International
IOR Rectifier

Data Sheet No. PD 10064 revC

Series PVN012APbF

Microelectronic Power IC

HEXFET® Power MOSFET Photovoltaic Relay

Single Pole, Normally Open, 0-20V, 4.0AAC/ 6.0A DC

General Description

The PVN012A Series Photovoltaic Relay at 50 milliohms features the lowest possible on-state resistance in a miniature package — lower than a comparable reed relay.

The PVN012A is a single-pole, normally open solid-state relay. It utilizes a HEXFET® MOSFET 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, miniaturization, magnetic insensitivity and ruggedness. They are ideally suited for switching high currents or low level signals without distortion or injection of electrical noise.

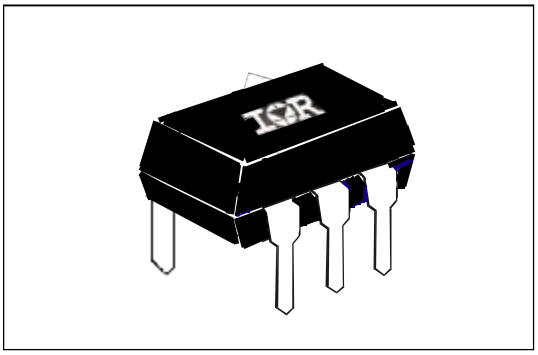
Series PVN012A relays are packaged in a 6-lead molded DIP package with either thru-hole or surface mount (gull-wing) terminals. They are available in standard plastic shipping tubes or on tape-and-reel. Please refer to part identification information.

Applications

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

Features

- 50mΩ On-Resistance
- Bounce-free Operation
- 4.0 - 6.0 Amp Capacity
- Linear AC/DC Operation
- 4,000 V_{RMS} I/O Isolation
- Solid-State Reliability
- UL Recognized
- ESD Tolerance:
  - 4000V Human Body Model
  - 500V Machine Model



Part Identification

PVN012APbF	Thru-hole
PVN012ASPbF	Surface-mount
PVN012AS-TPbF	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)

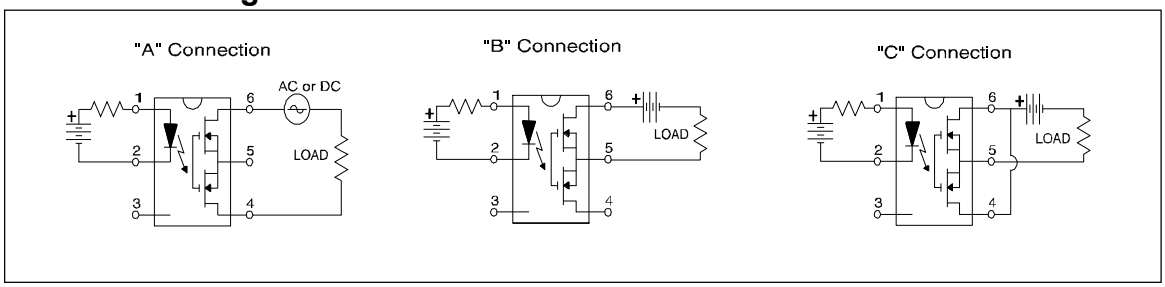
INPUT CHARACTERISTICS	Limits	Units
Minimum Control Current (see figure 1)	5.0	mA
Maximum Control Current for Off-State Resistance @ T_A = +25°C	0.4	mA
Control Current Range (Caution: current limit input LED, see figure 6)	5.0 to 25.0	mA
Maximum Reverse Voltage	6.0	V

OUTPUT CHARACTERISTICS		Limits	Units
Operating Voltage Range		0 to ±20	$V_{(DC\ or\ AC\ peak)}$
Maximum Continuous Load Current @ 40°C, 10mA Control (see figure 1)			
	A Connection	4.0	A (DC or AC)
	B Connection	4.5	A (DC)
	C Connection	6.0	A (DC)
Maximum Pulsed Load Current @ 25°C,10mA Control (100 mS @ 10% duty cycle)			
	A Connection	8.0	A (DC or AC)
	B Connection	9.0	A (DC)
	C Connection	15.0	A (DC)
Typical Thermal Resistance (Tthja, Junction-to-Ambient)			
	A Connection	85.1	(°C/W)
	B Connection	122.9	(°C/W)
	C Connection	89.7	(°C/W)
Maximum On-State Resistance @25°C, 10mA Control 100mA pulsed load, (see figs. 3 & 4)			
	A Connection	50	mΩ
	B Connection	25	mΩ
	C Connection	15	mΩ
Maximum Off-State Leakage @ T_A=+25°C, ±20V_{DC}		1.0	µA
Maximum Turn-On Time @T_A=+25°C (see figure 7), for 1A, 20 V_{DC} load, 10mA Control		3.0	ms
Maximum Turn-Off Time @T_A=+25°C (see figure 7), for 1A, 20 V_{DC} load, 10mA Control		0.5	ms
Typical Output Capacitance @ 20V_{DC} (see figure 2)		400	pF

GENERAL CHARACTERISTICS		Limits	Units
Minimum Dielectric Strength, Input-Output		4000	V_{RMS}
Minimum Insulation Resistance, Input-Output		10^{12}	Ω
Maximum Capacitance, Input-Output, Vd =0V, f = 1MHz		1.0	pF
Maximum Pin Soldering Temperature		+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.

Connection Diagrams



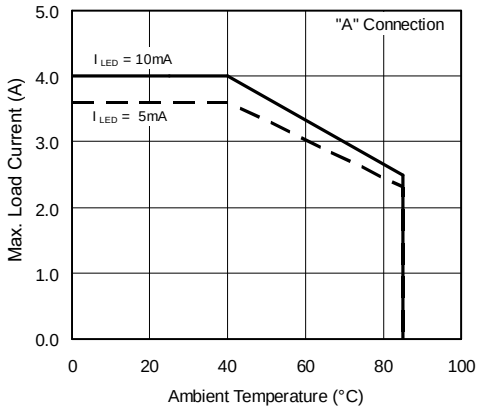


Figure 1. Current Derating Curves*

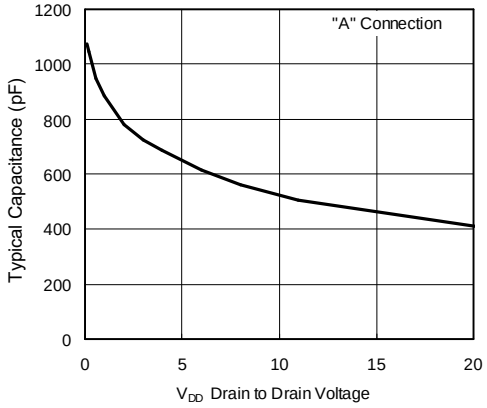


Figure 2. Typical Output Capacitance

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

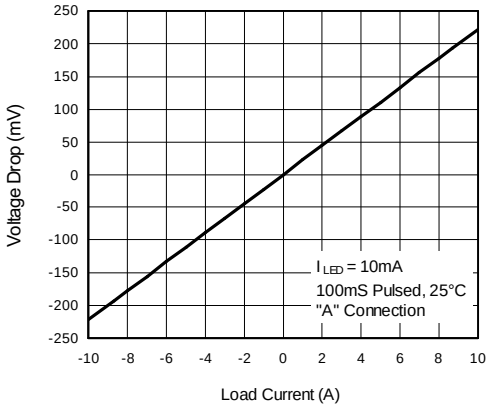


Figure 3. Linearity Characteristics

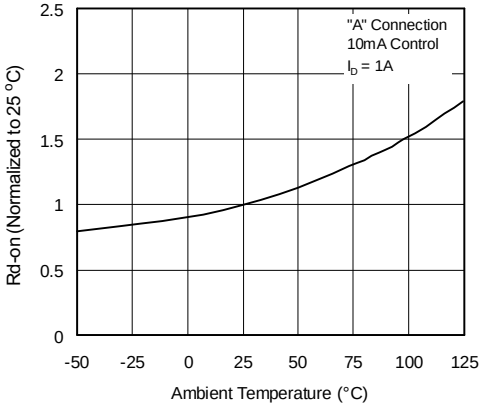


Figure 4. Typical Normalized On-Resistance

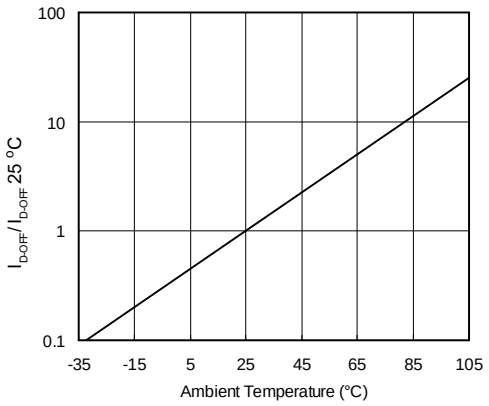


Figure 5. Typical Normalized Off-State Leakage

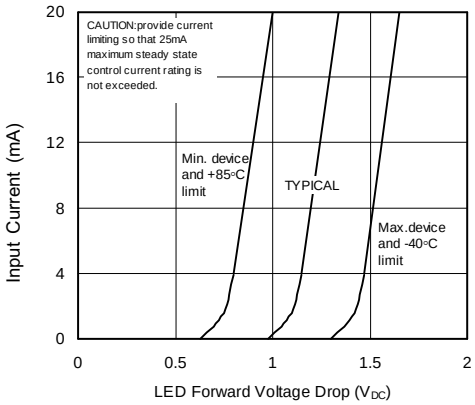


Figure 6. Input Characteristics (Current Controlled)

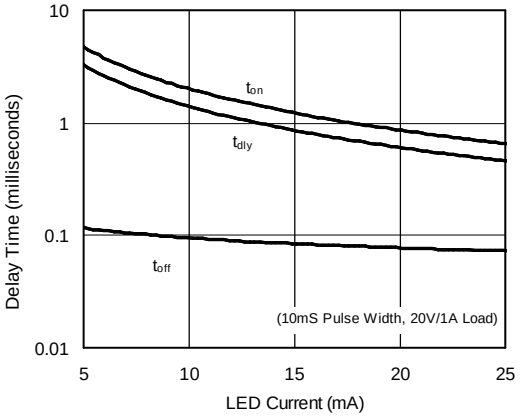


Figure 7. Typical Delay Times

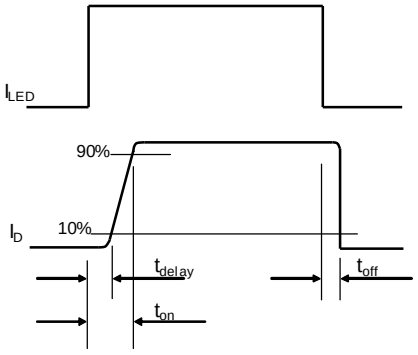


Figure 8. Delay Time Definitions

Case Outlines