Data Sheet No. PD 10029-G

Series PVI

Photovoltaic Isolator 5-10 Volt Output

General Description

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ICR Rectifier

The PVI Photovoltaic Isolator generates an electrically isolated DC voltage upon receipt of a DC input signal. The input of the PVI is a light-emitting diode (LED) which is optically coupled to, but electrically isolated from, the output. A GaAIAs LED is used for high output and maximum stability. The infrared emission from the LED energizes, by photovoltaic action, a series connection of silicon PN junctions. A unique alloyed junction stack which is edge-illuminated is used to form the output photovoltaic generators. This novel structure produces extremely high operating efficiency. Units are available with a single 5-volt output or dual 5-volt outputs which can be series connected to produce 10 volts.

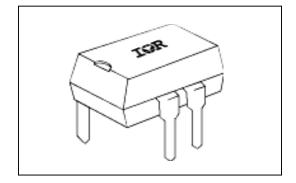
A PVI can serve as an isolator, a coupler and as an isolated voltage source. As an isolator, the PVI can serve as the key component in a solid state relay circuits. The PVI is ideally suited for driving power MOS-FETs and IGBTs or sensitive gate SCRs to form solid state relays.

As a coupler, the PVI can sense a low-level DC signal and transmit a voltage signal to an electrically remote circuit. As a voltage source, the PVI can function as a 'DC transformer' by providing an isolated, low-current DC source for biasing or supplying power to low quiescent current electronic devices.

Conventional optocouplers merely modulate the resistance of an output device such as a transistor, diode or resistor. Such optocouplers require a separate voltage source to detect the presence of an input signal. In contrast, a PVI actually transmits (and transforms) energy across the isolation barrier and directly generates an output voltage. This DC voltage, available at a 2500VAC isolation level, gives circuit designers a new and uniquely useful electronic component.

Features

- Isolated Voltage Source
 - MOSFET Driver
 - Up to 10µA Output
 - Fast Response
 - GaAIAs LED
- 2500V (RMS) Isolation
 - 8-pin DIP Package
 - Single or Dual Output



Part Identification

| Part Number | Outputs | Output Voltage | Output Current | |
|-------------|---------|-------------------|-------------------|--|
| PVI5050 | 1 | 5.0V | 5µA | |
| PVI5080 | 1 | 5.0V | 8µA | |
| PVI1050 | 2 | 5.0/10.0V | 10/5µA | |

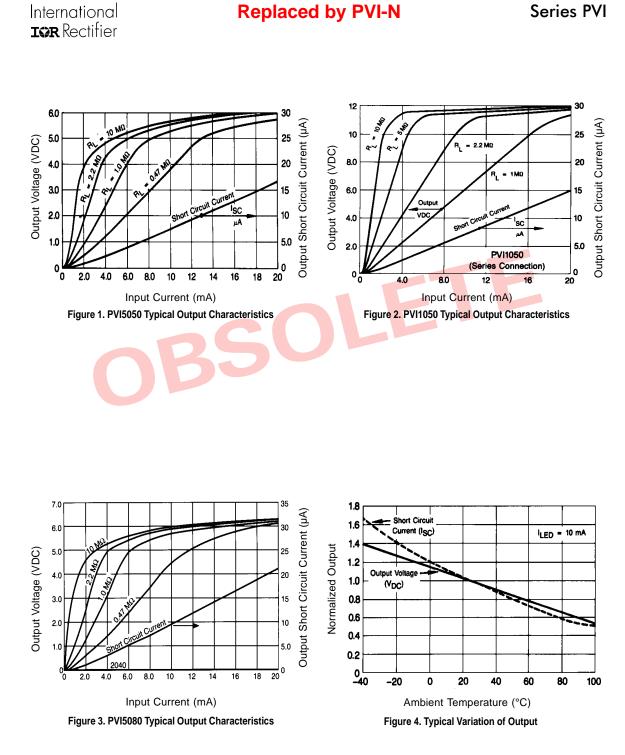
Electrical Specifications (-40°C \leq T_A \leq +85°C unless otherwise specified)

| INPUT CHARACTERISTICS | PVI Series | Units |
|--|------------|---------|
| Input Current Range (see figure 6) | 2.0 to 50 | mA (DC) |
| Maximum Forward Voltage Drop @ 10mA, 25°C (see figure 7) | 1.4 | V (DC) |
| Maximum Reverse Voltage | 7.0 | V(DC) |
| Maximum Reverse Current @ -7.0V (DC), 25°C | 100 | μA(DC) |
| Maximum Pulsed Input Current @ 25°C (see figure 8) | 1.0 | A(peak) |

| OUTPUT CHARACTERISTICS | PVI Series | Units |
|-----------------------------------|-----------------|-------------------|
| Maximum Forward Voltage @ 10µA | 8.0 per channel | V _(DC) |
| Maxiumum Reverse Current @ -10VDC | 10 | µA(DC) |
| | 10 | µ∧(⊔ |

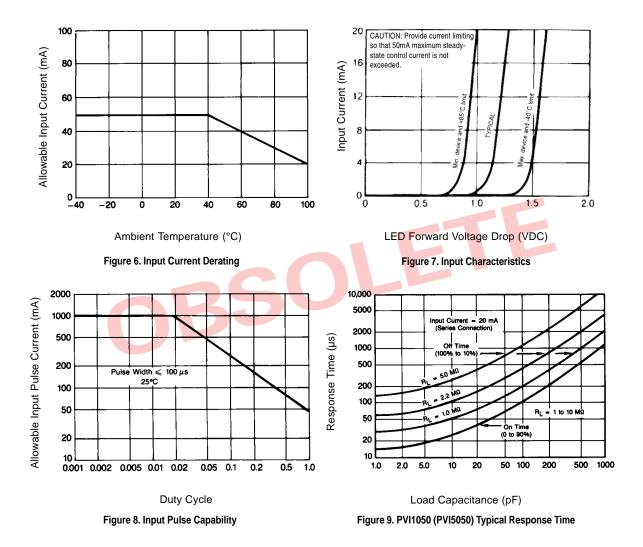
| COUPLED CHARACTERISTICS | | PVI5050 | PVI5080 | PVI1050 | Units |
|---|------------------|---------|-----------------|--------------------------------|---------|
| Minimum Open Circuit Voltage @ 10mA, 25°C (see | figures 1 to 4) | 5. | 0V | 5.0V/channel 10V series | V (DC) |
| Minimum Short Circuit Current @ 10mA, 25°C (see | figures 1 to 3) | 5μΑ | 8µA | 5.0µA/channel 10µA parallel | µA (DC) |
| Maximum Capacitance (Input/Output) | | 1 | .0 | 2.0 | pF |
| Maximum Turn-On Time @ 20mA Input, 25°C | RL=5.0MΩ | 30 | 30 | 30 | μs |
| (see figure 9) | $R_L=1.0M\Omega$ | 40 | 40 | 40 | μs |
| Maximum Turn-Off Time @ 20mA Input, 25°C | RL=5.0MΩ | 400 | 400 | 400 | μs |
| (see figure 9) | RL=1.0MΩ | 100 | 100 | 100 | μs |
| Insulation Resistance @ 90VDC (Input/Output) | | 1 | 0 ¹² | | Ω |
| Dielectric Strength | Input/Output | 2500 | | V(RMS) | |
| | Between Outputs | N | /A | 1200 | V(DC) |

| GENERAL CHARACTERISTICS | | PVI Series | Units |
|--|-------------------------|-------------|-------|
| Ambient Temperature Range | Operating | -40 to +100 | |
| | Storage | -40 to +100 | °C |
| Maximum Lead Temperature (1.6mm below seatin | g plane for 10 seconds) | 280 | |

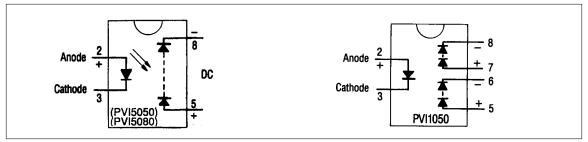


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Wiring Diagram



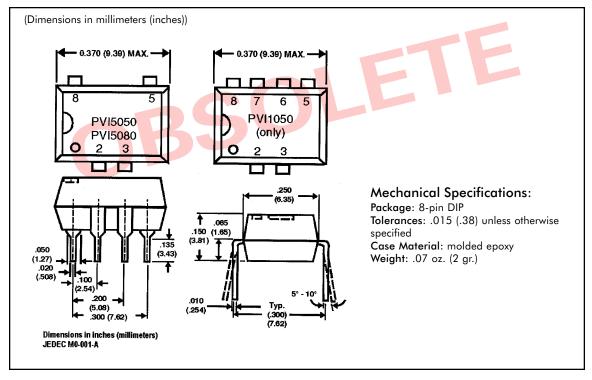
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Application Note:

The outputs of the PVI1050 (pins 5-6 and 7-8) may be placed in series connection to produce a 10-volt output with a 5μ A minimum short circuit current. Alternatively, the two ouptut of the PVI1050 may be connected in parallel to produce a 5.0-volt ouput with a 10μ A minimum short circuit current.

The two outputs of the PVI1050 may be applied separately with a maximum 1200VDC between the outputs. Input-to-output isolation to either output is 2500V (RMS).

Case Outline



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Data and specifications subject to change without notice. 12/6/2000