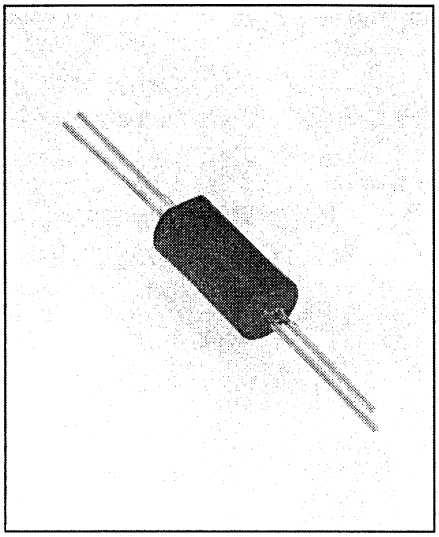
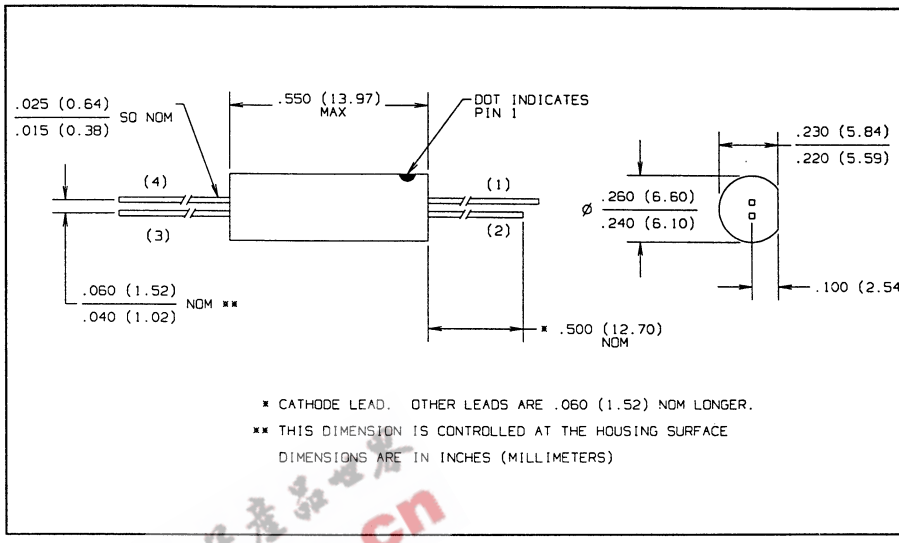
Optically Coupled Isolators
Types OPI110, OPI110A, OPI110B, OPI110C, OPI113





Features

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

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_A = 25° C unless otherwise noted)

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

Input Diode

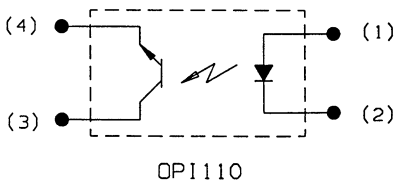
Forward DC Current ..... 40 mA(
Reverse DC Voltage 2.0
Power Dissipation ..... 50 mW(

Output Photosensor

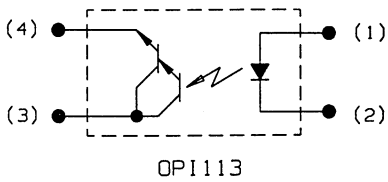
Collector-Emitter Voltage OPI110 30
OPI113 15
Emitter-Collector Voltage 5.0
Power Dissipation ..... 100 mW(

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



OPI110



OPI113

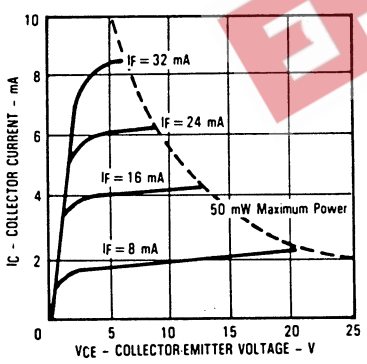
Types OPI110, OPI110A, OPI110B, OPI110C, OPI113

Electrical Characteristics (T_A = 25° C unless otherwise noted)

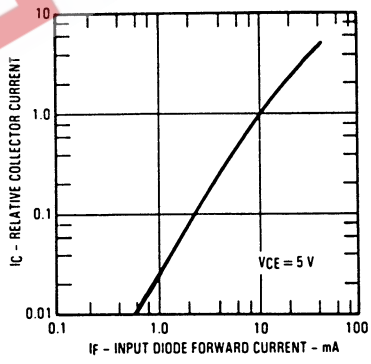
SYMBOL	PARAMETER		MIN	TYP	MAX	UNITS	TEST CONDITIONS
Input Diode							
V_F	Forward Voltage				1.60	V	I_F = 20 mA
I_R	Reverse Current				100	µA	V_R = 2.0 V
Output Photosensor							
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	OPI110 OPI113	30 15			V V	I_C = 100 µA I_C = 100 µA, I_F = 0
$V_{(BR)ECO}$	Emitter-Collector Breakdown Voltage		5.0			V	I_E = 100 µA, I_F = 0
I_{CEO}	Collector-Emitter Dark Current	OPI110 OPI113			100 100	nA nA	V_{CE} = 15 V, E_e = 0 V_{CE} = 10 V, E_e = 0
Coupled							
I_C/I_F	DC Current Transfer Ratio	OPI110 OPI110A OPI110B OPI110C OPI113	12.5 25 50 100 50	 400	 125 	% % % % %	I_F = 10.0 mA, V_{CE} = 5.0 V I_F = 10.0 mA, V_{CE} = 5.0 V I_F = 10.0 mA, V_{CE} = 5.0 V I_F = 10.0 mA, V_{CE} = 5.0 V I_F = 5.0 mA, V_{CE} = 2.0 V
$V_{CE(SAT)}$	Collector Saturation Voltage	OPI110 OPI113			0.40 1.20	V V	I_F = 10.0 mA, I_C = 1.6 mA I_F = 10.0 mA, I_C = 5.0 mA
I_{CEO}	Collector-Emitter Dark Current	OPI110 OPI113			200 100	nA nA	V_{CE} = 20.0 V, I_F = 0 V_{CE} = 10.0 V, I_F = 0
V_{ISO}	Isolation Voltage		10.0			kVDC	(See Note 1)

Typical Performance Curves (OPI110 Only)

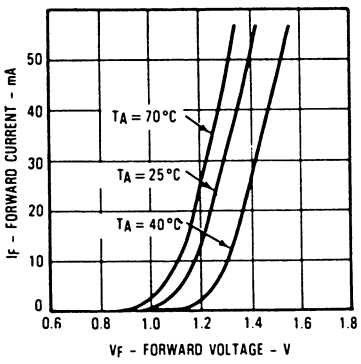
Collector Current vs Collector-Emitter Voltage



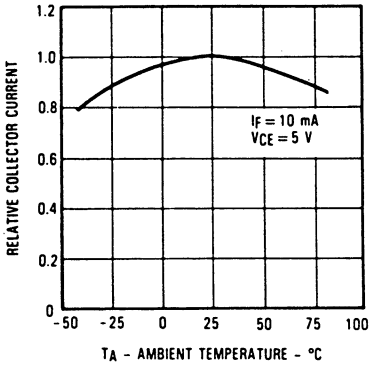
Relative Collector Current vs Diode Forward Current



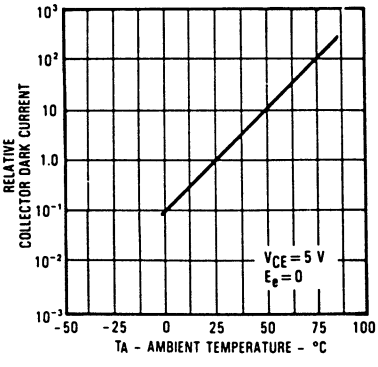
Diode Forward Current vs Diode Forward Voltage



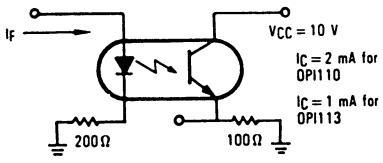
Relative Collector Current vs Ambient Temperature



Relative Collector Dark Current vs Ambient Temperature



Switching Time Test Circuit



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

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