International
IOR Rectifier

PD 6.040D

Series PVT412

HEXFET® Power MOSFET Photovoltaic Relay

Microelectronic
Power IC Relay
Single Pole, Normally Open, 0-400V, 140mA AC/DC

General Description

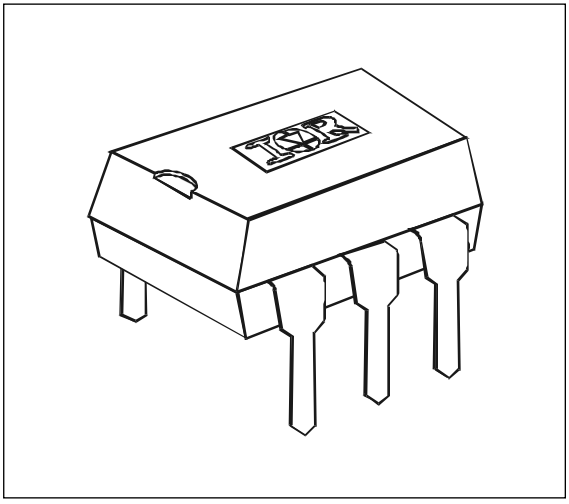
The PVT412 Series Photovoltaic Relay is a single-pole, normally open solid-state relay that can replace electromechanical relays in many applications. It utilizes International Rectifier's proprietary HEXFET power MOSFET as the output switch, driven by an integrated circuit photovoltaic generator of 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 SSRs are specifically designed for worldwide telecom applications. PVT412L employs an active current-limiting circuitry enabling it to pass FCC Part 68 and other regulatory agency current surge requirements when overvoltage protection is provided. PVT412 does not employ the current-limiting circuitry and offers lower on-state resistance.

Series PVT412 Relays are packaged in a 6-lead molded DIP package with either through-hole or surface mount ('gull-wing') terminals. It is available in standard plastic shipping tubes or on tape-and-reel. Please refer to part identification information opposite.

PVT412L Features

- HEXFET Power MOSFET output ■
- Bounce-free operation ■
- 4,000 VRMS I/O isolation ■
- Load current limiting ■
- Linear AC/DC operation ■
- Solid-State reliability ■
- UL recognized and CSA certified ■



Part Identification

PVT412L	current limit, through-hole
PVT412LS	current limit, surface-mount
PVT412LS-T	current limit, surface-mount, Tape and Reel
PVT412	no current limit, through-hole
PVT412S	no current limit, surface-mount
PVT412S-T	no current limit, surface-mount, Tape and Reel

Applications

- On/Off Hook switch
- Dial-Out relay
- Ring relay
- General switching

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

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

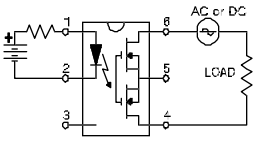
INPUT CHARACTERISTICS	Part Numbers		Units
	PVT412L	PVT412	
Minimum Control Current (see figures 1 and 2)	3.0		mA
Maximum Control Current for Off-State Resistance	0.4		mA
Control Current Range (Caution: current limit input LED, see figure 6)	3.0 to 25		mA
Maximum Reverse Voltage	7.0		V

OUTPUT CHARACTERISTICS	PVT412L	PVT412	
Operating Voltage Range	0 to ±400		$V_{(DC\ or\ AC\ peak)}$
Maximum Load Current @ T_A=+40°C, 5mA Control (see figures1 and 2)			
A Connection	120	140	mA (AC or DC)
B Connection	130	150	mA (DC)
C Connection	200	210	mA (DC)
Maximum On-State Resistance @T_A=+25°C, For 50mA Pulsed Load, 5mA Control (see figure 4)			
A Connection	35	27	Ω
B Connection	18	14	Ω
C Connection	9	7	Ω
Maximum Off-State Leakage @T_A=+25°C, ±400V (see figure 5)	1.0		µA
Current Limit @T_A=+25°C, For 5mA Control Current:			
Connection:	**A**	**C**	
Minimum	130	260	n/a mA
Maximum	220	440	n/a mA
Complies with FCC Part 68 Surge Requirements*	yes	yes	
Maximum Turn-On Time @T_A=+25°C (see figure 7) For 50mA, 100 V_{DC} load, 5mA Control	2.0		ms
Maximum Turn-Off Time @T_A=+25°C (see figure 7) For 50mA, 100 V_{DC} load, 5mA Control	0.5		ms
Maximum Thermal Offset Voltage @ 5mA Control	0.5		µV
Maximum Output Capacitance @ 50V_{DC}	12		pF

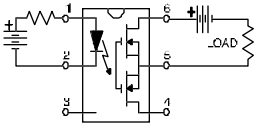
GENERAL CHARACTERISTICS		ALL MODELS	
Minimum Dielectric Strength, Input-Output		4000	V_{RMS}
Minimum Insulation Resistance, Input-Output @T_A=+25°C, 50%RH, 100V_{DC}		10^{12}	Ω
Maximum Capacitance, Input-Output		1.0	pF
Maximum Pin Soldering Temperature (10 seconds maximum)		+260	°C
Ambient Temperature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

Connection Diagrams

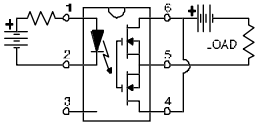
"A" Connection



"B" Connection



"C" Connection



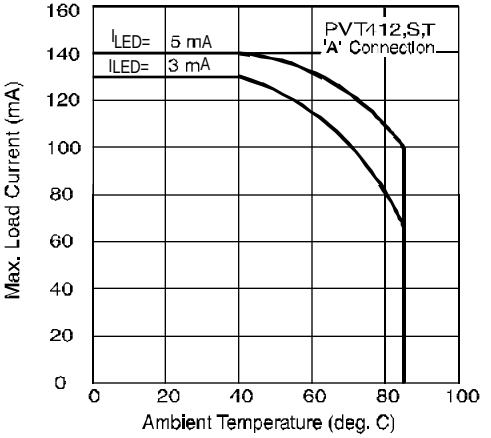


Figure 1. Current Derating Curves*

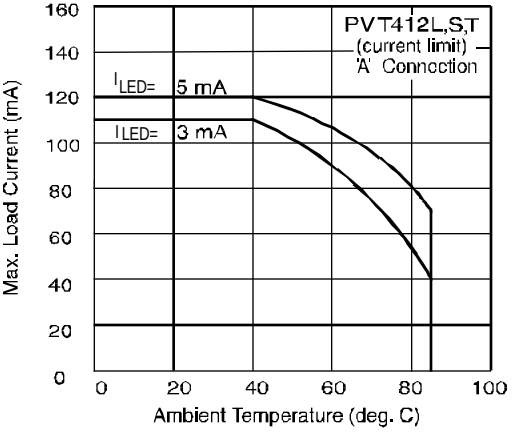


Figure 2. Current Derating Curves*

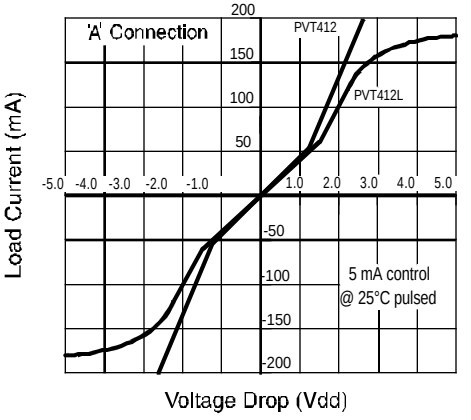


Figure 3. Linearity Characteristics

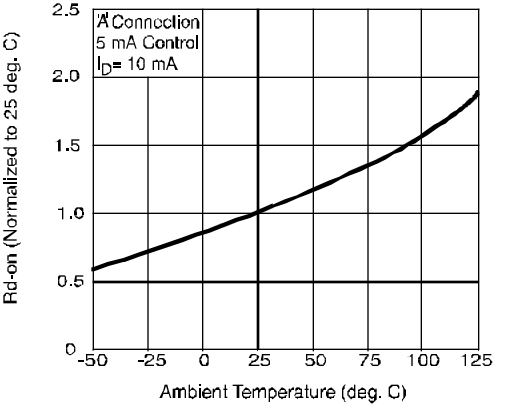


Figure 4. Typical Normalized On-Resistance

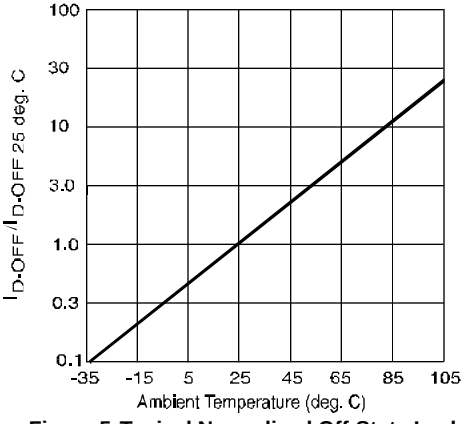


Figure 5. Typical Normalized Off-State Leakage

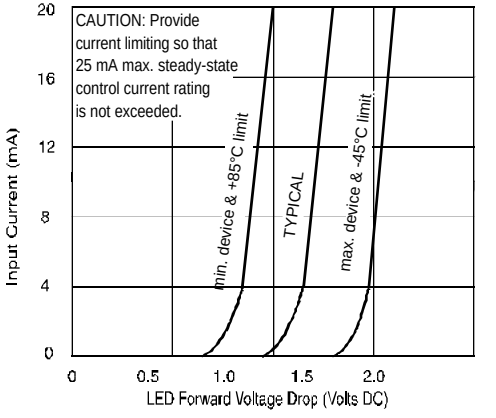


Figure 6. Input Characteristics (Current Controlled)

***** 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.

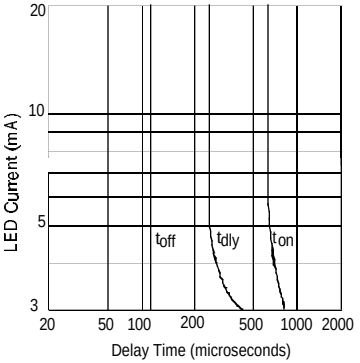


Figure 7. Typical Delay Times

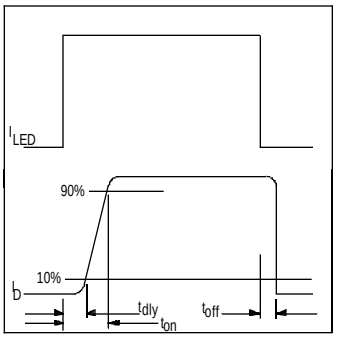


Figure 8. Delay Time Definitions

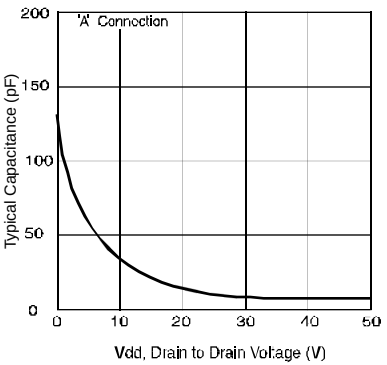


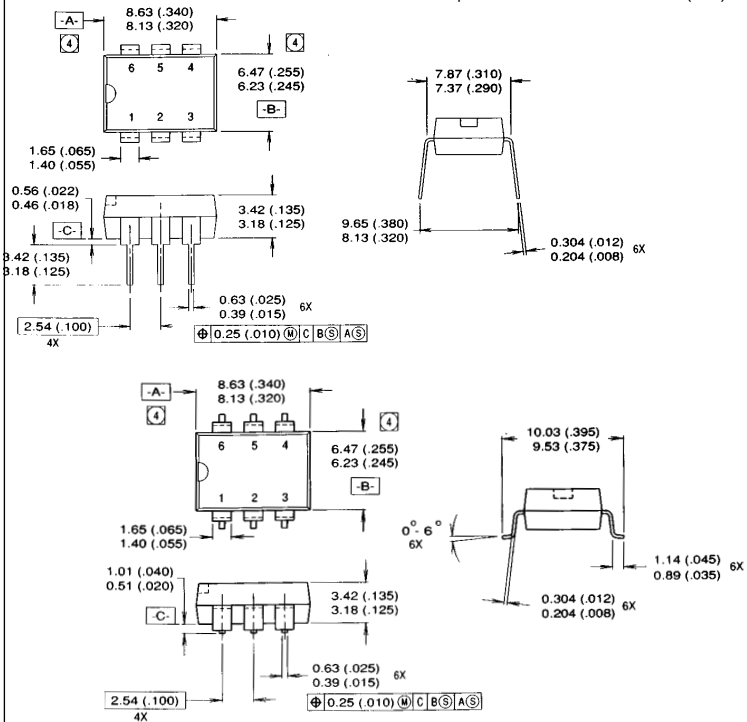
Figure 9. Typical Output Capacitance

Case Outline

Dimensions in millimeters (inches)

Mechanical Specifications:

1. Dimensioning and tolerancing per ANSI Y14.5M-1982
2. Controlling Dimension: Inch
4. Dimension does not include mold protrusions. Mold protrusions shall not exceed 0.25 (.010).



Note: PVT412L relays will pass FCC Part 68 surge current requirements operating into rated load or short circuit when protected from overvoltage by a transient protection device such as a 175 VRMS rated MOV placed between the tip and ring terminals of the telephone line or across the output of the relay. PVT412 relays will pass the above FCC Part 68 requirements when overcurrent protection devices (such as fusible resistors) are placed in series with tip and ring lines in addition to the aforementioned overvoltage protection. Consult factory for additional information.

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Data and specifications subject to change without notice. 9/96