

# International **IOR** Rectifier

Data Sheet No. PD10054-B

## Series PVI-N

Photovoltaic Isolator  
Single and Dual Channel  
5-10 Volt Output

### General Description

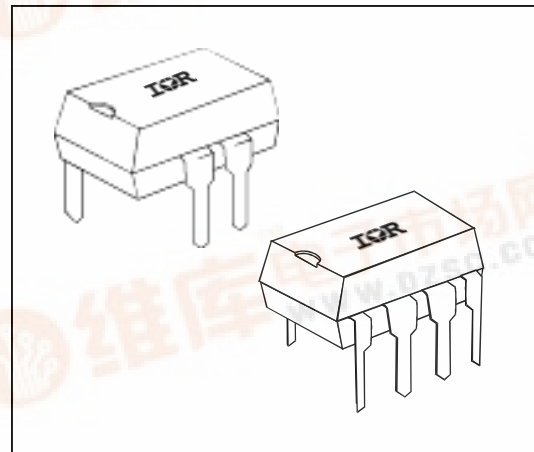
The PVI Series Photovoltaic Isolator generates an electrically isolated DC voltage upon receipt of a DC input signal. It is capable of directly driving gates of power MOSFETs or IGBTs. It utilizes a monolithic integrated circuit photovoltaic generator of novel construction as its output. The output is controlled by radiation from a GaAlAs light emitting diode (LED), which is optically isolated from the photovoltaic generator.

The PVI Series is ideally suited for applications requiring high-current and/or high-voltage switching with optical isolation between the low-level driving circuitry and high-energy or high-voltage load circuits. It can be used for directly driving gates of power MOSFETs. The dual-channel device allows its outputs to drive independent discrete power MOSFETs, or be connected in parallel or in series to provide higher current drive for power MOSFETs or higher voltage drive for IGBTs. The PVI Series Photovoltaic isolators employ fast turn-off circuitry.

These PVI Series Photovoltaic Isolators are packaged in 8-pin, molded DIP packages and available with either thru-hole or surface-mount ("gull-wing") leads, in plastic shipping tubes.

### Features

- Isolated Voltage Source
- Monolithic Construction
- Up to 8 $\mu$ A Output
- Single or Dual Output
- Solid-State Reliability



### Applications

- Load Distribution
- Industrial Controls
- Current-to-Voltage Conversion
- Custom Solid-State Relay

### Part Identification

|           |               |
|-----------|---------------|
| PVI1050N  |               |
| PVI5050N  | thru-hole     |
| PVI5080N  |               |
| PVI1050NS | surface-mount |
| PVI5050NS | (gull-wing)   |
| PVI5080NS |               |

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### Electrical Specifications ( $-40^{\circ}\text{C} \leq T_A \leq +85^{\circ}\text{C}$ unless otherwise specified)

| INPUT CHARACTERISTICS                                    | PVI Series | Units   |
|----------------------------------------------------------|------------|---------|
| Input Current Range (see figure 4)                       | 2.0 to 50  | mA (DC) |
| Maximum Forward Voltage Drop @ 10mA, 25°C (see figure 5) | 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 6)       | 1.0        | A(peak) |

| OUTPUT CHARACTERISTICS           | PVI Series      | Units             |
|----------------------------------|-----------------|-------------------|
| Maximum Forward Voltage @ 10μA   | 8.0 per channel | V <sub>(DC)</sub> |
| Maximum Reverse Current @ -10VDC | 10              | μA(DC)            |

| COUPLED CHARACTERISTICS                                                           | PVI5050N | PVI5080N | PVI1050N                    | Units   |
|-----------------------------------------------------------------------------------|----------|----------|-----------------------------|---------|
| Minimum Open Circuit Voltage @ ILED = 10mA, 25°C, RL = >10MΩ (see figures 1 to 2) | 5.0      |          | 5.0/channel<br>10 series    | V (DC)  |
| Minimum Short Circuit Current @ ILED = 10mA, 25°C (see figures 1 to 2)            | 5.0      | 8.0      | 5.0 /channel<br>10 parallel | μA (DC) |
| Maximum Capacitance (Input/Output)                                                | 1.0      |          | 2.0                         | pF      |
| Maximum Ton Time @ ILED=10mA, CLOAD=10pF (See Figure7)                            |          |          |                             |         |
| RL>20MΩ                                                                           | 300      |          |                             | μS      |
| RL=10MΩ                                                                           | 160      |          |                             | μS      |
| RL=4.7MΩ                                                                          | 90       |          |                             | μS      |
| Maximum Toff Time @ ILED=10mA, CLOAD=10pF (See Figure7)                           | 220      |          |                             | μS      |

| GENERAL CHARACTERISTICS                                                                          | PVI5050N/5080N   | PVI1050N | Units            |
|--------------------------------------------------------------------------------------------------|------------------|----------|------------------|
| Min. Dielectric Strength, Input-Output                                                           | 4000             | 2500     | V <sub>RMS</sub> |
| Min. Dielectric Strength, Output-to-Output                                                       | 1200             |          | V <sub>DC</sub>  |
| Min. Insulation Resistance, Input-to-Output<br>@T <sub>A</sub> =+25°C, 50%RH, 100V <sub>DC</sub> | 10 <sup>12</sup> |          | Ω                |
| Max. Pin Soldering Temperature (10 seconds max.)                                                 | +260             |          | °C               |
| Ambient Temperature Range: Operating                                                             | -40 to +85       |          | °C               |
| Storage                                                                                          | -40 to +125      |          | °C               |

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.

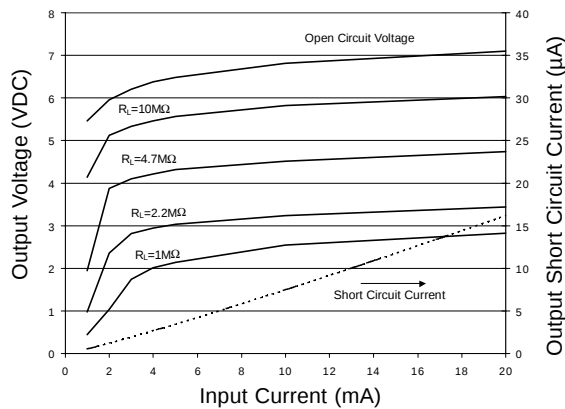


Figure 1. PVI5050N, PVI1050N Typical Output Characteristics

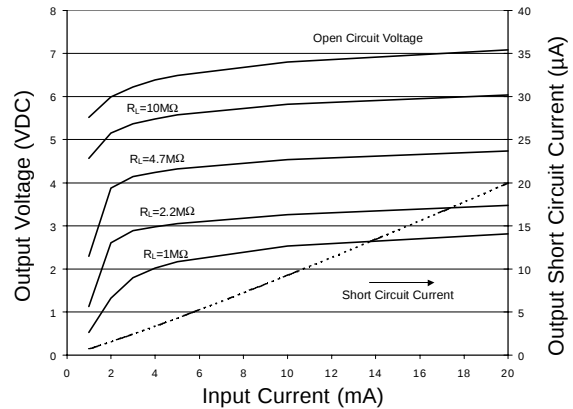


Figure 2. PVI15080N Typical Output Characteristics

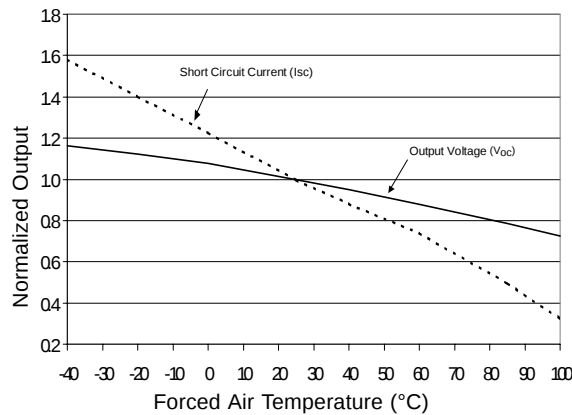


Figure 3. Typical Variation of Output

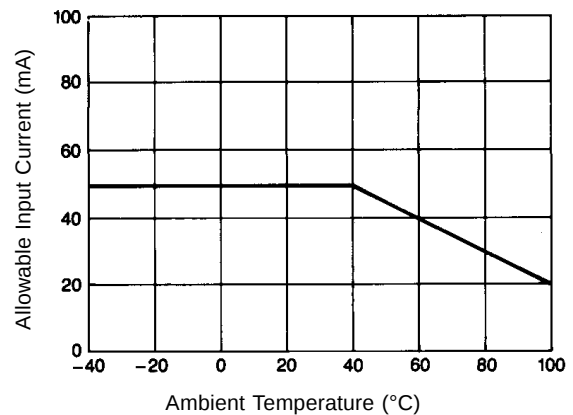


Figure 4. Input Current Derating

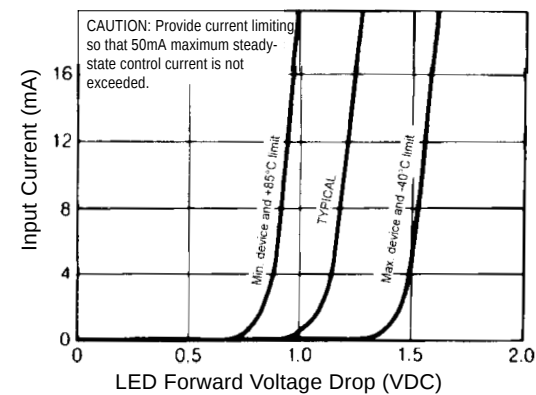


Figure 5. Input Characteristics

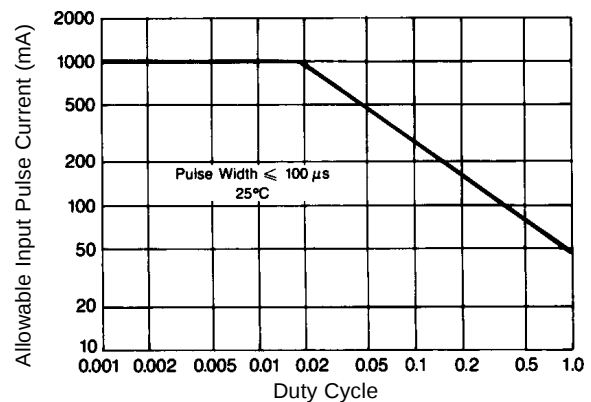


Figure 6. Input Pulse Capability

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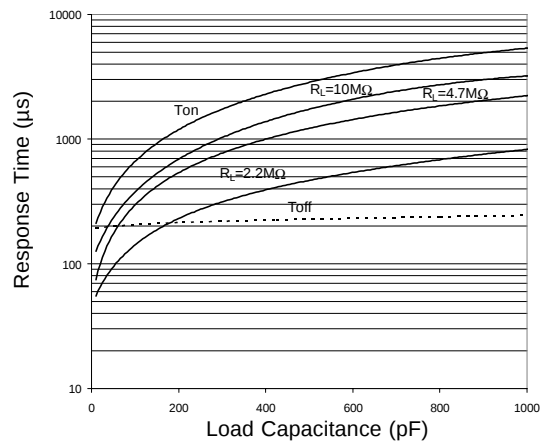
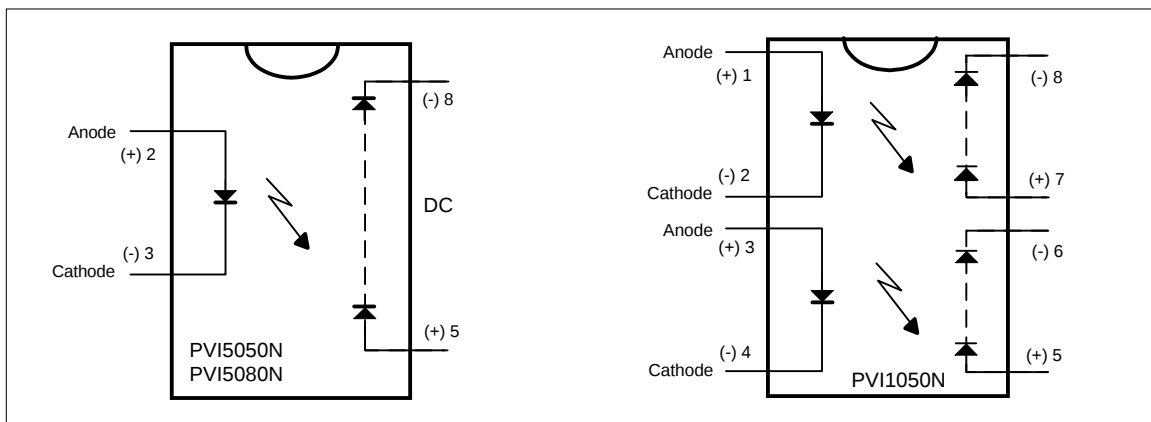


Figure 7. Typical Response Time

## Wiring Diagram



## Application Note:

The outputs of the PVI1050N (pins 5-6 and 7-8) may be placed in series connection to produce a 10-volt output with a 5 $\mu$ A minimum short circuit current. Alternatively, the two output of the PVI1050 may be connected in parallel to produce a 5.0-volt output with a 10 $\mu$ A minimum short circuit current.

The two outputs of the PVI1050N may be applied separately with a maximum 1200VDC between the outputs. Input-to-output isolation to either output is 2500V (RMS).

Technical drawing of the PVI1050N connector, showing dimensions in millimeters [inches].

**Top View:**

- Overall width: 9.39 [0.370] MAX.
- Pin 1 to Pin 4 spacing: 1.14 [0.045] (4X), 0.89 [0.035]
- Pin 5 to Pin 8 spacing: 1.65 [0.065] (4X), 1.40 [0.055]
- Pin 1 to Pin 5 spacing: 3.42 [0.135], 3.18 [0.125]
- Pin 5 to Pin 8 spacing: 3.93 [0.155], 3.69 [0.145]
- Pin 1 to Pin 4 spacing: 2.54 [0.100] (6X)
- Pin 5 to Pin 8 spacing: 0.63 [0.025] (8X), 0.39 [0.015]
- Pin 1 to Pin 4 spacing: 0.55 [0.022], 0.46 [0.018]
- Pin 5 to Pin 8 spacing: 0.63 [0.025] (8X), 0.39 [0.015]
- Pin 1 to Pin 4 spacing: 1.27 [0.050]
- Pin 5 to Pin 8 spacing: 1.27 [0.050]
- Pin 1 to Pin 4 spacing: 1.27 [0.050]
- Pin 5 to Pin 8 spacing: 1.27 [0.050]

**Side View:**

- Overall height: 7.87 [0.310], 7.37 [0.290]
- Pin 1 to Pin 4 spacing: 9.65 [0.380], 8.13 [0.320]
- Pin 5 to Pin 8 spacing: 0.304 [0.012] (8X), 0.204 [0.008]

**Detail View (C):**

- Pin 1 to Pin 4 spacing: 0.55 [0.022], 0.46 [0.018]
- Pin 5 to Pin 8 spacing: 0.63 [0.025] (8X), 0.39 [0.015]
- Pin 1 to Pin 4 spacing: 1.27 [0.050]
- Pin 5 to Pin 8 spacing: 1.27 [0.050]

**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 PROTRUSIONS. MOLD PROTRUSIONS SHALL NOT EXCEED 0.25 [0.010].
5. PRODUCTS AFFECTED: PVI1050N, PVT322, PVT322A, PVT422, PVI5013R AND PVI5033R.

**PVI1050N**

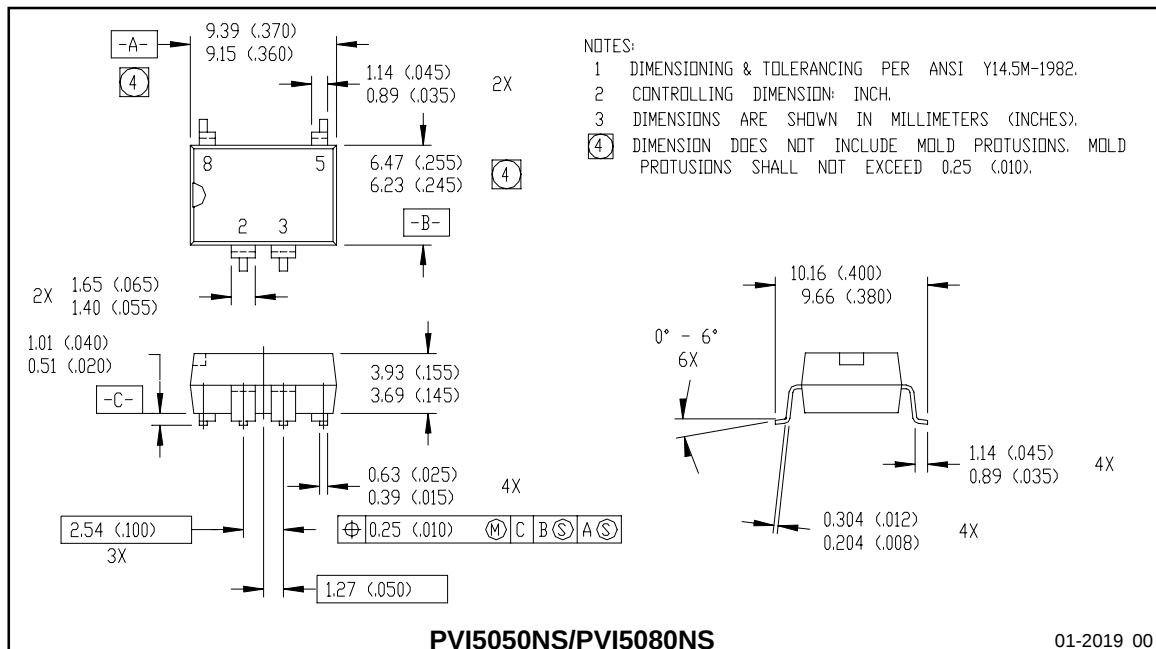
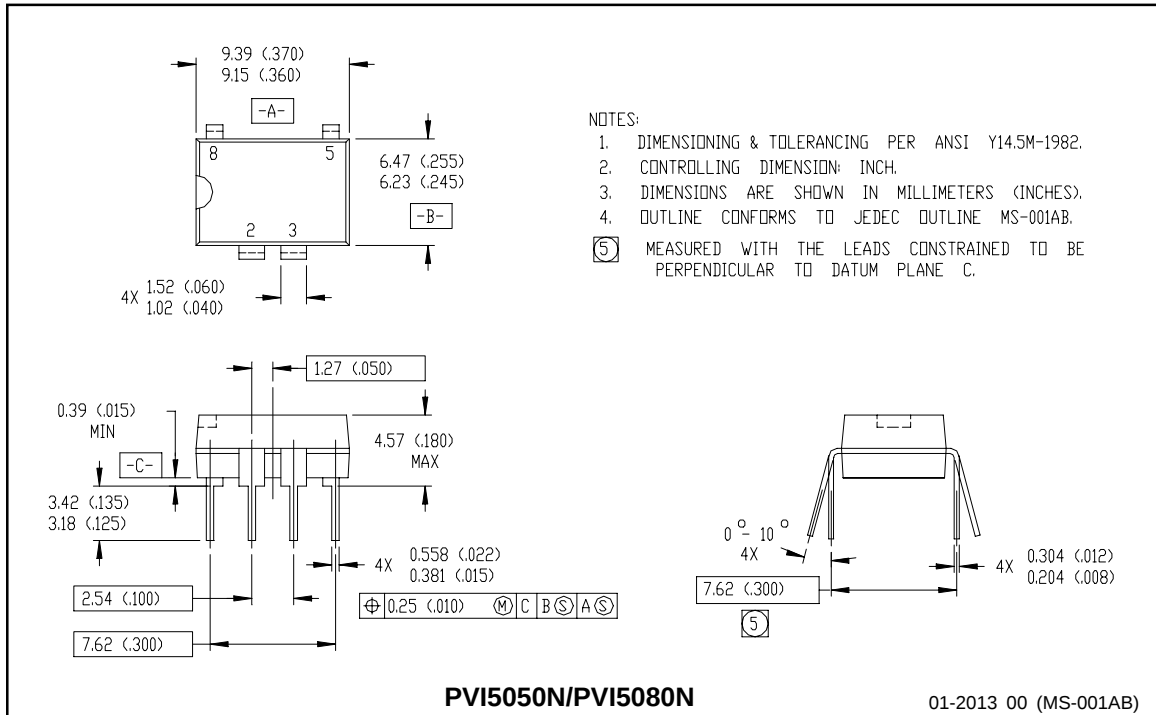
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### Case Outlines



Data and specifications subject to change without notice. 10/17/2003