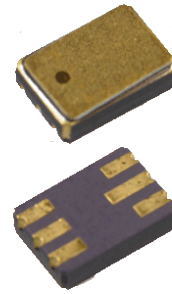


# Surface Mount Optically Coupled Isolator

JAN/JANTX/JANTXV 4N47U, 4N48U, 4N49U



## Features:

- Surface Mount (SM), Leadless Chip Carrier (LCC)
- 1 kV electrical isolation
- Base contact provided for conventional transistor biasing
- JANTX and JANTXV devices are processed to MIL-PRF-19500

## Description:

Each isolator in this series consists of an infrared emitting diode and a NPN silicon phototransistor, which are mounted in a hermetically sealed Surface Mount, 6 Pin package. Devices are designed for military and/or harsh environments.

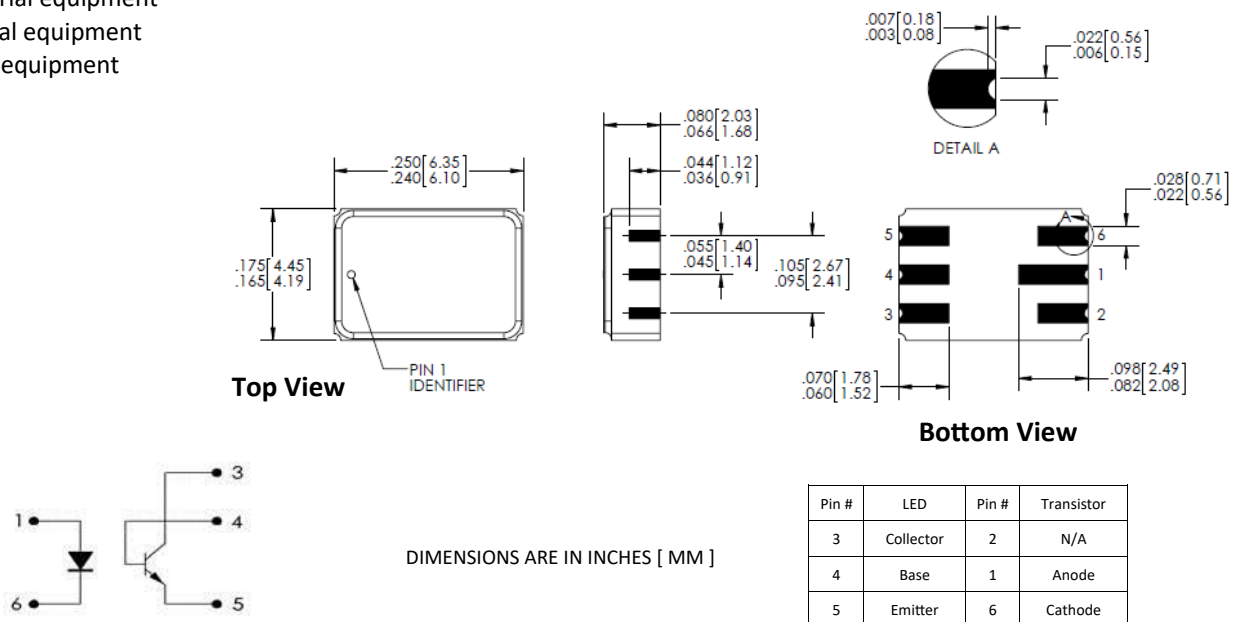
The JAN / JANTX / JANTXV 4N47U, 4N48U and 4N49U devices are processed to MIL-PRF-19500/548.

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

Please contact your local representative for more information.

## Applications:

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



## General Note

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## Electrical Specifications

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

|                                                                                             |                                             |
|---------------------------------------------------------------------------------------------|---------------------------------------------|
| Storage Temperature Range                                                                   | $-55^\circ\text{C}$ to $+150^\circ\text{C}$ |
| Operating Temperature Range                                                                 | $-55^\circ\text{C}$ to $+125^\circ\text{C}$ |
| 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] | $260^\circ\text{C}^{(2)}$                   |

### Input Diode

|                                                   |                      |
|---------------------------------------------------|----------------------|
| Forward DC Current ( $65^\circ\text{C}$ or below) | 40 mA                |
| Reverse Voltage                                   | 2 V                  |
| Power Dissipation                                 | 60 mW <sup>(3)</sup> |

### Output Phototransistor:

|                              |                       |
|------------------------------|-----------------------|
| Continuous Collector Current | 50 mA                 |
| Collector-Emitter Voltage    | 40 V                  |
| Collector-Base Voltage       | 45 V                  |
| Emitter-Base Voltage         | 7.0 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/ $^\circ\text{C}$  above  $65^\circ\text{C}$ .
4. Derate linearly 3.0 mW/ $^\circ\text{C}$  above  $25^\circ\text{C}$ .

| Ordering Information |                        |                      |                      |                          |
|----------------------|------------------------|----------------------|----------------------|--------------------------|
| Part Number          | Isolation Voltage (kV) | $I_F$ (mA) Typ / Max | $V_{CE}$ (Volts) Max | Processing MIL-PRF-19500 |
| JAN4N47U             | 1                      | 1 / 40               | 40                   | 548                      |
| JANTX4N47U           |                        |                      |                      |                          |
| JANTXV4N47U          |                        |                      |                      |                          |
| JAN4N48U             |                        |                      |                      |                          |
| JANTX4N48U           |                        |                      |                      |                          |
| JANTXV4N48U          |                        |                      |                      |                          |
| JAN4N49U             |                        |                      |                      |                          |
| JANTX4N49U           |                        |                      |                      |                          |
| JANTXV4N49U          |                        |                      |                      |                          |

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

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

### Input 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             | $I_E = 100\text{ }\mu\text{A}, I_C = 0, I_F = 0$                        |
| $I_{C(OFF)}^1$ | Collector-Emitter Dark Current      | -  | - | 100 | nA            | $V_{CE} = 20\text{ V}, I_B = 0, I_F = 0$                                |
| $I_{C(OFF)}^2$ | Collector-Emitter Dark Current      | -  | - | 100 | $\mu\text{A}$ | $V_{CE} = 20\text{ V}, I_B = 0, I_F = 0, T_A = 100^\circ\text{C}^{(1)}$ |
| $I_{CB(OFF)}$  | Collector-Base Dark Current         | -  | - | 10  | nA            | $V_{CB} = 20\text{ V}, I_E = 0, I_F = 0$                                |

### Coupled

|               |                                                                       |                      |             |              |               |                                                                                                                                                                                                                                       |
|---------------|-----------------------------------------------------------------------|----------------------|-------------|--------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $I_{C(ON)}$   | On-State Collector Current<br>JAN / JANTX / JANTXV 4N47 [U]           | 0.50<br>0.70<br>0.50 | -<br>-<br>- | -<br>-<br>-  | mA            | $I_F = 1.0\text{ mA}, V_{CE} = 5.0\text{ V}, I_B = 0$<br>$I_F = 2.0\text{ mA}, V_{CE} = 5.0\text{ V}, I_B = 0, T_A = -55^\circ\text{C}^{(1)}$<br>$I_F = 2.0\text{ mA}, V_{CE} = 5.0\text{ V}, I_B = 0, T_A = 100^\circ\text{C}^{(1)}$ |
|               | JAN / JANTX / JANTXV 4N48 [U]                                         | 1.00<br>1.40<br>1.00 | -<br>-<br>- | 5<br>-<br>-  |               | $I_F = 1.0\text{ mA}, V_{CE} = 5.0\text{ V}, I_B = 0$<br>$I_F = 2.0\text{ mA}, V_{CE} = 5.0\text{ V}, I_B = 0, T_A = -55^\circ\text{C}^{(1)}$<br>$I_F = 2.0\text{ mA}, V_{CE} = 5.0\text{ V}, I_B = 0, T_A = 100^\circ\text{C}^{(1)}$ |
|               | JAN / JANTX / JANTXV 4N49 [U]                                         | 2.00<br>2.80<br>2.00 | -<br>-<br>- | 10<br>-<br>- |               | $I_F = 1.0\text{ mA}, V_{CE} = 5.0\text{ V}, I_B = 0$<br>$I_F = 2.0\text{ mA}, V_{CE} = 5.0\text{ V}, I_B = 0, T_A = -55^\circ\text{C}^{(1)}$<br>$I_F = 2.0\text{ mA}, V_{CE} = 5.0\text{ V}, I_B = 0, T_A = 100^\circ\text{C}^{(1)}$ |
| $I_{CB(ON)}$  | On-State Collector Base                                               | 30                   | -           | -            | $\mu\text{A}$ | $V_{CB} = 5\text{ V}, I_E = 0, I_F = 10\text{ mA}$                                                                                                                                                                                    |
| $V_{CE(SAT)}$ | Collector-Emitter Saturation Voltage<br>JAN / JANTX / JANTXV 4N47 [U] | -                    | -           | 0.30         | V             | $I_F = 2.0\text{ mA}, I_C = 0.5\text{ mA}, I_B = 0$                                                                                                                                                                                   |
|               | JAN / JANTX / JANTXV 4N48 [U]                                         | -                    | -           | 0.30         |               | $I_F = 2.0\text{ mA}, I_C = 1.0\text{ mA}, I_B = 0$                                                                                                                                                                                   |
|               | JAN / JANTX / JANTXV 4N49 [U]                                         | -                    | -           | 0.30         |               | $I_F = 2.0\text{ mA}, I_C = 2.0\text{ mA}, I_B = 0$                                                                                                                                                                                   |
| $H_{FE}$      | 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)                                          | $10^{11}$            | -           | -            | $\Omega$      | $V_{I-O} = \pm 1000\text{ VDC}^{(3)}$                                                                                                                                                                                                 |
| $C_{IO}$      | Capacitance (Input-to-Output)                                         | -                    | -           | 5            | pF            | $V_{I-O} = 0\text{ V}, f = 1.0\text{ MHz}^{(3)}$                                                                                                                                                                                      |
| $T_R, T_F$    | Rise and Fall Time                                                    | -                    | -           | 20           | $\mu\text{s}$ | $V_{CC} = 10.0\text{ V}, I_F = 5.0\text{ mA}, R_L = 100\text{ }\Omega$                                                                                                                                                                |

### Notes:

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

### General Note

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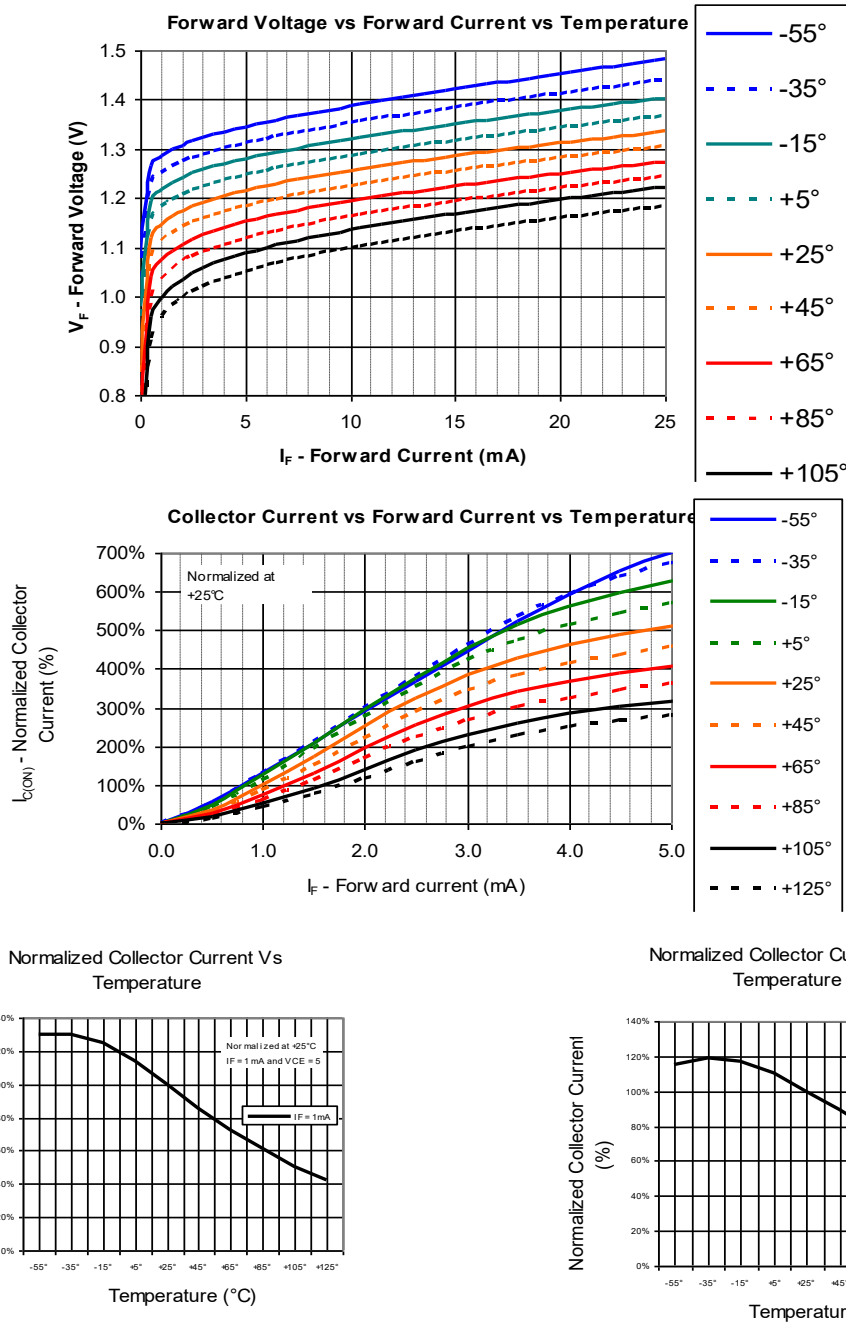
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## Typical Performance Curves



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