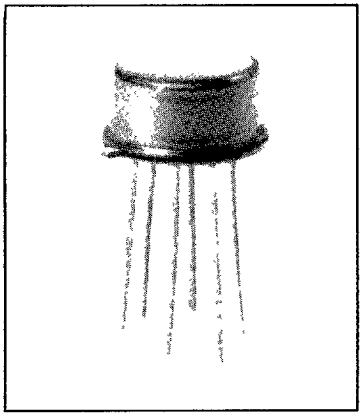
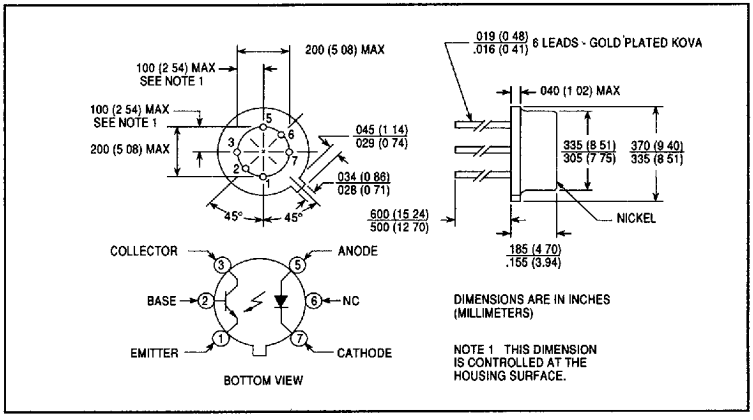
Optically Coupled Isolators
Types 4N22A, 4N23A, 4N24A





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-19500/486
- Higher breakdown voltage devices available as the "HV" series
- Patent number 4124860

Description

The 4N22A, 4N23A, and 4N24A are optically coupled isolators each consisting of a gallium arsenide LED and a silicon phototransistor mounted side by side and coupled on a ceramic substrate in a hermetic TO-78 package. All electrical characteristics for the 4N22A, 4N23A, and 4N24A are per the JEDEC registered test conditions. The 4N22AHV, 4N23AHV, and 4N24AHV 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	± 1.00 kVDC(1)
Storage and Operating Temperature Range	-65°C to +125°C
Lead Soldering Temperature [1/16 inch (1.6mm) from case for 5 sec. with soldering iron]	240°C(2)
Input Diode	
Forward DC Current (65°C or below)	40mA
Reverse Voltage	2.0V
Peak Forward Current (1 µs pulse width, 300 pps)	1.00A
Power Dissipation	60mW(3)
Output Sensor	
Continuous Collector Current	50mA
Collector-Emitter Voltage	35V
Collector-Base Voltage	35V
Emitter-Base Voltage	4.0V
Power Dissipation	300mW(4)

Notes:
(1) Measured with input diode 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 1.0mW/°C above 65°C.
(4) Derate linearly 3.0mW/°C above 25°C.
(5) Not 100% tested.

Types 4N22A, 4N23A, 4N24A

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

Symbol	Parameter	Type	Min	Typ	Max	Units	Test Conditions
Input Diode							
V_F	Forward Voltage		0.80		1.30	V	I_F = 10.0mA
			1.00		1.50	V	I_F = 10.0mA, T_A = -55°C(5)
			0.70		1.20	V	I_F = 10.0mA, T_A = 100°C(5)
I_R	Reverse Current				100	µA	V_R = 2.0V
Output Phototransistor							
$V_{(BR)CBO}$	Collector-Base Breakdown		35			V	I_C = 100µA, I_E = 0, I_F = 0
$V_{(BR)CEO}$	Collector-Emitter Breakdown		35			V	I_C = 1.0mA, I_B = 0, I_F = 0
$V_{(BR)EBO}$	Emitter-Base Breakdown		4.0			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
Coupled							
$I_{C(ON)}$	On-State Collector Current	4N22A	0.15 2.50 1.00 1.00			mA mA mA mA	V_{CE} = 5.0V, I_B = 0, I_F = 2.0mA V_{CE} = 5.0V, I_B = 0, I_F = 10.0mA V_{CE} = 5.0V, I_B = 0, I_F = 10.0mA, T_A = -55°C V_{CE} = 5.0V, I_B = 0, I_F = 10.0mA, T_A = 100°C
		4N23A	0.20 6.00 2.50 2.50			mA mA mA mA	V_{CE} = 5.0V, I_B = 0, I_F = 2.0mA V_{CE} = 5.0V, I_B = 0, I_F = 10.0mA V_{CE} = 5.0V, I_B = 0, I_F = 10.0mA, T_A = -55°C V_{CE} = 5.0V, I_B = 0, I_F = 10.0mA, T_A = 100°C
		4N24A	0.40 10.0 4.00 4.00			mA mA mA mA	V_{CE} = 5.0V, I_B = 0, I_F = 2.0mA V_{CE} = 5.0V, I_B = 0, I_F = 10.0mA V_{CE} = 5.0V, I_B = 0, I_F = 10.0mA, T_A = -55°C V_{CE} = 5.0V, I_B = 0, I_F = 10.0mA, T_A = 100°C
$V_{CE(SAT)}$	Collector-Emitter Saturation	4N22A 4N23A 4N24A			0.30 0.30 0.30	V	I_C = 2.5mA, I_B = 0, I_F = 20.0mA I_C = 5.0mA, I_B = 0, I_F = 20.0mA I_C = 10.0mA, I_B = 0, I_F = 20.0mA
h_{FE}	DC Current Gain	4N22A 4N23A 4N24A	200 300 400				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	4N22A 4N23A 4N24A			15.0 15.0 20.0	µs µs µs	V_{CC} = 10.0V, I_F = 10.0mA, R_L = 100Ω
t_f	Output Fall Time	4N22A 4N23A 4N24A			15.0 15.0 20.0	µs µs µs	

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