International
IOR Rectifier

Series PVA33NPbF

Microelectronic Power IC

HEXFET® Power MOSFET Photovoltaic Relay
Single-Pole, Normally-Open, 0-300V AC/DC, 150mA

General Description

The PVA33 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 PVA33 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 PVA33 can switch analog signals from thermocouple level to 300 Volts peak AC or DC polarity. Signal frequencies into the RF range are easily controlled and switching rates up to 500Hz are achievable. The extremely small thermally generated offset voltages allow increased measurement accuracies.

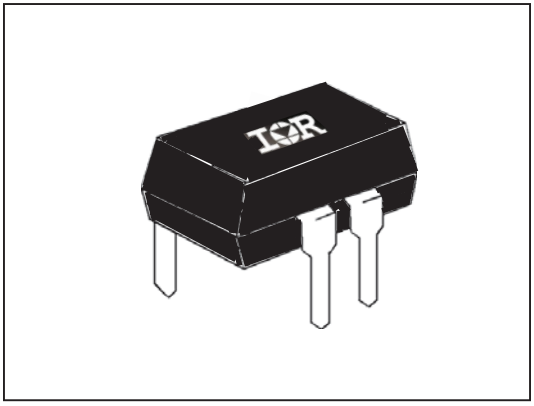
These relays are packaged in 8-pin, molded DIP packages and available with either thru-hole or surface-mount ("gull-wing") leads, in plastic shipping tubes.

Applications

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

Features

- Bounce-Free Operation
- 10^{10} Off-State Resistance
- 1,000 V/μsec dv/dt
- 0.2 μV Thermal Offset
- 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

PVA2352NPbF PVA3324NPbF PVA3354NPbF	thru-hole
PVA2352NS PbF PVA3324NS PbF PVA3354NS PbF	surface-mount (gull-wing)

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

Electrical Specifications (-40°C ≤ T_A ≤ +85°C unless otherwise specified)

INPUT CHARACTERISTICS	PVA2352N	PVA3324N	PVA3354N	Units
Minimum Control Current (see figures 1 and 2)				DC
For 60mA Continuous Load Current	--	1	--	mA@25°C
For 170mA Continuous Load Current	2	2	2	mA@25°C
For 100mA Continuous Load Current	5	2	5	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	PVA2352N	PVA3324N PVA3354N	Units
Operating Voltage Range	0 to ± 200	0 to ± 300	$V_{(PEAK)}$
Maxiumum Load Current 40°C I LED 5mA	150		$mA_{(DC)}$
Max. On-state Resistance 25°C (Pulsed) (fig. 4) 50 mA Load, 5mA Control	24		Ω
Min. Off-state Resistance @ 25°C (see figure 5)	10^8@160VDC	10^{10} @ 240VDC	Ω
Response Time @25°C (see figures 7 and 8)			
Max. $T_{(on)}$ @ 12mA Control, 50 mA Load, 100 VDC	100		μs
Max. $T_{(off)}$ @ 12mA Control, 50 mA Load, 100 VDC	110		μs
Max. Thermal Offset Voltage @ 5.0mA Control	0.2		μvolts
Min. Off-State dv/dt	1000		V/μs
Typical Output Capacitance (see figure 10)	6		pF @ 50V

GENERAL CHARACTERISTICS		(PVA2352N, PVA3324N and PVA3354N)	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	

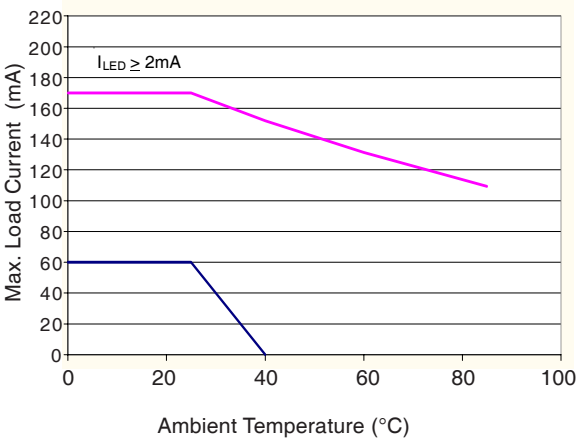


Figure 1. Current Derating Curves (PVA3324N)

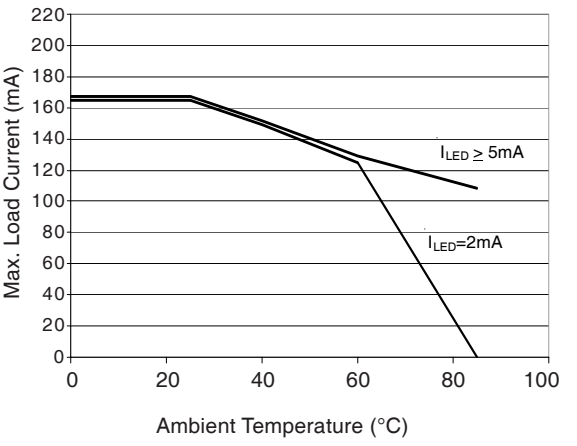


Figure 2. Current Derating Curves (PVA3354N, PVA2352N)

I_{LED} =1mA

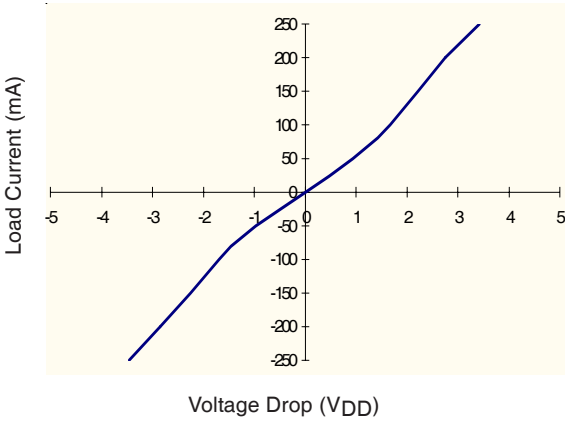


Figure 3.Typical On Characteristics

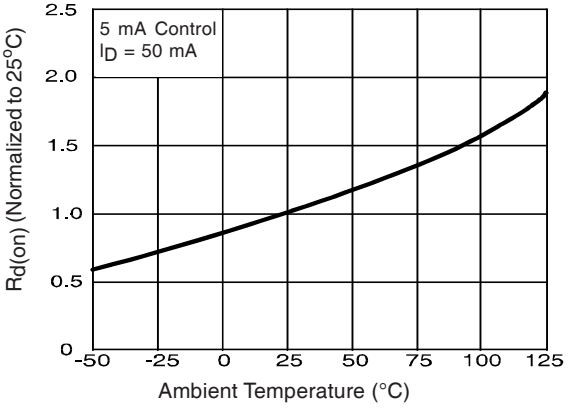


Figure 4. Typical On-Resistance

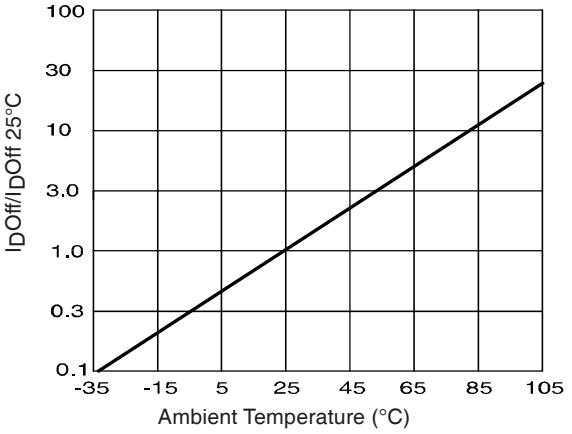


Figure 5. Typical Normalized Off-State Leakage

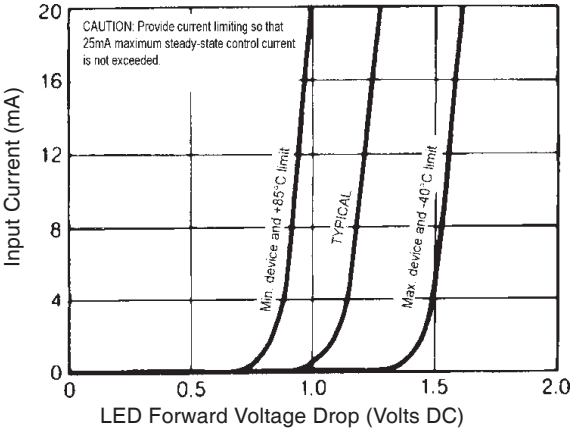


Figure 6. Input Characteristics (Current Controlled)

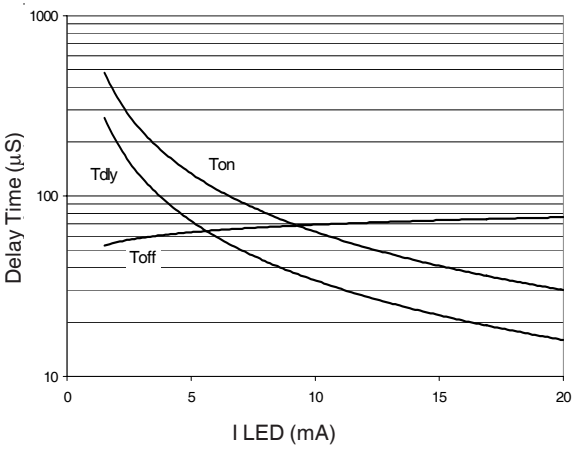


Figure 7.Typical Delay Times

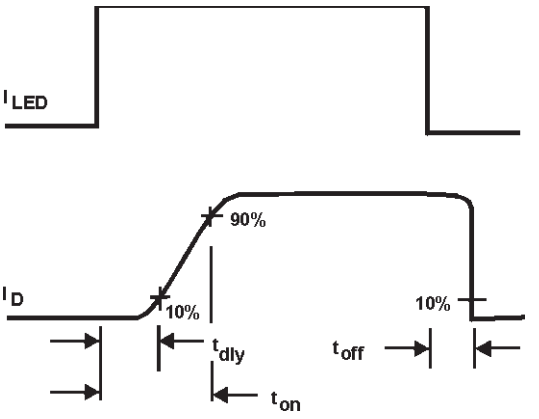


Figure 8. Delay Time Definitions

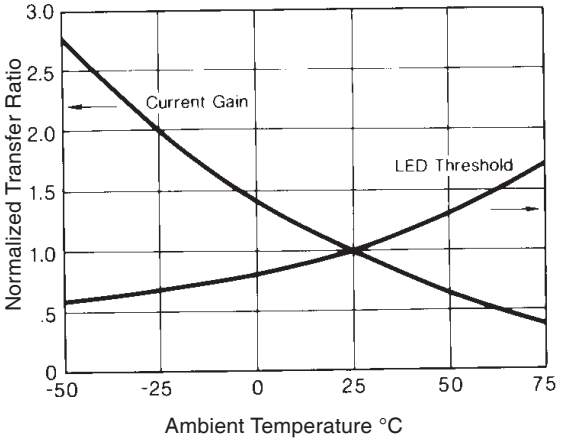


Figure 9. Typical Control Threshold and Transfer Ratio

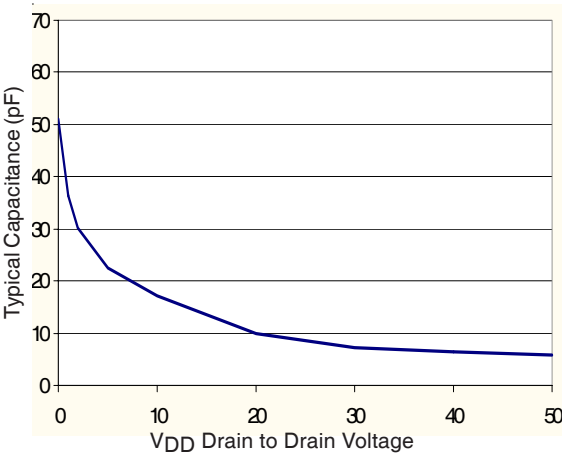
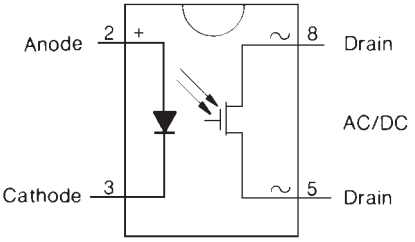
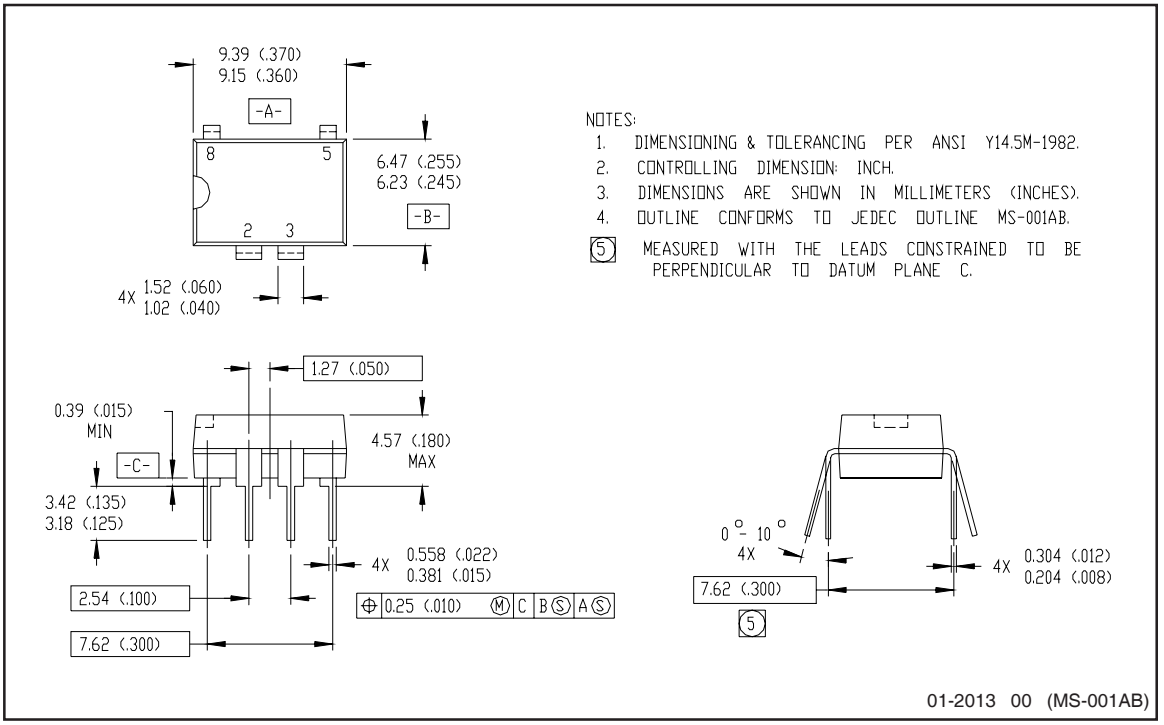


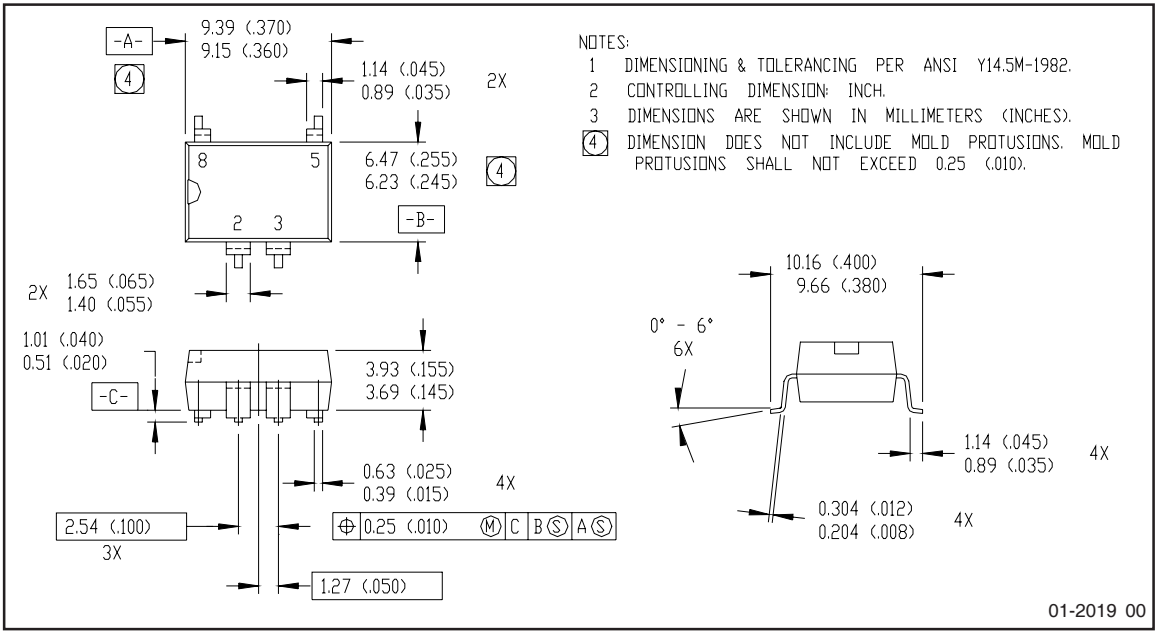
Figure 10. Typical Output Capacitance

Wiring Diagram



Case Outlines





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	PVA2352NPbF	N/A
	PVA3324NPbF	
	PVA3354NPbF	
	PVA2352NSPbF	MSL4 (per JEDEC J-STD-020E & JEDEC J-STD-033C ††)
	PVA3324NSPbF	
	PVA3354NSPbF	
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	• Added Qualification Information Table on page 7 • Updated data sheet with new IR corporate template

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