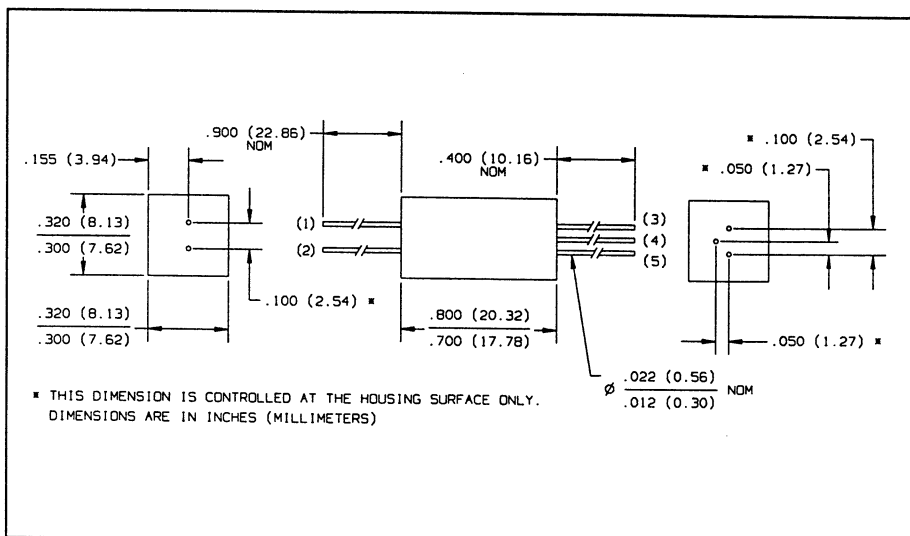
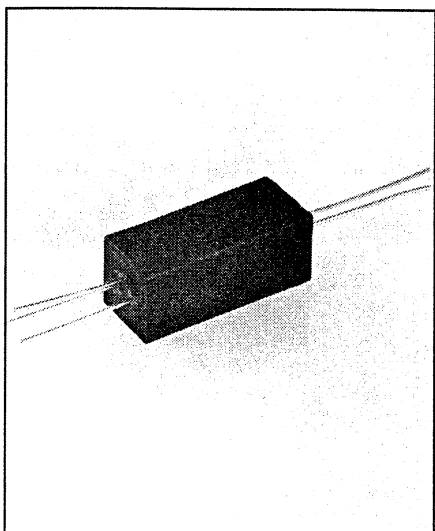


Optically Coupled Isolators Types OPI120, OPI123



Features

- 15kV electrical isolation
- Phototransistor output (OPI120) or photodarlington output (OPI123)
- Hermetically sealed LED and photosensor
- Base contact lead for conventional transistor biasing (OPI120 only)
- TX-TXV process available (see Hi-Rel section)
- UL recognized File No. E58730⁽⁶⁾

Description

The OPI120 and OPI123 are optically coupled isolators, each containing an infrared emitting diode and an NPN silicon phototransistor (OPI120) or photodarlington (OPI123) sealed in a high dielectric plastic housing. The LED and sensor are in hermetically sealed packages. These series are designed for applications requiring high voltage isolation between input and output over a wide range of temperatures.

Replaces

K8920 series

Absolute Maximum Ratings (T_A = 25° C unless otherwise noted)

Input-to-Output Isolation Voltage	± 15 kVDC ⁽¹⁾⁽⁶⁾
Storage Temperature Range	-55° C to +125° C
Operating Temperature Range	-55° C to +100° C
Lead Soldering Temperature [1/16 inch (1.6 mm) from case for 5 sec. with soldering iron]	260° C ⁽²⁾

Input Diode

Forward DC Current	150 mA ⁽³⁾
Reverse DC Current	3.0 V
Power Dissipation	200 mW ⁽⁴⁾

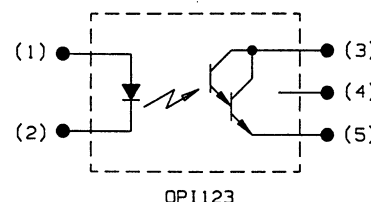
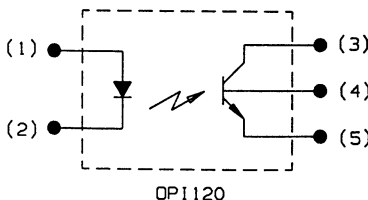
Output Photosensor

Collector-Emitter Voltage (OPI120)	25 V
(OPI123)	20 V
Emitter-Collector Voltage	5.0 V
Collector-Base Voltage (OPI120)	25 V
Power Dissipation	250 mW ⁽⁵⁾

Notes:

- (1) Measured with input and output leads shorted in air with a max. relative humidity of 50%. If suitably encapsulated or oil immersed, the isolation voltage is increased to 25 kV minimum.
- (2) RMA flux is recommended. Duration can be extended to 10 sec. max. when flow soldering.
- (3) Derate linearly 2.0 mA/° C above 25° C.
- (4) Derate linearly 2.67 mW/° C above 25° C.
- (5) Derate linearly 3.33 mW/° C above 25° C.
- (6) UL recognition is for 3750 VAC to 100° C.

Schematics

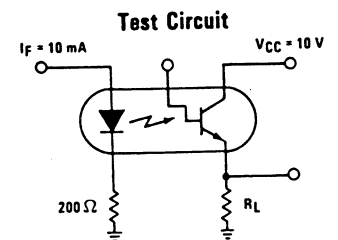
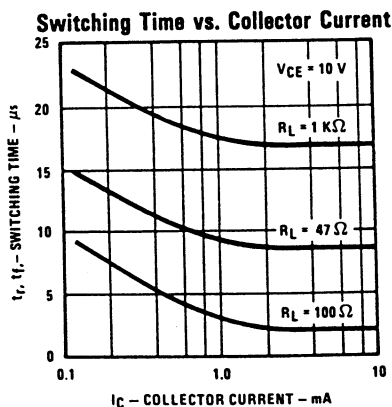
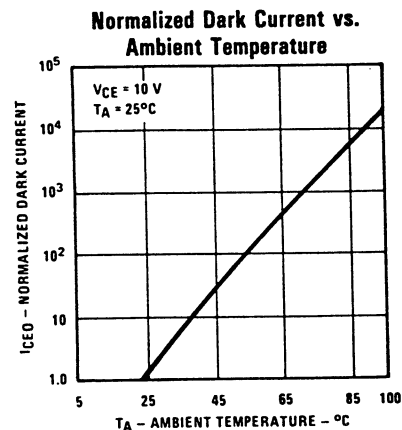
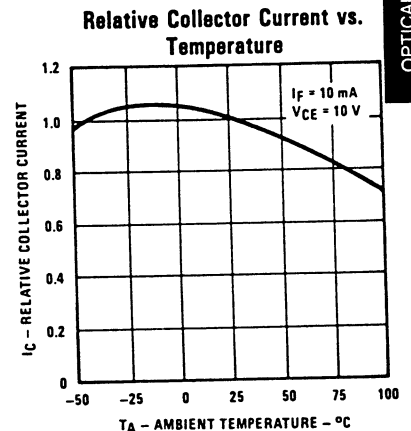
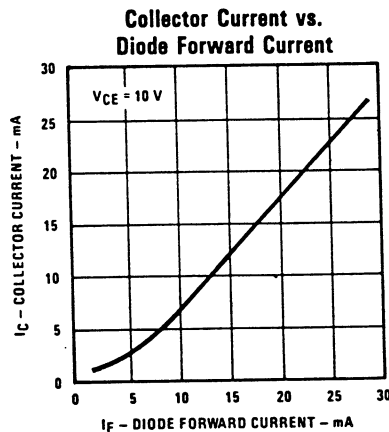
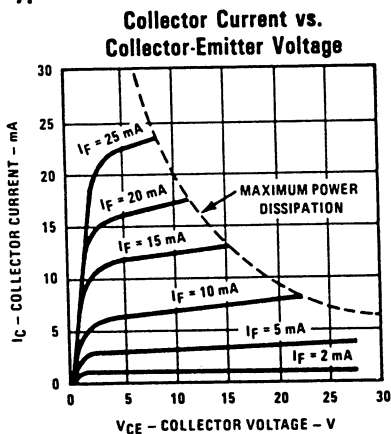


Types OPI120, OPI123

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

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Input Diode						
V_F	Forward Voltage	OPI120 OPI123		1.50 1.50	V V	$I_F = 30\text{ mA}$ $I_F = 10\text{ mA}$
I_R	Reverse Current	OPI120 OPI123		100 100	μA μA	$V_R = 3\text{ V}$ $V_R = 3\text{ V}$
Output Photosensor						
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	OPI120 OPI123	25 20		V V	$I_C = 1\text{ mA}$ $I_C = 1\text{ mA}$
$V_{(BR)ECO}$	Emitter-Collector Breakdown Voltage		5.0		V	$I_E = 100\text{ }\mu\text{A}$
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	OPI120	25		V	$I_C = 1\text{ mA}$
I_{CEO}	Collector-Emitter Dark Current			100	nA	$V_{CE} = 10\text{ V}$
Coupled						
I_C/I_F	DC Current Transfer Ratio	OPI120 OPI123	20 50	70	% %	$I_F = 10\text{ mA}, V_{CE} = 5\text{ V}$ $I_F = 10\text{ mA}, V_{CE} = 2\text{ V}$
$V_{CE(SAT)}$	Saturation Voltage	OPI120 OPI123		0.50 1.20	V V	$I_F = 30\text{ mA}, I_C = 1\text{ mA}$ $I_F = 5\text{ mA}, I_C = 1\text{ mA}$
V_{ISO}	Isolation Voltage		15.0		kV	(See Note 1)
t_r	Output Rise Time	OPI120 OPI123		2.0 40	μs μs	See Test Circuit See Test Circuit
t_f	Output Fall Time	OPI120 OPI123		2.0 40	μs μs	See Test Circuit See Test Circuit

Typical Performance Curves (OPI120 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 $\approx 100\text{ }\mu\text{s}$.