NEC

Solid State Relay
OCMOS FET

PS7111-2A,PS7111L-2A

8-PIN DIP, 100 V BREAK DOWN VOLTAGE 2-ch Optical Coupled MOS FET

DESCRIPTION

The PS7111-2A and PS7111L-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 PS7111L-2A has a surface mount type lead.

★ FEATURES

- 2 channel type (1 a + 1 a output)
- Low LED operating current (I_F = 2 mA)
- Designed for AC/DC switching line changer
- Small package (8-pin DIP)
- Low offset voltage
- PS7111L-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.

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The mark ★ shows major revised points.

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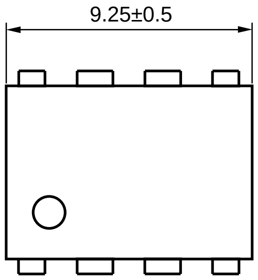
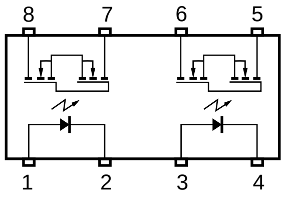
PACKAGE DIMENSIONS (in millimeters)

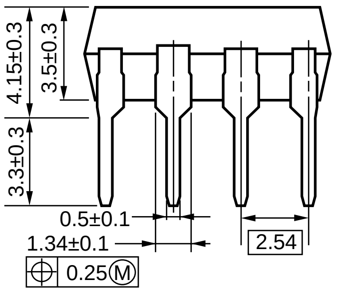
PS7111-2A

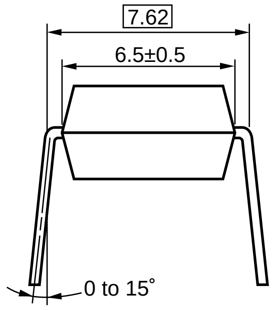


TOP VIEW

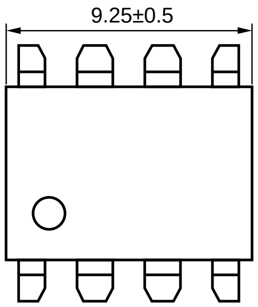


1. LED Anode
2. LED Cathode
3. LED Anode
4. LED Cathode
5. MOS FET
6. MOS FET
7. MOS FET
8. MOS FET





PS7111L-2A



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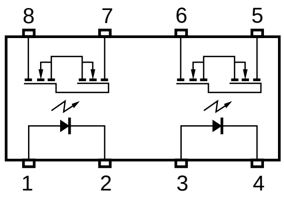

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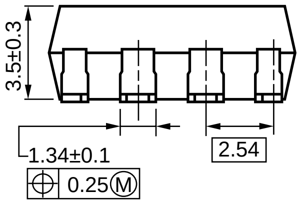
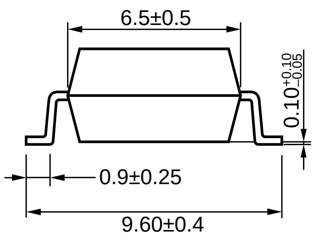




★ ORDERING INFORMATION

Part Number	Package	Packing Style	Application Part Number[*1]
PS7111-2A	8-pin DIP	Magazine case 50 pcs	PS7111-2A
PS7111L-2A			PS7111L-2A
PS7111L-2A-E3		Embossed Tape 1 000 pcs/reel	
PS7111L-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	100	V
	Continuous Load Current	I_L	100	mA
★	Pulse Load Current[*2] (AC/DC Connection)	I_{LP}	300	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

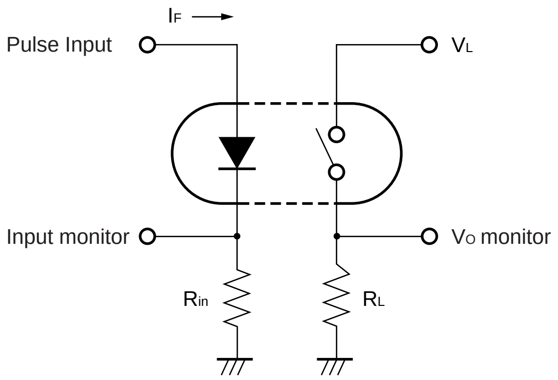
RECOMMENDED OPERATING CONDITIONS (T_A = 25 °C)

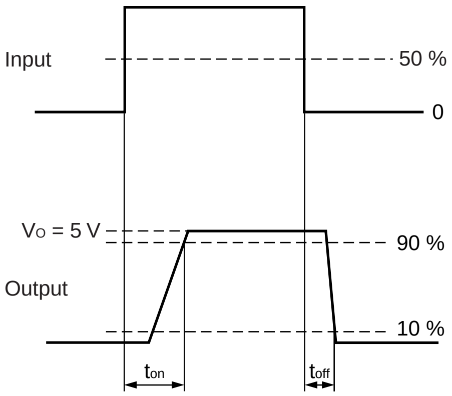
Parameter	Symbol	MIN.	TYP.	MAX.	Unit
LED Operating Current	I_F	2	10	20	mA
LED Off Voltage	V_F	0		0.5	V

★ 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 = 100 V		0.03	1.0	μA
	Output Capacitance	C_{out}	V_D = 0 V, f = 1 MHz		57		pF/ch
Coupled	LED On-state Current	I_{Fon}	I_L = 100 mA			2.0	mA
	On-state Resistance	R_{on1}	I_F = 10 mA, I_L = 10 mA		3.0	6.0	Ω
		R_{on2}	I_F = 10 mA, I_L = 100 mA, t ≤ 10 ms				
	Turn-on Time [*1]	t_{on}	I_F = 10 mA, V_O = 5 V, PW ≥ 10 ms		0.1	0.4	ms
	Turn-off Time [*1]	t_{off}			0.03	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

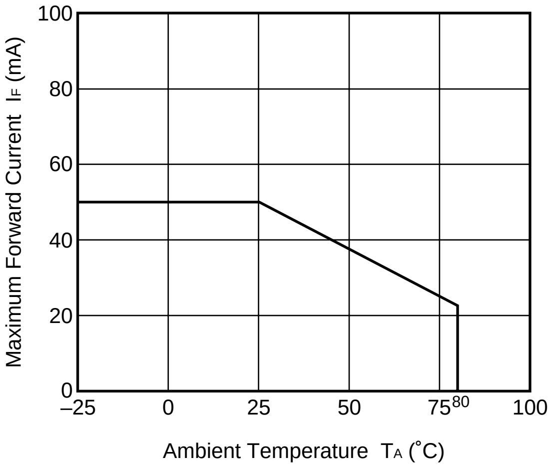
***1** Test Circuit for Switching Time



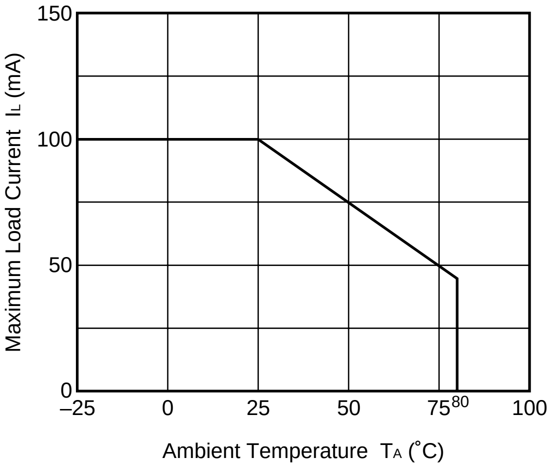


★ TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise specified)

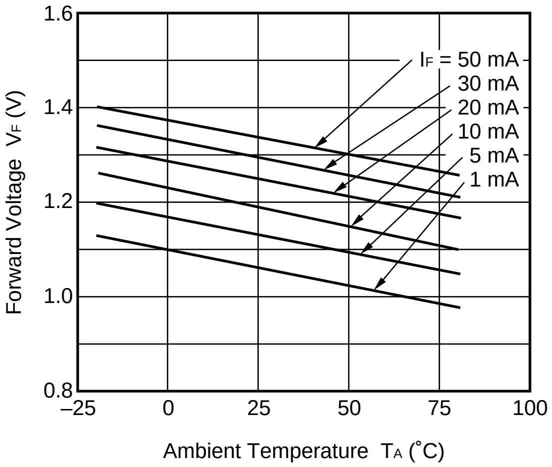
MAXIMUM FORWARD CURRENT vs. AMBIENT TEMPERATURE



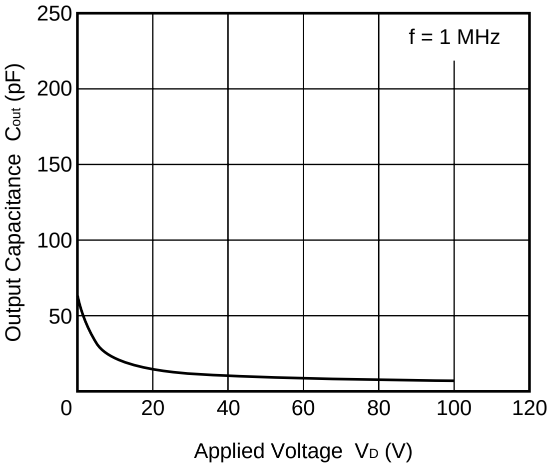
MAXIMUM LOAD CURRENT vs. AMBIENT TEMPERATURE



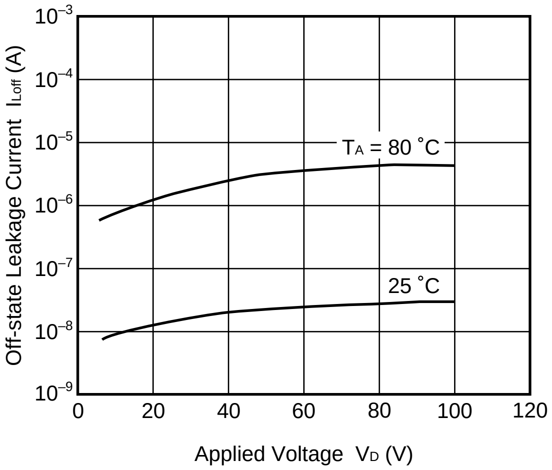
FORWARD VOLTAGE vs. AMBIENT TEMPERATURE



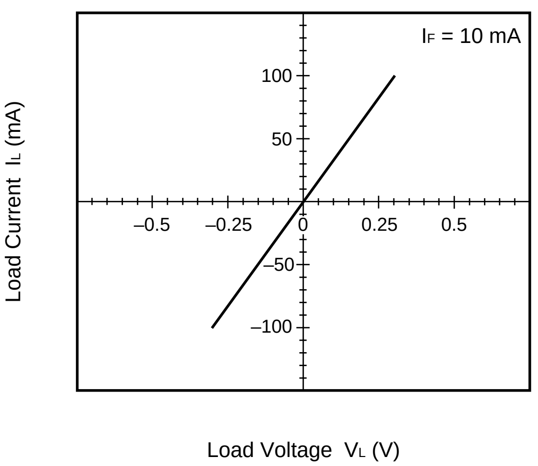
OUTPUT CAPACITANCE vs. APPLIED VOLTAGE

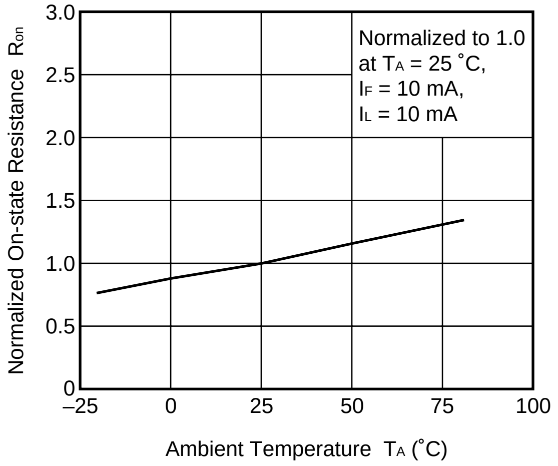


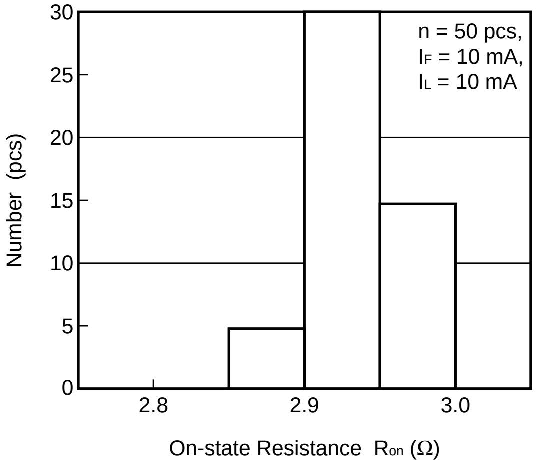
OFF-STATE LEAKAGE CURRENT vs. APPLIED VOLTAGE

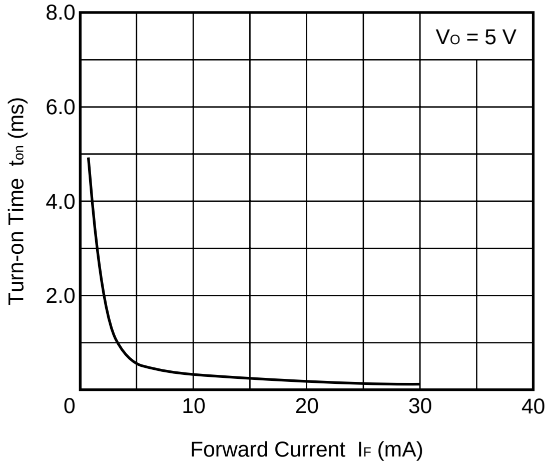


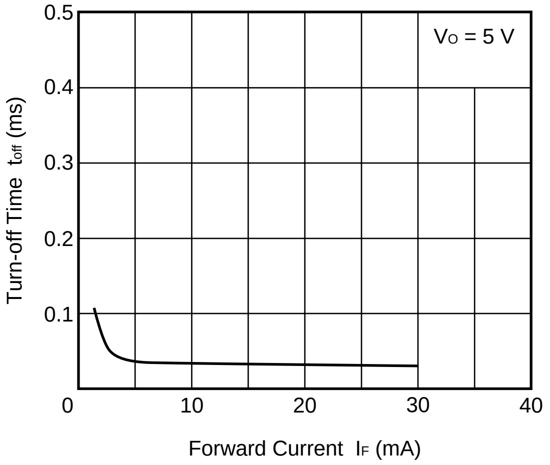
LOAD CURRENT vs. LOAD VOLTAGE

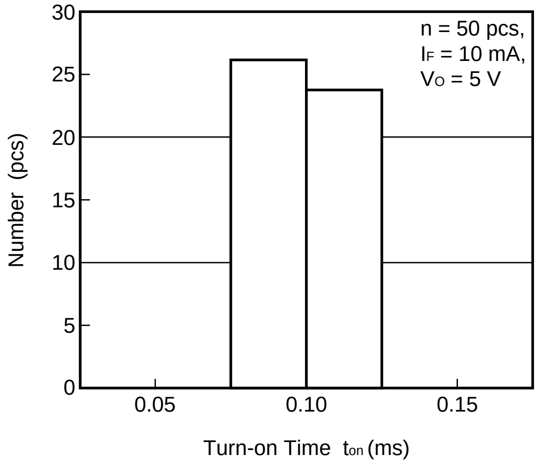


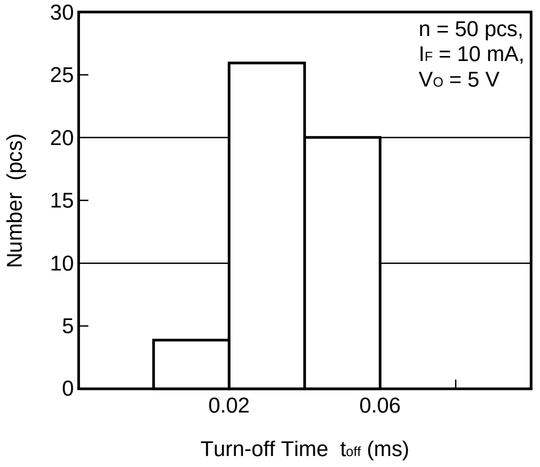

NORMALIZED ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE

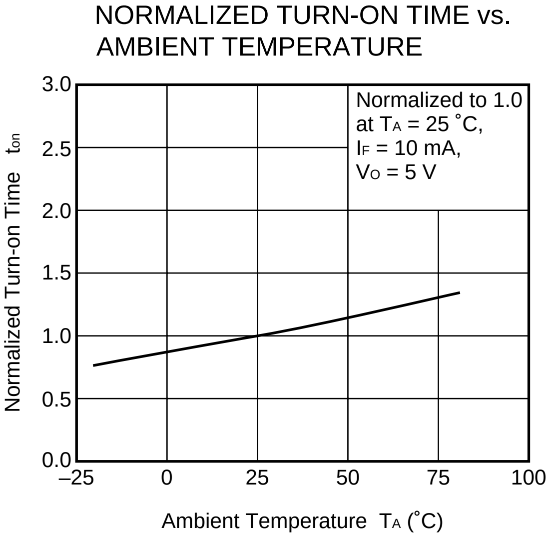

ON-STATE RESISTANCE DISTRIBUTION

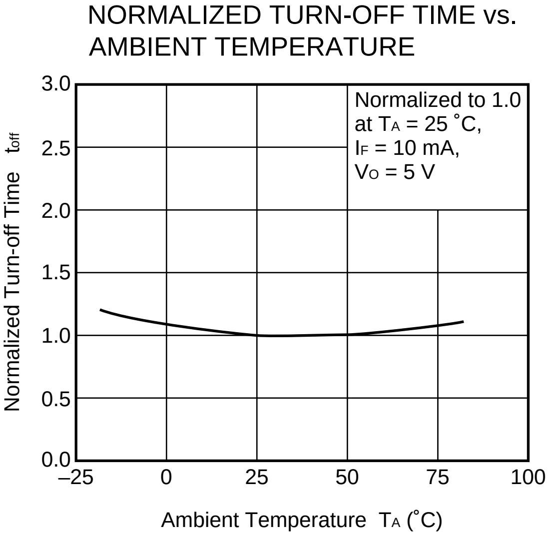

TURN-ON TIME vs. FORWARD CURRENT


TURN-OFF TIME vs. FORWARD CURRENT


TURN-ON TIME DISTRIBUTION


TURN-OFF TIME DISTRIBUTION

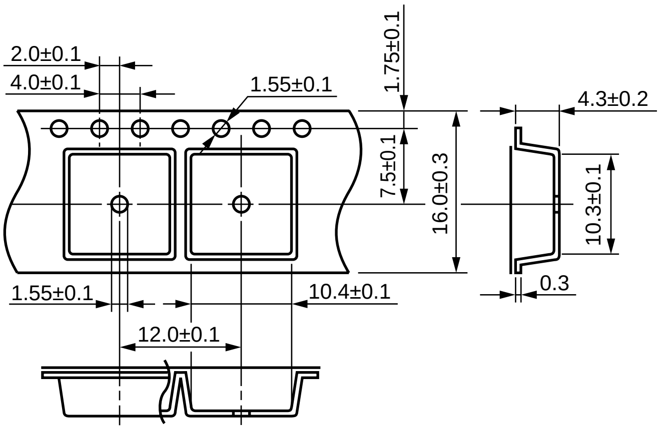




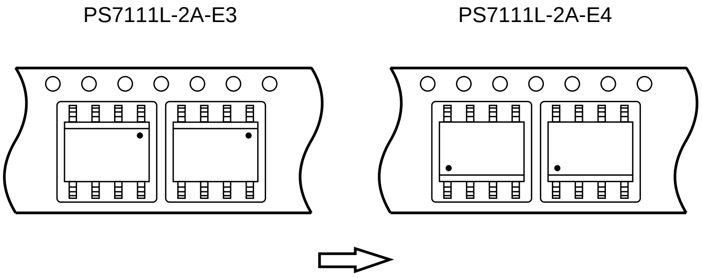
Remark The graphs indicate nominal characteristics.

★ TAPING SPECIFICATIONS (in millimeters)

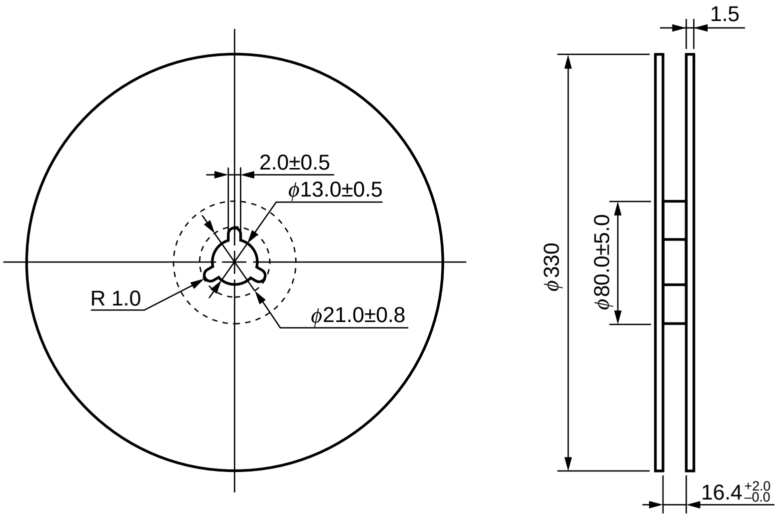
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



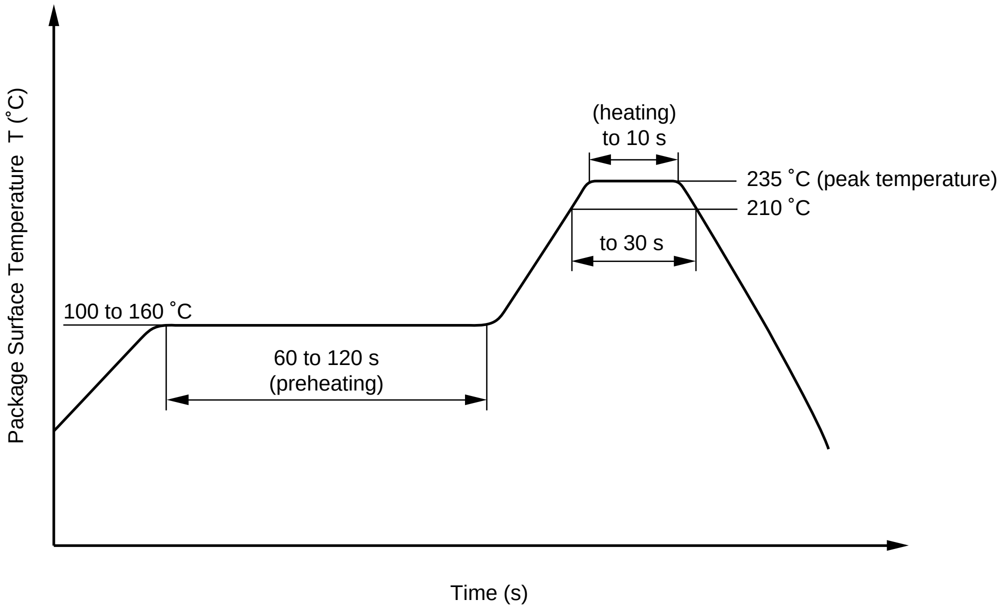
Packing: 1 000 pcs/reel

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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