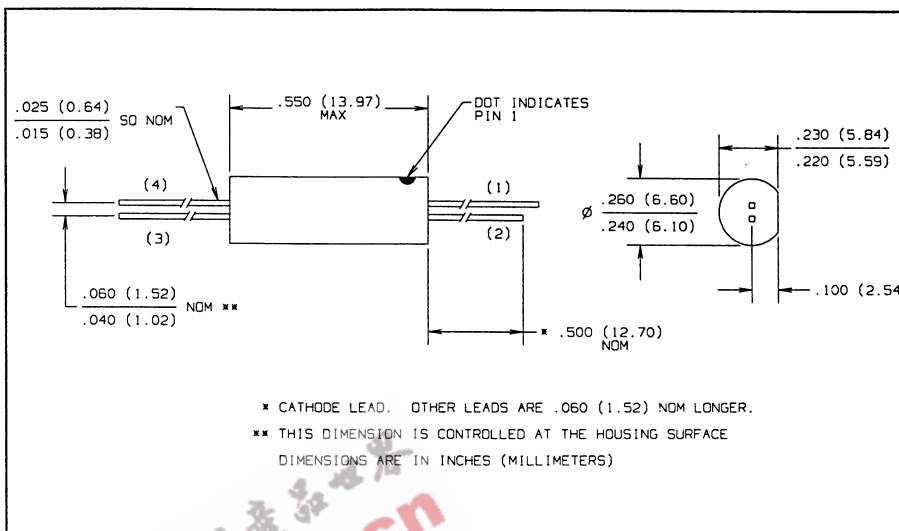
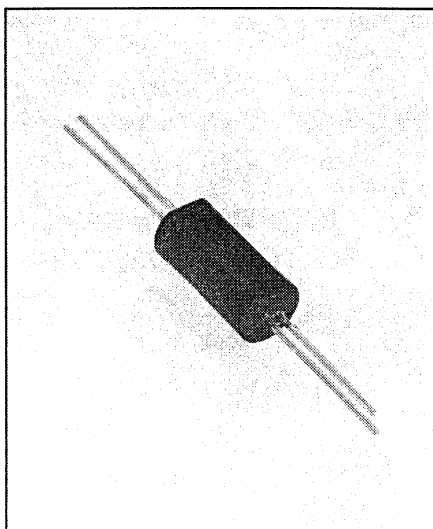


# Optically Coupled Isolators

## Types OPI110, OPI110A, OPI110B, OPI110C, OPI113



### Features

- 10kV electrical isolation
- Phototransistor output
- Low cost plastic housing
- UL Recognized File Number E58730<sup>(6)</sup>

### Description

The OPI110 and OPI113 series devices are optically coupled isolators, each containing an infrared emitting diode and an NPN silicon photosensor. The OPI110 uses a phototransistor and the OPI113 uses either a photodarlington or phototransistor sensor. The devices are sealed in a precast opaque housing. This series is designed for applications requiring high voltage isolation between input and output.

### Replaces

K8900 series

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

Input-to-Output Isolation Voltage	± 10 kVDC <sup>(1)</sup>
Storage Temperature Range	-40° C to +100° C
Operating Temperature Range	-40° C to +85° C
Lead Soldering Temperature [1/16 inch (1.6 mm) from case for 5 sec. with soldering iron]	260° C <sup>(2)</sup>

### Input Diode

Forward DC Current	40 mA <sup>(3)</sup>
Reverse DC Voltage	2.0 V <sup>(4)</sup>
Power Dissipation	50 mW <sup>(5)</sup>

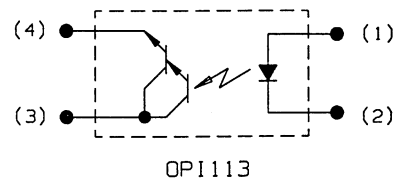
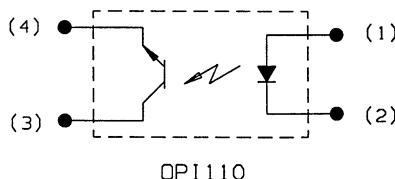
### Output Photosensor

Collector-Emitter Voltage OPI110	30 V <sup>(1)</sup>
OPI113	15 V <sup>(1)</sup>
Emitter-Collector Voltage	5.0 V <sup>(1)</sup>
Power Dissipation	100 mW <sup>(5)</sup>

### Notes:

- (1) Measured with input and output leads shorted. Typical input/output capacitance is 0.06 pF.
- (2) RMA flux is recommended. Duration can be extended to 10 sec. max. when flow soldering.
- (3) Derate linearly 0.67 mA/° C above 25° C.
- (4) Derate linearly 0.83 mW/° C above 25° C.
- (5) Derate linearly 1.67 mW/° C above 25° C.
- (6) UL recognition is for 3500 VAC, 1 minute only.

### Schematics

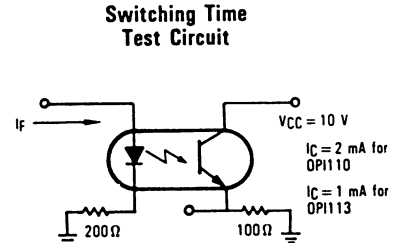
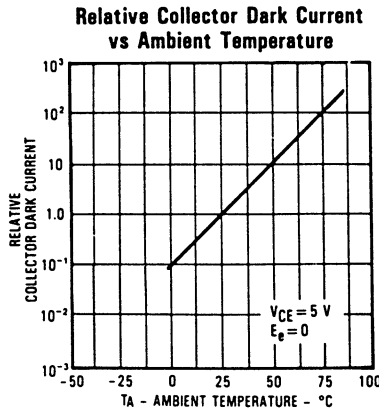
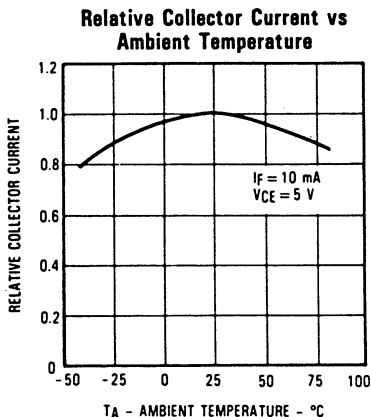
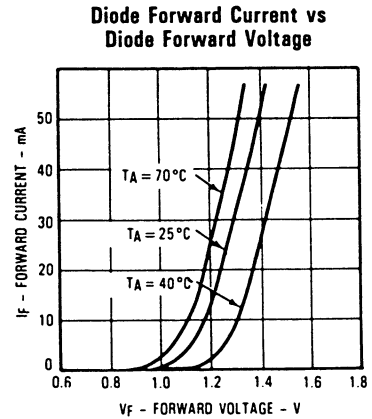
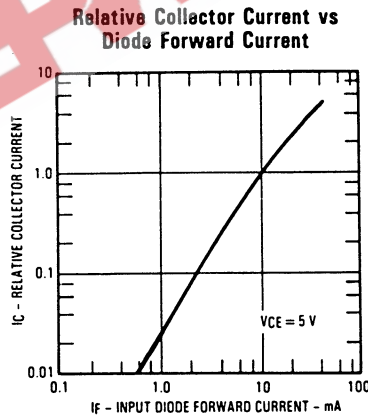
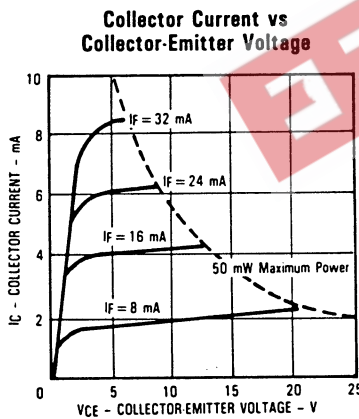


# Types OPI110, OPI110A, OPI110B, OPI110C, OPI113

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			1.60	V	$I_F = 20\text{ mA}$
$I_R$	Reverse Current			100	$\mu\text{A}$	$V_R = 2.0\text{ V}$
<b>Output Photosensor</b>						
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	OPI110 OPI113	30 15		V V	$I_C = 100\ \mu\text{A}$ $I_C = 100\ \mu\text{A}, I_F = 0$
$V_{(BR)ECO}$	Emitter-Collector Breakdown Voltage		5.0		V	$I_E = 100\ \mu\text{A}, I_F = 0$
$I_{CEO}$	Collector-Emitter Dark Current	OPI110 OPI113		100 100	nA nA	$V_{CE} = 15\text{ V}, E_e = 0$ $V_{CE} = 10\text{ V}, E_e = 0$
<b>Coupled</b>						
$I_C/I_F$	DC Current Transfer Ratio	OPI110 OPI110A OPI110B OPI110C OPI113	12.5 25 50 100 50		125 400	% % % % % $I_F = 10.0\text{ mA}, V_{CE} = 5.0\text{ V}$ $I_F = 10.0\text{ mA}, V_{CE} = 5.0\text{ V}$ $I_F = 10.0\text{ mA}, V_{CE} = 5.0\text{ V}$ $I_F = 10.0\text{ mA}, V_{CE} = 5.0\text{ V}$ $I_F = 5.0\text{ mA}, V_{CE} = 2.0\text{ V}$
$V_{CE(SAT)}$	Collector Saturation Voltage	OPI110 OPI113		0.40 1.20	V V	$I_F = 10.0\text{ mA}, I_C = 1.6\text{ mA}$ $I_F = 10.0\text{ mA}, I_C = 5.0\text{ mA}$
$I_{CEO}$	Collector-Emitter Dark Current	OPI110 OPI113		200 100	nA nA	$V_{CE} = 20.0\text{ V}, I_F = 0$ $V_{CE} = 10.0\text{ V}, I_F = 0$
$V_{ISO}$	Isolation Voltage		10.0		kVDC	(See Note 1)

## Typical Performance Curves (OPI110 Only)



$t_r$  and  $t_f$  for OPI110 are typically  $4\ \mu\text{s}$ .  
 $t_r$  and  $t_f$  for OPI113 are typically  $40\ \mu\text{s}$ .  
 The input waveform is supplied by a generator with the following characteristics:  $Z_{OUT} = 50\ \Omega$ ,  $t_r \leq 15\text{ ns}$ , duty cycle  $\cong 1\%$ , pulse width =  $100\ \mu\text{s}$ .