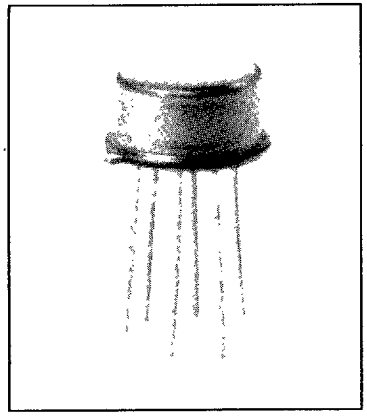
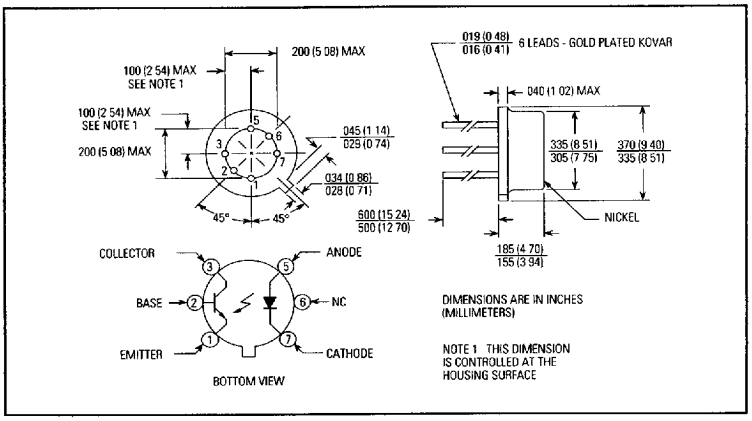
Optically Coupled Isolators
Types 4N47, 4N48, 4N49





Features

- High current transfer ratio
- TO-78 hermetic package
- 1.0 kV electrical isolation
- Base lead provided for conventional transistor biasing
- JANTX version available per MIL-S-19500/548
- Higher breakdown voltage devices available as the "HV" series
- Patent number 4124860

Description

The 4N47, 4N48, and 4N49 are optically coupled isolators each consisting of an infrared light emitting diode and a silicon phototransistor mounted side by side on a ceramic substrate and coupled in a hermetic TO-78 package. All electrical characteristics are according to the JEDEC registered 4N47, 4N48, and 4N49 test conditions. The 4N47HV, 4N48HV, and 4N49HV series of optoisolators are available when higher breakdown voltages are required.

The TO-78 package offers high power dissipation, ease of heat sinking and superior operation in hostile environments.

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

Input-to-Output Isolation Voltage	± 1.00kVDC(1)
Storage Temperature Range	-55°C to +150°C
Operating Temperature Range	-55°C to +125°C
Soldering Temperature [1/16 in. (1.6mm)) from case for 5 sec. with soldering iron]	240°C
Input Diode	
Forward DC Current (65°C or below)	40mA
Reverse Voltage	2.0V
Power Dissipation	60mW(2)
Output Phototransistor	
Continuous Collector Current	50mA
Collector-Base Voltage	45V(3)
Collector-Emitter Voltage	40V
Emitter-Base Voltage	7.0V
Power Dissipation	300mW(4)

Notes:
(1) Measured with input leads shorted together and output leads shorted together.
(2) Derate linearly 1.00mW/°C above 65°C.
(3) 4N47HV, 4N48HV, and 4N49HV are available rated at 55V minimum.
(4) Derate linearly 3.0mW/°C above 25°C.

Types 4N47, 4N48, 4N49

Electrical Characteristics ($T_A = 25^oC$ unless otherwise noted)

Symbol	Parameter	Type	Min	Typ	Max	Units	Test Conditions
Input Diode							
V_F	Forward Voltage		0.80 1.00 0.70		1.50 1.70 1.30	V V V	I_F = 10.0mA I_F = 10.0mA, T_A = -55°C I_F = 10.0mA, T_A = 100°C
I_R	Reverse Current				100	µA	V_R = 2.0V
Output Phototransistor							
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage[3]		45			V	I_C = 100µA, I_E = 0, I_F = 0
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage[3]		40			V	I_C = 1.0mA, I_B = 0, I_F = 0
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage		7.0			V	I_E = 100µA, I_C = 0, I_F = 0
$I_{C(OFF)}$	Collector-Emitter Dark Current				100 100	nA µA	V_{CE} = 20V, I_B = 0, I_F = 0 V_{CE} = 20V, I_B = 0, I_F = 0, T_A = 100°C
$I_{CB(OFF)}$	Collector-Base Dark Current				100	nA	V_{CB} = 20V, I_B = 0, I_F = 0
Coupled							
$I_{C(ON)}$	On-State Collector Current	4N47	0.5 0.7 0.5			mA mA mA	V_{CE} = 5.0V, I_B = 0, I_F = 1.0mA V_{CE} = 5.0V, I_B = 0, I_F = 2.0mA, T_A = -55°C V_{CE} = 5.0V, I_B = 0, I_F = 2.0mA, T_A = 100°C
		4N48	1.0 1.4 1.0		5.0	mA mA mA	V_{CE} = 5.0V, I_B = 0, I_F = 1.0mA V_{CE} = 5.0V, I_B = 0, I_F = 2.0mA, T_A = -55°C V_{CE} = 5.0V, I_B = 0, I_F = 2.0mA, T_A = 100°C
		4N49	2.0 2.8 2.0		10.0	mA mA mA	V_{CE} = 5.0V, I_B = 0, I_F = 1.0mA V_{CE} = 5.0V, I_B = 0, I_F = 2.0mA, T_A = -55°C V_{CE} = 5.0V, I_B = 0, I_F = 2.0mA, T_A = 100°C
$I_{CB(ON)}$	On-State Collector Base		30			µA	V_{CB} = 5.0V, I_E = 0, I_F = 10mA
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	4N47 4N48 4N49			0.30 0.30 0.30	V V V	I_C = 0.5mA, I_B = 0, I_F = 2.0mA I_C = 1.0mA, I_B = 0, I_F = 2.0mA I_C = 2.0mA, I_B = 0, I_F = 2.0mA
h_{FE}	DC Current Gain	4N47 4N48 4N49	100 100 100				V_{CE} = 5.0V, I_C = 10.0mA, I_F = 0mA
R_{IO}	Resistance (Input to Output)		10^{11}			Ω	V_{IO} = ± 1000Vdc[1]
C_{IO}	Capacitance (Input to Output)				5.0	pF	V_{IO} = 0.0V, f = 1.0MHz[1]
t_r	Output Rise Time	4N47 4N48 4N49			20.0 20.0 25.0	µs µs µs	V_{CC} = 10.0V, I_F = 5.0mA, R_L = 100Ω
t_f	Output Fall Time	4N47 4N48 4N49			20.0 20.0 25.0	µs µs µs	

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