

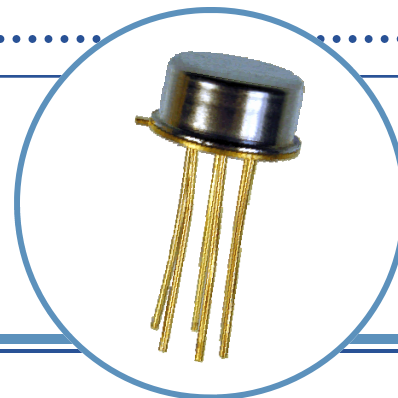
# Hi-Reliability Optically Coupled Isolator

## 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.

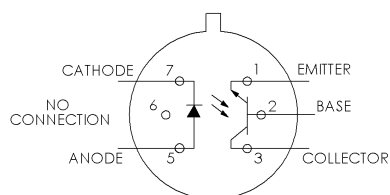
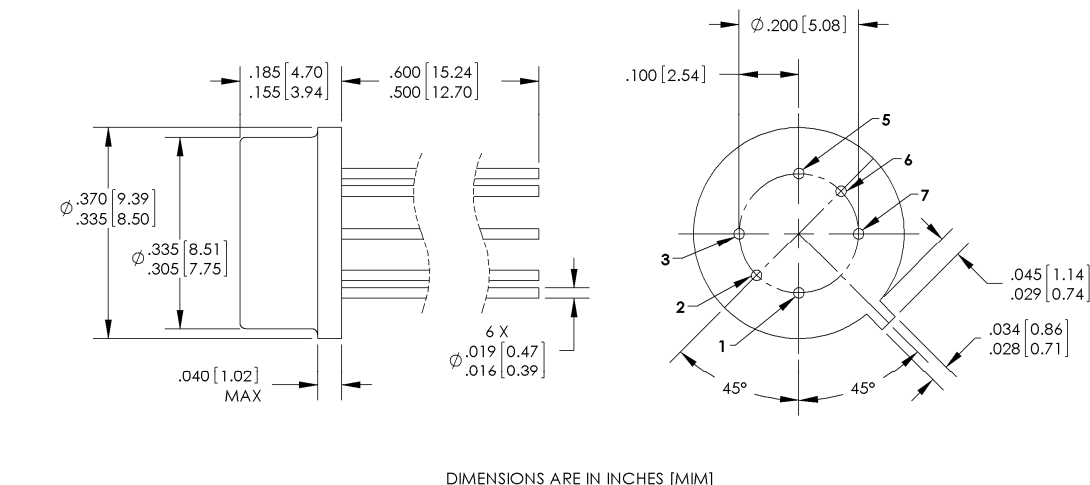
The JAN / JANTX / JANTXV 4N22, 4N22A, 4N23, 4N23A, 4N24, and 4N24A devices are processed to MIL-PRF-19500/486.

This series of 4N products are JEDEC registered, DSCC qualified.

Please contact your local representative or OPTEK for more information.

### Applications:

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



**BOTTOM VIEW**

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

This product is built, tested and shipped from the USA



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

# Hi-Reliability Optically Coupled Isolator

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



### Absolute Maximum Ratings ( $T_A = 25^\circ \text{C}$ unless otherwise noted)

|   |                               |
|---|-------------------------------|
| Storage Temperature Range   | -65° C to +150° C             |
| Operating Temperature Range   | -55° C to +125° C             |
| Input-to-Output Isolation Voltage   | $\pm 1.00 \text{ kVDC}^{(1)}$ |
| Lead Soldering Temperature [1/16 inch (1.6 mm) from case for 5 seconds with soldering iron] | 260° C <sup>(2)</sup>         |

### Input Diode

|   |                      |
|---|----------------------|
| Forward DC Current (65° C or below)                         | 40 mA                |
| Reverse Voltage   | 2 V                  |
| Peak Forward Current (1 $\mu\text{s}$ pulse width, 300 pps) | 1 A                  |
| Power Dissipation   | 60 mW <sup>(3)</sup> |

### 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 <sup>(4)</sup> |

#### 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)<br>Typ / Max | $V_{CE}$ (Volts)<br>Max | Processing<br>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 |                        |                         |                         |                              |

This product is built, tested and shipped from the USA



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

# Hi-Reliability Optically Coupled Isolator

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



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

| SYMBOL | PARAMETER | MIN | TYP | MAX | UNITS | TEST CONDITIONS |
|--------|-----------|-----|-----|-----|-------|-----------------|
|--------|-----------|-----|-----|-----|-------|-----------------|

#### Output Diode

|       |                 |                      |             |                      |               |   |
|-------|-----------------|----------------------|-------------|----------------------|---------------|---|
| $V_F$ | Forward Voltage | 0.80<br>1.00<br>0.70 | -<br>-<br>- | 1.50<br>1.70<br>1.30 | V             | $I_F = 10.0\text{ mA}$<br>$I_F = 10.0\text{ mA}, T_A = -55^\circ\text{C}^{(1)}$<br>$I_F = 10.0\text{ mA}, T_A = +100^\circ\text{C}^{(1)}$ |
| $I_R$ | Reverse Current | -                    | -           | 100                  | $\mu\text{A}$ | $V_R = 2.0\text{ V}$  |

#### Output Phototransistor

|               |                                     |    |   |            |                     |   |
|---------------|-------------------------------------|----|---|------------|---------------------|---|
| $V_{(BR)CEO}$ | Collector-Emitter Breakdown Voltage | 40 | - | -          | V                   | $I_C = 1.0\text{ mA}, I_B = 0, I_F = 0$   |
| $V_{(BR)CBO}$ | Collector-Base Breakdown Voltage    | 45 | - | -          | V                   | $I_C = 100\text{ }\mu\text{A}, I_B = 0, I_F = 0$  |
| $V_{(BR)EBO}$ | Emitter-Base Breakdown Voltage      | 7  | - | -          | V                   | $I_E = 100\text{ }\mu\text{A}, I_C = 0, I_F = 0$  |
| $I_{C(OFF)}$  | Collector-Emitter Dark Current      | -  | - | 100<br>100 | nA<br>$\mu\text{A}$ | $V_{CE} = 20\text{ V}, I_B = 0, I_F = 0$<br>$V_{CE} = 20\text{ V}, I_B = 0, I_F = 0, T_A = 100^\circ\text{C}$ |
| $I_{CB(OFF)}$ | Collector-Base Dark Current         | -  | - | 100        | nA                  | $V_{CB} = 20\text{ V}, I_E = 0, I_F = 0$  |

#### Coupled

|               |   |                              |                  |                      |               |   |
|---------------|---|------------------------------|------------------|----------------------|---------------|---|
| $I_{C(ON)}$   | On-State Collector Current<br>JAN / JANTX / JANTXV 4N22 [A]   | 0.15<br>2.50<br>1.00<br>1.00 | -<br>-<br>-<br>- | -<br>-<br>-<br>-     | mA            | $I_F = 2.0\text{ mA}, V_{CE} = 5\text{ V}, I_B = 0$<br>$I_F = 10.0\text{ mA}, V_{CE} = 5\text{ V}, I_B = 0$<br>$I_F = 10.0\text{ mA}, V_{CE} = 5\text{ V}, I_B = 0, T_A = -55^\circ\text{C}^{(1)}$<br>$I_F = 10.0\text{ mA}, V_{CE} = 5\text{ V}, I_B = 0, T_A = 100^\circ\text{C}^{(1)}$ |
|               | JAN / JANTX / JANTXV 4N23 [A]   | 0.20<br>6.00<br>2.50<br>2.50 | -<br>-<br>-<br>- | -<br>-<br>-<br>-     |               | $I_F = 2.0\text{ mA}, V_{CE} = 5\text{ V}, I_B = 0$<br>$I_F = 10.0\text{ mA}, V_{CE} = 5\text{ V}, I_B = 0$<br>$I_F = 10.0\text{ mA}, V_{CE} = 5\text{ V}, I_B = 0, T_A = -55^\circ\text{C}^{(1)}$<br>$I_F = 10.0\text{ mA}, V_{CE} = 5\text{ V}, I_B = 0, T_A = 100^\circ\text{C}^{(1)}$ |
|               | JAN / JANTX / JANTXV 4N24 [A]   | 0.40<br>10.0<br>4.00<br>4.00 | -<br>-<br>-<br>- | -<br>-<br>-<br>-     |               | $I_F = 2.0\text{ mA}, V_{CE} = 5\text{ V}, I_B = 0$<br>$I_F = 10.0\text{ mA}, V_{CE} = 5\text{ V}, I_B = 0$<br>$I_F = 10.0\text{ mA}, V_{CE} = 5\text{ V}, I_B = 0, T_A = -55^\circ\text{C}^{(1)}$<br>$I_F = 10.0\text{ mA}, V_{CE} = 5\text{ V}, I_B = 0, T_A = 100^\circ\text{C}^{(1)}$ |
| $V_{CE(SAT)}$ | Collector-Emitter Saturation Voltage<br>JAN / JANTX / JANTXV 4N22 [A]<br>JAN / JANTX / JANTXV 4N23 [A]<br>JAN / JANTX / JANTXV 4N24 [A] | -<br>-<br>-                  | -<br>-<br>-      | 0.30<br>0.30<br>0.30 | V             | $I_F = 20\text{ mA}, I_C = 2.5\text{ mA}, I_B = 0$<br>$I_F = 20\text{ mA}, I_C = 5.0\text{ mA}, I_B = 0$<br>$I_F = 20\text{ mA}, I_C = 10.0\text{ mA}, I_B = 0$   |
| $H_{FE}$      | DC Current Gain   | 100                          | -                | -                    | V             | $V_{CE} = 5.0\text{ V}, I_C = 10.0\text{ mA}, I_F = 0\text{ mA}$  |
| $R_{IO}$      | Resistance (Input-to-Output)  | $10^{11}$                    | -                | -                    | $\Omega$      | $V_{IO} = \pm 1.0\text{ VDC}^{(3)}$   |
| $C_{IO}$      | Capacitance (Input-to-Output)   | -                            | -                | 5                    | pF            | $V_{IO} = 0\text{ V}, f = 1.0\text{ MHz}^{(3)}$   |
| $T_R, T_F$    | Output Rise and Fall Time   | -                            | -                | 20.0                 | $\mu\text{s}$ | $V_{CC} = 10.0\text{ V}, I_F = 10.0\text{ mA}, R_L = 100\text{ }\Omega$   |

#### Notes:

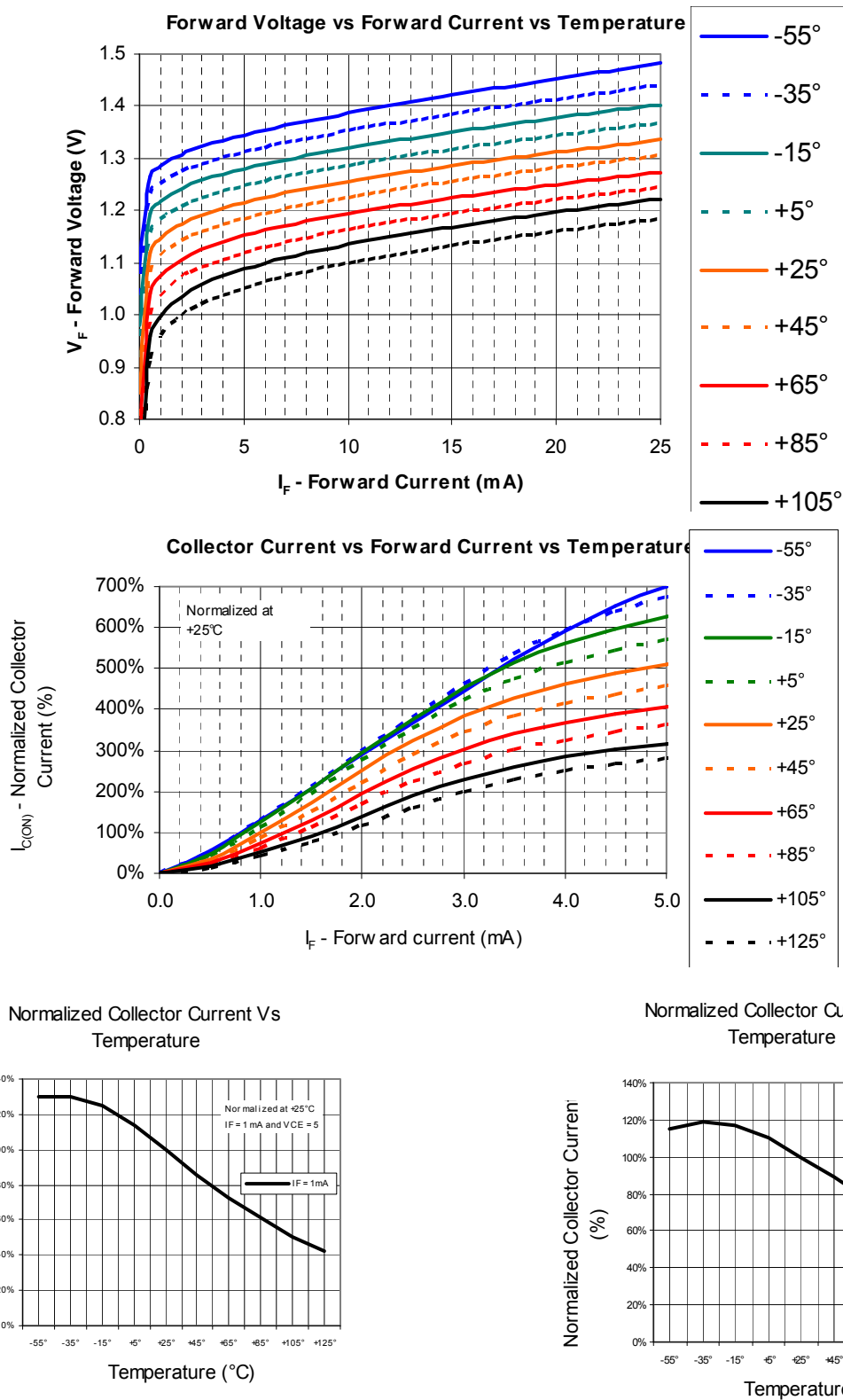
1. Guaranteed but not tested.
2. Sample tested, LTPD = 10.
3. Measured with input leads shorted together and output leads shorted together.

This product is built, tested and shipped from the USA



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

## Typical Performance Curves



This product is built, tested and shipped from the USA



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