NEC

Solid State Relay
OCMOS FET

PS7241-1A

4-PIN SOP 400 V BREAK DOWN VOLTAGE
1-ch Optical Coupled MOS FET

DESCRIPTION

The PS7241-1A is a solid state relay containing GaAs LEDs on the light emitting side (input side) and normally open (N.O.) contact MOS FETs on the output side.

It is suitable for analog signal control because of its low offset and high linearity.

FEATURES

- Small and thin package (4-pin SOP, Height = 2.1 mm)
- 1 channel type (1 a output)
- Low LED operating current (I_F = 2 mA)
- Designed for AC/DC switching line changer
- Low offset voltage
- Ordering number of taping product: PS7241-1A-E3, E4, E5, F3, F4
- UL approved: File No. E72422 (S)
- BSI approved: No. 8241/8242
- CSA approved: No. CA 101391
- VDE approved: No. 121302 ÜG

APPLICATIONS

- Laptop PC, PDA
- Modem card
- Telephone, FAX
- Measurement equipment

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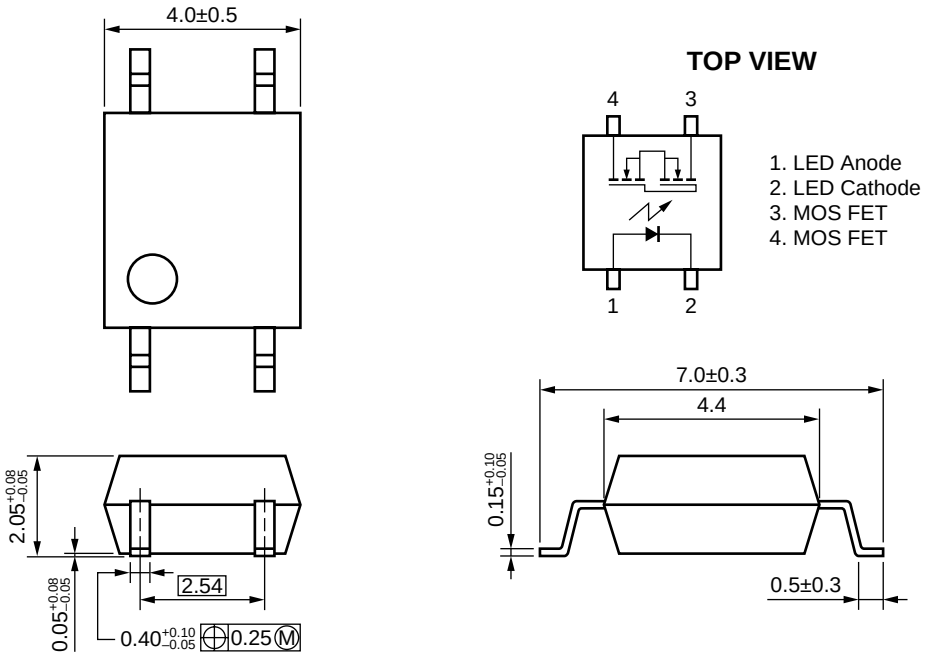
(Previous No. P13438EJ5V0DS00)
Date Published February 2003 CP(K)
Printed in Japan

The mark ★ shows major revised points.

PACKAGE DIMENSIONS
in millimeters



ORDERING INFORMATION

Part Number	Package	Packing Style	Application Part Number*1
PS7241-1A	4-pin SOP	Magazine case 100 pcs	PS7241-1A
PS7241-1A-E3		Embossed Tape 900 pcs/reel	
PS7241-1A-E4			
PS7241-1A-E5		Embossed Tape 1 000 pcs/reel	
PS7241-1A-F3		Embossed Tape 3 500 pcs/reel	
PS7241-1A-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	400	V
	Continuous Load Current	I_L	120	mA
	Pulse Load Current*2 (AC/DC Connection)	I_{LP}	240	mA
	Power Dissipation	P_D	300	mW
Isolation Voltage*3		BV	1 500	Vr.m.s.
Total Power Dissipation		P_T	350	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** PW = 100 ms, 1 shot

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

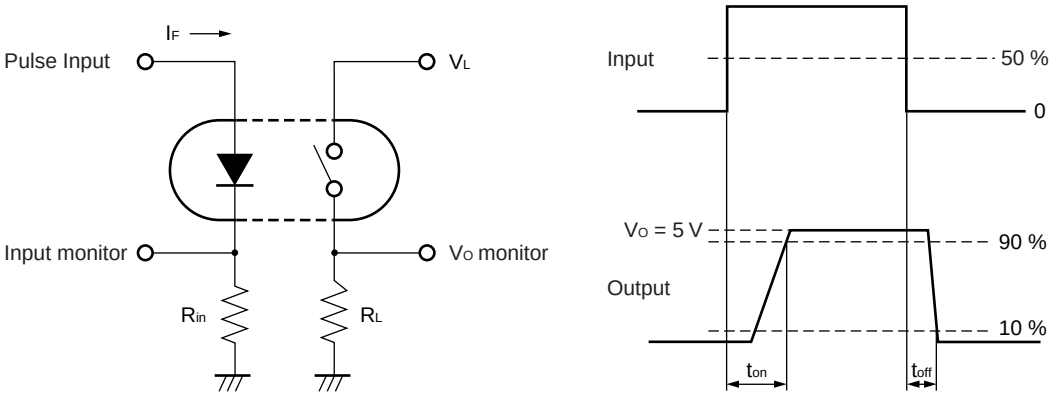
RECOMMENDED OPERATING CONDITIONS (T_A = 25 °C)

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

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

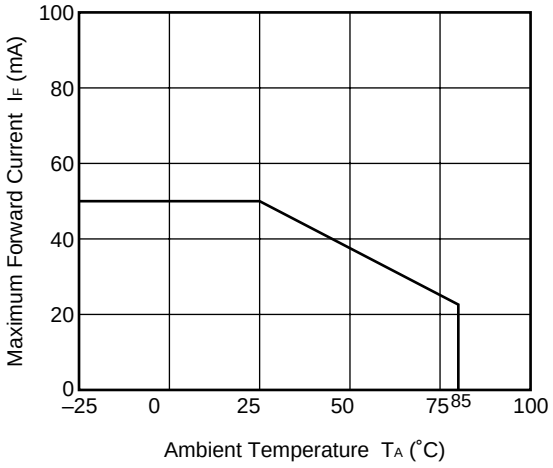
Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V_F	I_F = 10 mA		1.2	1.4	V
	Reverse Current	I_R	V_R = 5 V			5.0	μA
MOS FET	Off-state Leakage Current	I_{Loff}	V_D = 400 V		0.03	1.0	μA
	Output Capacitance	C_{out}	V_D = 0 V, f = 1 MHz		54		pF
Coupled	LED On-state Current	I_{Fon}	I_L = 120 mA			2.0	mA
	On-state Resistance	R_{on1}	I_F = 10 mA, I_L = 10 mA		18	30	Ω
		R_{on2}	I_F = 10 mA, I_L = 120 mA, t ≤ 10 ms		15	25	
★	Turn-on Time*1	t_{on}	I_F = 10 mA, V_O = 5 V, R_L = 500 Ω,		0.5	2.0	ms
	Turn-off Time*1	t_{off}	PW ≥ 10 ms		0.07	0.2	
	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

***1** Test Circuit for Switching Time

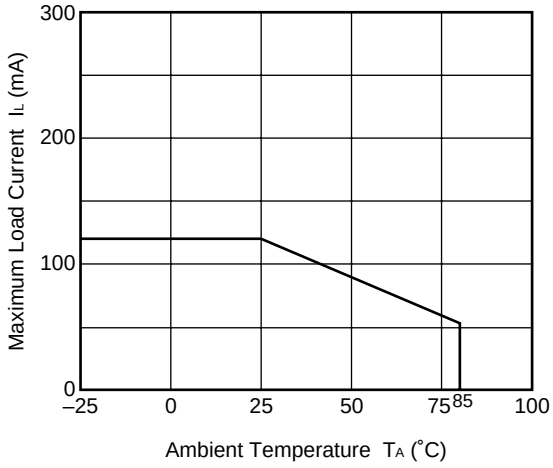


★ **TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise specified)**

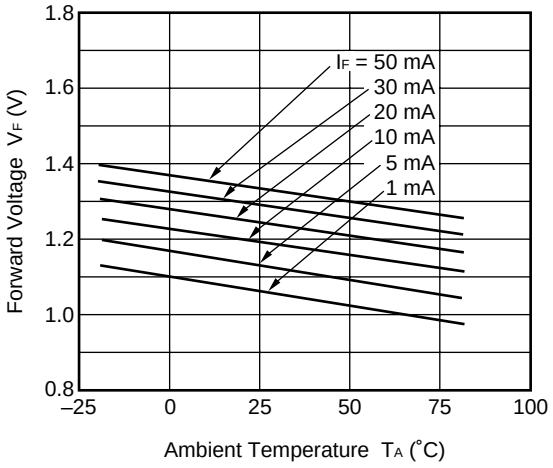
MAXIMUM FORWARD CURRENT vs. AMBIENT TEMPERATURE



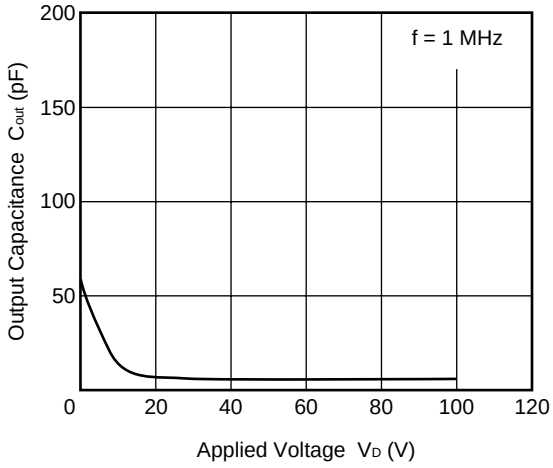
MAXIMUM LOAD CURRENT vs. AMBIENT TEMPERATURE



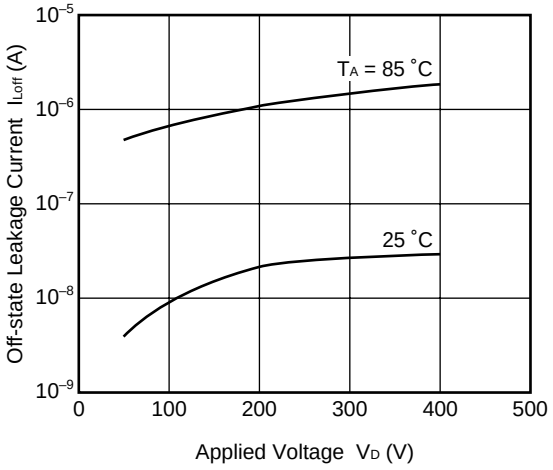
FORWARD VOLTAGE vs. AMBIENT TEMPERATURE



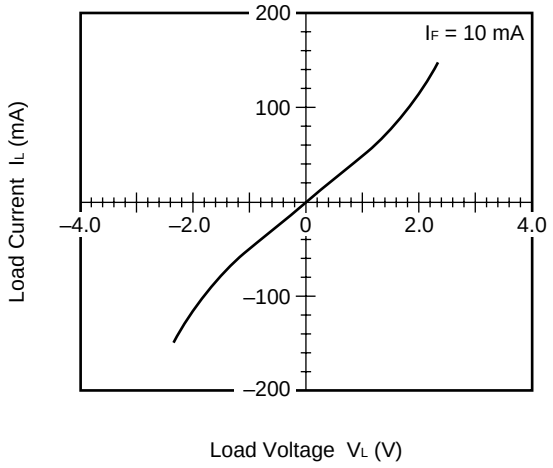
OUTPUT CAPACITANCE vs. APPLIED VOLTAGE



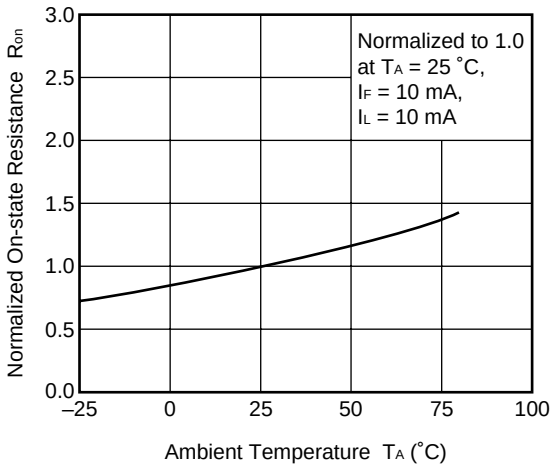
OFF-STATE LEAKAGE CURRENT vs. APPLIED VOLTAGE



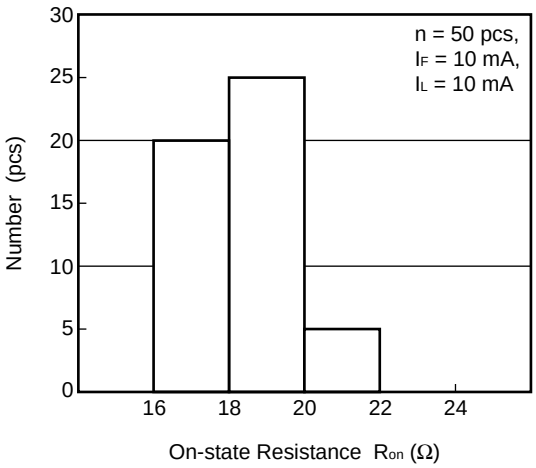
LOAD CURRENT vs. LOAD VOLTAGE



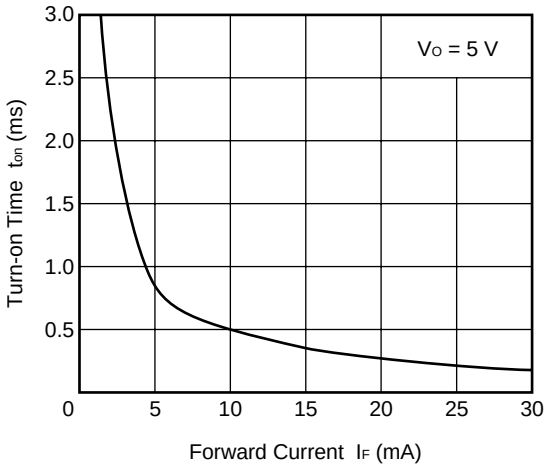
NORMALIZED ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE



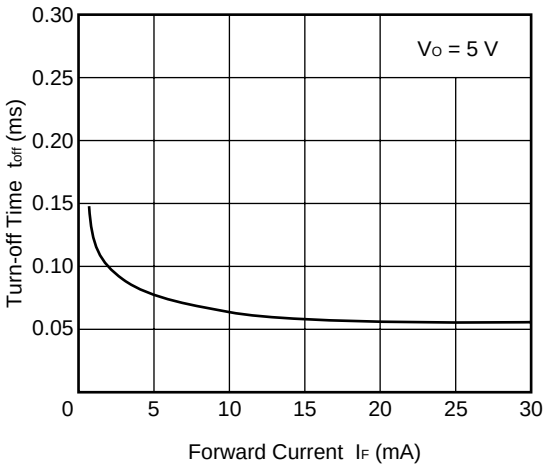
ON-STATE RESISTANCE DISTRIBUTION



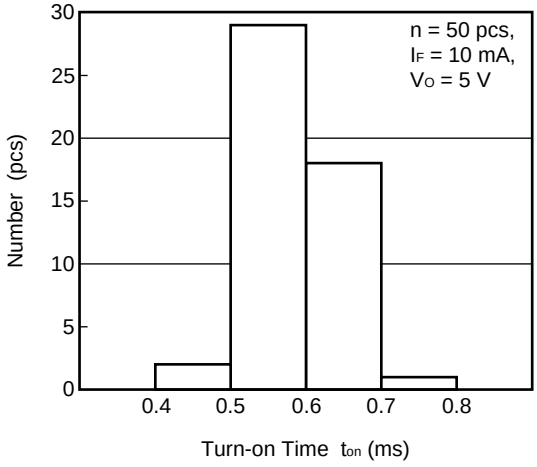
TURN-ON TIME vs. FORWARD CURRENT



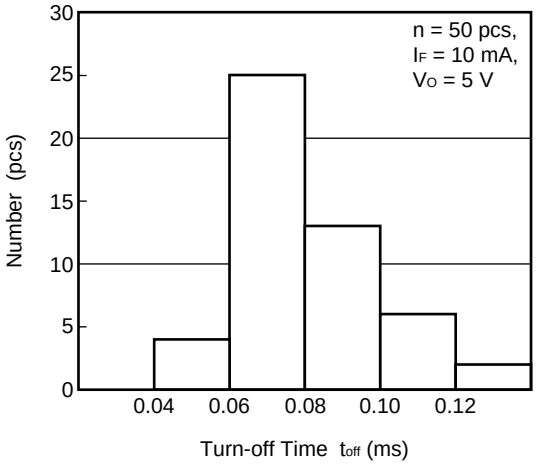
TURN-OFF TIME vs. FORWARD CURRENT



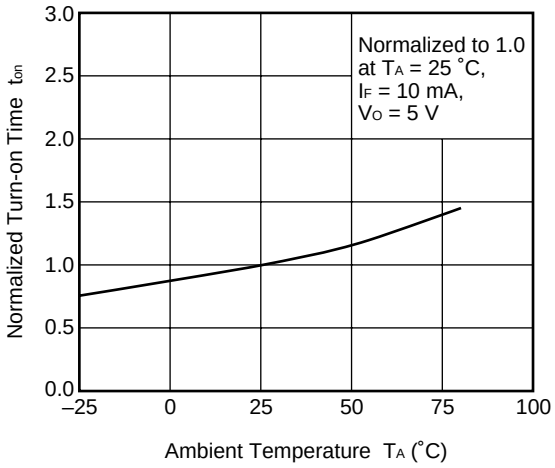
TURN-ON TIME DISTRIBUTION



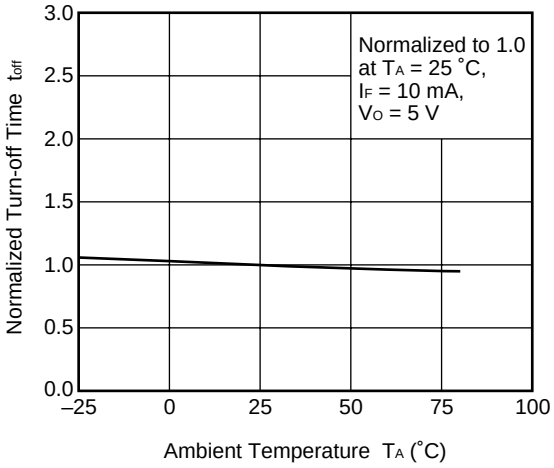
TURN-OFF TIME DISTRIBUTION



NORMALIZED TURN-ON TIME vs.
AMBIENT TEMPERATURE



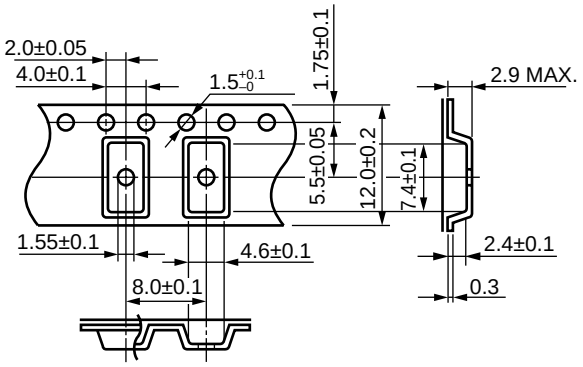
NORMALIZED TURN-OFF TIME vs.
AMBIENT TEMPERATURE



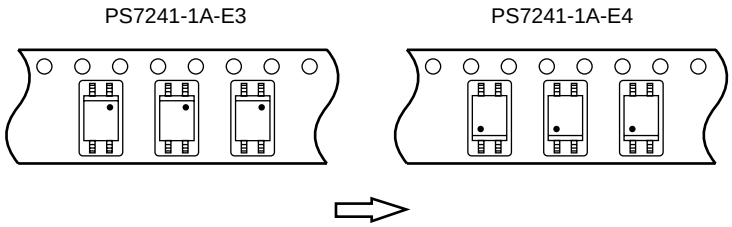
Remark The graphs indicate nominal characteristics.

★ **TAPING SPECIFICATIONS (in millimeters)**

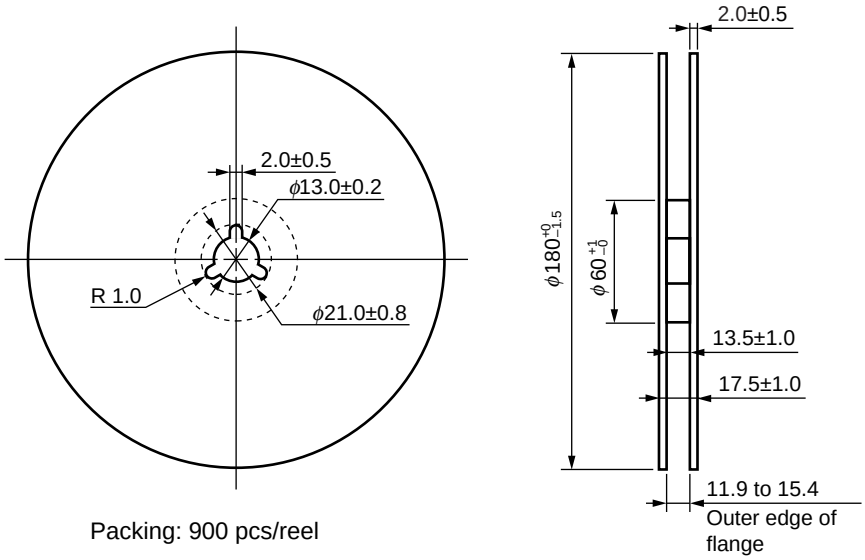
Outline and Dimensions (Tape)



Tape Direction

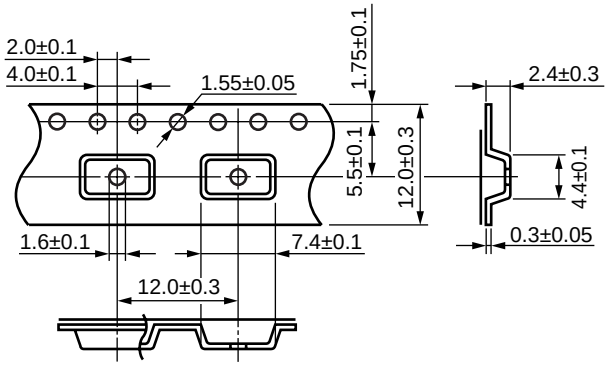


Outline and Dimensions (Reel)



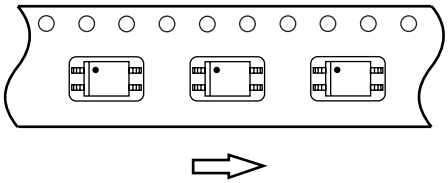
Packing: 900 pcs/reel

Outline and Dimensions (Tape)

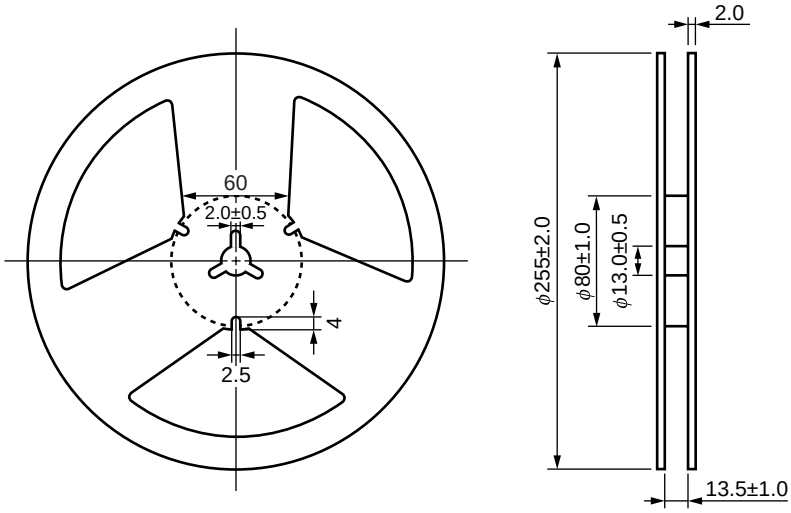


Tape Direction

PS7241-1A-E5

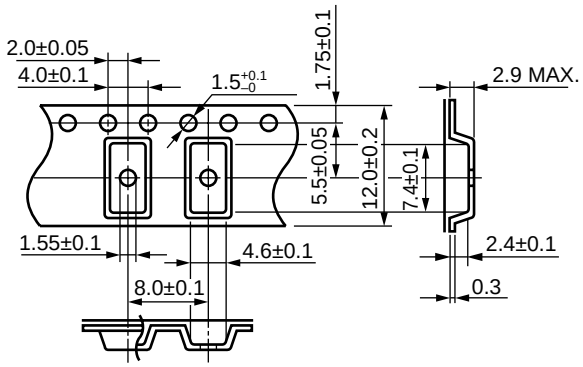


Outline and Dimensions (Reel)

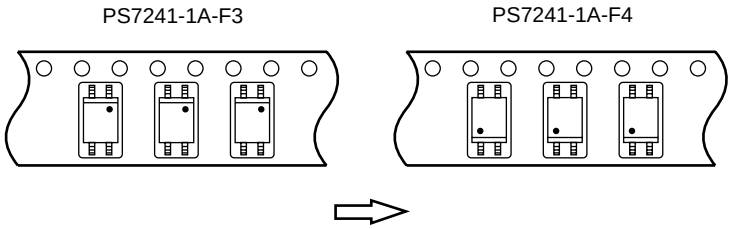


Packing: 1 000 pcs/reel

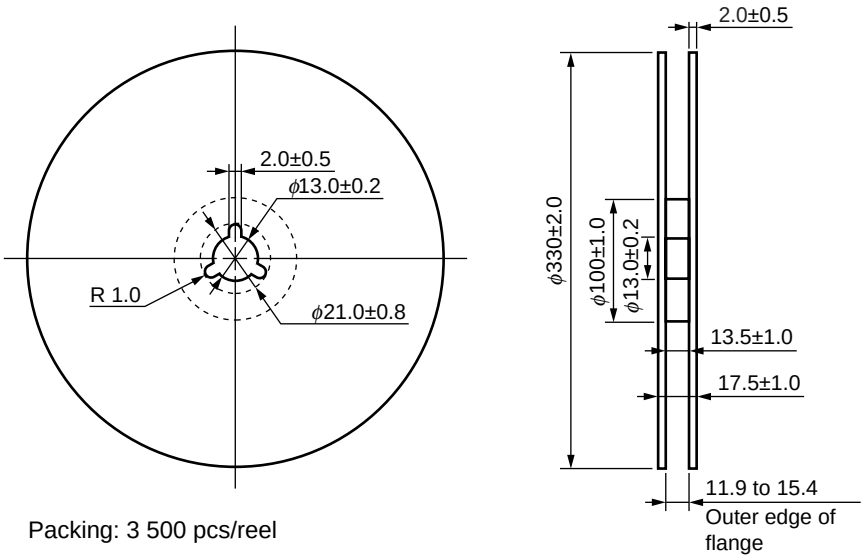
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



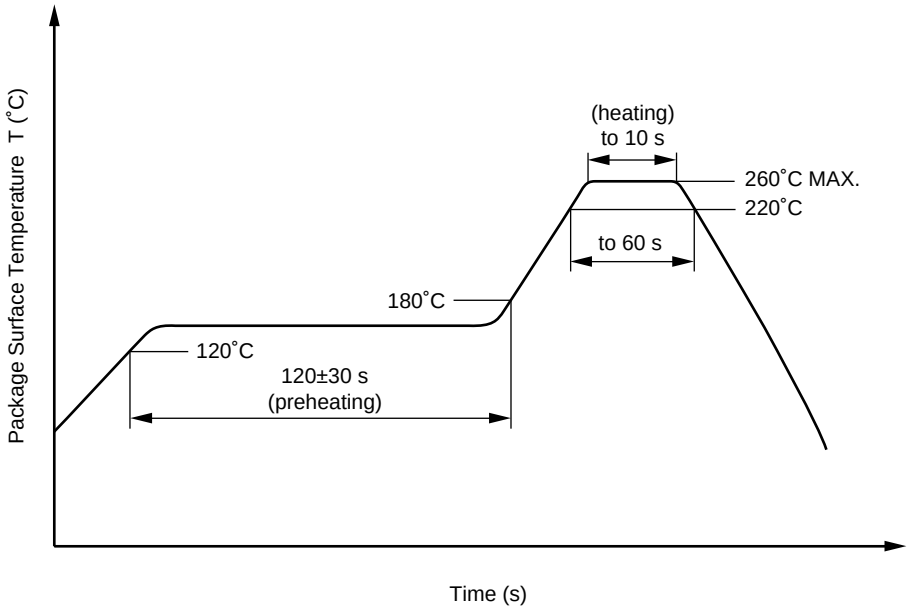
Packing: 3 500 pcs/reel

★ 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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