

6, 8 PIN DIP 400 V BREAKDOWN NORMALLY CLOSED TYPE 1-CH, 2-CH OPTICAL COUPLED MOSFET

PS7142-1B
PS7142-2B
PS7142L-1B
PS7142L-2B

FEATURES

- **1 CHANNEL TYPE:**
1b output
- **OR 2 CHANNEL TYPE:**
1b + 1b output
- **LOW LED OPERATING CURRENT:**
 $I_F = 2 \text{ mA}$
- **DESIGNED FOR AC/DC SWITCHING LINE CHANGER**
- **SMALL PACKAGE:**
6, 8 Pin DIP
- **LOW OFFSET VOLTAGE**
- **SURFACE MOUNT TYPE LEAD AVAILABLE:**
PS7142L-1B, 2B

DESCRIPTION

PS7142-1B,-2B and PS7142L-1B,-2B are solid state relays containing GaAs LEDs on the light emitting side (input side) and normally closed (N.C.) contact MOSFETs on the output side.

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

APPLICATIONS

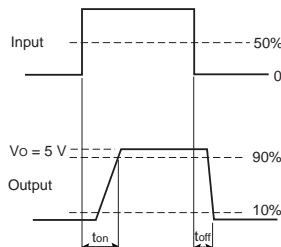
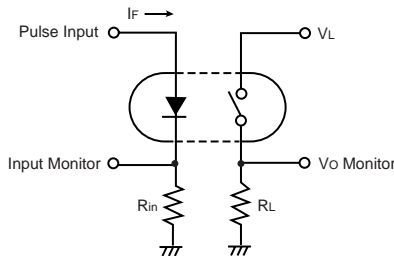
- EXCHANGE EQUIPMENT
- MEASUREMENT EQUIPMENT
- FA/OA EQUIPMENT

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

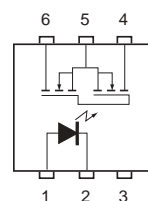
PART NUMBER			PS7142-1B, 2B, PS7142L-1B, 2B			
SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX	
Diode	V _F	Forward Voltage, I _F = 10 mA	V	1.2	1.4	
	I _R	Reverse Current, V _R = 5 V	μA		5.0	
MOSFET	I _{Loff}	Off-State Leakage Current, I _F = 10 mA, V _D = 400 V	μA	0.03	1.0	
	C _{OUT}	Output Capacitance, V _D = 0 V, f = 1 MHz, I _F = 10 mA	PS7142-1B	pF/ch	360	
			PS7142-2B	pF/ch	430	
	I _{Foff}	LED Off-state Current, I _L = 200 mA	mA		2.0	
Coupled	R _{on1}	On-State Resistance,				
		I _F = 0 mA, I _L = 10 mA	Ω	7	12	
	R _{on2}	I _F = 0 mA, I _L = 200 mA, t ≤ 10 ms	Ω	7	10	
	t _{on}	Turn-On Time ¹ , I _F = 10 mA, V _O = 5 V, P _W ≥ 10 ms	ms	0.03	0.2	
	t _{off}	Turn-Off Time ¹ , I _F = 10 mA, V _O = 5 V, P _W ≥ 10 ms	PS7142-1B	ms	1.1	5.0
			PS7142-2B	ms	1.1	2.0
R _{i-o}	Isolation Resistance, V _{in-out} = 1.0 kVDC	Ω	10 ⁹			
C _{i-o}	Isolation Capacitance, V = 0 V, f = 1 MHz	pF/ch		1.1		

Note:

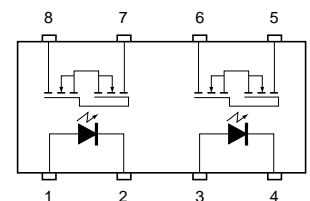
1. Test circuit for Switching Time



PS7142-1B, PS7142L-1B



PS7142-2B, PS7142L-2B



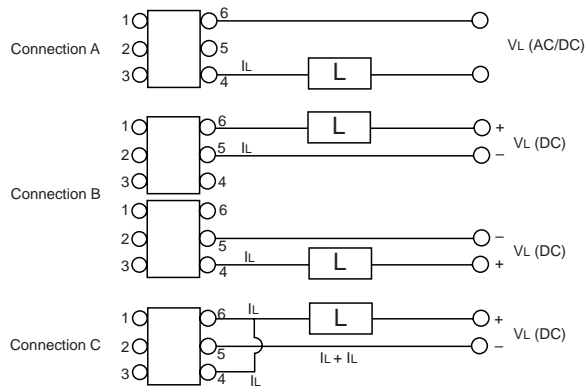
PS7142-1B, -2B, PS7142L-1B, -2B

ABSOLUTE MAXIMUM RATINGS¹ (T_A = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS	
			PS7142-1B PS7142L-1B	PS7142-2B PS7142L-2B
Diode				
V _R	Reverse Voltage	V	5	
I _F	Forward Current (DC)	mA	50	
P _D	Power Dissipation	mW/ch	50	
I _{FP}	Peak Forward Current ²	A	1	
MOSFET				
V _L	Break Down Voltage	V	400	
I _L	Continuous Load Current ³			
	Connection A	mA	200	
	Connection B	mA	250	–
	Connection C	mA	400	–
I _{LP}	Pulse Load Current ⁴ (AC/DC Connection)	mA	400	
P _D	Power Dissipation	mW/ch	560	375
Coupled				
BV	Isolation Voltage ⁵	Vr.m.s.	1500	
P _T	Total Power Dissipation	mW	610	850
T _A	Operating Ambient Temp.	°C	-40 to +80	
T _{STG}	Storage Temperature	°C	-40 to +100	

Notes:

- Operation in excess of any one of these parameters may result in permanent damage.
- PW = 100 μs, Duty Cycle = 1%.
- Conditions: I_F ≥ 2 mA. The following types of load connections are available.



- PW = 100 ms, 1 shot.
- AC voltage for 1 minute at T_A = 25 °C, RH = 60 % between input and output.

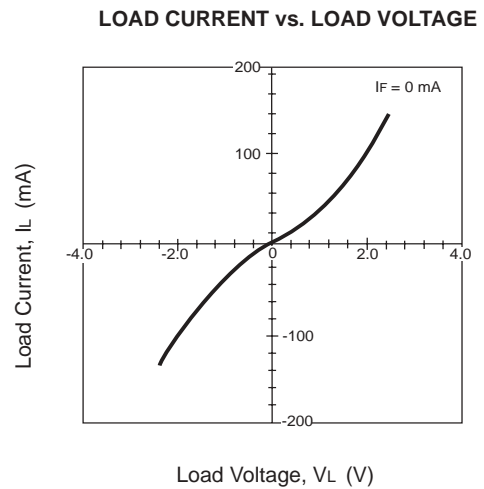
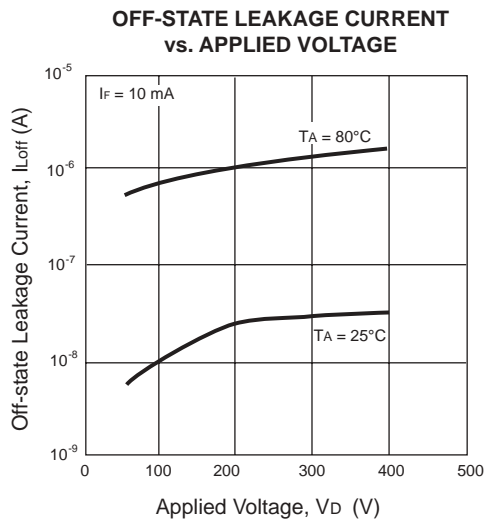
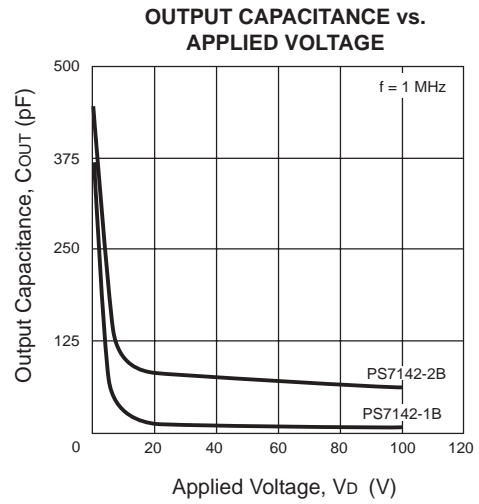
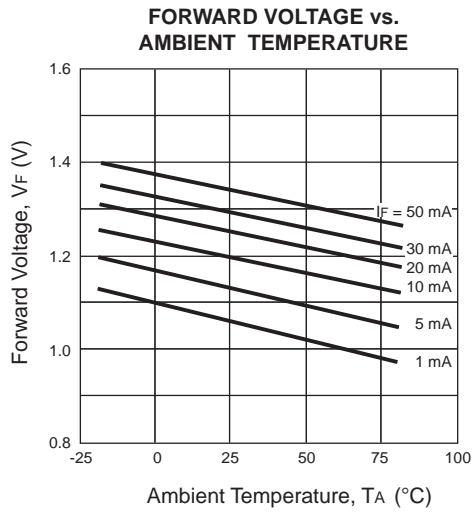
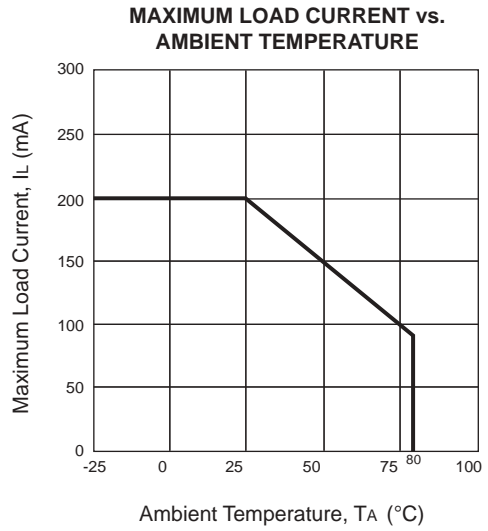
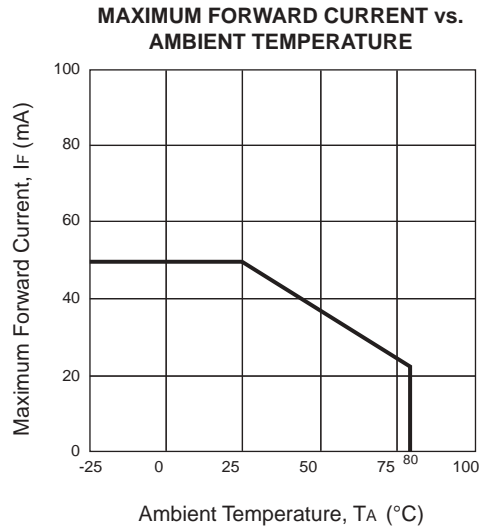
RECOMMENDED OPERATING CONDITIONS (T_A = 25 °C)

SYMBOL	PARAMETER	UNITS	MIN	TYP	MAX
I _F	LED Operating Current	mA	2	10	20
V _F	LED Off Voltage	V	0		0.5

ORDERING INFORMATION

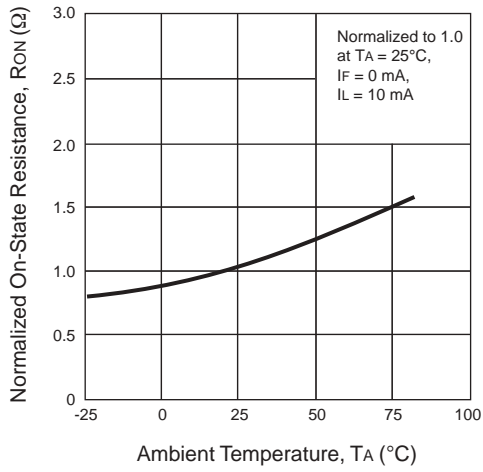
PART NUMBER	PACKAGE	PACKING STYLE
PS7142-1B	6 Pin DIP	Magazine case, 50 pcs
PS7142L-1B		Embossed Tape, 1000 pcs/reel
PS7142L-1B-E3		
PS7142L-1B-E4		
PS7142-2B	8Pin DIP	Magazine case, 50 pcs
PS7142L-2B		Embossed Tape, 1000 pcs/reel
PS7142L-2B-E3		
PS7142L-2B-E4		

TYPICAL PERFORMANCE CURVES ($T_A = 25^\circ\text{C}$)

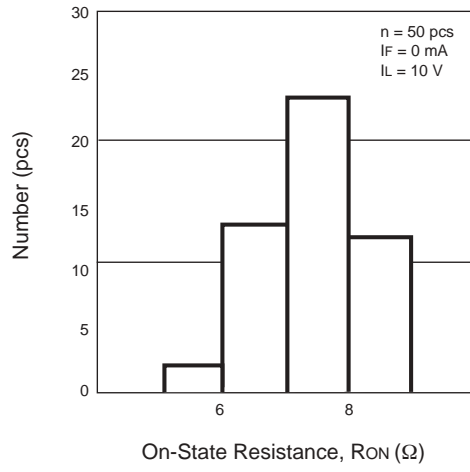


TYPICAL PERFORMANCE CURVES (TA = 25 °C)

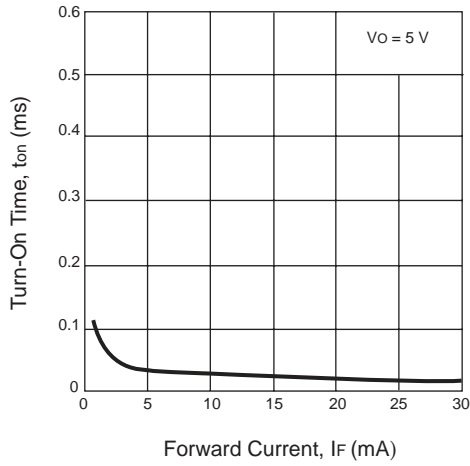
NORMALIZED ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE



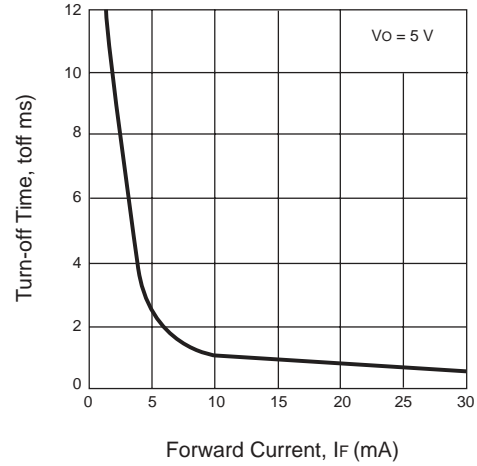
ON-STATE RESISTANCE DISTRIBUTION



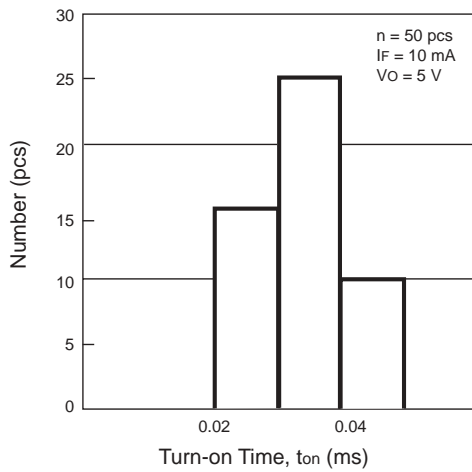
TURN-ON TIME vs. FORWARD CURRENT



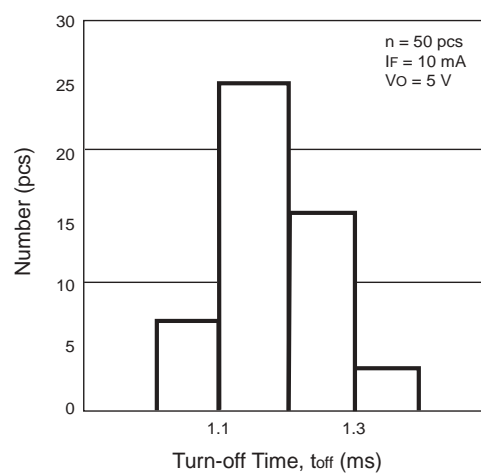
TURN-OFF TIME vs. FORWARD CURRENT



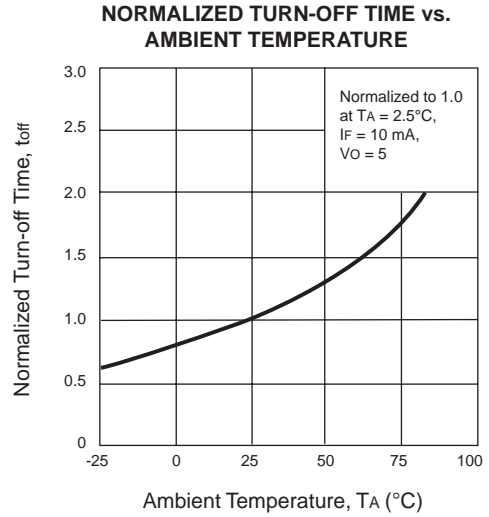
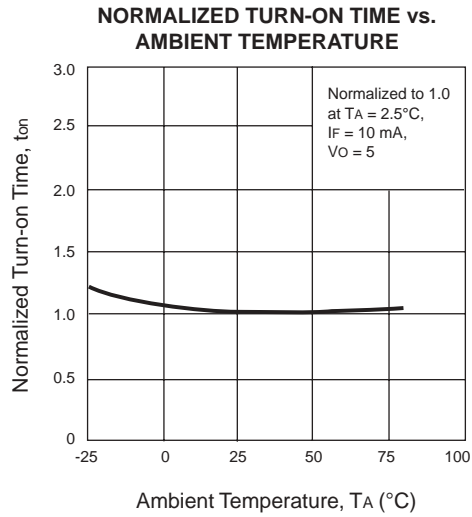
TURN-ON TIME DISTRIBUTION



TURN-OFF TIME DISTRIBUTION

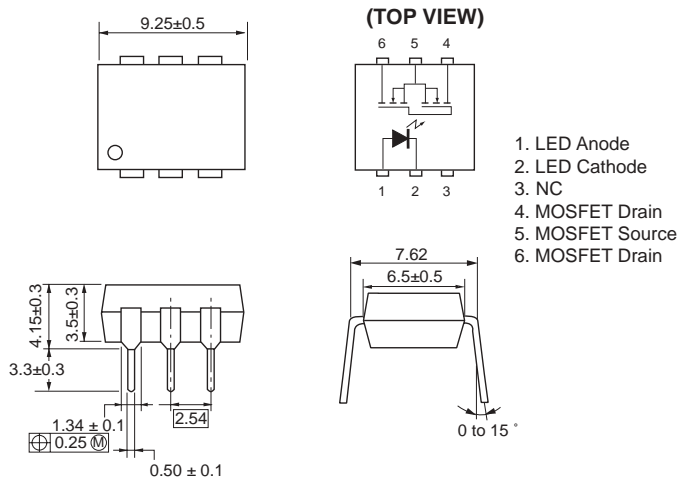


TYPICAL PERFORMANCE CURVES (TA = 25 °C)

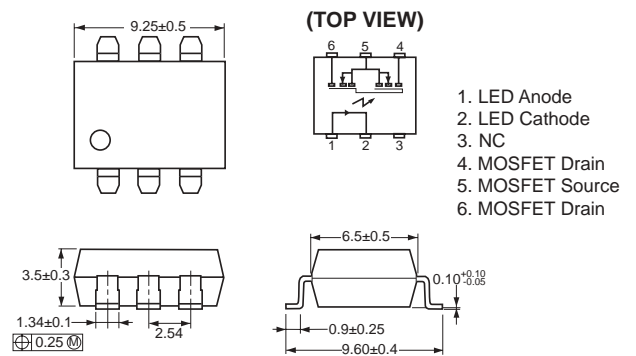


OUTLINE DIMENSIONS (Units in mm)

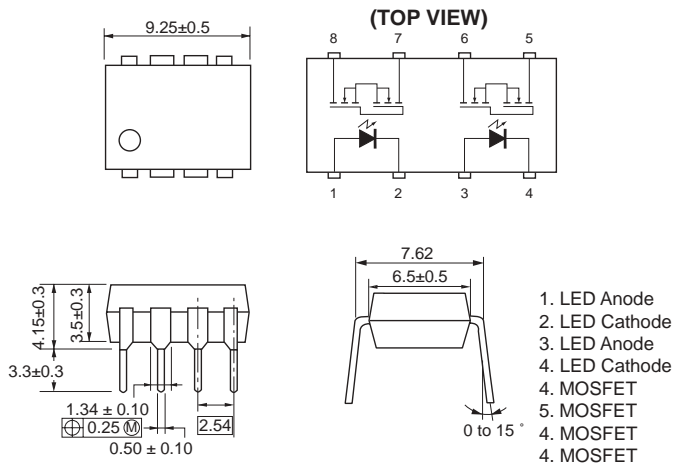
PS7142-1B



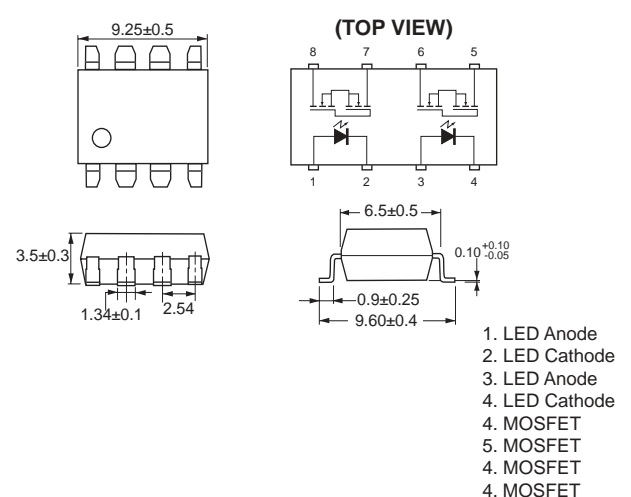
PS7142L-1B



PS7142-2B

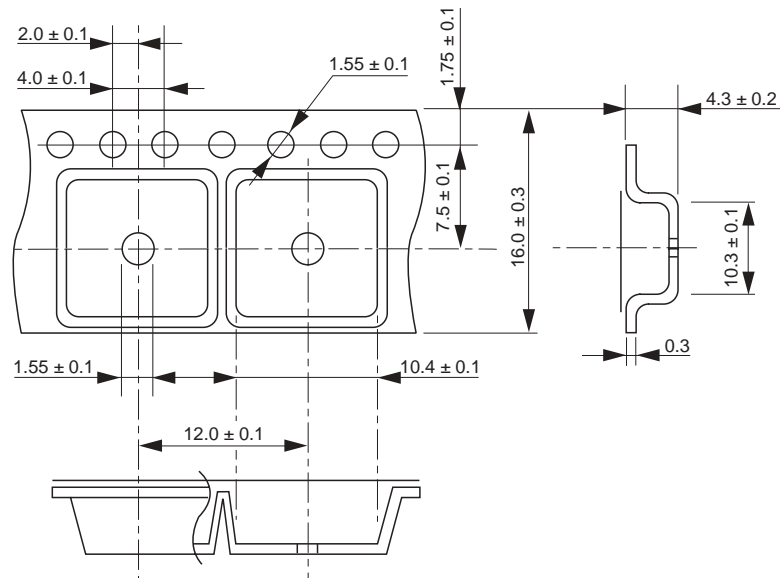


PS7142L-2B

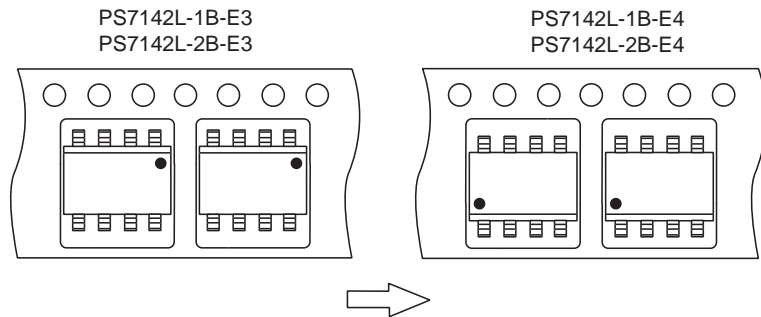


TAPING SPECIFICATIONS (Units in mm)

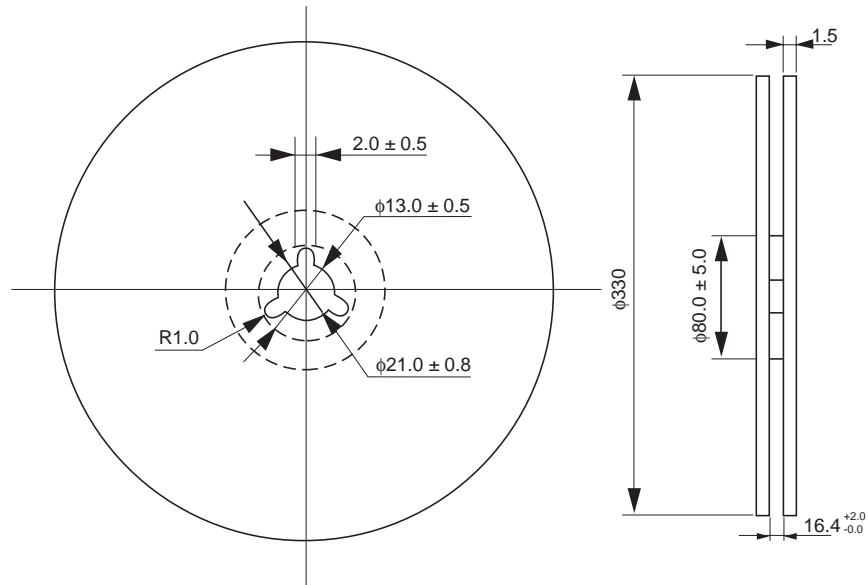
OUTLINE AND DIMENSIONS (TAPE)



TAPING DIRECTION



OUTLINE AND DIMENSIONS (REEL)



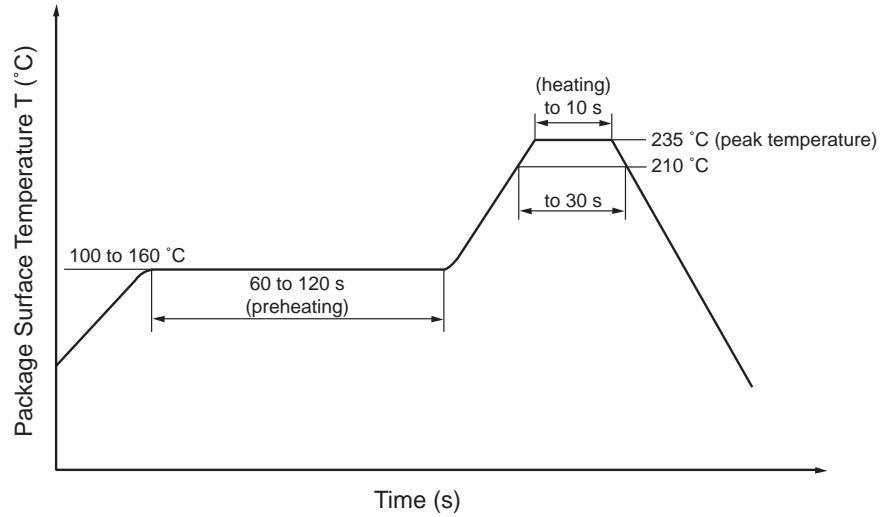
Packing : 1000 pcs/reel

RECOMMENDED SOLDERING CONDITIONS

(1) Infrared reflow soldering

- Peak reflow temperature 235 °C or below (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.)

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 cleaning solvent.

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09/04/2001