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## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

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Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China





Solid State Relay  
OCMOS FET

# PS7200A-1A

## 4-PIN SOP, 3.0 pF LOW OUTPUT CAPACITANCE 1-ch Optical Coupled MOS FET

–NEPOC Series–

### DESCRIPTION

The PS7200A-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 low  $C \times R$ , low output capacitance, and low off-state leakage current.

### FEATURES

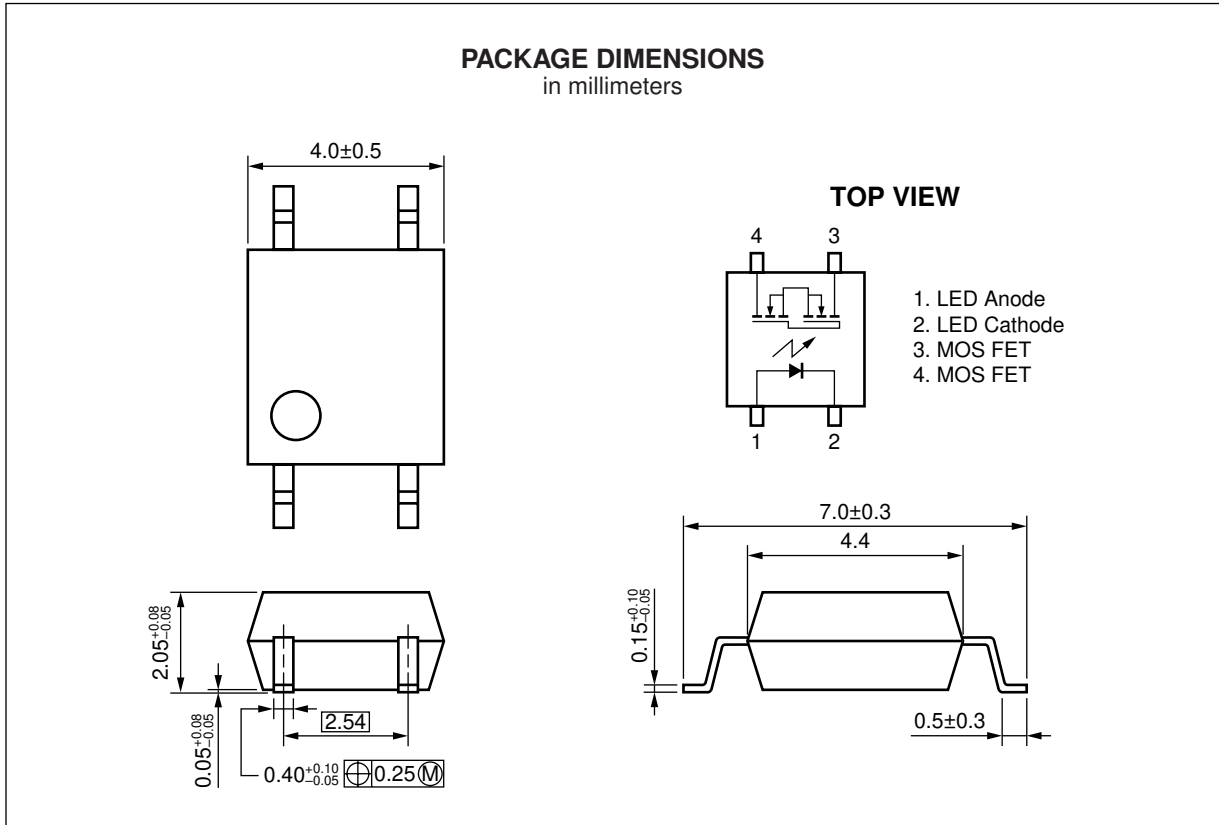
- Low  $C \times R$  ( $C \times R = 30 \text{ pF} \cdot \Omega$ )
- Low output capacitance ( $C_{\text{out}} = 3.0 \text{ pF TYP.}$ )
- Low off-state leakage current ( $I_{\text{Loff}} = 0.1 \text{ nA TYP.}$ )
- High-speed turn-on time ( $t_{\text{on}} = 0.01 \text{ ms TYP.}$ )
- 1 channel type (1 a output)
- Low LED operating current ( $I_{\text{F}} = 2 \text{ mA}$ )
- 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 : PS7200A-1A-E3, E4: 900 pcs/reel  
: PS7200A-1A-F3, F4: 3 500 pcs/reel

- <R>
- Pb-Free product
  - Safety standards
    - UL approved: File No. E72422
    - BSI approved: No. 8241/8242
    - CSA approved: No. CA 101391

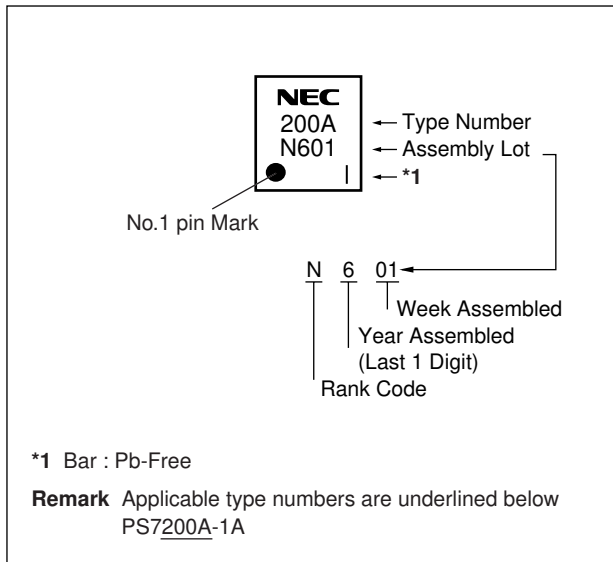
### APPLICATIONS

- Measurement equipment

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<R> **MARKING EXAMPLE (LASER MARKING)**



<R> **ORDERING INFORMATION**

Part Number	Order Number	Solder Plating Specification	Packing Style	Safety Standard Approval	Application Part Number <sup>*1</sup>
PS7200A-1A	PS7200A-1A-A	Pb-Free	Magazine case 100 pcs	Standard products (UL, BSI, CSA approved)	PS7200A-1A
PS7200A-1A-E3	PS7200A-1A-E3-A		Embossed Tape 900 pcs/reel		
PS7200A-1A-E4	PS7200A-1A-E4-A				
PS7200A-1A-F3	PS7200A-1A-F3-A		Embossed Tape 3 500 pcs/reel		
PS7200A-1A-F4	PS7200A-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>	100	mA
	Pulse Load Current <sup>*2</sup> (AC/DC Connection)	I <sub>LP</sub>	200	mA
	Power Dissipation	P <sub>D</sub>	100	mW
Isolation Voltage <sup>*3</sup>		BV	1 500	Vr.m.s.
Total Power Dissipation		P <sub>T</sub>	150	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.

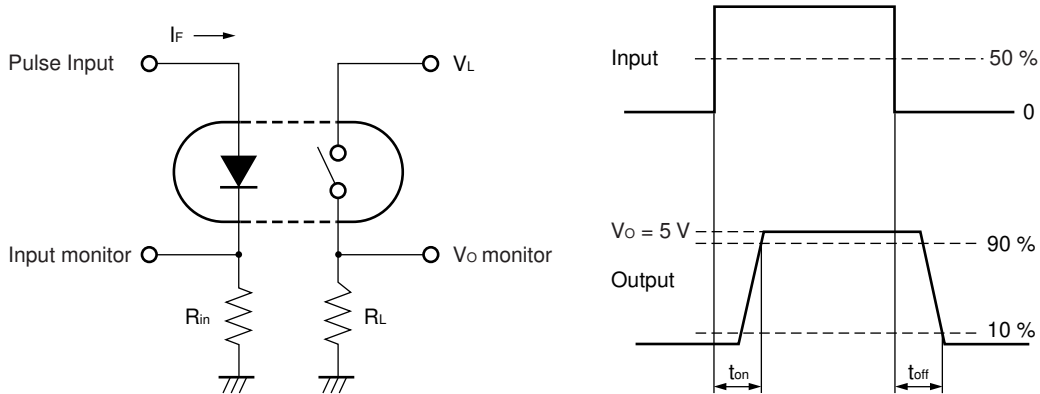
**RECOMMENDED OPERATING CONDITIONS (T<sub>A</sub> = 25°C)**

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> = 40 V		0.1	100	nA
	Output Capacitance	C <sub>out</sub>	V <sub>D</sub> = 0 V, f = 1 MHz		3.0		pF
Coupled	LED On-state Current	I <sub>Fon</sub>	I <sub>L</sub> = 100 mA			2.0	mA
	On-state Resistance	R <sub>on1</sub>	I <sub>F</sub> = 10 mA, I <sub>L</sub> = 10 mA		9.3	12	Ω
		R <sub>on2</sub>	I <sub>F</sub> = 10 mA, I <sub>L</sub> = 100 mA, t ≤ 10 ms				
	Turn-on Time <sup>*1,2</sup>	t <sub>on</sub>	I <sub>F</sub> = 10 mA, V <sub>O</sub> = 5 V, R <sub>L</sub> = 500 Ω, PW ≥ 10 ms		0.01	0.5	ms
	Turn-off Time <sup>*1,2</sup>	t <sub>off</sub>			0.07	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		0.5		pF

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

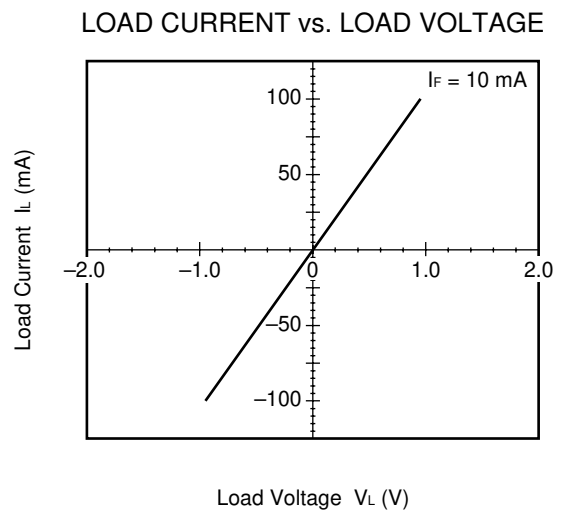
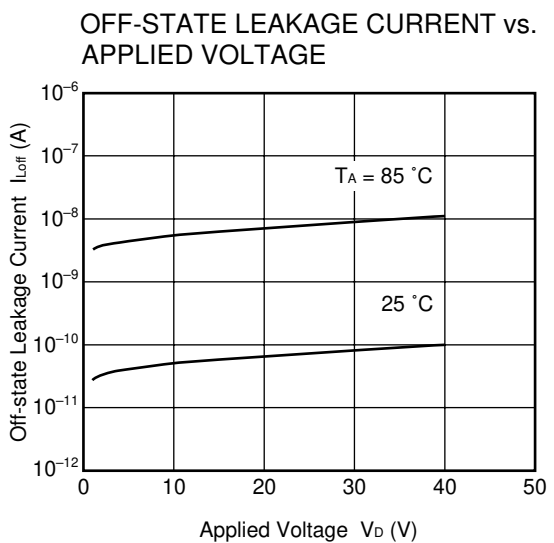
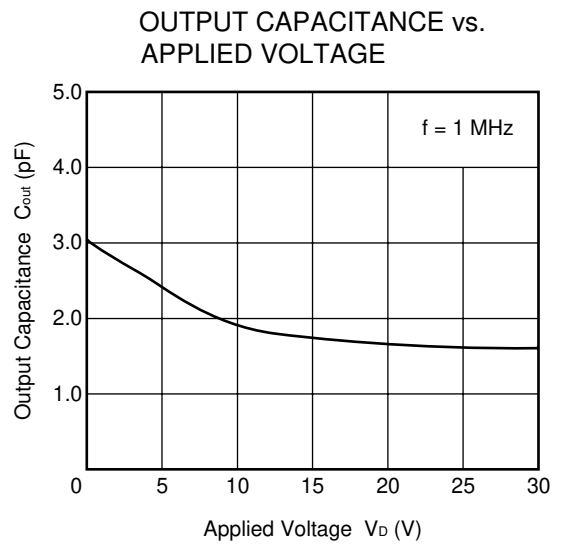
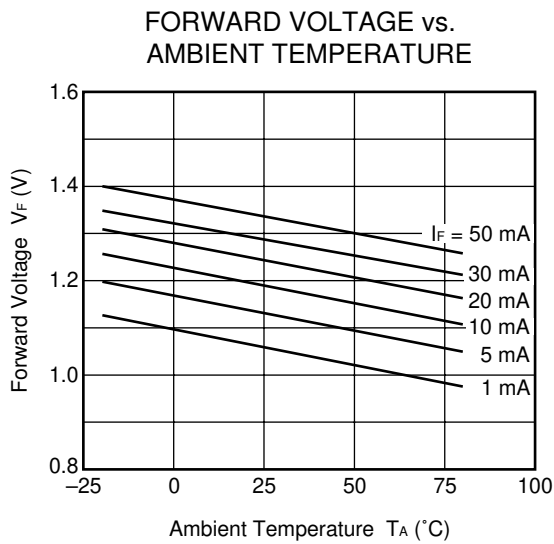
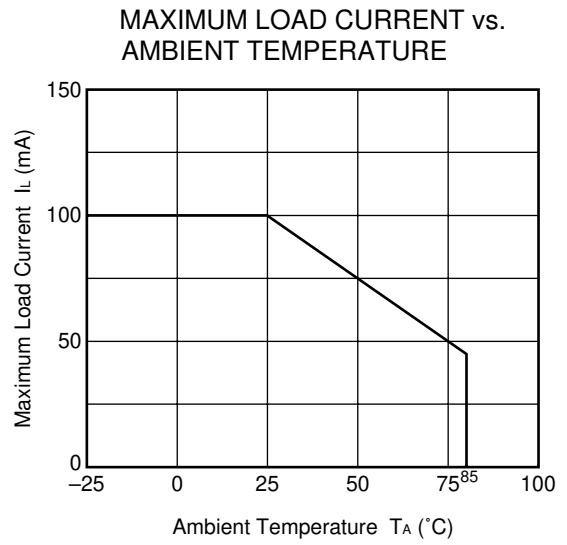
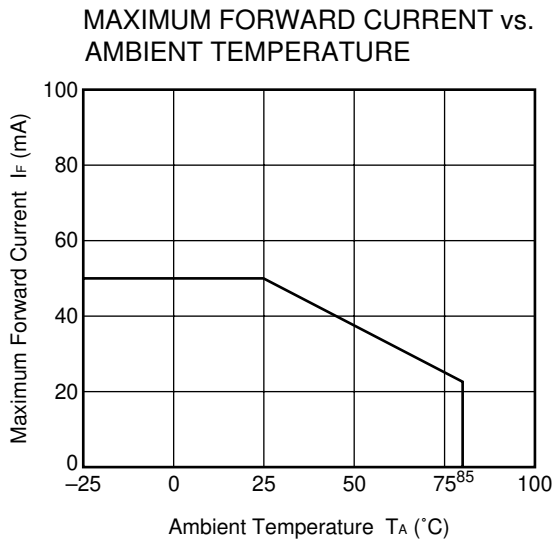


<R>

**\*2** The turn-on time and turn-off time are specified as input-pulse width ≥ 10 ms.

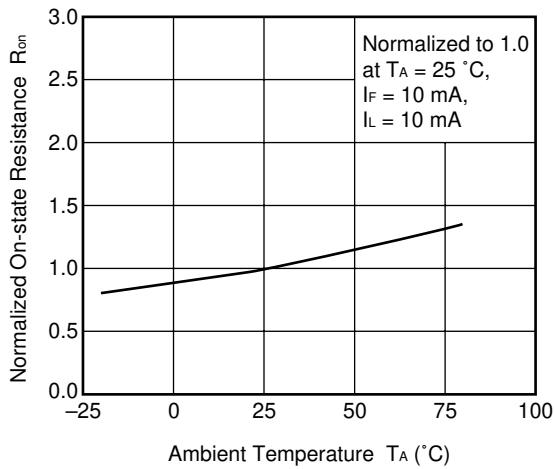
Be aware that when the device operates with an input-pulse width less than 10 ms, the turn-on time and turn-off time will increase.

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

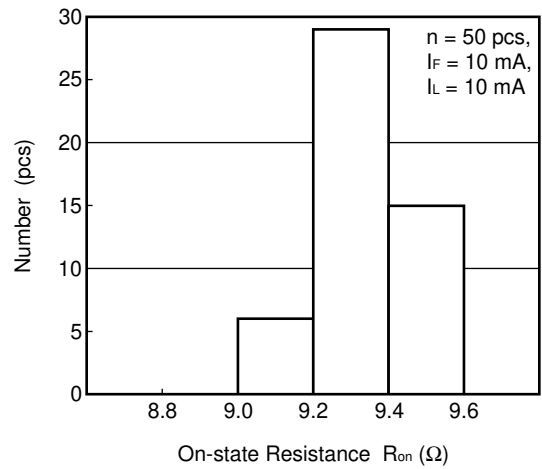


**Remark** The graphs indicate nominal characteristics.

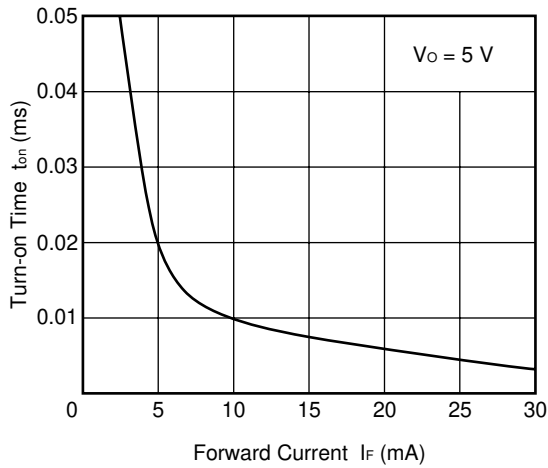
NORMALIZED ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE



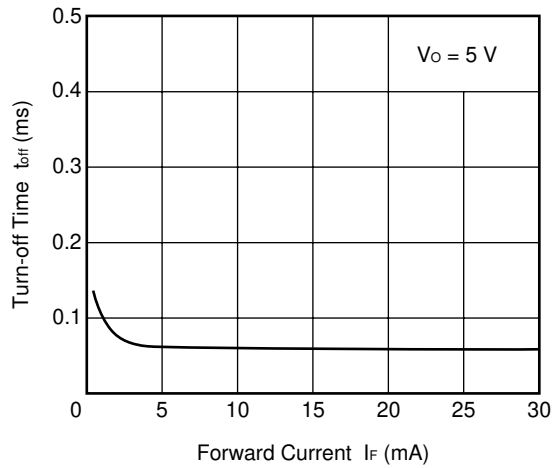
ON-STATE RESISTANCE DISTRIBUTION



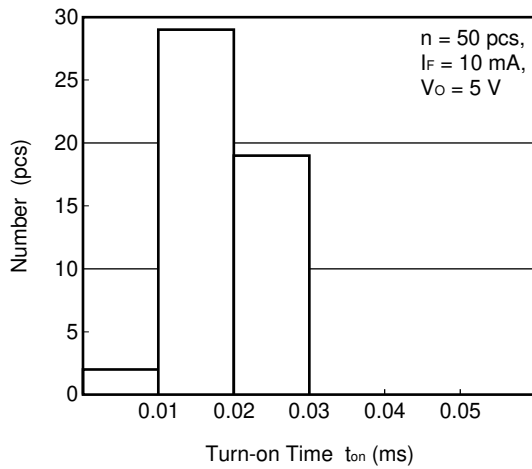
TURN-ON TIME vs. FORWARD CURRENT



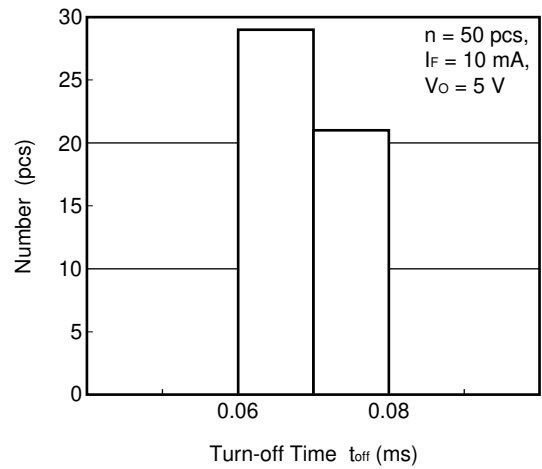
TURN-OFF TIME vs. FORWARD CURRENT



TURN-ON TIME DISTRIBUTION

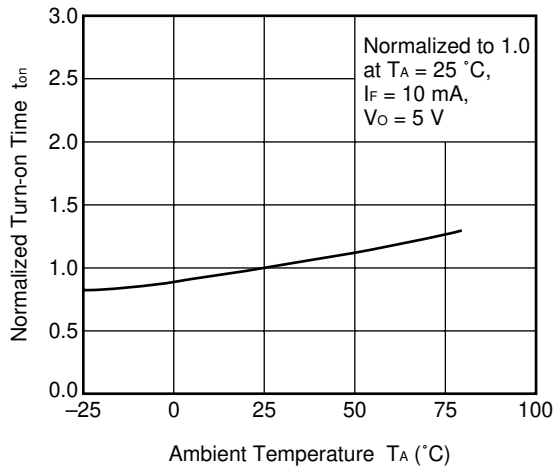


TURN-OFF TIME DISTRIBUTION

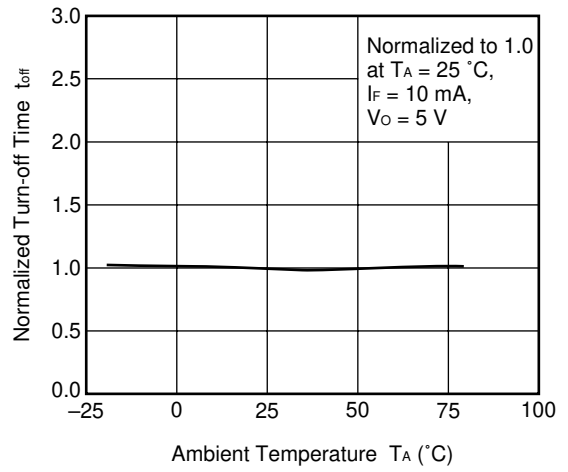


**Remark** The graphs indicate nominal characteristics.

NORMALIZED TURN-ON TIME vs. AMBIENT TEMPERATURE



NORMALIZED TURN-OFF TIME vs. AMBIENT TEMPERATURE

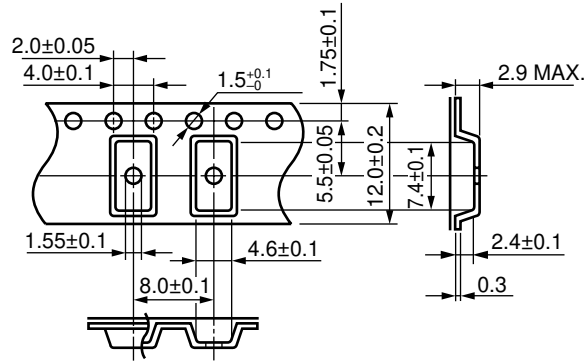


**Remark** The graphs indicate nominal characteristics.

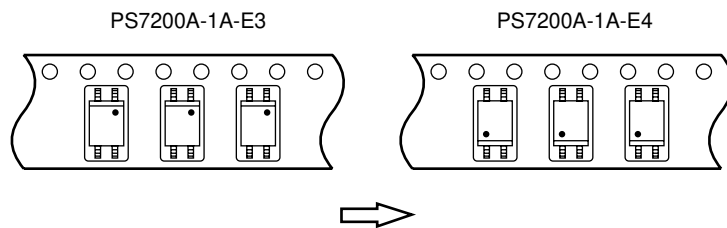


TAPING SPECIFICATIONS (in millimeters)

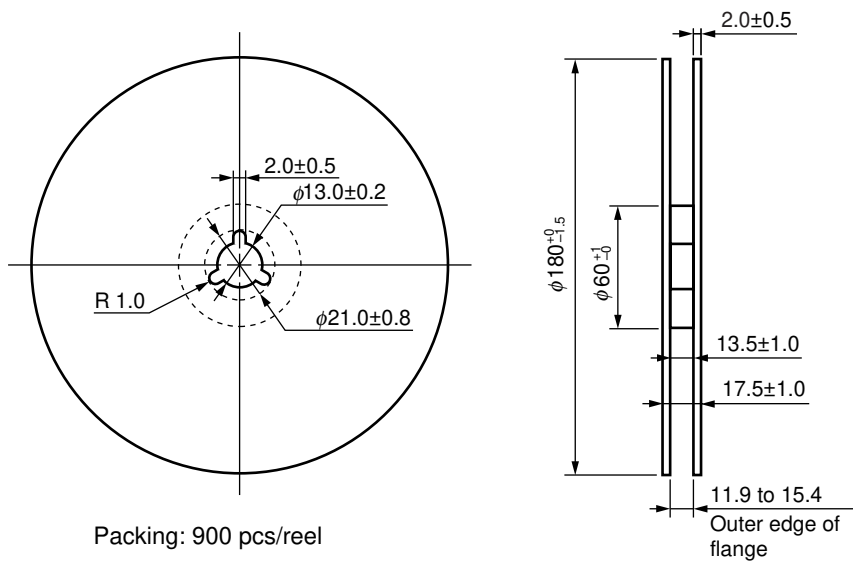
Outline and Dimensions (Tape)



Tape Direction

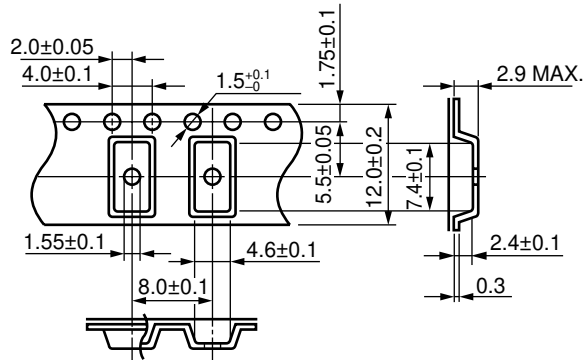


Outline and Dimensions (Reel)

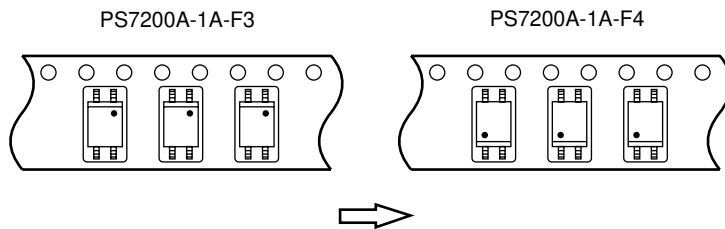


Packing: 900 pcs/reel

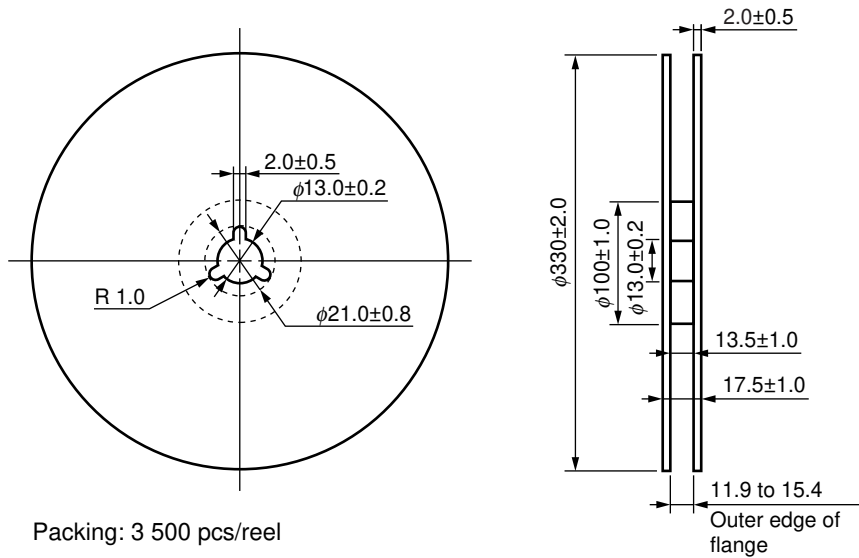
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)

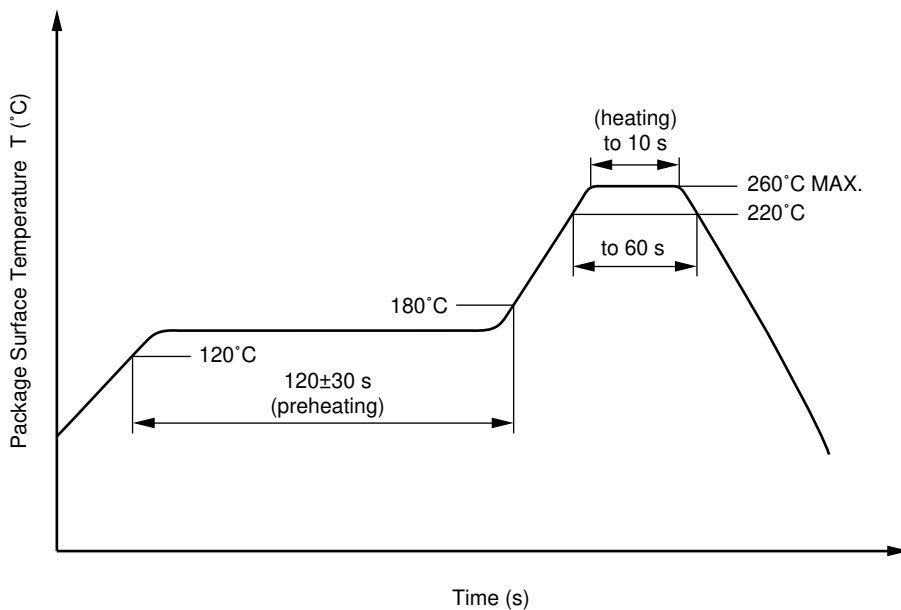


**RECOMMENDED SOLDERING CONDITIONS**

**(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.)

<R> **(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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► **For further information, please contact**

**NEC Compound Semiconductor Devices Hong Kong Limited**

E-mail: [contact@ncsd-hk.necel.com](mailto:contact@ncsd-hk.necel.com)

Hong Kong Head Office TEL: +852-3107-7303 FAX: +852-3107-7309  
 Taipei Branch Office TEL: +886-2-8712-0478 FAX: +886-2-2545-3859  
 Korea Branch Office TEL: +82-2-558-2120 FAX: +82-2-558-5209

**NEC Electronics (Europe) GmbH** <http://www.eu.necel.com/>

TEL: +49-211-6503-0 FAX: +49-211-6503-1327

**California Eastern Laboratories, Inc.** <http://www.cel.com/>

TEL: +1-408-988-3500 FAX: +1-408-988-0279

**Compound Semiconductor Devices Division**

**NEC Electronics Corporation**

URL: <http://www.ncsd.necel.com/>