

### Microelectronic Power IC

HEXFET® Power MOSFET Photovoltaic Relay  
Single-Pole, Normally-Open, 0-60V, 2.0A AC / 4.0A DC

## General Description

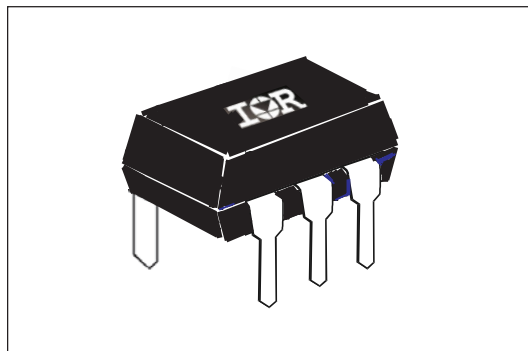
The PVG612A Series Photovoltaic Relay is a single-pole, normally open solid-state relay that can replace electromechanical relays in many applications. It utilizes International Rectifier's proprietary HEXFET power MOSFET as the output switch, driven by an integrated circuit photovoltaic generator of novel construction. The output switch is controlled by radiation from a GaAlAs light emitting diode (LED) which is optically isolated from the photovoltaic generator.

These units exceed the performance capabilities of electromechanical relays in operating life, sensitivity, stability of on-resistance, miniaturization, insensitivity to magnetic fields and ruggedness. The compact PVG612A is particularly suited for isolated switching of high currents from 12 to 48 Volt AC or DC power sources.

Series PVG612A 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 Part Identification information opposite.

## Features

- Bounce-free operation
- High load current capacity
- High off-state resistance
- Linear AC/DC operation
- 4,000 V<sub>RMS</sub> I/O Isolation
- Solid-State reliability
- UL recognized
- ESD Tolerance:
  - 4000V Human Body Model
  - 500V Machine Model



## Applications

- Programmable Logic Controllers
- Computers and Peripheral Devices
- Audio Equipment
- Power Supplies and Power Distribution
- Control of Displays and Indicators
- Industrial Automation

## Part Identification

|               |                              |
|---------------|------------------------------|
| PVG612APbF    | thru-hole                    |
| PVG612ASPbF   | surface-mount                |
| PVG612AS-TPbF | 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                                                          | Limits   | Units |
|--------------------------------------------------------------------------------|----------|-------|
| Minimum Control Current (see figure 1)                                         | 5.0      | 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)         | 5.0 - 25 | mA    |
| Maximum Reverse Voltage (1mA max.)                                             | 6.0      | V     |

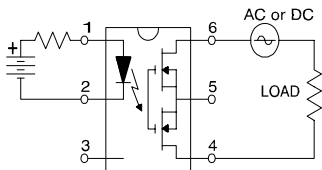
| OUTPUT CHARACTERISTICS                                                                                                                       | Limits        | Units                      |
|----------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------------------|
| Operating Voltage Range                                                                                                                      | 0 to $\pm 60$ | $V_{\text{DC}}$ or AC peak |
| Maximum Continuous Load Current @ $T_A = +40^{\circ}\text{C}$ , 10mA Control (see figure 1)                                                  |               |                            |
| A Connection                                                                                                                                 | 2.0           | A (AC or DC)               |
| B Connection                                                                                                                                 | 2.5           | A (DC)                     |
| C Connection                                                                                                                                 | 4.0           | A (DC)                     |
| Maximum Pulsed Load Current @ $T_A = +25^{\circ}\text{C}$ (100 ms @ 10% Duty Cycle)                                                          |               |                            |
| A Connection                                                                                                                                 | 7.5           | A (AC or DC)               |
| B Connection                                                                                                                                 | 8.5           | A (DC)                     |
| C Connection                                                                                                                                 | 15.5          | A (DC)                     |
| Typical Thermal Resistance ( $R_{\text{thja}}$ , Junction-to-Ambient)                                                                        |               |                            |
| A Connection                                                                                                                                 | 79.1          | $^{\circ}\text{C/W}$       |
| B Connection                                                                                                                                 | 112.2         | $^{\circ}\text{C/W}$       |
| C Connection                                                                                                                                 | 81.0          | $^{\circ}\text{C/W}$       |
| Maximum On-State Resistance @ $T_A = +25^{\circ}\text{C}$<br>For 1A pulsed load, 10mA Control (see figure 4)                                 |               |                            |
| A Connection                                                                                                                                 | 100           | $\text{m}\Omega$           |
| B Connection                                                                                                                                 | 50            | $\text{m}\Omega$           |
| C Connection                                                                                                                                 | 35            | $\text{m}\Omega$           |
| Maximum Off-State Leakage @ 60V, $T_A = +25^{\circ}\text{C}$                                                                                 | 1.0           | $\mu\text{A}$              |
| Maximum Turn-On Time @ $T_A = +25^{\circ}\text{C}$ (see figures 7 & 8)<br>For 500mA, 50V <sub>DC</sub> load, 10mA Control, 10mS pulse width  | 3.5           | ms                         |
| Maximum Turn-Off Time @ $T_A = +25^{\circ}\text{C}$ (see figures 7 & 8)<br>For 500mA, 50V <sub>DC</sub> load, 10mA Control, 10mS pulse width | 0.5           | ms                         |
| Typical Output Capacitance @ $V_{\text{dd}}=50\text{V}$ , $f=1\text{MHz}$ (see figure 2)                                                     | 105           | pF                         |

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

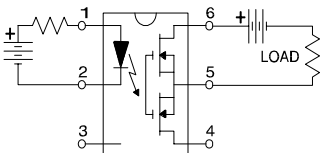
International Rectifier does not recommend the use of this product in aerospace, avionics, military or life support applications. Users of this International Rectifier product in such applications assume all risks of such use and indemnify International Rectifier against all damages resulting from such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

## Connection Diagrams

"A" Connection



"B" Connection



"C" Connection

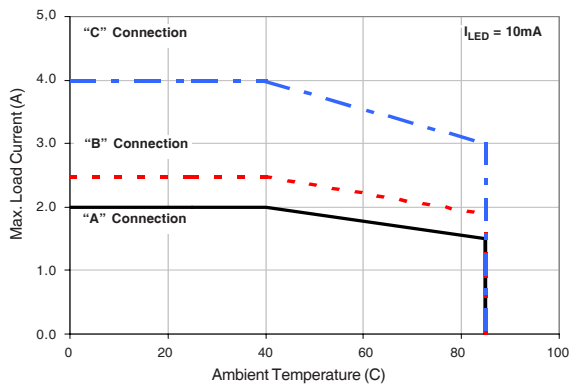
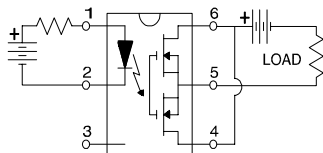


Figure 1. Current Derating Curves

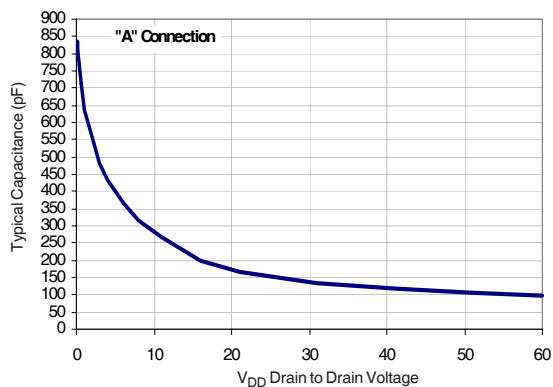


Figure 2. Typical Output Capacitance

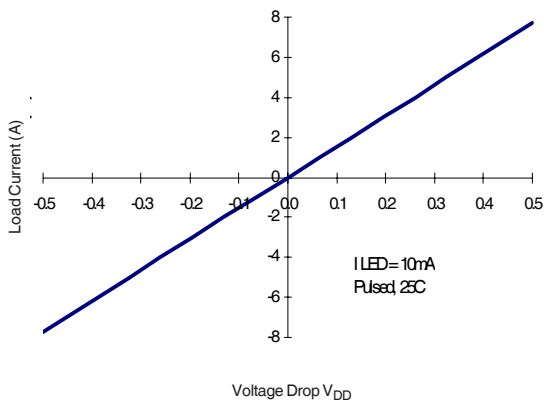


Figure 3. Typical Linearity Characteristics

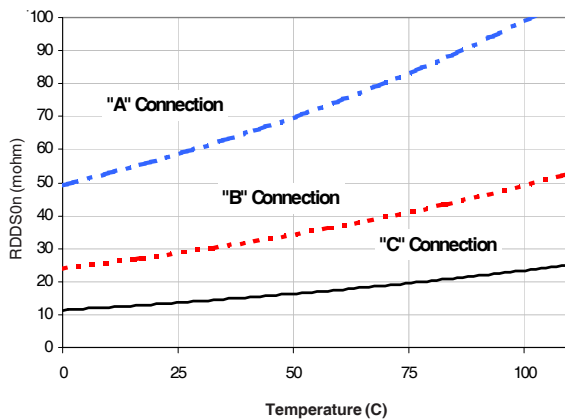


Figure 4. Typical Normalized On-Resistance

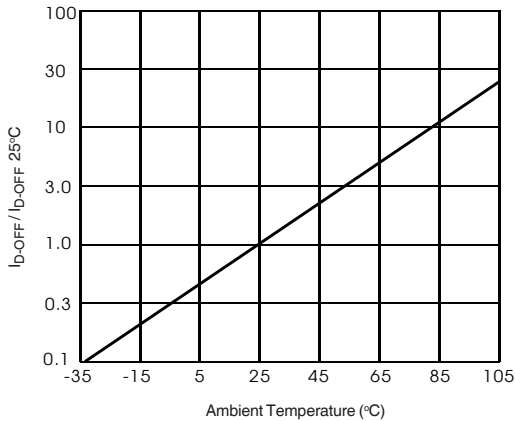


**Figure 5. Typical Normalized Off-State Leakage**

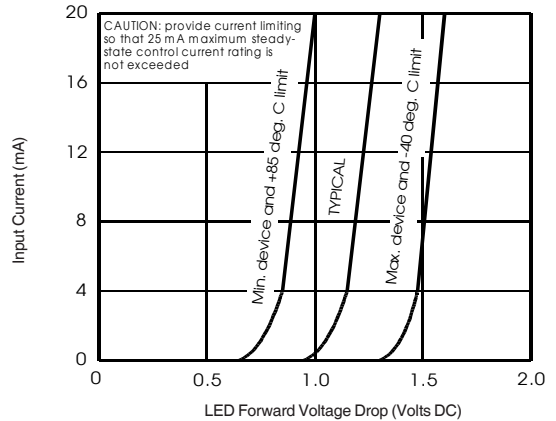


**Figure 6. Input Characteristics (Current Controlled)**

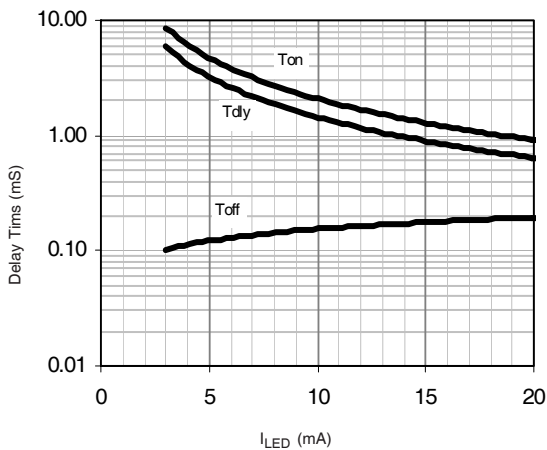


**Figure 7. Typical Delay Times**

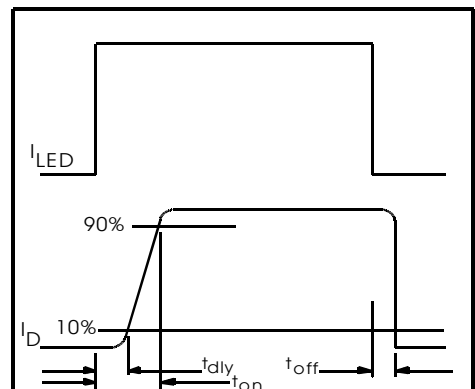
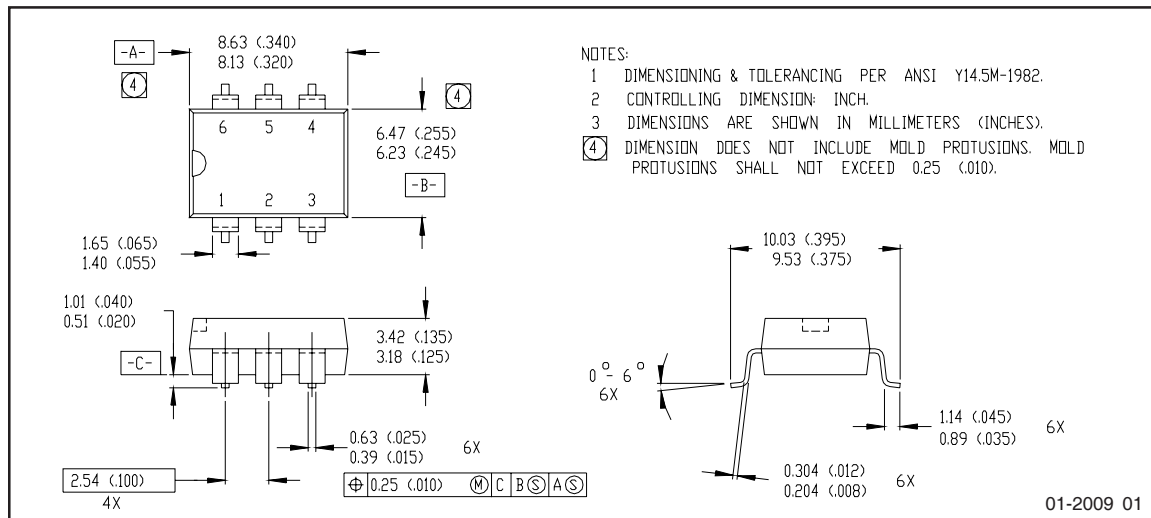
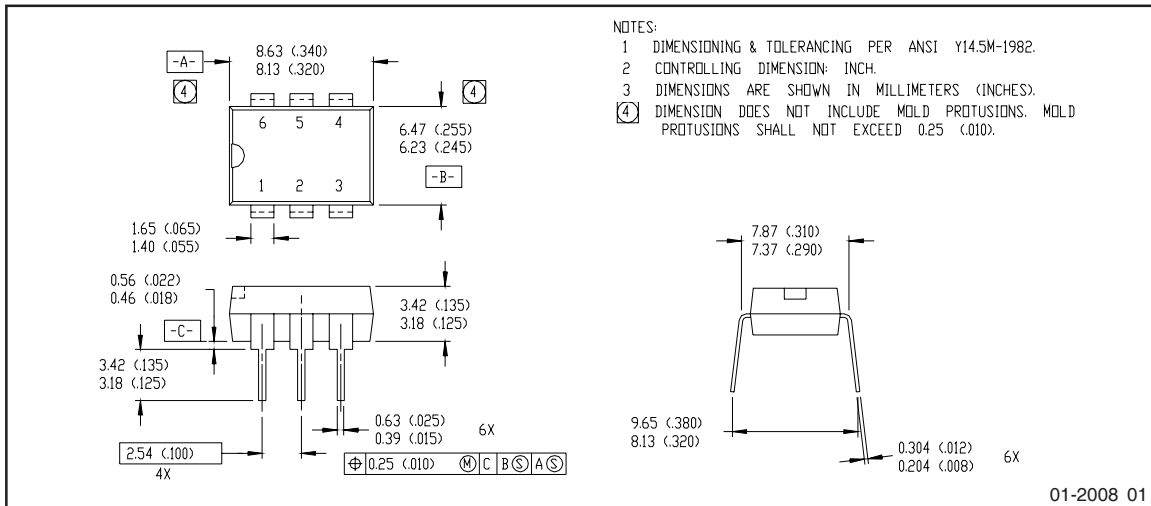


**Figure 8. Delay Time Definitions**

## Case Outlines



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

### Qualification information<sup>†</sup>

|                            |                                                            |                                                          |
|----------------------------|------------------------------------------------------------|----------------------------------------------------------|
| Qualification level        | Industrial<br>(per JEDEC JESD471 <sup>††</sup> guidelines) |                                                          |
| Moisture Sensitivity Level | PVG612APbF                                                 | N/A                                                      |
|                            | PVG612ASPbF                                                | MSL4                                                     |
|                            | PVG612AS-TPbF                                              | (per JEDEC J-STD-020E & JEDEC J-STD-033C <sup>††</sup> ) |
| RoHS compliant             | Yes                                                        |                                                          |

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

<sup>††</sup> Applicable version of JEDEC standard at the time of product release

### Revision History

| Date     | Comments                                                                                                                                                     |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5/4/2015 | <ul style="list-style-type: none"> <li>Added Qualification Information Table on page 6</li> <li>Updated data sheet with new IR corporate template</li> </ul> |

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Data and specifications subject to change without notice

To contact International Rectifier, please visit <http://www.irf.com/whoto-call/>