NEC

Solid State Relay
OCMOS FET

PS7122A-1C,PS7122AL-1C

8-PIN DIP, 250 V BREAK DOWN VOLTAGE, TRANSFER TYPE 2-ch Optical Coupled MOS FET

DESCRIPTION

The PS7122A-1C and PS7122AL-1C are transfer type solid state relays containing normally open (N.O.) contact and normally close (N.C.) contact on the output side.

They are suitable for analog signal control because of their low offset and high linearity.

The PS7122AL-1C has a surface mount type lead.

FEATURES

- 2 channel type (1 a + 1 b output)
- Low LED operating current (I_F = 2 mA)
- Designed for AC/DC switching line changer
- Small package (8-pin DIP)
- Low offset voltage
- PS7122AL-1C: Surface mount type

APPLICATIONS

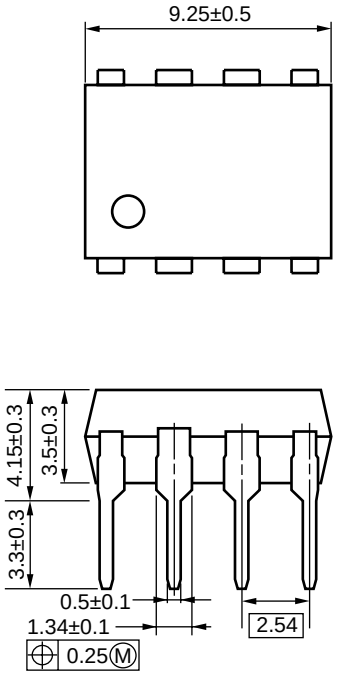
- Exchange equipment
- Measurement equipment
- FA/OA equipment

Document No. PN10275EJ01V1DS (1st edition)
(Previous No. P13383EJ4V0DS00)
Date Published February 2003 CP(K)
Printed in Japan

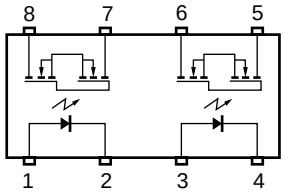
The mark ★ shows major revised points.

PACKAGE DIMENSIONS (in millimeters)

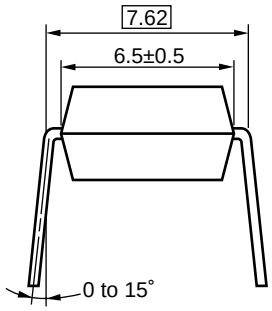
PS7122A-1C



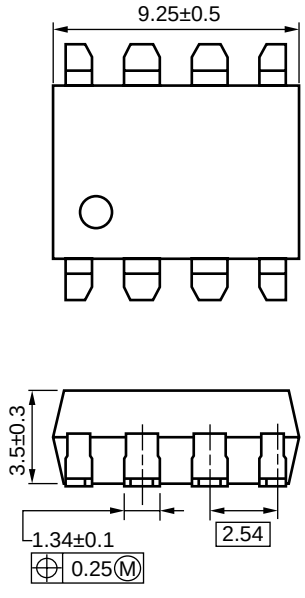
TOP VIEW



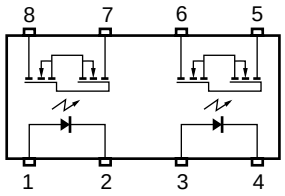
1. LED Anode
2. LED Cathode
3. LED Anode
4. LED Cathode
5. MOS FET (N.O.)
6. MOS FET (N.O.)
7. MOS FET (N.C.)
8. MOS FET (N.C.)



PS7122AL-1C



TOP VIEW



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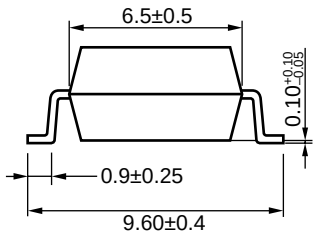


ORDERING INFORMATION

Part Number	Package	Packing Style	Application Part Number[*1]
PS7122A-1C	8-pin DIP	Magazine case 50 pcs	PS7122A-1C
PS7122AL-1C			PS7122AL-1C
PS7122AL-1C-E3		Embossed Tape 1 000 pcs/reel	
PS7122AL-1C-E4			

***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/ch
	Peak Forward Current[*1]	I_{FP}	1	A
MOS FET	Break Down Voltage	V_L	250	V
	Continuous Load Current	I_L	200	mA
	Pulse Load Current[*2] (AC/DC Connection)	I_{LP}	400	mA
	Power Dissipation	P_D	375	mW/ch
Isolation Voltage[*3]		BV	1 500	Vr.m.s.
Total Power Dissipation		P_T	850	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

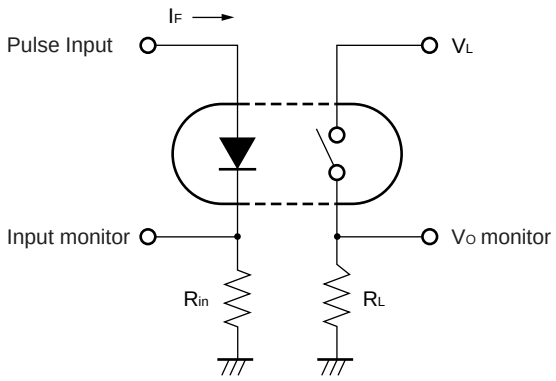
RECOMMENDED OPERATING CONDITIONS (T_A = 25 °C)

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

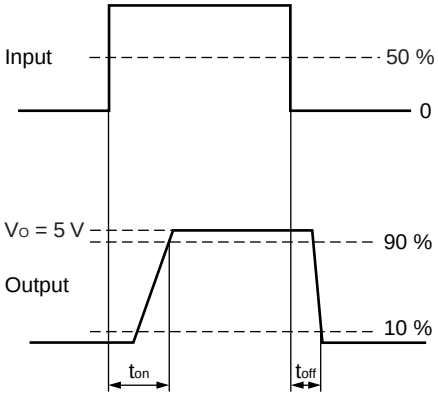
ELECTRICAL CHARACTERISTICS (T_A = 25 ºC)

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}	N.O.: I_F = 0 mA, V_D = 250 V		0.03	1.0	μA
			N.C.: I_F = 10 mA, V_D = 250 V				
	Output Capacitance	C_{out}	N.O.: V_D = 0 V, f = 1 MHz		120		pF/ch
			N.C.: I_F = 10 mA, V_D = 0 V, f = 1 MHz		340		
Coupled	LED On-state Current	I_{Fon}	N.O.: I_L = 200 mA			2.0	mA
	LED Off-state Current	I_{Foff}	N.C.: I_L = 200 mA			2.0	mA
	On-state Resistance	R_{on1}	N.O.: I_F = 10 mA, I_L = 10 mA		4.5	8.0	Ω
			N.C.: I_F = 0 mA, I_L = 10 mA				
		R_{on2}	N.O.: I_F = 10 mA, I_L = 200 mA, t ≤ 10 ms				
			N.C.: I_F = 0 mA, I_L = 200 mA, t ≤ 10 ms				
★	Turn-on Time *1	$t_{on\ (N.O.)}$	I_F = 10 mA, V_O = 5 V, R_L = 500 Ω,		0.5	1.5	ms
		$t_{on\ (N.C.)}$	PW ≥ 10 ms		0.04	0.2	
	Turn-off Time *1	$t_{off\ (N.O.)}$			0.04	0.2	
		$t_{off\ (N.C.)}$			0.5	1.5	
	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		1.1		pF/ch

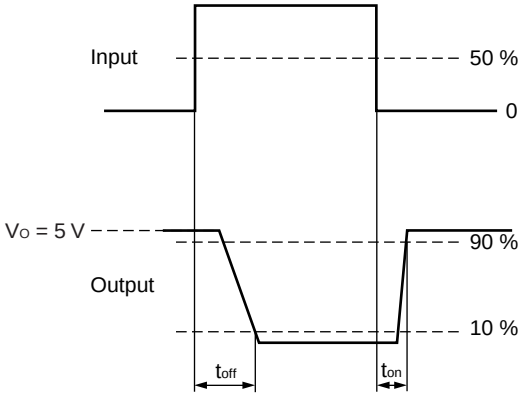
***1** Test Circuit for Switching Time



N.O. (between pin 5 and 6)

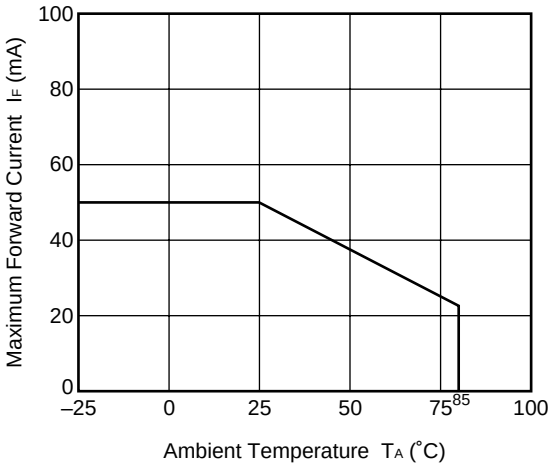


N.C. (between pin 7 and 8)

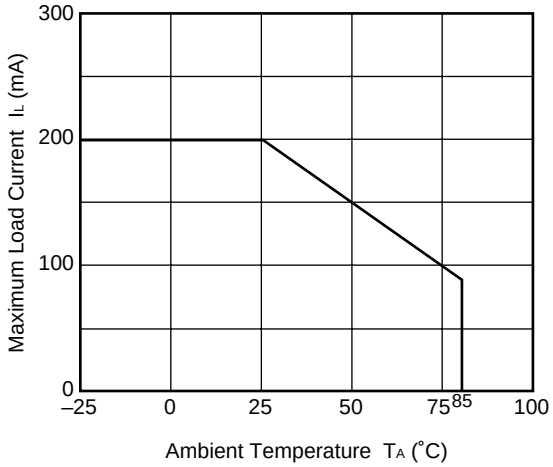


★ **TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise specified)**

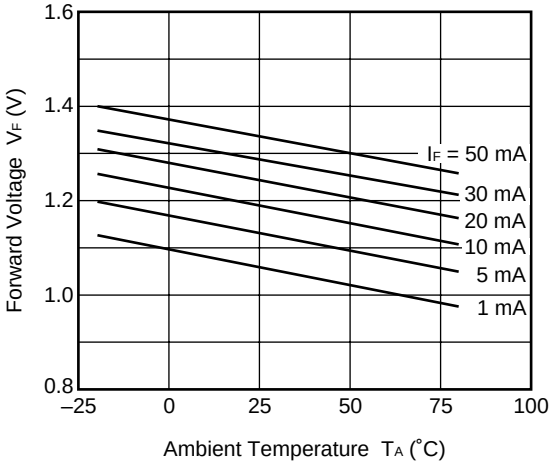
MAXIMUM FORWARD CURRENT vs. AMBIENT TEMPERATURE



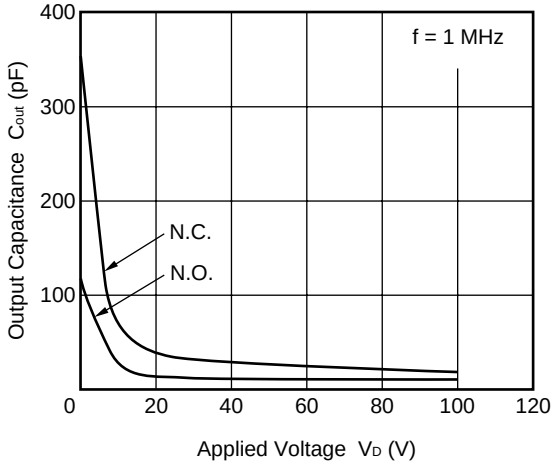
MAXIMUM LOAD CURRENT vs. AMBIENT TEMPERATURE



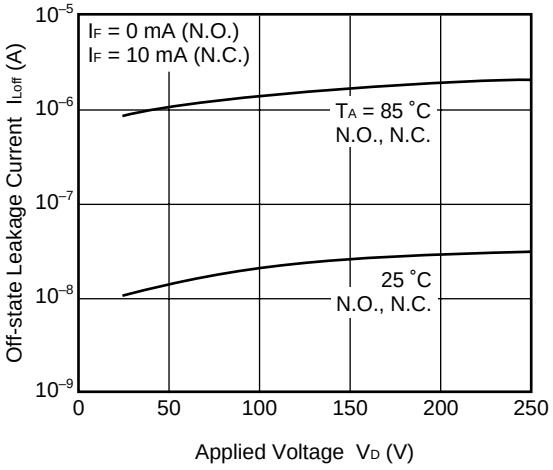
FORWARD VOLTAGE vs. AMBIENT TEMPERATURE



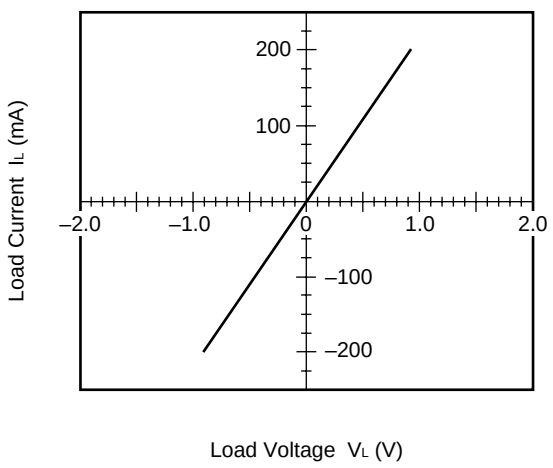
OUTPUT CAPACITANCE vs. APPLIED VOLTAGE



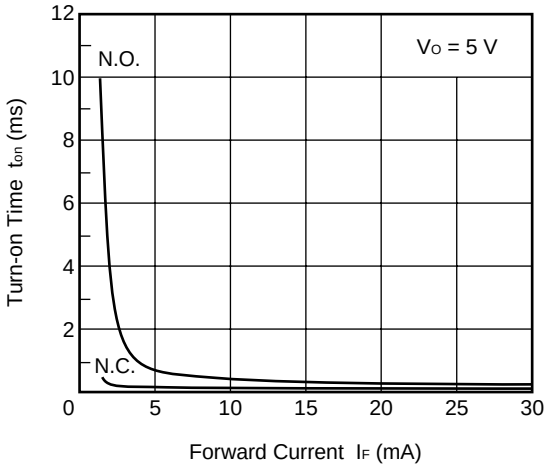
OFF-STATE LEAKAGE CURRENT vs. APPLIED VOLTAGE



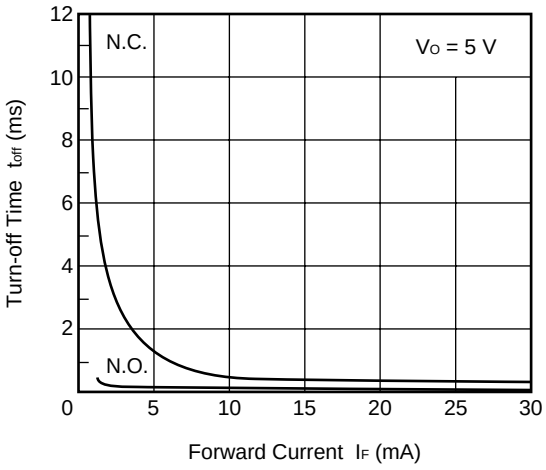
LOAD CURRENT vs. LOAD VOLTAGE



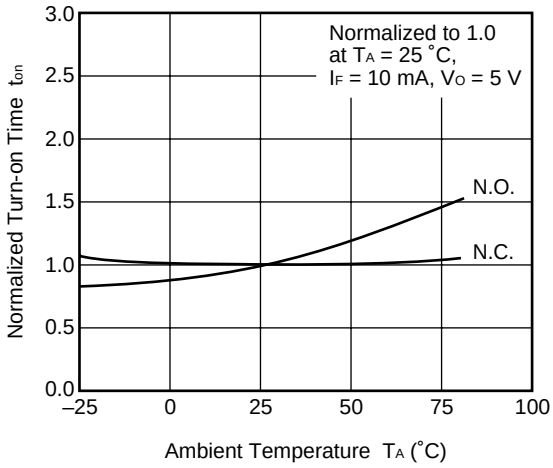
TURN-ON TIME vs. FORWARD CURRENT



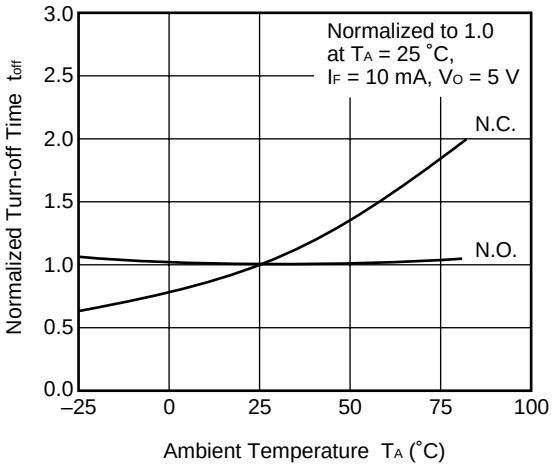
TURN-OFF TIME vs. FORWARD CURRENT



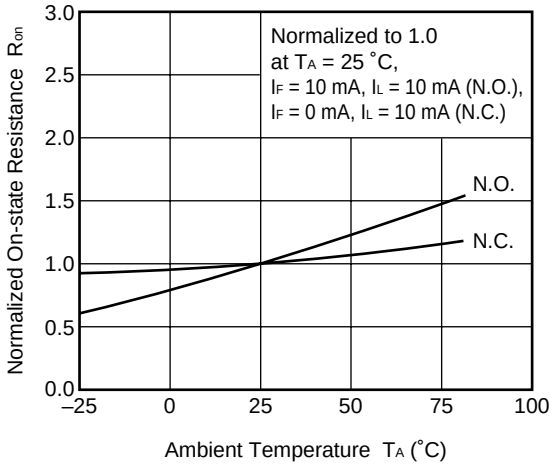
NORMALIZED TURN-ON TIME vs. AMBIENT TEMPERATURE



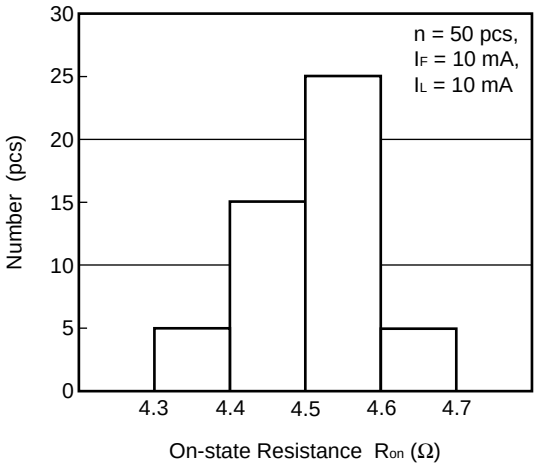
NORMALIZED TURN-OFF TIME vs. AMBIENT TEMPERATURE



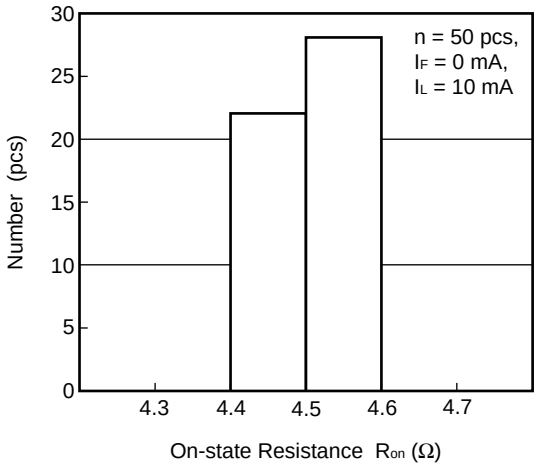
NORMALIZED ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE



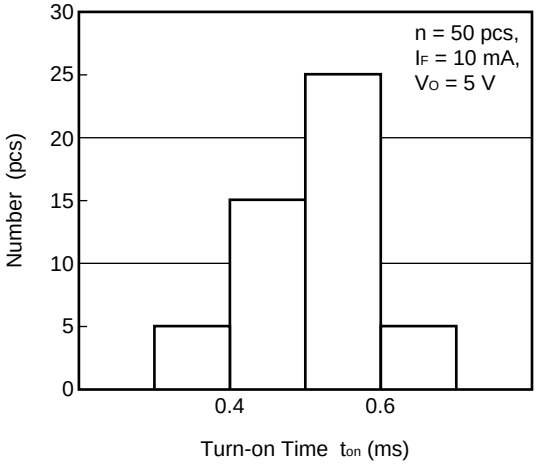
ON-STATE RESISTANCE (N.O.) DISTRIBUTION



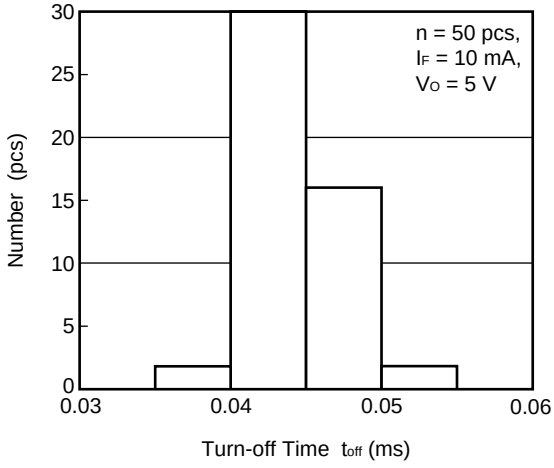
ON-STATE RESISTANCE (N.C.) DISTRIBUTION



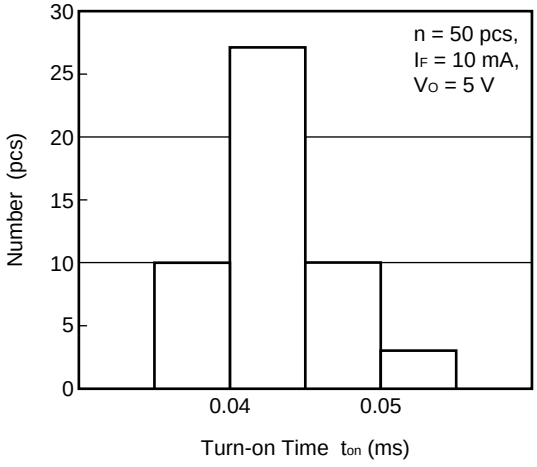
TURN-ON TIME (N.O.) DISTRIBUTION



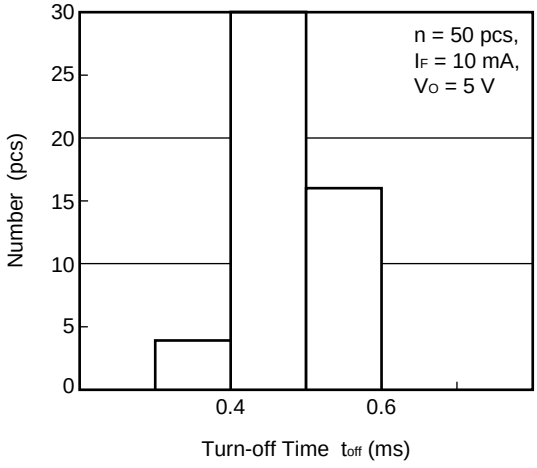
TURN-OFF TIME (N.O.) DISTRIBUTION



TURN-ON TIME (N.C.) DISTRIBUTION



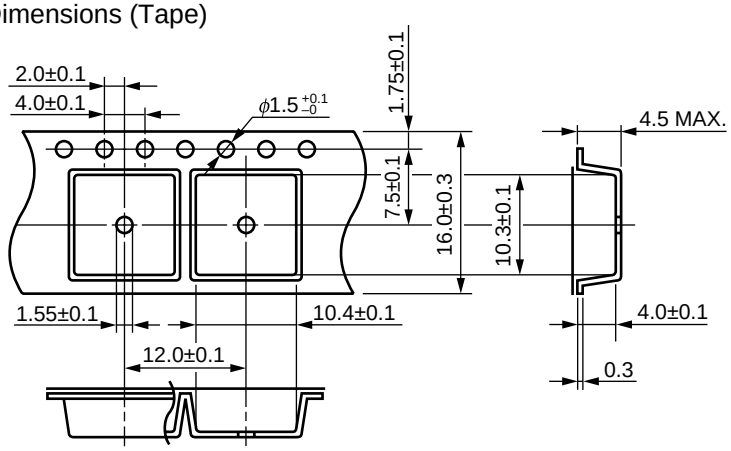
TURN-OFF TIME (N.C.) DISTRIBUTION



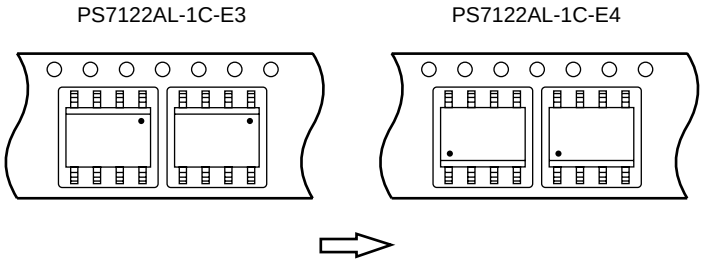
Remark The graphs indicate nominal characteristics.

★ **TAPING SPECIFICATIONS (in millimeters)**

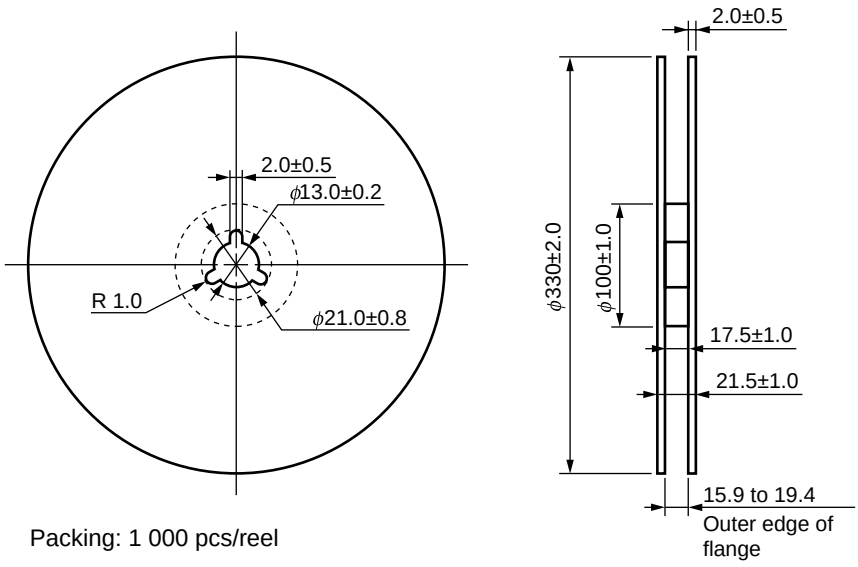
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



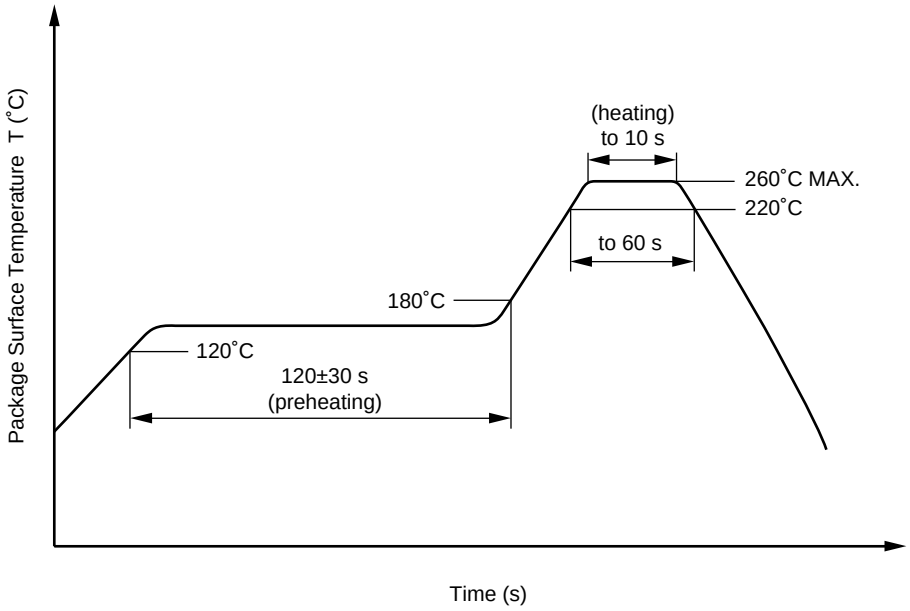
Packing: 1 000 pcs/reel

★ 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.

- **The information in this document is current as of February, 2003. The information is subject to change without notice. For actual design-in, refer to the latest publications of NEC's data sheets or data books, etc., for the most up-to-date specifications of NEC semiconductor products. Not all products and/or types are available in every country. Please check with an NEC sales representative for availability and additional information.**
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  (2) "NEC semiconductor products" means any semiconductor product developed or manufactured by or for NEC (as defined above).

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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