

Microelectronic Power IC

HEXFET® Power MOSFET Photovoltaic Relay
Single-Pole, Normally-Open, 0-250V, 190mA AC/DC

General Description

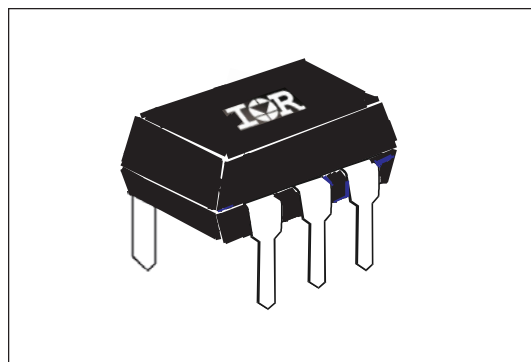
The PVT312 Photovoltaic Relay is a single-pole, normally open solid-state relay that can replace electromechanical relays in many applications. It utilizes International Rectifier's proprietary HEXFET power MOSFET as the output switch, driven by an integrated circuit photovoltaic generator of novel construction. The output switch is controlled by radiation from a GaAlAs light emitting diode (LED) which is optically isolated from the photovoltaic generator.

This SSR is specifically designed for telecom applications. PVT312L employs an active current-limiting circuitry enabling it to withstand current surge transients.

PVT312 Relays are packaged in a 6-pin, molded DIP package with either thru-hole or surface mount ("gull-wing") terminals. It is available in standard plastic shipping tubes or on tape-and-reel. Please refer to the Part Identification information opposite.

Features

- HEXFET Power MOSFET output
- Bounce-free operation
- 4,000 V_{RMS} I/O isolation
- Load current limiting
- Linear AC/DC operation
- Solid-State Reliability
- UL recognized and BABT certified;
- ESD Tolerance:
 - 4000V Human Body Model
 - 500V Machine Model



Applications

- On/Off Hook switch
- Dial-Out relay
- Ring injection relay
- Ground start
- General switching

Part Identification

| | |
|---------------|---|
| PVT312LPbF | current limit, thru-hole |
| PVT312LSPbF | current limit, surface-mount |
| PVT312LS-TPbF | current limit, surface-mount, tape and reel |
| PVT312PbF | no current limit, thru-hole |
| PVT312SPbF | no current limit, surface-mount |
| PVT312S-TPbF | no current limit, surface-mount tape and reel |

(HEXFET is the registered trademark for International Rectifier Power MOSFETs)

Electrical Specifications ($-40^{\circ}\text{C} \leq T_A \leq +85^{\circ}\text{C}$ unless otherwise specified)

| INPUT CHARACTERISTICS | Part Numbers | | Units |
|--|--------------|--------|-------|
| | PVT312L | PVT312 | |
| Minimum Control Current (see figures 1 and 2) | 2.0 | | mA |
| Maximum Control Current for Off-State Resistance @ $T_A = +25^{\circ}\text{C}$ | 0.4 | | mA |
| Control Current Range (Caution: current limit input LED, see figure 6) | 2.0 to 25 | | mA |
| Maximum Reverse Voltage | 6.0 | | V |

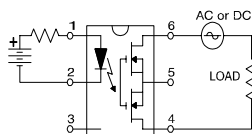
| OUTPUT CHARACTERISTICS | PVT312L | PVT312 | |
|--|----------------|--------|------------------------------|
| Operating Voltage Range | 0 to ± 250 | | $V_{(\text{DC or AC peak})}$ |
| Maximum Load Current @ $T_A = +40^{\circ}\text{C}$, 5mA Control (see figures 1 and 2) | | | |
| A Connection | 170 | 190 | mA (AC or DC) |
| B Connection | 190 | 210 | mA (DC) |
| C Connection | 300 | 320 | mA (DC) |
| Maximum On-State Resistance @ $T_A = +25^{\circ}\text{C}$ for 50mA pulsed load 5mA Control (see figure 4) | | | |
| A Connection | 15 | 10 | Ω |
| B Connection | 8 | 5.5 | Ω |
| C Connection | 4.25 | 3 | Ω |
| Maximum Off-State Leakage @ $T_A = +25^{\circ}\text{C}$, $\pm 250\text{V}$ (see figure 5) | 1.0 | | μA |
| Current Limit @ $T_A = +25^{\circ}\text{C}$, 5mA Control | | | |
| Connection: | A | C | |
| Minimum | 190 | 330 | n/a |
| Maximum | 300 | 560 | n/a |
| Maximum Turn-On Time @ $T_A = +25^{\circ}\text{C}$ (see figure 7) for 50mA, 100 V_{DC} load, 5mA Control | 3.0 | | ms |
| Maximum Turn-Off Time @ $T_A = +25^{\circ}\text{C}$ (See Fig. 6) For 50mA, 100 V_{DC} load, 5mA Control | 0.5 | | ms |
| Maximum Output Capacitance @ 50V _{DC} | 50 | | pF |

| GENERAL CHARACTERISTICS | ALL MODELS | | |
|---|------------|-------------|--------------------|
| Minimum Dielectric Strength, Input-Output | 4000 | | V_{RMS} |
| Minimum Insulation Resistance, Input-Output @ $T_A = +25^{\circ}\text{C}$, 50%RH, 100V _{DC} | 10^{12} | | Ω |
| Maximum Capacitance, Input-Output | 1.0 | | pF |
| Maximum Pin Soldering Temperature (10 seconds maximum) | +260 | | $^{\circ}\text{C}$ |
| Ambient Temperature Range: | Operating | -40 to +85 | $^{\circ}\text{C}$ |
| | Storage | -40 to +100 | |

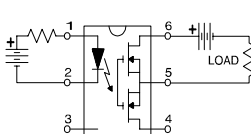
International Rectifier does not recommend the use of this product in aerospace, avionics, military or life support applications. Users of this International Rectifier product in such applications assume all risks of such use and indemnify International Rectifier against all damages resulting from such use.

Connection Diagrams

"A" Connection



"B" Connection



"C" Connection

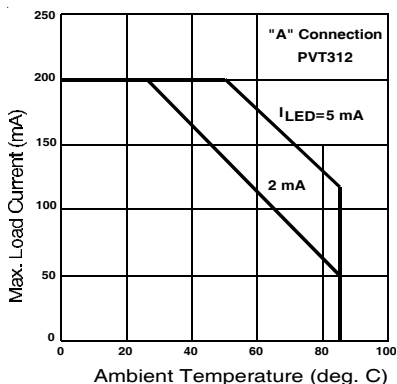
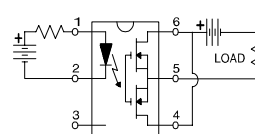


Figure 1. Typical Current Derating Curves

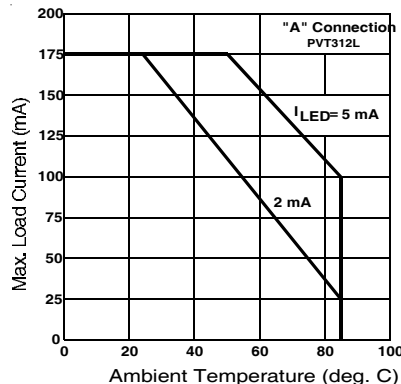


Figure 2. Typical Current Derating Curves

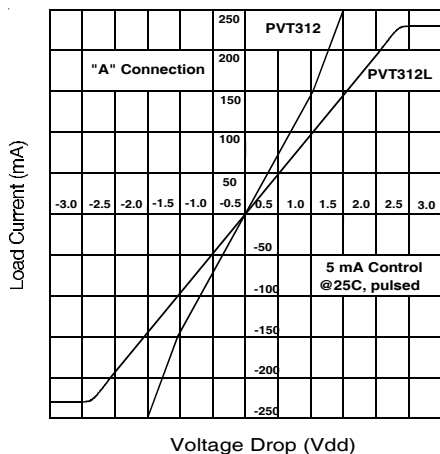


Figure 3. Linearity Characteristics

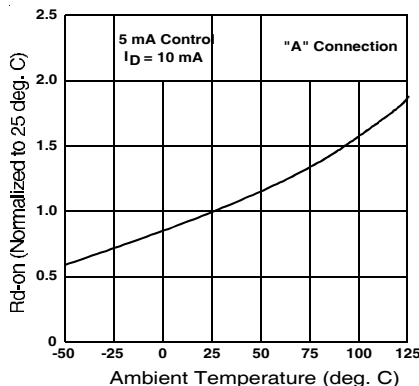


Figure 4. Typical Normalized On-Resistance

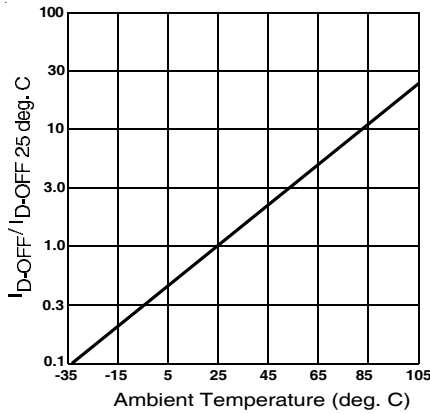


Figure 5. Typical Normalized Off-State Leakage

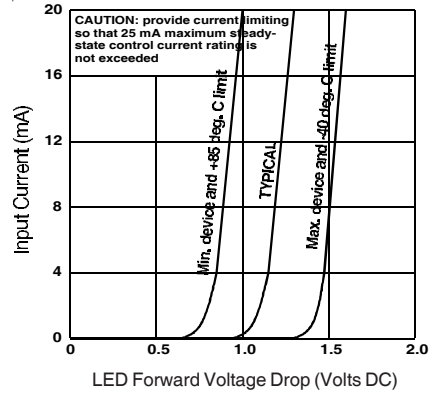


Figure 6. Input Characteristics (Current Controlled)

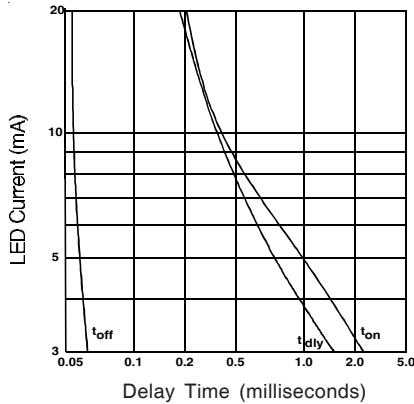


Figure 7. Typical Delay Times

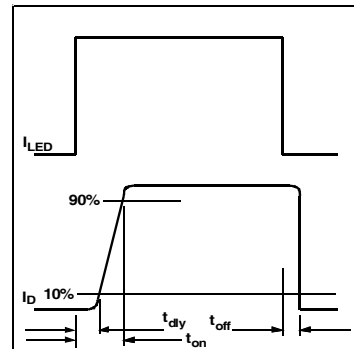


Figure 8. Delay Time Definitions

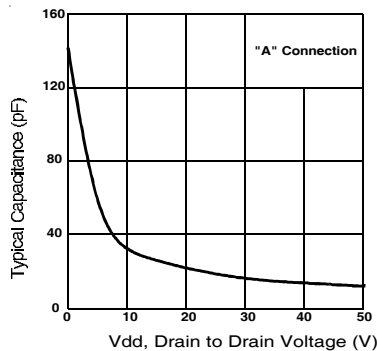
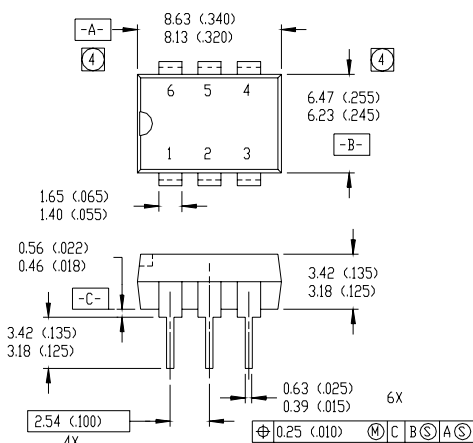


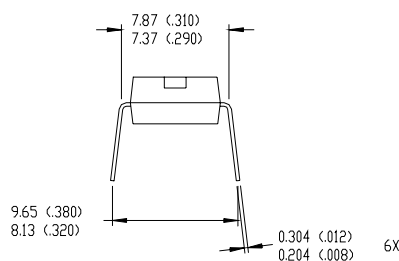
Figure 9. Typical Output Capacitance

Case Outlines

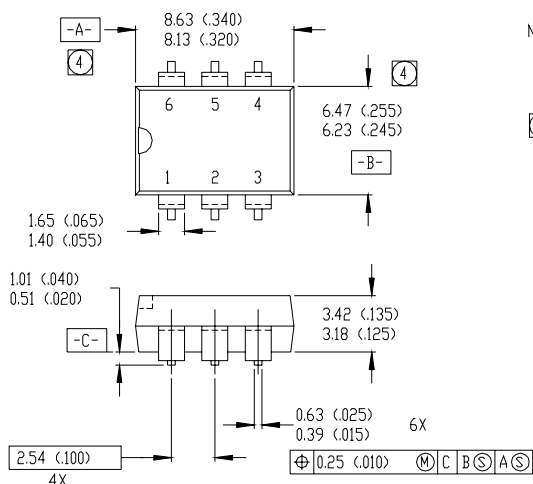


NOTES:

- 1 DIMENSIONING & TOLERANCING PER ANSI Y14.5M-1982.
2 CONTROLLING DIMENSION: INCH.
3 DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
4 DIMENSION DOES NOT INCLUDE MOLD PROTUSIONS. MOLD
PROTUSIONS SHALL NOT EXCEED 0.25 (0.010).

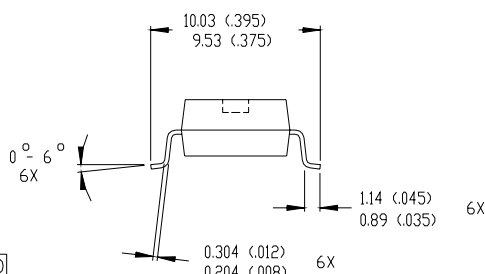


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Note: For the most current drawing please refer to IR website at: <http://www.irf.com/package/>

Qualification information[†]

| Qualification level | Industrial (per JEDEC JESD47I ^{††} guidelines) | |
|----------------------------|--|--|
| Moisture Sensitivity Level | PVT312LPbF | N/A |
| | PVT312PbF | |
| | PVT312LSPbF | MSL4 (per JEDEC J-STD-020E & JEDEC J-STD-033C ^{††}) |
| | PVT312LS-TPbF | |
| | PVT312SPbF | |
| | PVT312S-TPbF | |
| RoHS compliant | Yes | |

[†] Qualification standards can be found at International Rectifier's web site: <http://www.irf.com/product-info/reliability>

^{††} Applicable version of JEDEC standard at the time of product release

Revision History

| Date | Comments |
|-----------|--|
| 5/18/2015 | <ul style="list-style-type: none"> Added Qualification Information Table on page 6 Updated data sheet with new IR corporate template |

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Data and specifications subject to change without notice

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