

Microelectronic Power IC

HEXFET® Power MOSFET Photovoltaic Relay
 Single-Pole, Normally-Open, 0-100V AC/DC, 375mA

General Description

The PVA13 Series AC Relay (PVA) is a single-pole, normally open, solid-state replacement for electromechanical relays used for general purpose switching of analog signals. It utilizes International Rectifier's HEXFET power MOSFETs as the output switches, 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.

The PVA13 Series overcomes the limitations of both conventional electromechanical and reed relays by offering the solid state advantages of long life, fast operating speed, low pick up power, bounce-free operation, low thermal offset voltages and miniature package. These advantages allow product improvement and design innovations in many applications such as process control, multiplexing, automatic test equipment and data acquisition.

The PVA13 can switch analog signals from thermocouple level to 100 Volts peak AC or DC polarity. Signal frequencies into the RF range are easily controlled and switching rates up to 450Hz are achievable. The extremely small thermally generated offset voltages allow increased measurement accuracies.

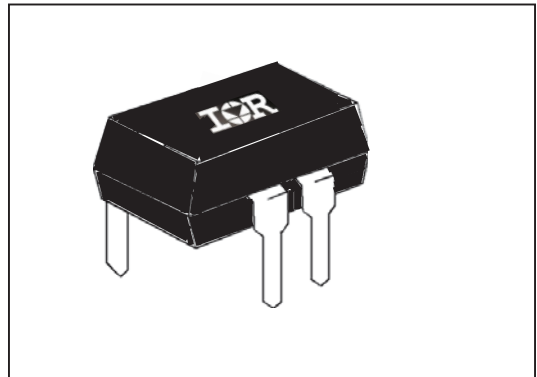
These relays are packaged in 8-pin, molded DIP packages and available with either thru-hole or surface-mount ("gull-wing") leads, in plastic shipping tubes.

Applications

- Process Control
- Data Acquisition
- Test Equipment
- Multiplexing and Scanning

Features

- Bounce-Free Operation
- 10¹⁰ Off-State Resistance
- 1,000 V/μsec dv/dt
- 5 mA Input Sensitivity
- 4,000 V_{RMS} I/O Isolation
- Solid-State Reliability
- UL Recognized
- ESD Tolerance:
 4000V Human Body Model
 500V Machine Model



Part Identification

| | |
|----------------|---------------|
| PVA1352NPbF | thru-hole |
| PVA1354NPbF | thru-hole |
| PVA1352NSPbF | surface-mount |
| PVA1354NSPbF | (gull-wing) |
| PVA1354NS-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 | PVA1352N | PVA1354N | Units |
|--|-------------|----------|-------------------------------------|
| Minimum Control Current (see figures 1 and 2) For 325mA Continuous Load Current For 370mA Continuous Load Current For 190mA Continuous Load Current | 2 5 5 | | DC mA@25°C mA@40°C mA@85°C |
| Maximum Control Current for Off-State Resistance at 25°C | 10 | | μA(DC) |
| Control Current Range (Caution: current limit input LED. See figure 6) | 2.0 to 25 | | mA(DC) |
| Maximum Reverse Voltage | 6.0 | | V(DC) |

| OUTPUT CHARACTERISTICS | PVA1352N | PVA1354N | Units |
|--|-----------------|------------------|---------------------|
| Operating Voltage Range | 0 to ± 100 | | V _(peak) |
| Maximum Load Current 40°C, I _{LED} 5mA | 375 | | mA(DC) |
| Response Time @25°C (see figures 7 and 8) Maximum T _(on) @ 12mA Control, 50 mA Load, 50 VDC Maximum T _(off) @ 12mA Control, 50 mA Load, 50 VDC | 150 125 | | μs μs |
| Maximum On-state Resistance 25°C (Pulsed) (figure 4) 50 mA Load, 5mA Control | 5 | | Ω |
| Minimum Off-state Resistance 25°C @ 80 VDC (see figure 5) | 10 ⁸ | 10 ¹⁰ | Ω |
| Maximum Thermal Offset Voltage @ 5.0mA Control | 0.2 | | μvolts |
| Minimum Off-State dv/dt | 1000 | | V/μs |
| Typical Output Capacitance (see figure 9) | 11pF | | @ 50VDC |

| GENERAL CHARACTERISTICS (PVA1352N and PVA1354N) | | | Units |
|---|-----------|----------------------------------|------------------|
| Dielectric Strength: Input-Output | | 4000 | V _{RMS} |
| Insulation Resistance: Input-Output @ 90V _{DC} | | 10 ¹² @ 25°C - 50% RH | Ω |
| Maximum Capacitance: Input-Output | | 1.0 | pF |
| Max. Pin Soldering Temperature (1.6mm below seating plane, 10 seconds max.) | | +260 | °C |
| Ambient Temperature Range: | 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.

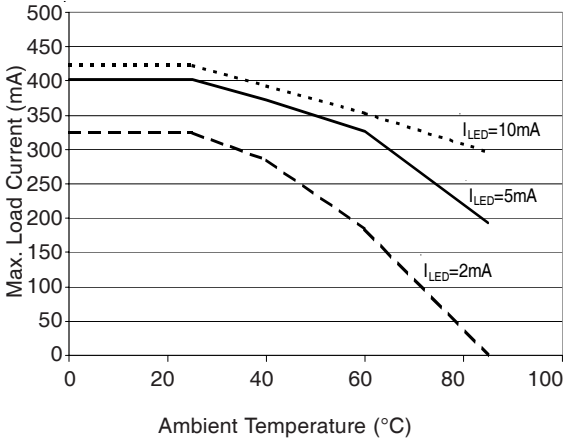


Figure 1. Current Derating Curves

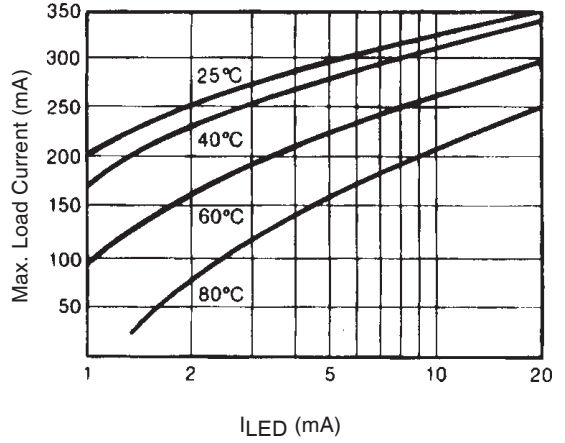


Figure 2. Typical Control Current Requirements

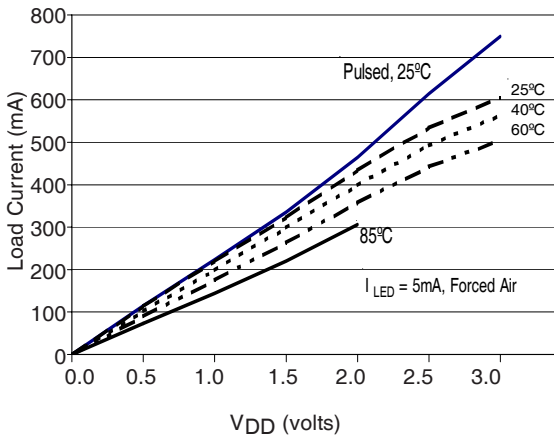


Figure 3. Typical On Characteristics

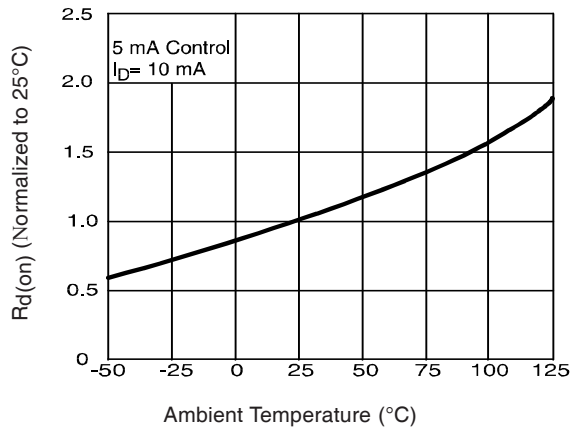


Figure 4. Typical Normalized On-Resistance

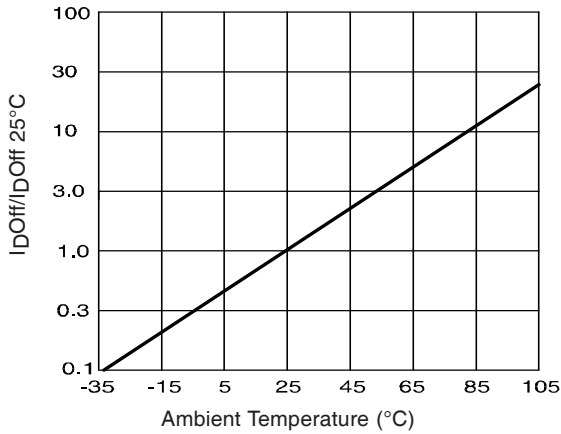


Figure 5. Normalized Off-State Leakage

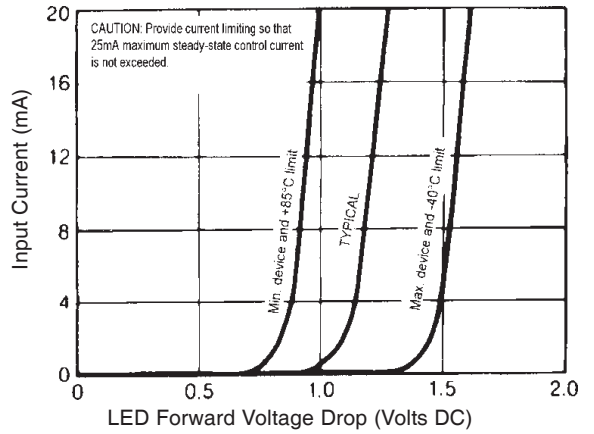


Figure 6. Input Characteristics (Current Controlled)

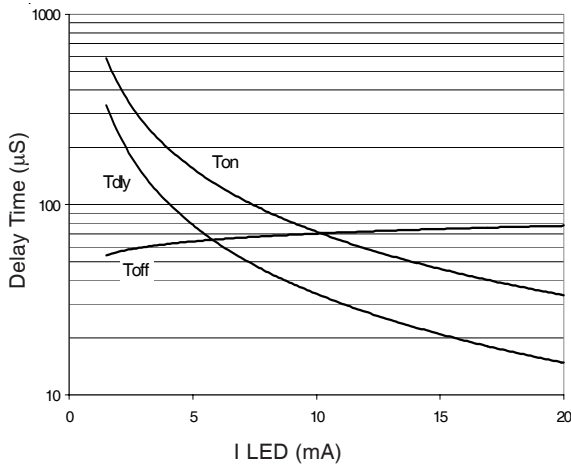


Figure 7. Typical Delay Times

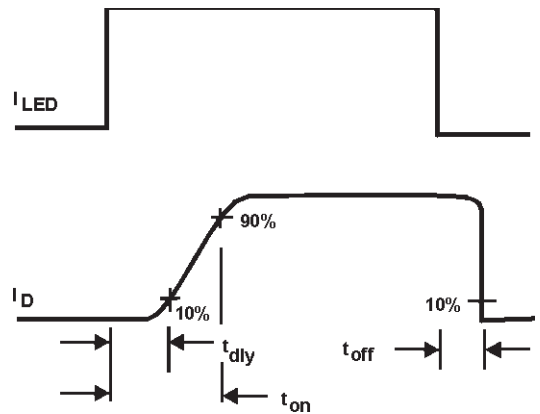


Figure 8. Delay Time Definitions

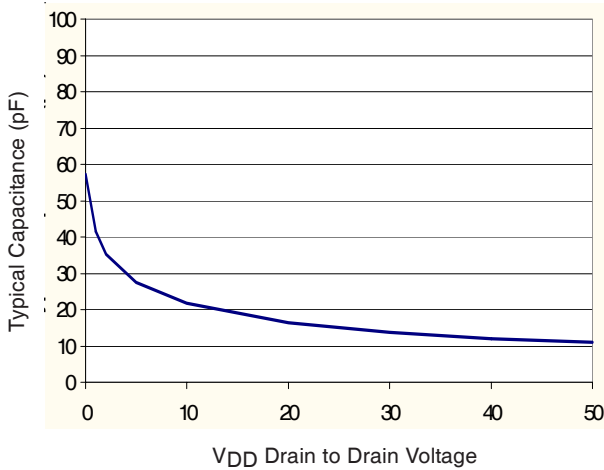
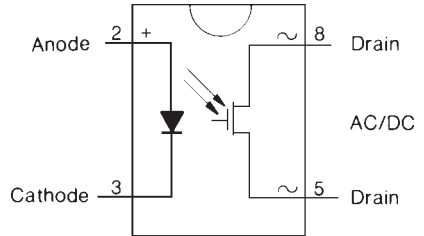
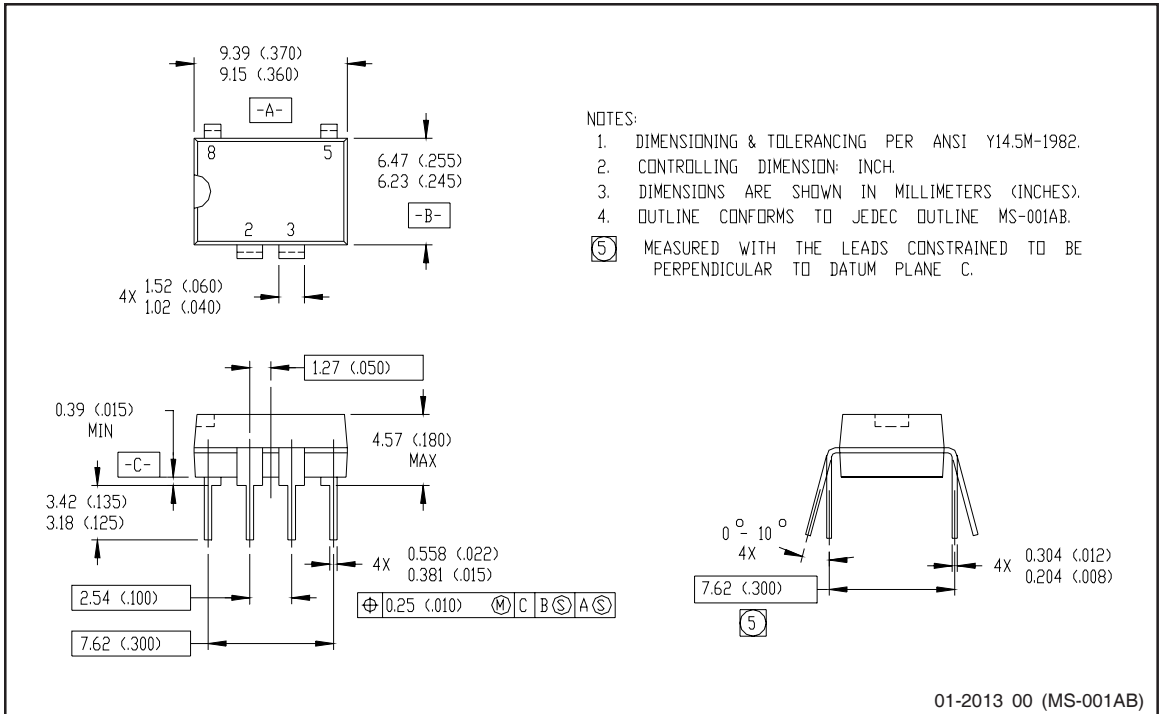


Figure 9. Typical Output Capacitance

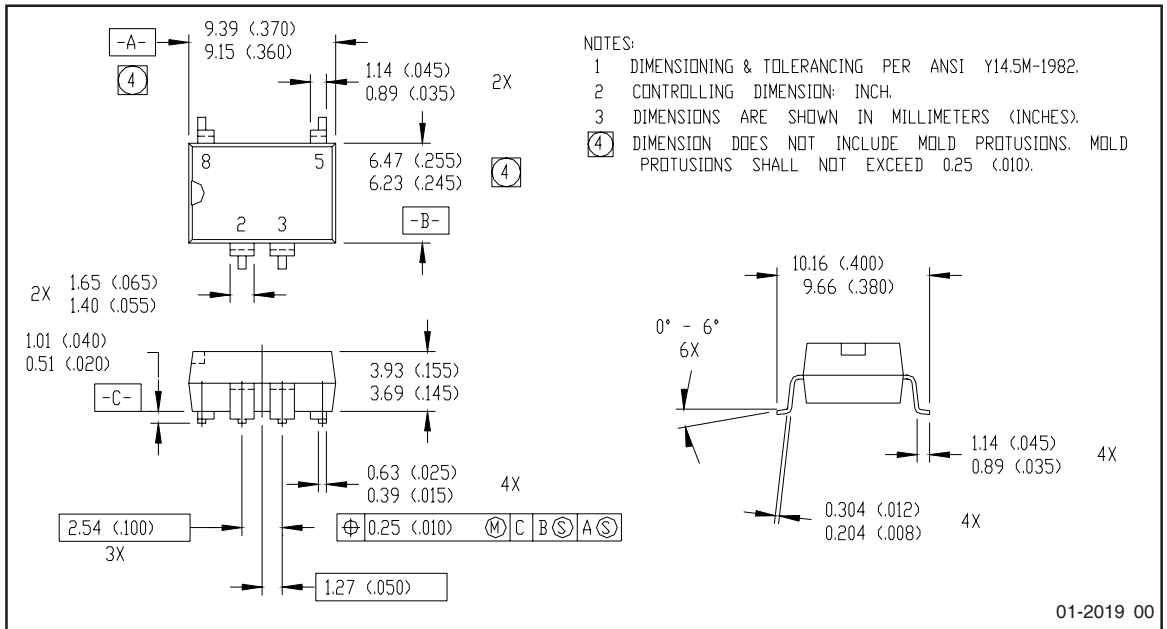
Wiring Diagram



Case Outlines



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



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Qualification information[†]

| Qualification level | Industrial (per JEDEC JESD47I ^{††} guidelines) | |
|----------------------------|--|--|
| Moisture Sensitivity Level | PVA1352NPbF | N/A |
| | PVA1354NPbF | |
| | PVA1352NSPbF | MSL4 (per JEDEC J-STD-020E & JEDEC J-STD-033C ^{††}) |
| | PVA1354NSPbF | |
| | PVA1354NS-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 |
|-----------|--|
| 4/24/2015 | <ul style="list-style-type: none"> Added Qualification Information Table on page 6 Updated data sheet with new IR corporate template |

International
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IR WORLD HEADQUARTERS: 101 N. Sepulveda Blvd., El Segundo, California 90245, USA
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