

FEATURES

- **2 CHANNEL TYPE**
(1 A + 1 A Output)
- **DESIGNED FOR AC/DC SWITCHING LINE CHANGER**
- **SMALL PACKAGE**
(8 pin DIP)
- **LOW OFFSET VOLTAGE**
- **PS7142L-2A: SURFACE MOUNT TYPE**
- **UL BSI APPROVED**

DESCRIPTION

PS7142-2A and PS7142L-2A are solid state relays containing GaAs LED on the light emitting side (input side) and MOSFETs on the output side.

APPLICATIONS

- **TELECOMMUNICATIONS EQUIPMENT**
- **MEASUREMENT EQUIPMENT**
- **FA/OA EQUIPMENT**

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

| PART NUMBER | | | PS7142-2A, PS7142L-2A | | | |
|-------------|-------------------|--|--|-----------------|------|-----|
| 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 | |
| Mosfet | I _{Loff} | Off-State Leakage Current, V _D = 400 V | μA | 0.05 | 1.0 | |
| | C _{out} | Output Capacitance, V = 0 V, f = 1 MHz | pF/ch | 140 | | |
| Coupled | R _{on1} | On-State Resistance, I _F = 10 mA, I _L = 10 mA | Ω | 7.5 | 12 | |
| | R _{on2} | On-State Resistance, I _F = 10 mA, I _L = 200 mA | Ω | 7.0 | 10 | |
| | t _{on} | 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} | Turn-Off Time | | ms | 0.03 | 0.2 |
| | R _{I-O} | Isolation Resistance, V _{in-out} = 1.0 kVDC | Ω | 10 ⁹ | | |
| | C _{I-O} | Isolation Capacitance, V = 0 V, f = 1 MHz | pF/ch | | 1.1 | |

PS7142-2A, PS7142L-2A

ABSOLUTE MAXIMUM RATINGS¹ (T_A = 25°C)

| SYMBOLS | PARAMETERS | UNITS | RATINGS |
|-----------------------|-----------------------------------|------------------|-------------------------|
| | | | PS7142-2A PS7142L-2A |
| 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 | 200 |
| P _D | Power Dissipation | mW/ch | 375 |
| Coupled | | | |
| BV | Isolation Voltage ³ | V _{RMS} | 1500 |
| P _T | Total Power Dissipation | mW | 850 |
| T _{STG} | Storage Temperature | °C | -40 to +100 |
| T _A | Operating Ambient Temp. | °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.

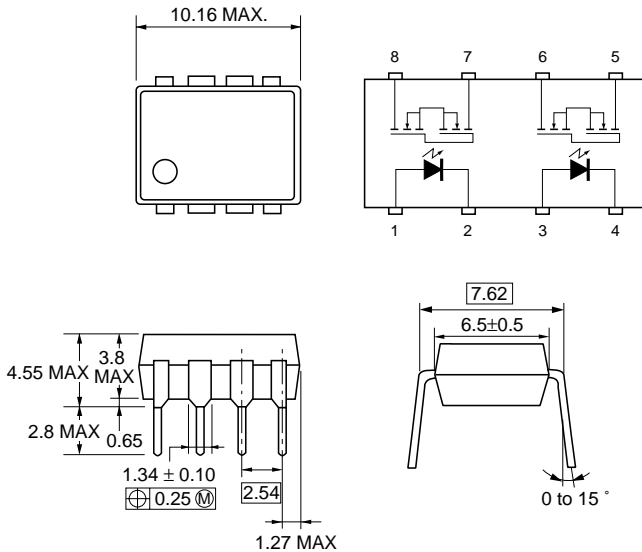
RECOMMENDED OPERATING CONDITIONS (T_A = 25 °C)

| 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)

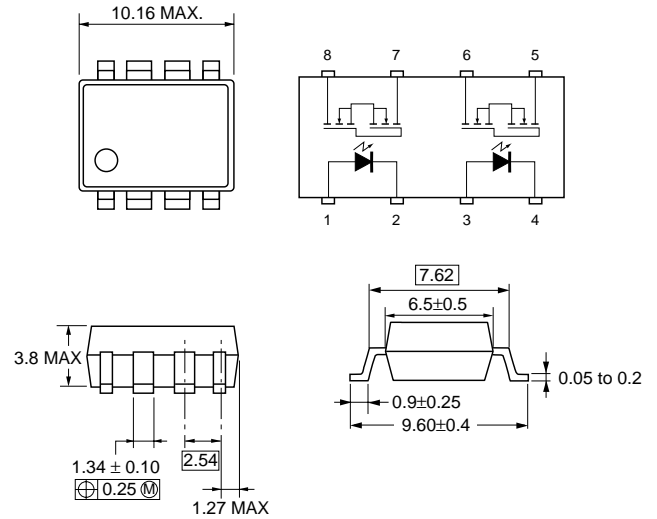
PS7142-2A

- | | |
|----------------|-----------|
| 1. LED Anode | 5. MOSFET |
| 2. LED Cathode | 6. MOSFET |
| 3. LED Anode | 7. MOSFET |
| 4. LED Cathode | 8. MOSFET |



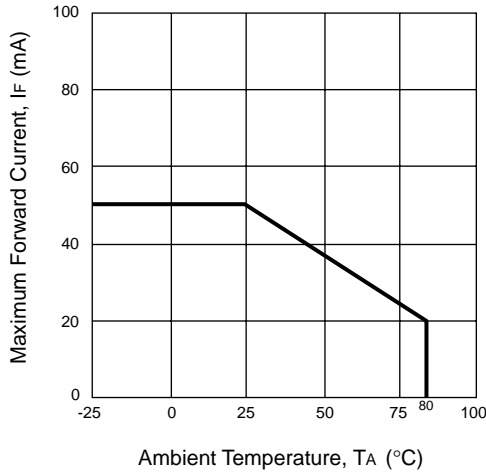
PS7142L-2A

- | | |
|----------------|-----------|
| 1. LED Anode | 5. MOSFET |
| 2. LED Cathode | 6. MOSFET |
| 3. LED Anode | 7. MOSFET |
| 4. LED Cathode | 8. MOSFET |

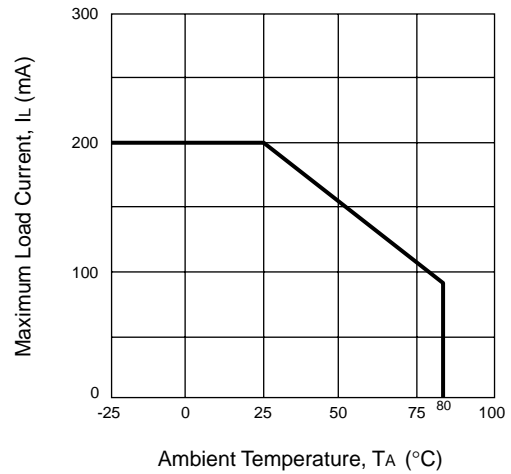


TYPICAL PERFORMANCE CURVES ($T_A = 25^\circ\text{C}$)

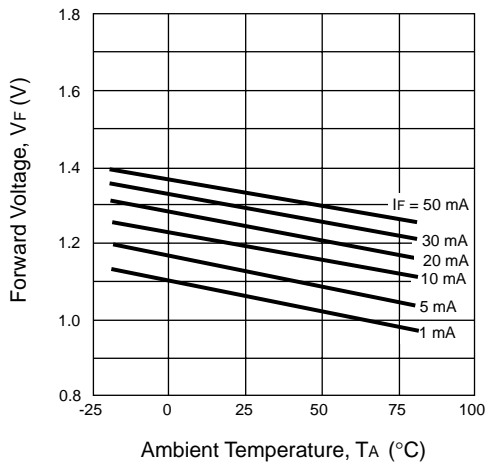
MAXIMUM FORWARD CURRENT vs. AMBIENT TEMPERATURE



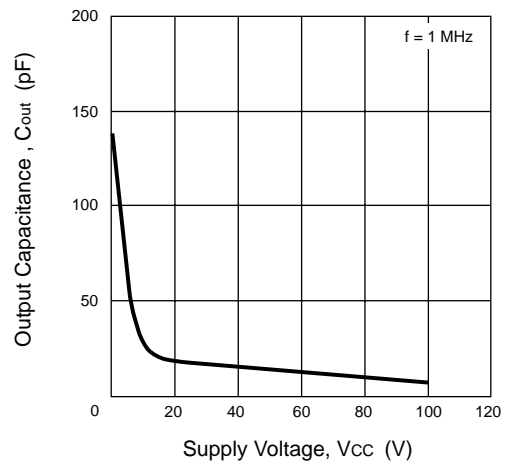
MAXIMUM LOAD CURRENT vs. AMBIENT TEMPERATURE



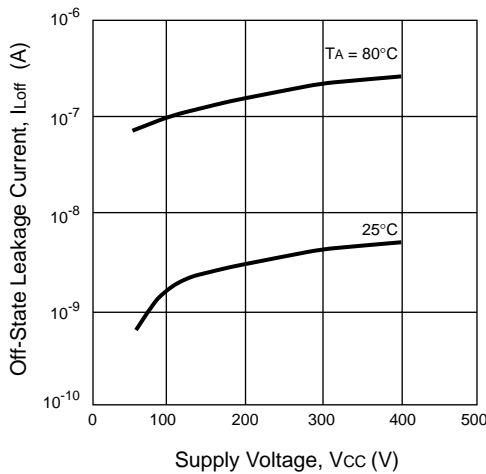
FORWARD VOLTAGE vs. AMBIENT TEMPERATURE



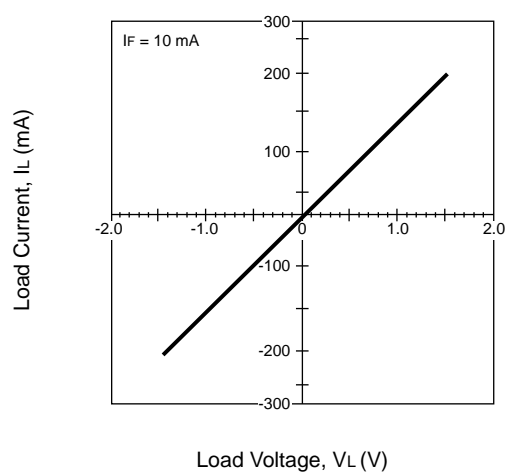
OUTPUT CAPACITANCE vs. SUPPLY VOLTAGE



OFF-STATE LEAKAGE CURRENT vs. SUPPLY VOLTAGE

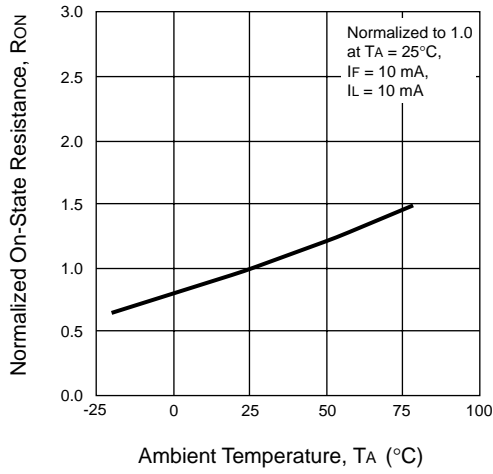


LOAD CURRENT vs. LOAD VOLTAGE

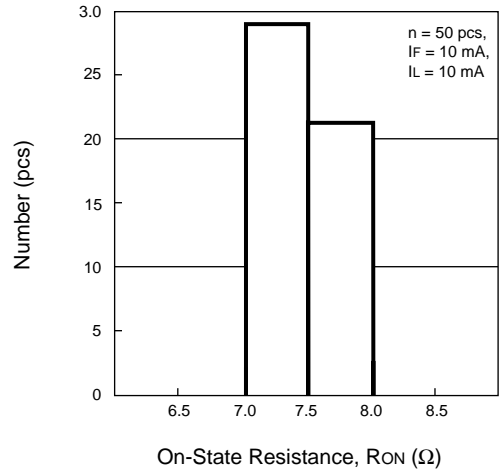


TYPICAL PERFORMANCE CURVES (TA = 25 °C)

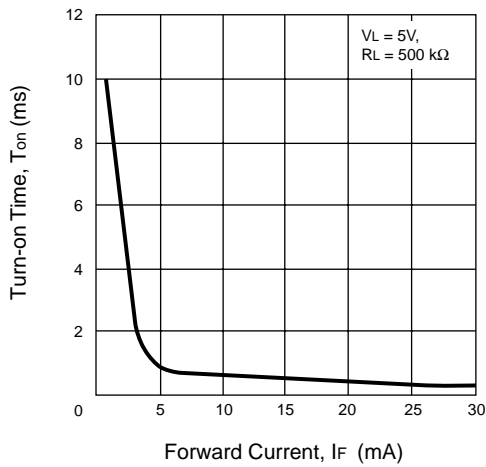
NORMALIZED ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE



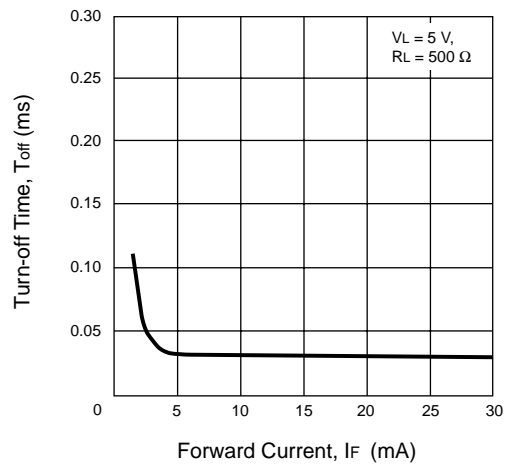
ON-STATE RESISTANCE DISTRIBUTION



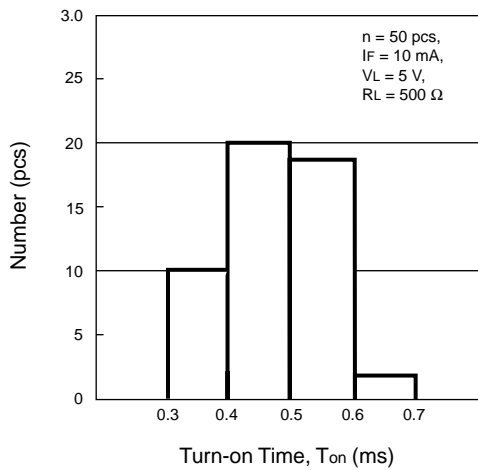
TURN-ON TIME vs. FORWARD CURRENT



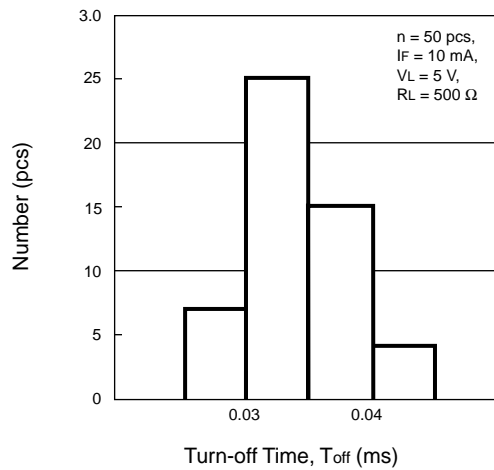
TURN-OFF TIME vs. FORWARD CURRENT



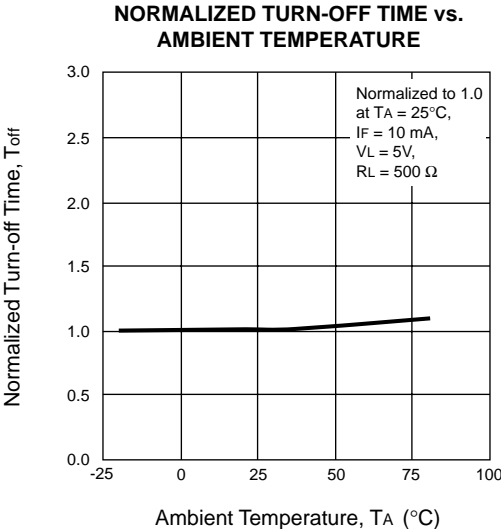
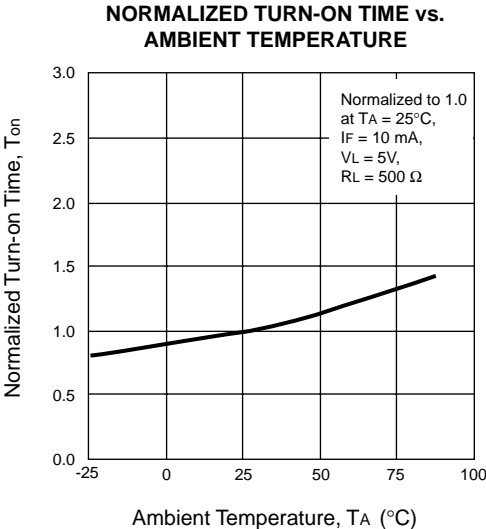
TURN-ON TIME DISTRIBUTION



TURN-OFF TIME DISTRIBUTION

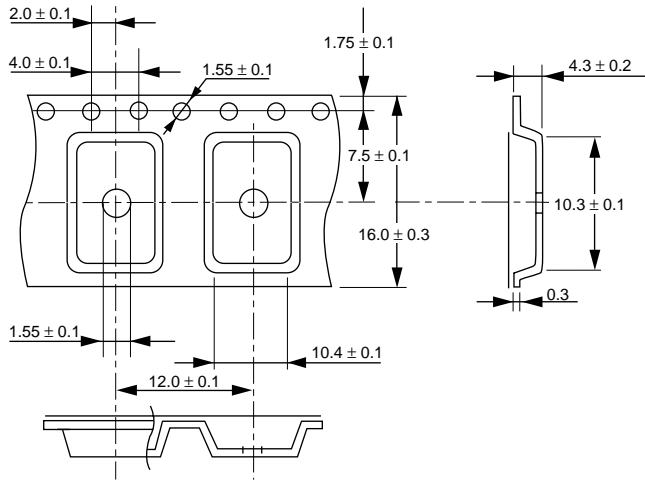


TYPICAL PERFORMANCE CURVES ($T_A = 25\text{ }^\circ\text{C}$)

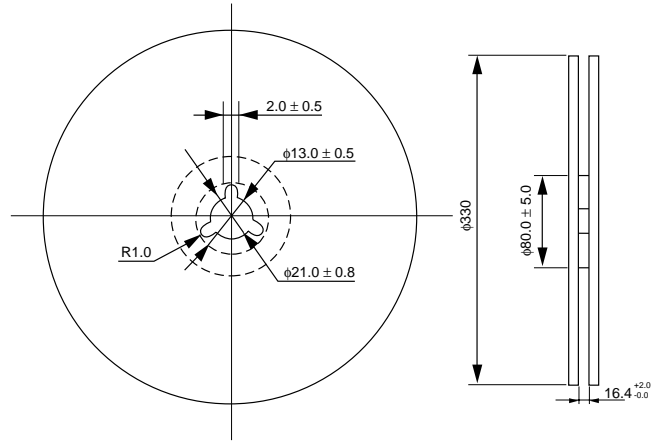


TAPING SPECIFICATIONS (Units in mm)

OUTLINE AND DIMENSIONS (TAPE)



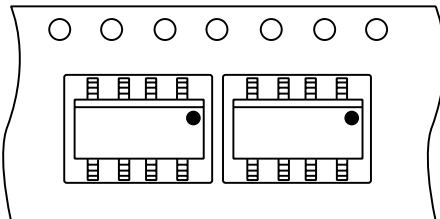
OUTLINE AND DIMENSIONS (REEL)



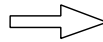
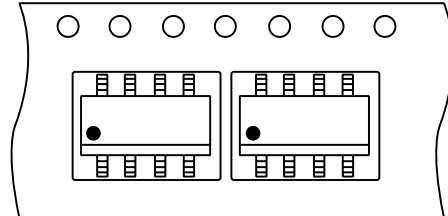
Notes:
1. Packing : 1000 pcs/reel

TAPE DIRECTION

PS7142L-2A-E3



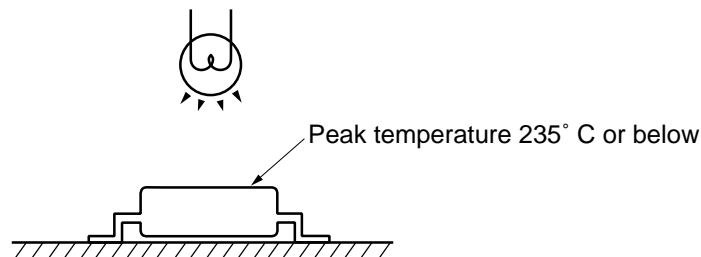
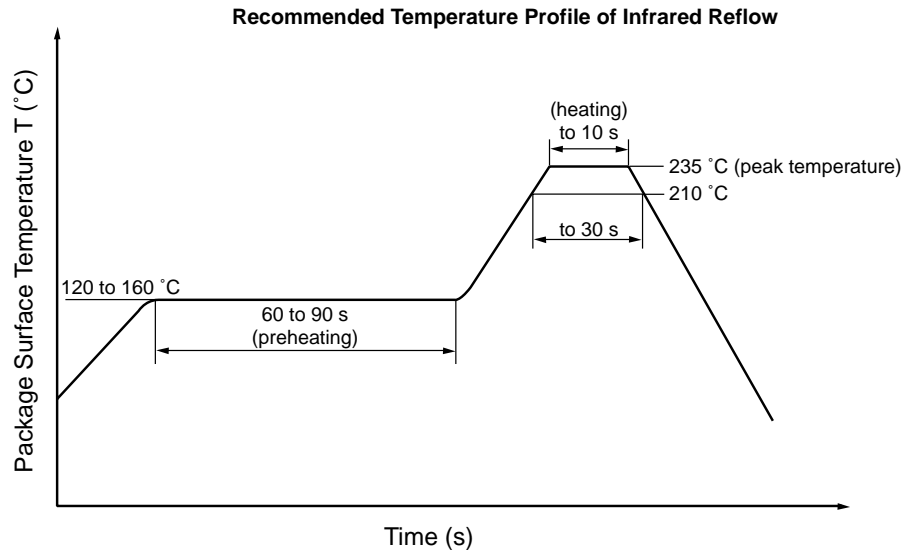
PS7142L-2A-E4



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 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).

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