

4N47U
4N48U
4N49U

JAN, JANTX, JANTXV, OPTOCOUPERS



OPTOELECTRONIC PRODUCTS
 DIVISION

Features:

- High reliability
- Base lead provided for conventional transistor biasing
- Very high gain, high voltage transistor
- Hermetically sealed for reliability and stability
- Stability over wide temperature range
- High voltage electrical isolation

Applications:

- Line Receivers
- Switchmode Power Supplies
- Signal ground isolation
- Process Control input/output isolation

DESCRIPTION

Very high gain optocoupler utilizing GaAIAs infrared LED optically coupled to an N-P-N silicon phototransistor packaged in a hermetically sealed 6-pin leadless chip carrier. The **4N47U**, **4N48U** and **4N49U** optocouplers can be supplied to customer specifications as well as JAN, JANS, JANTX, and JANTXV quality levels.

***ABSOLUTE MAXIMUM RATINGS**

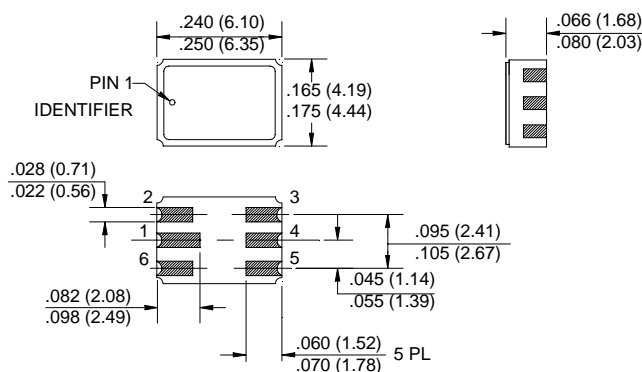
| | |
|--|-----------------|
| Input to Output Voltage | ±1kV |
| Collector-Base Voltage | .45V |
| Collector-Emitter Voltage (See Note 1) | .40V |
| Emitter-Base Voltage | .7V |
| Input Diode Reverse Voltage | .2V |
| Input Diode Continuous Forward Current at (or below) 65°C Free-Air Temperature (see note 2) | .40mA |
| Continuous Collector Current | .50mA |
| Peak Diode Current (See Note 3) | 1A |
| Continuous Transistor Power Dissipation at (or below) 25°C Free-Air Temperature (see Note 4) | 300mW |
| Operating Free-Air Temperature Range | -55°C to +125°C |
| Storage Temperature | -65°C to +125°C |
| Lead Temperature (1/16" (1.6mm) from case for 10 seconds) | 240°C |

Notes:

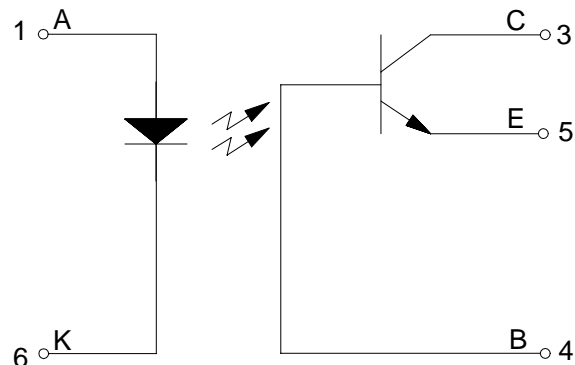
1. This value applies with the emitter-base diode open-circuited and the input-diode current equal to zero.
2. Derate linearly to 125°C free-air temperature at the rate of 0.67 mA/°C.
3. This value applies for $t_w \leq 1\mu s$. PRR < 300 pps.
4. Derate linearly to 125°C free-air temperature at the rate of 3 mW/°C.

* JEDEC registered data

Package Dimensions



Schematic Diagram



ELECTRICAL CHARACTERISTICS $T_A = 25^\circ\text{C}$ Unless otherwise specified

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNITS | TEST CONDITIONS | NOTE |
|------------------------------------|--------|-----|-----|-----|---------------|---------------------|------|
| Input Diode Static Reverse Current | I_R | | | 100 | μA | $V_R = 2\text{V}$ | |
| Input Diode Static Forward Voltage | V_F | 1.0 | 1.4 | 1.7 | V | $I_E = 10\text{mA}$ | |
| | | 0.8 | | 1.5 | | | |
| | | 0.7 | | 1.3 | | | |

OUTPUT TRANSISTOR $T_A = 25^\circ\text{C}$ Unless otherwise specified

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNITS | TEST CONDITIONS | NOTE |
|-------------------------------------|---------------|-----|-----|-----|-------|--|------|
| Collector-Base Breakdown Voltage | $V_{(BR)CBO}$ | 45 | | | V | $I_C = 100\mu\text{A}, I_B = 0, I_F = 0$ | |
| Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | 40 | | | V | $I_C = 1\text{mA}, I_B = 0, I_F = 0$ | |
| Emitter-Collector Breakdown Voltage | $V_{(BR)ECO}$ | 7 | | | V | $I_C = 0, I_E = 100\mu\text{A}, I_F = 0$ | |

COUPLED CHARACTERISTICS $T_A = 25^\circ\text{C}$ Unless otherwise specified

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNITS | TEST CONDITIONS | NOTE |
|--------------------------------------|---------------|-----------|-----|------|---------------|---|------|
| On State Collector Current | $I_{C(ON)}$ | 0.5 | | 5 | mA | $V_{CE} = 5\text{V}, I_B = 0, I_F = 1\text{mA}$ | |
| | | 1.0 | | 10 | | | |
| On State Collector Current | $I_{C(ON)}$ | 0.7 | | | mA | $V_{CE} = 5\text{V}, I_B = 0, I_F = 2\text{mA}$ | |
| | | 1.4 | | | | | |
| | | 2.8 | | | | | |
| On State Collector Current | $I_{C(ON)}$ | 0.5 | | | mA | $V_{CE} = 5\text{V}, I_B = 0, I_F = 2\text{mA}$ | 2 |
| | | 1.0 | | | | | |
| | | 2.0 | | | | | |
| Off State Collector Current | $I_{C(OFF)}$ | | | 100 | nA | $V_{CE} = 20\text{V}, I_B = 0, I_F = 0\text{mA}$ | |
| Off State Collector Current | $I_{C(OFF)}$ | | | 100 | μA | $V_{CE} = 20\text{V}, I_B = 0, I_F = 0\text{mA}$ | |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ | | | 0.3 | V | $I_C = 0.5\text{mA}, I_B = 0, I_F = 2\text{mA}$ | |
| | | | | 0.3 | V | $I_C = 1\text{mA}, I_B = 0, I_F = 2\text{mA}$ | |
| | | | | 0.3 | V | $I_C = 2\text{mA}, I_B = 0, I_F = 2\text{mA}$ | |
| Input to Output Resistance | R_{I-O} | 10^{11} | | | | $V_{IN-OUT} = 1\text{kV}$ | 1 |
| Input to Output Capacitance | C_{I-O} | | | 5 | pF | $f = 1\text{MHz}, V_{IN-OUT} = 1\text{kV}$ | 1 |
| Rise Time/ Fall Time | t_r / t_f | | | 20 | μs | $V_{CC} = 10\text{V}, I_F = 10\text{mA}, R_L = 100\Omega$ | |
| Phototransistor Operation | t_r / t_f | | | 25 | μs | | |
| | | | | 25 | μs | | |
| Rise Time/ Fall Time | t_r / t_f | | | 0.85 | μs | $V_{CC} = 10\text{V}, I_F = 10\text{mA}, R_L = 100\Omega$ | |
| Photodiode Operation | t_r / t_f | | | 0.85 | μs | | |
| | | | | 0.85 | μs | | |

NOTES:

- These parameters are measured between all phototransistor leads shorted together and with both input diode leads shorted together.
- This parameter measured using pulse techniques $t_w = 100\mu\text{s}$, duty cycle $\leq 1\%$.

RECOMMENDED OPERATING CONDITIONS:

| PARAMETER | SYMBOL | MIN | MAX | UNITS |
|---------------------------|----------|-----|-----|---------------|
| Input Current, Low Level | I_{FL} | 0 | 100 | μA |
| Input Current, High Level | I_{FH} | 2 | 10 | mA |
| Supply Voltage | V_{CE} | 5 | 10 | V |

SELECTION GUIDE

| PART NUMBER | PART DESCRIPTION |
|-------------|---|
| JAN4N47U | 4N47U Optocoupler, JAN Screening level |
| JAN4N48U | 4N48U Optocoupler, JAN Screening level |
| JAN4N49U | 4N49U Optocoupler, JAN Screening level |
| JANTX4N47U | 4N47U Optocoupler, JANTX Screening level |
| JANTX4N48U | 4N48U Optocoupler, JANTX Screening level |
| JANTX4N49U | 4N49U Optocoupler, JANTX Screening level |
| JANTXV4N47U | 4N47U Optocoupler, JANTXV Screening level |
| JANTXV4N48U | 4N48U Optocoupler, JANTXV Screening level |
| JANTXV4N49U | 4N49U Optocoupler, JANTXV Screening level |
| JANS4N47U | 4N47U Optocoupler, JANS Screening level |
| JANS4N48U | 4N48U Optocoupler, JANS Screening level |
| JANS4N49U | 4N49U Optocoupler, JANS Screening level |