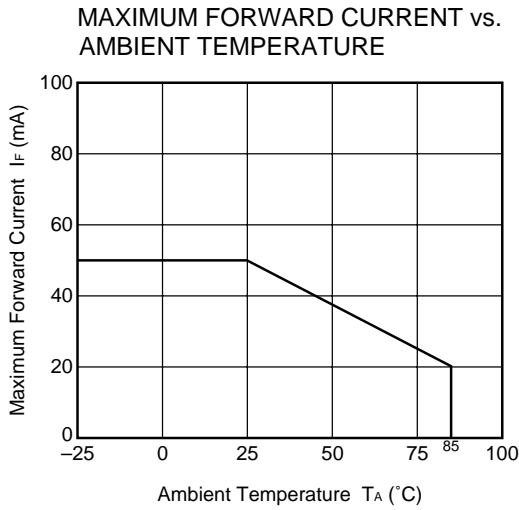
**\*1 Test Circuit for Switching Time**



**\*2 The turn-on time and turn-off time are specified as input-pulse width  $\geq 10 \text{ ms}$ .**

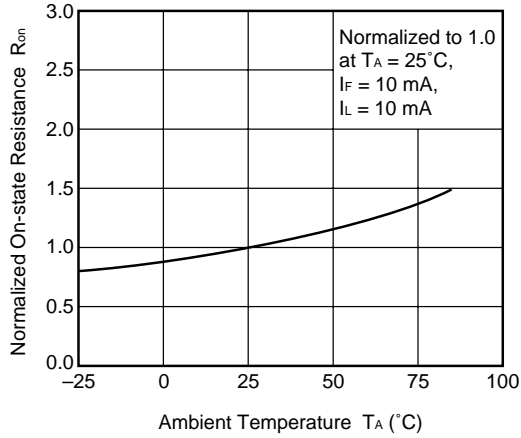
Be aware that when the device operates with an input-pulse width less than 10 ms, the turn-on time and turn-off time will increase.

**TYPICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ , unless otherwise specified)**

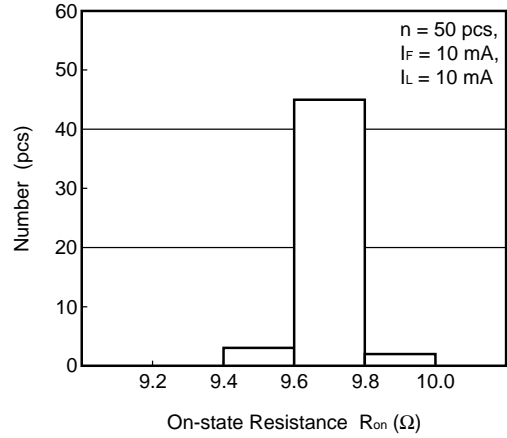


**Remark** The graphs indicate nominal characteristics.

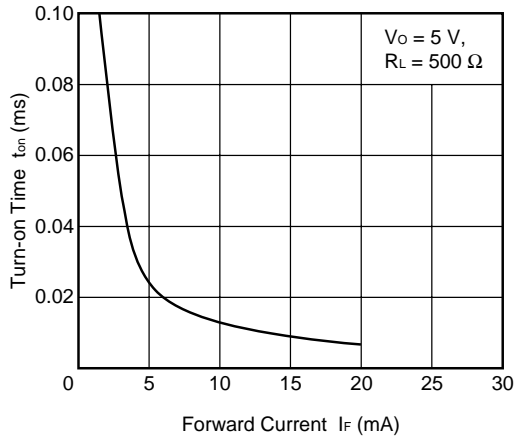
NORMALIZED ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE



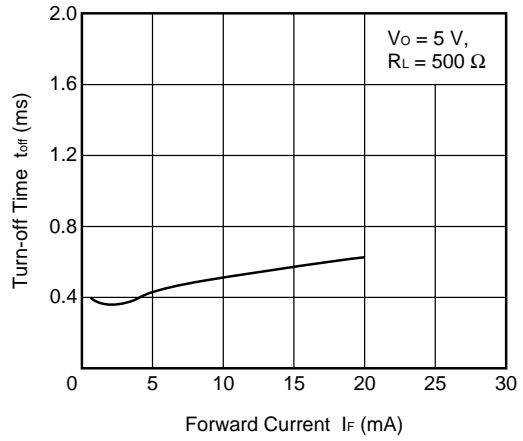
ON-STATE RESISTANCE DISTRIBUTION



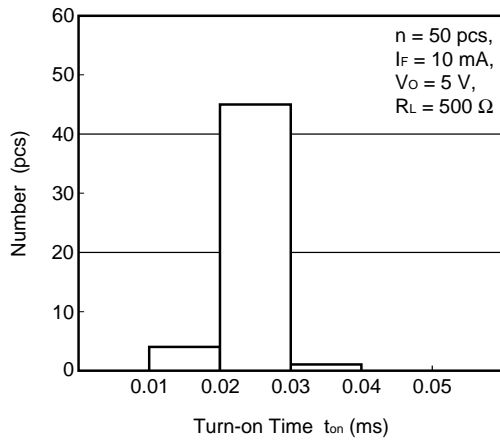
TURN-ON TIME vs. FORWARD CURRENT



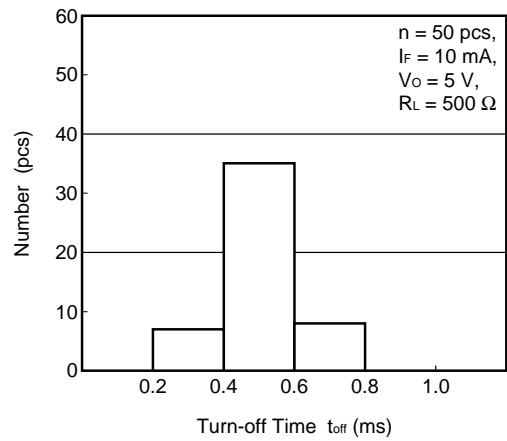
TURN-OFF TIME vs. FORWARD CURRENT



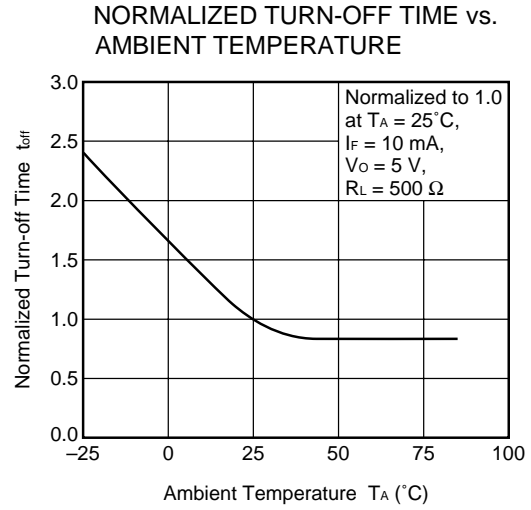
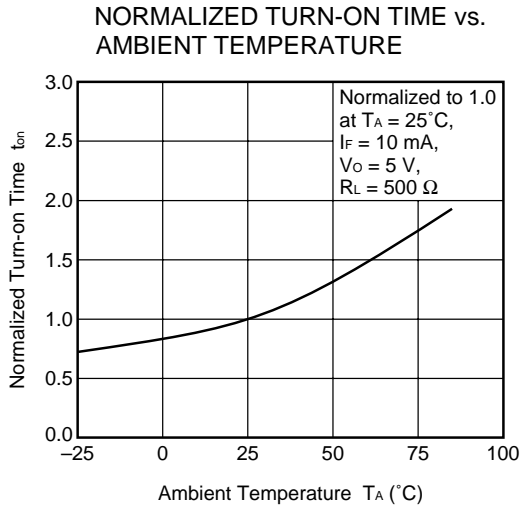
TURN-ON TIME DISTRIBUTION



TURN-OFF TIME DISTRIBUTION



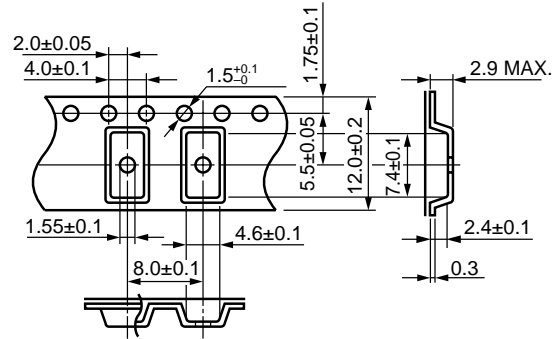
**Remark** The graphs indicate nominal characteristics.



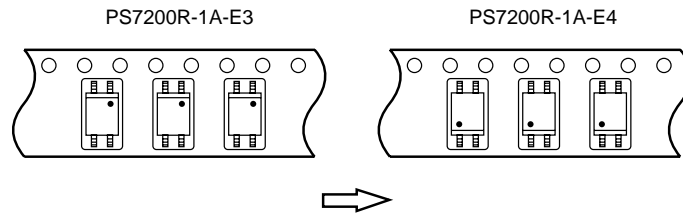
**Remark** The graphs indicate nominal characteristics.

TAPING SPECIFICATIONS (UNIT: mm)

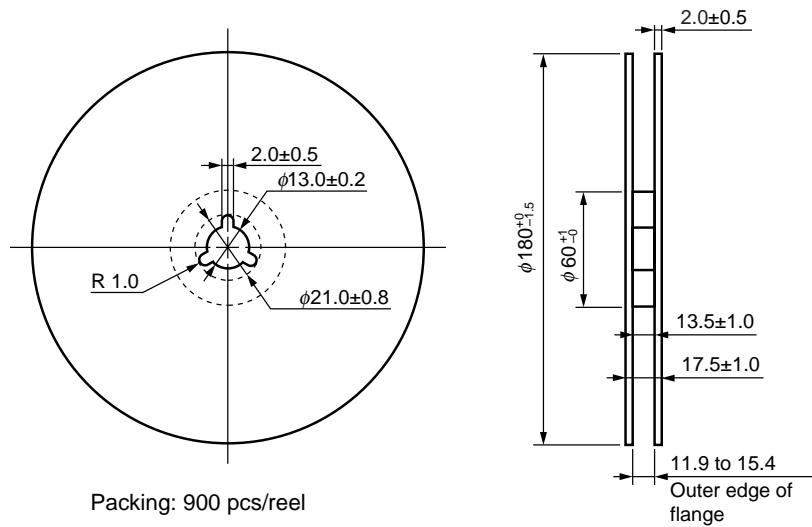
Outline and Dimensions (Tape)



Tape Direction

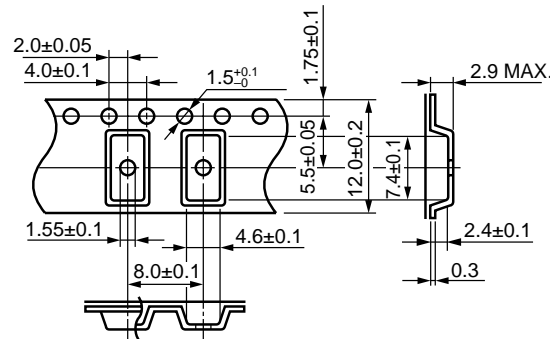


Outline and Dimensions (Reel)

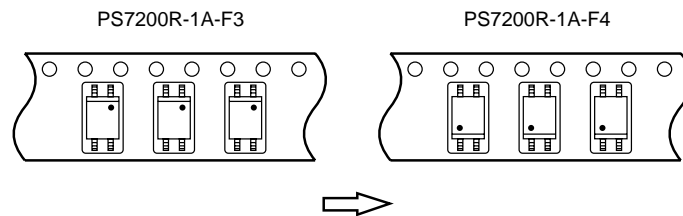




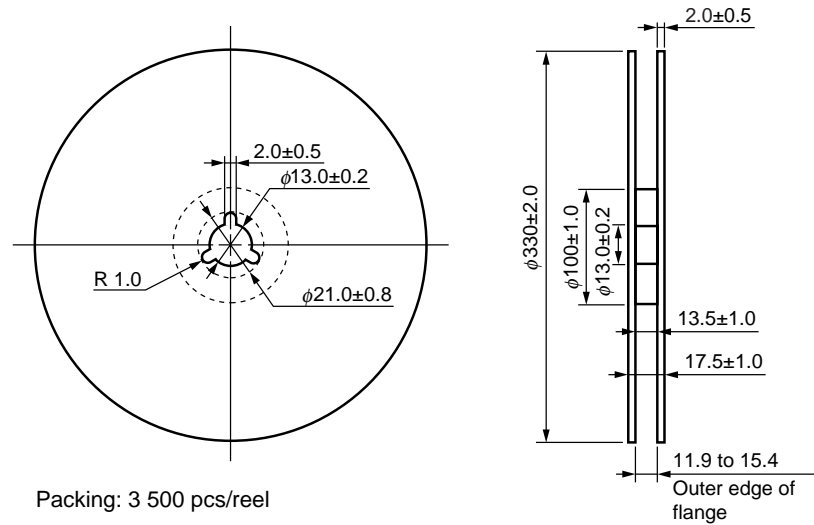
Outline and Dimensions (Tape)



Tape Direction



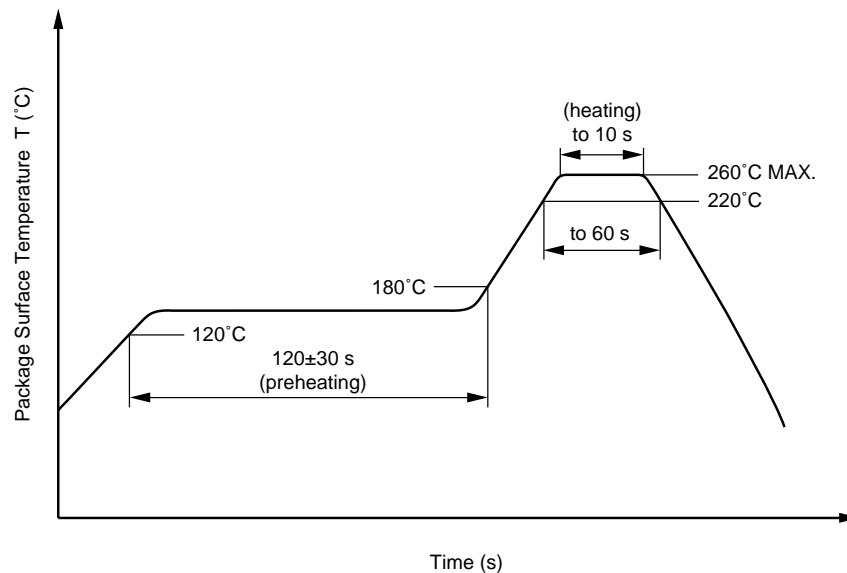
Outline and Dimensions (Reel)



**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.)

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**(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.

<R> **USAGE CAUTIONS**

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

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M8E 02.11-1

<b>Caution</b>	GaAs Products	<p>This product uses gallium arsenide (GaAs). GaAs vapor and powder are hazardous to human health if inhaled or ingested, so please observe the following points.</p> <ul style="list-style-type: none"><li>• Follow related laws and ordinances when disposing of the product. If there are no applicable laws and/or ordinances, dispose of the product as recommended below.</li></ul> <ol style="list-style-type: none"><li>1. Commission a disposal company able to (with a license to) collect, transport and dispose of materials that contain arsenic and other such industrial waste materials.</li><li>2. Exclude the product from general industrial waste and household garbage, and ensure that the product is controlled (as industrial waste subject to special control) up until final disposal.</li></ol> <ul style="list-style-type: none"><li>• Do not burn, destroy, cut, crush, or chemically dissolve the product.</li><li>• Do not lick the product or in any way allow it to enter the mouth.</li></ul>
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► For further information, please contact

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