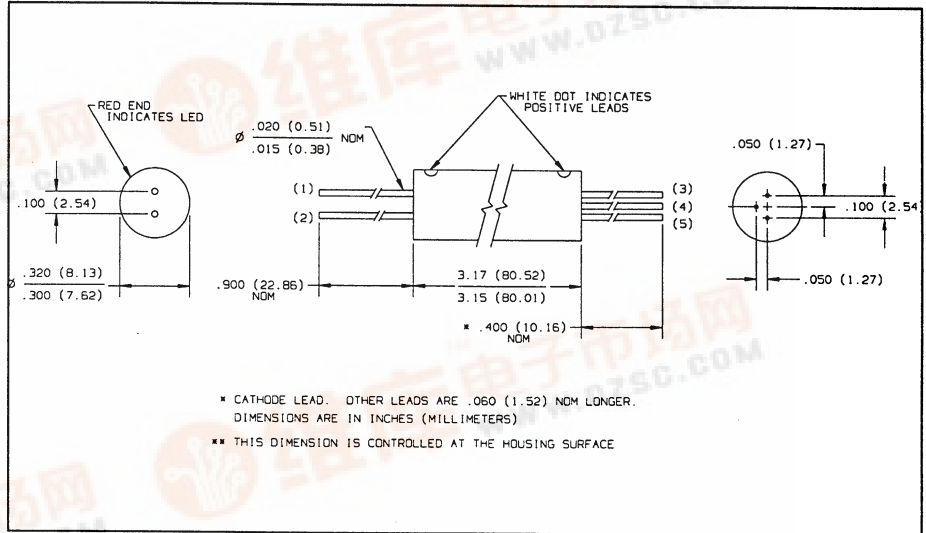
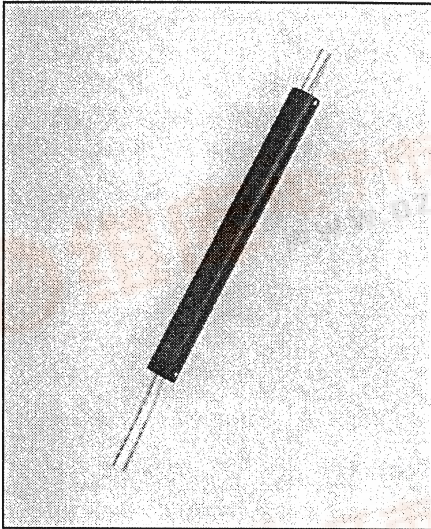




Product Bulletin OPI150TX  
September 1996

# Optically Coupled Isolators

## Types OPI150TX, OPI150TXV



### Features

- High current transfer ratio
- 50kV electrical isolation
- Base contact lead for conventional transistor biasing
- Components processed to Optek's screening program patterned after MIL-PRF-19500 for TX and TXV devices.

### Description

The OPI150TX and OPI150TXV are optically coupled isolators, consisting of a gallium aluminum arsenide infrared light emitting diode component (OP235TX or OP235TXV) and optically coupled to an NPN silicon phototransistor component (OP804TX or OP804TXV) by means of a light pipe and sealed in a high dielectric plastic housing. This series is designed for applications requiring very high voltage isolation between input and output.

High reliability processing is performed in accordance with MIL-PRF-19500 for both the infrared light emitting diode and the NPN silicon phototransistor at the component level. Typical screening and lot acceptance tests are provided on page 13-4.

### Absolute Maximum Ratings (T<sub>A</sub> = 25° C unless otherwise noted)

|  |                          |
|--|--------------------------|
| Input-to-Output Voltage  | ± 50 kVDC <sup>(1)</sup> |
| Storage Temperature Range  | -65° C to +150° C        |
| Operating Temperature Range  | -65° C to +125° C        |
| Lead Soldering Temperature [1/16 inch (1.6 mm) from case for 5 sec. with soldering iron] | 240° C                   |

### Input Diode

|                            |                       |
|----------------------------|-----------------------|
| Continuous Forward Current | 100 mA                |
| Reverse Voltage            | 2.0 V                 |
| Power Dissipation          | 200 mW <sup>(2)</sup> |

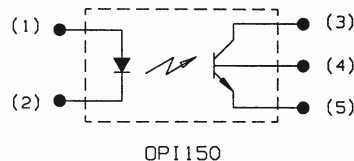
### Output Photosensor

|                              |                       |
|------------------------------|-----------------------|
| Continuous Collector Current | 50 mA                 |
| Collector-Emitter Voltage    | 50 V                  |
| Emitter-Base Voltage         | 7.0 V                 |
| Collector-Base Voltage       | 50 V                  |
| Power Dissipation            | 250 mW <sup>(3)</sup> |

### Notes:

- (1) Measured with input and output leads shored together in air with maximum relative humidity of 50%.
- (2) Derate linearly 2.00 mW/° C above 25° C.
- (3) Derate linearly 2.50 mW/° C above 25° C.
- (4) Methanol or isopropanol are recommended as cleaning agents.

### Schematic



# Types OPI150TX, OPI150TXV

Electrical Characteristics ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

| SYMBOL                    | PARAMETER                                 | MIN  | TYP  | MAX  | UNITS         | TEST CONDITIONS   |
|---------------------------|---|------|------|------|---------------|---|
| <b>Input Diode</b>        |   |      |      |      |               |   |
| $V_F$                     | Forward Voltage <sup>(5)</sup>            | 1.0  | 1.4  | 1.7  | V             | $I_F = 30\text{ mA}$  |
|                           |   | 1.2  | 1.6  | 1.9  | V             | $I_F = 30\text{ mA}, T_A = -55^\circ\text{C}$                               |
|                           |   | 0.9  | 1.15 | 1.5  | V             | $I_F = 30\text{ mA}, T_A = 100^\circ\text{C}$                               |
| $I_R$                     | Reverse Current                           |      | 0.1  | 10   | $\mu\text{A}$ | $V_R = 2.0\text{ V}$  |
| <b>Output Photosensor</b> |   |      |      |      |               |   |
| $V_{(BR)CEO}$             | Collector-Emitter Breakdown Voltage       | 50   | 80   |      | V             | $I_C = 1.0\text{ mA}, I_B = 0, I_F = 0$                                     |
| $V_{(BR)EBO}$             | Emitter-Base Breakdown Voltage            | 7.0  | 110  |      | V             | $I_E = 100\ \mu\text{A}, I_C = 0, I_F = 0$                                  |
| $V_{(BR)CBO}$             | Collector-Base Breakdown Voltage          | 50   | 10.0 |      | V             | $I_C = 100\ \mu\text{A}, I_E = 0, I_F = 0$                                  |
| $I_{CEO}$                 | Collector-Emitter Dark Current            |      | 0.2  | 100  | nA            | $V_{CE} = 10.0\text{ V}, I_B = 0, I_F = 0$                                  |
|                           |   |      | 10   | 100  | $\mu\text{A}$ | $V_{CE} = 10.0\text{ V}, I_B = 0, I_F = 0, T_A = 100^\circ\text{C}$         |
| $I_{CBO}$                 | Collector-Base Dark Current               |      | 0.1  | 10   | nA            | $V_{CB} = 10.0\text{ V}, I_E = 0, I_F = 0$                                  |
| <b>Coupled</b>            |   |      |      |      |               |   |
| $I_{C(ON)}$               | On-State Collector Current <sup>(5)</sup> | 1.0  |      |      | mA            | $V_{CE} = 5\text{ V}, I_B = 0, I_F = 10\text{ mA}$                          |
|                           |   | 0.6  |      |      | mA            | $V_{CE} = 5\text{ V}, I_B = 0, I_F = 10\text{ mA}, T_A = -55^\circ\text{C}$ |
|                           |   | 0.6  |      |      | mA            | $V_{CE} = 5\text{ V}, I_B = 0, I_F = 10\text{ mA}, T_A = 100^\circ\text{C}$ |
| $V_{CE(SAT)}$             | Collector-Emitter Saturation Voltage      |      | 0.20 | 0.30 | V             | $I_C = 1.0\text{ mA}, I_B = 0, I_F = 16.0\text{ mA}$                        |
| $V_{ISO}$                 | Isolation Voltage (Input-to-Output)       | 50.0 |      |      | kV            | See Note 1  |
| $t_r$                     | Output Rise Time                          |      | 8.0  | 15.0 | $\mu\text{s}$ | $V_{CC} = 10.0\text{ V}, I_C = 2.0\text{ mA}, R_L = 100\ \Omega$            |
| $t_f$                     | Output Fall time                          |      | 8.0  | 15.0 | $\mu\text{s}$ | $V_{CC} = 10.0\text{ V}, I_C = 2.0\text{ mA}, R_L = 100\ \Omega$            |

(5) Measurement is taken during last 500  $\mu\text{s}$  of a single 1.0 ms test pulse. Heating due to increased pulse rate or pulse width can cause change in measurement results.