Hi-Reliability Optically Coupled Isolator

JAN/JANTX/JANTXV 4N22, 4N23, 4N24 [A]

Features:

- TO-78 hermetically sealed package
- High current transfer ratio
- 1 kV electrical isolation
- Base contact provided for conventional transistor biasing
- JAN, JANTX and JANTXV devices processed to MIL-PRF-19500
- Patent No. 4124860

Description:

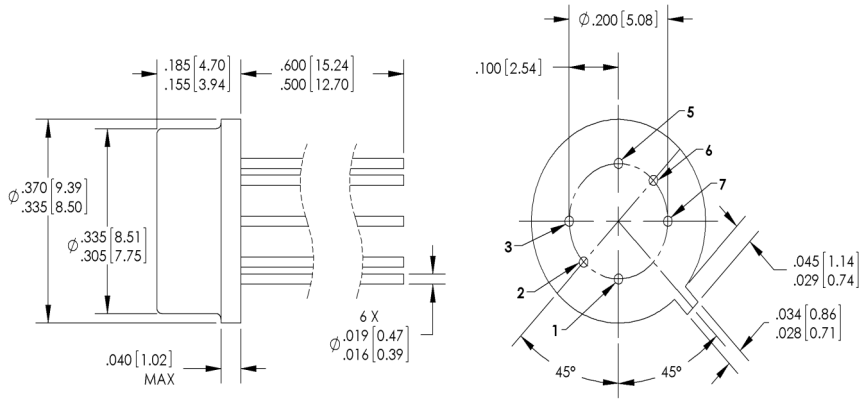
Each isolator in this series consists of an infrared emitting diode and a NPN silicon phototransistor, which are mounted in a hermetically sealed TO-78 package. Devices are designed for military and/or harsh environments. The suffix letter "**A**" denotes the collector is electrically isolated from the case.

The *JAN / JANTX / JANTXV 4N22, 4N22A, 4N23, 4N23A, 4N24, and 4N24A* devices are processed to *MIL-PRF-19500/486*. This series of 4N products are JEDEC registered, DSCC qualified.

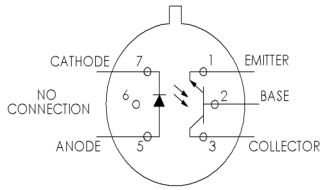
Please contact your local representative for more information.

Applications:

- High-voltage isolation between input and output
- Electrical isolation in dirty environments
- Industrial equipment
- Medical equipment
- Office equipment



DIMENSIONS ARE IN INCHES [MM]



BOTTOM VIEW

Pin #	Function	Pin #	Function
3	Collector	5	Anode
2	Base	6	Open
1	Emitter	7	Cathode

General Note
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Electrical Specifications

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

Storage Temperature Range	-65°C to 150°C
Operating Temperature Range	-55°C to +125°C
Input-to-Output Isolation Voltage	± 1.00 kVDC(1)
Lead Soldering Temperature [1/16 inch (1.6mm) from case for 5 seconds with soldering iron]	260°C(2)
ESD Class	1C
Input Diode	
Forward DC Current (65°C or below)	40 mA
Reverse Voltage	2 V
Peak Forward Current (1 µs pulse width, 300 pps)	1 A
Power Dissipation	60 mW(3)
Output Sensor:	
Continuous Collector Current	50 mA
Collector-Emitter Voltage	40 V
Collector-Base Voltage	45 V
Emitter-Base Voltage	4 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 seconds maximum when flow soldering.
3. Derate linearly 1.0 mW/° C above 65° C.
4. Derate linearly 3.0 mW/° C above 25° C.

Ordering Information

Part Number	Isolation Voltage (kV)	I_F (mA) Typ / Max	V_{CE} (Volts) Max	Processing MIL-PRF-195000
JAN4N22 or JAN4N22A	1	10 / 40	40	486
JANTX4N22 or JANTX4N22A				
JANTXV4N22 or JANTXV4N22A				
JAN4N23 or JAN4N23A				
JANTX4N23 or JANTX4N23A				
JANTXV4N23 or JANTXV4N23A				
JAN4N24 or JAN4N24A				
JANTX4N24 or JANTX4N24A				
JANTXV4N24 or JANTXV4N24A				

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

SYMBOL	PARAMETER	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	I_F = 10.0 mA I_F = 10.0 mA, T_A = -55° C(1) I_F = 10.0 mA, T_A = +100° C(1)
I_R	Reverse Current	-	-	100	µA	V_R= 2.0 V
Output Phototransistor						
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	40	-	-	V	I_C = 1.0 mA, I_B= 0, I_F= 0
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	45	-	-	V	I_C = 100 µA, I_B= 0, I_F= 0
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	7	-	-	V	I_E = 100 µA, I_C= 0, I_F= 0
$I_{C(OFF)}$	Collector-Emitter Dark Current	-	-	100 100	nA µA	V_{CE} = 20 V, I_B= 0, I_F= 0 V_{CE} = 20 V, I_B= 0, I_F= 0, T_A = 100ºC
$I_{CB(OFF)}$	Collector-Base Dark Current	-	-	100	nA	V_{CB} = 20 V, I_E= 0, I_F= 0
Coupled						
$I_{C(ON)}$	On-State Collector Current JAN / JANTX / JANTXV 4N22 [A]	0.15 2.50 1.00 1.00	- - - -	- - - -	mA	I_F = 2.0 mA , V_{CE} = 5 V, I_B = 0 I_F = 10.0 mA , V_{CE} = 5 V, I_B = 0 I_F = 10.0 mA , V_{CE} = 5 V, I_B = 0, T_A = -55° C(1)
	JAN / JANTX / JANTXV 4N23 [A]	0.20 6.00 2.50 2.50	- - - -	- - - -		I_F = 2.0 mA , V_{CE} = 5 V, I_B = 0 I_F = 10.0 mA , V_{CE} = 5 V, I_B = 0 I_F = 10.0 mA , V_{CE} = 5 V, I_B = 0, T_A = -55° C(1)
	JAN / JANTX / JANTXV 4N24 [A]	0.40 10.0 4.00 4.00	- - - -	- - - -		I_F = 2.0 mA , V_{CE} = 5 V, I_B = 0 I_F = 10.0 mA , V_{CE} = 5 V, I_B = 0 I_F = 10.0 mA , V_{CE} = 5 V, I_B = 0, T_A = -55° C(1)
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage JAN / JANTX / JANTXV 4N22 [A] JAN / JANTX / JANTXV 4N23 [A] JAN / JANTX / JANTXV 4N24 [A]	- - -	- - -	0.30 0.30 0.30	V	I_F = 20 mA , I_C = 2.5 mA, I_B = 0 I_F = 20 mA , I_C = 5.0 mA, I_B = 0 I_F = 20 mA , I_C = 10.0 mA, I_B = 0
H_{FE}	DC Current Gain	100	-	-	V	V_{CE} = 5.0 V , I_C = 10.0 mA, I_F = 0 mA
R_{IO}	Resistance (Input-to-Output)	10^{11}	-	-	Ω	V_{10} = ± 1.0 VDC(3)
C_{IO}	Capacitance (Input-to-Output)	-	-	5	pF	V_{I-O} = 0 V, f = 1.0 MHz(3)
T_R, T_F	Output Rise and Fall Time	-	-	20.0	µs	V_{CC} = 10.0 V , I_F = 10.0 mA, R_L = 100 Ω

Notes:

1. Guaranteed but not tested.
2. Sample tested, LTPD = 10.
3. Measured with input leads shorted together and output leads shorted together.

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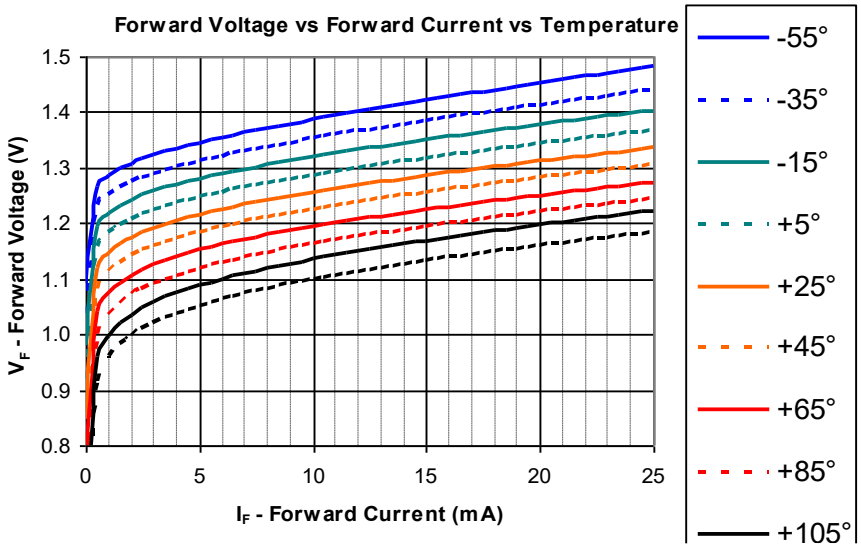
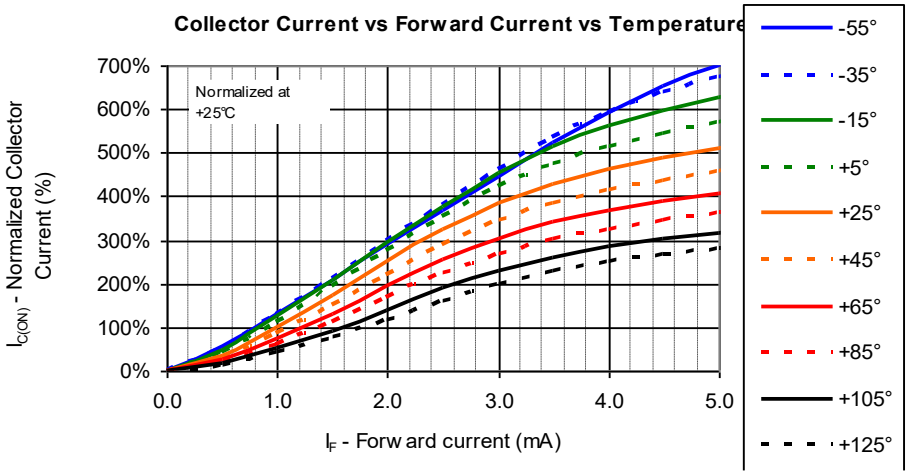
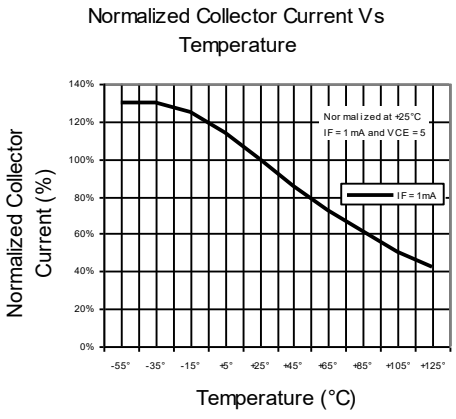
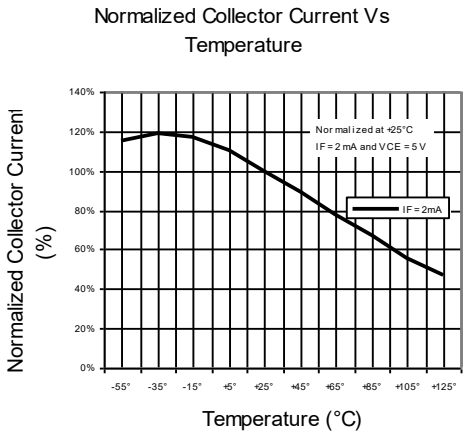
Typical Performance Curves









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