

# 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

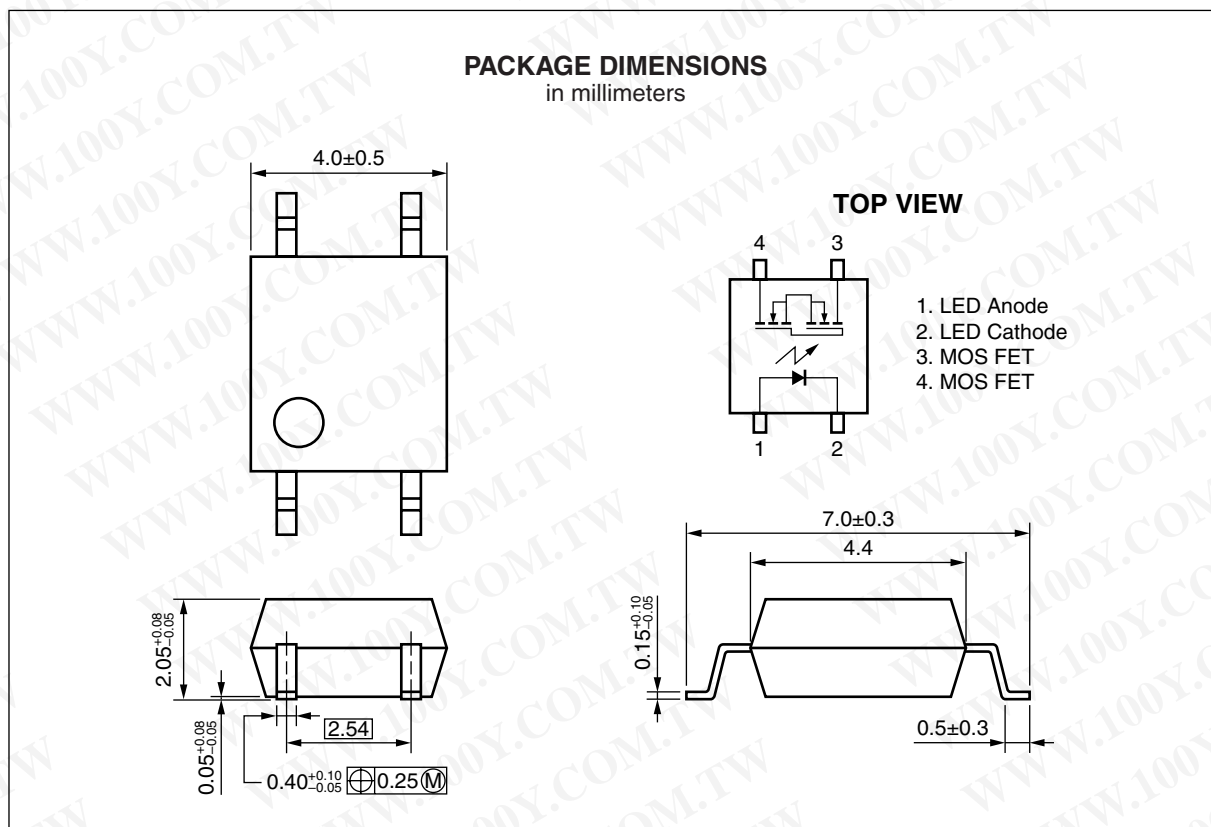
- Low  $C \times R$  ( $C \times R = 30 \text{ pF} \cdot \Omega$ )
- Low output capacitance ( $C_{out} = 3.0 \text{ pF TYP.}$ )
- Low off-state leakage current ( $I_{Loff} = 0.1 \text{ nA TYP.}$ )
- High-speed turn-on time ( $t_{on} = 0.01 \text{ ms TYP.}$ )
- 1 channel type (1 a output)
- Low LED operating current ( $I_F = 2 \text{ mA}$ )
- 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

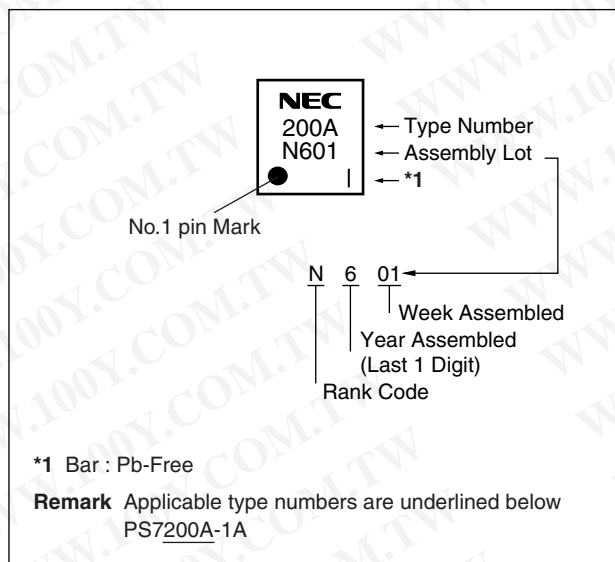
### APPLICATIONS

- Measurement equipment

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



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<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.

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RECOMMENDED OPERATING CONDITIONS ( $T_A = 25^\circ\text{C}$ )

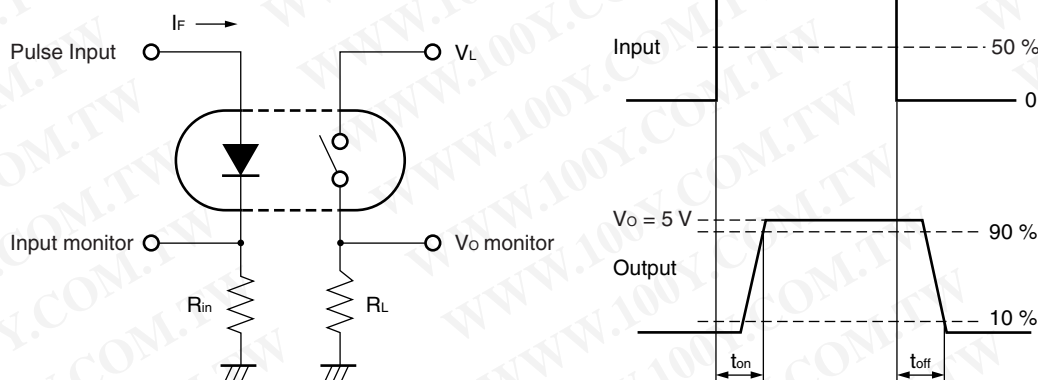
Parameter	Symbol	MIN.	TYP.	MAX.	Unit
LED Operating Current	$I_F$	2	10	20	mA
LED Off Voltage	$V_F$	0		0.5	V

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ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ )

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	$I_F = 10\text{ mA}$		1.2	1.4	V
	Reverse Current	$V_R = 5\text{ V}$			5.0	$\mu\text{A}$
MOS FET	Off-state Leakage Current	$V_D = 40\text{ V}$		0.1	100	nA
	Output Capacitance	$V_D = 0\text{ V}, f = 1\text{ MHz}$		3.0		pF
Coupled	LED On-state Current	$I_L = 100\text{ mA}$			2.0	mA
	On-state Resistance	$I_F = 10\text{ mA}, I_L = 10\text{ mA}$		9.3	12	$\Omega$
		$I_F = 10\text{ mA}, I_L = 100\text{ mA}, t \leq 10\text{ ms}$				
	Turn-on Time <sup>*1,2</sup>	$I_F = 10\text{ mA}, V_O = 5\text{ V}, R_L = 500\text{ }\Omega,$		0.01	0.5	ms
	Turn-off Time <sup>*1,2</sup>	$PW \geq 10\text{ ms}$		0.07	0.2	
	Isolation Resistance	$V_{I-O} = 1.0\text{ kV}_{DC}$	$10^9$			$\Omega$
	Isolation Capacitance	$V = 0\text{ V}, f = 1\text{ MHz}$		0.5		pF

\*1 Test Circuit for Switching Time



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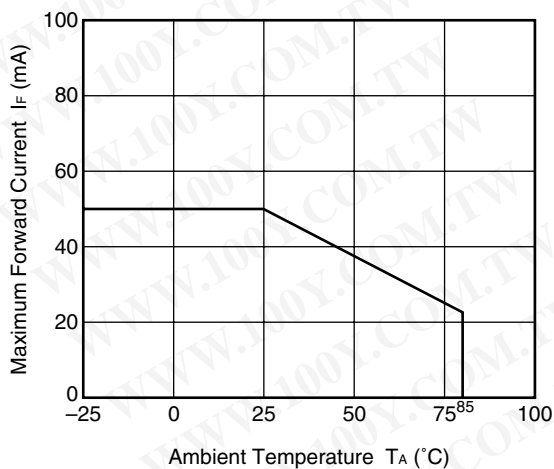
\*2 The turn-on time and turn-off time are specified as input-pulse width  $\geq 10\text{ ms}$ .

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.

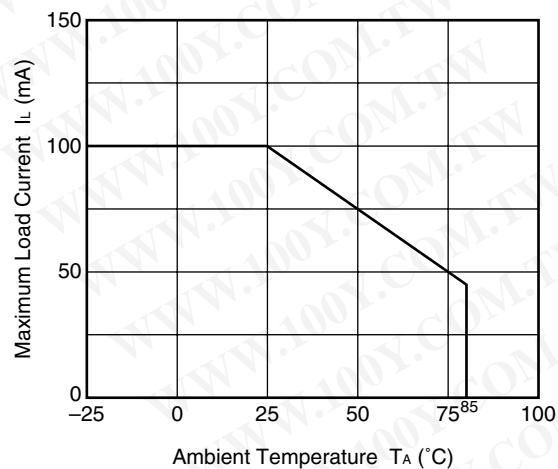


**TYPICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ , unless otherwise specified)**

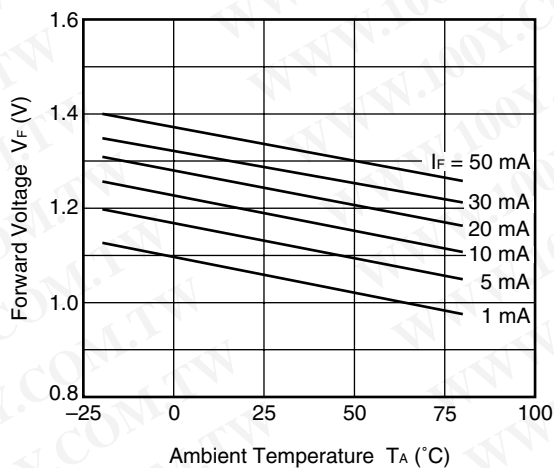
**MAXIMUM FORWARD CURRENT vs. AMBIENT TEMPERATURE**



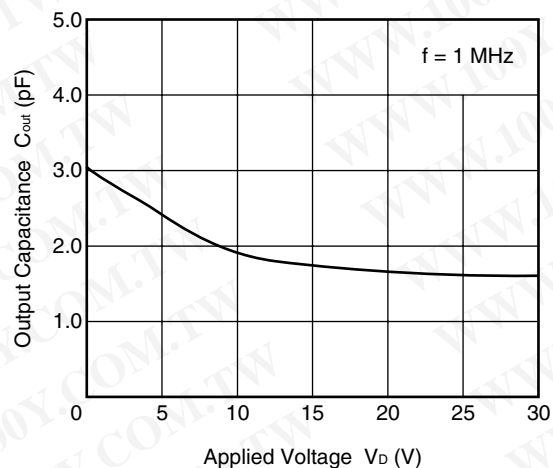
**MAXIMUM LOAD CURRENT vs. AMBIENT TEMPERATURE**



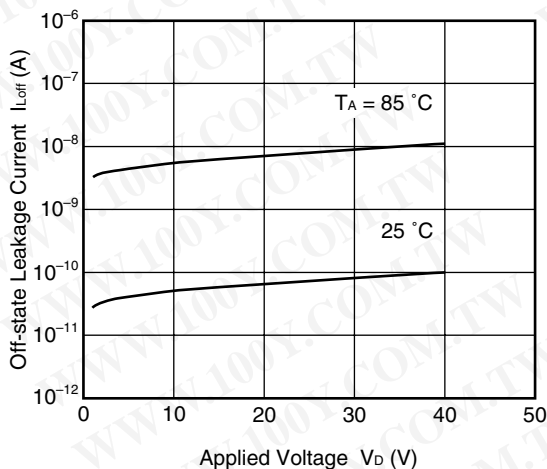
**FORWARD VOLTAGE vs. AMBIENT TEMPERATURE**



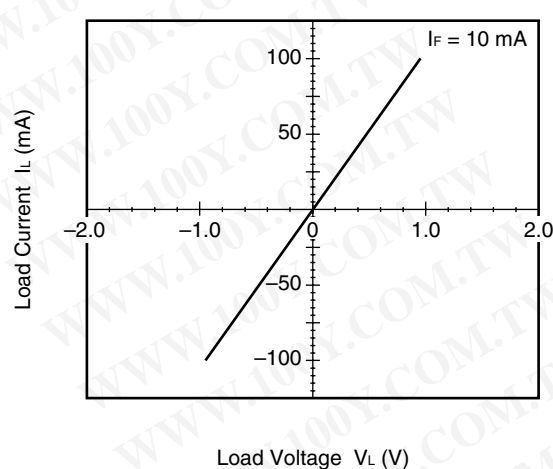
**OUTPUT CAPACITANCE vs. APPLIED VOLTAGE**



**OFF-STATE LEAKAGE CURRENT vs. APPLIED VOLTAGE**

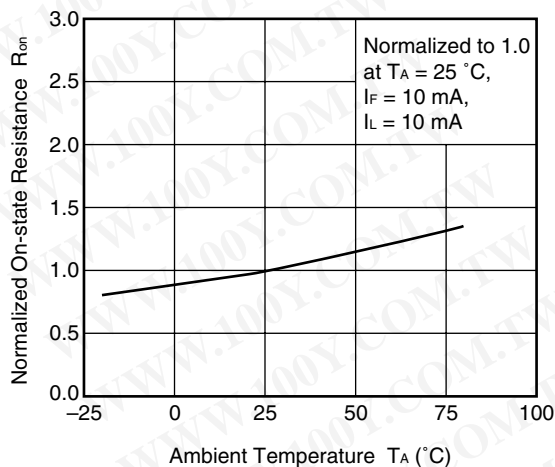


**LOAD CURRENT vs. LOAD VOLTAGE**

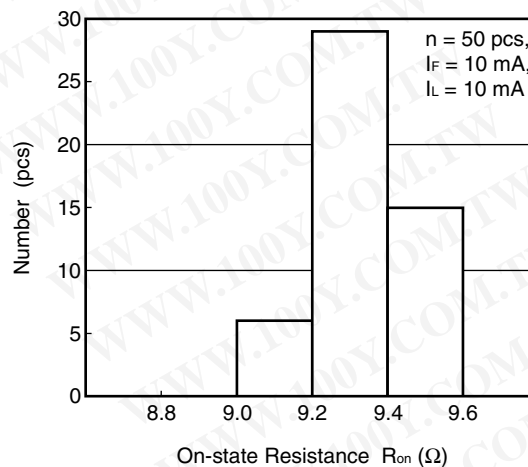


**Remark** The graphs indicate nominal characteristics.

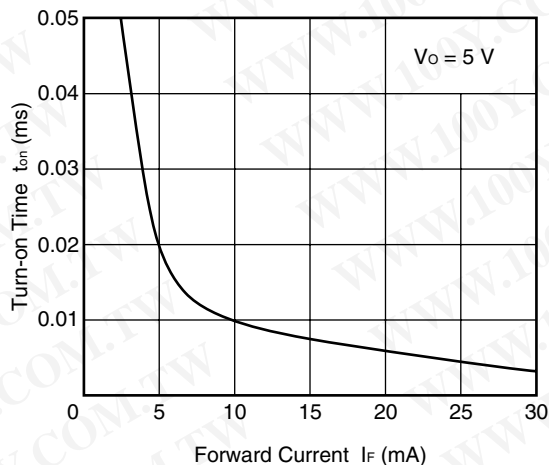
NORMALIZED ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE



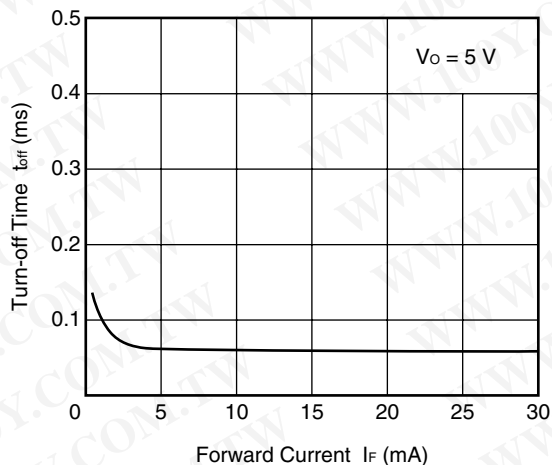
ON-STATE RESISTANCE DISTRIBUTION



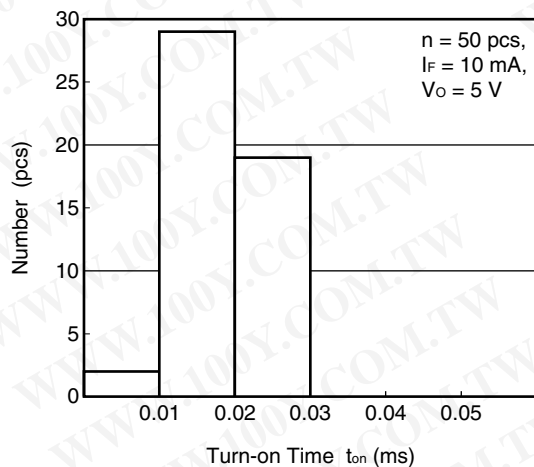
TURN-ON TIME vs. FORWARD CURRENT



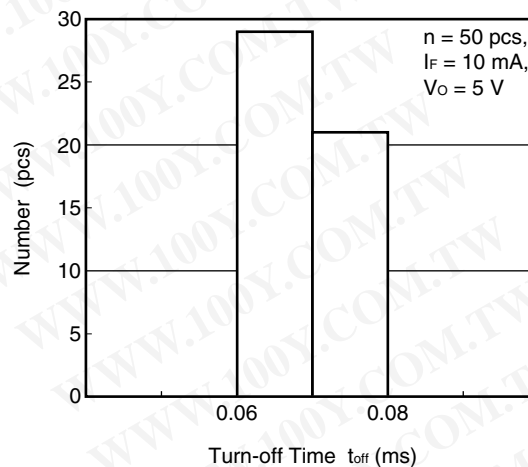
TURN-OFF TIME vs. FORWARD CURRENT



TURN-ON TIME DISTRIBUTION

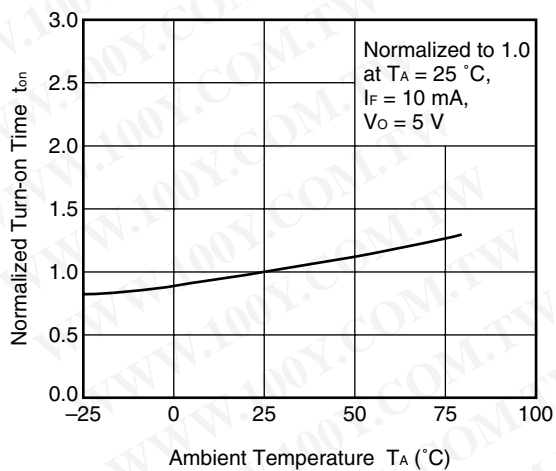


TURN-OFF TIME DISTRIBUTION

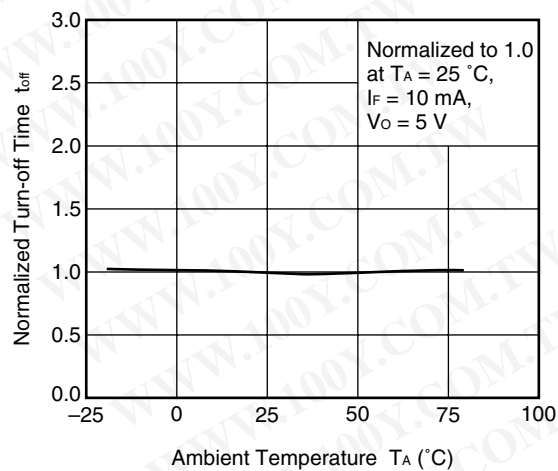


**Remark** The graphs indicate nominal characteristics.

NORMALIZED TURN-ON TIME vs.  
AMBIENT TEMPERATURE



NORMALIZED TURN-OFF TIME vs.  
AMBIENT TEMPERATURE



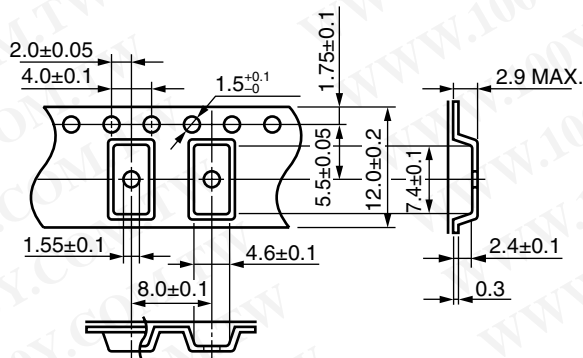
**Remark** The graphs indicate nominal characteristics.

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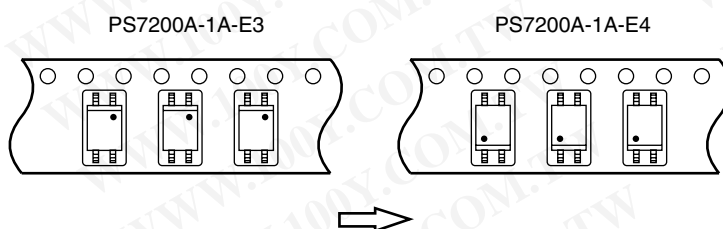
TAPING SPECIFICATIONS (in millimeters)

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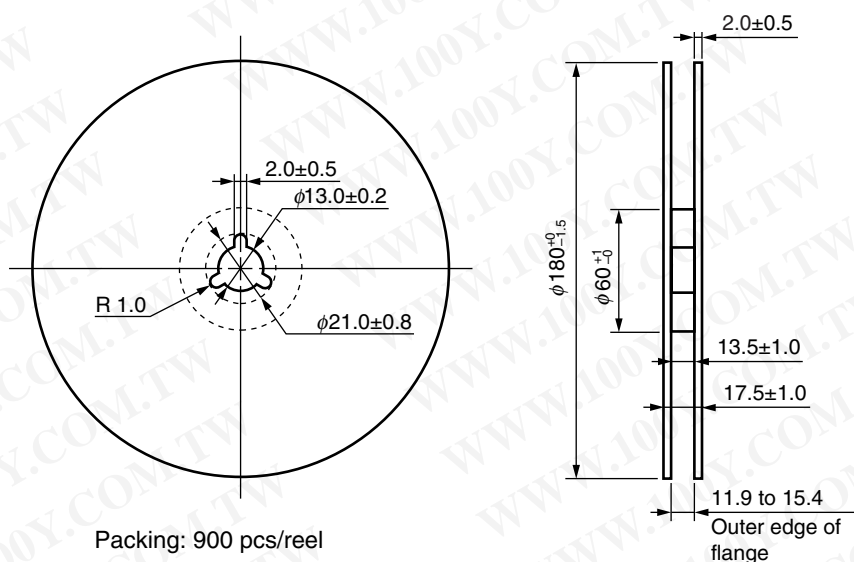
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)

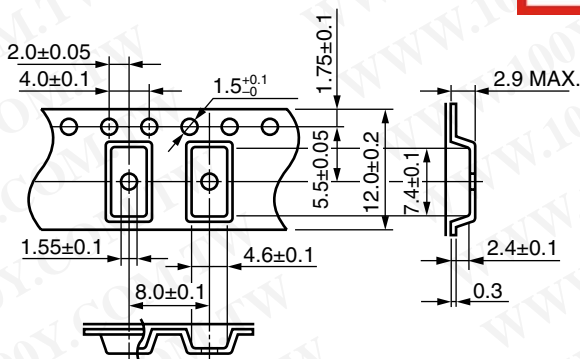


Packing: 900 pcs/reel

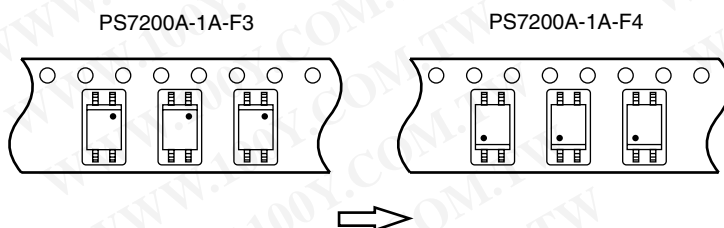


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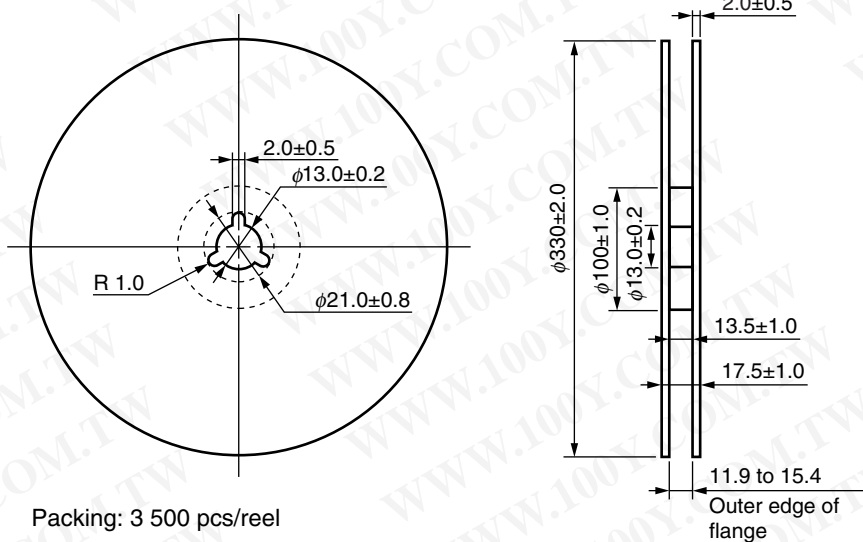
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



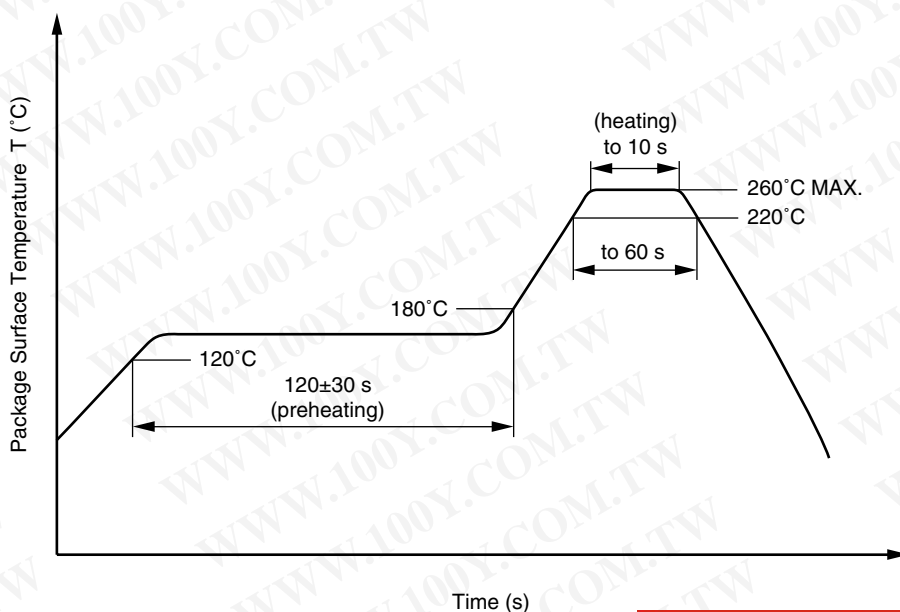
Packing: 3 500 pcs/reel

## 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.) |

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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.

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# 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



**Caution**

GaAs Products

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.

- 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.
  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.
  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.
- Do not burn, destroy, cut, crush, or chemically dissolve the product.
- Do not lick the product or in any way allow it to enter the mouth.

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