

Solid State Relais

PVA3324

Photovoltaic Relais

DATASHEET

OEM – International Rectifier

Source: International Rectifier Databook 1995

Data Sheet No. PD-1.021C

INTERNATIONAL RECTIFIER

SERIES PVA33

Microelectronic
Power IC Relay

Single Pole, 130 mA
0-300V AC/DC

BOSFET® PhotoVoltaic Relay

GENERAL DESCRIPTION

The Photovoltaic AC Relay (PVA) is a single-pole, normally open solid state replacement for electro-mechanical relays used for general purpose switching of analog signals. It utilizes as an output switch a unique bidirectional (AC or DC) MOSFET power IC termed a BOSFET. The BOSFET is controlled by a photovoltaic generator of novel construction, which is energized by radiation from a dielectrically isolated light emitting diode (LED).

PVA FEATURES

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

The PVA 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 5 kHz are achievable. The extremely small thermally generated offset voltages allow increased measurement accuracies.

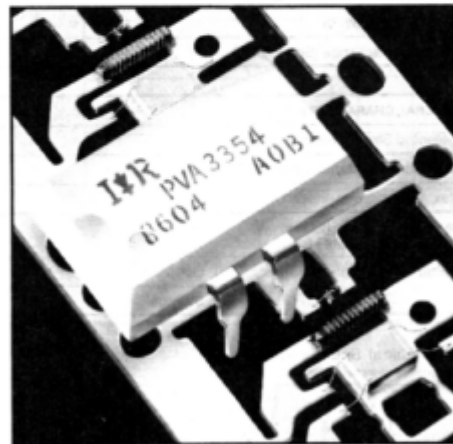
Unique silicon technology developed by International Rectifier forms the heart of the PVA. The monolithic BOSFET contains a bidirectional N channel power MOSFET output structure. In addition, this power IC chip has input circuitry for fast turn-off and gate protection functions. This section of the BOSFET chip utilizes both bipolar and MOS technology to form NPN transistors, P channel MOSFETs, resistors, diodes and capacitors.

The photovoltaic generator similarly utilizes a unique International Rectifier alloyed multi-junction structure. The excellent current conversion efficiency of this technique results in the very fast response of the PVA microelectronic power IC relay.

This advanced semiconductor technology has created a radically new control device. Designers can now develop switching systems to new standards of electrical performance and mechanical compactness.

(BOSFET is a trademark of International Rectifier)

- BOSFET Power IC
- 10¹⁰ Operations
- 100 μSec Operating Time
- 0.2 μVolt Thermal Offset
- 3 milliwatts Pick-Up Power
- 1000 V/μsec dv/dt
- Bounce Free
- 8-Pin DIP Package
- -40° C to 85° C
- UL Recognized



Part Identification

Part No.	Operating Voltage AC/DC	Sensitivity	Off-State Resistance
PVA2352	0-200V	5 mA	10 ⁹ Ohms
PVA3324	0-300V	2 mA	10 ¹⁰ Ohms
PVA3354		5 mA	10 ¹⁰ Ohms

BOSFET PVA33 PhotoVoltaic Relay

ELECTRICAL SPECIFICATIONS (-40°C ≤ T_A ≤ 85°C unless otherwise specified)

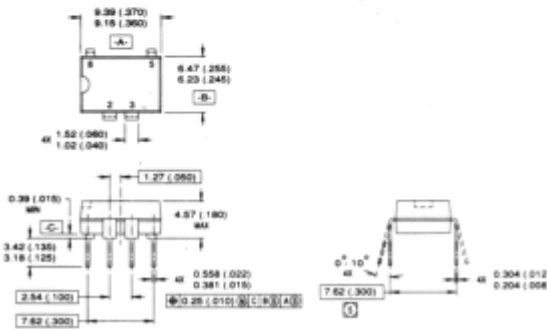
INPUT CHARACTERISTICS	PART NUMBERS			UNITS
	PVA2352	PVA3324	PVA3354	
Min. Control Current: (See Figs. 1 & 2) For 20 mA Continuous Load Current. For 100 mA Continuous Load Current. For 10 mA Continuous Load Current.	2.0 5.0 5.0	1.0 2.0 2.0	2.0 5.0 5.0	(DC) mA @ 25°C mA @ 25°C mA @ 85°C
Max. Control Current for Off-State Resistance at 25°C	10			μA (DC)
Control Current Range (Caution: Current limit input LED. See Fig. 6)	2.0 to 25			mA (DC)
Max Reverse Voltage	7.0			V (DC)
Response Time (See Fig. 7 and 8) Max. T _(on) @ 12 mA Control, 50 mA load, 100 VDC, 25°C, 0 to 90%	100			microsec
Max. T _(off) @ 12mA control, 50 mA load, 100 VDC, 25°C, 100% to 10%	50			microsec

OUTPUT CHARACTERISTICS	PVA2352	PVA3324	PVA3354	UNITS
Operating Voltage Range	0 ± 200	0 ± 300		V (peak)
Max. Load Current 40°C (See Fig. 1 and 2)	130			mA (DC)
Max. On-State Resistance 25°C (pulsed) (See Fig. 4) (50mA Load 5mA Control)	24			Ohms
Min. Off-State Resistance at 25°C (See Fig. 5)	10 ⁸ @ 160VDC	10 ¹⁸ @ 240 VDC		Ohms
Max. Thermal Offset Voltage. @ 5.0 mA Control	0.2			μ volts
Min. Off-State dv/dt	1000			V/μs
Output Capacitance (See Fig. 10)	12			pf @ 50 VDC

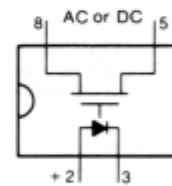
GENERAL CHARACTERISTICS	ALL MODELS			UNITS
Dielectric Strength-Input/Output	2500			V (RMS)
Insulation Resistance @ 90 VDC-Input/Output	10 ¹² @ 25°C - 50% RH			Ohms
Max. Capacitance-Input/Output	1.0			pf
Lead Temperature (1.6mm below seating plane) for 10 secs.	260			°C
Ambient Temperature Range:	Operating	-40 to 85		°C
	Storage	-40 to 100		°C

Mechanical Specifications:

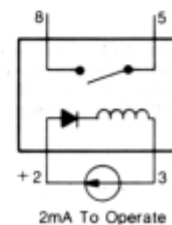
Dimensions in Inches(Millimeters)
Jedec MO-001-An



Wiring Diagram



Electromechanical Analogy



BOSFET PVA33

PERFORMANCE CHARACTERISTICS CURVES

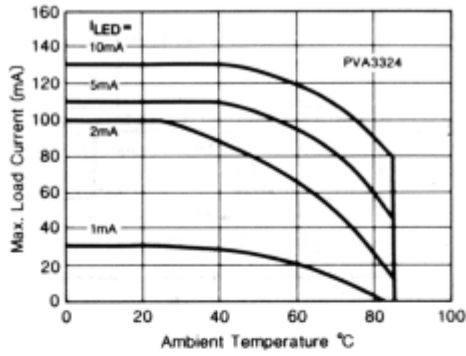


Figure 1. Current Derating Curves

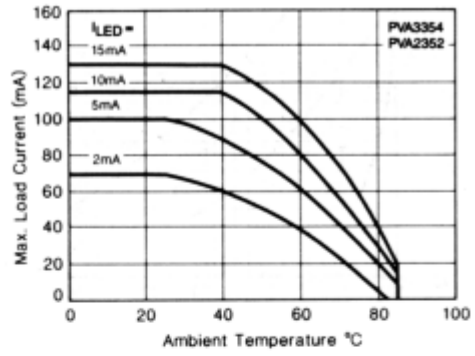


Figure 2. Current Derating Curves

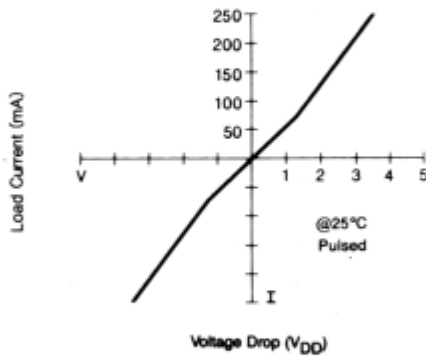


Figure 3. Linearity Characteristic

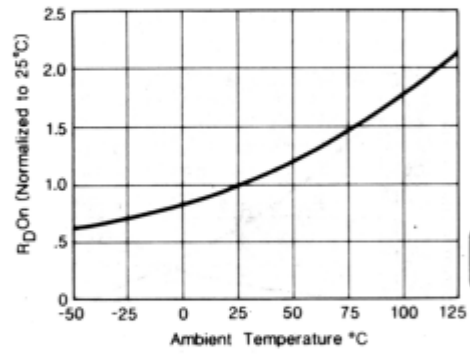


Figure 4. Typical Normalized On-Resistance

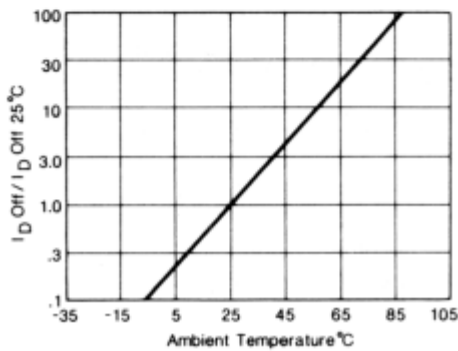


Figure 5. Normalized Off-State Leakage

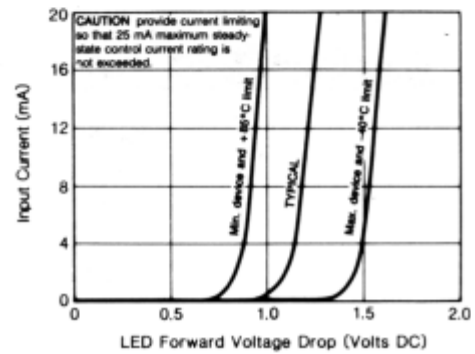


Figure 6. Input Characteristics (Current Controlled)

BOSFET PVA33 PhotoVtaic Relay PERFORMANCE CHARACTERISTICS CURVES

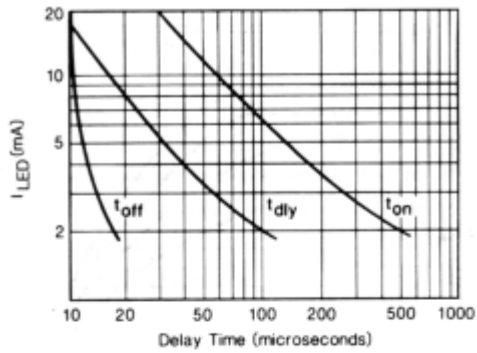


Figure 7. Typical Delay Times

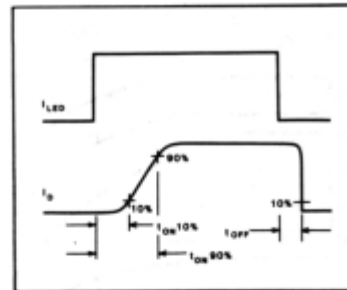


Figure 8. Delay Time

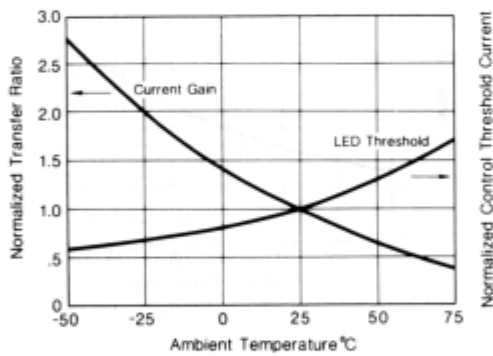


Figure 9. Typical Control Threshold and Transfer Ratio

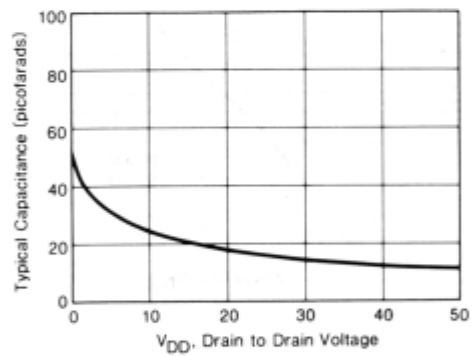


Figure 10. Typical Output Capacitance