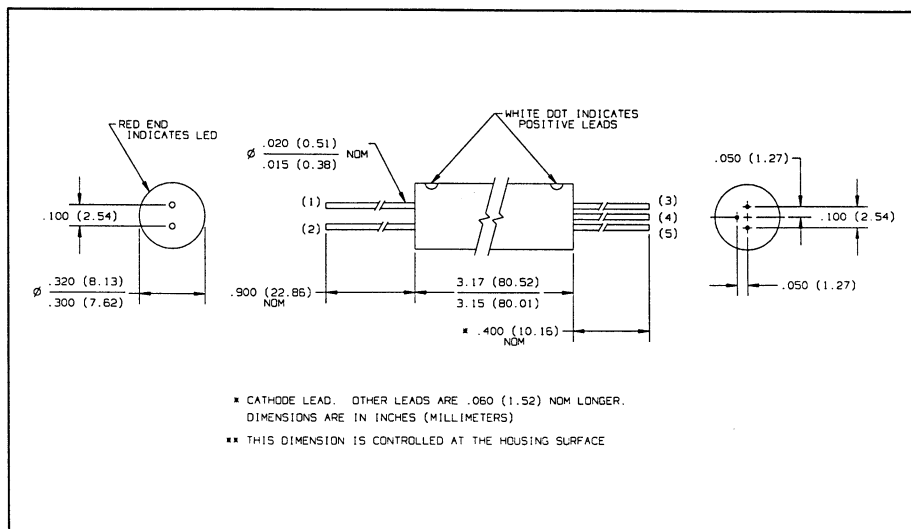
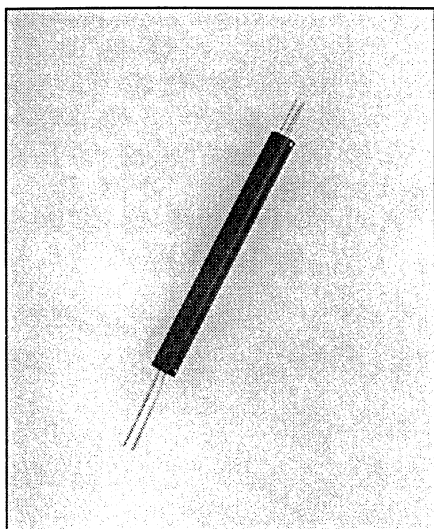


# Optically Coupled Isolators

## Types OPI150, OPI153



### Features

- 50kV electrical isolation
- Phototransistor output (OPI150) or photodarlington output (OPI153)
- Hermetically sealed LED and photosensor
- Base contact lead for conventional transistor biasing
- TX-TXV process available (see Hi-Rel section)

### Description

The OPI150 and OPI153 each contain an infrared emitting diode and an NPN silicon phototransistor (OPI150) or photodarlington (OPI153) optically coupled by means of a light pipe and mounted in a high dielectric plastic housing. The LED and sensor are in hermetically sealed packages. These series are designed for applications requiring very high isolation between input and output.

### Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

|                                                                                          |                                            |
|------------------------------------------------------------------------------------------|--------------------------------------------|
| Input-to-Output Isolation Voltage                                                        | $\pm 50\text{ kVDC}^{(1)}$                 |
| Storage Temperature Range                                                                | $-40^\circ\text{C}$ to $+85^\circ\text{C}$ |
| Operating Temperature Range                                                              | $-40^\circ\text{C}$ to $+85^\circ\text{C}$ |
| Lead Soldering Temperature [1/16 inch (1.6 mm) from case for 5 sec. with soldering iron] | $260^\circ\text{C}^{(2)}$                  |

### Input Diode

|                            |                       |
|----------------------------|-----------------------|
| Continuous Forward Current | 50 mA                 |
| Reverse Voltage            | 3.0 V                 |
| Power Dissipation          | 200 mW <sup>(3)</sup> |

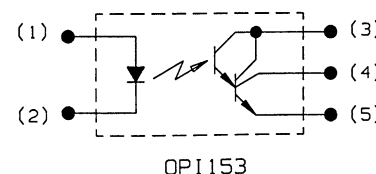
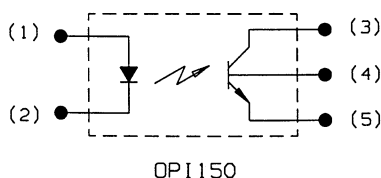
### Output Photosensor

|                                  |                       |
|----------------------------------|-----------------------|
| Collector-Emitter Voltage OPI150 | 30 V                  |
| OPI153                           | 15.0 V                |
| Emitter-Collector Voltage OPI150 | 5.0 V                 |
| OPI153                           | 5.0 V                 |
| Collector-Base Voltage OPI150    | 30 V                  |
| OPI153                           | 20 V                  |
| Power Dissipation OPI150         | 250 mW <sup>(4)</sup> |
| OPI153                           | 250 mW <sup>(4)</sup> |

### Notes:

- (1) Measured with input and output leads shorted.
- (2) RMA flux is recommended. Duration can be extended to 10 sec. max. when flow soldering.
- (3) Derate linearly  $3.33\text{ mW}/^\circ\text{C}$  above  $25^\circ\text{C}$ .
- (4) Derate linearly  $4.17\text{ mW}/^\circ\text{C}$  above  $25^\circ\text{C}$ .

### Schematics

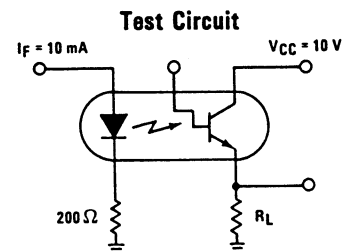
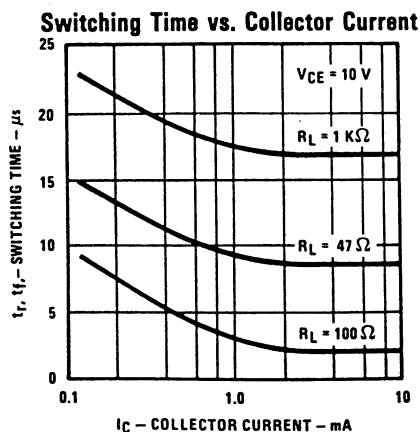
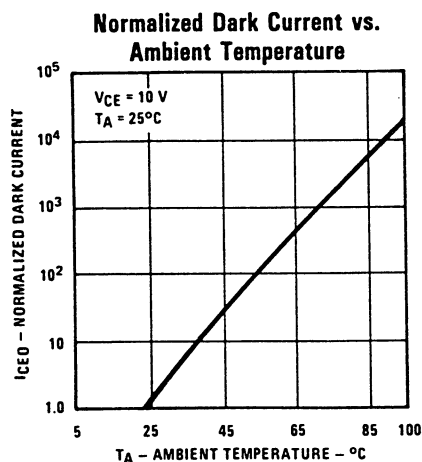
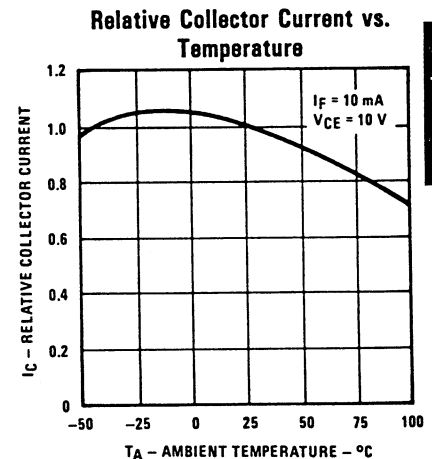
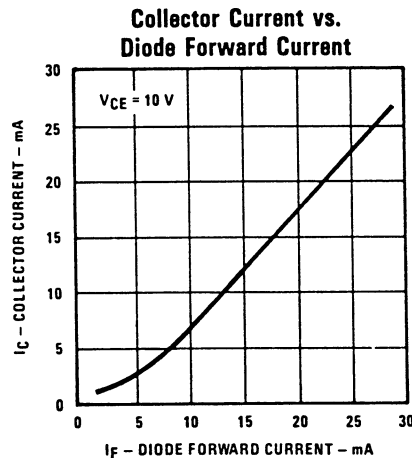
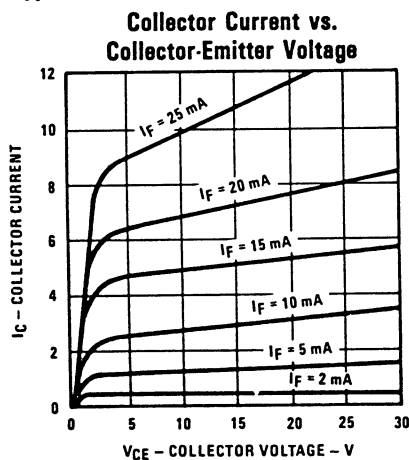


# Types OPI150, OPI153

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                     | OPI150 |     |     | 1.60 | V             | $I_F = 50\text{ mA}$                      |
|                           |                                     | OPI153 |     |     | 1.60 | V             | $I_F = 50\text{ mA}$                      |
| $I_R$                     | Reverse Current                     |        |     |     | 100  | $\mu\text{A}$ | $V_R = 3\text{ V}$                        |
| <b>Output Photosensor</b> |                                     |        |     |     |      |               |                                           |
| $V_{(BR)CEO}$             | Collector-Emitter Breakdown Voltage | OPI150 | 30  |     |      | V             | $I_C = 1\text{ mA}$                       |
|                           |                                     | OPI153 | 15  |     |      | V             | $I_C = 1\text{ mA}$                       |
| $V_{(BR)ECO}$             | Emitter-Collector Breakdown Voltage | OPI150 | 5   |     |      | V             | $I_F = 100\text{ }\mu\text{A}$            |
| $V_{(BR)CBO}$             | Collector-Base Breakdown Voltage    | OPI150 | 30  |     |      | V             | $I_C = 100\text{ }\mu\text{A}$            |
|                           |                                     | OPI153 | 20  |     |      | V             | $I_C = 100\text{ }\mu\text{A}$            |
| $I_{CEO}$                 | Collector-Emitter Dark Current      | OPI150 |     |     | 100  | nA            | $V_{CE} = 10\text{ V}$                    |
|                           |                                     | OPI153 |     |     | 500  | nA            | $V_{CE} = 10\text{ V}$                    |
| $I_{CBO}$                 | Collector-Base Dark Current         | OPI150 |     |     | 50   | nA            | $V_{CB} = 10\text{ V}$                    |
| <b>Coupled</b>            |                                     |        |     |     |      |               |                                           |
| $I_C/I_F$                 | DC Current Transfer Ratio           | OPI150 | 10  |     |      | %             | $I_F = 10\text{ mA}, V_{CE} = 5\text{ V}$ |
|                           |                                     | OPI153 | 25  |     |      | %             | $I_F = 20\text{ mA}, V_{CE} = 5\text{ V}$ |
| $I_{CB(ON)}$              | On-State Photodiode Current         | OPI150 | 10  |     |      | $\mu\text{A}$ | $I_F = 20\text{ mA}, V_{CB} = 5\text{ V}$ |
| $V_{CE(SAT)}$             | Saturation Voltage                  | OPI150 |     |     | 0.50 | V             | $I_F = 16\text{ mA}, I_C = 1\text{ mA}$   |
|                           |                                     | OPI153 |     |     | 1.20 | V             | $I_F = 30\text{ mA}, I_C = 2\text{ mA}$   |

## Typical Performance Curves (OPI150 Only)



The input waveform is supplied by a generator with the following characteristics:  $Z_{OUT} = 50\Omega$ ,  $t_r \leq 15\text{ ns}$ , Duty cycle  $\approx 1\%$ , pulse width  $\approx 100\text{ }\mu\text{s}$ .

Optek reserves the right to make changes at any time in order to improve design and to supply the best product possible.

Optek Technology, Inc. 1215 W. Crosby Road Carrollton, Texas 75006 (972)323-2200 Fax (972)323-2396