International
IOR Rectifier

Data Sheet No. PD10050-D

Series PVA30N

Microelectronic Power IC
HEXFET® Power MOSFET Photovoltaic Relay
Single-Pole, Normally-Open
0-300V AC/DC, 50mA

General Description

The PVA30 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 PVA30 Series combines very low solid-state output capacitance, very high off-state resistance and very fast response times. These Photovoltaic Relays are designed specifically to accurately switch low-level signals in high-performance instrumentation systems.

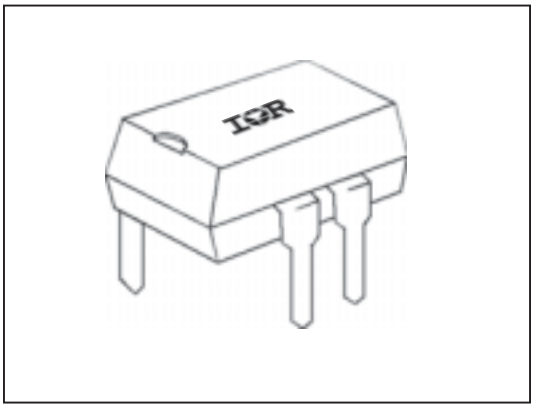
The PVA30 Series overcomes the limitations of both conventional electromechanical and reed relays by offering the solid state advantages of long life, fast operating speed, low pick up power, bounce-free operation, low thermal offset voltages and miniature package. These advantages allow product improvement and design innovations in many applications such as process control, multiplexing, automatic test equipment and data acquisition.

The PVA30 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 1.7kHz 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.

Features

- Bounce-Free Operation
- 10^{11} 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



Applications

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

Part Identification

PVA3054N	
PVA3055N	thru-hole
PVA3054NS	
PVA3055NS	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	PVA3054N	PVA3055N	Units
Minimum Control Current (see figure 1)			DC
For 55mA Continuous Load Current	2		mA@25°C
For 50mA Continuous Load Current	5		mA@40°C
For 35mA Continuous Load Current	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	7.0		V(DC)

OUTPUT CHARACTERISTICS	PVA3054N	PVA3055N	Units
Operating Voltage Range	0 to ± 300		$V_{(PEAK)}$
Maxiumum Load Current 40°C I LED 5mA	50		$mA_{(DC)}$
Response Time @25°C (see figures 6 and 7)			
Maximum $T_{(on)}$ @ 12mA Control, 20 mA Load, 100 VDC	60		µs
Maximum $T_{(off)}$ @ 12mA Control, 20 mA Load, 100 VDC	100		µs
Max. On-state Resistance 25°C (Pulsed) (fig. 3) 10 mA Load, 5mA Control	160		Ω
Minimum Off-state Resistance 25°C @ 240 VDC	10^{10}	10^{11}	Ω
Maximum Off-state Leakage 25°C @ 5.0 VDC (see figure 4)	—	0.05	nA
Maximum Thermal Offset Voltage @ 5.0mA Control $V_{O(OS)}$	0.2		µvolts
Minimum Off-State dv/dt	1000		V/µs
Typical Output Capacitance (see figure 8)	2.2		pF @ 40V

GENERAL CHARACTERISTICS (PVA3054N and PVA3055N)			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.

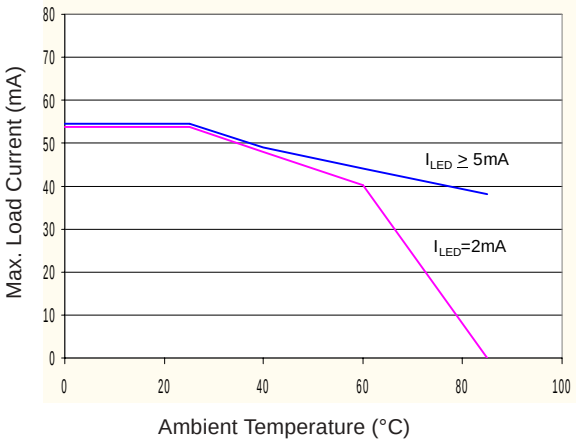


Figure 1. Current Derating Curves

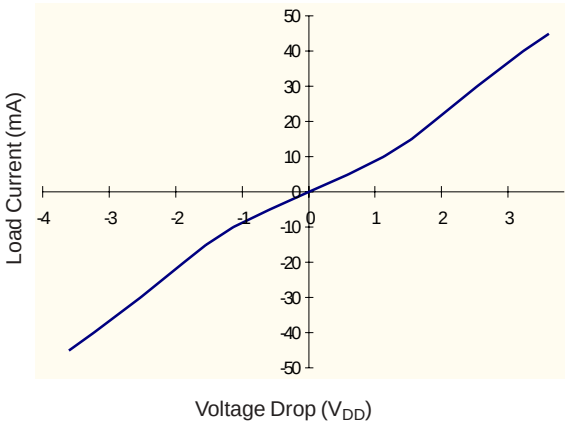


Figure 2.Typical On Characteristics

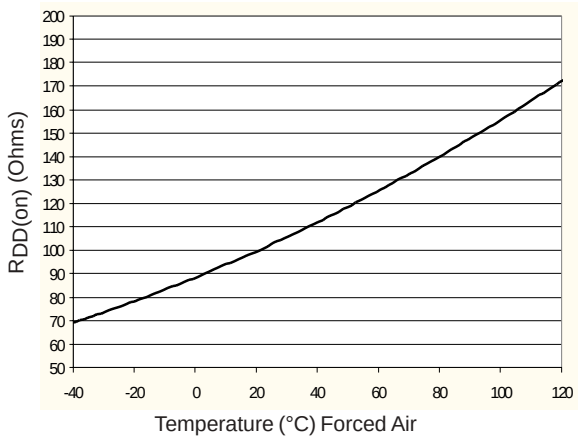


Figure 3.Typical On-Resistance

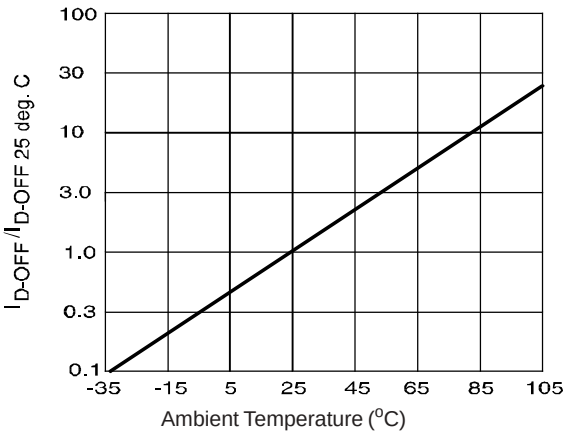


Figure 4.Typical Normalized Off-State Leakage

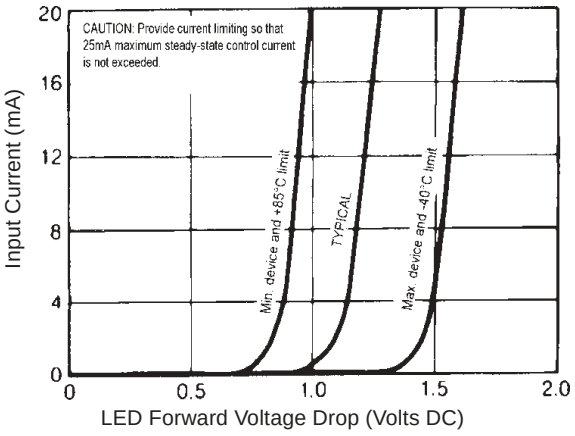


Figure 5. Input Characteristics (Current Controlled)

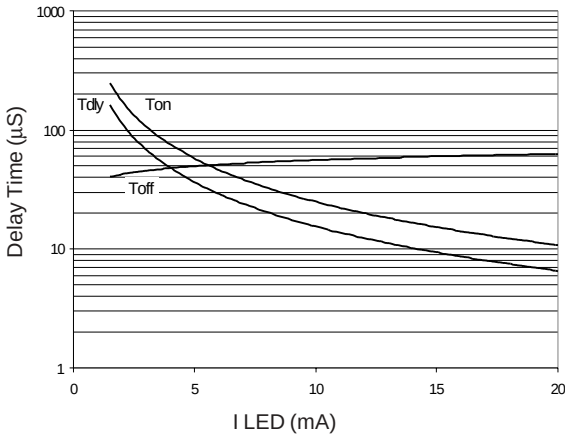


Figure 6. Typical Delay Times

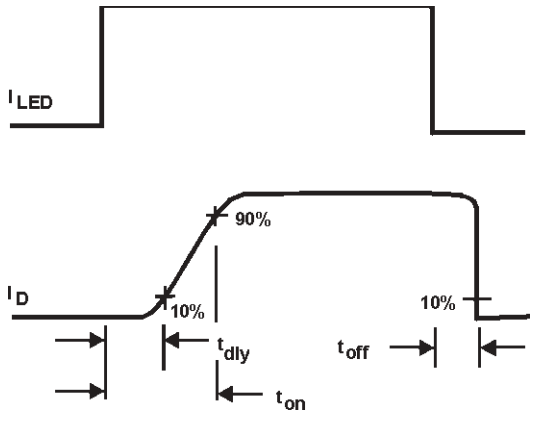


Figure 7. Delay Time Definitions

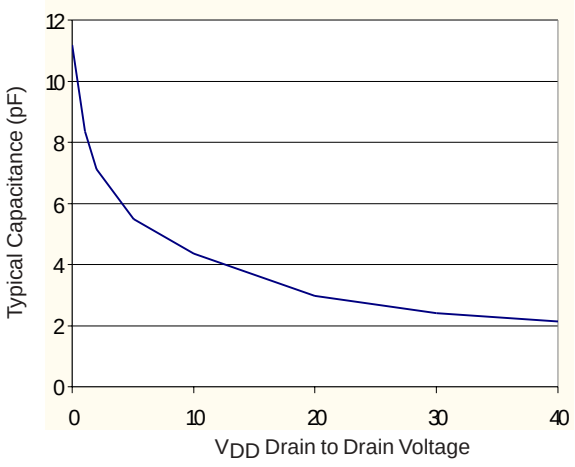
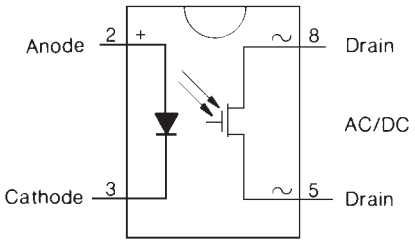
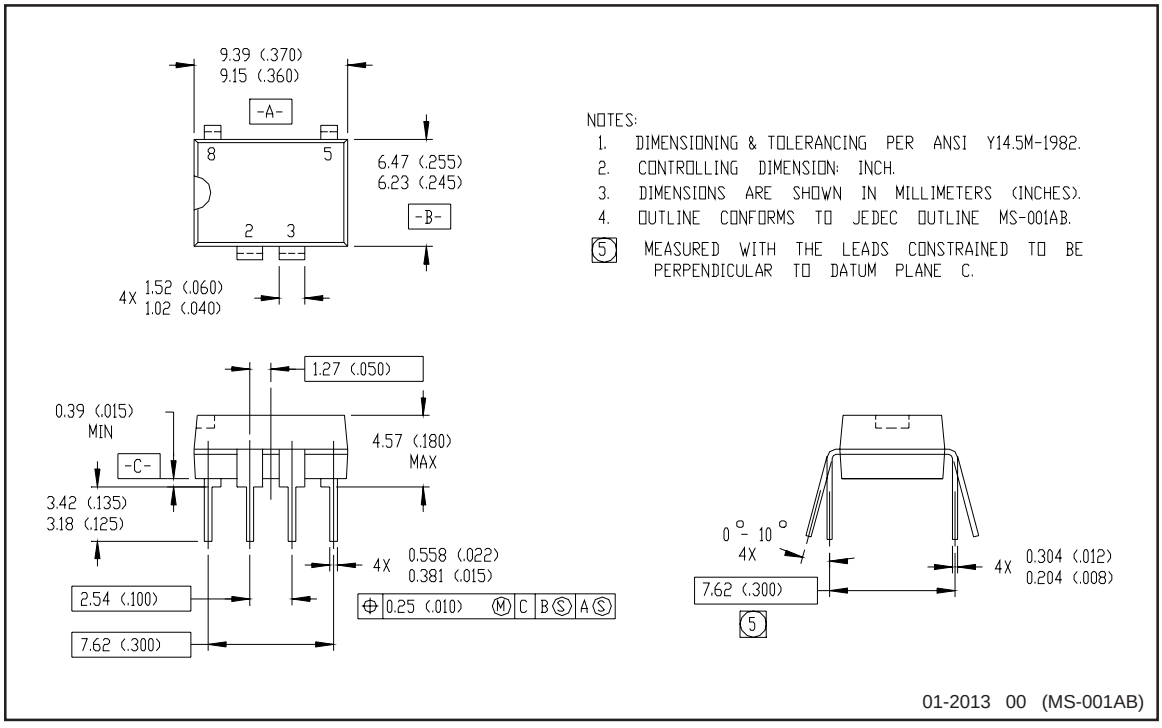


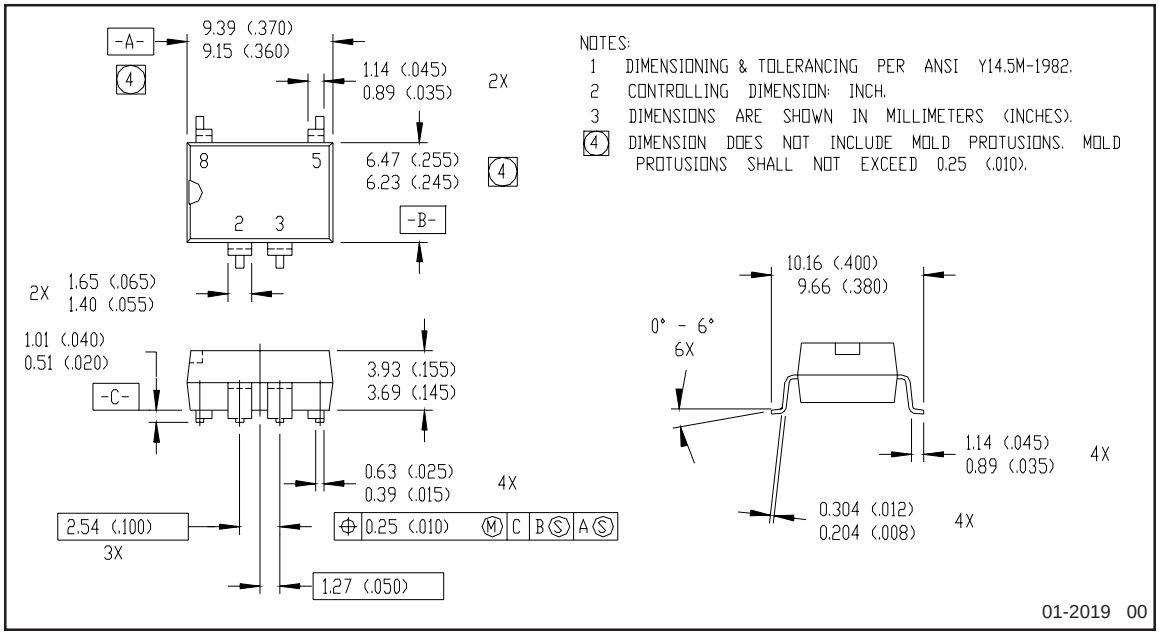
Figure 8. Typical Output Capacitance

Wiring Diagram



Case Outlines





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Data and specifications subject to change without notice. 12/11/2003