

NEC

Solid State Relay
OCMOS FET

PS7142-1C, PS7142L-1C

**8-PIN DIP, 400 V BREAK DOWN VOLTAGE, TRANSFER TYPE
2-ch Optical Coupled MOS FET**

DESCRIPTION

The PS7142-1C and PS7142L-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 PS7142L-1C has a surface mount type lead.

FEATURES

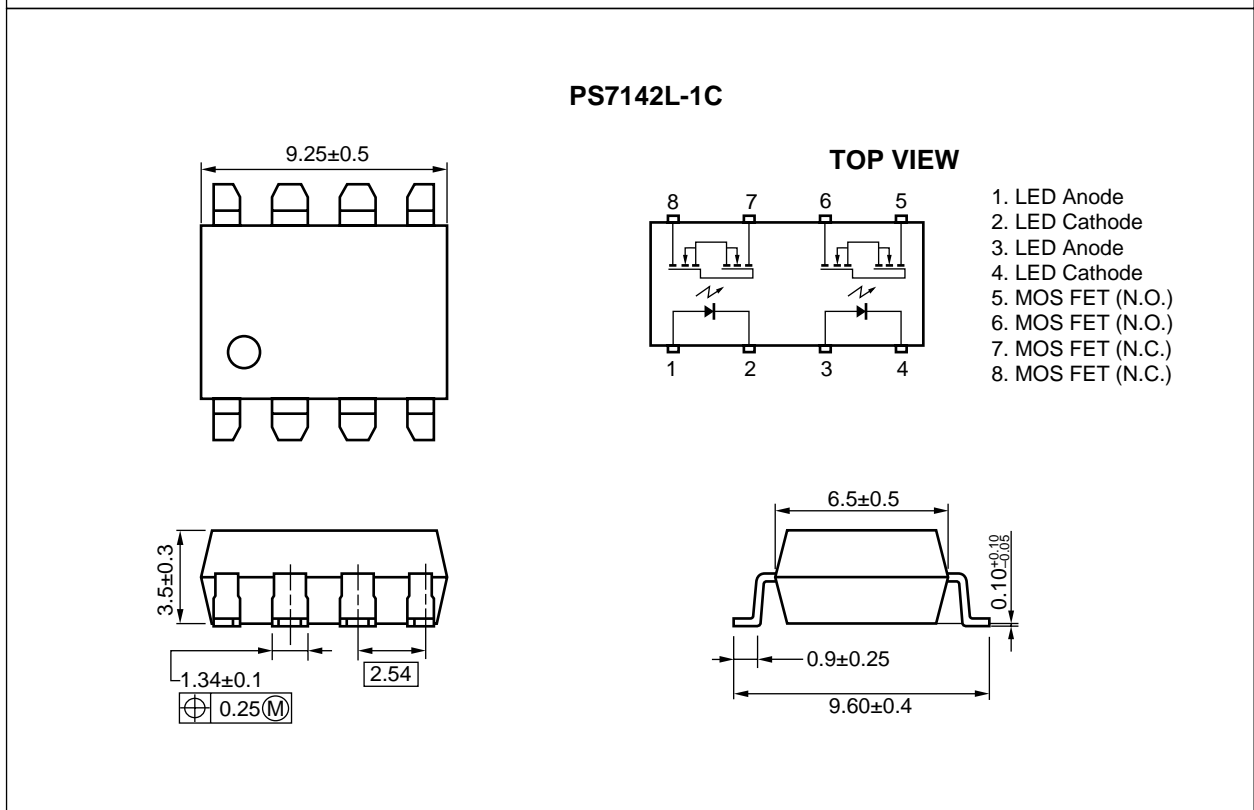
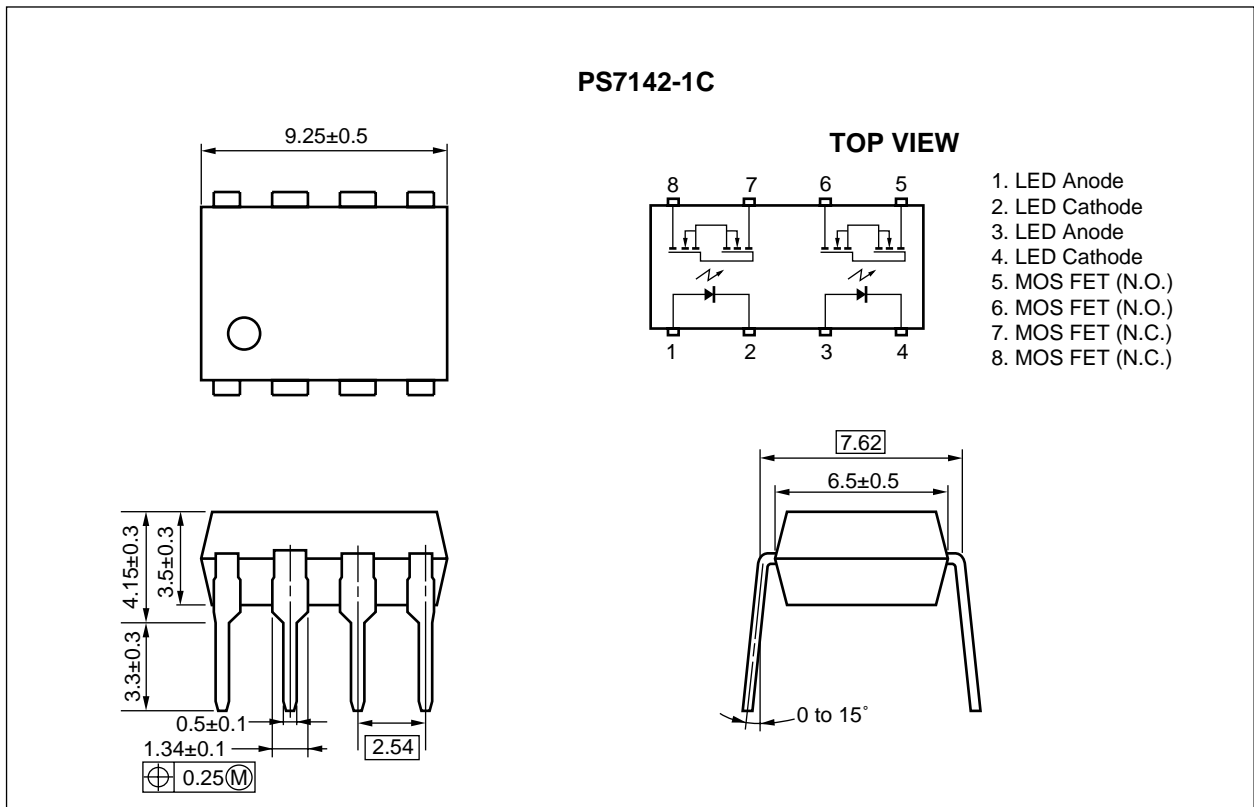
- 2 channel type (1 a + 1 b output)
- Low LED operating current ($I_f = 2 \text{ mA}$)
- Designed for AC/DC switching line changer
- Small package (8-pin DIP)
- Low offset voltage
- PS7142L-1C: Surface mount type

APPLICATIONS

- Exchange equipment
- Measurement equipment
- FA/OA equipment

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Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

PACKAGE DIMENSIONS (in millimeters)



ORDERING INFORMATION

Part Number	Package	Packing Style	Application Part Number ^{*1}
PS7142-1C	8-pin DIP	Magazine case 50 pcs	PS7142-1C
PS7142L-1C			PS7142L-1C
PS7142L-1C-E3		Embossed Tape 1 000 pcs/reel	
PS7142L-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	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 +80	°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)

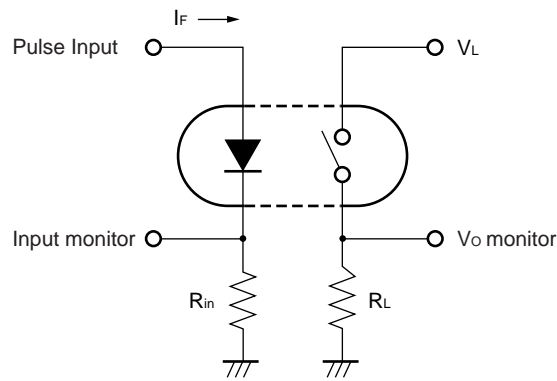
Parameter	Symbol	MIN.	TYP.	MAX.	Unit
LED Operating Current	I _F	2	10	20	mA
LED Off Voltage	V _F	0		0.5	V

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

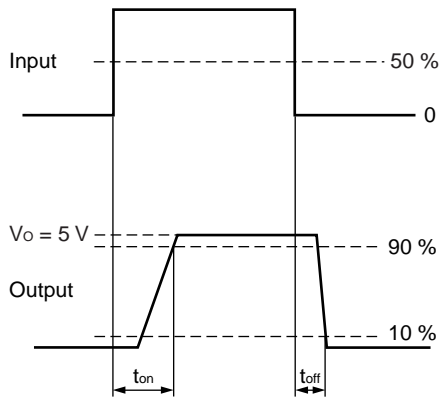
Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit	
Diode	Forward Voltage	V _F	I _F = 10 mA		1.2	1.4	V	
	Reverse Current	I _R	V _R = 5 V			5.0	μA	
MOS FET	Off-state Leakage Current	I _{Loff}	N.O. : I _F = 0 mA, V _D = 400 V		0.03	1.0	μA	
			N.C. : I _F = 10 mA, V _D = 400 V					
	Output Capacitance	C _{out}	N.O. : V _D = 0 V, f = 1 MHz		140		pF/ch	
			N.C. : V _D = 0 V, f = 1 MHz, I _F = 10 mA		430			
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		
	On-state Resistance	R _{on1}	N.O. : I _F = 10 mA, I _L = 10 mA		8	12	Ω	
			N.C. : I _F = 0 mA, I _L = 10 mA		7	12		
		R _{on2}	N.O. : I _F = 10 mA, I _L = 200 mA, t ≤ 10 ms		7	10		
			N.C. : I _F = 0 mA, I _L = 200 mA, t ≤ 10 ms		7	10		
	Turn-on Time ^{*1}	t _{on} (N.O.)	I _F = 10 mA, V _O = 5 V, PW ≥ 10 ms		0.3	2.0	ms	
				t _{on} (N.C.)		0.03		0.2
		Turn-off Time ^{*1}		t _{off} (N.O.)		0.03		0.2
				t _{off} (N.C.)		0.6		2.0
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		

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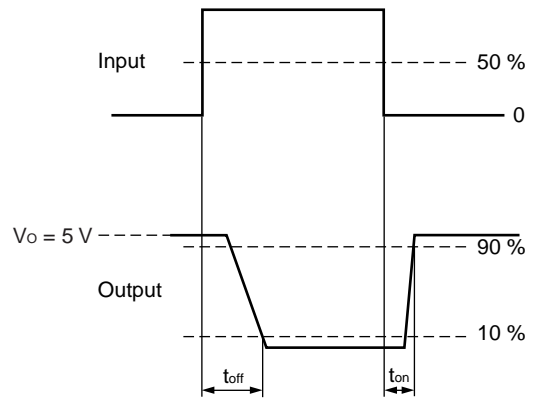
*1 Test Circuit for Switching Time



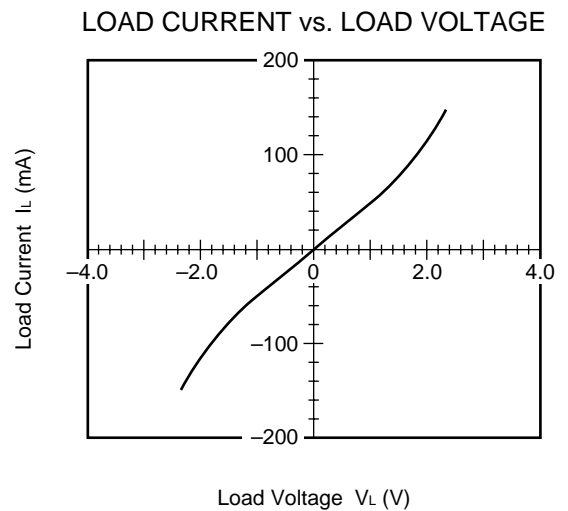
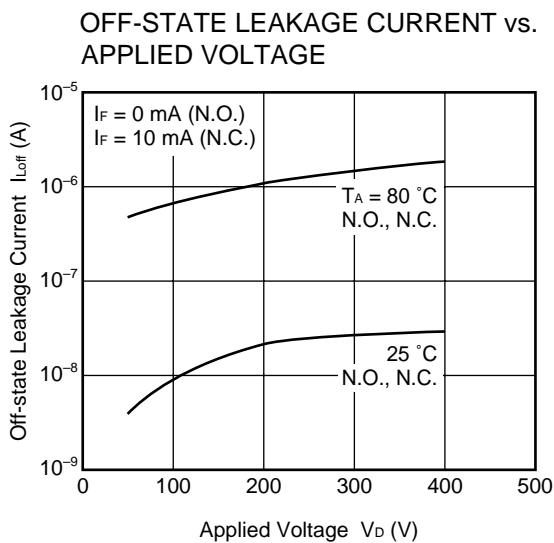
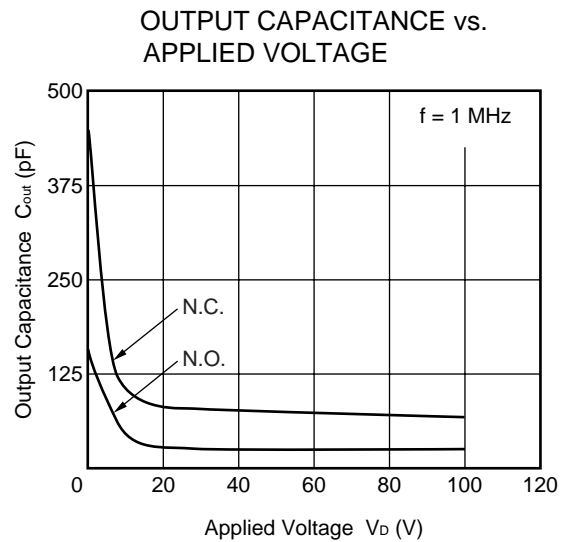
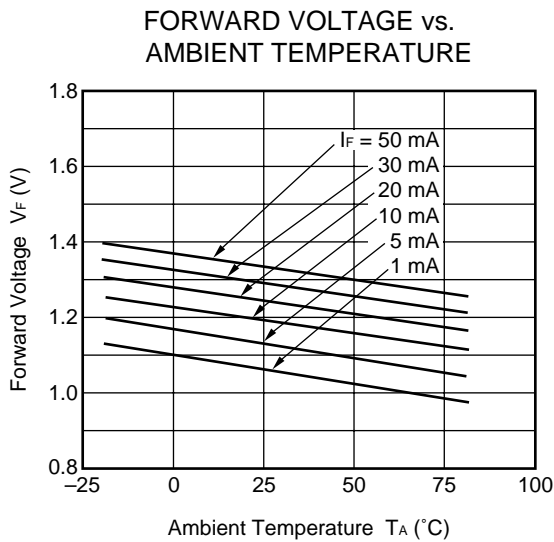
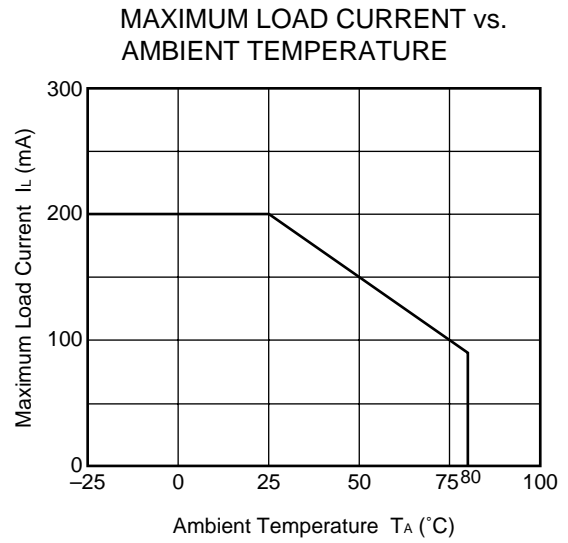
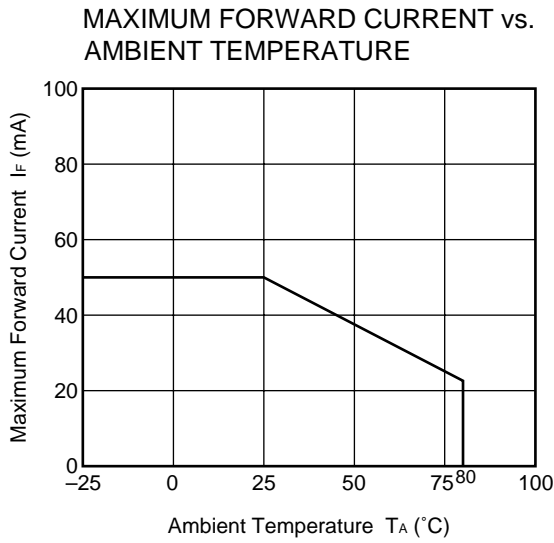
N.O. (between pin 5 and 6)



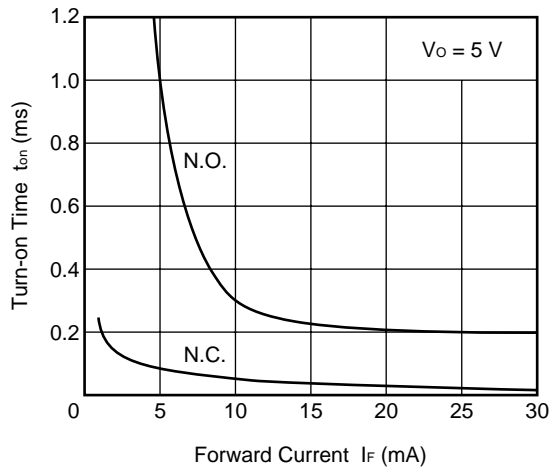
N.C. (between pin 7 and 8)



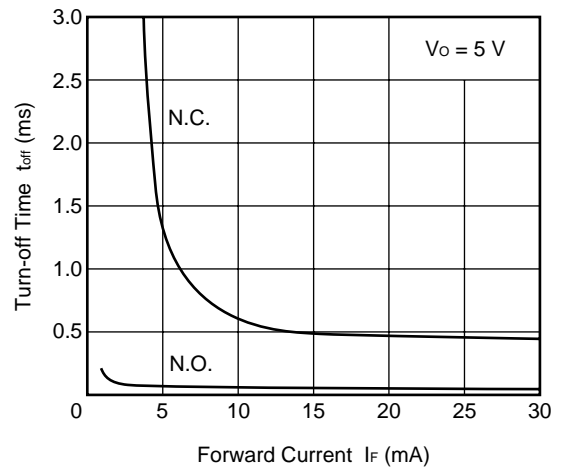
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise specified)



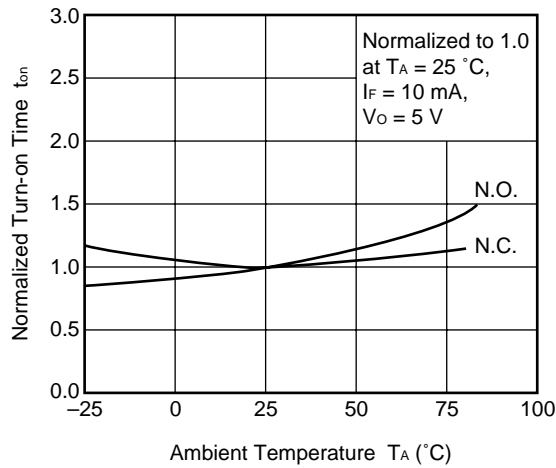
TURN-ON TIME vs. FORWARD CURRENT



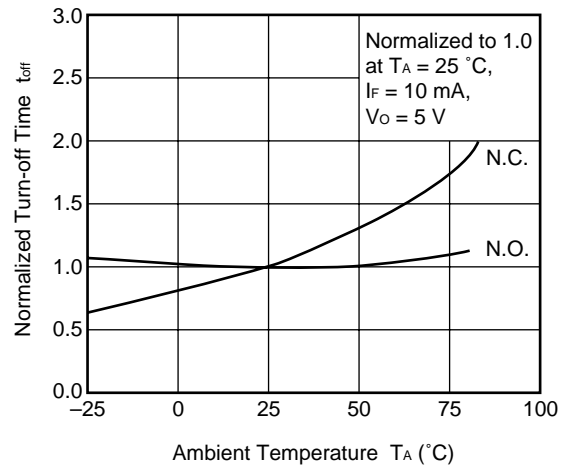
TURN-OFF TIME vs. FORWARD CURRENT



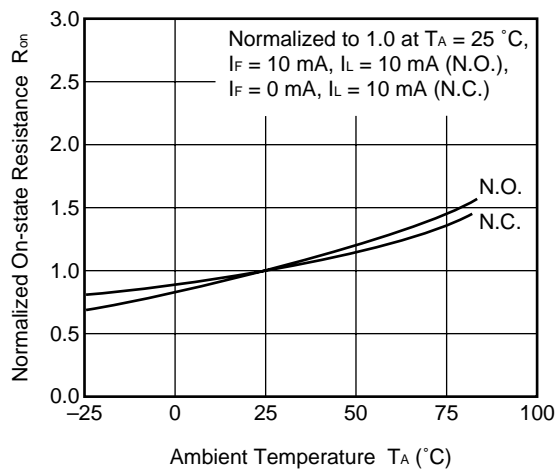
NORMALIZED TURN-ON TIME vs. AMBIENT TEMPERATURE



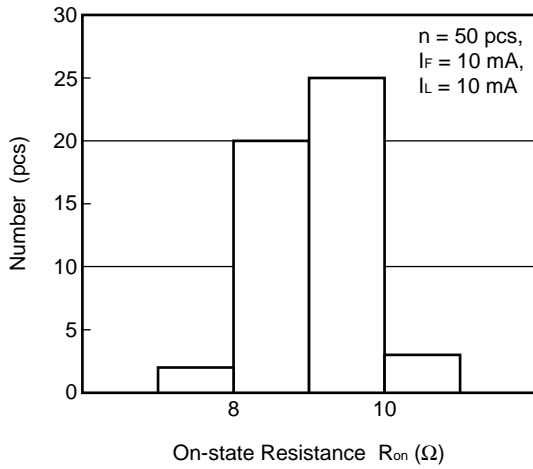
NORMALIZED TURN-OFF TIME vs. AMBIENT TEMPERATURE



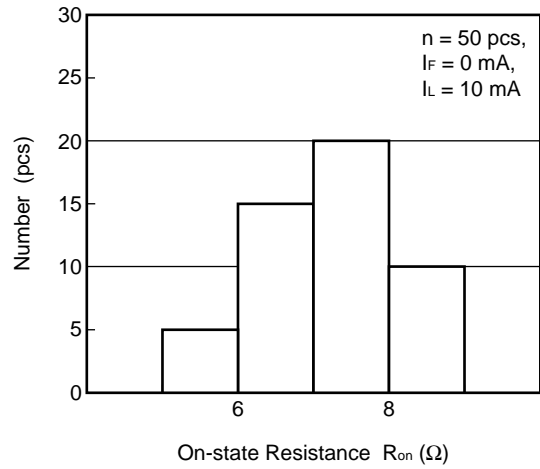
NORMALIZED ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE



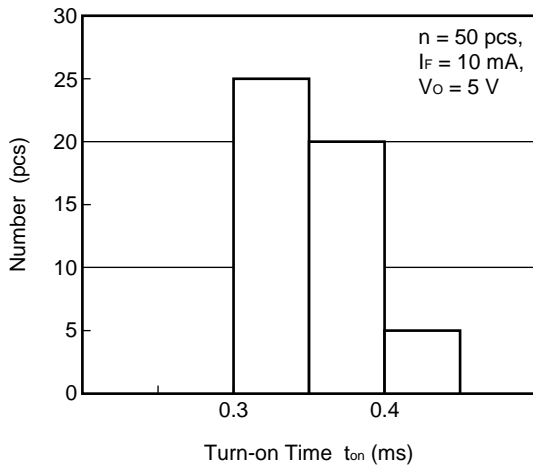
ON-STATE RESISTANCE (N.O.) DISTRIBUTION



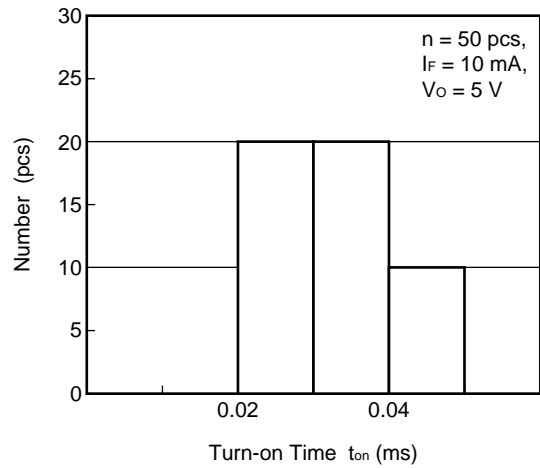
ON-STATE RESISTANCE (N.C.) DISTRIBUTION



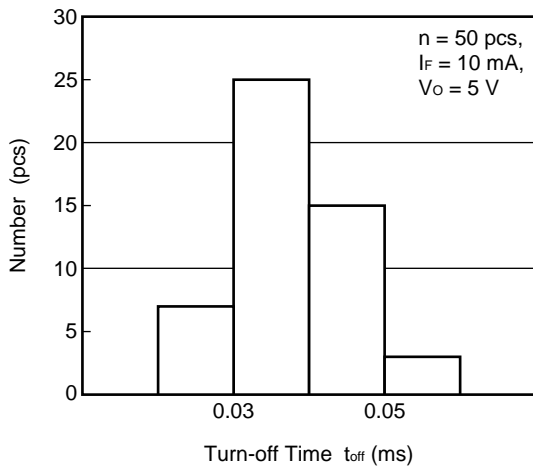
TURN-ON TIME (N.O.) DISTRIBUTION



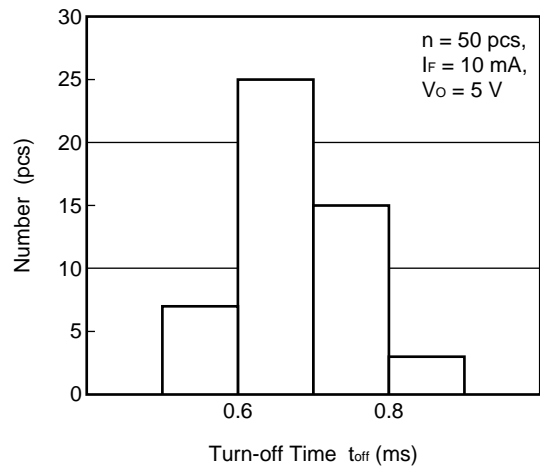
TURN-ON TIME (N.C.) DISTRIBUTION



TURN-OFF TIME (N.O.) DISTRIBUTION



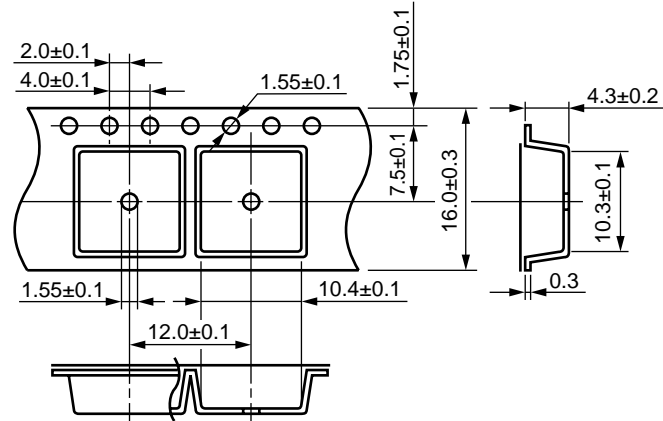
TURN-OFF TIME (N.C.) DISTRIBUTION



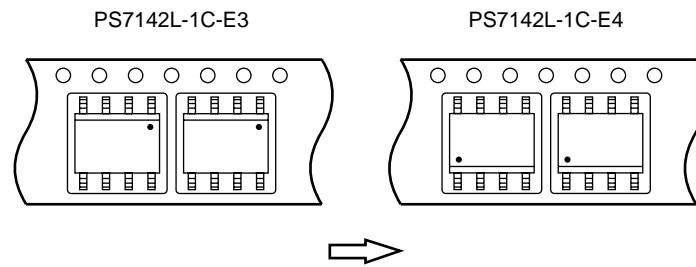
Remark The graphs indicate nominal characteristics.

TAPING SPECIFICATIONS (in millimeters)

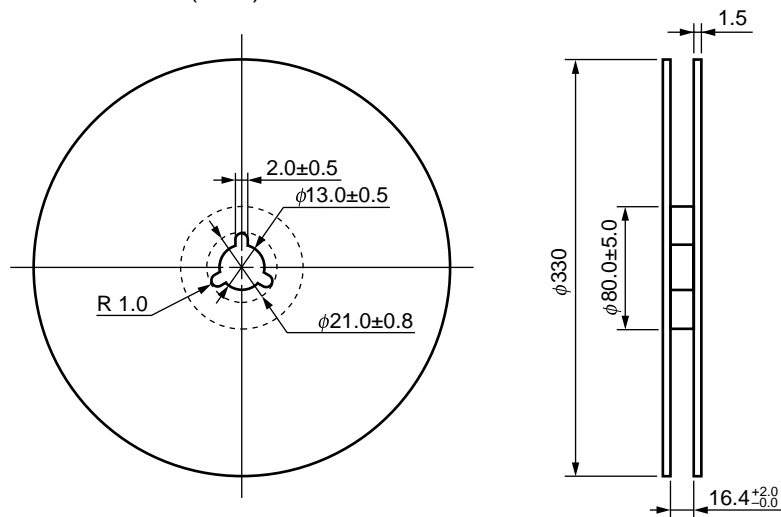
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



Packing: 1 000 pcs/reel

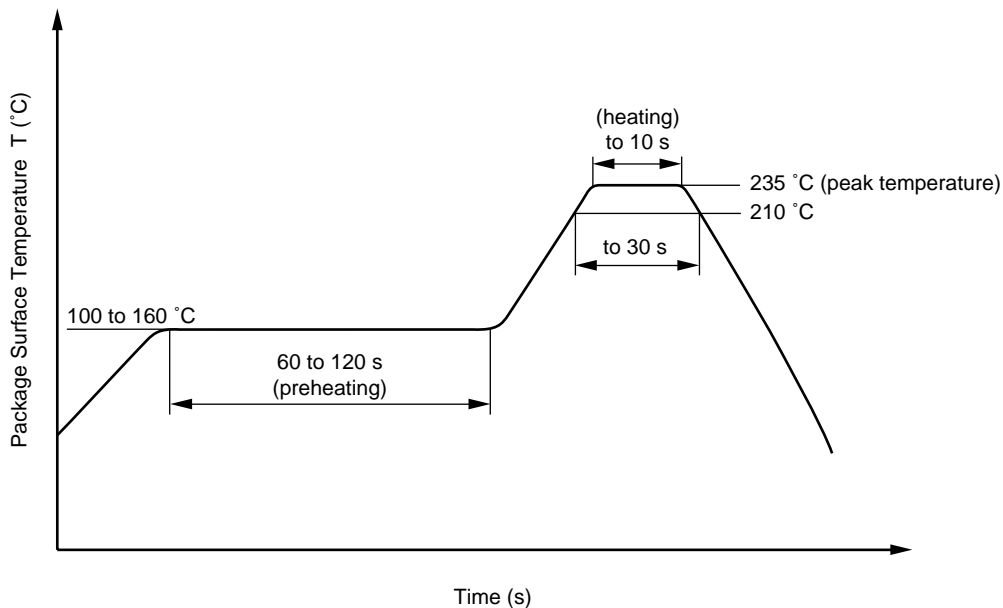
RECOMMENDED SOLDERING CONDITIONS

(1) Infrared reflow soldering

- Peak reflow temperature 235 °C (package surface temperature)
- Time of temperature higher than 210 °C 30 seconds or less
- Number of reflows Two
- 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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Recommended Temperature Profile of Infrared Reflow



(2) Dip soldering

- Temperature 260 °C or below (molten solder temperature)
- Time 10 seconds or less
- 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.

[MEMO]

CAUTION

Within this device there exists GaAs (Gallium Arsenide) material which is a harmful substance if ingested. Please do not under any circumstances break the hermetic seal.

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 - Standard: Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots
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