CEL

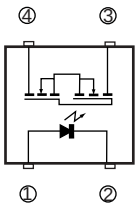
NEC's 4 PIN SOP SOLID STATE RELAY

PS7241-1A

FEATURES

- **1 CHANNEL TYPE**
  (1a output)
- **DESIGNED FOR AC/DC SWITCHING LINE CHANGER**
- **SMALL PACKAGE**
  4 pin SOP
- **LOW OFFSET VOLTAGE**
- **SURFACE MOUNT TYPE LEAD**
  PS7241-1A-F3, PS7241-1A-F4
- **LOW LED OPERATING CURRENT**
  I_F = 2 mA

PS7241-1A



DESCRIPTION

NEC's PS7241-1A is a solid state relay containing a GaAs LED on the input side and a MOSFET on the output side. It is suitable for analog signal control because of its low offset and high linearity.

APPLICATIONS

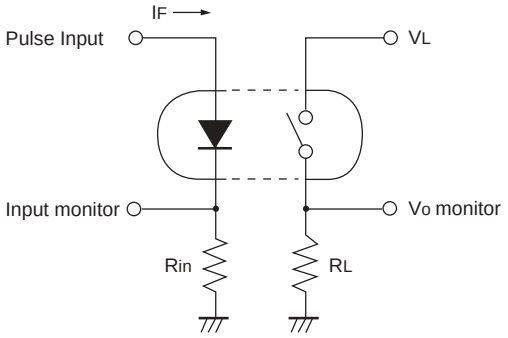
- **EXCHANGE EQUIPMENT**
- **MEASUREMENT EQUIPMENT**
- **FA/OA EQUIPMENT**
- **LAPTOP PC, PDA**

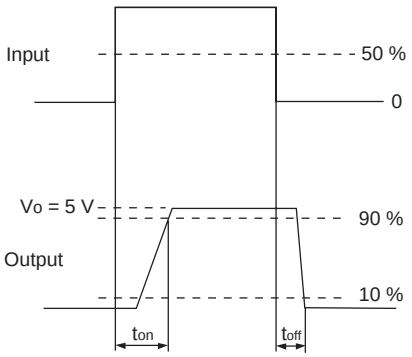
ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

PART NUMBER				PS7241-1A		
	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	C_{OUT}	Output Capacitance, VD = 0 V, f = 1 MHz	pF/ch		54	
	I_{LOFF}	Off-State Leakage Current, I_F = 0 mA, V_D = 400 V	μA		0.03	1.0
Coupled	R_{ON}[1]	On-State Resistance, I_F = 10 mA, I_L = 10 mA	Ω		18	30
	R_{ON}[2]	On-State Resistance, I_F = 10 mA, I_L = 120 mA, t ≤ 10 ms	Ω		15	25
	t_{ON}[1]	Turn-on Time, I_F = 10 mA, V_L = 5 V, R_L = 500 Ω, PW ≥ 10 ms	ms		0.5	2.0
	t_{OFF}[1]	Turn-off Time, I_F = 10 mA, V_L = 5 V, R_L = 2 KΩ, PW ≥ 10 ms	ms		0.07	0.2
	R_{I-O}	Isolation Resistance, V_{I-O} = 1.0 kV	Ω	10^9		
	C_{I-O}	Isolation Capacitance, V = 0 V, f = 1 MHz	pF/ch		0.5	

Notes:

1. Test Circuit for Switching Time





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

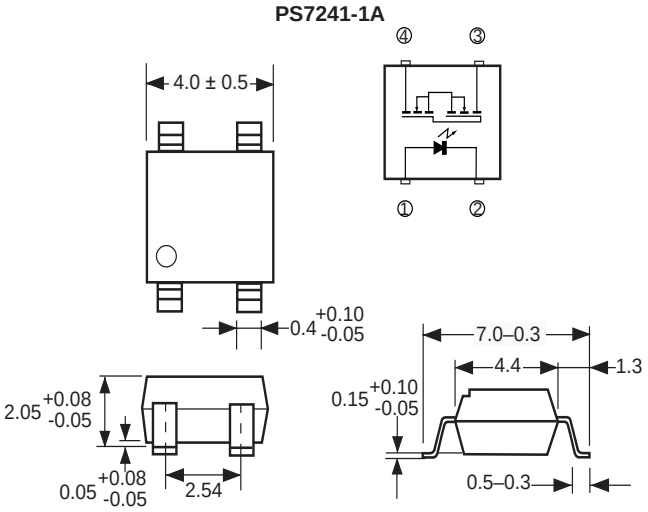
SYMBOLS	PARAMETERS	UNITS	RATINGS
Diode			
I_F	Forward Current (DC)	mA	50
V_R	Reverse Voltage	V	5.0
P_D	Power Dissipation	mW/ch	50
I_{FP}	Peak Foward Current[2]	A	1
MOS FET			
V_L	Break Down Voltage	V	400
I_L	Continuous Load Current	mA	120
I_{LP}	Pulse Load Current[3]	mA	240
P_D	Power Dissipation	mW/ch	300
Coupled			
BV	Isolation Voltage[4]	Vr.m.s.	1500
P_T	Total Power Dissipation	mW	350
T_{OP}	Operating Temperature	°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. AC voltage for 1 minute at T_A = 25 °C, RH = 60 % between input and output.
4. PW = 100 ms, 1 shot

RECOMMENDED OPERATING CONDITIONS (T_A = 25°C)

PART NUMBER		PS7241-1A			
SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX
I_F	LED Operating Current	mA	2	10	20
V_F	LED Off Voltage	V	0		0.5

OUTLINE DIMENSIONS (Units in mm)



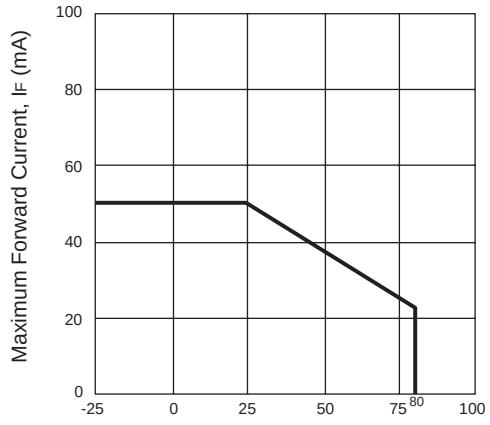
1. LED Anode
2. LED Cathode
3. MOSFET
4. MOSFET

ORDERING INFORMATION

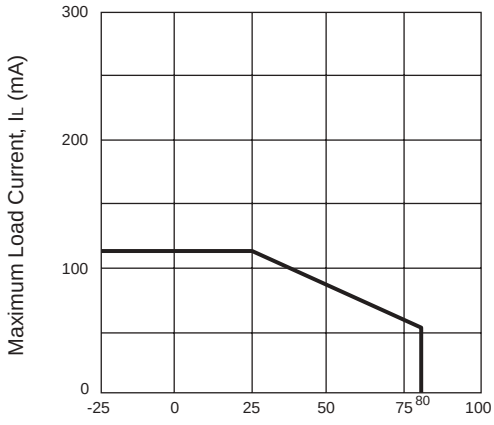
PART	PACKAGE NUMBER	PACKING STYLE	APPLICATION PART NUMBER
PS7241-1A	4-pin SOP	Magazine case 100 pcs	PS7241-1A
PS7241-1A-E3		Embossed Tape 900 pcs/reel	
PS7241-1A-E4			
PS7241-1A-E5		Embossed Tape 1000 pcs/reel	
PS7241-1A-F3		Embossed Tape 3500 pcs/reel	
PS7241-1A-F4			

TYPICAL PERFORMANCE CURVES (T_A = 25 °C)

MAXIMUM FORWARD CURRENT vs. AMBIENT TEMPERATURE

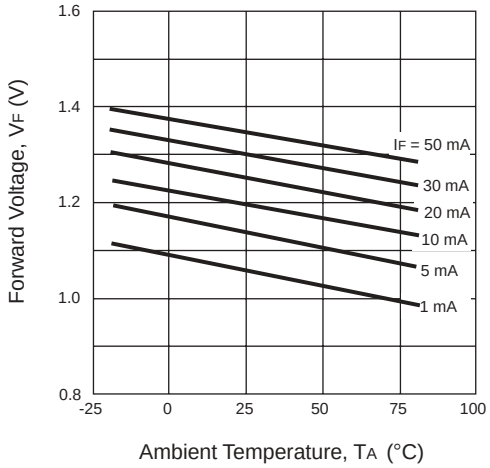


MAXIMUM LOAD CURRENT vs. AMBIENT TEMPERATURE

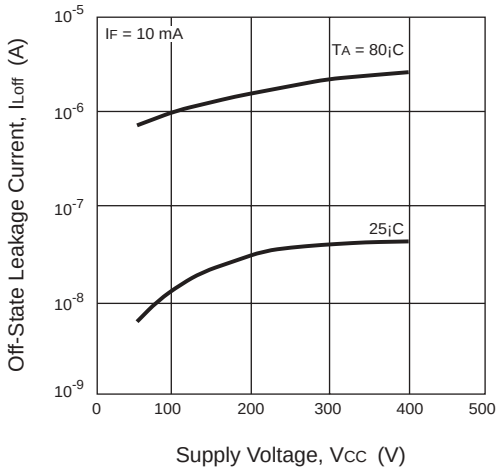


TYPICAL PERFORMANCE CURVES (T_A = 25 °C)

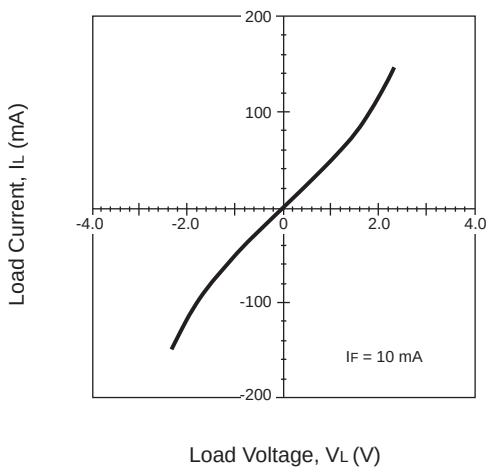
FORWARD VOLTAGE vs. AMBIENT TEMPERATURE



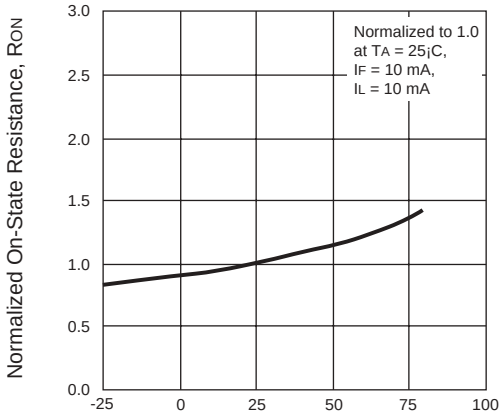
OFF-STATE LEAKAGE CURRENT vs. SUPPLY VOLTAGE



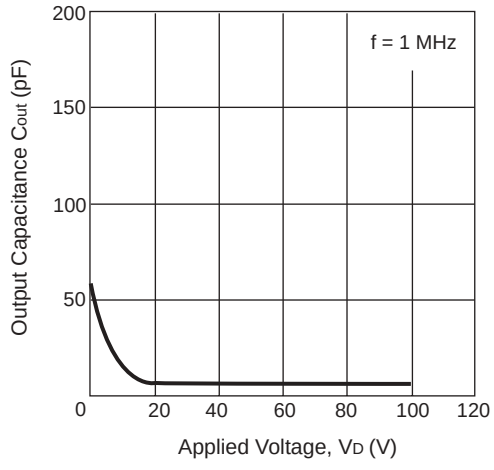
LOAD CURRENT vs. LOAD VOLTAGE



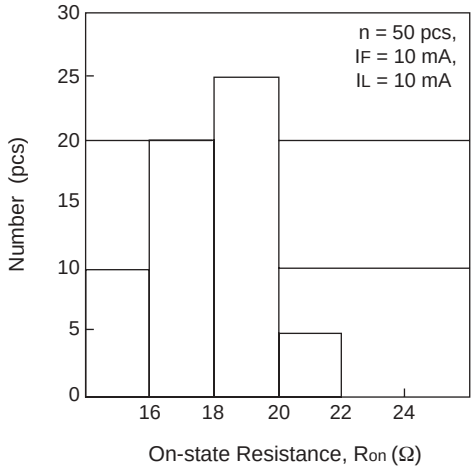
NORMALIZED ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE



OUTPUT CAPACITANCE vs. APPLIED VOLTAGE

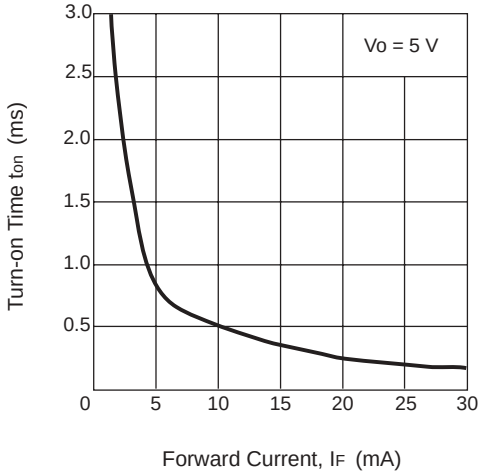


ON-STATE RESISTANCE DISTRIBUTION

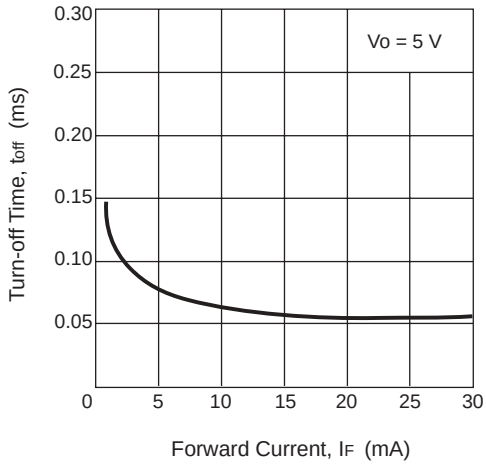


TYPICAL PERFORMANCE CURVES (T_A = 25 °C)

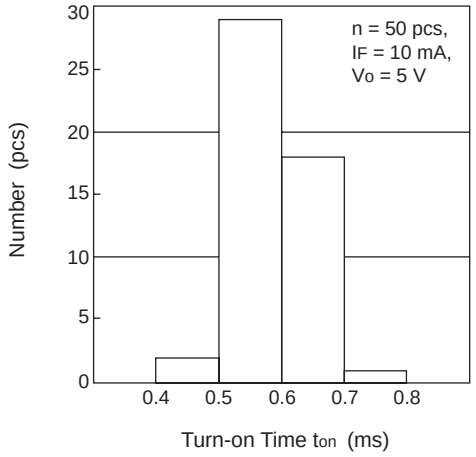
TURN-ON TIME vs. FORWARD CURRENT



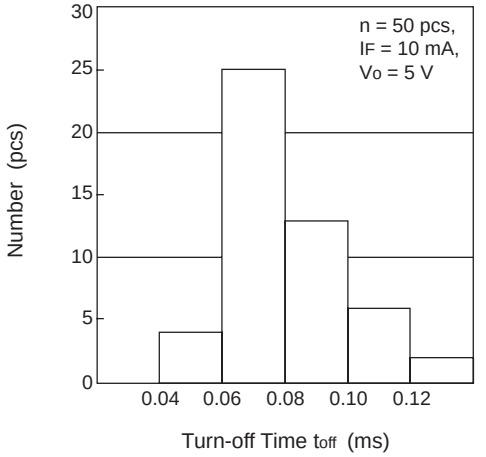
TURN-OFF TIME vs. FORWARD CURRENT



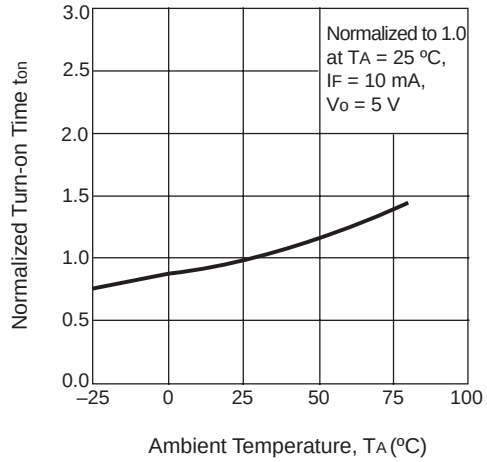
TURN-ON TIME DISTRIBUTION



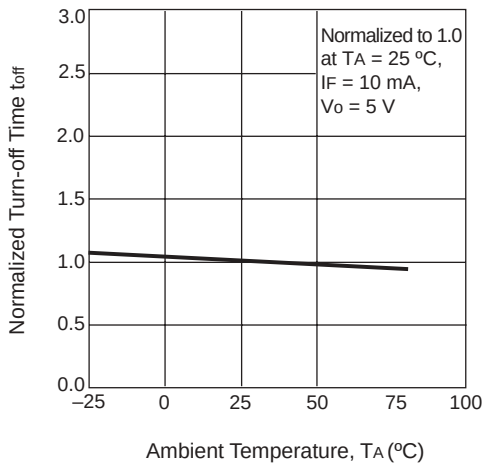
TURN-OFF TIME DISTRIBUTION



NORMALIZED TURN-ON TIME vs. AMBIENT TEMPERATURE

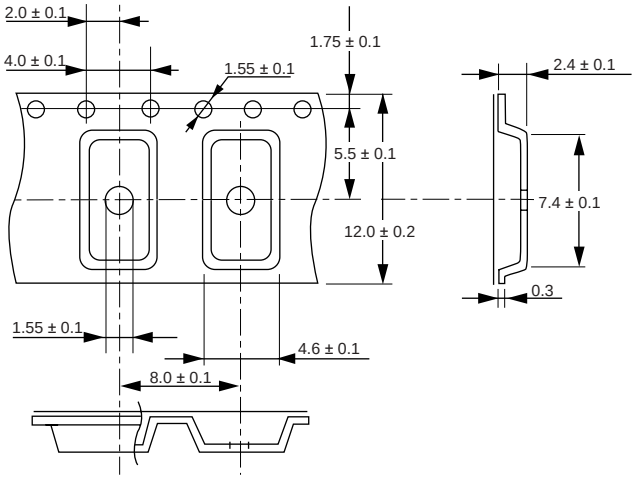


NORMALIZED TURN-OFF TIME vs. AMBIENT TEMPERATURE



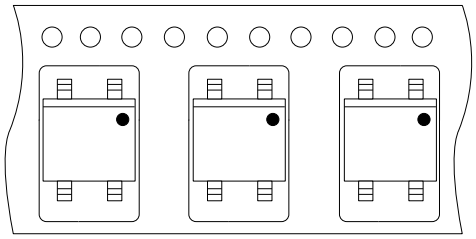
TAPING SPECIFICATIONS (Units in mm)

OUTLINE AND DIMENSIONS (TAPE)

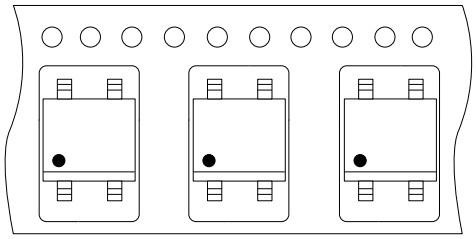


TAPE DIRECTION

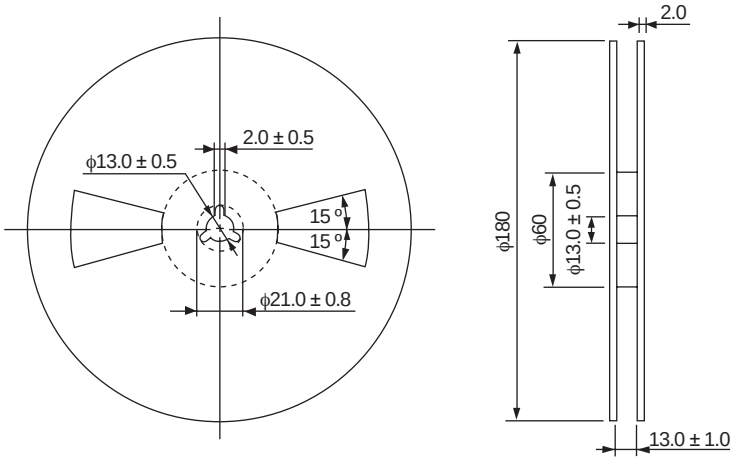
PS7241-1A-E3



PS7241-1A-E4



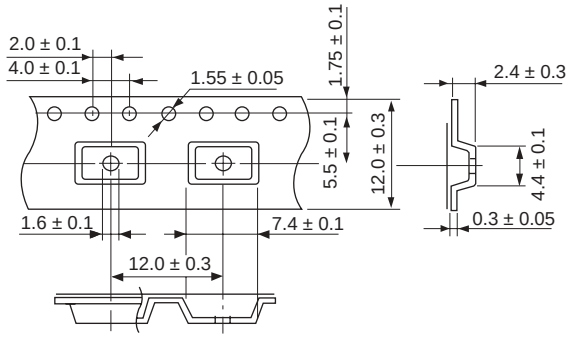
OUTLINE AND DIMENSIONS (REEL)



Notes:
1. Packing : PS7241-1A-E3/E4 900 pcs/reel

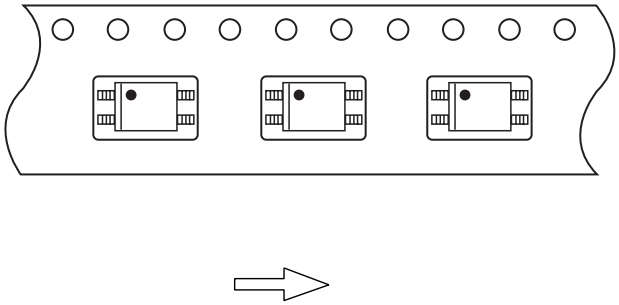
TAPING SPECIFICATIONS (Units in mm)

OUTLINE AND DIMENSIONS (TAPE)

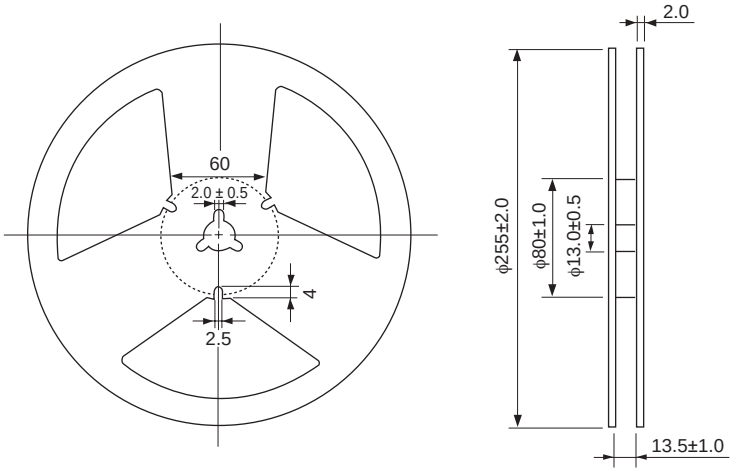


TAPE DIRECTION

PS7241-1A-E5



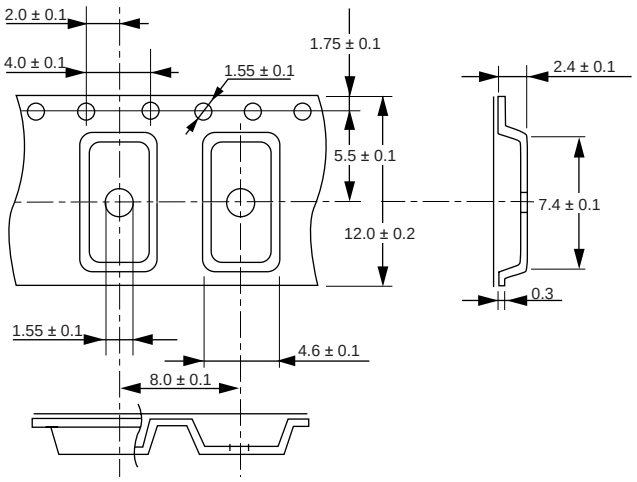
OUTLINE AND DIMENSIONS (REEL)



Notes:
1. Packing : PS7241-1A-E5 1000 pcs/reel

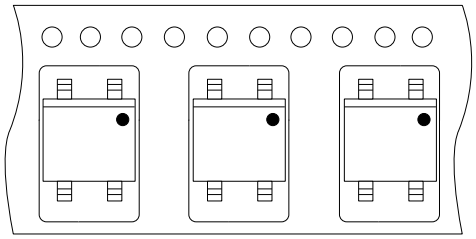
TAPING SPECIFICATIONS (Units in mm)

OUTLINE AND DIMENSIONS (TAPE)

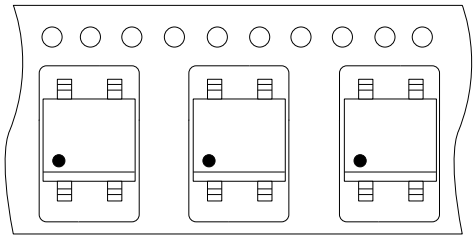


TAPE DIRECTION

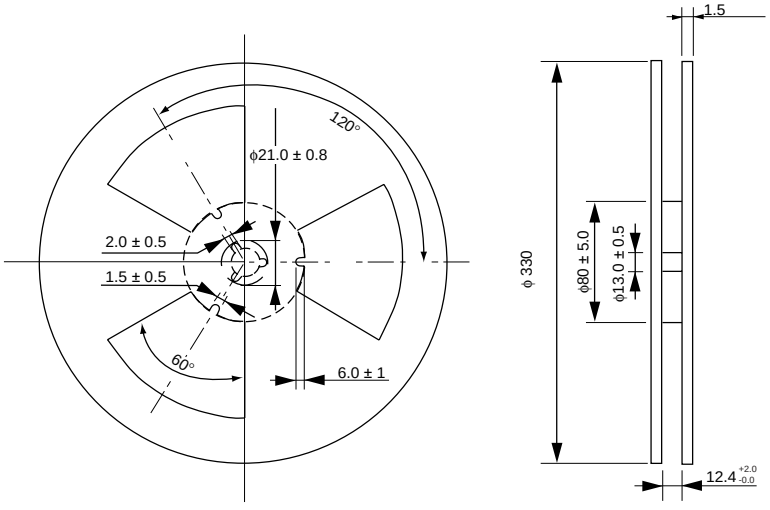
PS7241-1A-F3



PS7241-1A-F4



OUTLINE AND DIMENSIONS (REEL)



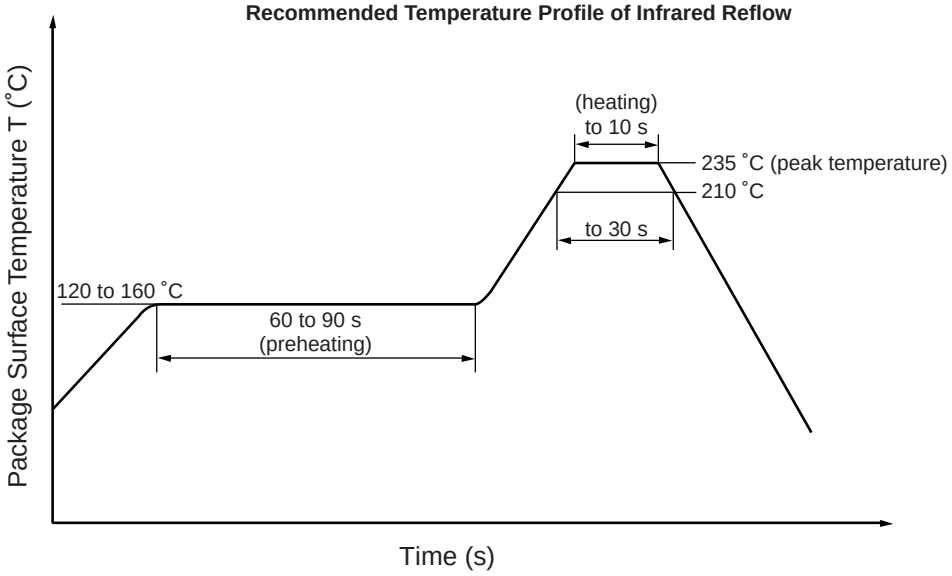
Notes:
1. Packing : PS7241-1A-F3/F4 3500 pcs/reel

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 max. 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 max. chlorine content of 0.2 Wt % is recommended.)

Life Support Applications
These NEC products are not intended for use in life support devices, appliances, or systems where the malfunction of these products can reasonably be expected to result in personal injury. The customers of CEL using or selling these products for use in such applications do so at their own risk and agree to fully indemnify CEL for all damages resulting from such improper use or sale.