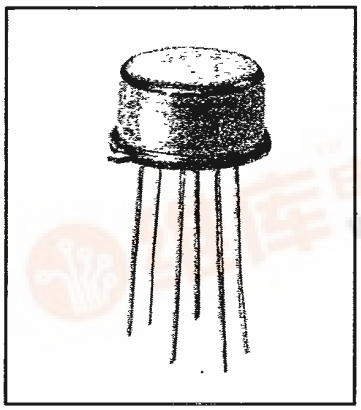
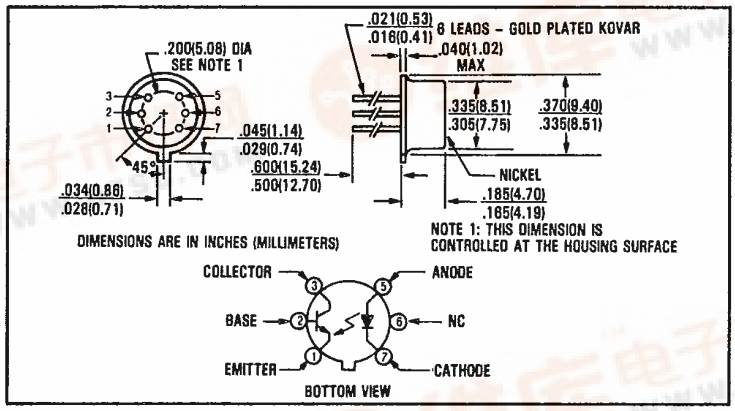
Optoelectronics Division
TRW Electronic Components Group

Product Bulletin 5179
January 1985

Optically Coupled Isolators
Types OPI102, OPI103





Features
- High DC current transfer ratio
- TO-5 hermetically sealed package
- 1000 volt isolation
- Base lead is provided for conventional transistor biasing

Description
The OPI102 and OPI103 are optically coupled isolators consisting of a gallium arsenide infrared emitting diode and an NPN silicon phototransistor mounted in a hermetically sealed TO-5 package. TO-5 packages offer high power dissipation, ease of heat sinking and superior hostile environment operation.

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

Input-to-Output Isolation Voltage	±1000 VDC[1]
Storage and Operating Temperature Range	−55°C to +125°C
Lead Soldering Temperature (1/16 inch (1.6 mm) from case for 5 sec. with soldering iron)	240°C[2]
Input Diode	
Forward DC Current (65°C or below)	40 mA[3]
Reverse Voltage	2.0 V
Output Sensor	
Continuous Collector Current	50 mA
Collector-Emitter Voltage	35 V
Collector-Base Voltage	35 V
Emitter-Base Voltage	4.0 V
Power Dissipation	300 mW[4]

Notes:
(1) Measured with input leads shorted together and output leads shorted together.
(2) RMA flux is recommended. Duration can be extended to 10 sec. max. when flow soldering.
(3) Derate linearly 0.67 mA/°C above 65°C.
(4) Derate linearly 3.0 mW/°C above 25°C.
(5) Measured with input and output leads shorted together.

Types OPI102, OPI103

T-41-83

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

Symbol	Parameter		Min.	Typ.	Max.	Units	Test Conditions
Input Diode							
V_F	Forward Voltage				1.30	V	I_F = 10.0 mA
I_R	Reverse Current				100	μA	V_R = 2.0 V
Output Sensor							
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage		35.0			V	I_C = 1.00 mA, I_B = 0, I_F = 0
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage		35.0			V	I_C = 100 μA, I_B = 0, I_F = 0
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage		4.0			V	I_E = 100 μA, I_B = 0, I_F = 0
I_{CEO}	Collector-Emitter Dark Current				100	nA	V_{CE} = 20 V, I_B = 0, I_F = 0
h_{FE}	Forward Current Gain	OPI102		300			V_{CE} = 5.0 V, I_C = 10.0 mA, I_F = 0
		OPI103		500			V_{CE} = 5.0 V, I_C = 10.0 mA, I_F = 0
Coupled							
$I_{C(ON)}$	On-State Collector Current	OPI102	2.50			mA	V_{CE} = 5.0 V, I_F = 10.0 mA, I_B = 0
		OPI103	10.0			mA	V_{CE} = 5.0 V, I_F = 10.0 mA, I_B = 0
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	OPI102			0.30	V	I_C = 2.5 mA, I_F = 20 mA
		OPI103			0.30	V	I_C = 10.0 mA, I_F = 20 mA
R_{IO}	Input-to-Output Resistance		10^{11}			Ω	V_{IO} = ±1.00 kV (See Note 5)
C_{IO}	Input-to-Output Capacitance			2.5		pF	V_{IO} = 0, f = 1.00 MHz (See Note 5)
t_r	Output Rise Time			5.0		μs	V_{CC} = 10.0 V, I_F = 10.0 mA
t_f	Output Fall Time			5.0		μs	R_L = 100Ω (See Test Circuit)

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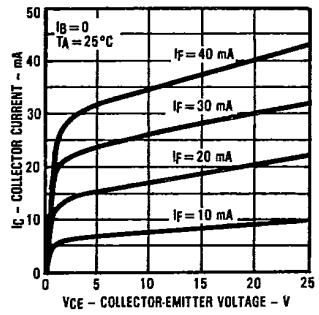
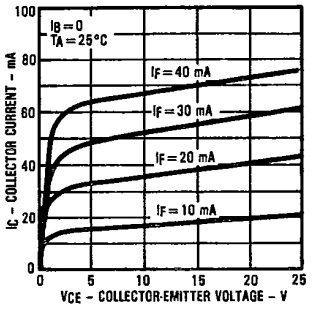
Typical Performance Curves

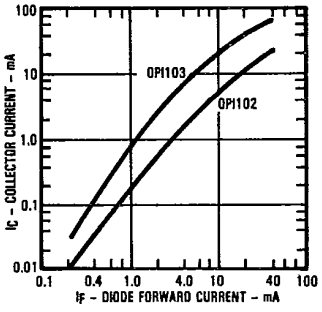
Collector Current vs Collector-Emitter Voltage (OPI102)



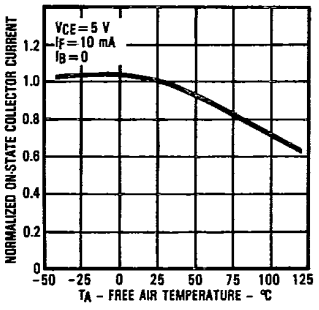
Collector Current vs Collector-Emitter Voltage (OPI103)



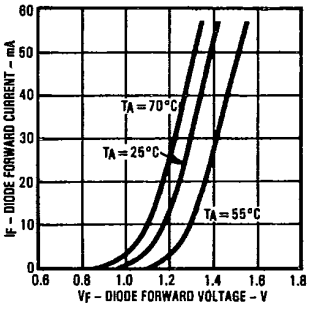
Collector Current vs Diode Forward Current



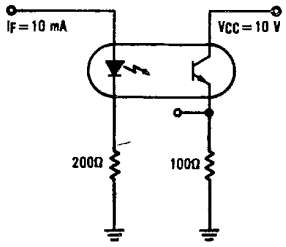
Normalized On-State Collector Current vs Free-Air Temperature



Diode Forward Current vs Diode Forward Voltage



Test Circuit



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

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