NEC

4 PIN SOP, 100 V BREAKDOWN VOLTAGE 1-CH OPTICAL COUPLED MOSFET

PS7212-1A

FEATURES

- **SMALL AND THIN PACKAGE:**
  4 pin SOP, Height = 2.1 mm
- **1 CHANNEL TYPE:**
  1a output
- **LOW LED OPERATING CURRENT:**
  I_F = 2 mA
- **DESIGNED FOR AC/DC SWITCHING LINE CHANGER**
- **LOW OFFSET VOLTAGE**
- **SURFACE MOUNT AVAILABLE:**
  PS7212-1A-E3, E4, F3, F4

DESCRIPTION

The PS7212-1A is a solid state relay containing GaAs LEDs on the light emitting side (input side) and normally open (N.O.) MOS FETs on the output side.

It is suitable for analog control because of its low offset and high linearity.

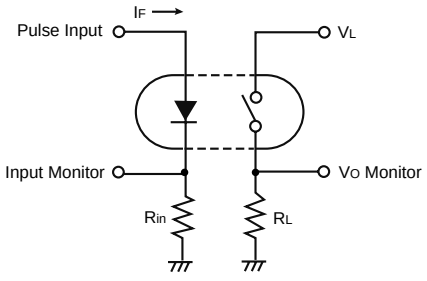
APPLICATIONS

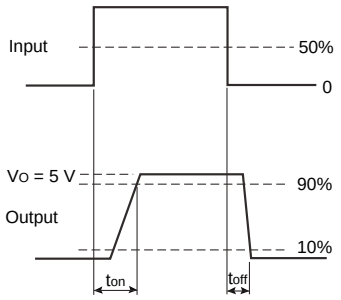
- **LAPTOP PC, PDA**
- **MODEM, CARD**
- **TELEPHONE, FAX**
- **MEASUREMENT EQUIPMENT**

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

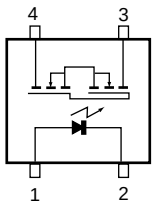
PART NUMBER				PS7214-1A		
	SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX
Diode	V_F	Forward Voltage, I_F = 10 mA	V		1.2	1.4
	I_R	Reverse Current, V_R = 5 V	μA			5.0
MOS FET	I_{LOFF}	Off-State Leakage Current, V_D = 100 V	μA		0.03	1.0
	C_{OUT}	Output Capacitance, V_D = 0 V, f = 1 MHz	pF		57	
Coupled	I_{Fon}	LED On-State Current, I_L = 200 mA	mA			2.0
	R_{on}	On-state Resistance, I_F = 10 mA, I_L = 10 mA	Ω		3.0	6.0
		I_F = 10 mA, I_L = 200 mA t≤10 ms				
	t_{ON}	Turn-on Time[1], I_F = 10 mA, V_O = 5 V, PW ≥ 10 ms	ms		0.35	1.0
	t_{OFF}	Turn-off Time[1], I_F = 10 mA, V_O = 5 V, PW ≥ 10 ms	ms		0.08	0.2
	R_{I-O}	Isolation Resistance, V_{I-O} = 1.0 kV$_{DC}$	Ω	10^9		
	C_{I-O}	Isolation Capacitance, V = 0 V, f = 1 MHz	pF		0.5	

Note:
1. Test Circuit for Switching Time





PS7212-1A



ABSOLUTE MAXIMUM RATINGS[1] (T_A = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
Diode			
I_F	Forward Current (DC)	mA	50
V_R	Reverse Voltage	V	5.0
P_D	Power Dissipation	mW	50
I_{FP}	Peak Foward Current[2]	A	1
MOSFET			
V_L	Break Down Voltage	V	100
I_L	Continuous Load Current	mA	200
I_{LP}	Pulse Load Current[3] (AC/DC Connection)	mA	400
P_D	Power Dissipation	mW	300
Coupled			
BV	Isolation Voltage[4]	Vr.m.s.	1500
P_T	Total Power Dissipation	mW	350
T_A	Operating Ambient Temp.	°C	-40 to +80
T_{STG}	Storage Temperature	°C	-40 to +100

Notes:
1. Operation in excess of any one of these parameters may result in permanent damage.
2. PW = 100 µs, Duty Cycle = 1 %
3. PW = 100 ms, 1 shot
4. AC voltage for 1 minute at T_A = 25 °C, RH = 60 % between input and output.

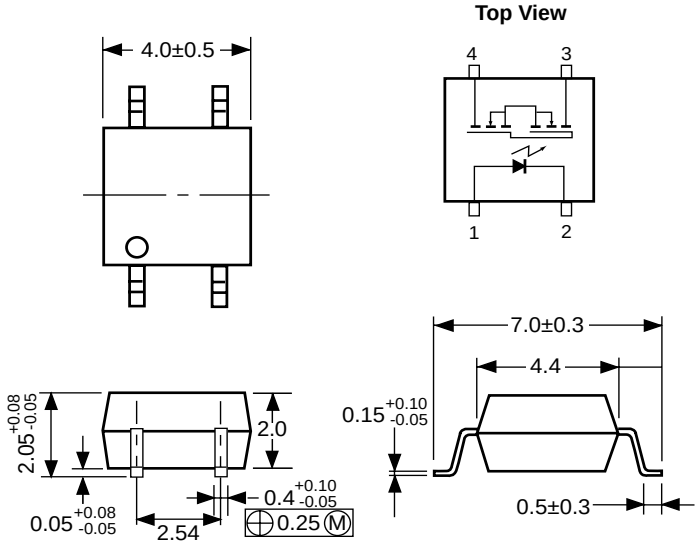
RECOMMENDED OPERATING CONDITIONS (T_A = 25°C)

PART NUMBER		PS7212-1A			
SYMBOLS	PARAMETERS	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	PACKING STYLE
PS7212-1A	Magazine case, 100 pcs
PS7212-1A-E3	Embossed Tape, 900 pcs/reel
PS7212-1A-E4	
PS7212-1A-F3	Embossed Tape, 3500 pcs/reel
PS7212-1A-F4	

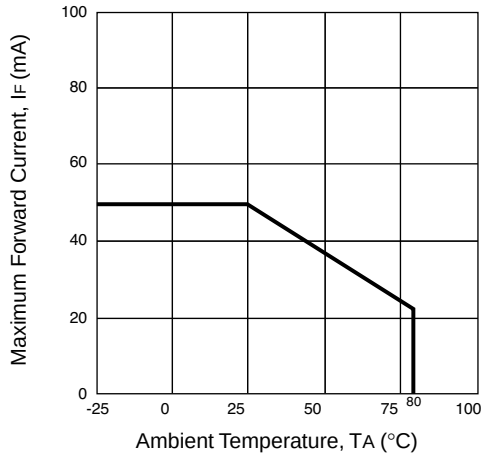
OUTLINE DIMENSIONS (Units in mm)



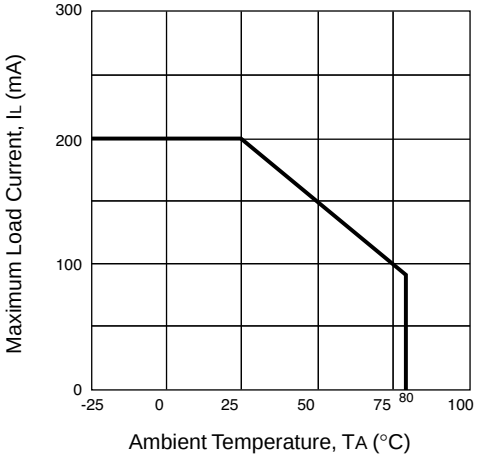
1. LED Anode
2. LED Cathode
3. MOS FET
4. MOS FET

TYPICAL PERFORMANCE CURVES (T_A = 25°C)

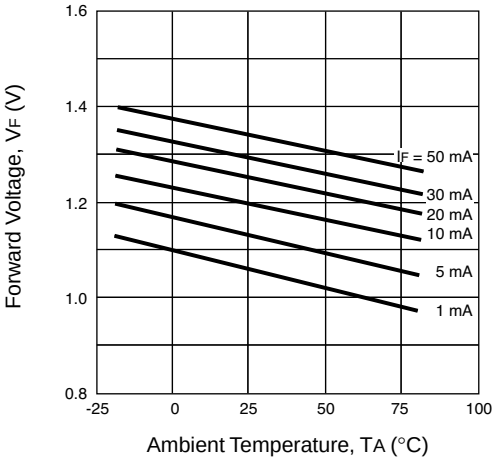
MAXIMUM FORWARD CURRENT vs. AMBIENT TEMPERATURE



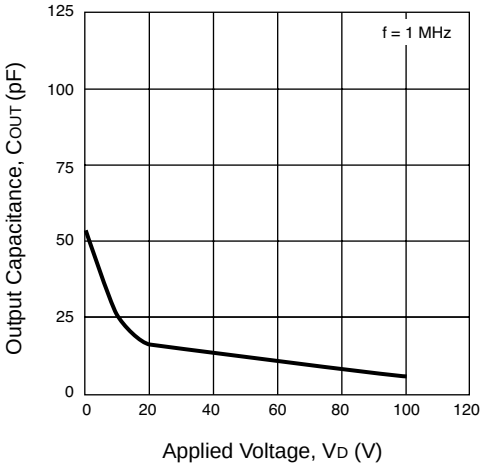
MAXIMUM LOAD CURRENT vs. AMBIENT TEMPERATURE



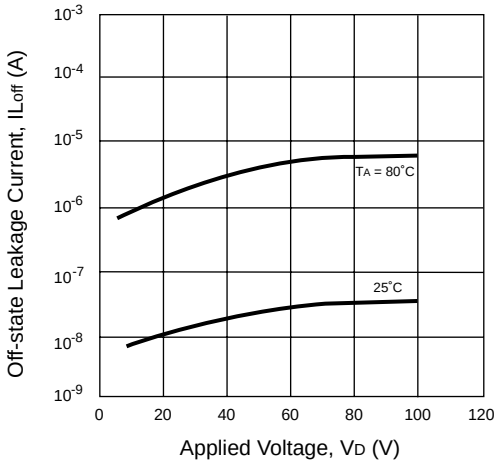
FORWARD VOLTAGE vs. AMBIENT TEMPERATURE



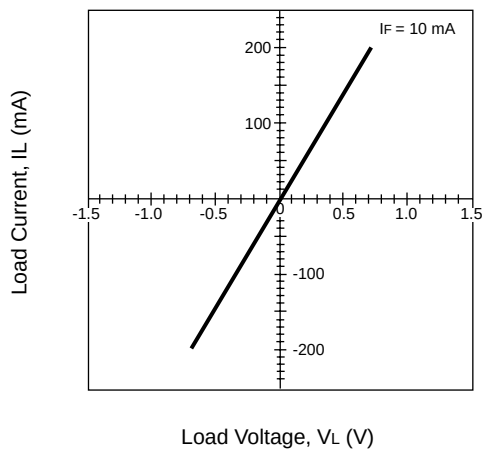
OUTPUT CAPACITANCE vs. APPLIED VOLTAGE



OFF-STATE LEAKAGE CURRENT vs. APPLIED VOLTAGE

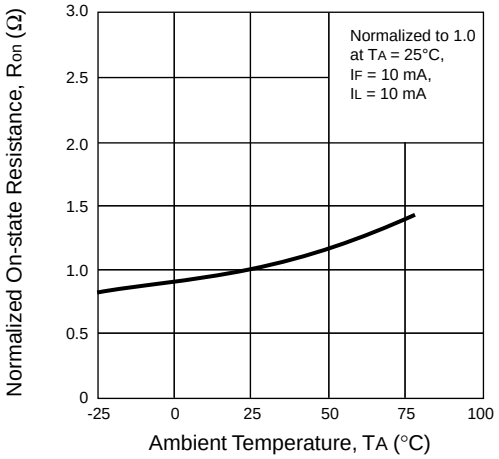


LOAD CURRENT vs. LOAD VOLTAGE

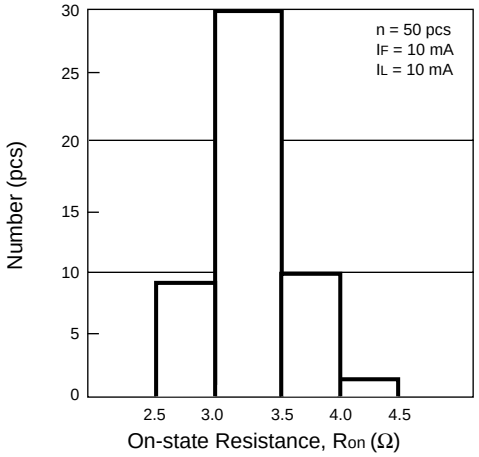


TYPICAL PERFORMANCE CURVES (T_A = 25°C)

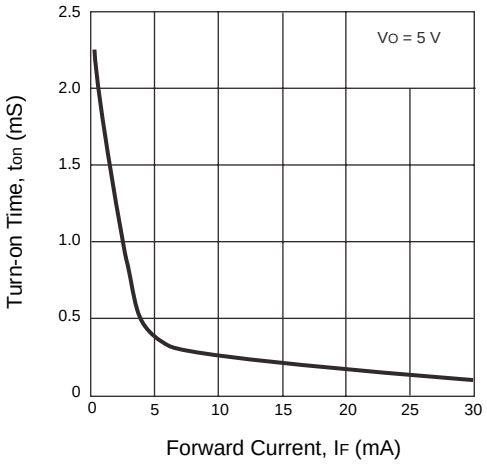
NORMALIZED ON-STATE RESISTANCE vs. APPLIED VOLTAGE



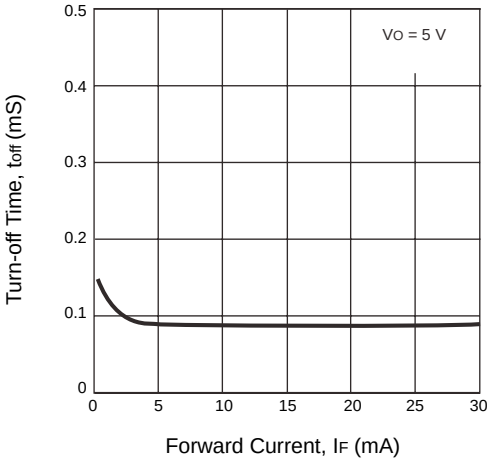
ON-STATE RESISTANCE DISTRIBUTION



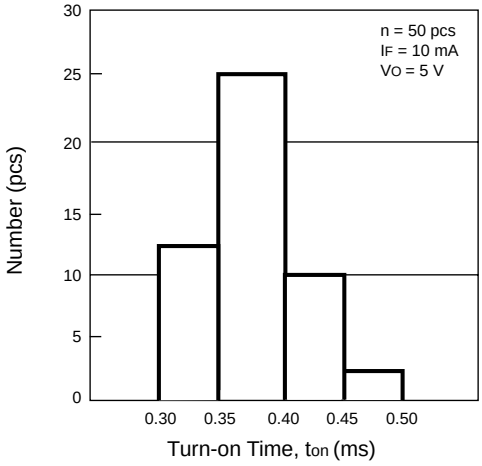
TURN-ON TIME vs. FORWARD CURRENT



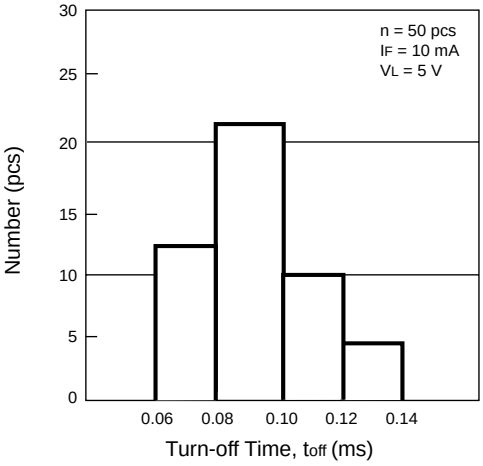
TURN-OFF TIME vs. FORWARD CURRENT



TURN-ON TIME DISTRIBUTION

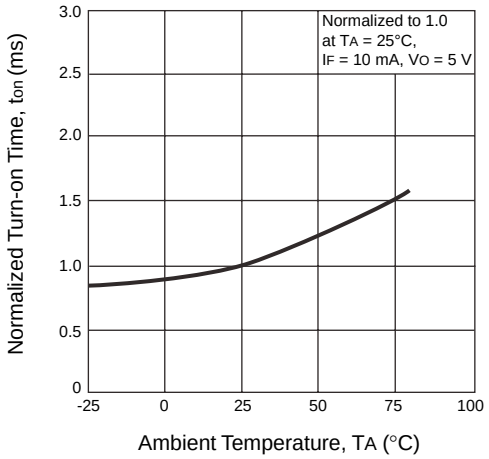


TURN-OFF TIME DISTRIBUTION

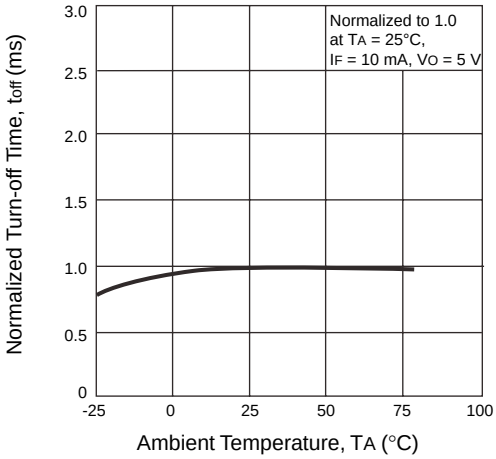


TYPICAL PERFORMANCE CURVES (T_A = 25°C)

NORMALIZED TURN-ON TIME vs. AMBIENT TEMPERATURE

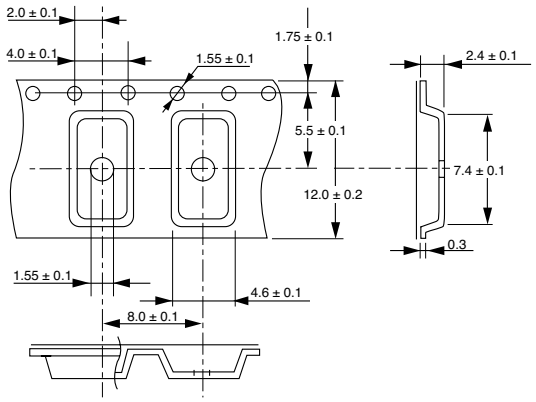


NORMALIZED TURN-OFF TIME vs. AMBIENT TEMPERATURE

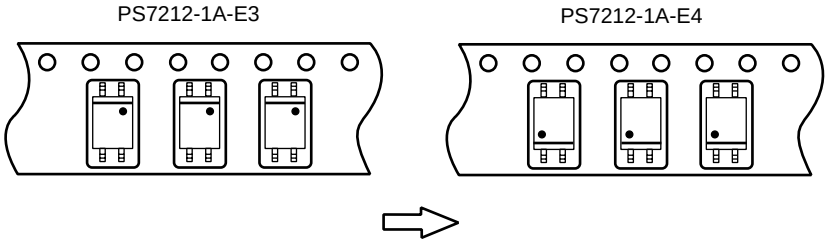


TAPING SPECIFICATIONS (Units in mm)

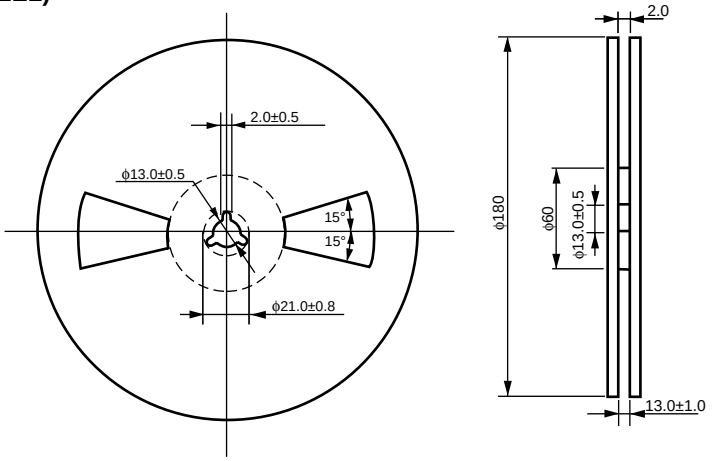
OUTLINE AND DIMENSIONS (TAPE)



TAPE DIRECTION

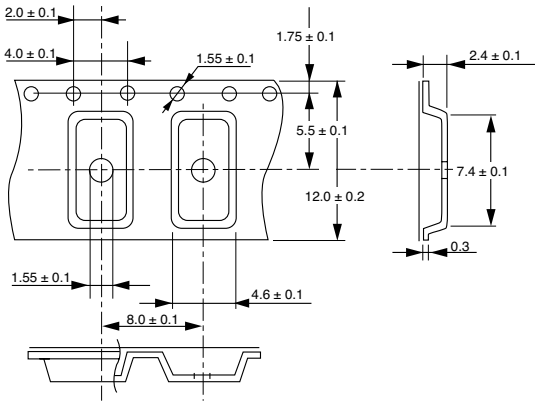


OUTLINE AND DIMENSIONS (REEL)

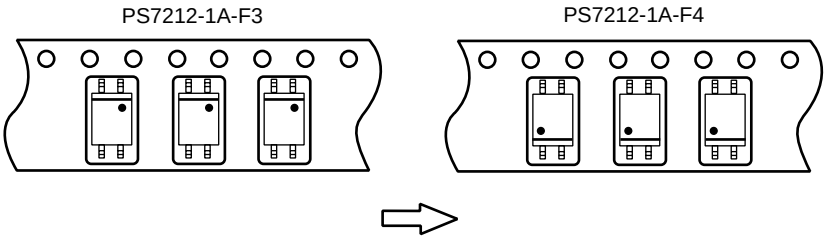


TAPING SPECIFICATIONS (Units in mm)

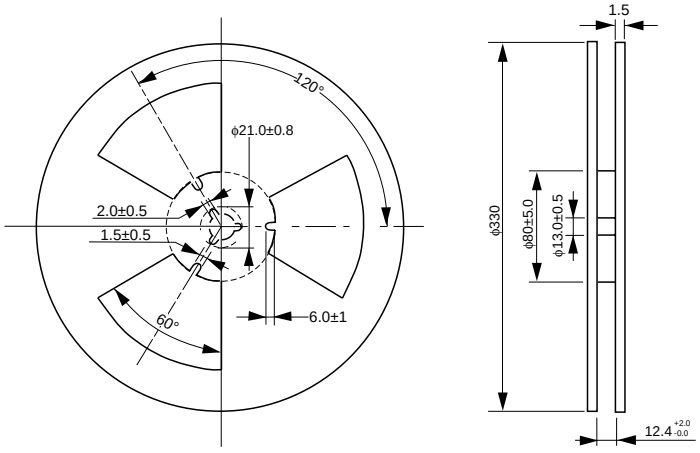
OUTLINE AND DIMENSIONS (TAPE)



TAPE DIRECTION



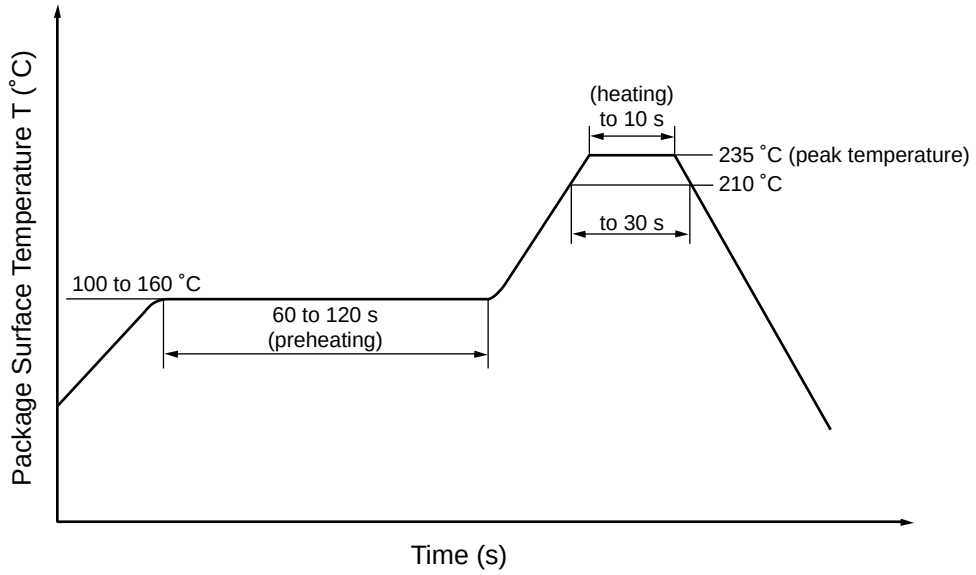
OUTLINE AND DIMENSIONS (REEL)



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.)



(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.