

## Series PVI5013R

Photovoltaic Isolator  
Solid-State  
Opto-Isolated MOSFET Gate Driver  
Dual-Channel, 5V, 1.0 $\mu$ A

### General Description

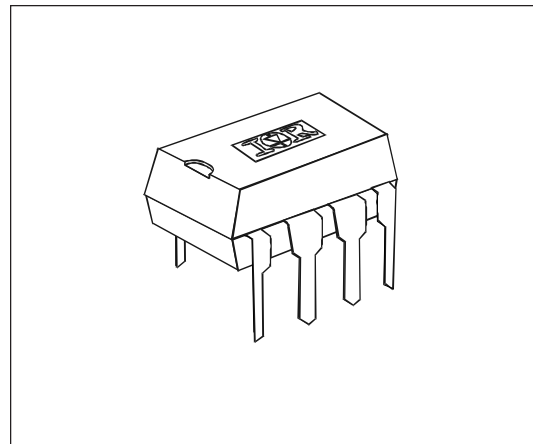
The PVI5013R Photovoltaic Isolator is a dual-channel, opto-isolated driver capable of directly driving gates of power MOSFETs or IGBTs. It utilizes a monolithic integrated circuit photovoltaic generator of novel construction as its output. The output is controlled by radiation from a GaAlAs light emitting diode (LED) which is optically isolated from the photovoltaic generator.

The PVI5013R 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. PVI5013R employs a fast turn-off circuitry.

PVI5013R Photovoltaic Isolators are packaged in an 8-pin, 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.

### 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
- BABT Certified



### Applications

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

### Part Identification

|             |                              |
|-------------|------------------------------|
| PVI5013R    | through-hole                 |
| PVI5013RS   | surface-mount                |
| PVI5013RS-T | surface-mount, Tape and Reel |

# Series PVI5013R

International  
**IOR** Rectifier

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

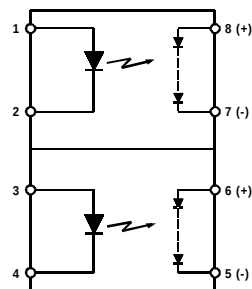
| INPUT CHARACTERISTICS                                                      | Limits    | Units         |
|----------------------------------------------------------------------------|-----------|---------------|
| Minimum Input Current (see figure 1)                                       | 5.0       | mA            |
| Input Current Range (see figure 1)                                         | 3.0 to 25 | mA            |
| Maximum Continuous Input Current @ $T_A = +25^{\circ}\text{C}$             | 40        | mA            |
| LED Forward Voltage Drop @ 5mA, $T_A = +25^{\circ}\text{C}$ (see figure 3) | 1.4       | V             |
| Maximum Reverse Voltage                                                    | 7.0       | V             |
| Maximum Reverse Current @ $-7V_{DC}$ , $T_A = +25^{\circ}\text{C}$         | 10        | $\mu\text{A}$ |

| OUTPUT CHARACTERISTICS  | Limits | Units              |
|-------------------------|--------|--------------------|
| Minimum Forward Voltage | 8.0    | $V_{DC}$           |
| Maximum Reverse Current | 10     | $\mu\text{A}_{DC}$ |

| COUPLED CHARACTERISTICS                                                                                                                                  | Limits             | Units                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------------------|
| Minimum Output Voltage @ $I_{LED} = 5\text{mA}$ , $R_L = 10\text{M}\Omega$<br>@ $T_A = 0^{\circ}\text{C}$ to $+70^{\circ}\text{C}$ (see figures 1 and 2) | 3                  | V                    |
| Maximum Output Voltage @ $I_{LED} = 5\text{mA}$ , $R_L = 10\text{M}\Omega$<br>@ $T_A = 0^{\circ}\text{C}$ to $+70^{\circ}\text{C}$ (see figures 1 and 2) | 8                  | V                    |
| Maximum Voltage Differential Between Outputs<br>@ $I_{LED} = 5\text{mA}$ , $R_L = 10\text{M}\Omega$                                                      | 1.0                | V                    |
| Typical Output Short-Circuit Current<br>@ $I_{LED} = 5\text{mA}$ , @ $T_A = +25^{\circ}\text{C}$ (see figures 1 and 2)                                   | 1.0                | $\mu\text{A}$        |
| Maximum Turn-On Time @ $I_{LED} = 5\text{mA}$ , $C_{LOAD} = 200\text{pF}$ (see figure 4)                                                                 | 5                  | ms                   |
| Max. Turn-Off Time @ $I_{LED} = 5\text{mA}$ , $C_{LOAD} = 200\text{pF}$ (see figure 4)                                                                   | 0.25               | ms                   |
| Off-State Clamping Resistance:                                                                                                                           | minimum<br>maximum | $\Omega$<br>$\Omega$ |
|                                                                                                                                                          | 100<br>3300        |                      |

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

## Connection Diagram



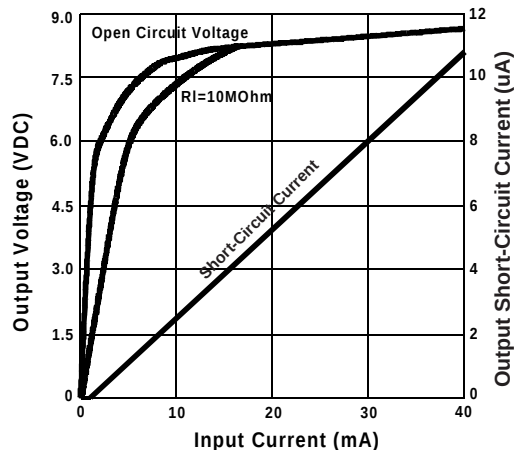


Figure 1. Typical Output Characteristics

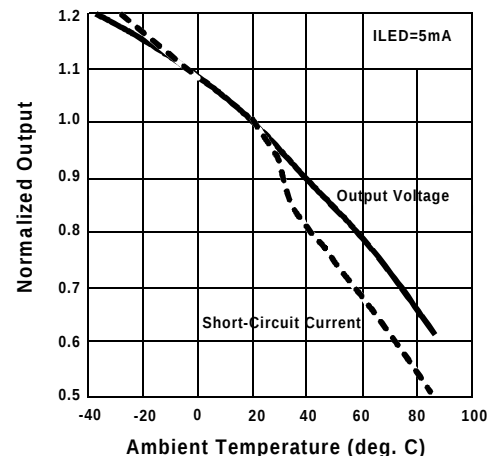


Figure 2. Typical Variation of Output

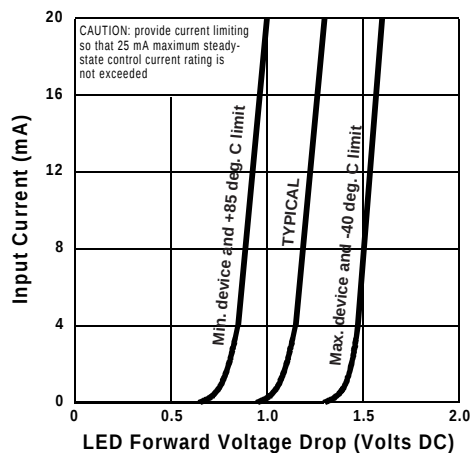


Figure 3. Input Characteristics (Current Controlled)

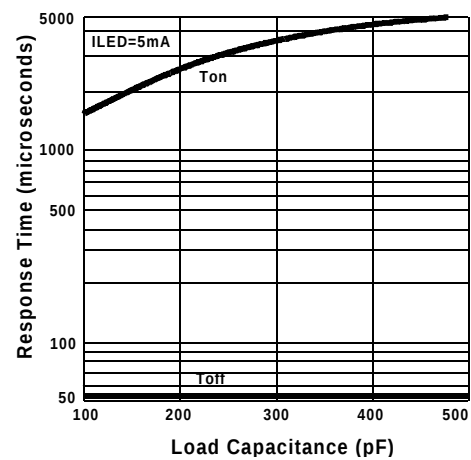


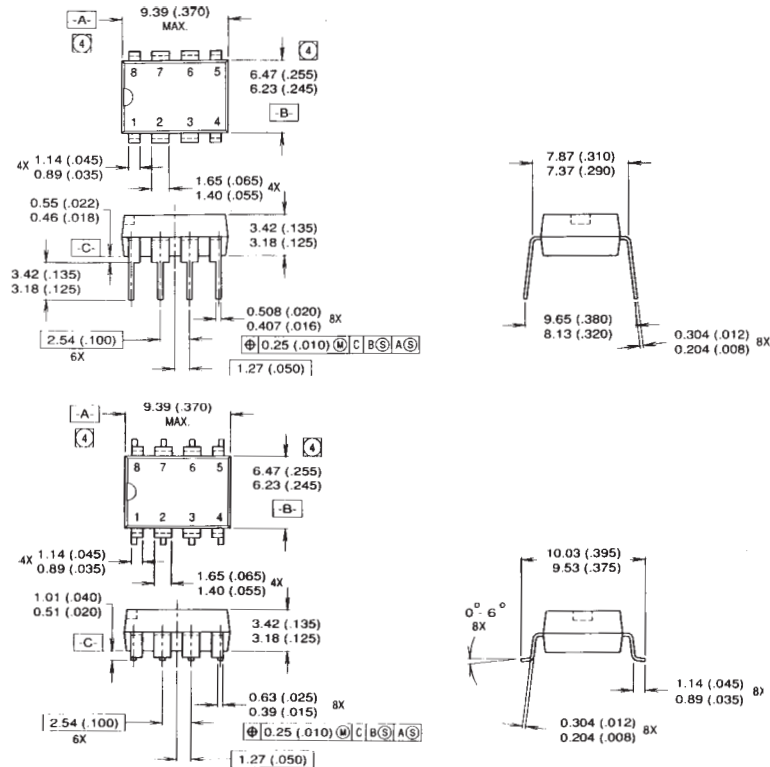
Figure 4. Typical Response Time

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### Case Outline

Dimensions in millimeters (inches)



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).

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**WORLD HEADQUARTERS:** 233 Kansas St., El Segundo, California 90245 Tel: (310) 322 3331

**IR GREAT BRITAIN:** Hurst Green, Oxted, Surrey RH8 9BB, UK Tel: ++ 44 1883 732020

**IR JAPAN:** K&H Bldg., 2F, 30-4 Nishi-Ikebukuro 3-Chome, Toshima-Ku, Tokyo, Japan 171-0021 Tel: 8133 983 0086

**IR HONG KONG:** Unit 308, #F, New East Ocean Centre, No. 9 Science Museum Road, Tsimshatsui East, Kowloon, Hong Kong Tel: (852) 2803-7380

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Data and specifications subject to change without notice. 6/14/99