

6 AND 8 PIN DIP 400 V BREAKDOWN VOLTAGE NORMALLY CLOSED TYPE 1-CH, 2-CH OPTICAL COUPLED MOSFET

PS7141-1B,-2B
PS7141L-1B,-2B

FEATURES

- **1 CHANNEL TYPE:**
(1b output)
- **2 CHANNEL TYPE:**
(1b + 1b output)
- **DESIGNED FOR AC/DC SWITCHING LINE CHANGER**
- **SMALL PACKAGE:**
6 and 8 pin DIP
- **LOW OFFSET VOLTAGE**
- **LOW LED OPERATING CURRENT:**
 $I_F = 2 \text{ mA}$
- **SURFACE MOUNT TYPE LEAD:**
PS7141L-1B,-2B

DESCRIPTION

The PS7141-1B,-2B and PS7141L-1B,-2B are solid state relays containing GaAs LEDs on the light emitting side (input side) and normally closed (N.C.) contact MOS FETs on the output side. They are suitable for analog signal control because of their low offset and high linearity.

APPLICATIONS

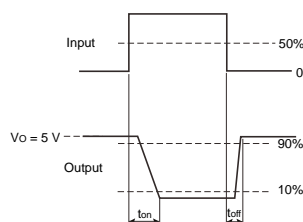
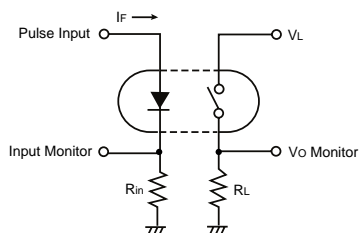
- EXCHANGE EQUIPMENT
- MEASUREMENT EQUIPMENT
- FA/OA EQUIPMENT

ELECTRICAL CHARACTERISTICS ($T_A = 25 \text{ }^\circ\text{C}$)

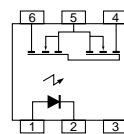
| PART NUMBER | | | PS7141-1B,-2B, PS7141L-1B,-2B | | | | |
|-------------|--|---|--|--------|------|-----|--|
| | SYMBOLS | PARAMETERS | UNITS | MIN | TYP | MAX | |
| Diode | V_F | Forward Voltage, $I_F = 10 \text{ mA}$ | V | | 1.2 | 1.4 | |
| | I_R | Reverse Current, $V_R = 5 \text{ V}$ | μA | | | 5.0 | |
| MOS FET | I_{LOFF} | Off-State Leakage Current, $I_F = 10 \text{ mA}$, $V_D = 400 \text{ V}$ | μA | | 0.03 | 1.0 | |
| | C_{out} | Output Capacitance, $V_D = 0 \text{ V}$, $f = 1 \text{ MHz}$, $I_F = 10 \text{ mA}$ | pF/ch | | 185 | | |
| Coupled | I_{Foff} | LED Off-state Current, $I_L = 150 \text{ mA}$ | mA | | | 2.0 | |
| | R_{ON1} | On-State Resistance | Ω | | 20 | 30 | |
| | | | | | | | $I_F = 0 \text{ mA}$, $I_L = 10 \text{ mA}$ |
| | R_{ON2} | | $I_F = 0 \text{ mA}$, $I_L = 150 \text{ mA}$, $t \leq 10 \text{ ms}$ | | | 16 | 25 |
| | t_{ON} | Turn-on Time ¹ $I_F = 10 \text{ mA}$, $V_O = 5 \text{ V}$, $PW \geq 10 \text{ ms}$ | ms | | 0.02 | 0.2 | |
| | t_{OFF} | Turn-off Time ¹ $I_F = 10 \text{ mA}$, $V_O = 5 \text{ V}$, $PW \geq 10 \text{ ms}$ | ms | | 0.2 | 1.0 | |
| | R_{I-O} | Isolation Resistance, $V_{I-O} = 1.0 \text{ kVDC}$ | Ω | 10^9 | | | |
| C_{I-O} | Isolation Capacitance, $V = 0 \text{ V}$, $f = 1 \text{ MHz}$ | pF/ch | | 1.1 | | | |

Notes:

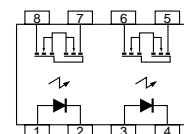
1. Turn-on, Turn-off Time.



**PS7141-1B,
PS7141L-1B**



**PS7141-2B,
PS7141L-2B**



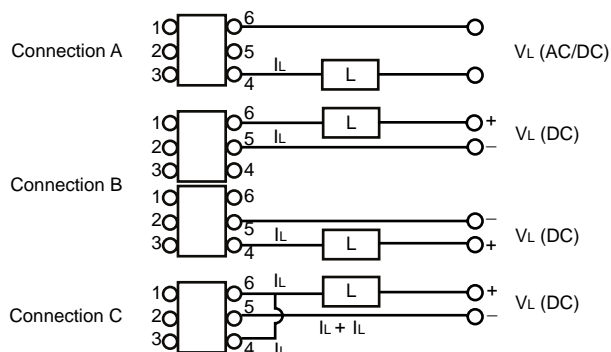
PS7141-1B,-2B, PS7141L-1B,-2B

ABSOLUTE MAXIMUM RATINGS¹ (T_A = 25°C)

| SYMBOLS | PARAMETERS | UNITS | RATINGS | |
|------------------|--------------------------------------|---------|-------------------------|-------------------------|
| | | | PS7141-1B PS7141L-1B | PS7141-2B PS7141L-2B |
| 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 Forward Current ² | A | 1 | |
| MOSFET | | | | |
| V _L | Break Down Voltage | V | 400 | |
| I _L | Continuous Load Current ³ | mA | 150 | |
| | Connection A | | 200 | - |
| | Connection B | | 300 | - |
| I _{LP} | Pulse Load Current ⁴ | mA | 300 | |
| | AC/DC Connection | | | |
| P _D | Power Dissipation | mW/ch | 560 | 375 |
| Coupled | | | | |
| B _V | Isolation Voltage ⁵ | Vr.m.s. | 1500 | |
| P _T | Total Power Dissipation | mW | 610 | 850 |
| 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. Conditions: I_F ≥ 2 mA. The following types of load connections are available:



4. PW = 100 ms, 1 shot.
5. AC voltage for 1 minute at T_A = 25 °C, RH = 60 % between input and output.

RECOMMENDED OPERATING CONDITIONS (T_A = 25°C)

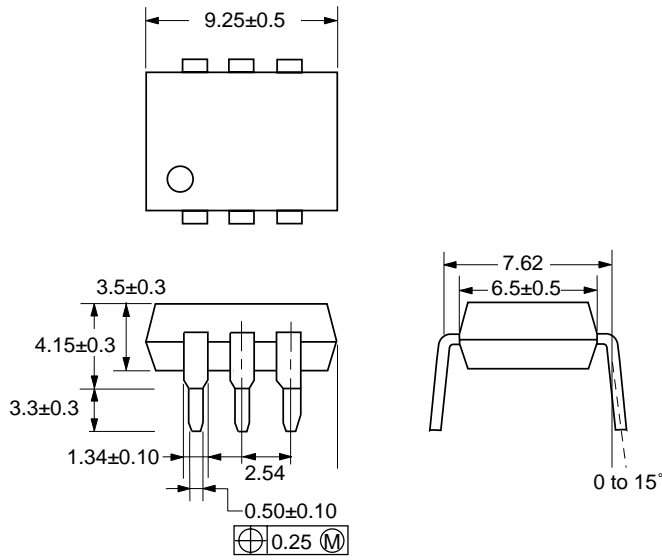
| PART NUMBER | | PS7141-1B,-2B, PS7141L-1B,-2B | | | |
|----------------|-----------------------|-------------------------------|-----|-----|-----|
| SYMBOLS | PARAMETERS | UNITS | MIN | TYP | MAX |
| I _F | LED Operating Current | mA | 2 | 10 | 20 |
| V _F | LED Off Voltage | V | 0 | | 0.5 |

ORDERING INFORMATION

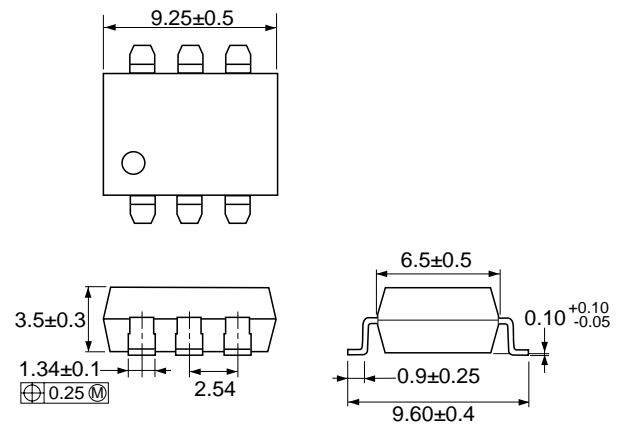
| PART NUMBER | PACKAGE | PACKING STYLE |
|---------------|-----------|------------------------------|
| PS7141-1B | 6-pin DIP | Magazine case 50 pcs |
| PS7141L-1B | | Embossed Tape 1,000 pcs/reel |
| PS7141L-1B-E3 | | |
| PS7141L-1B-E4 | | |
| PS7141-2B | 8-pin DIP | Magazine case 50 pcs |
| PS7141L-2B | | Embossed Tape 1,000 pcs/reel |
| PS7141L-2B-E3 | | |
| PS7141L-2B-E4 | | |

OUTLINE DIMENSIONS (Units in mm)

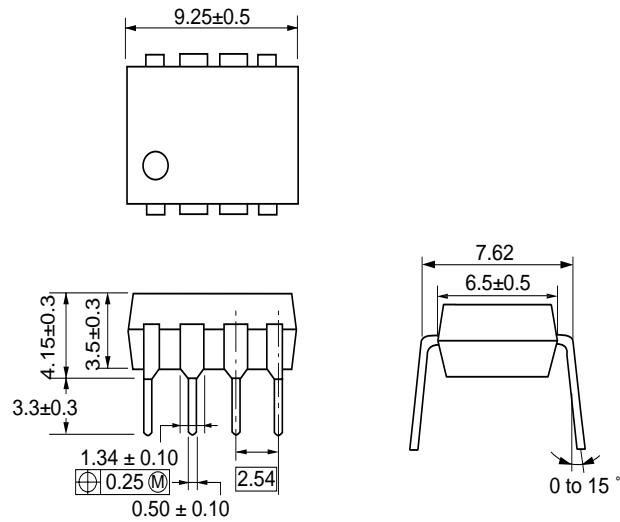
PS7141-1B



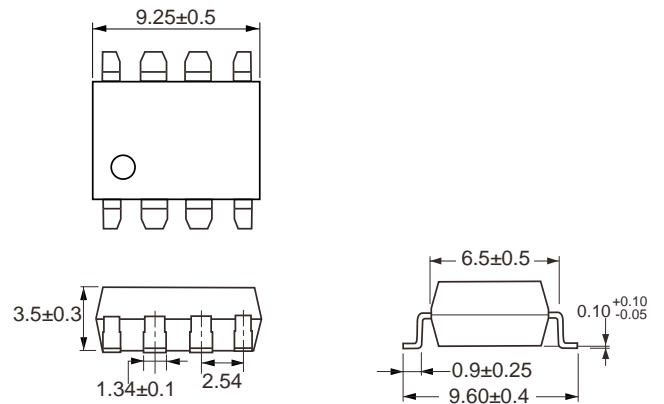
PS7141L-1B



PS7141-2B

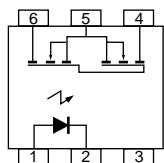


PS7141L-2B



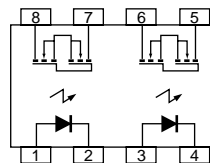
PIN CONNECTION (Top View)

PS7141-1B, PS7141L-1B



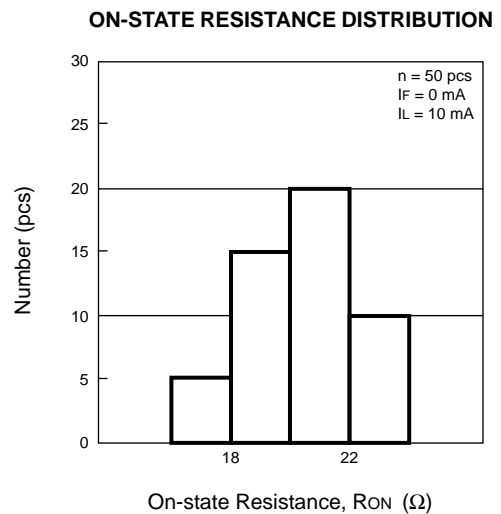
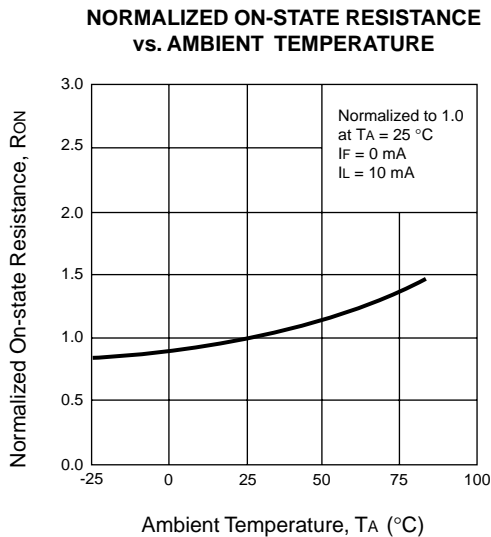
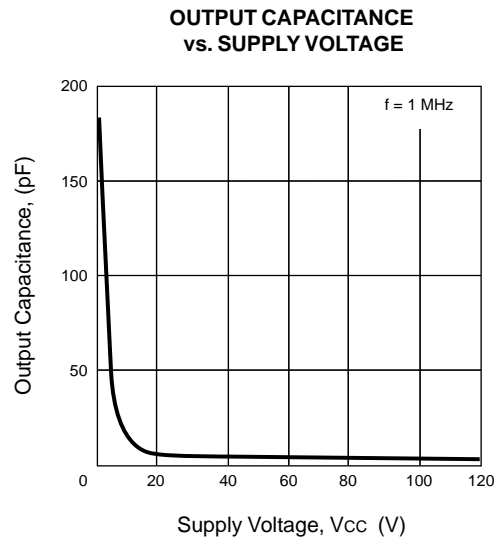
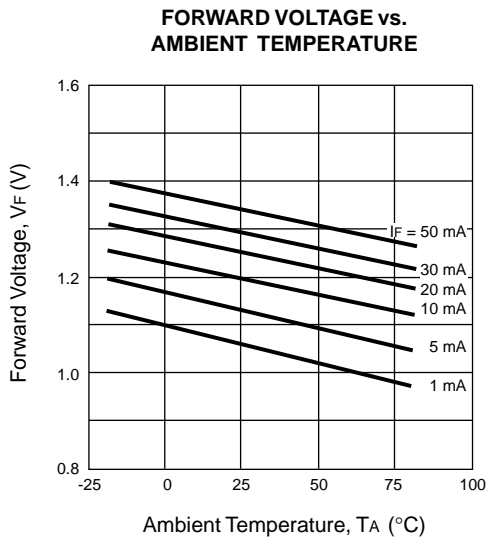
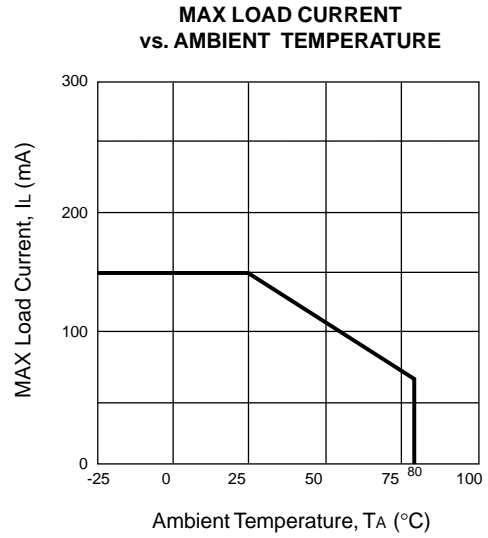
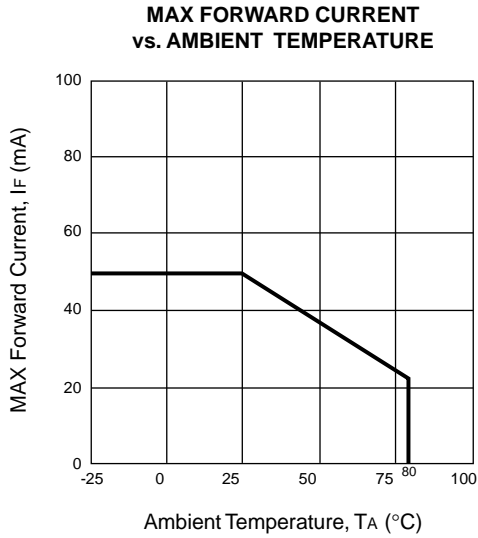
1. LED Anode
2. LED Cathode
3. NC
4. MOSFET Source
5. MOSFET Drain
6. MOSFET Source

PS7141-2B, PS7141L-2B



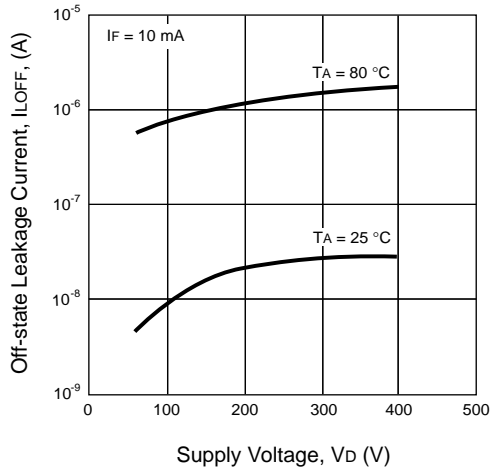
1. LED Anode 1
2. LED Cathode 1
3. LED Anode 2
4. LED Cathode 2
5. MOSFET 2
6. MOSFET 2
7. MOSFET 1
8. MOSFET 1

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

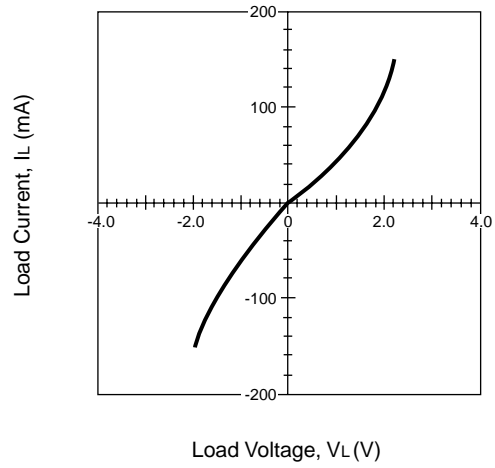


TYPICAL PERFORMANCE CURVES (TA = 25 °C)

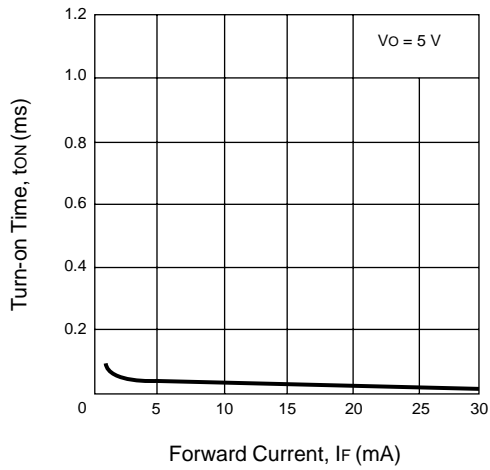
OFF-STATE LEAKAGE CURRENT vs. SUPPLY VOLTAGE



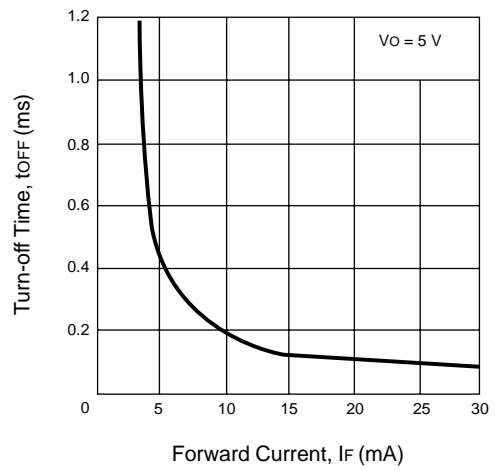
LOAD CURRENT vs. LOAD VOLTAGE



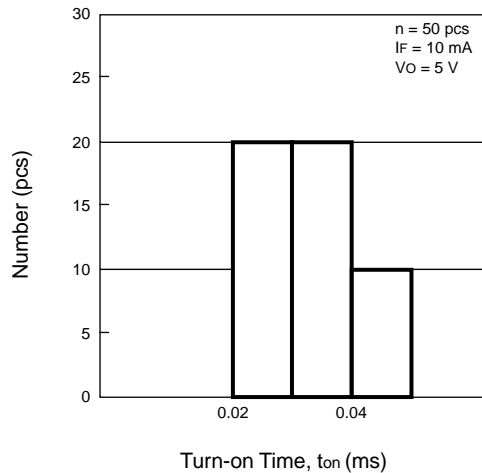
TURN-ON TIME VS. FORWARD CURRENT



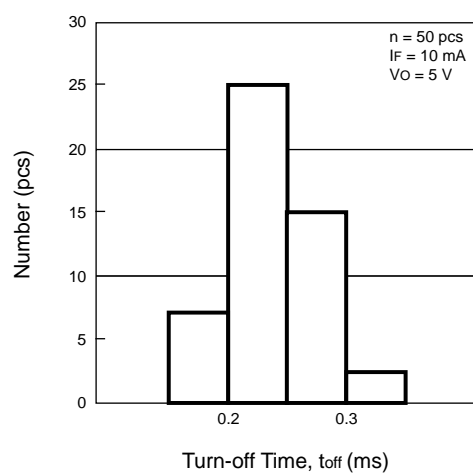
TURN-OFF TIME VS. FORWARD CURRENT



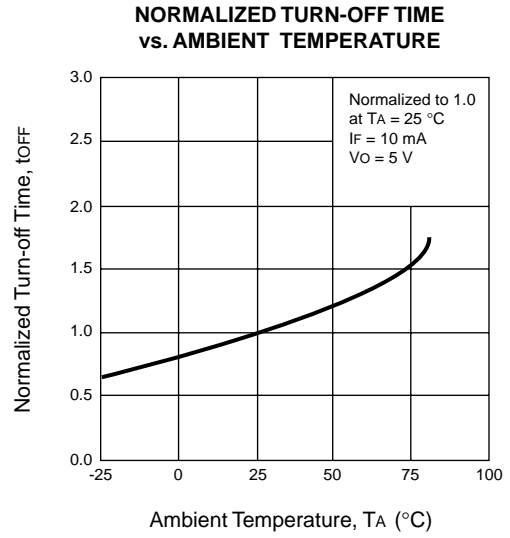
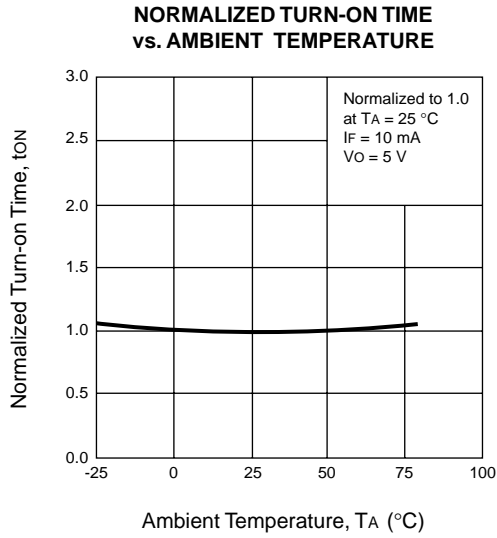
TURN-ON TIME DISTRIBUTION



TURN-OFF TIME DISTRIBUTION

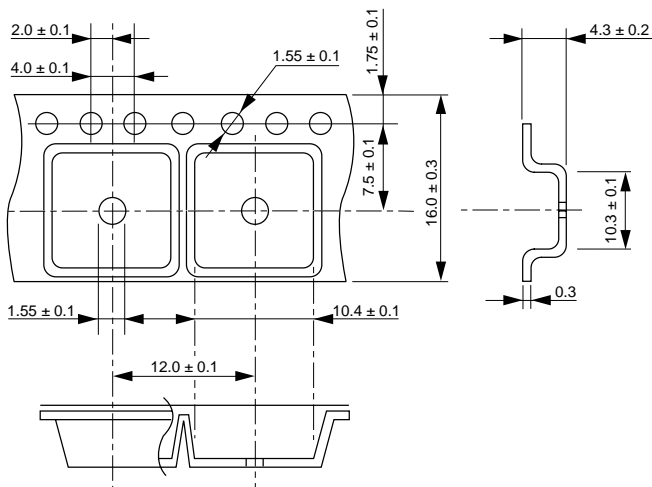


TYPICAL PERFORMANCE CURVES (TA = 25 °C)

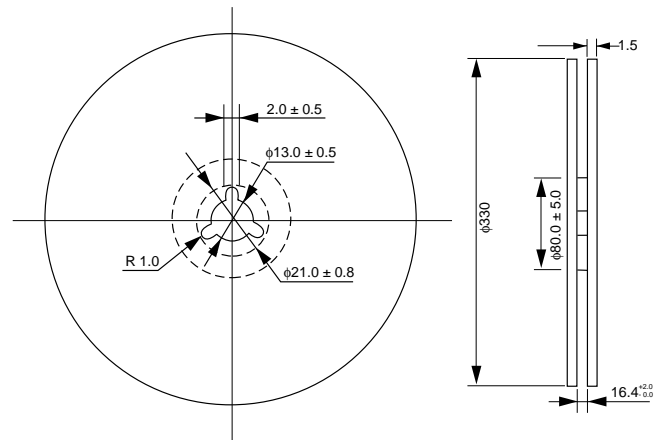


TAPING SPECIFICATIONS (Units in mm)

OUTLINE AND DIMENSIONS (TAPE)



OUTLINE AND DIMENSIONS (REEL)

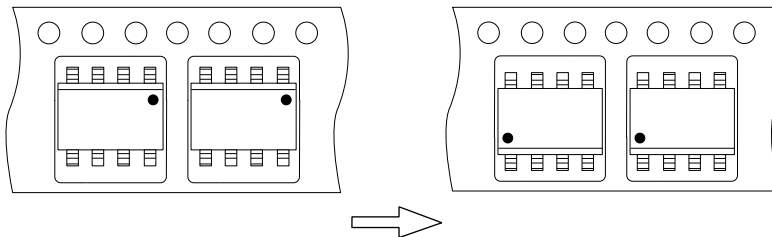


Packaging : 1000 pcs/reel

TAPING DIRECTION

PS7141L-1B-E3
PS7141L-2B-E3

PS7141L-1B-E4
PS7141L-2B-E4

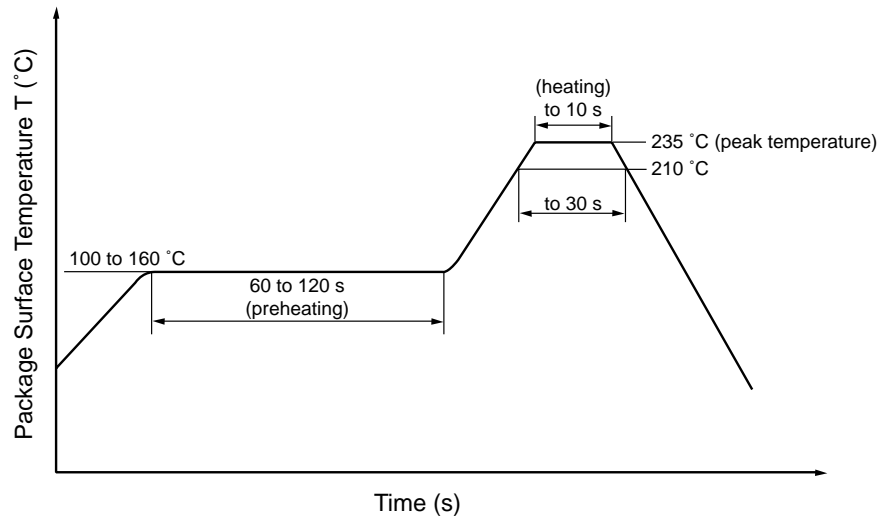


RECOMMENDED SOLDERING CONDITIONS

(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 cleaning solvent.

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