NEC

Solid State Relay
OCMOS FET

PS7200E-1A

4-PIN SOP, 0.8 Ω LOW ON-STATE RESISTANCE
1-ch Optical Coupled MOS FET

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 × R, low on-state resistance, and low off-state leakage current.

FEATURES

- Low ERT (ERT = 78 ps TYP.)
- Low C × R (C × R = 27 pF • Ω)
- Low on-state resistance (R_{on} = 0.8 Ω 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 Vr.m.s.)
- Low offset voltage
- Ordering number of tape product: PS7200E-1A-E3, E4, F3, F4

APPLICATIONS

- Measurement equipment

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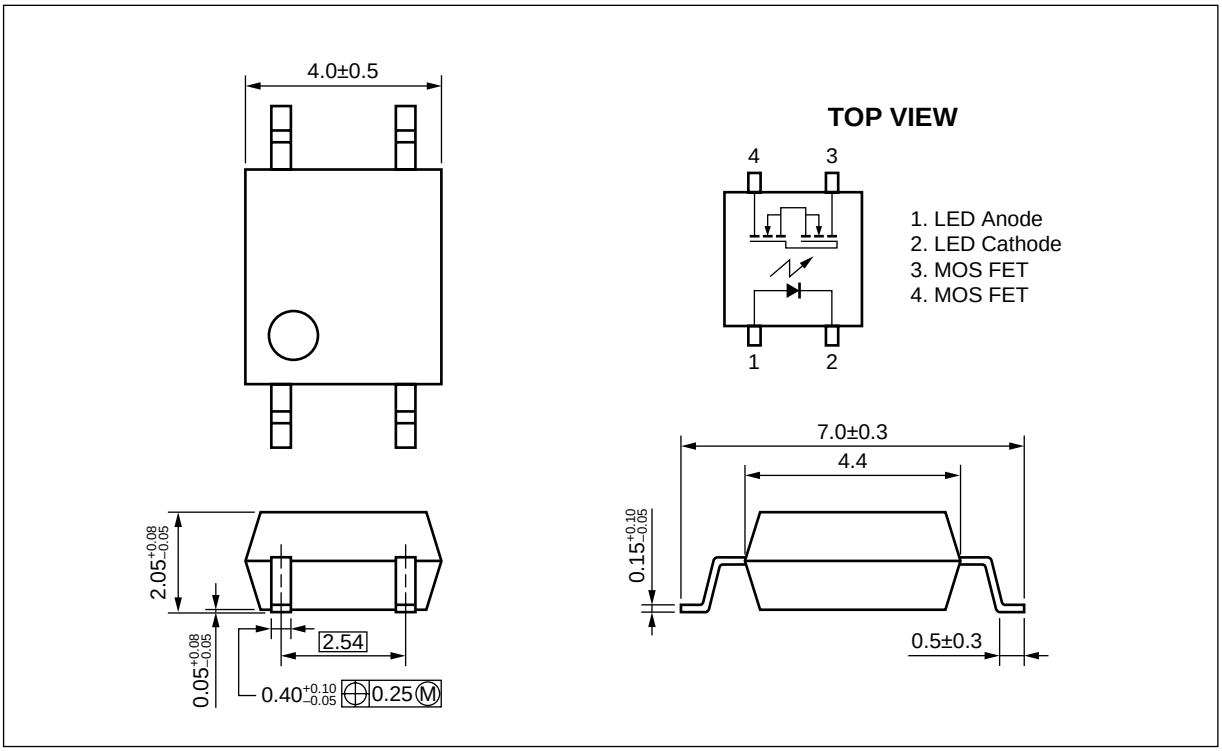
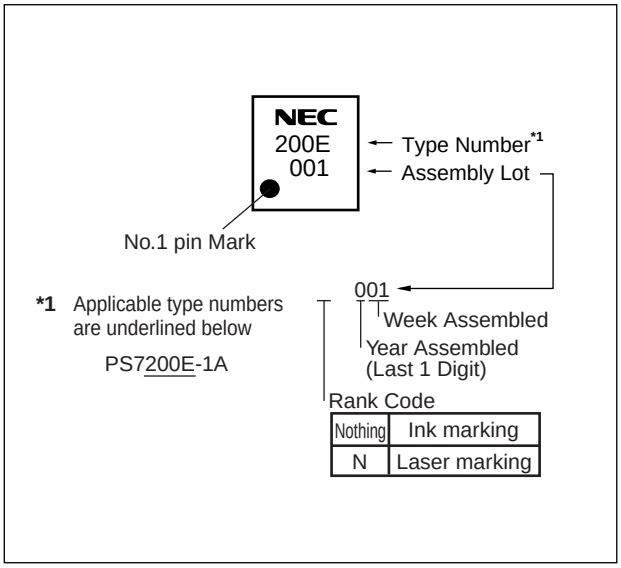
Printed in Japan

The mark ★ shows major revised points.

PACKAGE DIMENSIONS (Unit : mm)



MARKING EXAMPLE



ORDERING INFORMATION

Part Number	Package	Packing Style	Application Part Number*1
PS7200E-1A	4-pin SOP	Magazine case 100 pcs	PS7200E-1A
PS7200E-1A-E3		Embossed Tape 900 pcs/reel	
PS7200E-1A-E4			
PS7200E-1A-F3		Embossed Tape 3 500 pcs/reel	
PS7200E-1A-F4			

***1** For the application of the Safety Standard, following part number should be used.

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C, unless otherwise specified)

Parameter		Symbol	Ratings	Unit
Diode	Forward Current (DC)	I_F	50	mA
	Reverse Voltage	V_R	5.0	V
	Power Dissipation	P_D	50	mW
	Peak Forward Current*1	I_{FP}	1	A
MOS FET	Break Down Voltage	V_L	40	V
	Continuous Load Current	I_L	250	mA
	Power Dissipation	P_D	100	mW
Isolation Voltage*2		BV	1 500	Vr.m.s.
Total Power Dissipation		P_T	150	mW
Operating Ambient Temperature		T_A	–40 to +85	°C
Storage Temperature		T_{stg}	–40 to +100	°C

***1** PW = 100 μs, Duty Cycle = 1 %

***2** AC voltage for 1 minute at T_A = 25 °C, RH = 60 % between input and output

RECOMMENDED OPERATING CONDITIONS (T_A = 25 °C)

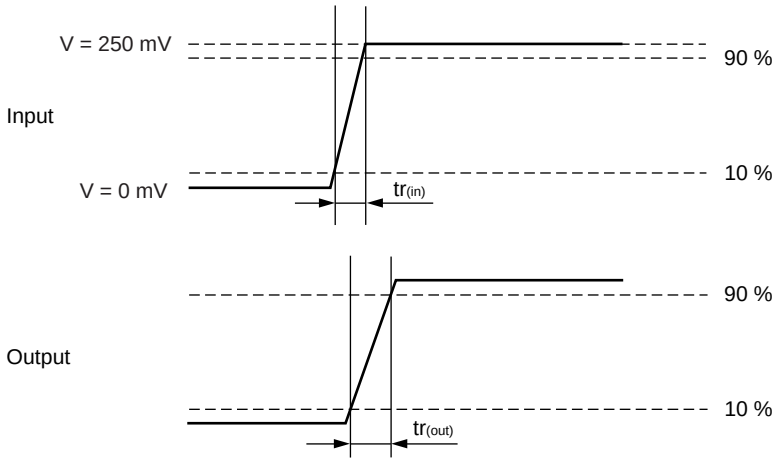
Parameter	Symbol	MIN.	TYP.	MAX.	Unit
LED Operating Current	I_F	2	5	20	mA
LED Off Voltage	V_F	0		0.5	V

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V_F	I_F = 5 mA		1.1	1.4	V
	Reverse Current	I_R	V_R = 5 V			5.0	μA
MOS FET	Off-state Leakage Current	I_{Loff}	V_D = 40 V		0.1	10	nA
	Output Capacitance	C_{out}	V_D = 0 V, f = 1 MHz		33.5		pF
Coupled	LED On-state Current	I_{Fon}	I_L = 250 mA			2.0	mA
	On-state Resistance	R_{on1}	I_F = 5 mA, I_L = 10 mA		0.8	1.6	Ω
		R_{on2}	I_F = 5 mA, I_L = 250 mA, t ≤ 10 ms		0.8	1.6	
	Turn-on Time*1	t_{on}	I_F = 5 mA, V_O = 5 V, R_L = 500 Ω,		0.48	1.0	ms
	Turn-off Time*1	t_{off}	PW ≥ 10 ms		0.15	0.5	
	Isolation Resistance	R_{I-O}	V_{I-O} = 1.0 kV_{DC}	10^9			Ω
	Isolation Capacitance	C_{I-O}	V = 0 V, f = 1 MHz		0.5		pF
	Equivalent Rise Time*2	ERT	I_F = 10 mA, $tr_{(in)}$ = 25 ps, V = 250 mV, 50 Ω termination		78		ps

***1** 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 of under 10 ms, the turn-on time and turn-off time will increase.

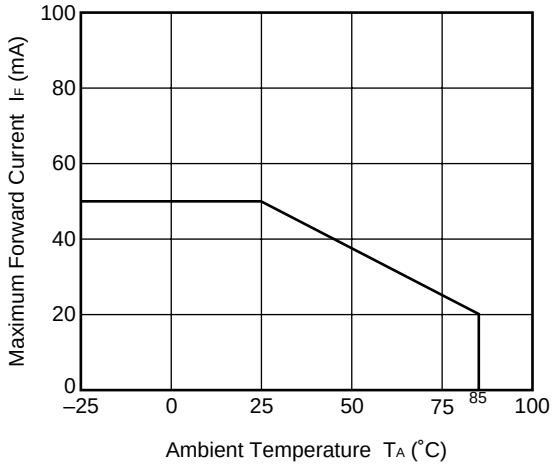
***2** ERT waveform and equation



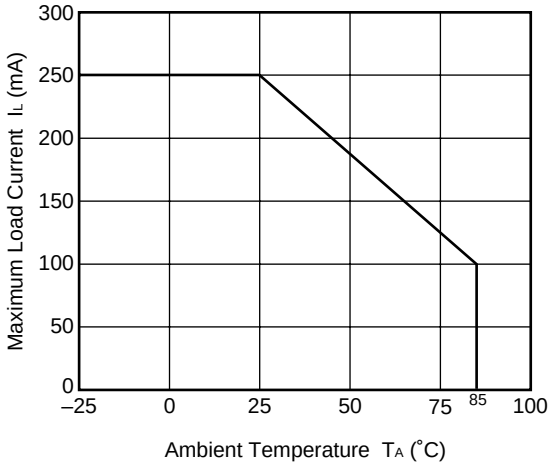
$$ERT = \sqrt{tr_{(out)}^2 - tr_{(in)}^2}$$

TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise specified)

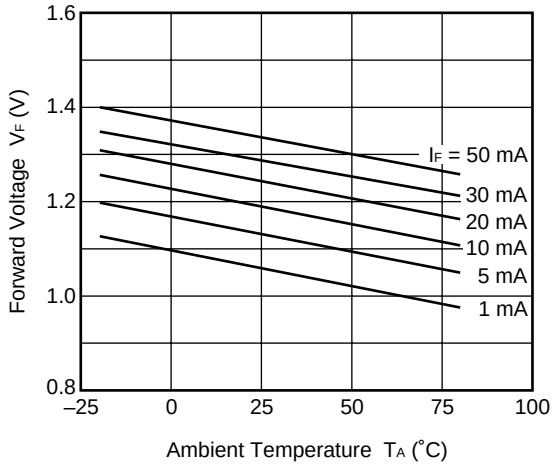
MAXIMUM FORWARD CURRENT vs. AMBIENT TEMPERATURE



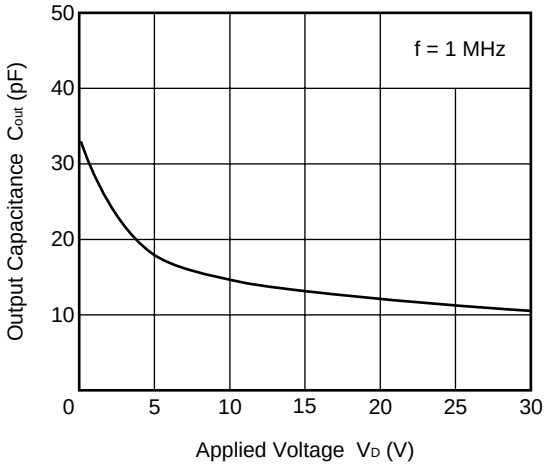
MAXIMUM LOAD CURRENT vs. AMBIENT TEMPERATURE



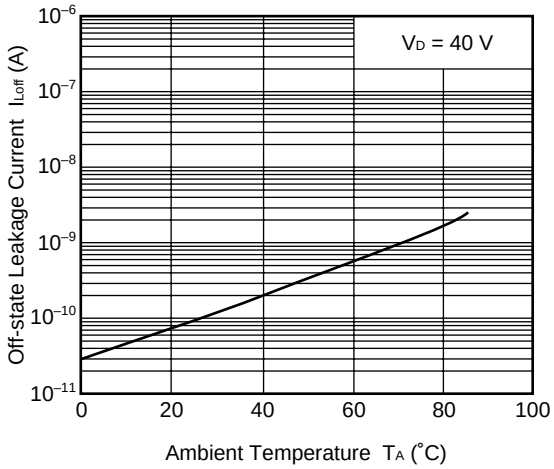
FORWARD VOLTAGE vs. AMBIENT TEMPERATURE



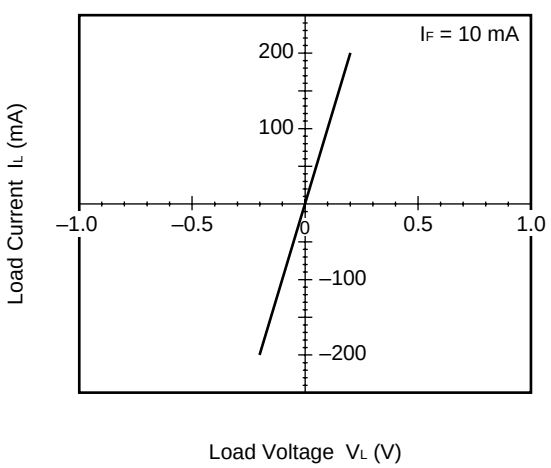
OUTPUT CAPACITANCE vs. APPLIED VOLTAGE



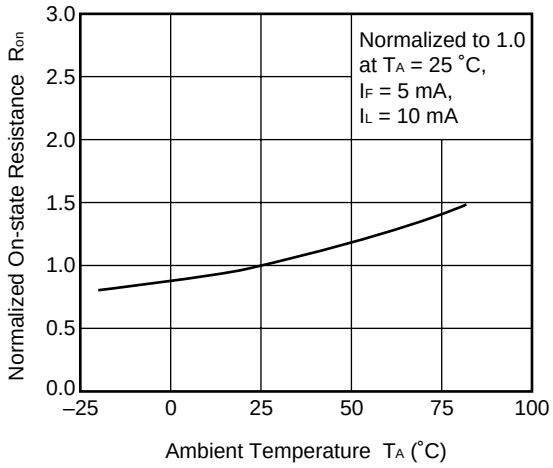
OFF-STATE LEAKAGE CURRENT vs. AMBIENT TEMPERATURE



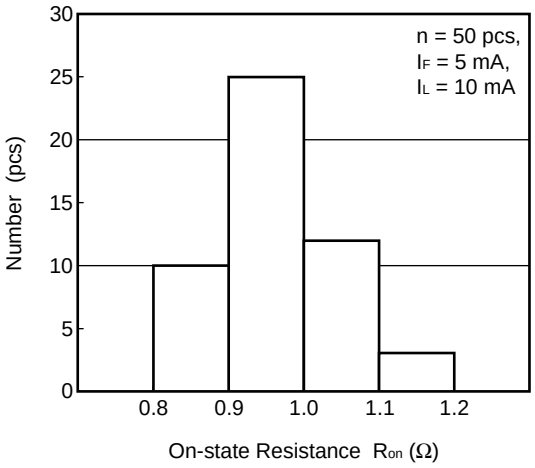
LOAD CURRENT vs. LOAD VOLTAGE



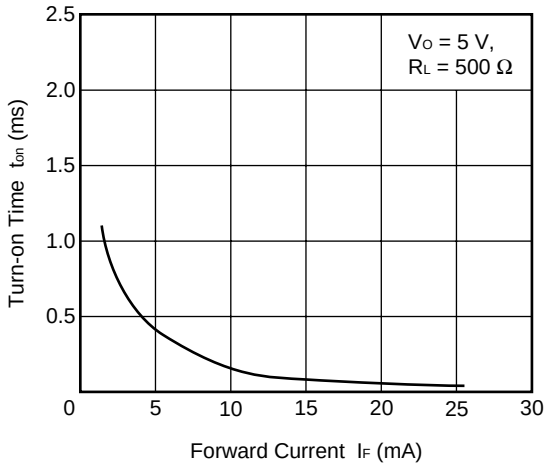
NORMALIZED ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE



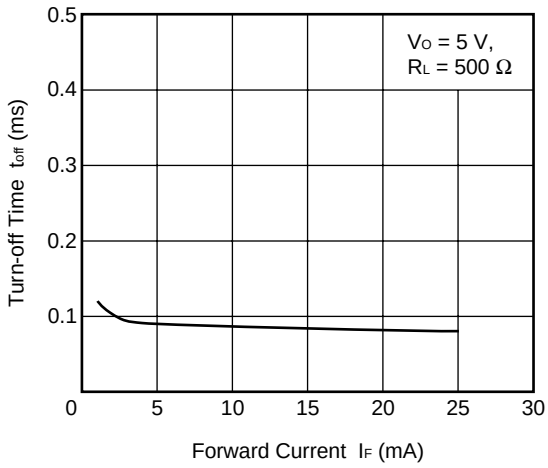
ON-STATE RESISTANCE DISTRIBUTION



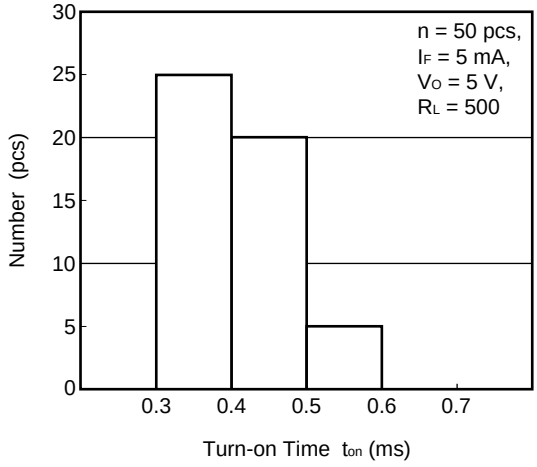
TURN-ON TIME vs. FORWARD CURRENT



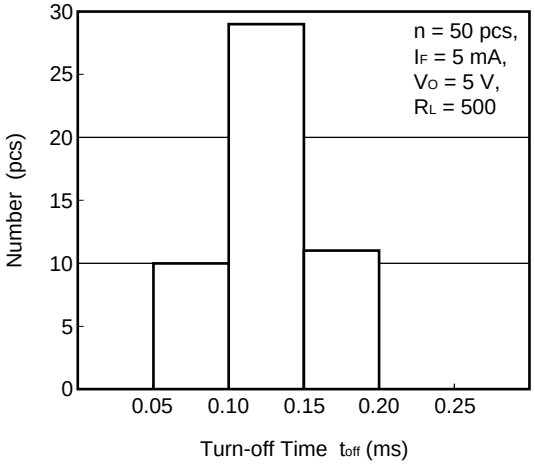
TURN-OFF TIME vs. FORWARD CURRENT



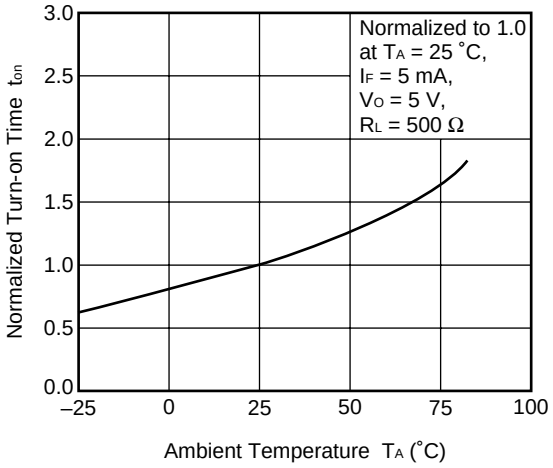
TURN-ON TIME DISTRIBUTION



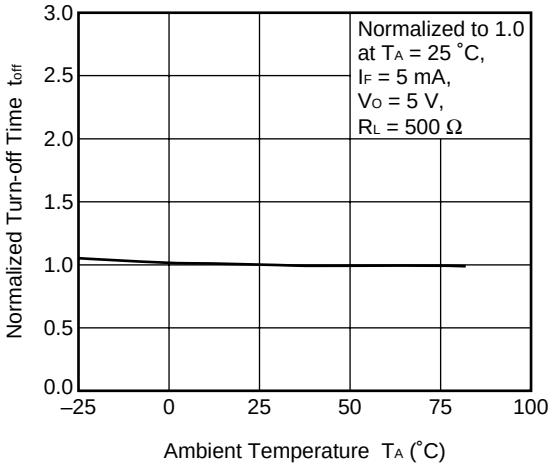
TURN-OFF TIME DISTRIBUTION



NORMALIZED TURN-ON TIME vs.
AMBIENT TEMPERATURE



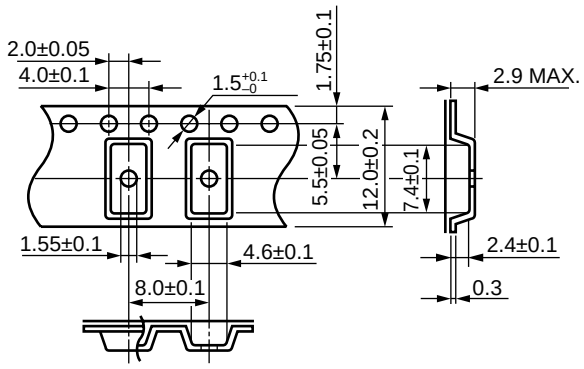
NORMALIZED TURN-OFF TIME vs.
AMBIENT TEMPERATURE



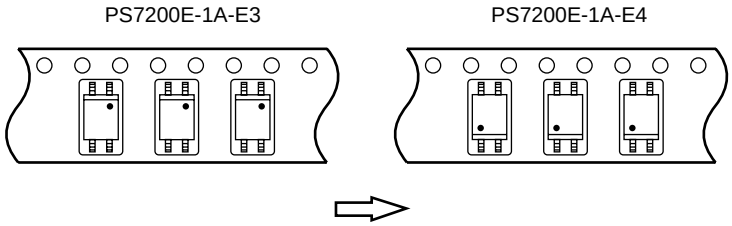
Remark The graphs indicate nominal characteristics.

★ **TAPING SPECIFICATIONS (Unit : mm)**

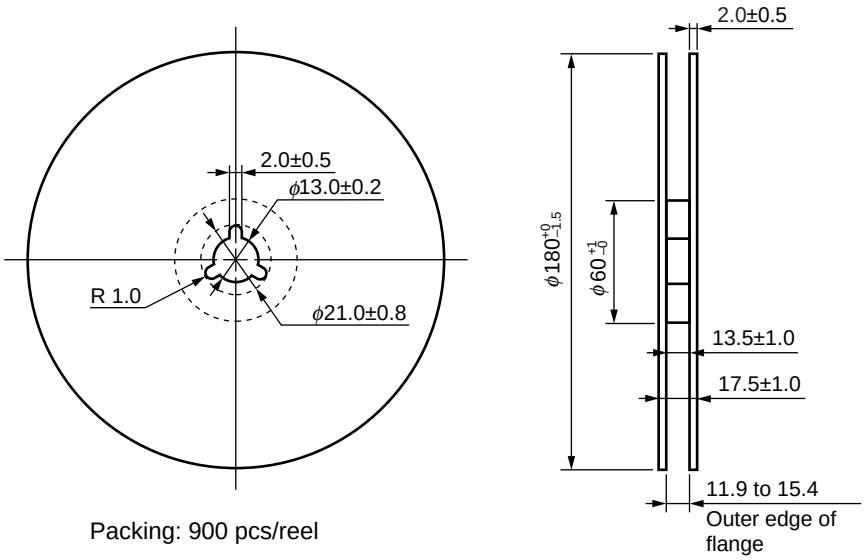
Outline and Dimensions (Tape)



Tape Direction

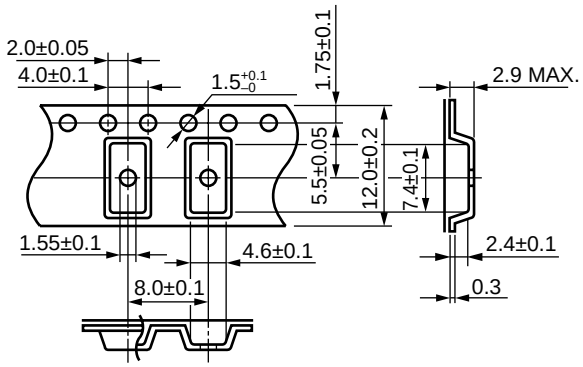


Outline and Dimensions (Reel)

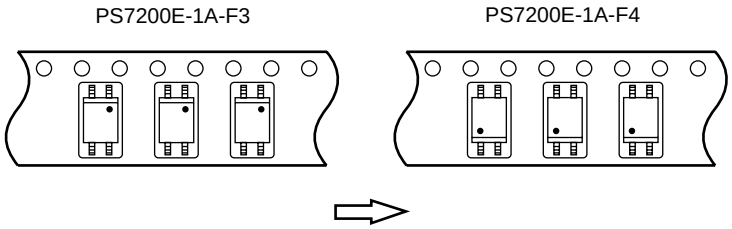


Packing: 900 pcs/reel

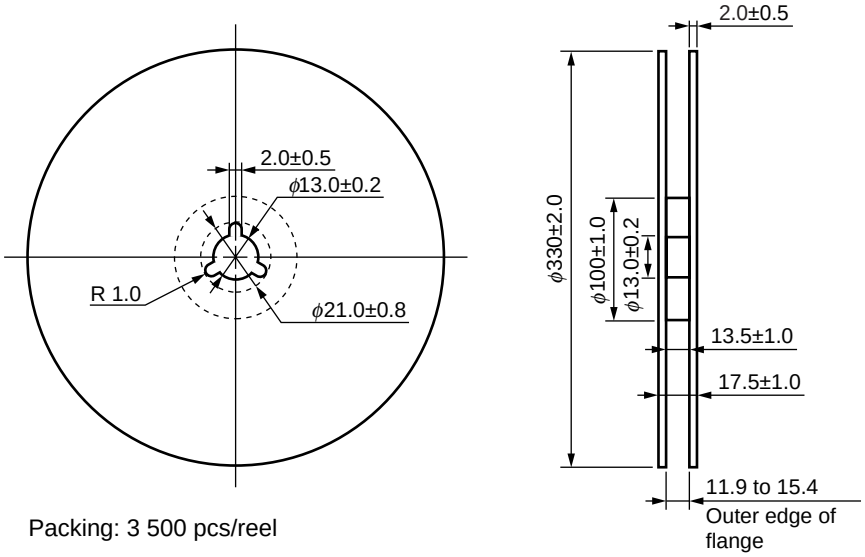
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



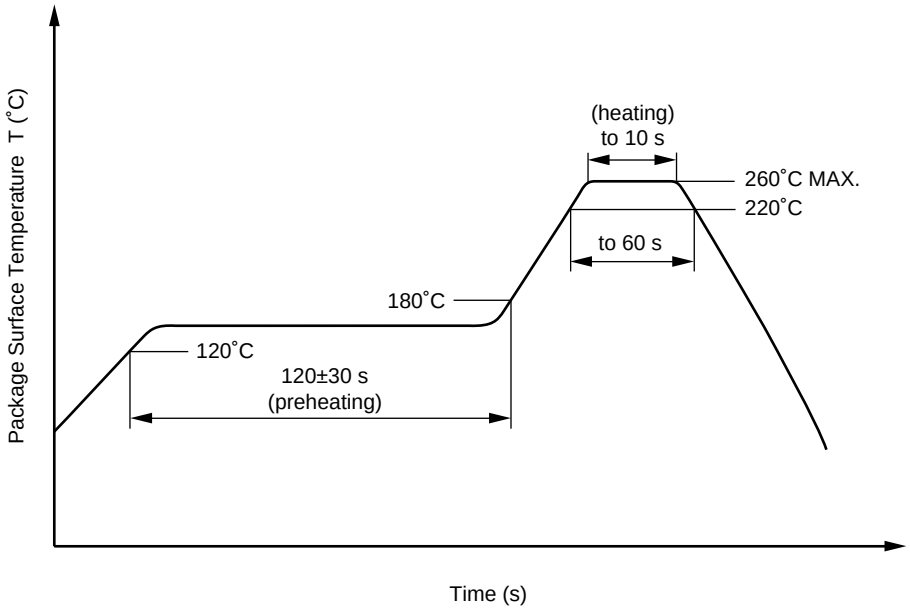
Packing: 3 500 pcs/reel

★ 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.)

(3) Cautions

• Fluxes

Avoid removing the residual flux with freon-based and chlorine-based cleaning solvent.

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M8E 00.4-0110

SAFETY INFORMATION ON THIS PRODUCT

Caution GaAs Products	The product contains gallium arsenide, GaAs. GaAs vapor and powder are hazardous to human health if inhaled or ingested. • Do not destroy or burn the product. • Do not cut or cleave off any part of the product. • Do not crush or chemically dissolve the product. • Do not put the product in the mouth. Follow related laws and ordinances for disposal. The product should be excluded from general industrial waste or household garbage.

▶**For further information, please contact**

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