

PS7141-1C, PS7141L-1C**8-PIN DIP, 400 V BREAK DOWN VOLTAGE, TRANSFER TYPE
2-ch Optical Coupled MOS FET****DESCRIPTION**

The PS7141-1C and PS7141L-1C are transfer type solid state relays containing normally open (N.O.) contact and normally close (N.C.) contact on output side.

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

The PS7141L-1C has a surface mount type lead.

FEATURES

- 2 channel type (1 a + 1 b output)
- Low LED operating current ($I_F = 2 \text{ mA}$)
- Designed for AC/DC switching line changer
- Small package (8-pin DIP)
- Low offset voltage
- PS7141L-1C: Surface mount type
- UL approved: File No. E72422 (S)
- BSI approved: No. 8245/8246
- CSA approved: No. CA 101391

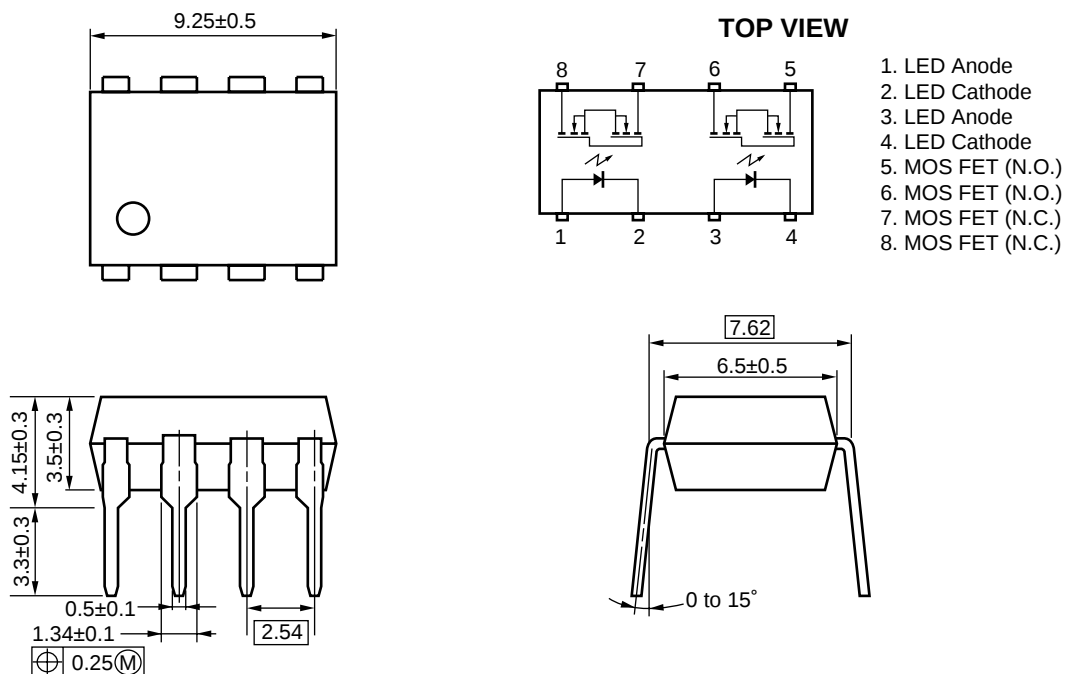
APPLICATIONS

- Exchange equipment
- Measurement equipment
- FA/OA equipment

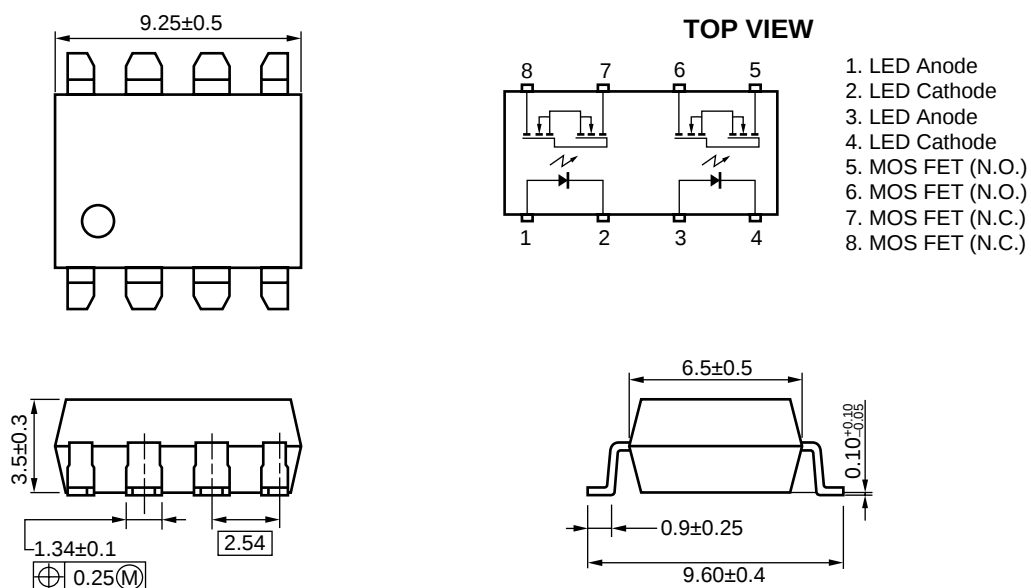
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PACKAGE DIMENSIONS (in millimeters)

PS7141-1C



PS7141L-1C



ORDERING INFORMATION

Part Number	Package	Packing Style	Application Part Number ^{*1}
PS7141-1C	8-pin DIP	Magazine case 50 pcs	PS7141-1C
PS7141L-1C			PS7141L-1C
PS7141L-1C-E3		Embossed Tape 1 000 pcs/reel	
PS7141L-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	400	V
	Continuous Load Current	I _L	150	mA
	Pulse Load Current ^{*2} (AC/DC Connection)	I _{LP}	300	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

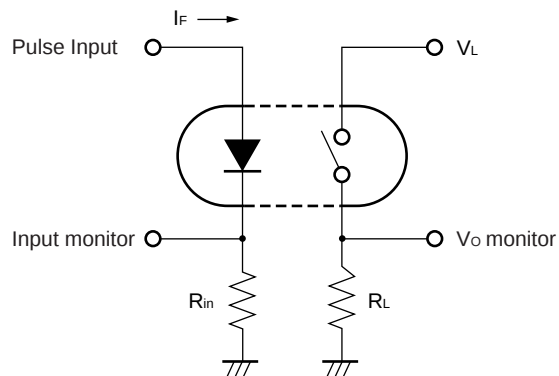
RECOMMENDED OPERATING CONDITIONS (T_A = 25 °C)

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

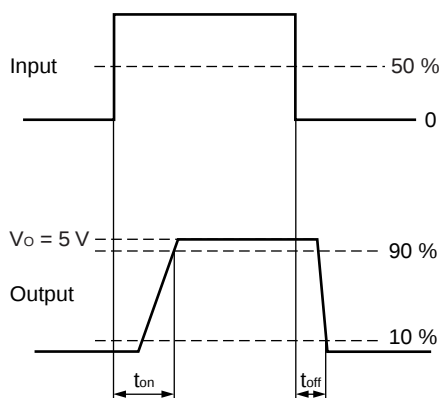
ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

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}	N.O.: I _F = 0 mA, V _D = 400 V		0.03	1.0	μA
			N.C.: I _F = 10 mA, V _D = 400 V				
	Output Capacitance	C _{out}	N.O.: V _D = 0 V, f = 1 MHz		65		pF/ch
			N.C.: V _D = 0 V, f = 1 MHz, I _F = 10 mA				
★ Coupled	LED On-state Current	I _{Fon}	N.O.: I _L = 150 mA			2.0	mA
	LED Off-state Current	I _{Off}	N.C.: I _L = 150 mA			2.0	mA
	On-state Resistance	R _{on1}	N.O.: I _F = 10 mA, I _L = 10 mA		20	30	Ω
			N.C.: I _F = 0 mA, I _L = 10 mA		24	30	
		R _{on2}	N.O.: I _F = 10 mA, I _L = 150 mA, t ≤ 10 ms		16	25	
			N.C.: I _F = 0 mA, I _L = 150 mA, t ≤ 10 ms		16	25	
	Turn-on Time *1	t _{on} (N.O.)	I _F = 10 mA, V _O = 5 V, R _L = 500 Ω, PW ≥ 10 ms		0.33	1.0	ms
		t _{on} (N.C.)			0.02	0.2	
	Turn-off Time *1	t _{off} (N.O.)			0.03	0.2	
		t _{off} (N.C.)			0.20	1.0	
	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

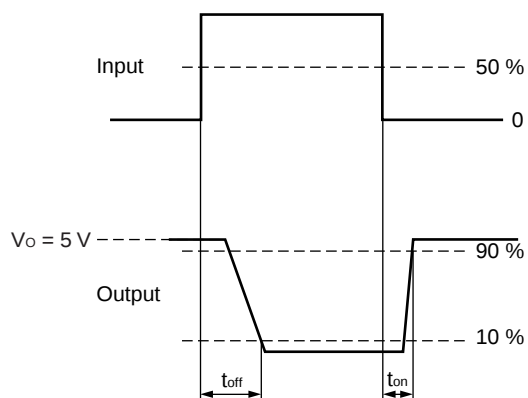
*1 Test Circuit for Switching Time



N.O. (between pin 5 and 6)

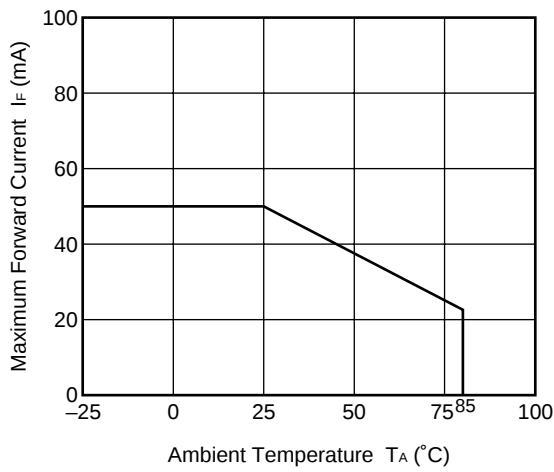


N.C. (between pin 7 and 8)

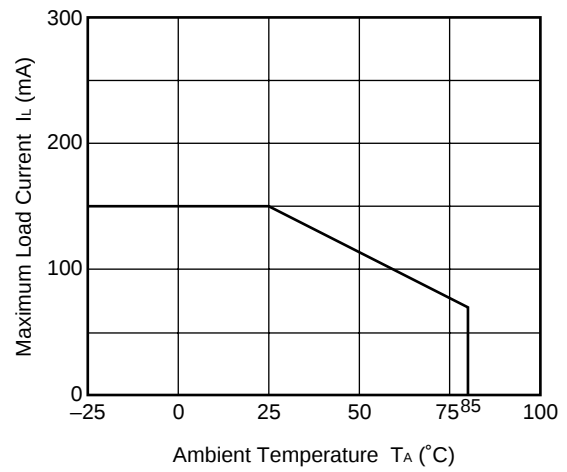


★ TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise specified)

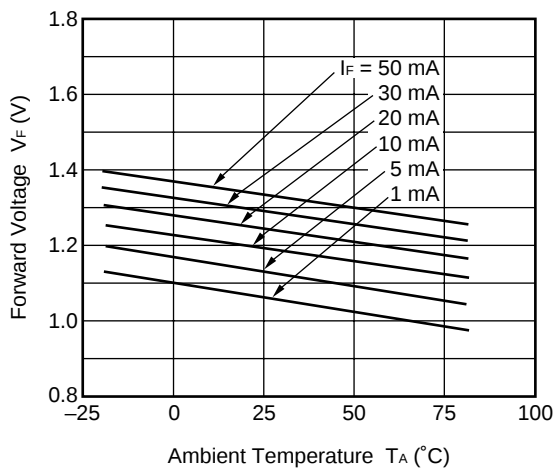
MAXIMUM FORWARD CURRENT vs. AMBIENT TEMPERATURE



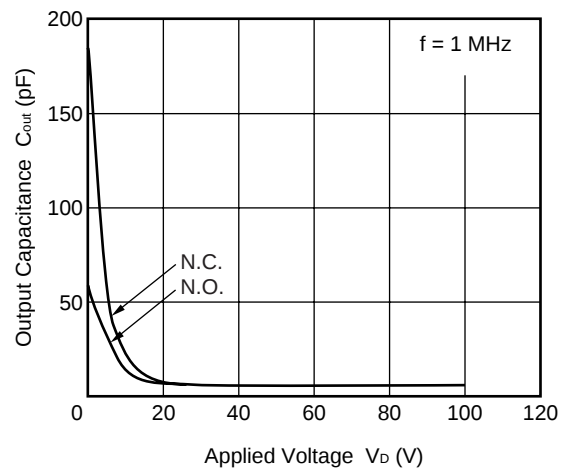
MAXIMUM LOAD CURRENT vs. AMBIENT TEMPERATURE



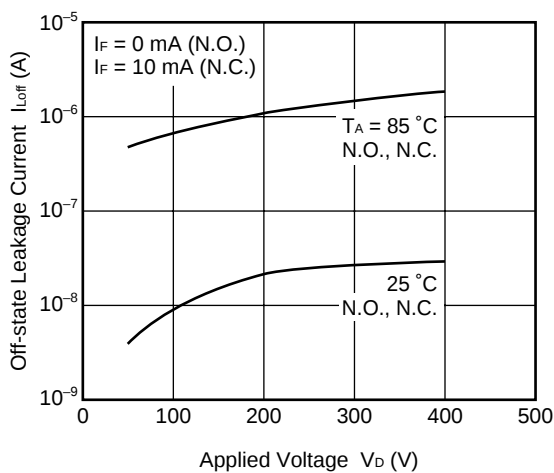
FORWARD VOLTAGE vs. AMBIENT TEMPERATURE



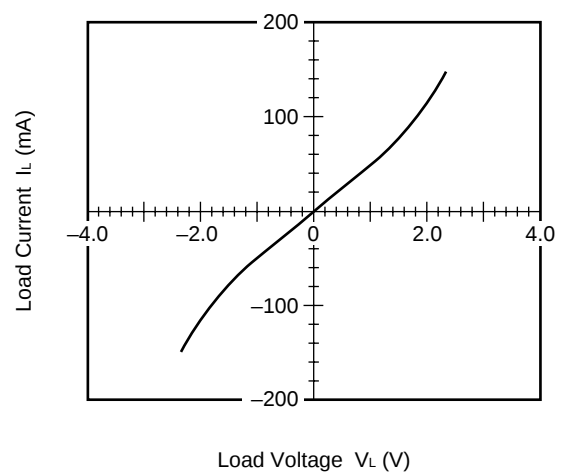
OUTPUT CAPACITANCE vs. APPLIED VOLTAGE



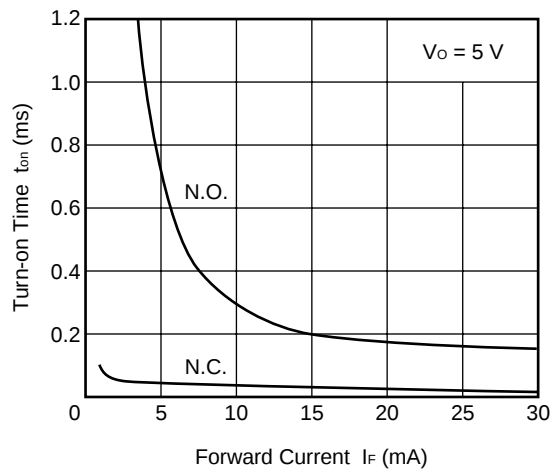
OFF-STATE LEAKAGE CURRENT vs. APPLIED VOLTAGE



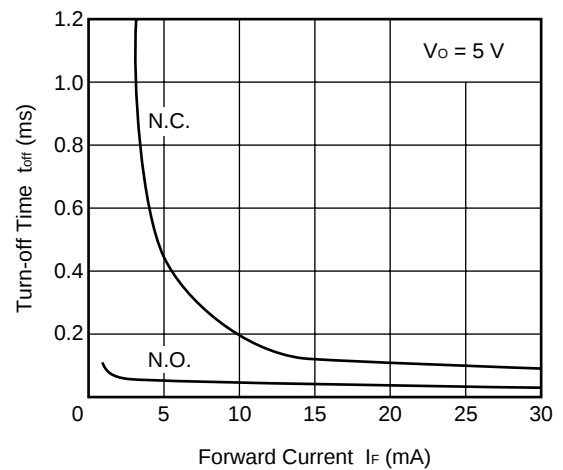
LOAD CURRENT vs. LOAD VOLTAGE



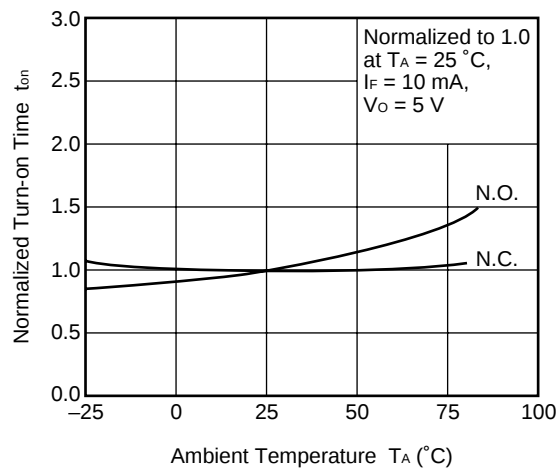
TURN-ON TIME vs. FORWARD CURRENT



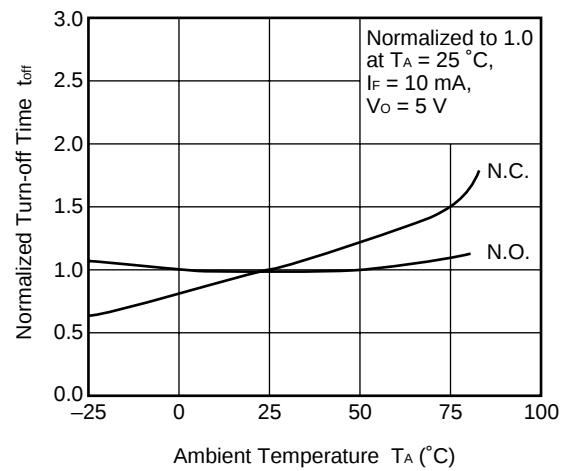
TURN-OFF TIME vs. FORWARD CURRENT



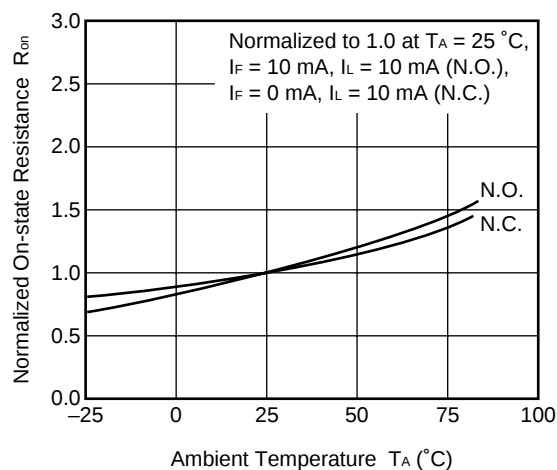
NORMALIZED TURN-ON TIME vs. AMBIENT TEMPERATURE



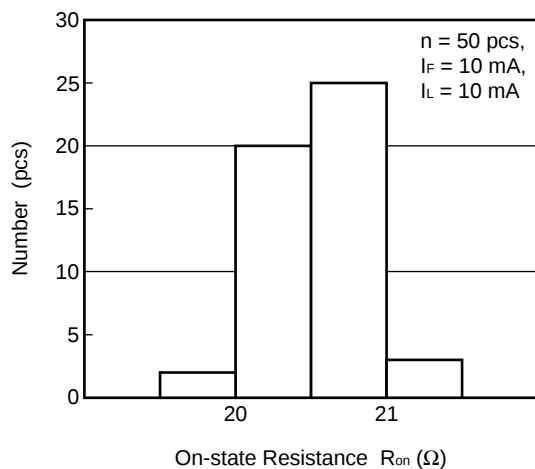
NORMALIZED TURN-OFF TIME vs. AMBIENT TEMPERATURE



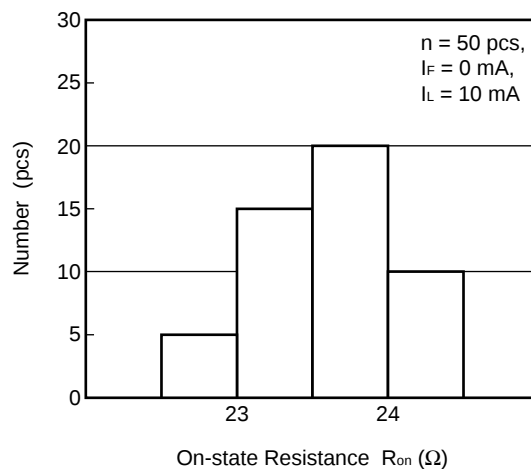
NORMALIZED ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE



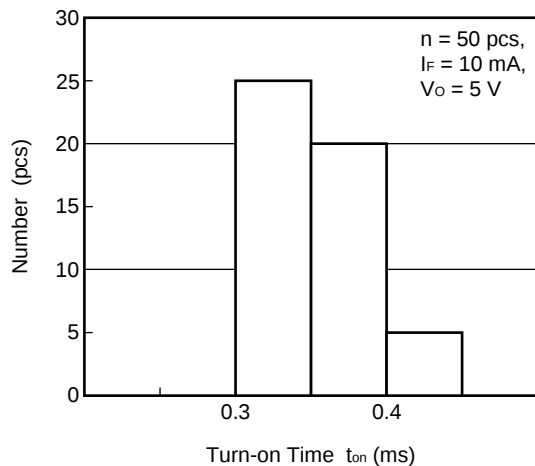
ON-STATE RESISTANCE (N.O.)
DISTRIBUTION



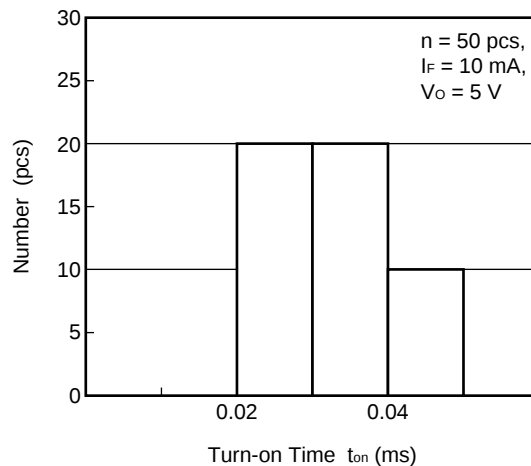
ON-STATE RESISTANCE (N.C.)
DISTRIBUTION



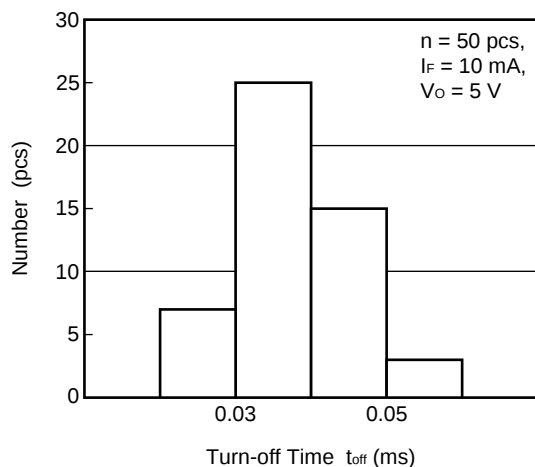
TURN-ON TIME (N.O.) DISTRIBUTION



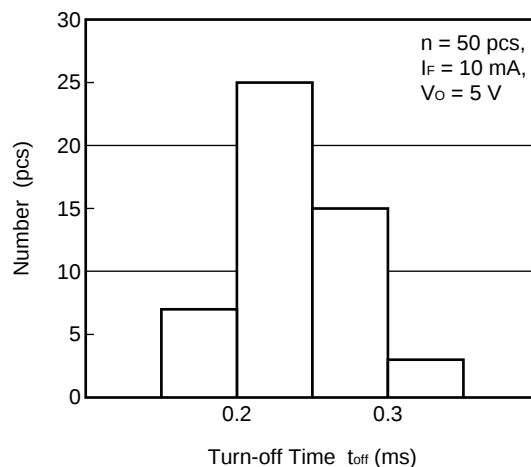
TURN-ON TIME (N.C.) DISTRIBUTION



TURN-OFF TIME (N.O.) DISTRIBUTION



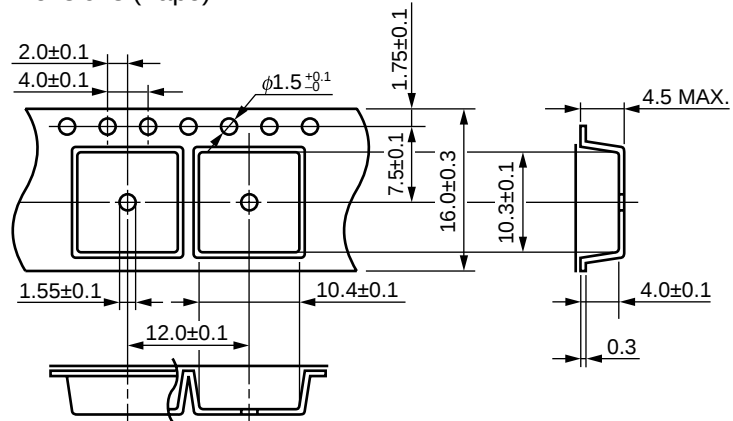
TURN-OFF TIME (N.C.) DISTRIBUTION



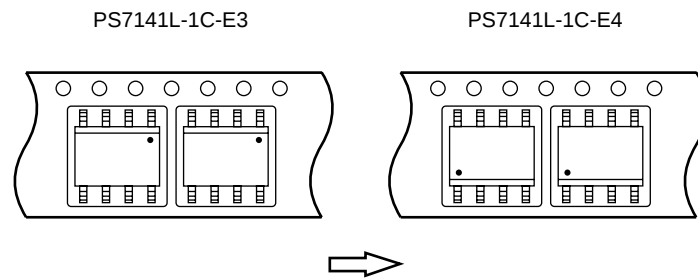
Remark The graphs indicate nominal characteristics.

★ TAPING SPECIFICATIONS (in millimeters)

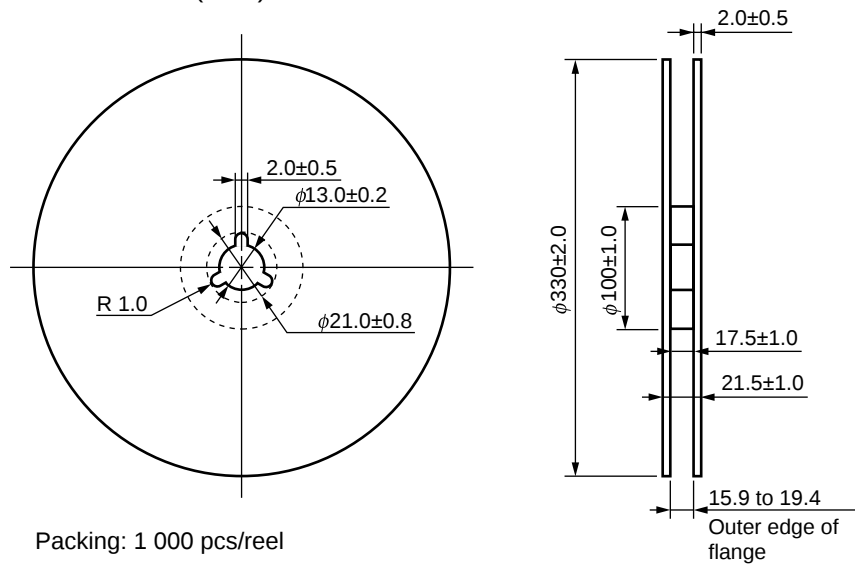
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)

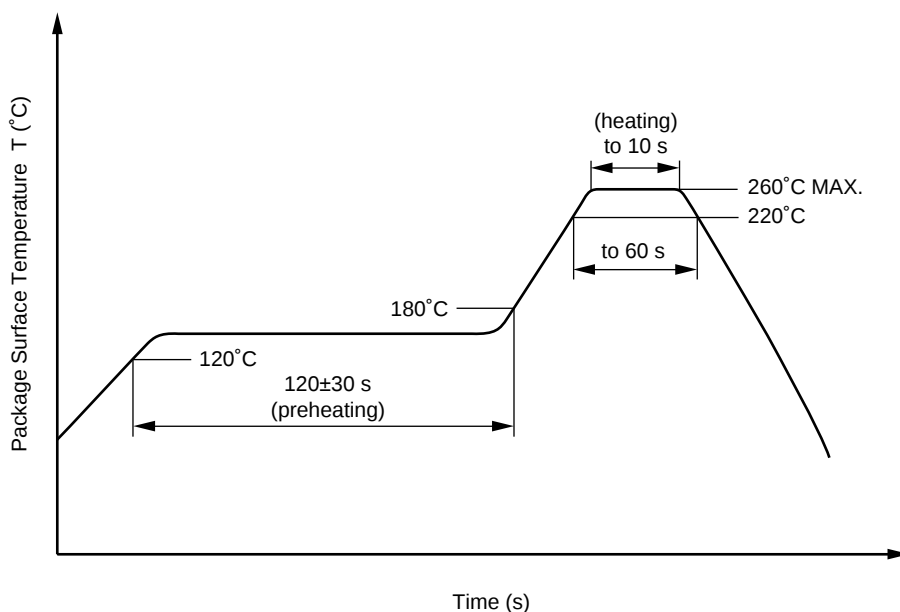


★ **RECOMMENDED SOLDERING CONDITIONS**

(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.
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►For further information, please contact

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