INTERNATIONAL RECTIFIER IOR CRYDOM

A-29-07

SERIES PVA

BOSFET™ PhotoVoltaic Relay

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

GENERAL DESCRIPTION:

The Crydom Photovoltaic AC Relay (PVA) is a single-pole, normally open solid state replacement for electromechanical Reed Relays. 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.

PVA FEATURES

The PVA overcomes the limitations of Reed 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.

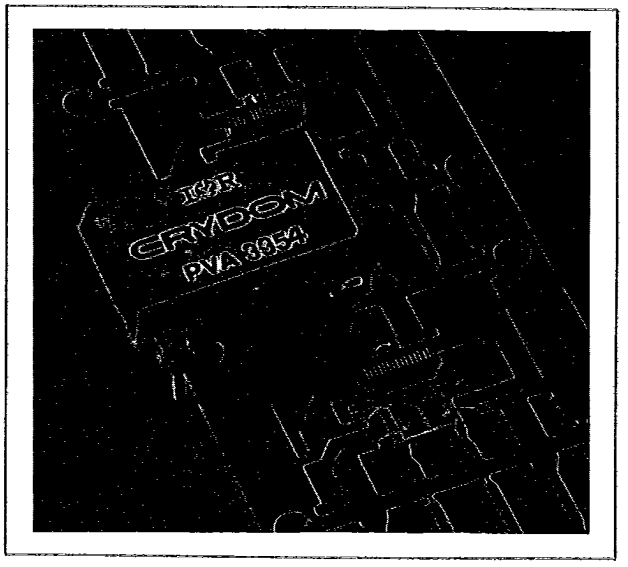
The PVA can switch analog signals from thermocouple level to 300 volts peak AC or DC polarity. Signal frequencies into the RF range are easily controlled and switching rates up to 5 kHz are achievable. The extremely small thermally generated offset voltages allow increased measurement accuracies.

Unique silicon technology developed by International Rectifier forms the heart of the Crydom PVA. The monolithic BOSFET contains a bidirectional N channel power mosfet output structure. In addition, this power IC chip also 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 transitors, 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 Crydom PVA.

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

- **BOSFET Power IC**
- **10^{10} Operations**
- **250 μSec Operating Time**
- **0.2 μVolt Thermal Offset**
- **5 milliwatts Pick-Up Power**
- **1000 V/μsec dv/dt**
- **Bounce Free**
- **8-Pin DIP Package**
- **-40° C to 80° C**



Part Identification

Part No.	Operating Voltage	Off-state Resistance
PVA 3354	0-300V AC/DC	10^{10} ohms

For data on a two-pole PVR, request Bulletin PVR-1. A lower resistance model is described in Bulletin PVD-1.

IOR CRYDOM BOSFET® PVA PhotoVoltaic Relay

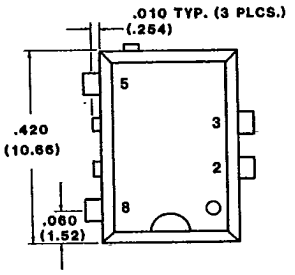
Specifications: (-40°C≤T_A≤80°C unless otherwise specified)

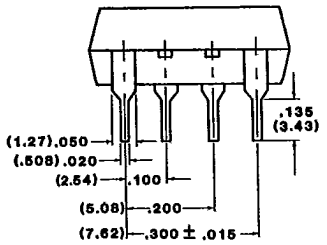
INPUT CHARACTERISTICS		PART NUMBERS			UNITS
		PVA 2352	PVA 3352	PV 3354	
Min. Allowable Control Current: (See Fig. 4) For 20 mA Continuous Load Current. For 100 mA Continuous Load Current. For 20 mA Continuous Load Current.		1.0 @ 25°C 8.0 @ 25°C 6.0 @ 80°C			mA (DC) mA (DC) mA (DC)
Min. Turn-Off Current (@ 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) Max. $T_{(on)}$ @ 8 mA Control, 50 mA load, 100 VDC, 25°C, 0 to 90%		250			microsec
Max. $T_{(off)}$ @ 8 mA control, 50 mA load, 100 VDC, 25°C, 100% to 10%		50			microsec
OUTPUT CHARACTERISTICS					
Operating Voltage Range		0-±200	0-±300	0-±300	V (peak)
Max. Load Current 40°C (See Fig. 1 and 4)		130			mA (RMS)
Max. On-State Resistance 25°C (See Fig. 2) (50 mA Load 5 mA Control)		24			Ohms
Min. Off-State Resistance at 240 VDC, 25°C (See Fig. 5)		1×10^8	1×10^8	1×10^{10}	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. 3)		12			pf @ 50 VDC
GENERAL CHARACTERISTICS					
Dielectric Strength-Input/Output		3750			V (RMS)
Insulation Resistance @ 90 VDC-Input/Output		10^{12}			Ohms
Max. Capacitance-Input/Output		1.0			pf
Ambient Temperature Range:	Operating	-40 to 80			°C
	Storage	-40 to 100			°C

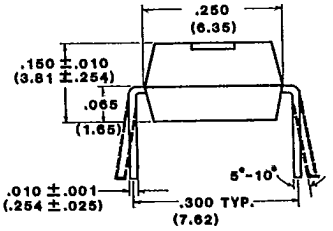
Mechanical Specifications:

Dimensions in Inches (Millimeters)

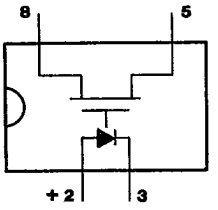
JEDEC MO-001-AN



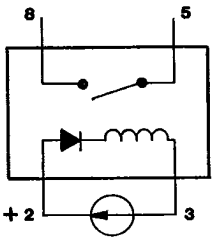




Wiring Diagram



Electromechanical Analogy



2mA To Operate

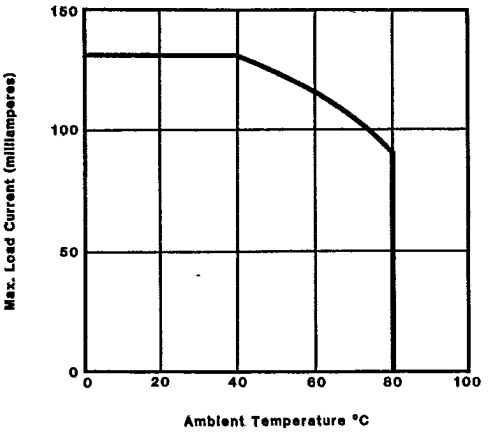


FIGURE 1. Current Derating Curve

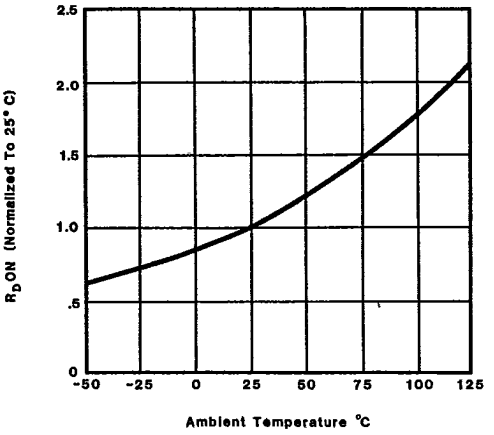


FIGURE 2. Normalized On-Resistance

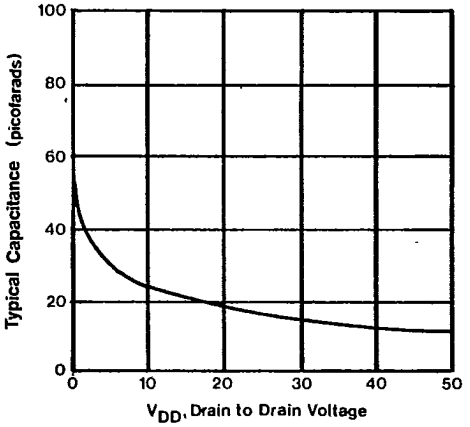


FIGURE 3. Typical Output Capacitance

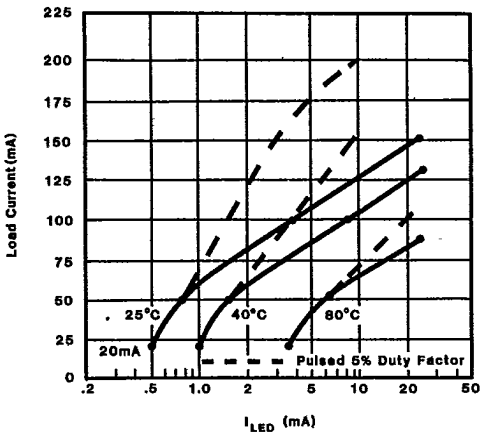


FIGURE 4. Typical Control Current For Full Turn-On

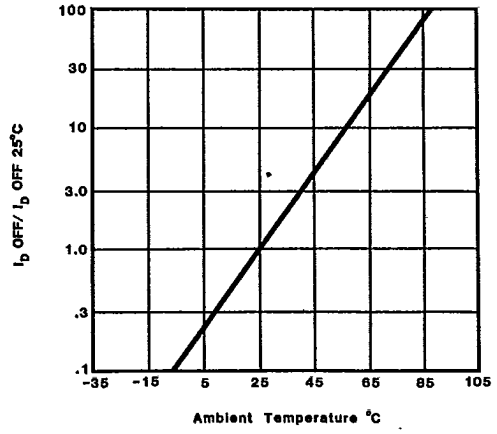


FIGURE 5. Normalized Off-State Leakage

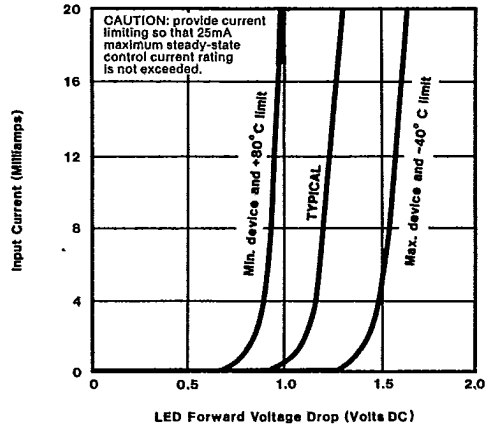


FIGURE 6. LED Input Characteristics

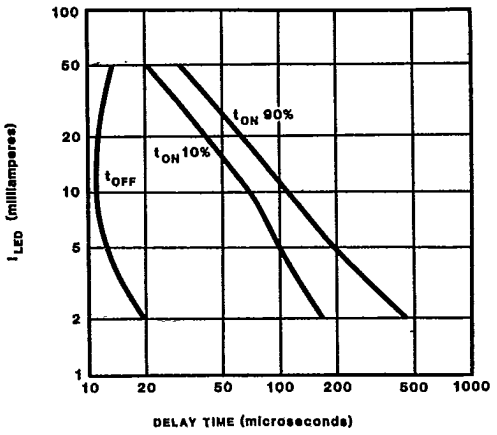


FIGURE 7. Typical Delay Times

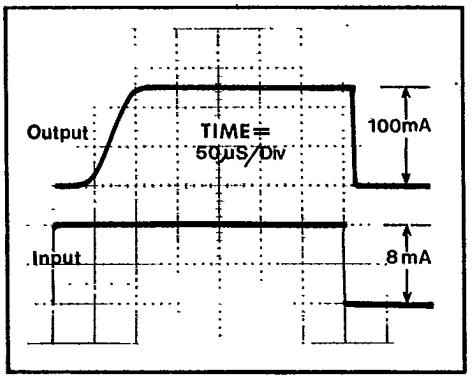


FIGURE 8. Switching Waveforms

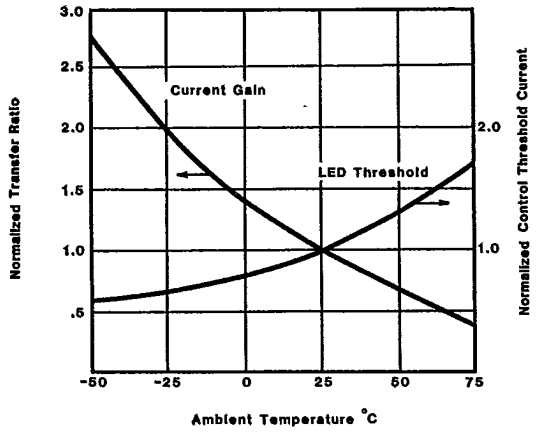


FIGURE 9. Typical Control Threshold and Transfer Ratio

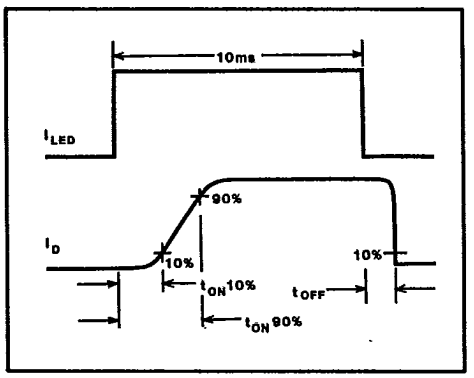


FIGURE 10. Delay Time

Data and specifications subject to change without notice

IOR CRYDOM
A DIVISION OF INTERNATIONAL RECTIFIER

WORLD HEADQUARTERS: 1521 E.Grand Ave., El Segundo, CA 90245. (213) 322-4987. TWX: 910-348-6283

EUROPEAN HEADQUARTERS

IR Great Britain
Hurst Green, Oxted
Surrey RH8 9BB, England
Telephone: Oxted (08833) 3215
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INTERNATIONAL SALES OFFICES

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Telex: 04-13123

IR Italy
Via Liguria 49
10071 Borgaro, Torino
Telephone: (011) 470-14-84
Telex: 221257

Sales Offices, Agents and Distributors in Major Cities throughout the World.

 Printed in U.S.A. 186-M15