

PS7141-1A, PS7141L-1A**6-PIN DIP, 400V BREAK DOWN VOLTAGE
1-ch Optical Coupled MOS FET****DESCRIPTION**

The PS7141-1A and PS7141L-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 PS7141L-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
- PS7141L-1A: Surface mount type
- UL approved: File No. E72422 (S)
- BSI approved: No. 8245/8246
- CSA approved: No. CA 101391

APPLICATIONS

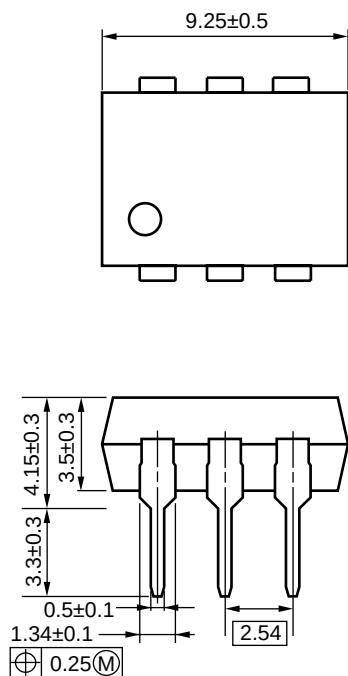
- Exchange equipment
- Measurement equipment
- FA/OA equipment

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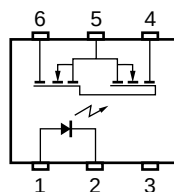
Not all devices/types available in every country. Please check with local NEC Compound Semiconductor Devices representative for availability and additional information.

PACKAGE DIMENSIONS (in millimeters)

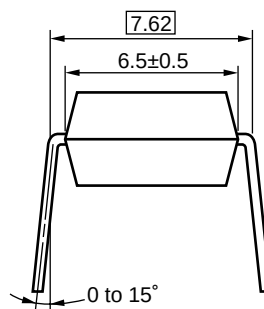
PS7141-1A



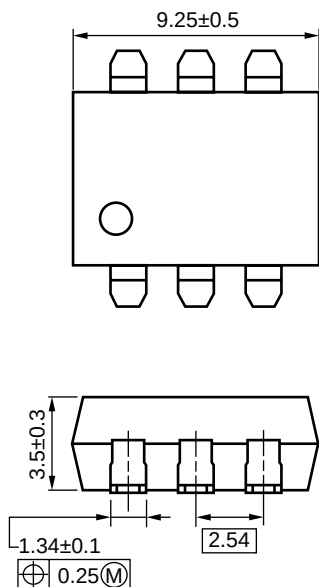
TOP VIEW



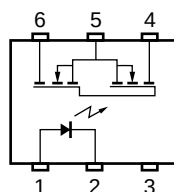
1. LED Anode
2. LED Cathode
3. NC
4. MOS FET Drain
5. MOS FET Source
6. MOS FET Drain



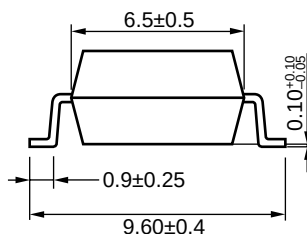
PS7141L-1A



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}
PS7141-1A	6-pin DIP	Magazine case 50 pcs	PS7141-1A
PS7141L-1A			PS7141L-1A
PS7141L-1A-E3		Embossed Tape 1 000 pcs/reel	
PS7141L-1A-E4			

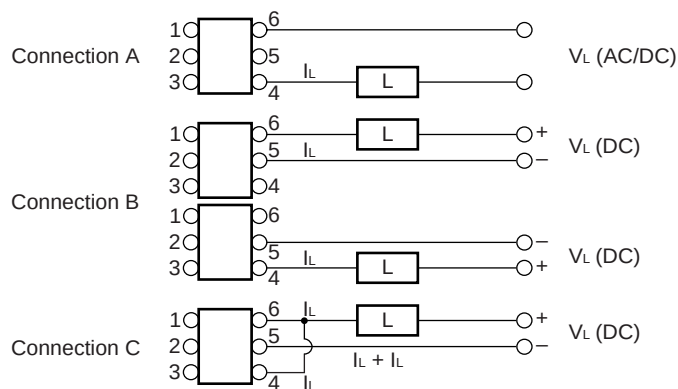
***1** For the application of the Safety Standard, following part number should be used.

ABSOLUTE MAXIMUM RATINGS ($T_A = 25\text{ }^{\circ}\text{C}$, 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
	Peak Forward Current ^{*1}	I_{FP}	1	A
MOS FET	Break Down Voltage	V_L	400	V
	Continuous Load Current ^{*2}	Connection A	I_L	mA
		Connection B	200	
		Connection C	300	
	Pulse Load Current ^{*3} (AC/DC Connection)	I_{LP}	300	mA
	Power Dissipation	P_D	560	mW
Isolation Voltage ^{*4}		BV	1 500	Vr.m.s.
Total Power Dissipation		P_T	610	mW
Operating Ambient Temperature		T_A	-40 to +85	$^{\circ}\text{C}$
Storage Temperature		T_{stg}	-40 to +100	$^{\circ}\text{C}$

***1** $PW = 100\text{ }\mu\text{s}$, Duty Cycle = 1 %

***2** Conditions: $I_F \geq 2\text{ mA}$. The following types of load connections are available.



***3** $PW = 100\text{ ms}$, 1 shot

***4** AC voltage for 1 minute at $T_A = 25\text{ }^{\circ}\text{C}$, $RH = 60\text{ \%}$ between input and output

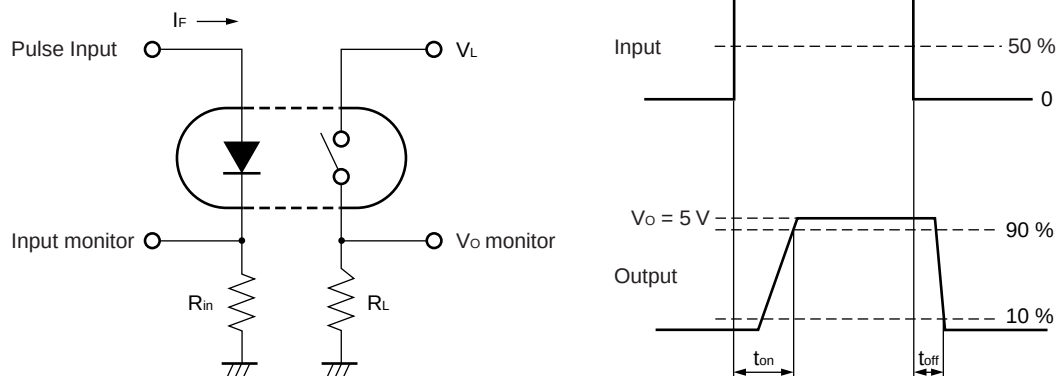
RECOMMENDED OPERATING CONDITIONS ($T_A = 25\text{ }^\circ\text{C}$)

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

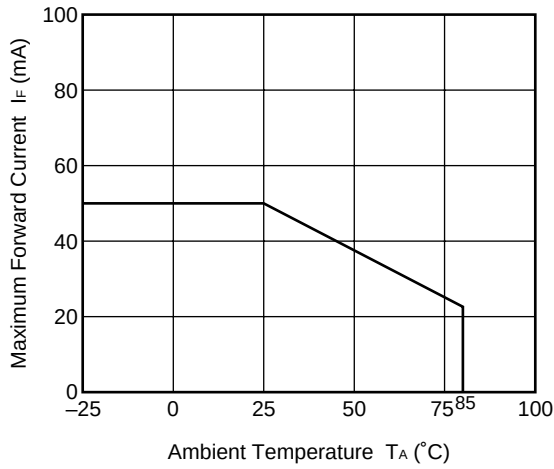
Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V_F	$I_F = 10\text{ mA}$		1.2	1.4	V
	Reverse Current	I_R	$V_R = 5\text{ V}$			5.0	μA
MOS FET	Off-state Leakage Current	I_{Leak}	$V_D = 400\text{ V}$		0.03	1.0	μA
	Output Capacitance	C_{out}	$V_D = 0\text{ V}$, $f = 1\text{ MHz}$		65		pF
Coupled	LED On-state Current	I_{Fon}	$I_L = 150\text{ mA}$			2.0	mA
	On-state Resistance	R_{on1}	$I_F = 10\text{ mA}$, $I_L = 10\text{ mA}$		20	30	Ω
		R_{on2}	$I_F = 10\text{ mA}$, $I_L = 150\text{ mA}$, $t \leq 10\text{ ms}$		16	25	
	Turn-on Time ^{*1}	t_{on}	$I_F = 10\text{ mA}$, $V_O = 5\text{ V}$, $R_L = 1.5\text{ k}\Omega$, $PW \geq 10\text{ ms}$		0.35	1.0	ms
	Turn-off Time ^{*1}	t_{off}			0.06	0.2	
	Isolation Resistance	$R_{\text{I-O}}$	$V_{\text{I-O}} = 1.0\text{ kV}_{\text{DC}}$	10^9			Ω
	Isolation Capacitance	$C_{\text{I-O}}$	$V = 0\text{ V}$, $f = 1\text{ MHz}$		1.1		pF

*1 Test Circuit for Switching Time

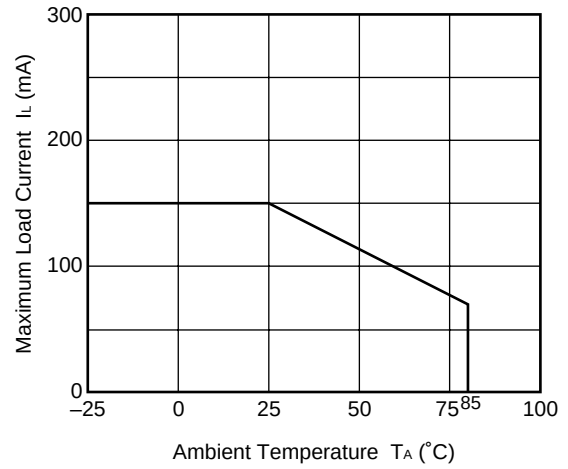


★ TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise specified)

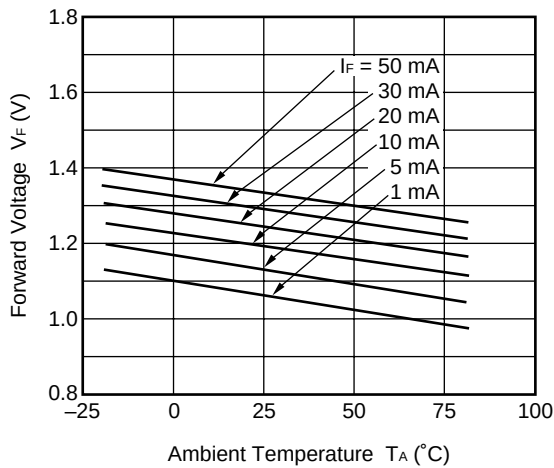
MAXIMUM FORWARD CURRENT vs.
AMBIENT TEMPERATURE



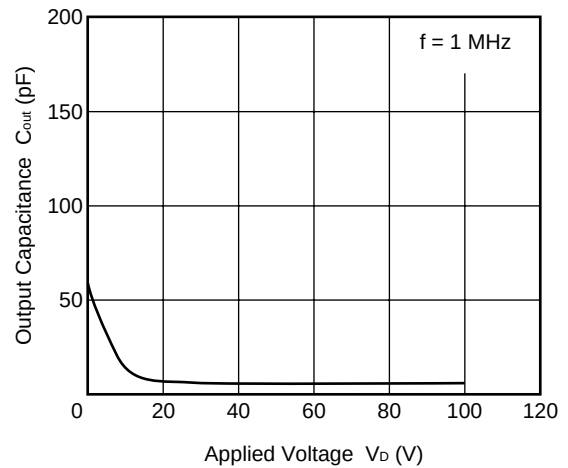
MAXIMUM LOAD CURRENT vs.
AMBIENT TEMPERATURE



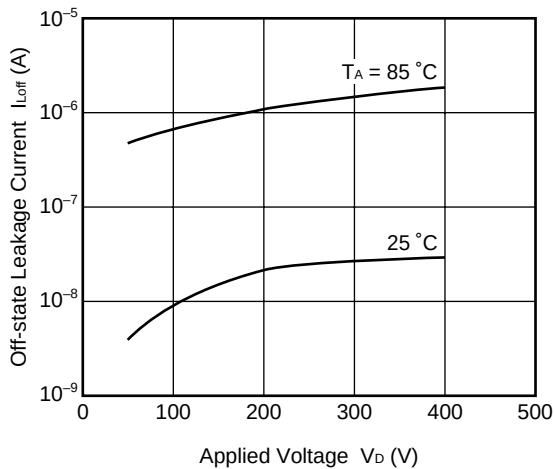
FORWARD VOLTAGE vs.
AMBIENT TEMPERATURE



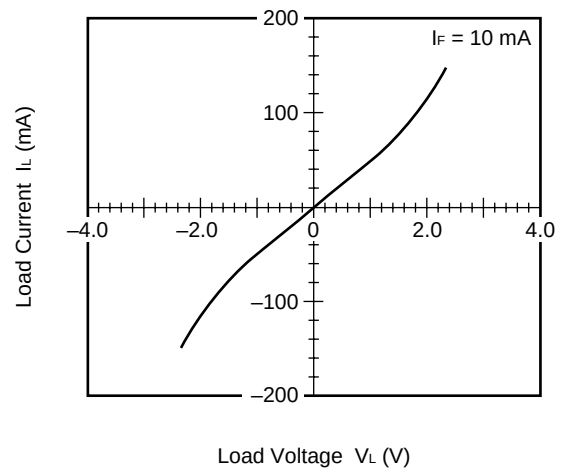
OUTPUT CAPACITANCE vs.
APPLIED VOLTAGE



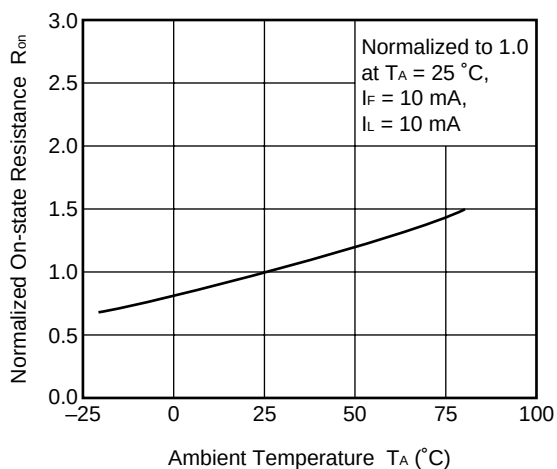
OFF-STATE LEAKAGE CURRENT vs.
APPLIED VOLTAGE



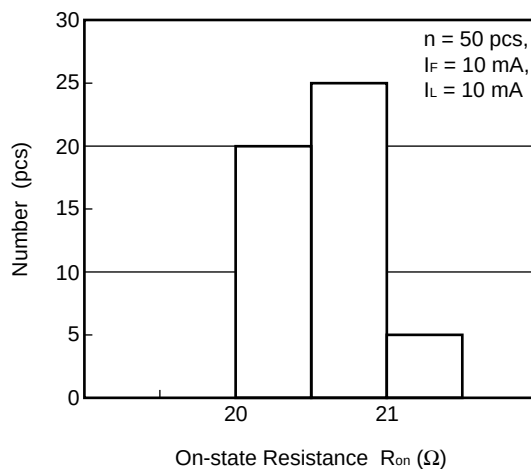
LOAD CURRENT vs. LOAD VOLTAGE



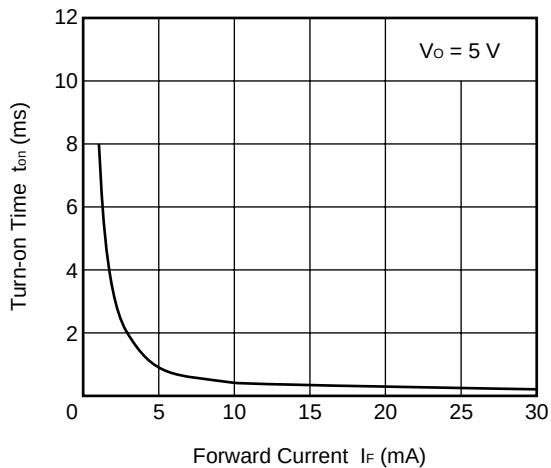
NORMALIZED ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE



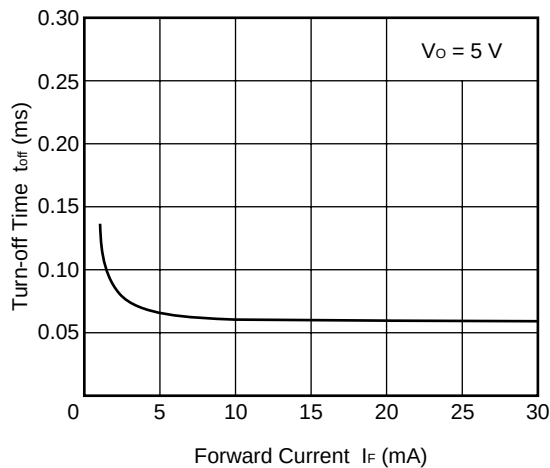
ON-STATE RESISTANCE DISTRIBUTION



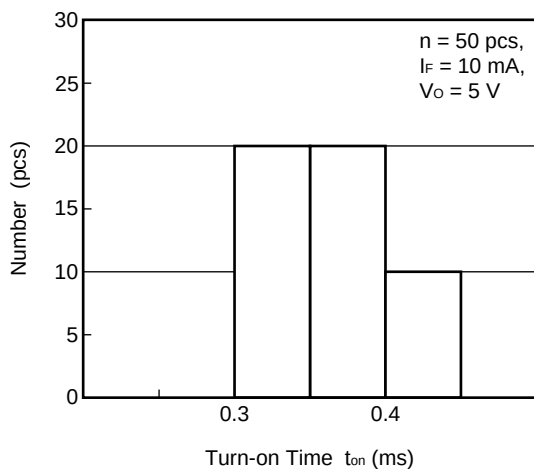
TURN-ON TIME vs. FORWARD CURRENT



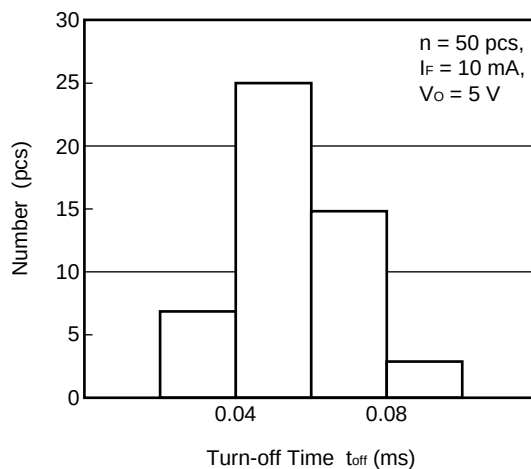
TURN-OFF TIME vs. FORWARD CURRENT



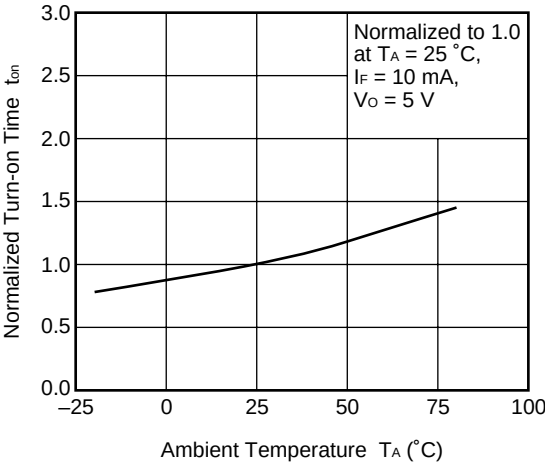
TURN-ON TIME DISTRIBUTION



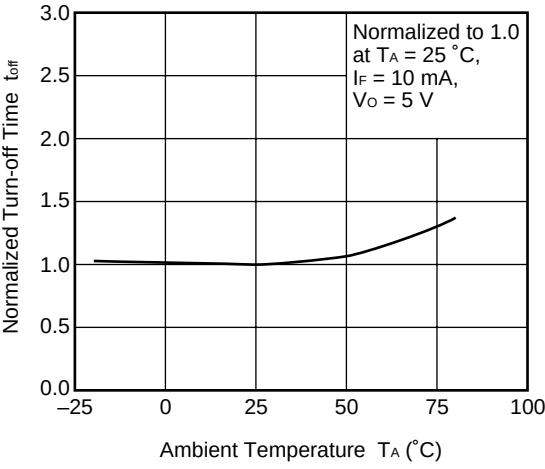
TURN-OFF TIME DISTRIBUTION



NORMALIZED TURN-ON TIME vs.
AMBIENT TEMPERATURE



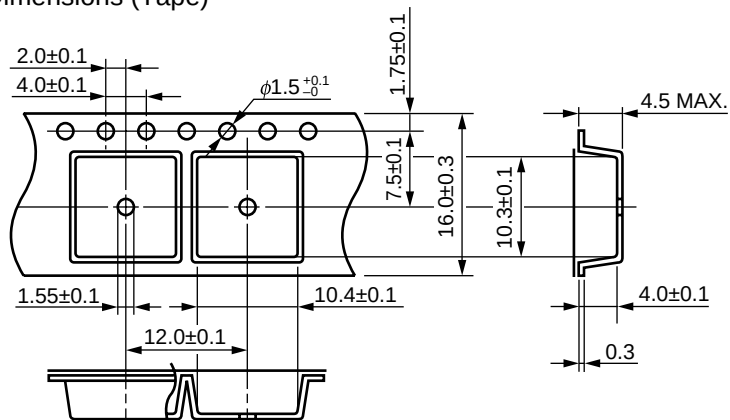
NORMALIZED TURN-OFF TIME vs.
AMBIENT TEMPERATURE



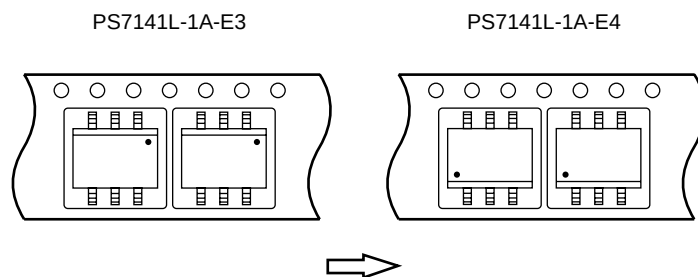
Remark The graphs indicate nominal characteristics.

★ TAPING SPECIFICATIONS (in millimeters)

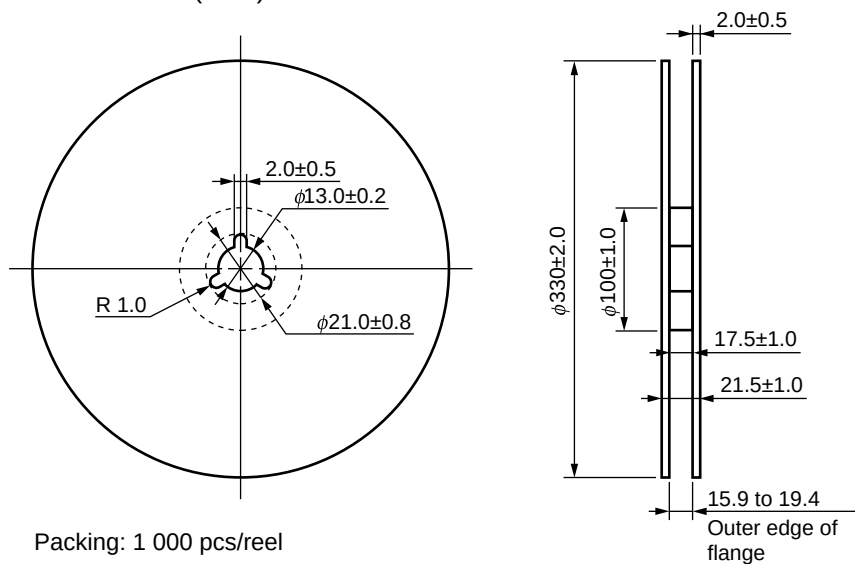
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



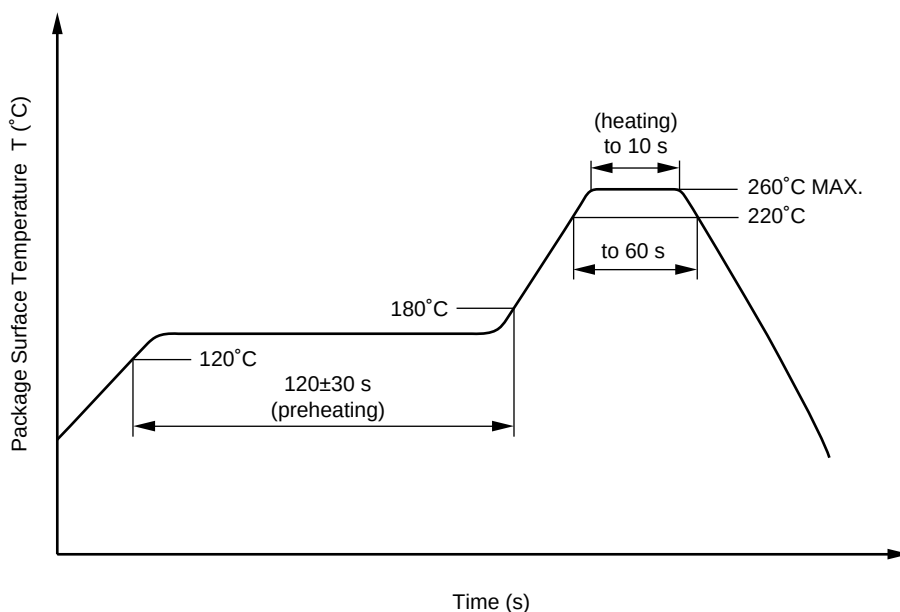
Packing: 1 000 pcs/reel

★ **RECOMMENDED SOLDERING CONDITIONS**

(1) Infrared reflow soldering

- Peak reflow temperature 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.

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M8E 00.4-0110

SAFETY INFORMATION ON THIS PRODUCT

Caution GaAs Products	The product contains gallium arsenide, GaAs. GaAs vapor and powder are hazardous to human health if inhaled or ingested. • Do not destroy or burn the product. • Do not cut or cleave off any part of the product. • Do not crush or chemically dissolve the product. • Do not put the product in the mouth. Follow related laws and ordinances for disposal. The product should be excluded from general industrial waste or household garbage.
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►For further information, please contact

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