



**THE DATASHEET OF  
PS7200E-1A-F3**



**4-PIN SOP, 0.8  $\Omega$  LOW ON-STATE RESISTANCE  
1-ch Optical Coupled MOS FET**

-NEPOC Series-

**DESCRIPTION**

The PS7200E-1A is a low on-state resistance 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 on-state resistance, and low off-state leakage current.

**FEATURES**

- Low ERT (ERT = 78 ps TYP.)
- Low  $C \times R$  ( $C \times R = 27 \text{ pF} \cdot \Omega$ )
- Low on-state resistance ( $R_{on} = 0.8 \Omega$  TYP.)
- Low off-state leakage current
- 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 : PS7200E-1A-E3, E4: 900 pcs/reel  
: PS7200E-1A-F3, F4: 3 500 pcs/reel

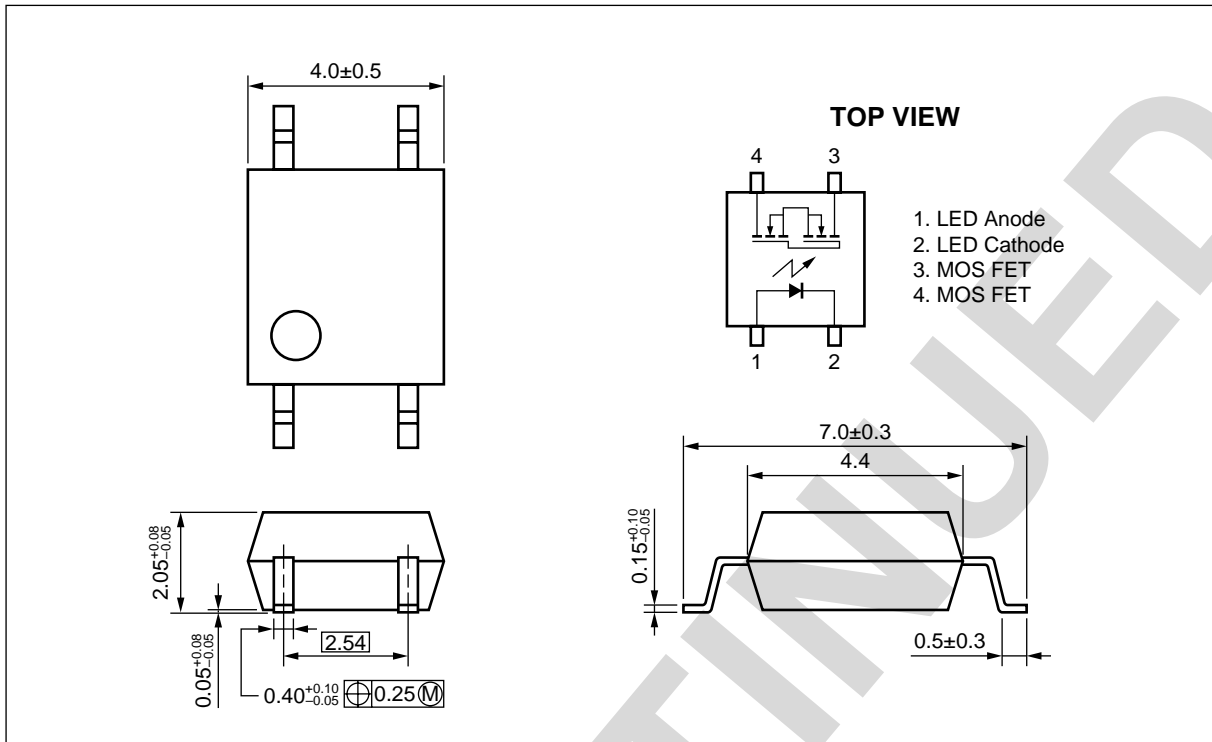
<R> • Pb-Free product

**APPLICATIONS**

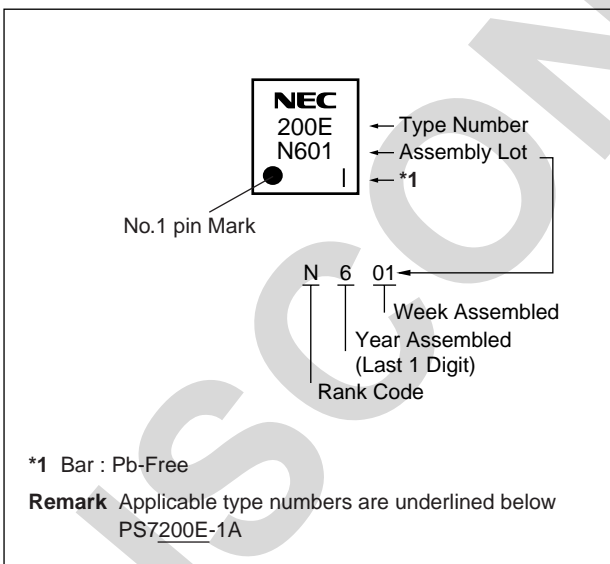
- Measurement equipment

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PACKAGE DIMENSIONS (Unit : mm)



<R> MARKING EXAMPLE (LASER MARKING)



<R> **ORDERING INFORMATION**

Part Number	Order Number	Solder Plating Specification	Packing Style
PS7200E-1A	PS7200E-1A-A	Pb-Free	Magazine case 100 pcs
PS7200E-1A-E3	PS7200E-1A-E3-A		Embossed Tape 900 pcs/reel
PS7200E-1A-E4	PS7200E-1A-E4-A		
PS7200E-1A-F3	PS7200E-1A-F3-A		Embossed Tape 3 500 pcs/reel
PS7200E-1A-F4	PS7200E-1A-F4-A		

**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 *1	I <sub>FP</sub>	1	A
MOS FET	Break Down Voltage	V <sub>L</sub>	40	V
	Continuous Load Current	I <sub>L</sub>	250	mA
	Power Dissipation	P <sub>D</sub>	100	mW
Isolation Voltage *2		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 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.

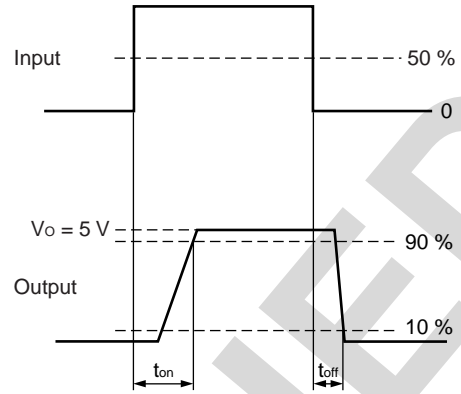
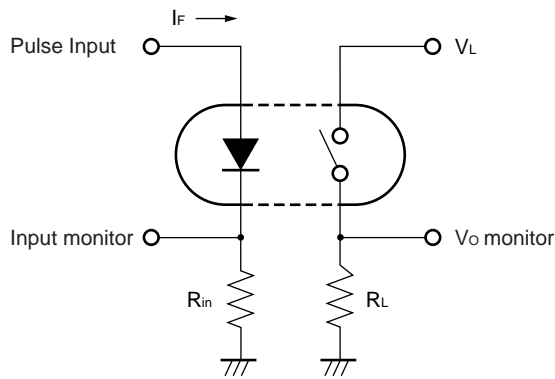
**RECOMMENDED OPERATING CONDITIONS (T<sub>A</sub> = 25°C)**

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
LED Operating Current	I <sub>F</sub>	2	5	20	mA
LED Off Voltage	V <sub>F</sub>	0		0.5	V

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

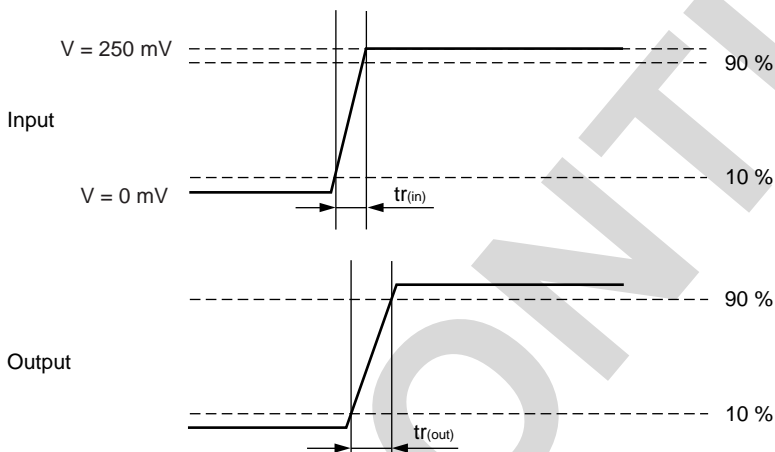
Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V <sub>F</sub>	I <sub>F</sub> = 5 mA		1.1	1.4	V
	Reverse Current	I <sub>R</sub>	V <sub>R</sub> = 5 V			5.0	μA
MOS FET	Off-state Leakage Current	I <sub>Loff</sub>	V <sub>D</sub> = 40 V		0.1	10	nA
	Output Capacitance	C <sub>out</sub>	V <sub>D</sub> = 0 V, f = 1 MHz		33.5		pF
Coupled	LED On-state Current	I <sub>Fon</sub>	I <sub>L</sub> = 250 mA			2.0	mA
	On-state Resistance	R <sub>on1</sub>	I <sub>F</sub> = 5 mA, I <sub>L</sub> = 10 mA		0.8	1.6	Ω
		R <sub>on2</sub>	I <sub>F</sub> = 5 mA, I <sub>L</sub> = 250 mA, t ≤ 10 ms		0.8	1.6	
	Turn-on Time <sup>*1,2</sup>	t <sub>on</sub>	I <sub>F</sub> = 5 mA, V <sub>O</sub> = 5 V, R <sub>L</sub> = 500 Ω,		0.48	1.0	ms
	Turn-off Time <sup>*1,2</sup>	t <sub>off</sub>	PW ≥ 10 ms		0.15	0.5	
	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
Equivalent Rise Time <sup>*3</sup>	ERT	I <sub>F</sub> = 10 mA, t <sub>r(in)</sub> = 25 ps, V = 250 mV, 50 Ω termination		78		ps	

<R> \*1 Test Circuit for Switching Time



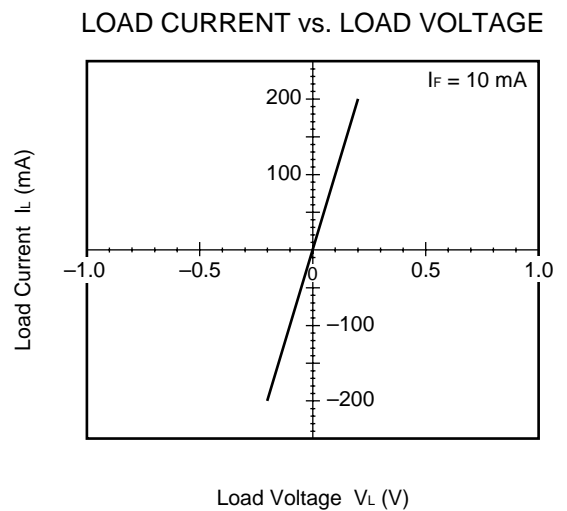
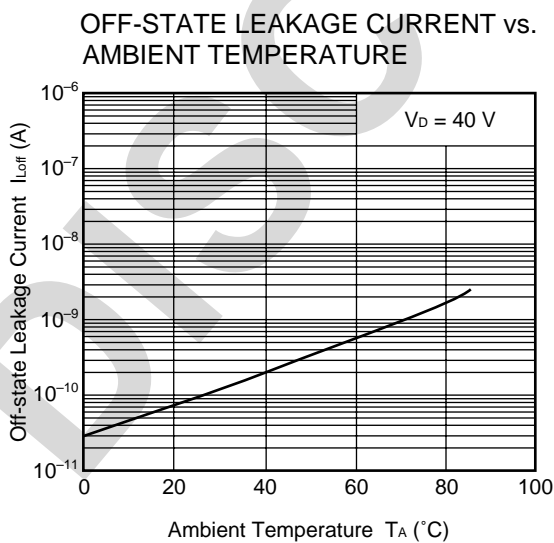
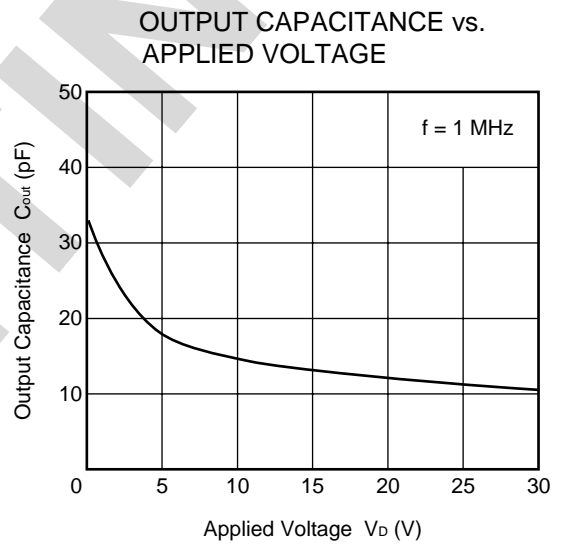
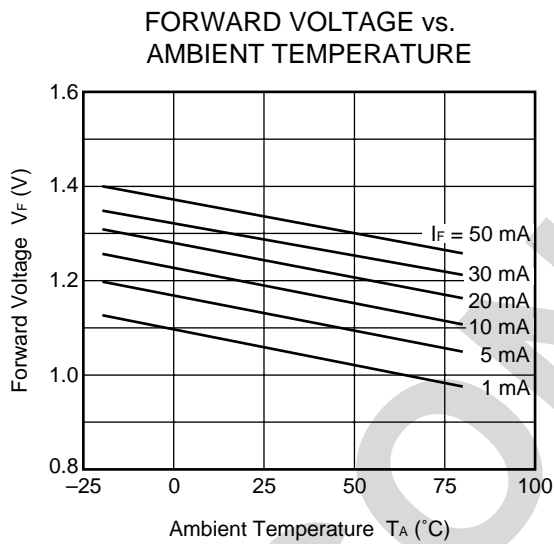
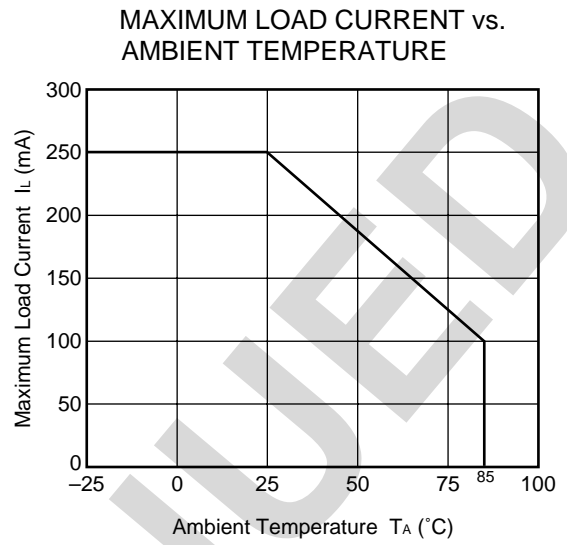
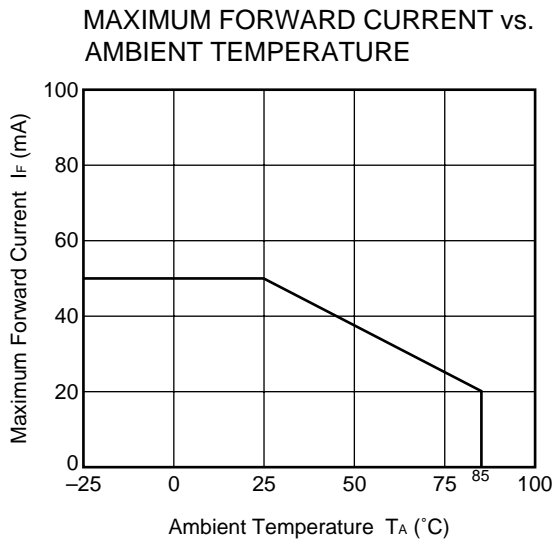
\*2 The turn-on time and turn-off time are specified as input-pulse width  $\geq 10$  ms.  
 Be aware that when the device operates with an input-pulse width less than 10 ms, the turn-on time and turn-off time will increase.

\*3 ERT waveform and equation



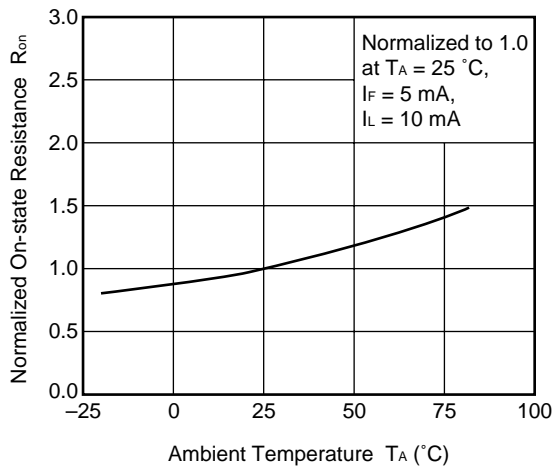
$$ERT = \sqrt{tr_{(out)}^2 - tr_{(in)}^2}$$

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

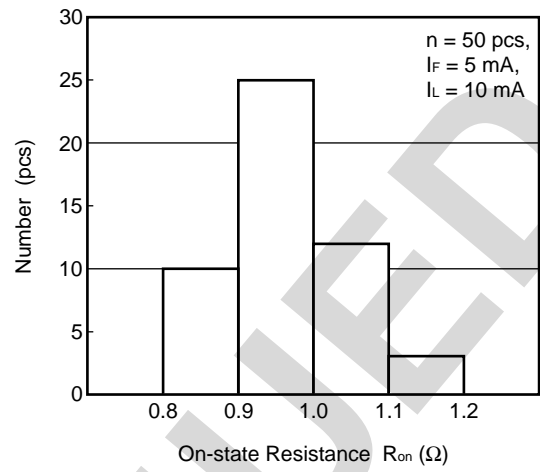


**Remark** The graphs indicate nominal characteristics.

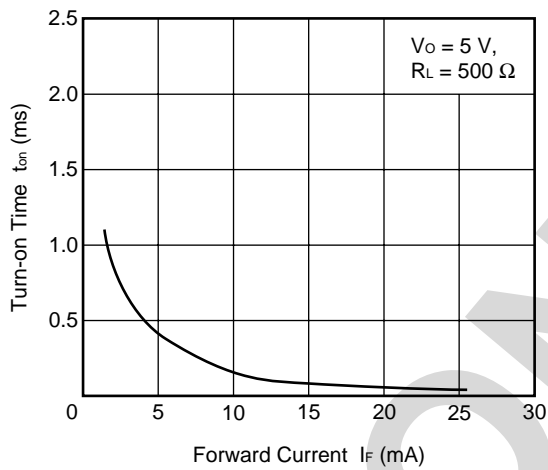
NORMALIZED ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE



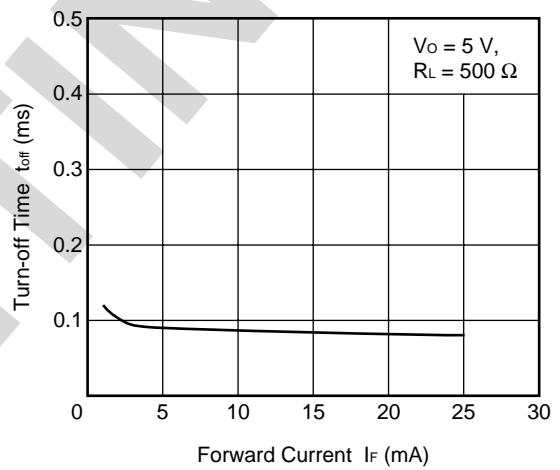
ON-STATE RESISTANCE DISTRIBUTION



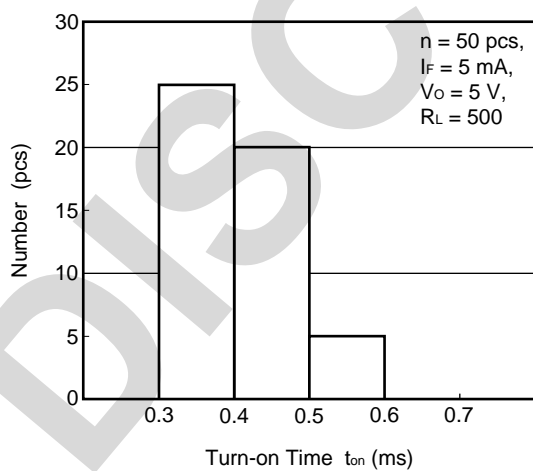
TURN-ON TIME vs. FORWARD CURRENT



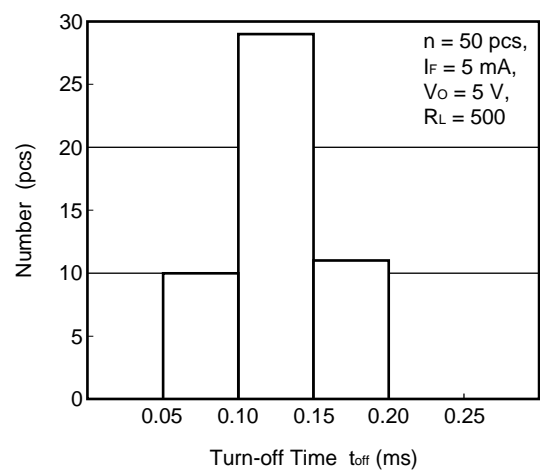
TURN-OFF TIME vs. FORWARD CURRENT



TURN-ON TIME DISTRIBUTION

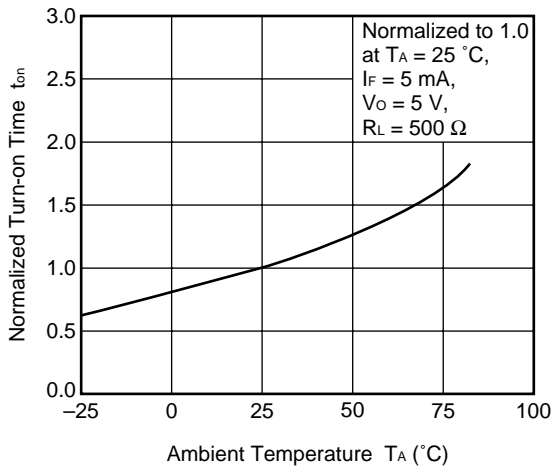


TURN-OFF TIME DISTRIBUTION

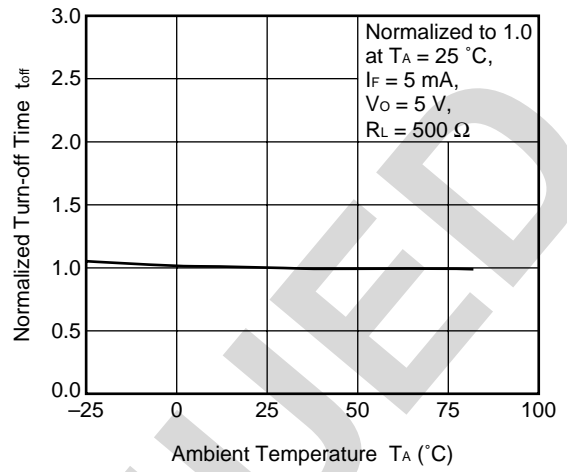


**Remark** The graphs indicate nominal characteristics.

NORMALIZED TURN-ON TIME vs. AMBIENT TEMPERATURE



NORMALIZED TURN-OFF TIME vs. AMBIENT TEMPERATURE

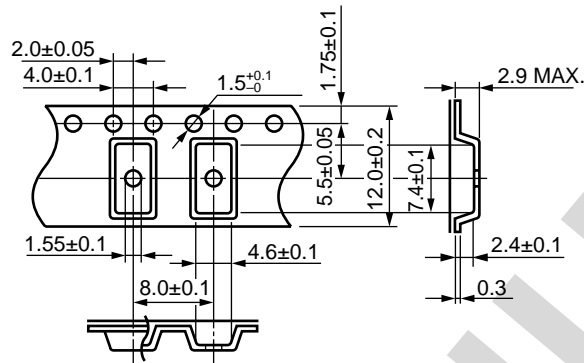


**Remark** The graphs indicate nominal characteristics.

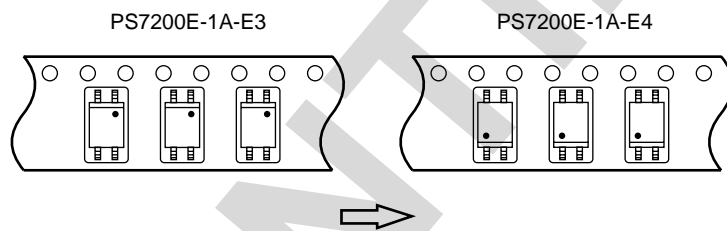
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TAPING SPECIFICATIONS (Unit : mm)

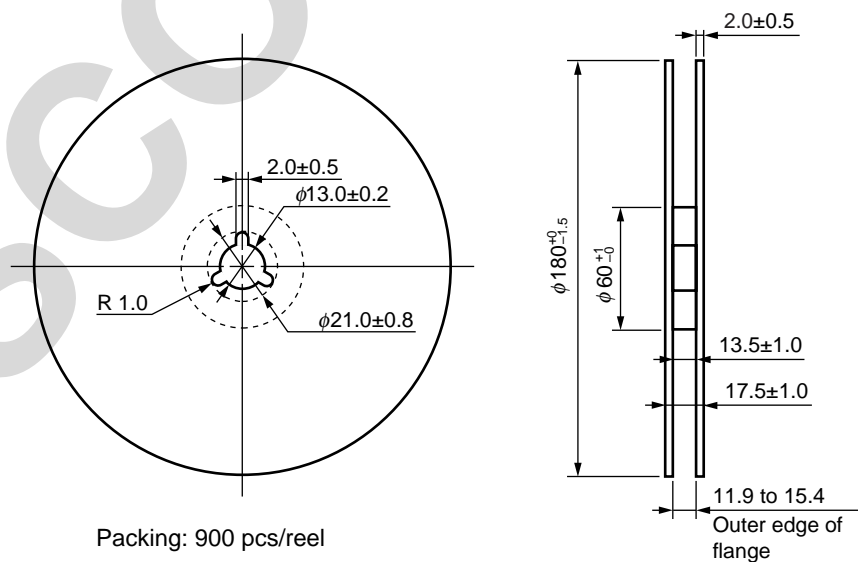
Outline and Dimensions (Tape)



Tape Direction

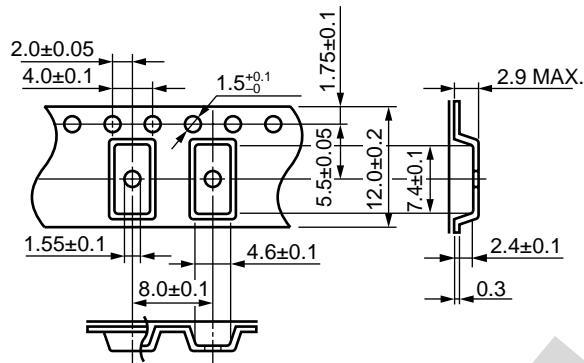


Outline and Dimensions (Reel)

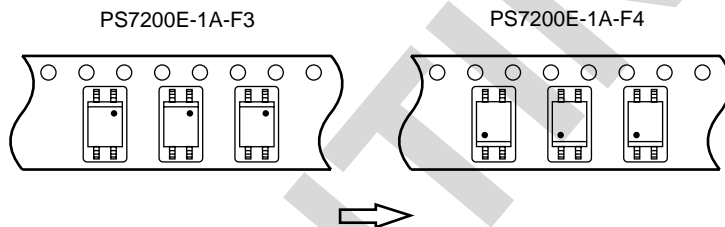


Packing: 900 pcs/reel

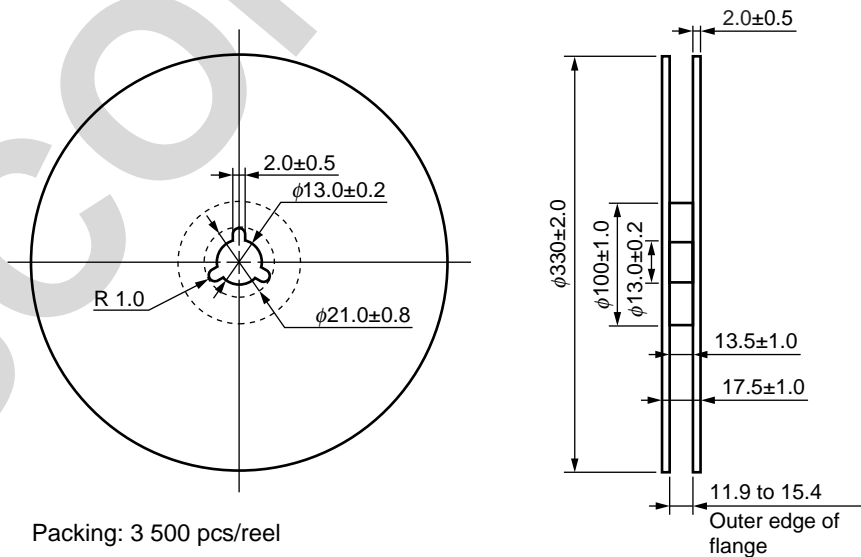
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



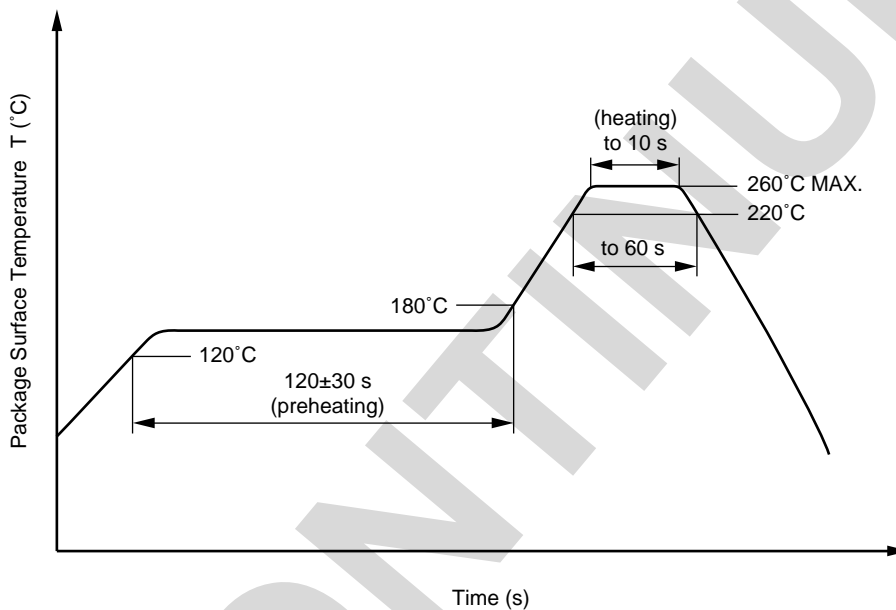
Packing: 3 500 pcs/reel

**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.)

<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**

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