



NEC's 6-PIN DIP
400 V BREAK DOWN VOLTAGE
1-CH OPTICAL COUPLED MOS FET

PS7142-1A
PS7142L-1A

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
- **SAFETY STANDARDS:**
UL approved: File No. E72422 (S)
BSI approved: File No. 8245/8246
CSA approved: File No. CA 101391

DESCRIPTION

NEC's 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.

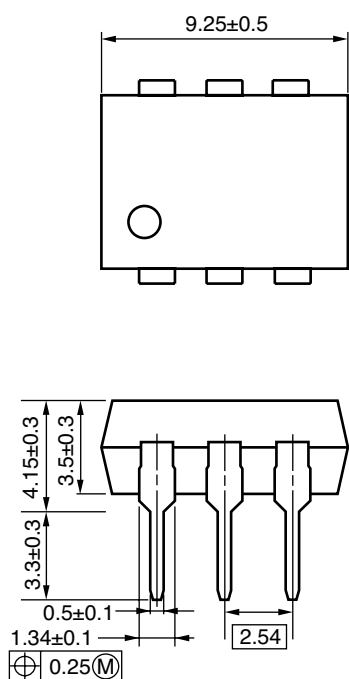
The PS7142L-1A has a surface mount type lead.

APPLICATION

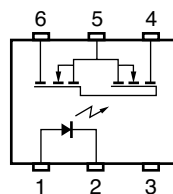
- **Exchange Equipment**
- **Measurement Equipment**
- **FA/OA Equipment**

PACKAGE DIMENSIONS (UNIT: mm)

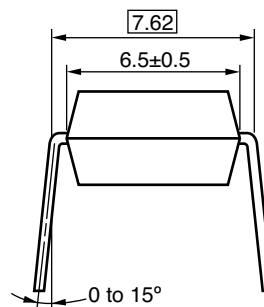
PS7142-1A



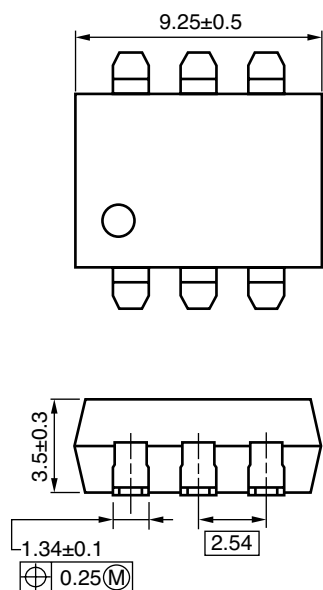
TOP VIEW



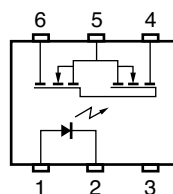
1. LED Anode
2. LED Cathode
3. NC
4. MOS FET Drain
5. MOS FET Source
6. MOS FET Drain



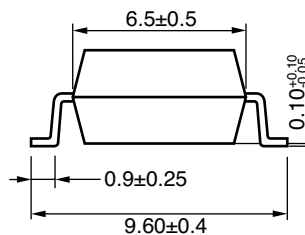
PS7142L-1A



TOP VIEW



1. LED Anode
2. LED Cathode
3. NC
4. MOS FET Drain
5. MOS FET Source
6. MOS FET Drain



ORDERING INFORMATION

PART NUMBER	PACKAGE	PACKING STYLE	APPLICATION PART NUMBER *1
PS7142-1A	6-pin DIP	Magazine case 50 pcs	PS7142-1A
PS7142L-1A			PS7142L-1A
PS7142L-1A-E3		Embossed Tape 1000 pcs/reel	
PS7142L-1A-E4			

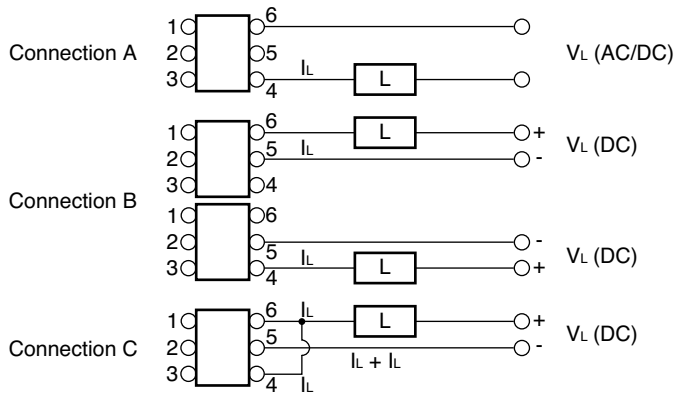
^{*1} For the application of the Safety Standard, following part number should be used.

ABSOLUTE MAXIMUM RATINGS (TA = 25°C, unless otherwise Specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Diode	Forward Current (DC)	IF	50	mA
	Reverse Voltage	VR	5.0	V
	Power Dissipation	PD	50	mW
	Peak Forward Current *1	IFP	1	A
MOS FET	Break Down Voltage	VL	400	V
	Continuous Load Current *2	IL	200	mA
			250	
			400	
	Pulse Load Current *3 (AC/DC Connection)	ILP	400	mA
	Power Dissipation	PD	560	mW
Isolation Voltage *4		BV	1 500	Vr.m.s.
Total Power Dissipation		PT	610	mW
Operating Ambient Temperature		TA	-40 to +85	°C
Storage Temperature		Tstg	-40 to +100	°C

*1 PW = 100 μs, Duty Cycle = 1 %

*2 Conditions: IF ≥ 2 mA. The following types of load connections are available.



*3 PW = 100 ms, 1 shot

*4 AC voltage for 1 minute at TA = 25 °C, RH = 60 % between input and output

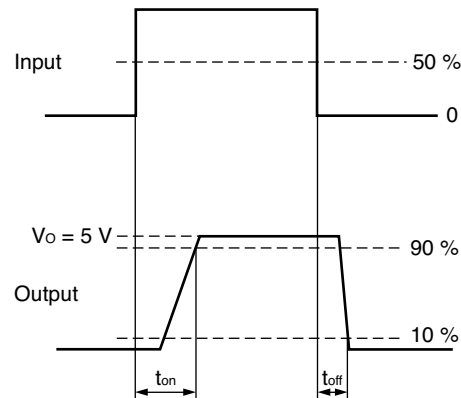
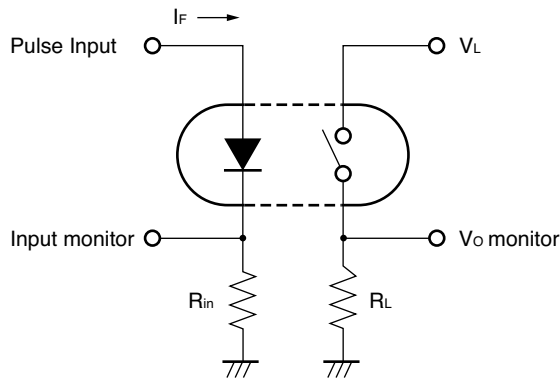
RECOMMENDED OPERATING CONDITIONS (TA = 25°C)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
LED Operating Current	IF	2	10	20	mA
LED Off Voltage	VF	0		0.5	V

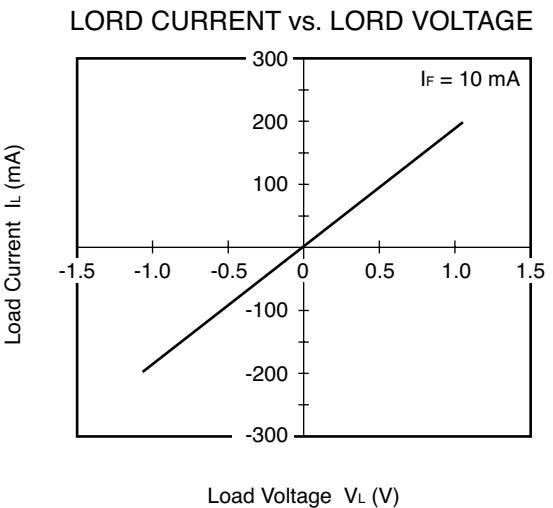
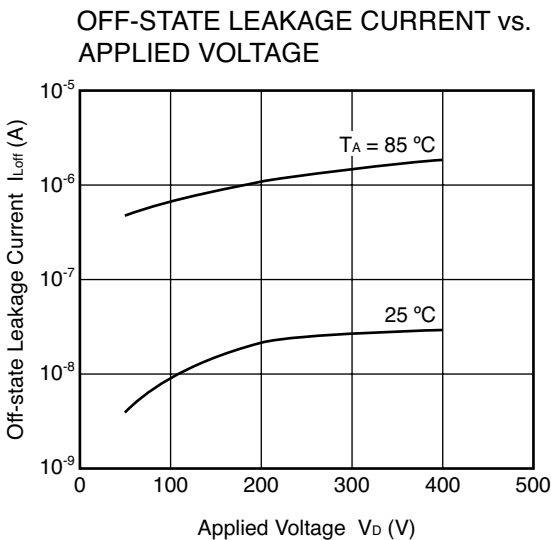
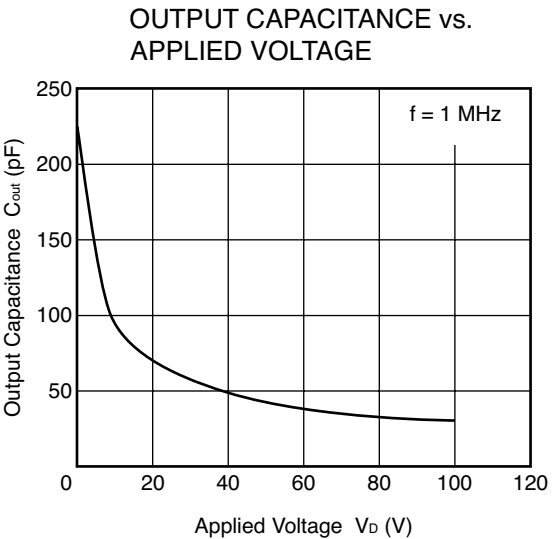
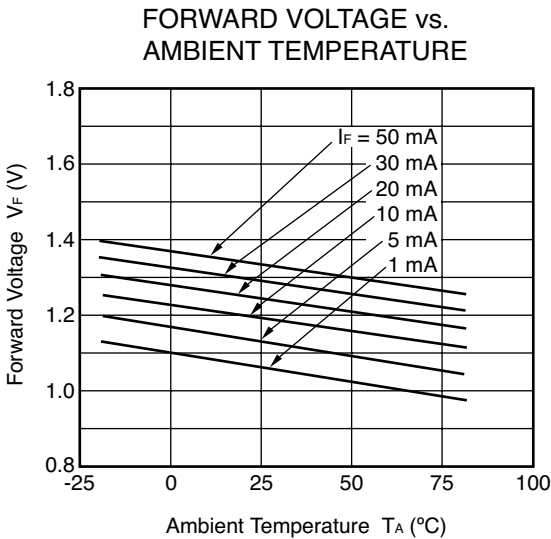
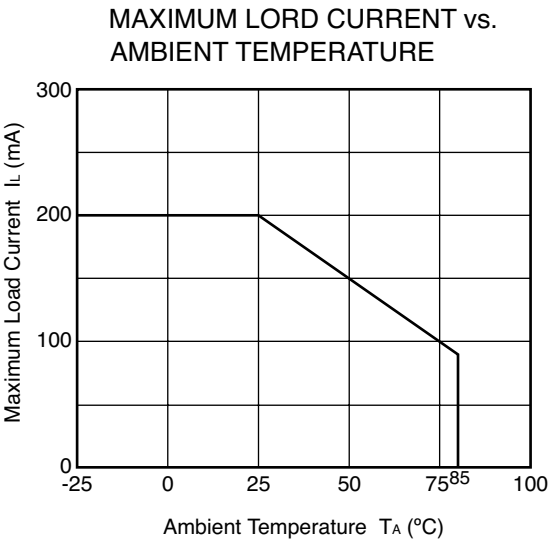
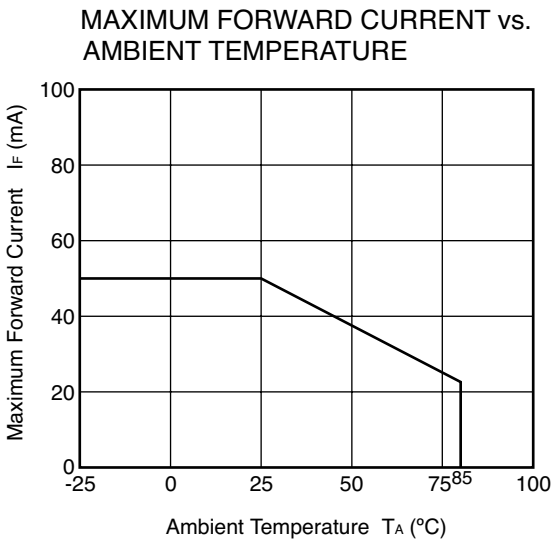
ELECTRICAL CHARACTERISTICS (TA = 25°C)

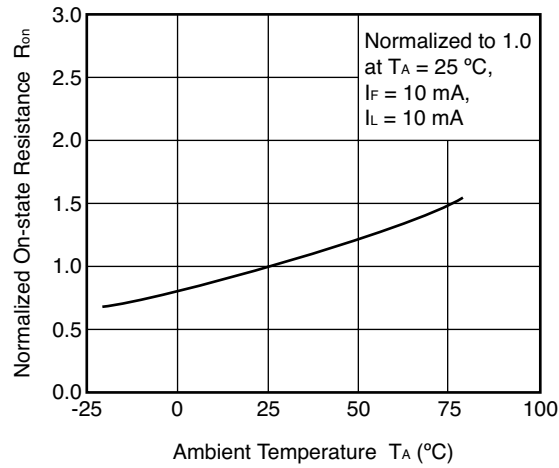
	PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Diode	Forward Voltage	VF	IF = 10 mA		1.2	1.4	V
	Reverse Current	IR	VR = 5 V			5.0	μA
MOS FET	Off-state Leakage Current	ILoff	VD = 400 V		0.03	1.0	μA
	Output Capacitance	Cout	VD = 0 V, f = 1 MHz		225		pF
Coupled	LED On-state Current	IFon	IL = 200 mA			2.0	mA
	On-state Resistance	Ron1	IF = 10 mA, IL = 10 mA		6.0	10	Ω
		Ron2	IF = 10 mA, IL = 200 mA, t ≤ 10 ms				
	Turn-on Time *1	ton	IF = 10 mA, VO = 5 V, RL = 500 Ω,		0.8	5.0	ms
	Turn-off Time *1	toff	PW ≥ 10 ms		0.02	0.2	
	Isolation Resistance	RI-O	VI-O = 1.0 kVDC	10 ⁹			Ω
	Isolation Capacitance	CI-O	V = 0 V, f = 1 MHz		1.1		pF

*1 Test Circuit for Switching Time

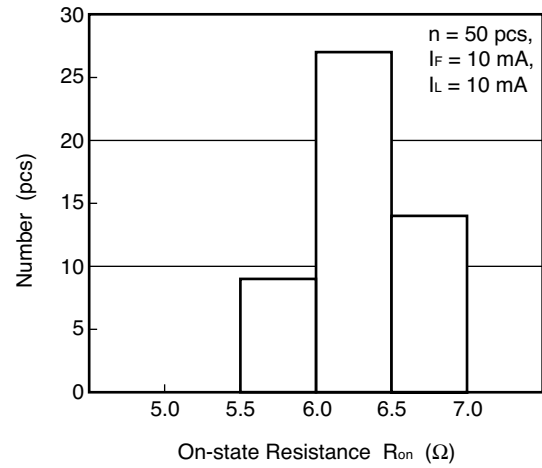


TYPICAL CHARACTERISTICS (TA = 25°C, unless otherwise specified)

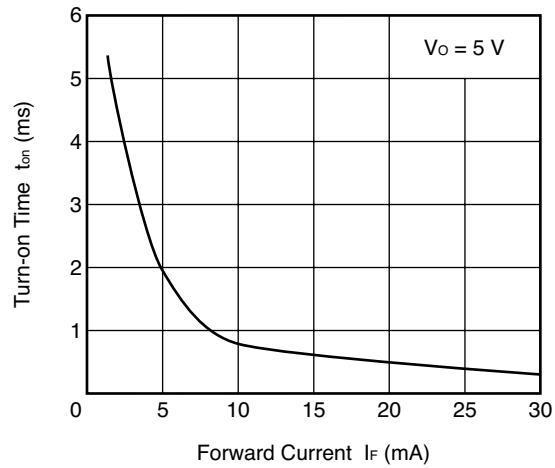


NORMALIZED ON-STATE RESISTANCE
vs. AMBIENT TEMPERATURE

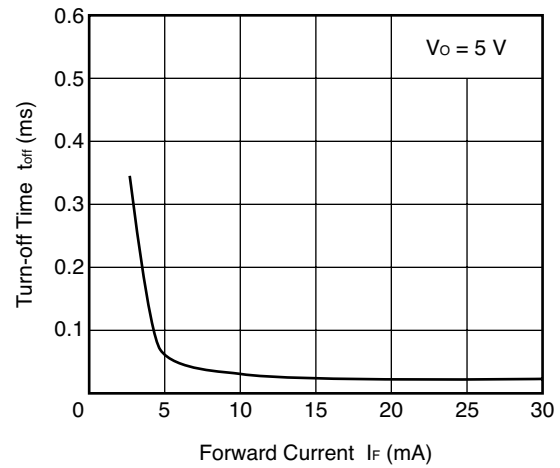
ON-STATE RESISTANCE DISTRIBUTION



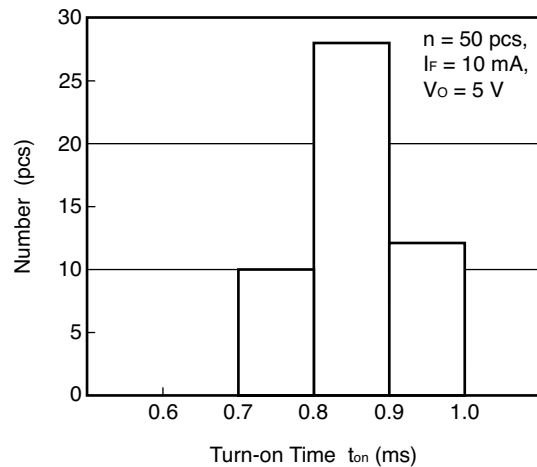
TURN-ON TIME vs. FORWARD CURRENT



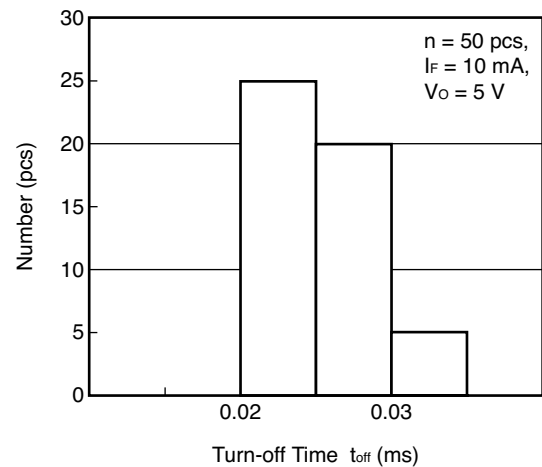
TURN-OFF TIME vs. FORWARD CURRENT

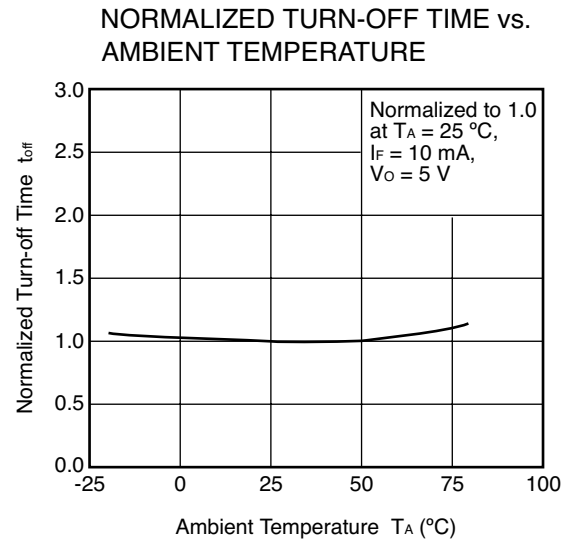
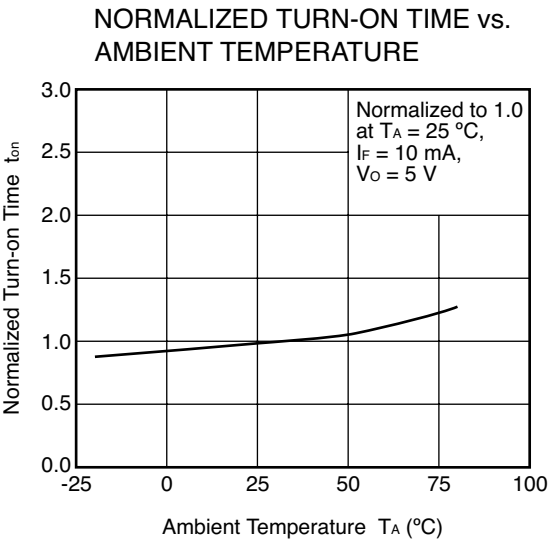


TURN-ON TIME DISTRIBUTION



TURN-OFF TIME DISTRIBUTION

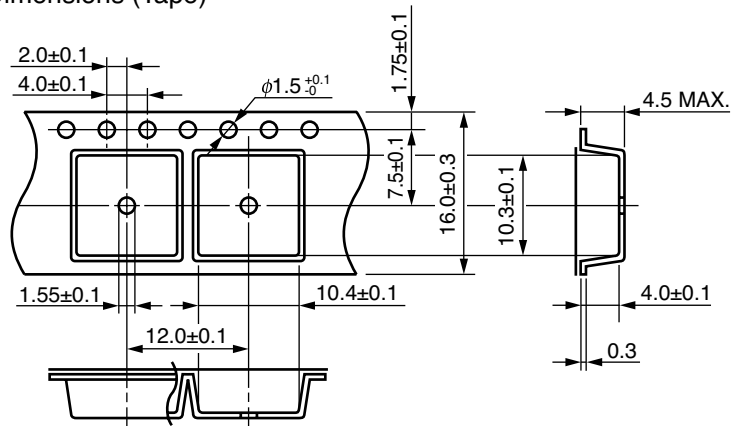




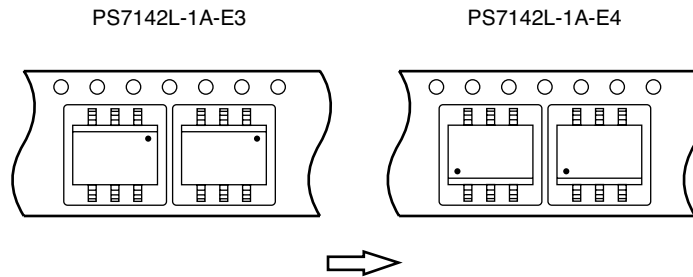
Remark The graphs indicate nominal characteristics.

TAPING SPECIFICATIONS (UNIT:mm)

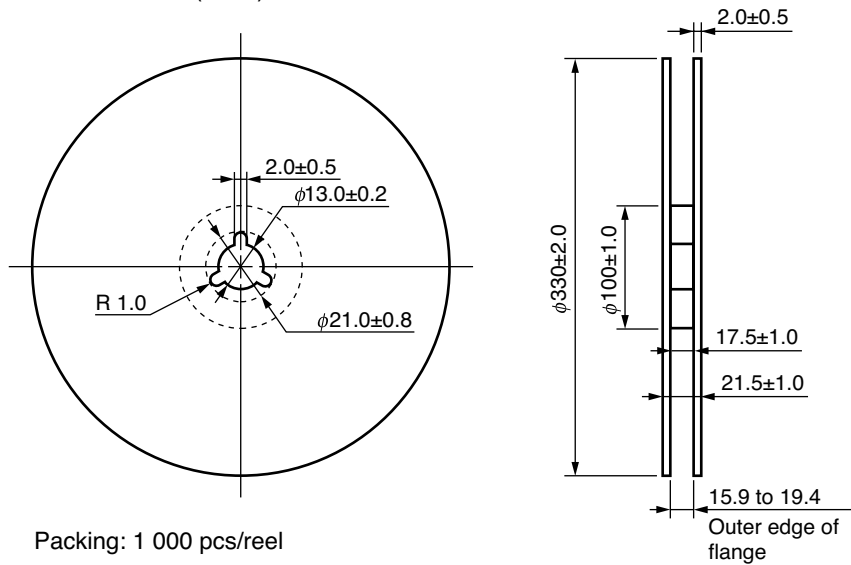
Outline and Dimensions (Tape)



Tape Direction



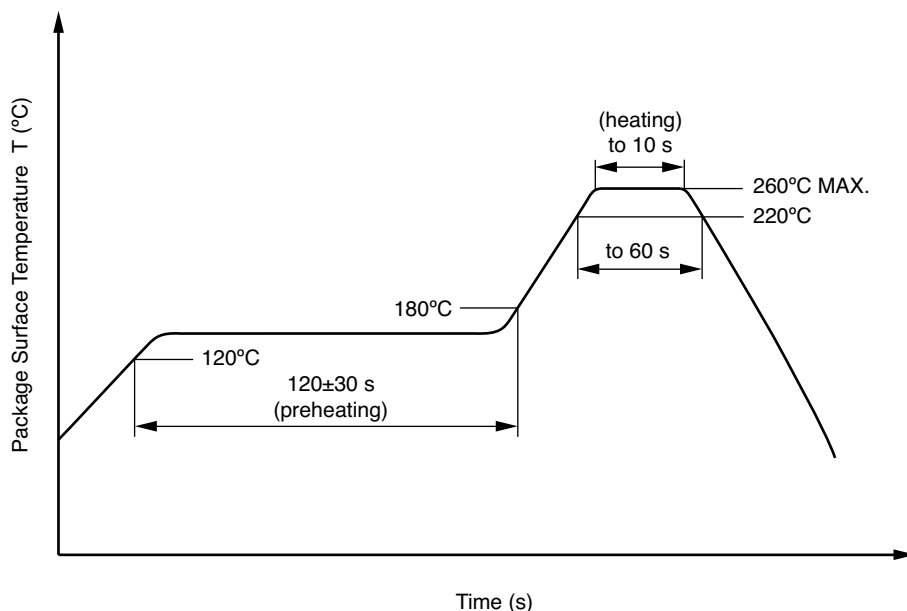
Outline and Dimensions (Reel)



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.

Life Support Applications

These NEC products are not intended for use in life support devices, appliances, or systems where the malfunction of these products can reasonably be expected to result in personal injury. The customers of CEL using or selling these products for use in such applications do so at their own risk and agree to fully indemnify CEL for all damages resulting from such improper use or sale.