International
IOR Rectifier

Data Sheet No. PD 10059

Series PVN013

Microelectronic Power IC

HEXFET® Power MOSFET Photovoltaic Relay

Single Pole, Normally Open, 0-20V, 2.5A AC/ 4.5A DC

General Description

The PVN013 Series Photovoltaic Relay at 100 milliohms features the lowest possible on-state resistance in a miniature package — lower than a comparable reed relay.

The PVN013 is a single-pole, normally open solid-state relay. It utilizes a GenerationV HEXFET output switch, 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.

These units exceed the performance capabilities of electromechanical relays in life, sensitivity, stable on-resistance, low off-state leakage, miniaturization, magnetic insensitivity and ruggedness. They are ideally suited for switching high currents or low level signals without distortion or injection of electrical noise.

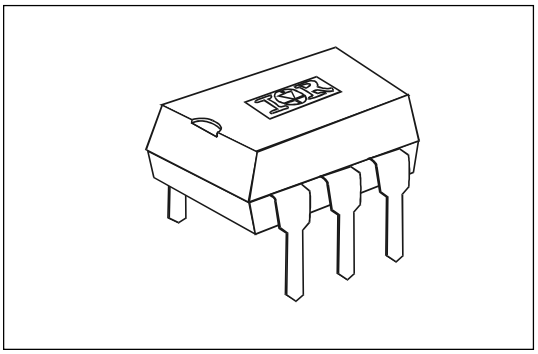
Series PVN013 Relays are packaged in a 6-lead molded DIP package with either through-hole or surface mount (gull-wing) terminals. They are available in standard plastic shipping tubes or on tape-and-reel. Please refer to part identification information opposite.

Applications

- Portable Electronics
- Industrial Control
- Computers and Peripheral Devices
- Audio Equipment
- Power Supplies and Power Distribution
- Instrumentation

Features

- 100mΩ On-Resistance
- GenV HEXFET output
- Bounce-free operation
- 2.5 - 4.5 Amp capacity
- Linear AC/DC operation
- 4,000 V_{RMS} I/O isolation
- Solid-State reliability
- UL recognition pending
- ESD Tolerance:
  - 4000V Human Body Model
  - 500V Machine Model



Part Identification

PVN013	through-hole
PVN013S	surface-mount
PVN013S-T	surface-mount, tape and reel

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

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

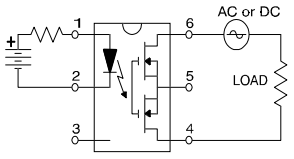
INPUT CHARACTERISTICS	Limits	Units
Minimum Control Current (see figure 1)	3.0	mA
Maximum Control Current for Off-State Resistance @ T_A = +25°C	0.4	mA
Control Current Range (Caution: current limit input LED, see figure 6)	3.0 to 25	mA
Maximum Reverse Voltage	7.0	V

OUTPUT CHARACTERISTICS		Limits	Units
Operating Voltage Range		0 to ±20	V(DC or AC peak)
Maximum Continuous Load Current @ T_A=+40°C, 5mA Control (see figure 1)			
	A Connection	2.5	A (DC or AC)
	B Connection	3.0	A (DC)
	C Connection	4.5	A (DC)
Maximum Pulsed Load Current @T_A=+25°C, (100 ms @ 10% duty cycle)			
	A Connection	6.0	A (DC or AC)
Maximum On-State Resistance @T_A=+25°C, for 1A pulsed load, 5mA Control (see figure 4)			
	A Connection	100	mΩ
	B Connection	65	
	C Connection	40	
Maximum Off-State Leakage @ T_A=+25°C, ±16V_{DC}		10	nA
Maximum Turn-On Time @T_A=+25°C (see figure 7), for 1A, 20 V_{DC} load, 5mA Control		5.0	ms
Maximum Turn-Off Time @T_A=+25°C (see figure 7), for 1A, 20 V_{DC} load, 5mA Control		0.5	ms
Maximum Output Capacitance @ 20V_{DC} (see figure 2)		300	pF

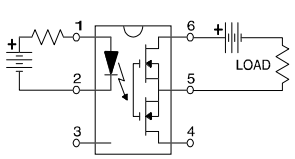
GENERAL CHARACTERISTICS		Limits	Units
Minimum Dielectric Strength, Input-Output		4000	V_{RMS}
Minimum Insulation Resistance, Input-Output, @T_A=+25°C, 50%RH, 100V_{DC}		10^{12}	Ω
Maximum Capacitance, Input-Output		1.0	pF
Maximum Pin Soldering Temperature (10 seconds maximum)		+260	°C
Ambient Temperature Range:	Operating	-40 to +85	
	Storage	-40 to +100	

Connection Diagrams

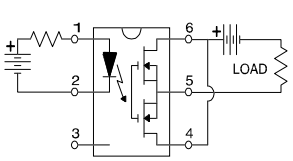
"A" Connection



"B" Connection



"C" Connection



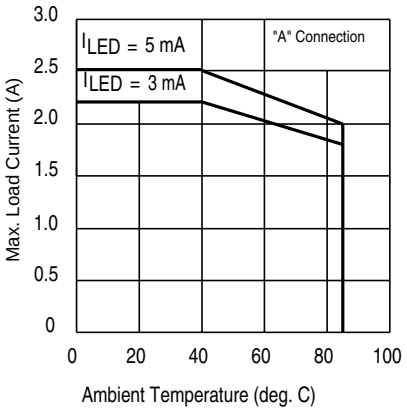


Figure 1. Current Derating Curves*

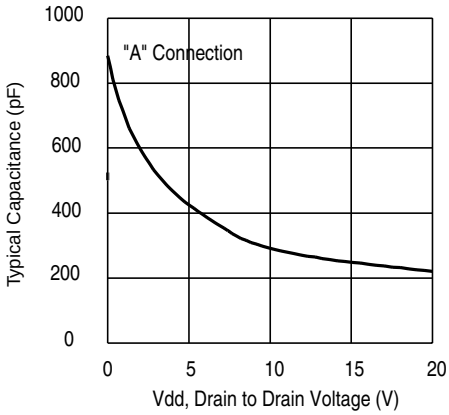


Figure 2. Typical Output Capacitance

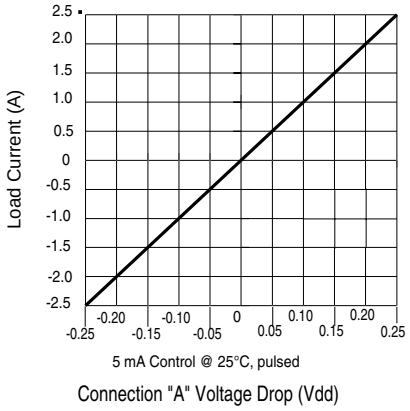


Figure 3. Linearity Characteristics

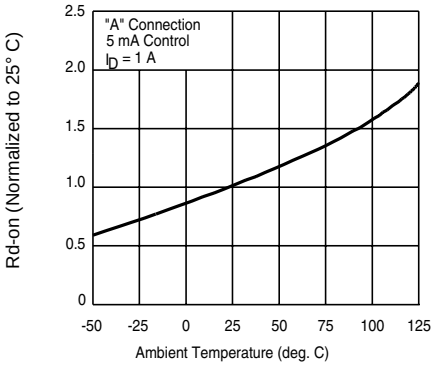


Figure 4. Typical Normalized On-Resistance

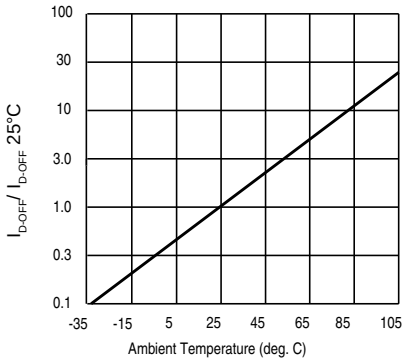


Figure 5. Typical Normalized Off-State Leakage

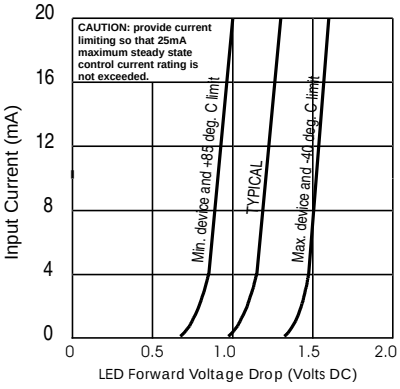


Figure 6. Input Characteristics (Current Controlled)

* Derating of 'B' and 'C' connection at +85°C will be 70% of that specified at +40°C and is linear from +40°C to +85°C.

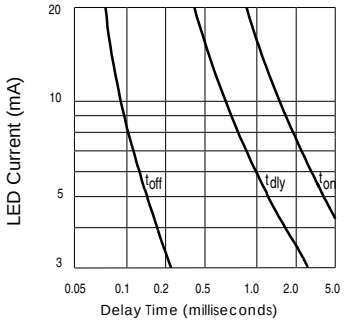


Figure 7. Typical Delay Times

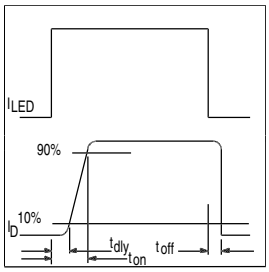
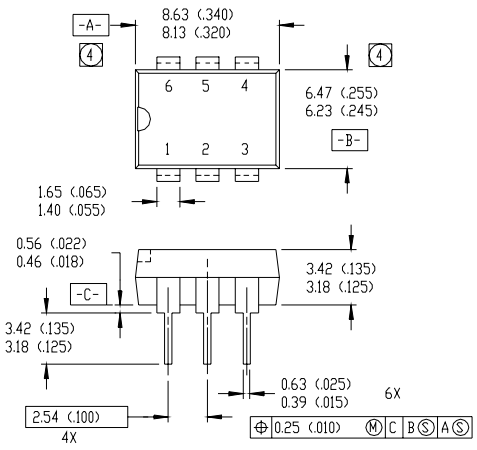
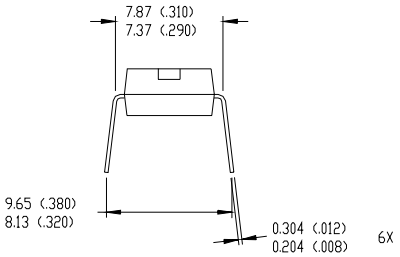


Figure 8. Delay Time Definitions

Case Outline



NOTES:
1 DIMENSIONING & TOLERANCING PER ANSI Y14.5M-1982.
2 CONTROLLING DIMENSION: INCH.
3 DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
4 DIMENSION DOES NOT INCLUDE MOLD PROTUSIONS. MOLD PROTUSIONS SHALL NOT EXCEED 0.25 (.010).



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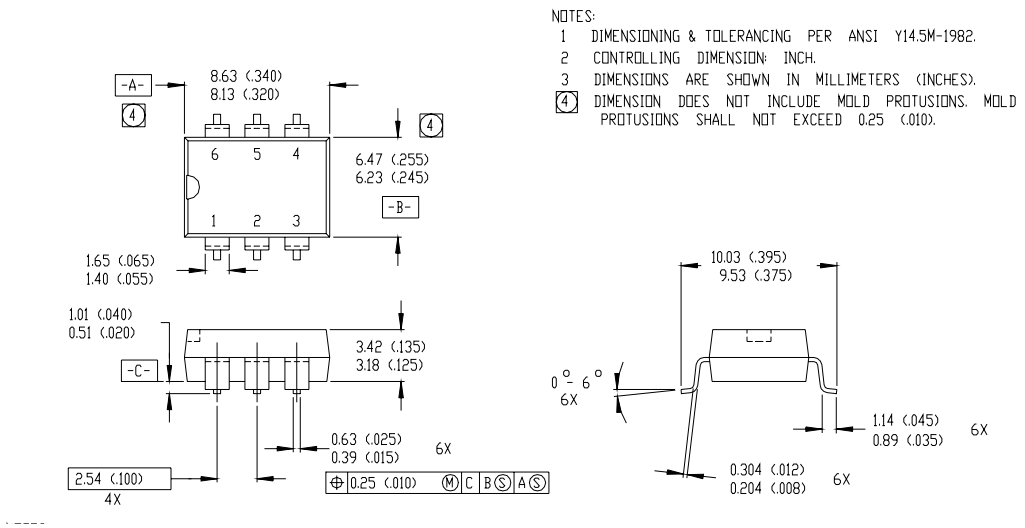
Case Outline



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