

NEC

Solid State Relay
OCMOS FET

PS7160-2A, PS7160L-2A

8-PIN DIP, 600 V BREAK DOWN VOLTAGE
2-ch Optical Coupled MOS FET

DESCRIPTION

The PS7160-2A and PS7160L-2A 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 PS7160L-2A has a surface mount type lead.

★ FEATURES

- 2 channel type (1 a + 1 a 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
- PS7160L-2A: Surface mount type
- UL approved: File No. E72422 (S)
- BSI approved: No. 8245/8246
- CSA approved: No. CA 101391

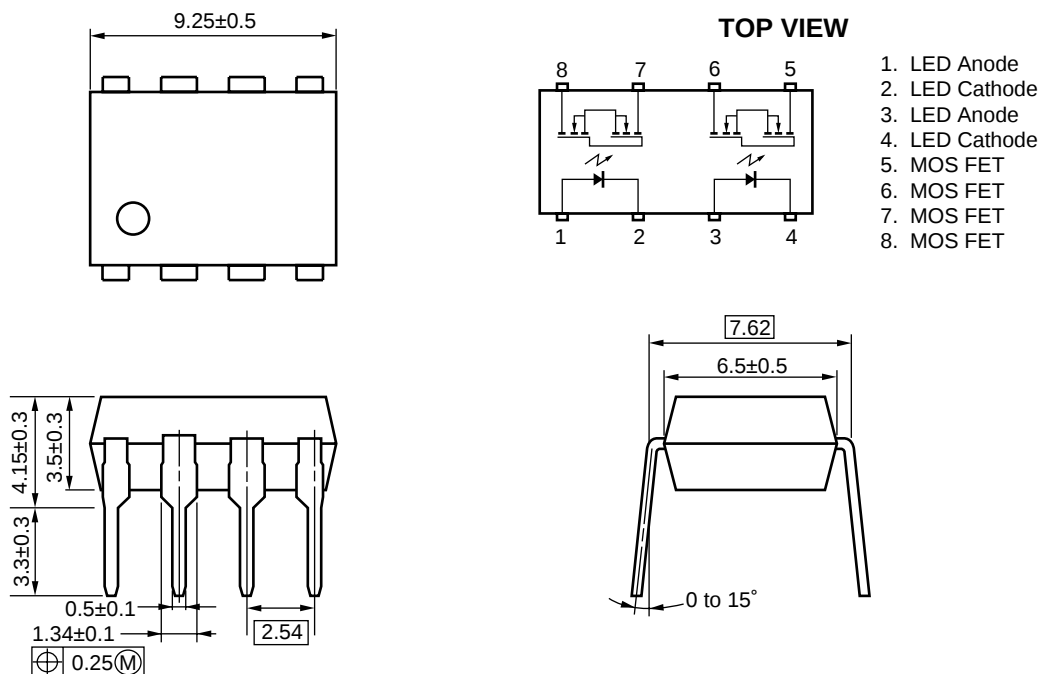
APPLICATIONS

- Exchange equipment
- Measurement equipment
- FA/OA equipment

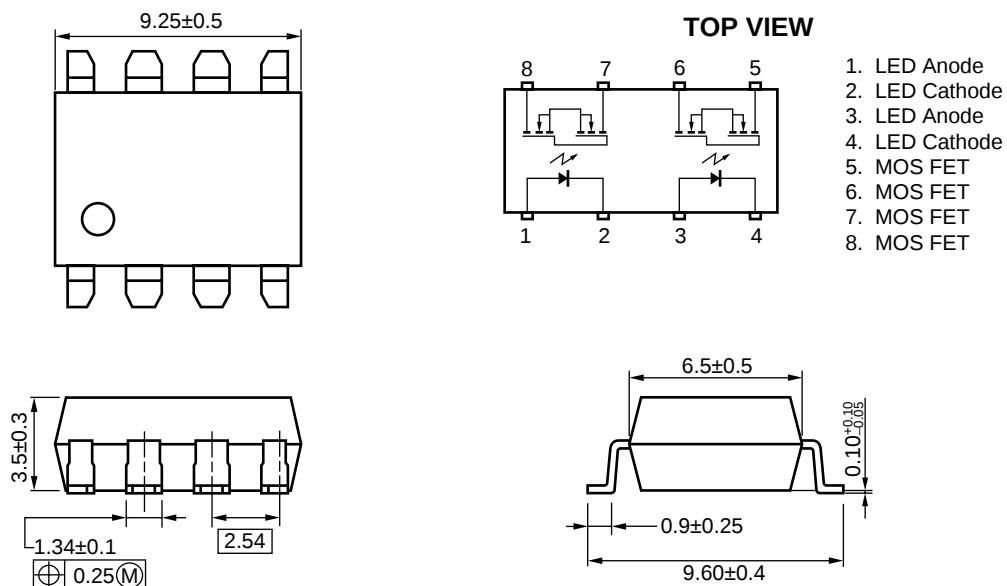
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Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

PACKAGE DIMENSIONS (in millimeters)

PS7160-2A



PS7160L-2A



★ ORDERING INFORMATION

Part Number	Package	Packing Style	Application Part Number ^{*1}
PS7160-2A	8-pin DIP	Magazine case 50 pcs	PS7160-2A
PS7160L-2A			PS7160L-2A
PS7160L-2A-E3		Embossed Tape 1 000 pcs/reel	
PS7160L-2A-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	600	V
	Continuous Load Current	I _L	90	mA
	Pulse Load Current ^{*2} (AC/DC Connection)	I _{LP}	250	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

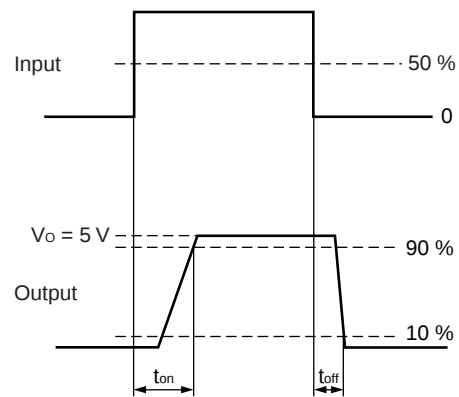
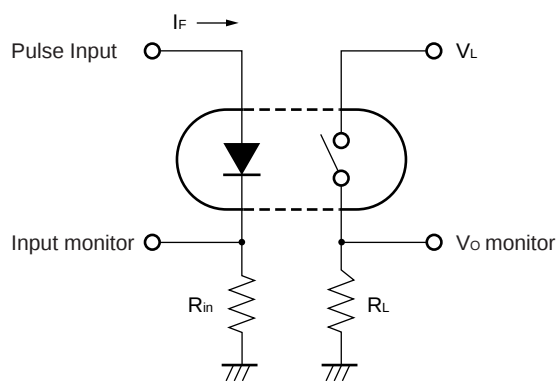
RECOMMENDED OPERATING CONDITIONS (T_A = 25 °C)

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)

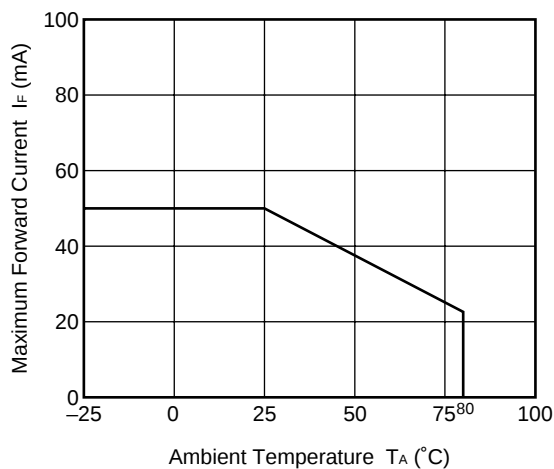
Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V _F	I _F = 10 mA		1.2	1.4	V
	Reverse Current	I _R	V _R = 5 V			5.0	μA
MOS FET	Off-state Leakage Current	I _{Loff}	V _D = 600 V		0.03	1.0	μA
	Output Capacitance	C _{out}	V _D = 0 V, f = 1 MHz		110		pF/ch
Coupled	LED On-state Current	I _{Fon}	I _L = 90 mA			2.0	mA
	On-state Resistance	R _{on1}	I _F = 10 mA, I _L = 10 mA		42	50	Ω
		R _{on2}	I _F = 10 mA, I _L = 90 mA, t ≤ 10 ms		33	50	
	Turn-on Time *1	t _{on}	I _F = 10 mA, V _O = 5 V, PW ≥ 10 ms		0.8	1.5	ms
	Turn-off Time *1	t _{off}			0.06	0.2	
	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

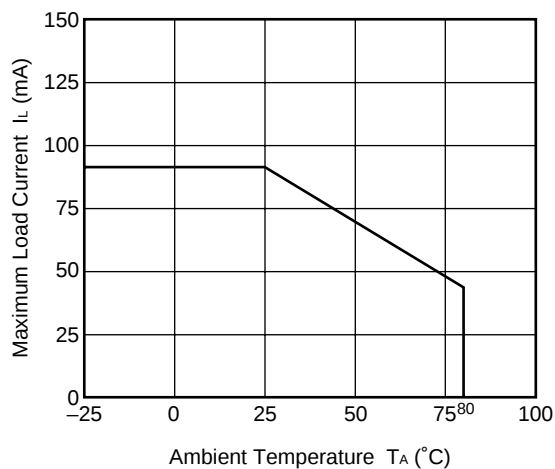


★ TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise specified)

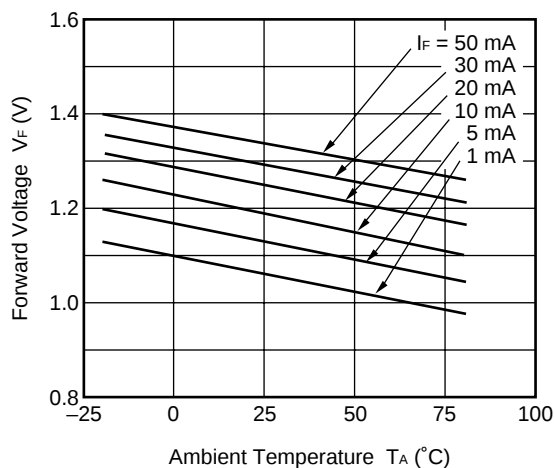
MAXIMUM FORWARD CURRENT vs.
AMBIENT TEMPERATURE



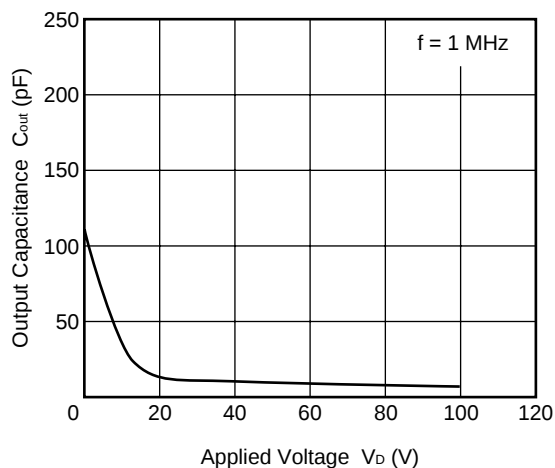
MAXIMUM LOAD CURRENT vs.
AMBIENT TEMPERATURE



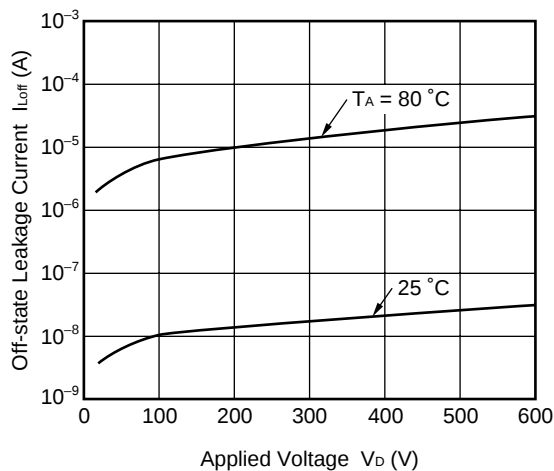
FORWARD VOLTAGE vs.
AMBIENT TEMPERATURE



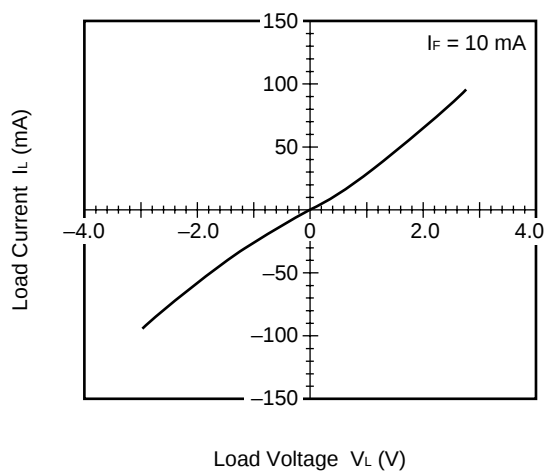
OUTPUT CAPACITANCE vs.
APPLIED VOLTAGE



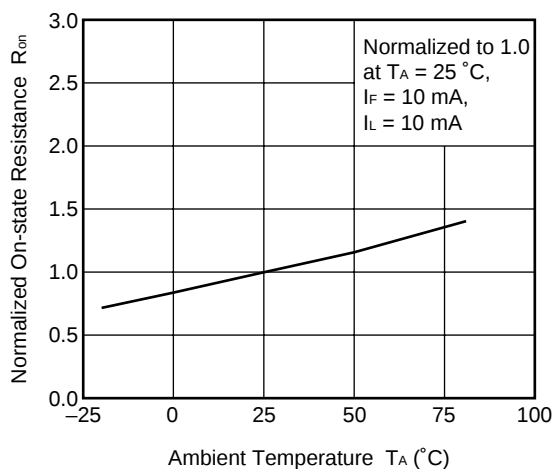
OFF-STATE LEAKAGE CURRENT vs.
APPLIED VOLTAGE



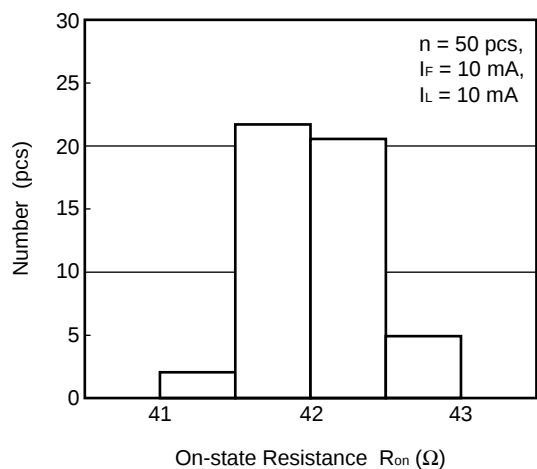
LOAD CURRENT vs. LOAD VOLTAGE



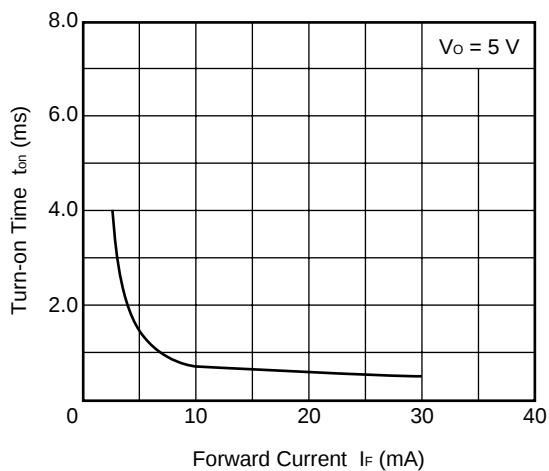
NORMALIZED ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE



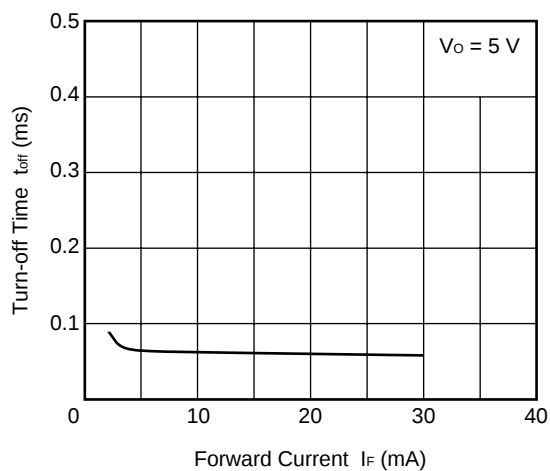
ON-STATE RESISTANCE DISTRIBUTION



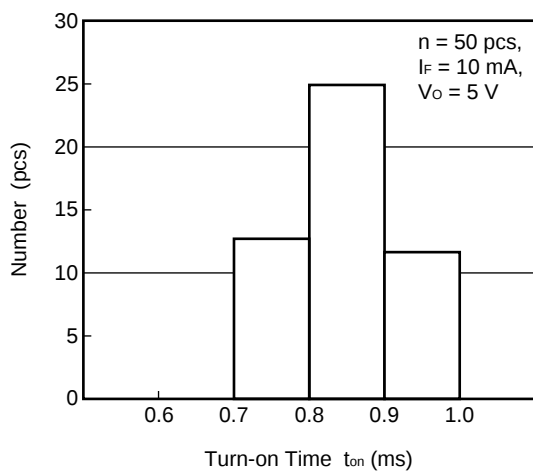
TURN-ON TIME vs. FORWARD CURRENT



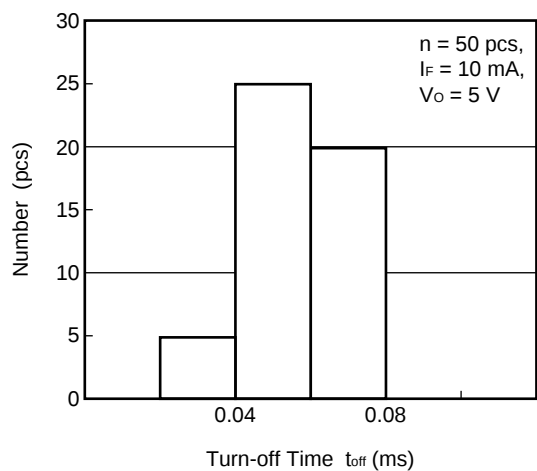
TURN-OFF TIME vs. FORWARD CURRENT

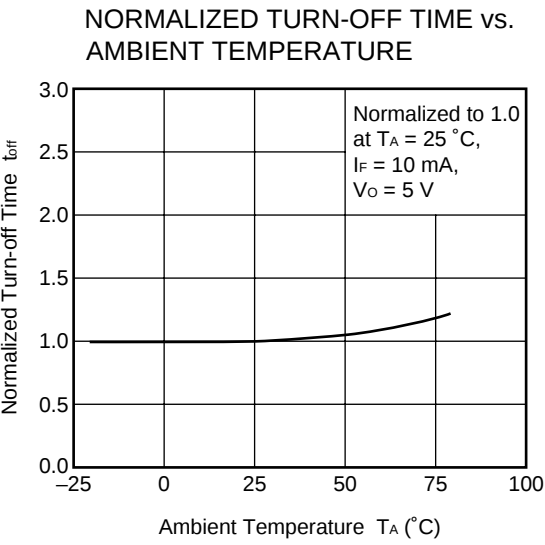
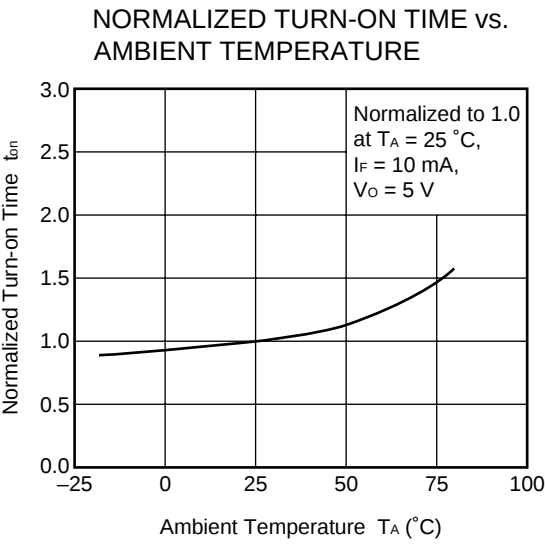


TURN-ON TIME DISTRIBUTION



TURN-OFF TIME DISTRIBUTION

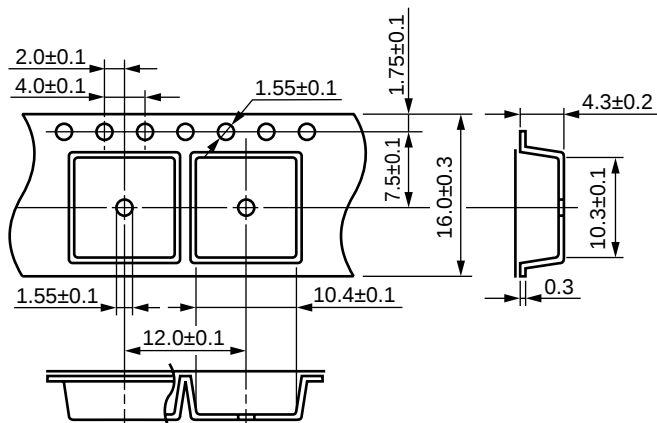




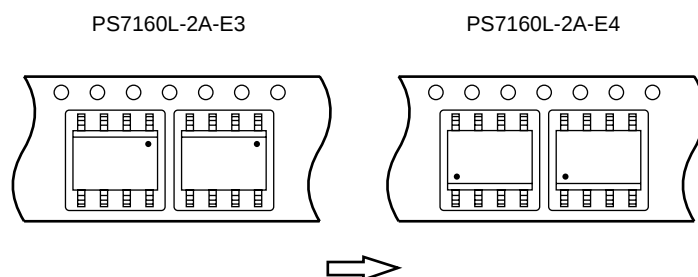
Remark The graphs indicate nominal characteristics.

★ TAPING SPECIFICATIONS (in millimeters)

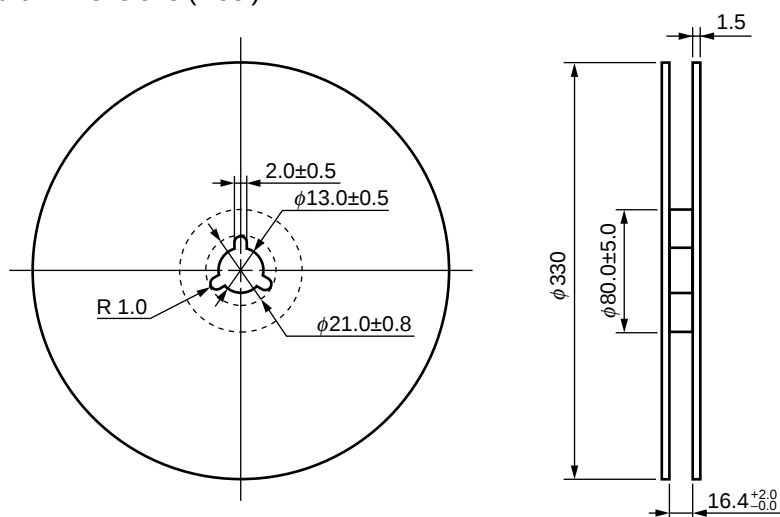
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



Packing: 1 000 pcs/reel

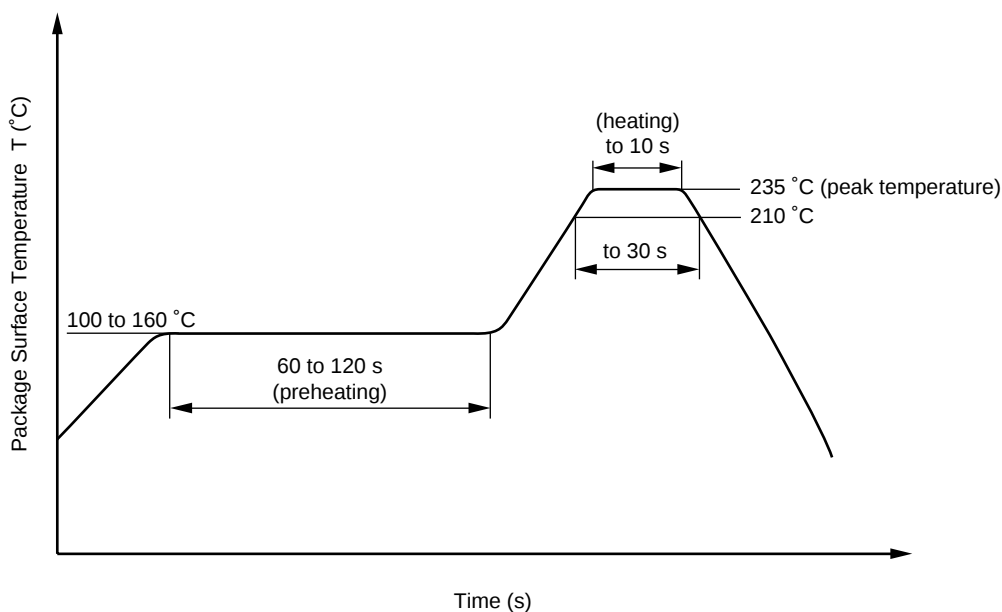
RECOMMENDED SOLDERING CONDITIONS

(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.)

★

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]

[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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