NEC

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

DESCRIPTION

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

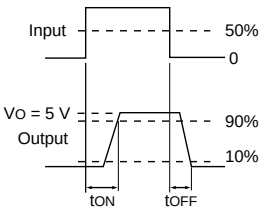
- **EXCHANGE EQUIPMENT**
- **MEASUREMENT EQUIPMENT**
- **FA/OA EQUIPMENT**

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

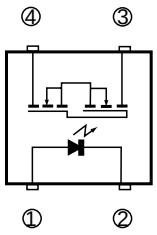
PART NUMBER				PS7241-1A		
	SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX
Diode	V_F	Forward Voltage, I_F = 10 mA	V		1.2	1.4
	I_R	Reverse Current, V_R = 5 V	μA			5.0
MOS FET	I_{LOFF}	Off-State Leakage Current, I_F = 0 mA, V_D = 400 V	μA		0.03	1.0
Coupled	R_{ON}	On-State Resistance, I_F = 10 mA, I_L = 10 mA	Ω		24	35
	t_{ON}[1]	Turn-on Time, I_F = 10 mA, V_L = 5 V, R_L = 500 Ω, PW ≥ 10 ms	ms		0.15	1.0
	t_{OFF}[1]	Turn-off Time, I_F = 10 mA, V_L = 5 V, R_L = 2 KΩ, PW ≥ 10 ms	ms		0.03	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. Turn-on, Turn-off time.

PS7241-1A



PS7241-1A



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/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
P_D	Power Dissipation	mW/ch	300
Coupled			
BV	Isolation Voltage[3]	Vr.m.s.	1500
P_T	Total Power Dissipation	mW	350
T_{OP}	Operating Temperature	°C	-40 to +85
T_{STG}	Storage Temperature	°C	-40 to +100

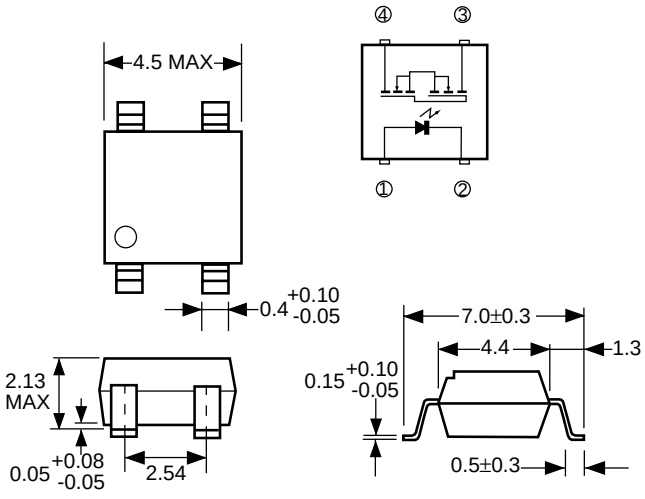
Notes:
1. Operation in excess of any one of these parameters may result in permanent damage.
2. PW = 100 µs, Duty Cycle = 1 %
3. AC voltage for 1 minute at T_A = 25 °C, RH = 60 % between input and output.

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)

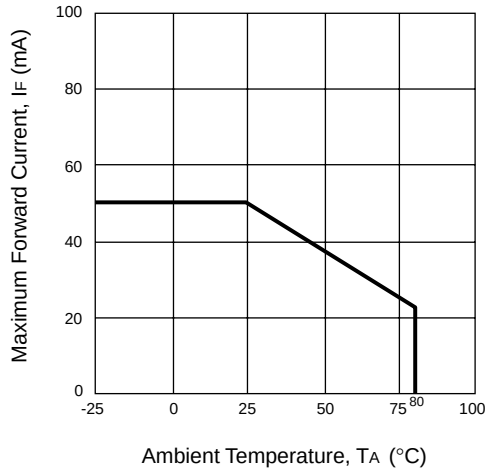
PS7241-1A



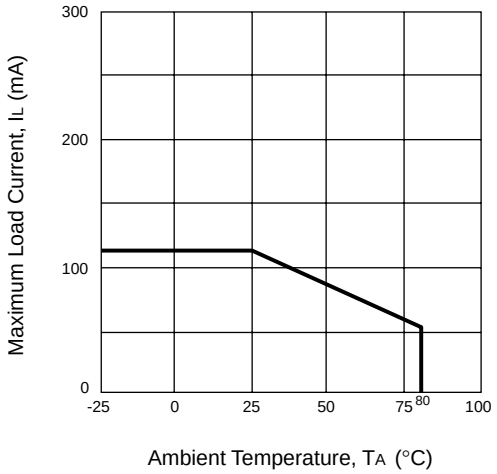
1. LED Anode
2. LED Cathode
3. MOSFET
4. MOSFET

TYPICAL PERFORMANCE CURVES (T_A = 25 °C)

MAXIMUM FORWARD CURRENT vs. AMBIENT TEMPERATURE

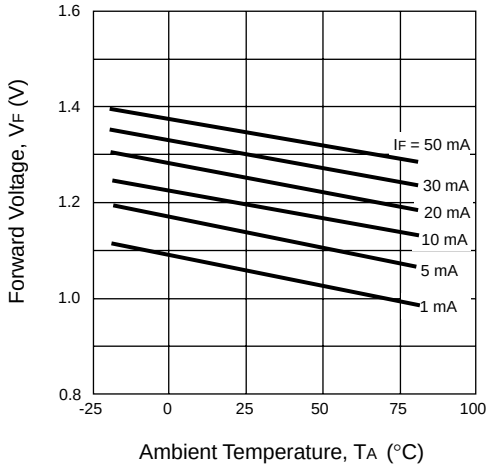


MAXIMUM LOAD CURRENT vs. AMBIENT TEMPERATURE

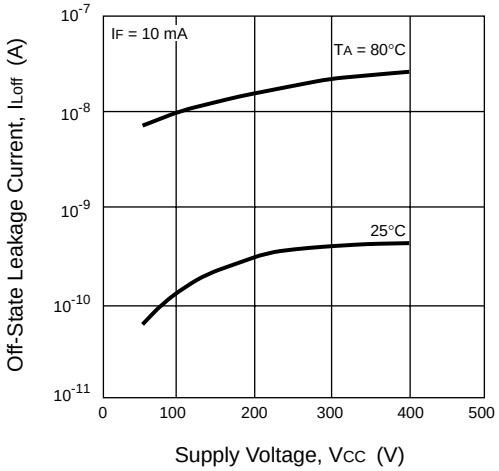


TYPICAL PERFORMANCE CURVES (T_A = 25 °C)

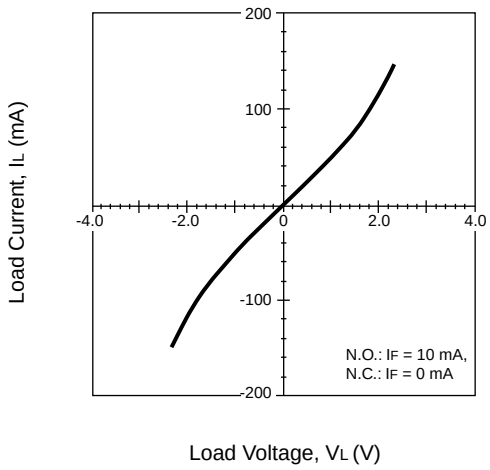
FORWARD VOLTAGE vs. AMBIENT TEMPERATURE



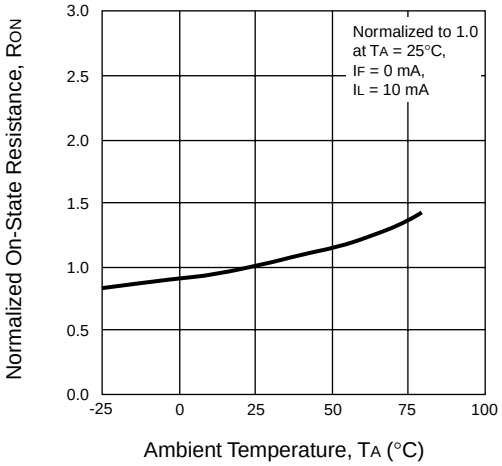
OFF-STATE LEAKAGE CURRENT vs. SUPPLY VOLTAGE



LOAD CURRENT vs. LOAD VOLTAGE

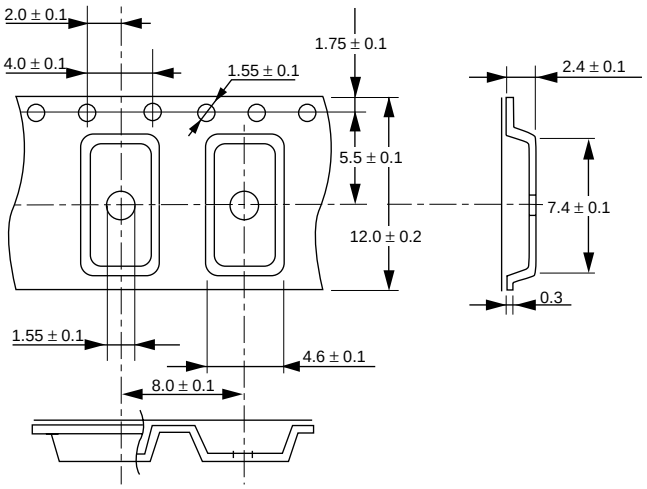


NORMALIZED ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE

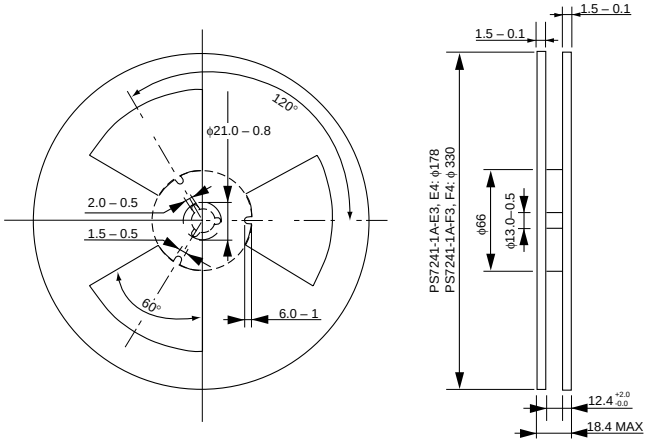


TAPING SPECIFICATIONS (Units in mm)

OUTLINE AND DIMENSIONS (TAPE)



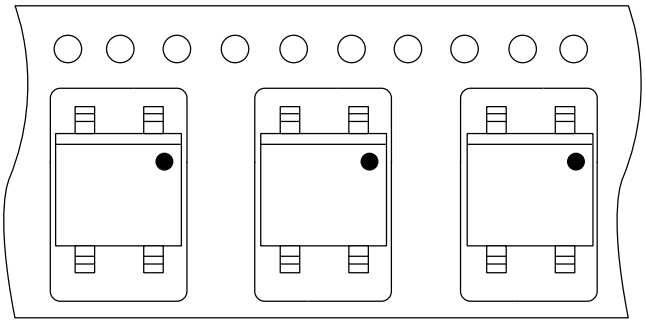
OUTLINE AND DIMENSIONS (REEL)



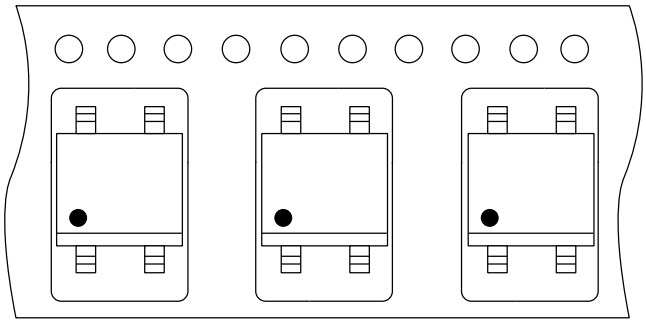
Notes:
1. Packing : PS7241-1A-E3/E4 900 pcs/reel
   PS7241-1A-F3/F4 3500 pcs/reel

TAPE DIRECTION

PS7241-1A-E3
PS7241-1A-F3



PS7241-1A-E4
PS7241-1A-F4

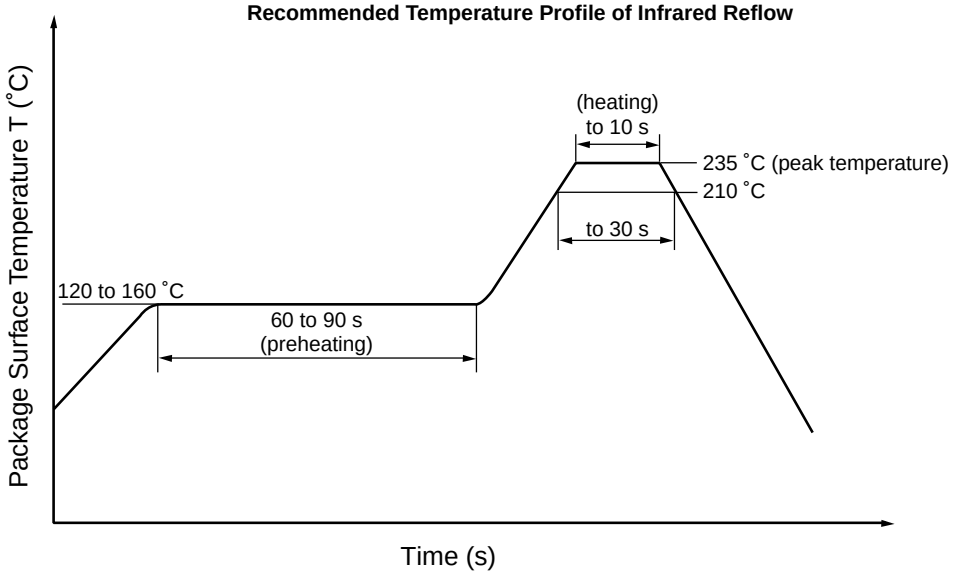


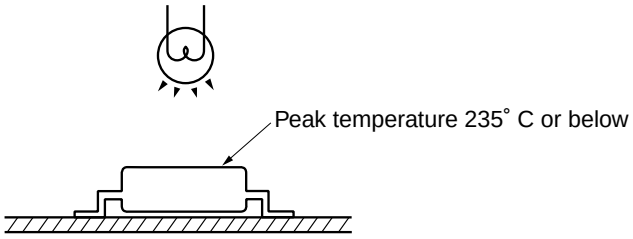
RECOMMENDED SOLDERING CONDITIONS

(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**
  Three
- **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