NEC

8 PIN SOP 400 V BREAKDOWN VOLTAGE TRANSFER TYPE 2-CH OPTICAL COUPLED MOSFET

PS7241-1C

FEATURES

- **2 CHANNEL TYPE:**
  1a + 1b Output
- **DESIGNED FOR AC/DC SWITCHING LINE CHANGER**
- **SMALL AND THIN PACKAGE:**
  8 PIN SOP
- **LOW LED OPERATING CURRENT:**
  I_F = 2 mA
- **LOW OFFSET VOLTAGE**
- **AVAILABLE IN TAPE AND REEL**

DESCRIPTION

PS7241-1C is a transfer type solid state relay containing normally open (N.O.) contact and normally closed (N.C.) contact on the output side.

This device is suitable for analog signal control because of its low offset and high linearity.

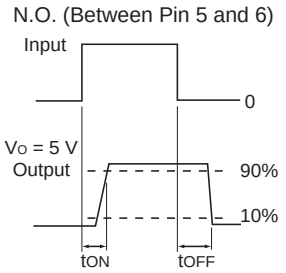
APPLICATIONS

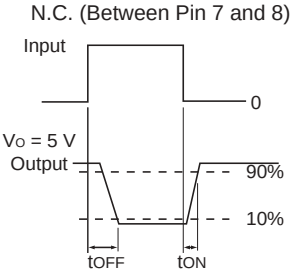
- **EXCHANGE EQUIPMENT**
- **MEASUREMENT EQUIPMENT**
- **FA/OA EQUIPMENT**
- **COMMUNICATIONS EQUIPMENT**
- **DAA (MODEM)**

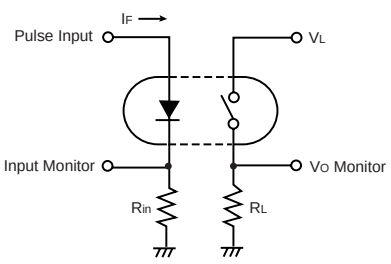
ELECTRICAL CHARACTERISTICS (T_A = 25°C)

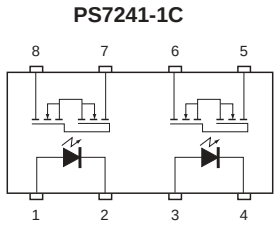
PART NUMBER					PS7241-1C		
	SYMBOLS	PARAMETERS		UNITS	MIN	TYP	MAX
Diode	V_F	Forward Voltage, I_F = 10 mA		V		1.2	1.4
	I_R	Reverse Current, V_R = 5 V		μA			5
MOSFET	I_{Loff}	Off-State Leakage Current, N.O.: I_F = 0 mA, V_D = 400 V N.C.: I_F = 10 mA, V_D = 400 V		μA		0.03	1
	C_{OUT}	Output Capacitance	N.O.: V_D = 0 mA, f = 1.0 mHz	pF/ch		65	
			N.C.: V_D = 0 mA, f = 1.0 mHz, I_F = 10 mA			185	
Coupled	I_{Fon}	LED On-state Current NO: I_L = 120 mA		mA			2.0
	I_{Foff}	LED Off-state Current NC I_L = 120 mA					
	R_{on1}	On-State Resistance,	N.O.: I_F = 10 mA, I_L = 10 mA	Ω		21	30
			N.C.: I_F = 0 mA, I_L = 10 mA				
	R_{on2}		N.O.: I_F = 10 mA, I_L = 120 mA, t ≤10 ms	Ω		16	25
			N.C.: I_F = 0 mA, I_L = 120 mA, t ≤10 ms				
	t_{ON} (N.O.) t_{ON} (N.C.)	Turn-On Time[1]	I_F = 10 mA, V_O = 5 V, PW ≥ 10 ms	ms		0.2	1.0
						0.02	0.2
	t_{OFF} (N.O.) t_{OFF} (N.C.)	Turn-Off Time[1]				0.02	0.2
						0.1	1.0
	R_{I-O}	Isolation Resistance, V_{IN-OUT} = 1.0 kV_{DC}		Ω	10^9		
	C_{I-O}	Isolation Capacitance, V = 0 V, f = 1 MHz		pF/ch		0.4	

Note:
1. Test Circuit for Switching Time:









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

SYMBOLS	PARAMETERS	UNITS	RATINGS
Diode			
V_R	Reverse Voltage	V	5
I_F	Forward Current (DC)	mA	50
P_D	Power Dissipation	mW/ch	50
$I_{F\ (Peak)}$	Peak Forward Current[2]	A	1
MOSFET			
V_L	Break Down Voltage	V	400
I_L	Continuous Load Current	mA	120
I_{LP}	Pulse Load Current[4] (AC/DC Current)	mA	200
P_D	Power Dissipation	mW/ch	180
Coupled			
BV	Isolation Voltage[3]	Vr.m.s.	1500
P_T	Total Power Dissipation	mW	460
T_{STG}	Storage Temperature	°C	-40 to +100
T_A	Ambient Temperature	°C	-40 to +80

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

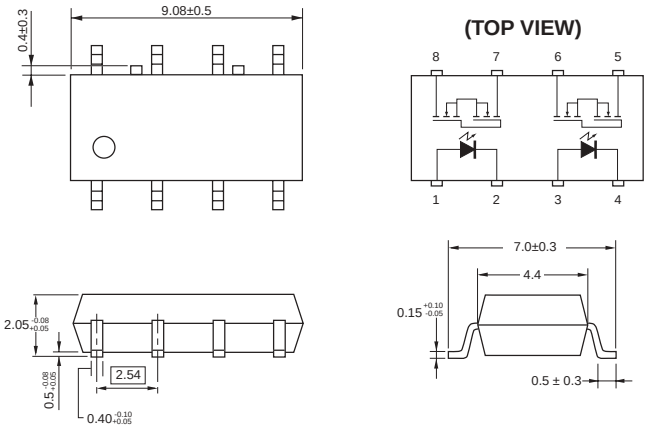
ORDERING INFORMATION

PART NUMBER	PACKAGE	PACKING STYLE
PS7241-1C	8 pin SOP	Magazine case 45 pcs
PS7241-1C-F3		Embossed tape 1500 pcs/reel
PS7241-1C-F4		

RECOMMENDED OPERATING CONDITIONS (T_A = 25 °C)

SYMBOL	PARAMETER	UNITS	MIN	TYP	MAX
I_F	LED Operating Current	mA	2	10	20
V_F	LED Off Voltage	V	0		0.5

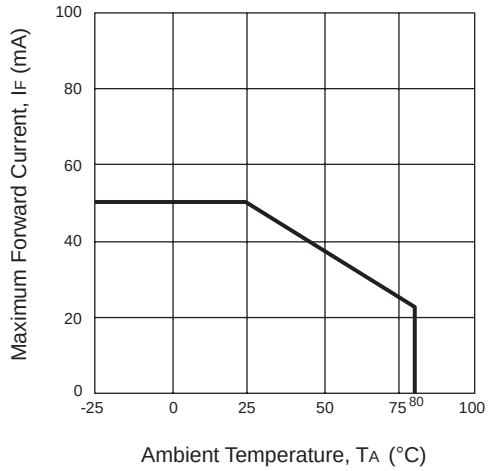
OUTLINE DIMENSIONS (Units in mm)



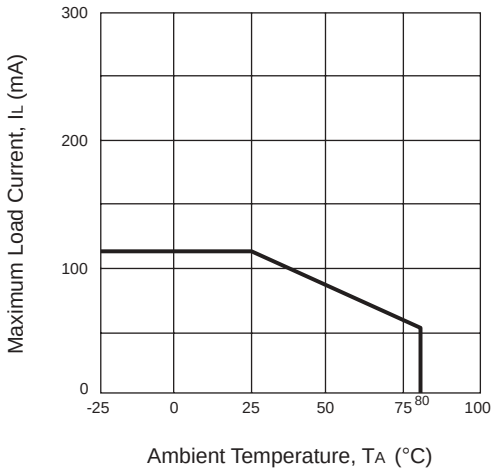
1. LED Anode
2. LED Cathode
3. LED Anode
4. LED Cathode
5. MOSFET (N.O.)
6. MOSFET (N.O.)
7. MOSFET (N.C.)
8. MOSFET (N.C.)

TYPICAL PERFORMANCE CURVES (T_A = 25 °C)

MAXIMUM FORWARD CURRENT vs. AMBIENT TEMPERATURE

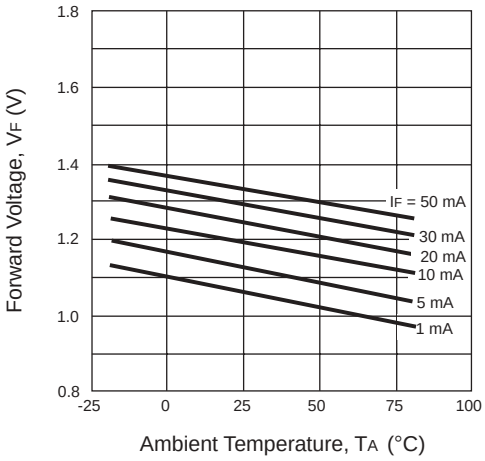


MAXIMUM LOAD CURRENT vs. AMBIENT TEMPERATURE

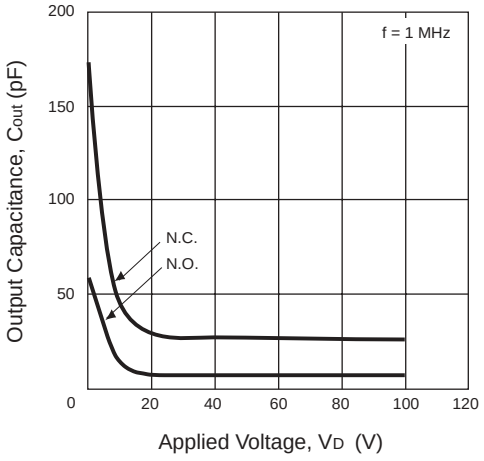


TYPICAL PERFORMANCE CURVES (T_A = 25 °C)

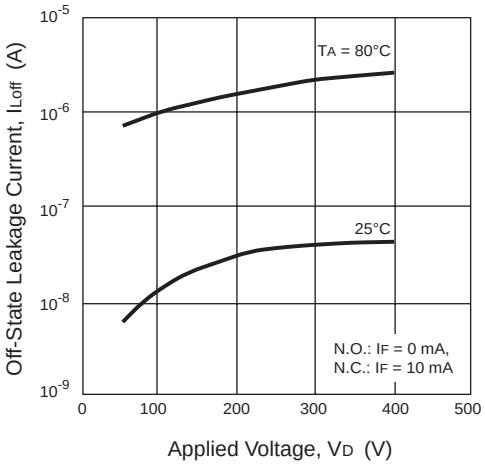
FORWARD VOLTAGE vs. AMBIENT TEMPERATURE



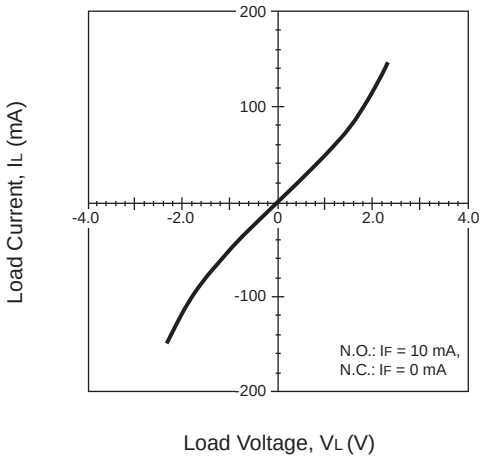
OUTPUT CAPACITANCE vs. APPLIED VOLTAGE



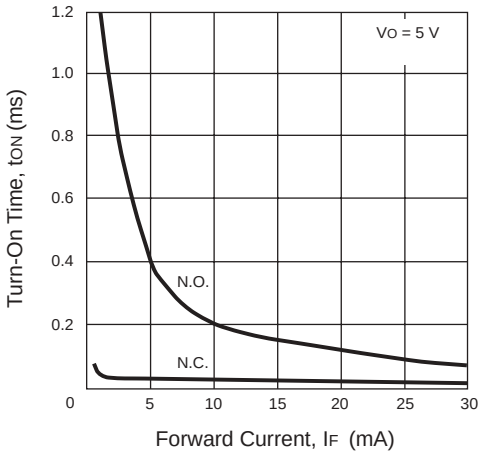
OFF-STATE LEAKAGE CURRENT vs. APPLIED VOLTAGE



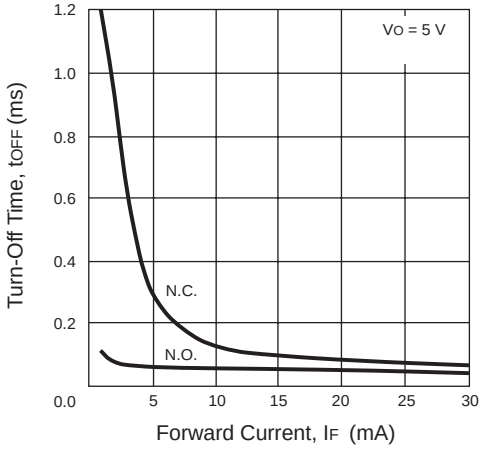
LOAD CURRENT vs. LOAD VOLTAGE



TURN-ON TIME vs. FORWARD CURRENT

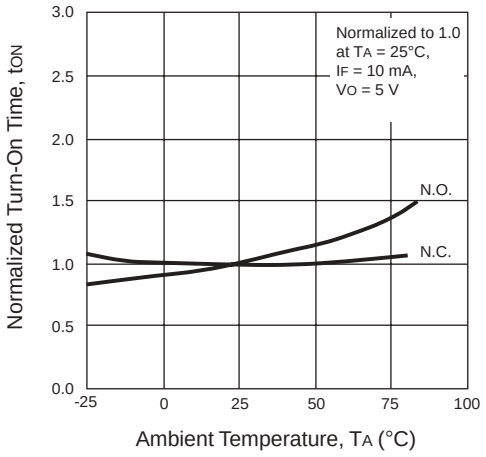


TURN-OFF TIME vs. FORWARD CURRENT

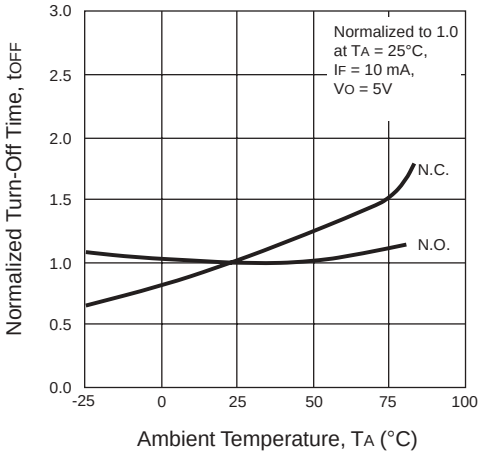


TYPICAL PERFORMANCE CURVES (T_A = 25 °C)

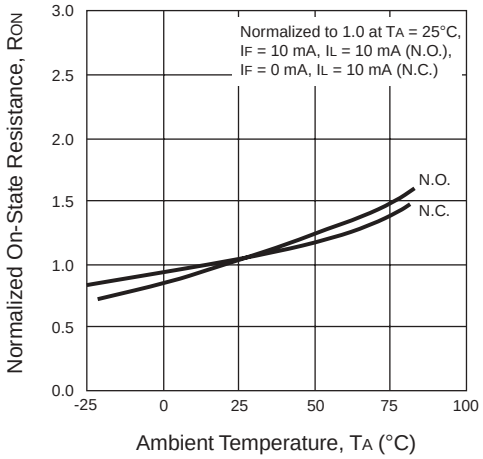
NORMALIZED TURN-ON TIME vs. AMBIENT TEMPERATURE



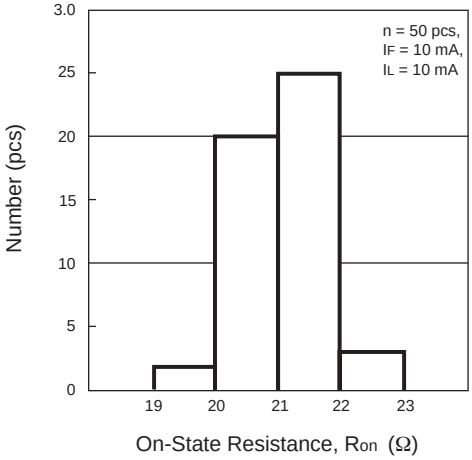
NORMALIZED TURN-OFF TIME vs. AMBIENT TEMPERATURE



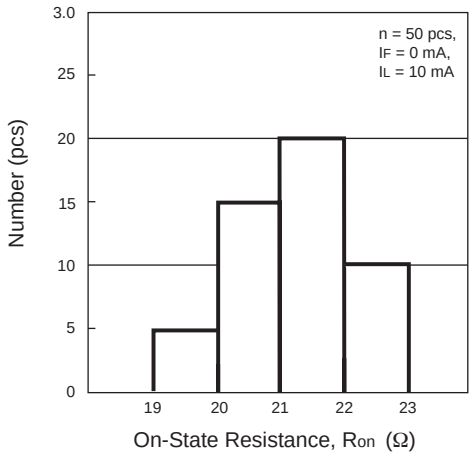
NORMALIZED ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE



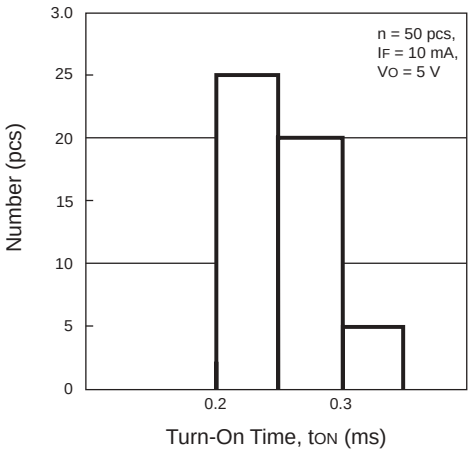
ON-STATE RESISTANCE (N.O.) DISTRIBUTION



ON-STATE RESISTANCE (N.C.) DISTRIBUTION

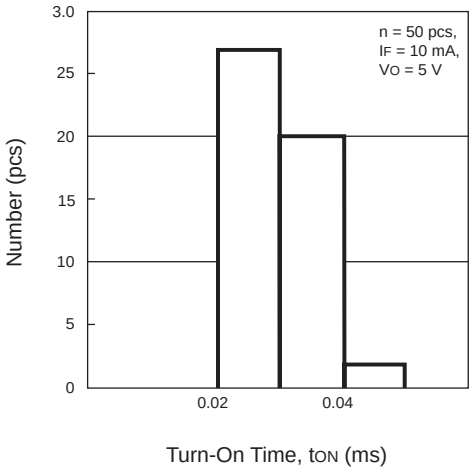


TURN-ON TIME (N.O) DISTRIBUTION

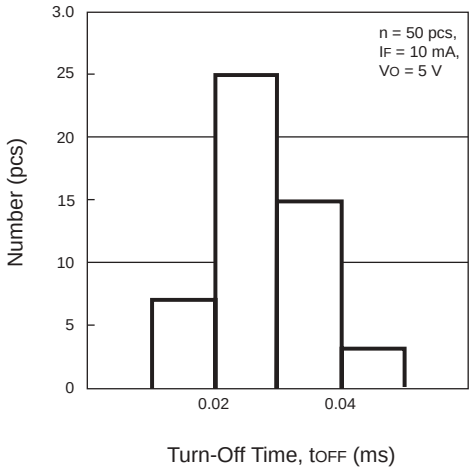


TYPICAL PERFORMANCE CURVES (T_A = 25 °C)

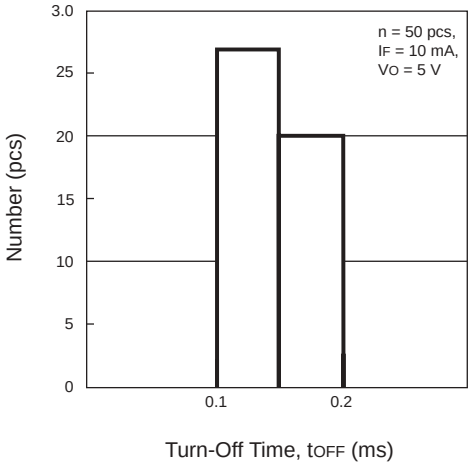
TURN-ON TIME (N.C) DISTRIBUTION



TURN-OFF TIME (N.O) DISTRIBUTION

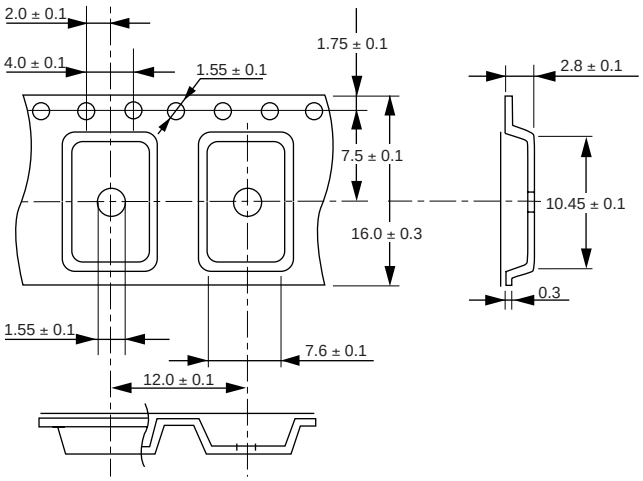


TURN-OFF TIME (N.C) DISTRIBUTION

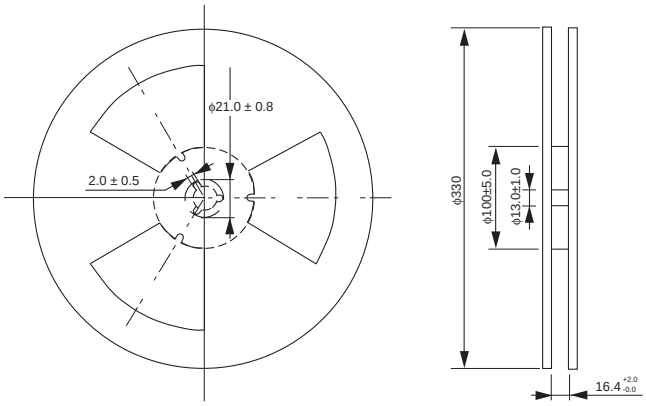


TAPING SPECIFICATIONS (Units in mm)

OUTLINE AND DIMENSIONS (TAPE)

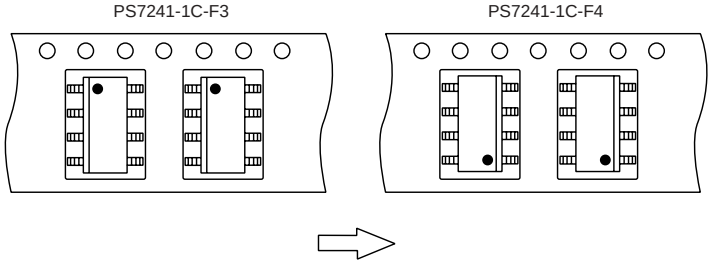


OUTLINE AND DIMENSIONS (REEL)



Packing : 1500 pcs/reel

TAPING DIRECTION

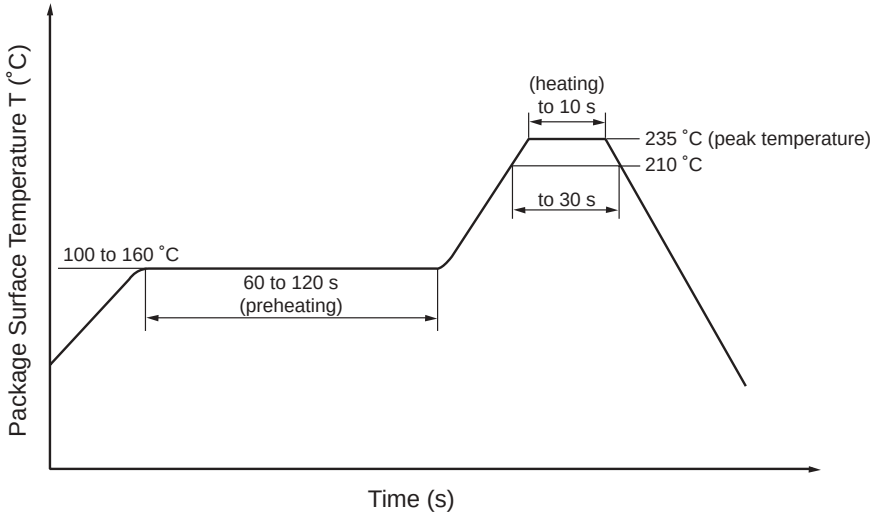


RECOMMENDED SOLDERING CONDITIONS

(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.)

Recommended Temperature Profile of Infrared Reflow

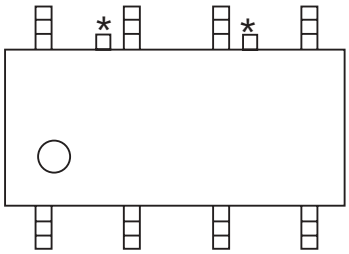


(2) Dip soldering

• 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.
- Avoid shorting between portion of frame and leads.



*: Portion of frame