

**PS7142-1A, PS7142L-1A****6-PIN DIP, 400 V BREAK DOWN VOLTAGE  
1-ch Optical Coupled MOS FET****DESCRIPTION**

The PS7142-1A and PS7142L-1A are solid state relays containing GaAs LEDs on the light emitting side (input side) and MOS FETs on the output side.

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

The PS7142L-1A has a surface mount type lead.

**★ FEATURES**

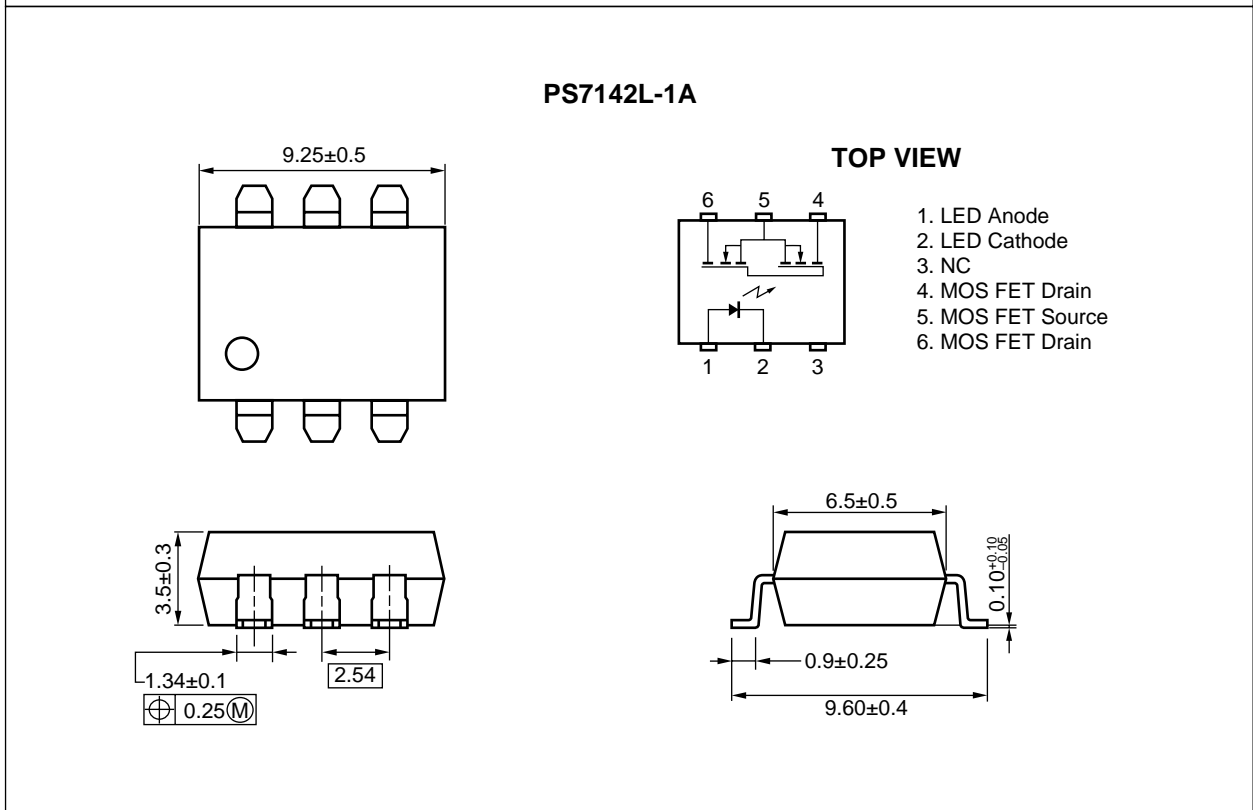
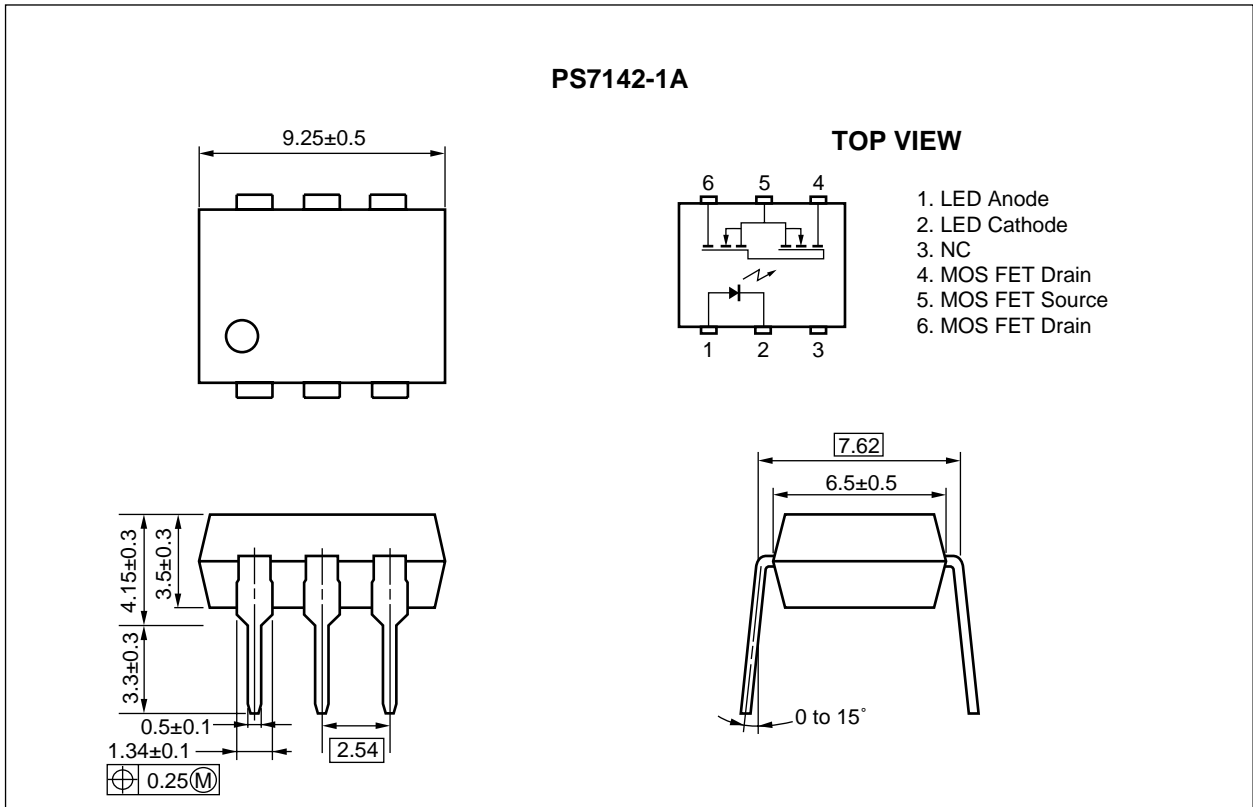
- 1 channel type (1 a output)
- Low LED operating current ( $I_f = 2 \text{ mA}$ )
- Designed for AC/DC switching line changer
- Small package (6-pin DIP)
- Low offset voltage
- PS7142L-1A: Surface mount type
- UL approved: File No. E72422 (S)
- BSI approved: No. 8245/8246
- CSA approved: No. CA 101391

**APPLICATIONS**

- Exchange equipment
- Measurement equipment
- FA/OA equipment

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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 <sup>*1</sup>
PS7142-1A	6-pin DIP	Magazine case 50 pcs	PS7142-1A
PS7142L-1A			PS7142L-1A
PS7142L-1A-E3		Embossed Tape 1 000 pcs/reel	
PS7142L-1A-E4			

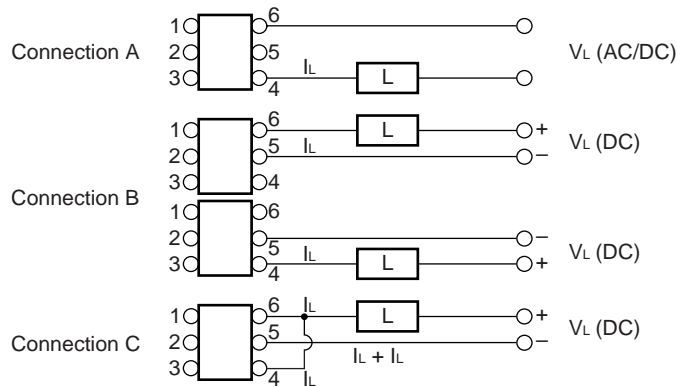
\*1 For the application of the Safety Standard, following part number should be used.

**ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25 °C, unless otherwise specified)**

Parameter		Symbol	Ratings	Unit	
Diode	Forward Current (DC)	I <sub>F</sub>	50	mA	
	Reverse Voltage	V <sub>R</sub>	5.0	V	
	Power Dissipation	P <sub>D</sub>	50	mW	
	Peak Forward Current <sup>*1</sup>	I <sub>FP</sub>	1	A	
MOS FET	Break Down Voltage	V <sub>L</sub>	400	V	
	Continuous Load Current <sup>*2</sup>	Connection A	I <sub>L</sub>	200	mA
		Connection B		250	
		Connection C		400	
	Pulse Load Current <sup>*3</sup> (AC/DC Connection)	I <sub>LP</sub>	400	mA	
Power Dissipation	P <sub>D</sub>	560	mW		
Isolation Voltage <sup>*4</sup>		BV	1 500	Vr.m.s.	
Total Power Dissipation		P <sub>T</sub>	610	mW	
Operating Ambient Temperature		T <sub>A</sub>	-40 to +80	°C	
Storage Temperature		T <sub>stg</sub>	-40 to +100	°C	

\*1 PW = 100 μs, Duty Cycle = 1 %

\*2 Conditions: I<sub>F</sub> ≥ 2 mA. The following types of load connections are available.



\*3 PW = 100 ms, 1 shot

\*4 AC voltage for 1 minute at T<sub>A</sub> = 25 °C, RH = 60 % between input and output

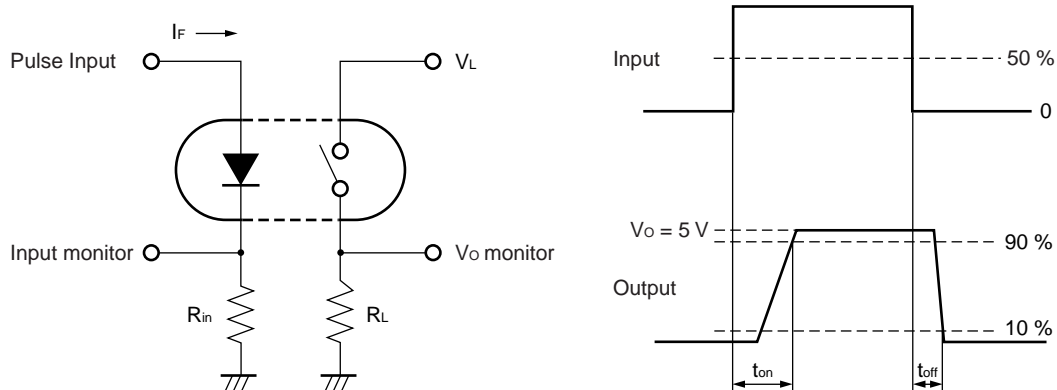
RECOMMENDED OPERATING CONDITIONS (T<sub>A</sub> = 25 °C)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
LED Operating Current	I <sub>F</sub>	2	10	20	mA
LED Off Voltage	V <sub>F</sub>	0		0.5	V

★ ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C)

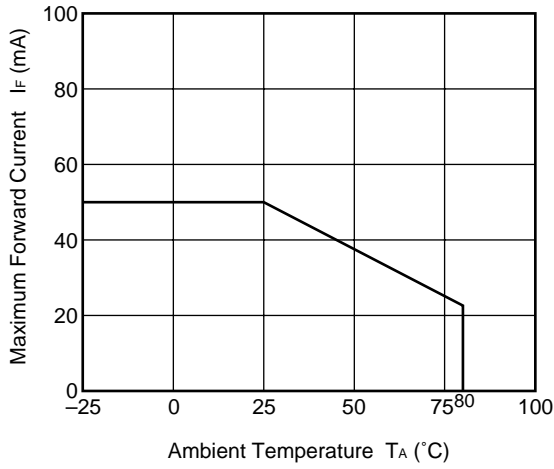
Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V <sub>F</sub>	I <sub>F</sub> = 10 mA		1.2	1.4	V
	Reverse Current	I <sub>R</sub>	V <sub>R</sub> = 5 V			5.0	μA
MOS FET	Off-state Leakage Current	I <sub>Loff</sub>	V <sub>D</sub> = 400 V		0.03	1.0	μA
	Output Capacitance	C <sub>out</sub>	V <sub>D</sub> = 0 V, f = 1 MHz		225		pF
Coupled	LED On-state Current	I <sub>Fon</sub>	I <sub>L</sub> = 200 mA			2.0	mA
	On-state Resistance	R <sub>on1</sub>	I <sub>F</sub> = 10 mA, I <sub>L</sub> = 10 mA		6.0	10	Ω
		R <sub>on2</sub>	I <sub>F</sub> = 10 mA, I <sub>L</sub> = 200 mA, t ≤ 10 ms				
	Turn-on Time *1	t <sub>on</sub>	I <sub>F</sub> = 10 mA, V <sub>O</sub> = 5 V, PW ≥ 10 ms		0.8	5.0	ms
	Turn-off Time *1	t <sub>off</sub>			0.02	0.2	
	Isolation Resistance	R <sub>I-O</sub>	V <sub>I-O</sub> = 1.0 kV <sub>DC</sub>	10 <sup>9</sup>			Ω
Isolation Capacitance	C <sub>I-O</sub>	V = 0 V, f = 1 MHz		1.1		pF	

\*1 Test Circuit for Switching Time

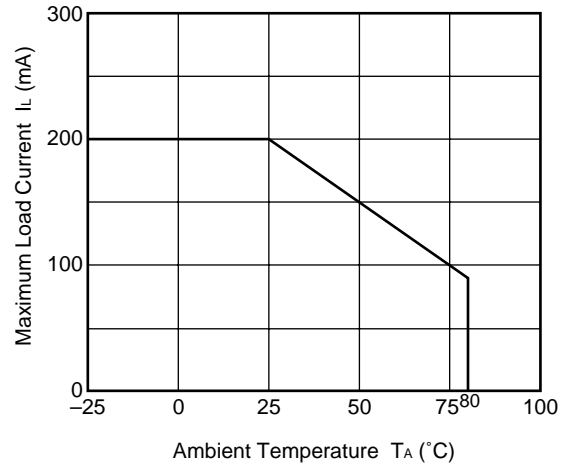


★ TYPICAL CHARACTERISTICS ( $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise specified)

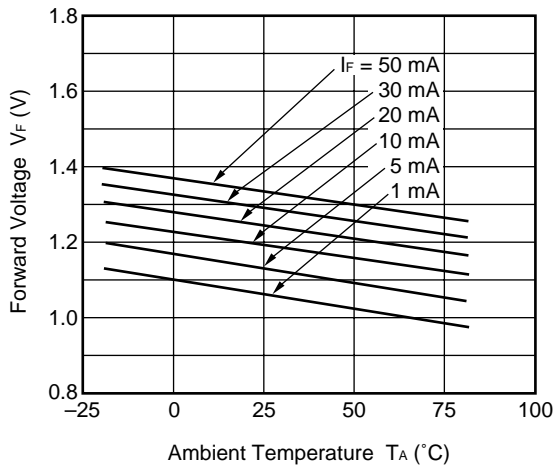
MAXIMUM FORWARD CURRENT vs. AMBIENT TEMPERATURE



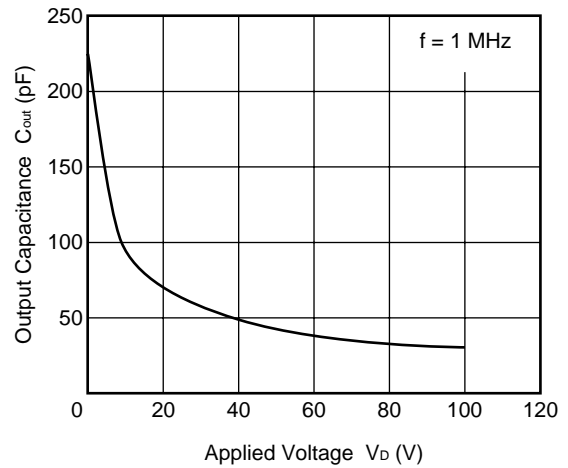
MAXIMUM LOAD CURRENT vs. AMBIENT TEMPERATURE



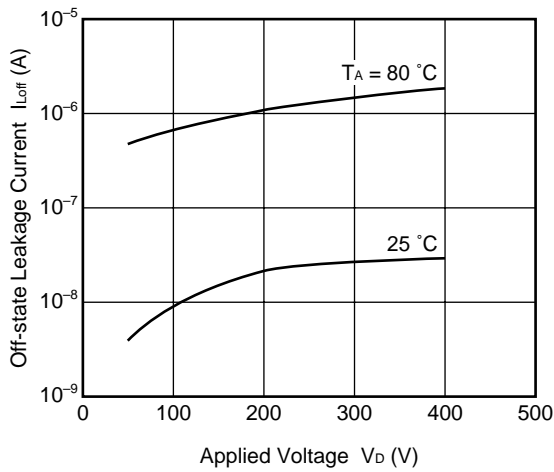
FORWARD VOLTAGE vs. AMBIENT TEMPERATURE



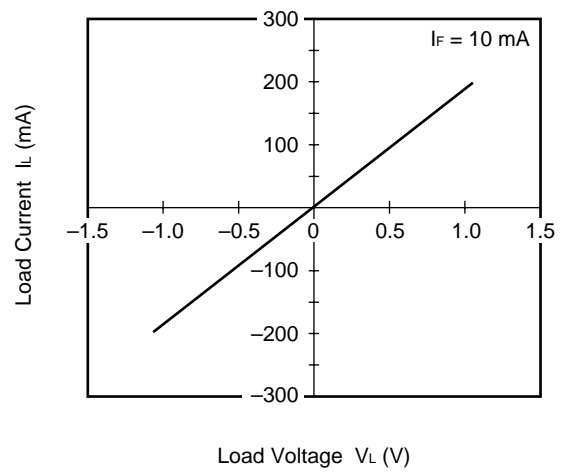
OUTPUT CAPACITANCE vs. APPLIED VOLTAGE



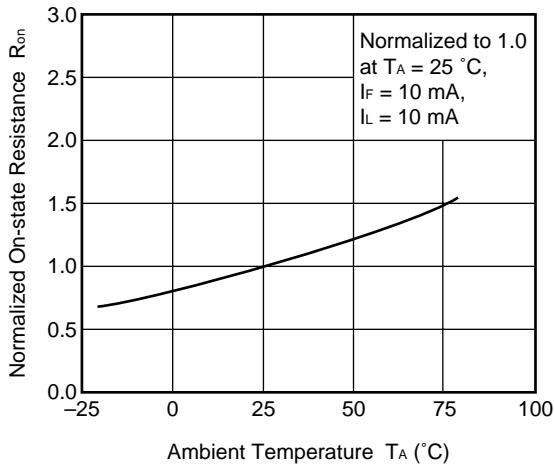
OFF-STATE LEAKAGE CURRENT vs. APPLIED VOLTAGE



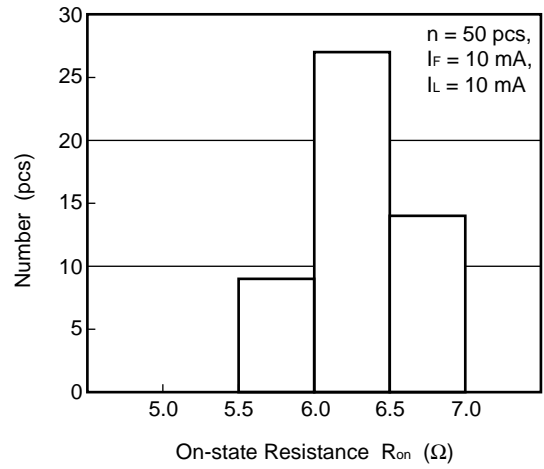
LORD CURRENT vs. LORD VOLTAGE



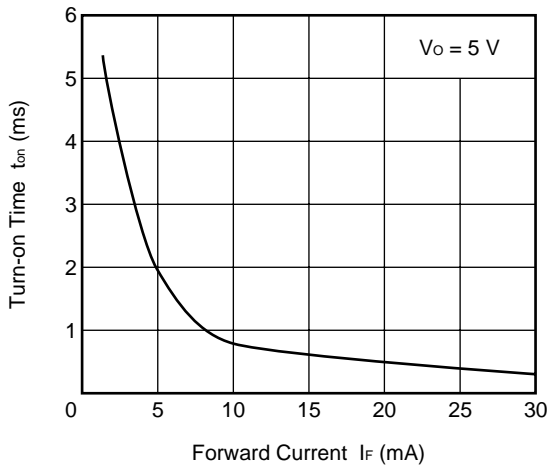
NORMALIZED ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE



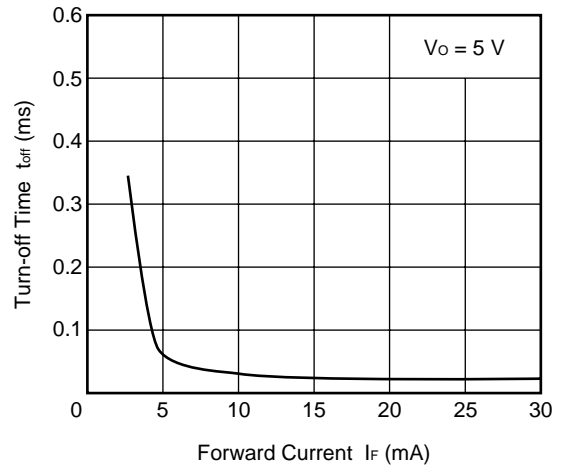
ON-STATE RESISTANCE DISTRIBUTION



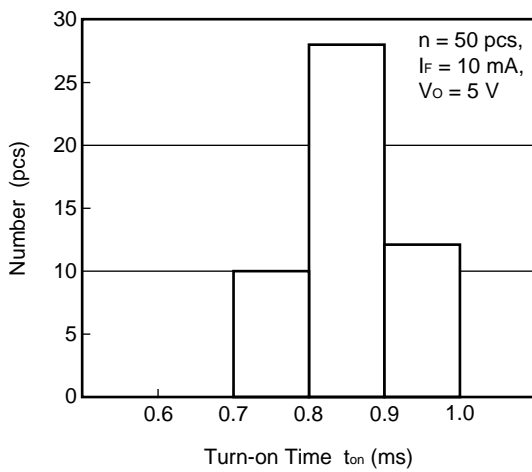
TURN-ON TIME vs. FORWARD CURRENT



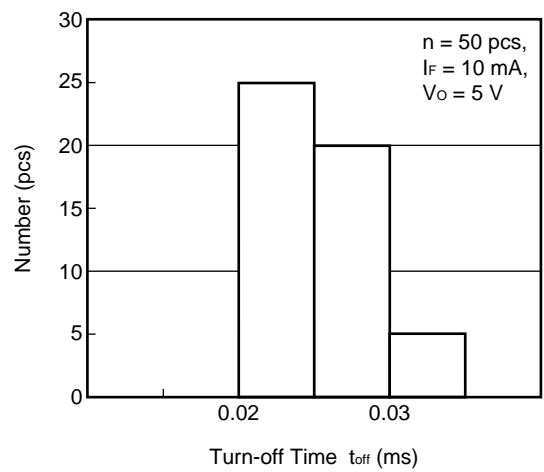
TURN-OFF TIME vs. FORWARD CURRENT



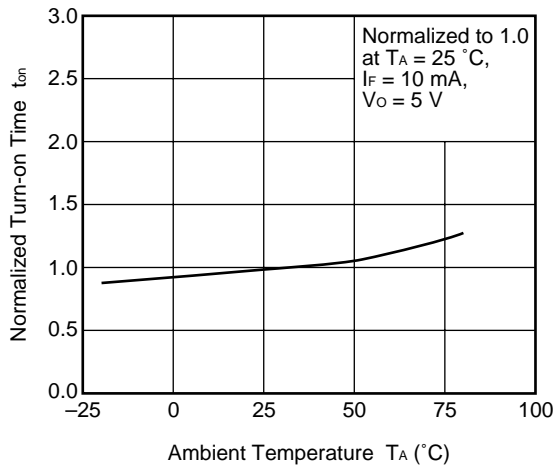
TURN-ON TIME DISTRIBUTION



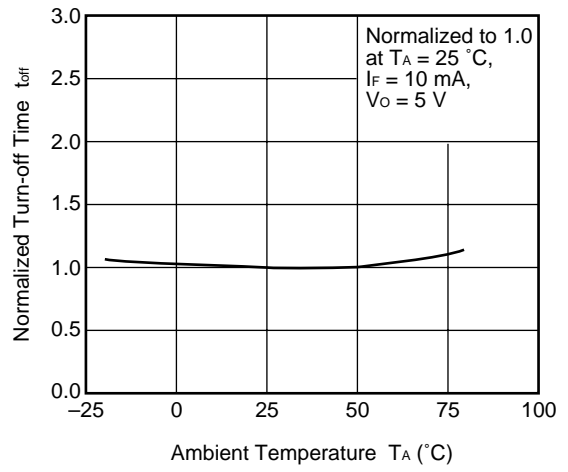
TURN-OFF TIME DISTRIBUTION



NORMALIZED TURN-ON TIME vs. AMBIENT TEMPERATURE



NORMALIZED TURN-OFF TIME vs. AMBIENT TEMPERATURE

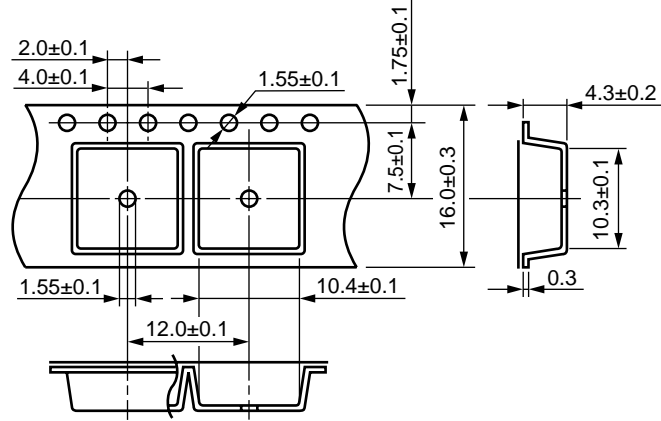


**Remark** The graphs indicate nominal characteristics.

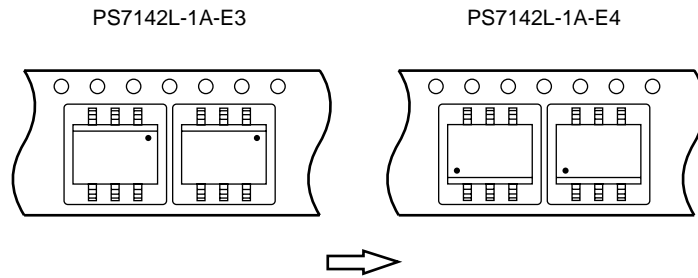


★ TAPING SPECIFICATIONS (in millimeters)

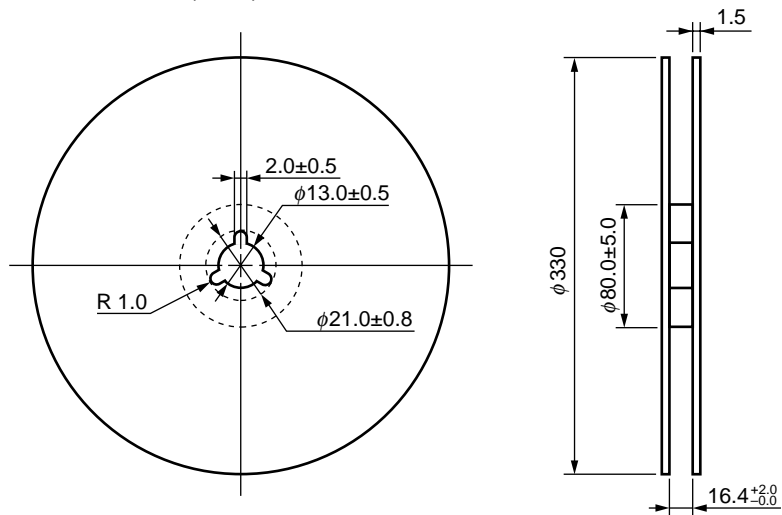
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



Packing: 1 000 pcs/reel

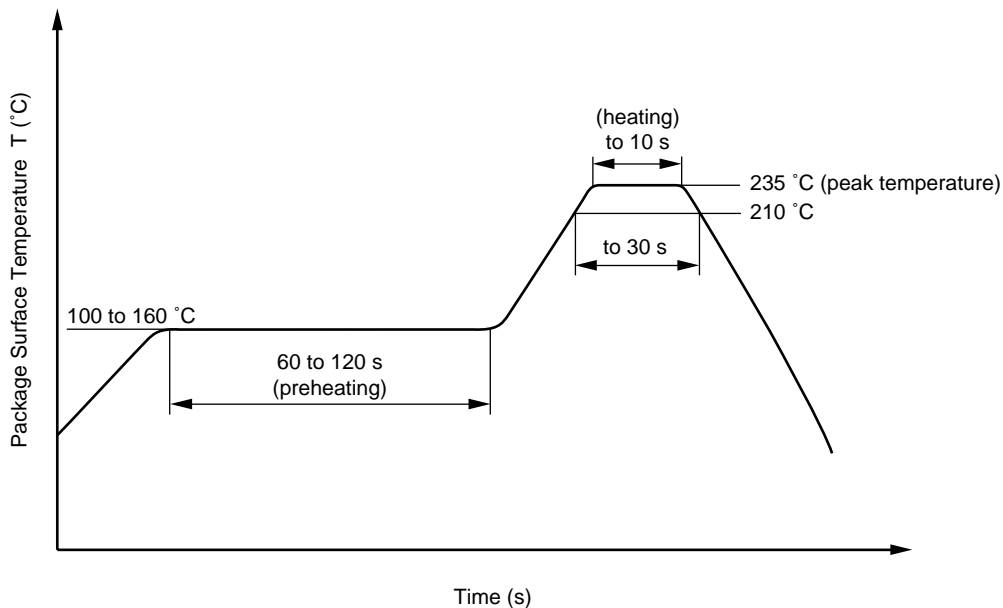
**RECOMMENDED SOLDERING CONDITIONS**

**(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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