

## Series PVI5033R & PbF

Photovoltaic Isolator  
Solid-State  
Opto-Isolated MOSFET Gate Driver  
Dual-Channel, 5V, 5 $\mu$ A

### General Description

The PVI5033R Photovoltaic Isolator is a dual-channel, opto-isolated driver 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 PVI5033R 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 configuration 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. PVI5033R employs a fast turn-off circuitry.

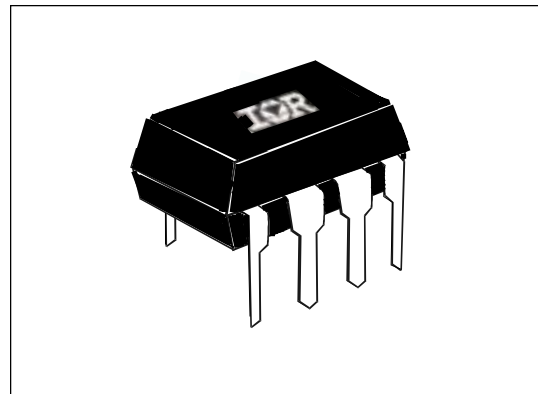
PVI5033R Photovoltaic Isolators are packaged in an 8-pin, molded DIP package with either thru-hole or "gull-wing" terminals. It is available in standard plastic shipping tubes or on tape-and-reel. Refer to Part Identification information.

### Applications

- Telecommunications
- Load Distribution
- Industrial Controls
- Instrumentation and Measurement
- Electronic Ballast

### Features

- Monolithic construction
- 3,750 V<sub>RMS</sub> I/O isolation
- 1,200 V<sub>DC</sub> output-to-output isolation
- Dual-Channel application flexibility
- Solid-State Reliability
- UL Recognized and BABT Certified



### Part Identification

|                   |                    |
|-------------------|--------------------|
| PVI5033R & PbF    | thru-hole          |
| PVI5033RS & PbF   | SMT                |
| PVI5033RS-T & PbF | SMT, Tape and Reel |

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

| <b>INPUT CHARACTERISTICS</b>   | <b>Limits</b> | <b>Units</b>  |
|--|---------------|---------------|
| Min. Input Current (See Fig.1)   | 5.0           | mA            |
| Input Current Range (See Fig. 1)                                       | 3.0 to 25     | mA            |
| Max. Continuous Input Current @ $T_A=+25^{\circ}\text{C}$              | 40            | mA            |
| LED Forward Voltage Drop @ 5mA, $T_A=+25^{\circ}\text{C}$ (See Fig. 3) | 1.4           | V             |
| Max. Reverse Voltage   | 6.0           | V             |
| Max. Reverse Current @ -6Vdc, $T_A=+25^{\circ}\text{C}$                | 10            | $\mu\text{A}$ |

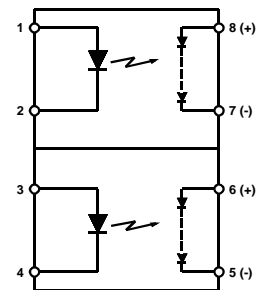
| <b>OUTPUT CHARACTERISTICS</b> | <b>Limits</b> | <b>Units</b>              |
|-------------------------------|---------------|---------------------------|
| Min. Forward Voltage          | 8.0           | $V_{\text{DC}}$           |
| Max. Reverse Current          | 10            | $\mu\text{A}_{\text{DC}}$ |

| <b>COUPLED CHARACTERISTICS</b>   | <b>Limits</b> | <b>Units</b>  |
|--|---------------|---------------|
| Min. Output Voltage @ $I_{\text{LED}} = 10\text{mA}$ , $R_L = 10\text{M}\Omega$<br>@ $T_A=0^{\circ}\text{C}$ to $+70^{\circ}\text{C}$ (See Fig. 1 & 2) | 5             | V             |
| Max. Output Voltage @ $I_{\text{LED}} = 10\text{mA}$ , $R_L = 10\text{M}\Omega$<br>@ $T_A=0^{\circ}\text{C}$ to $+70^{\circ}\text{C}$ (See Fig. 1 & 2) | 10            | V             |
| Max. Voltage Differential Between Outputs<br>@ $I_{\text{LED}} = 5\text{mA}$ , $R_L = 10\text{M}\Omega$  | 1.0           | V             |
| Min. Output Short-Circuit Current<br>@ $I_{\text{LED}} = 5\text{mA}$ , @ $T_A=+25^{\circ}\text{C}$ (See Fig. 1 & 2)                                    | 1.65          | $\mu\text{A}$ |
| Typical Output Short-Circuit Current<br>@ $I_{\text{LED}} = 10\text{mA}$ , @ $T_A=+25^{\circ}\text{C}$ (See Fig. 1 & 2)                                | 5             | $\mu\text{A}$ |
| Max. Turn-On Time @ $I_{\text{LED}} = 5\text{mA}$ , $C_{\text{LOAD}} = 200\text{pF}$ (See Fig. 4)  | 2.5           | ms            |
| Max. Turn-Off Time @ $I_{\text{LED}} = 5\text{mA}$ , $C_{\text{LOAD}} = 200\text{pF}$ (See Fig. 4)   | .5            | ms            |
| Off-State Clamping Resistance: minimum   | 350           | $\Omega$      |
| maximum  | 1500          | $\Omega$      |

| <b>GENERAL CHARACTERISTICS</b>  | <b>Limits</b> | <b>Units</b>       |
|---|---------------|--------------------|
| Min. Dielectric Strength, Input-Output  | 3750          | $V_{\text{RMS}}$   |
| Min. Dielectric Strength, Output-to-Output  | 1200          | $V_{\text{DC}}$    |
| Min. Insulation Resistance, Input-to-Output<br>@ $T_A=+25^{\circ}\text{C}$ , 50%RH, 100V $_{\text{DC}}$ | $10^{12}$     | $\Omega$           |
| Max. Capacitance, Input-Output  | 5.0           | pF                 |
| Max. Pin Soldering Temperature (10 seconds max.)  | +260          | $^{\circ}\text{C}$ |
| Ambient Temperature Range: Operating  | -40 to +85    | $^{\circ}\text{C}$ |
| Storage   | -40 to +125   | $^{\circ}\text{C}$ |

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.

**Connection Diagram**



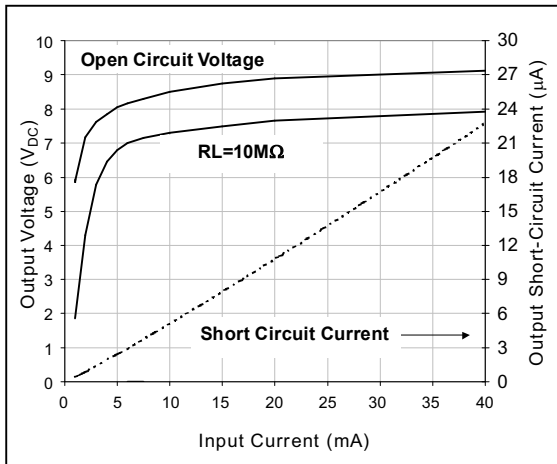


Figure 1. Typical Output Characteristics

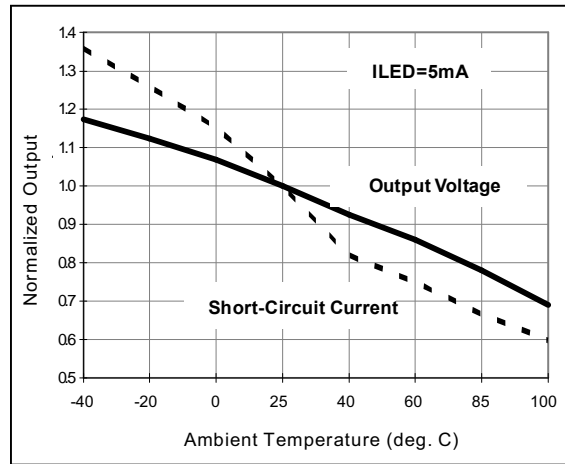


Figure 2. Typical Variation of Output

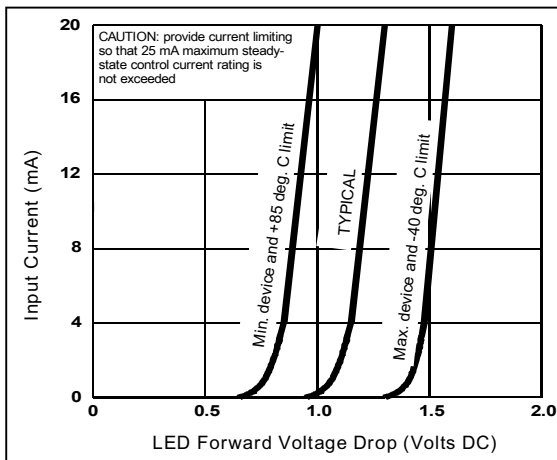


Figure 3. Input Characteristics (Current Controlled)

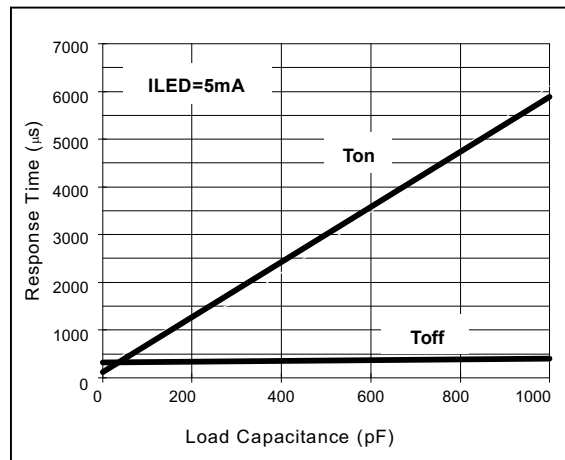
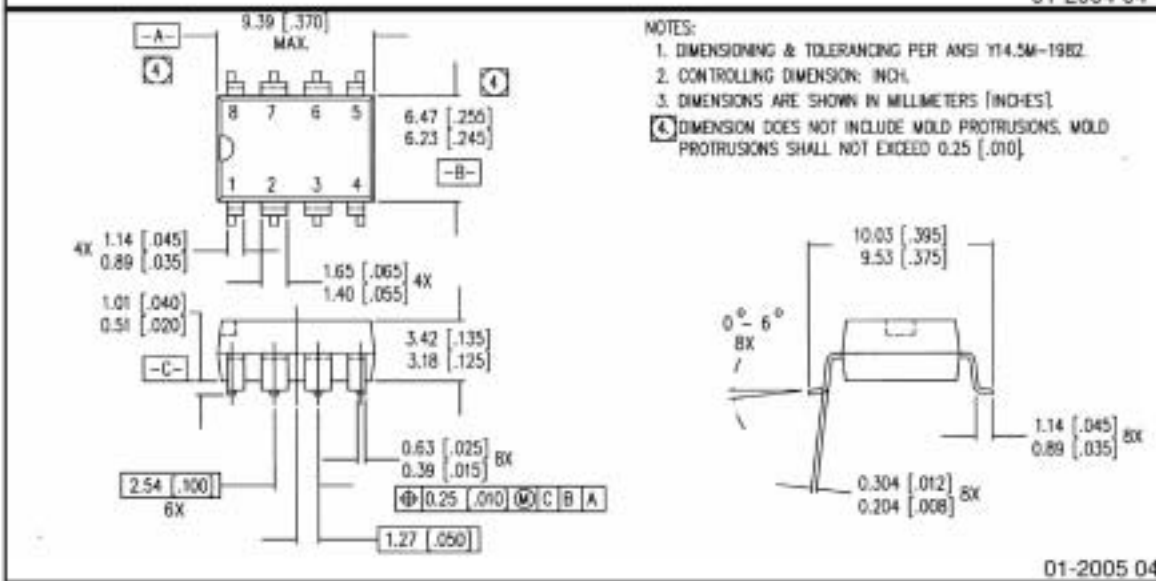
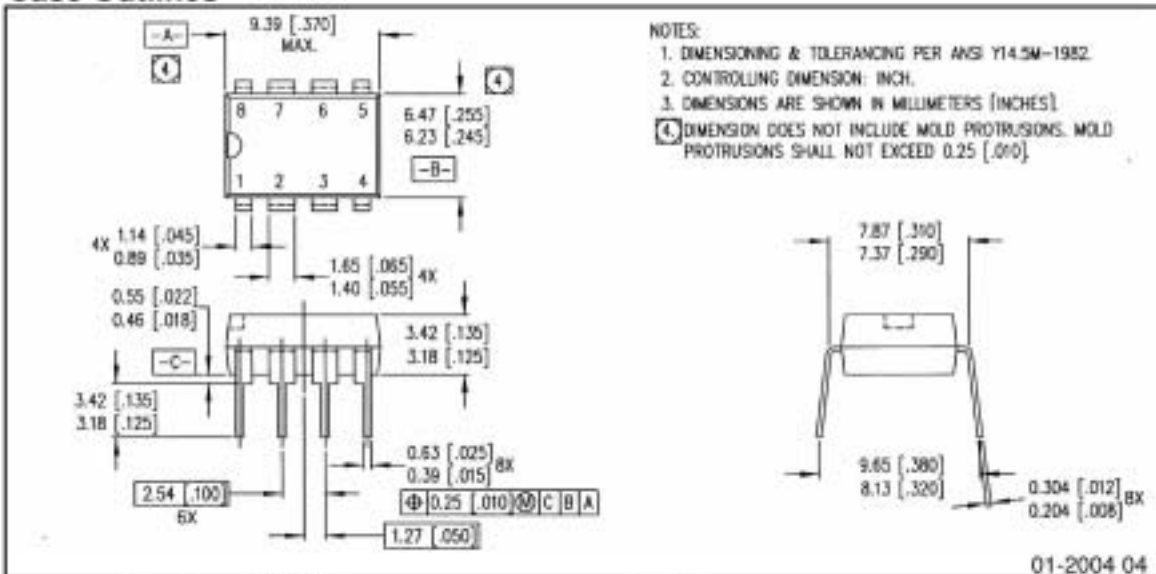


Figure 4. Typical Response Time

**Case Outlines**



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