

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 GaAlAs 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

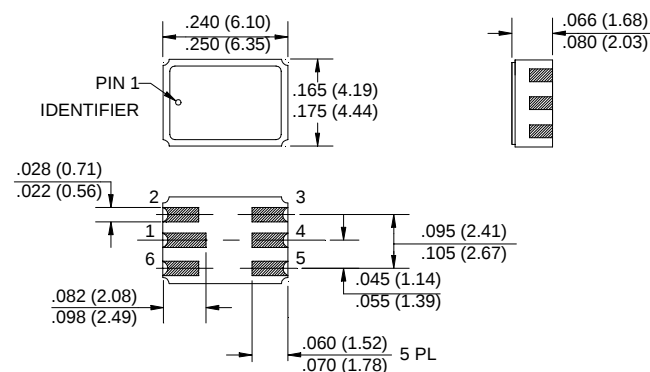
Input to Output Voltage	±1kV
Collector-Base Voltage	45V
Collector-Emitter Voltage (See Note 1)	40V
Emitter-Base Voltage	7V
Input Diode Reverse Voltage	2V
Input Diode Continuous Forward Current at (or below) 65°C Free-Air Temperature (see note 2)	40mA
Continuous Collector Current	50mA
Peak Diode Current (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:

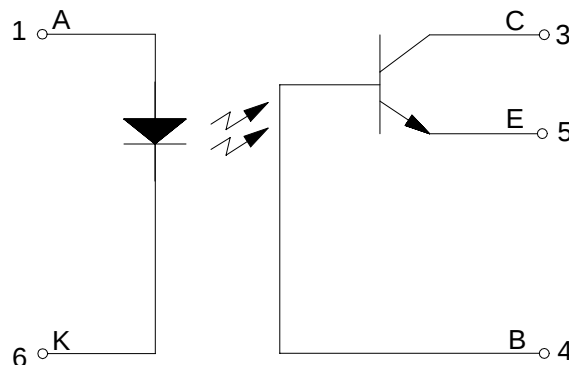
1. This value applies with the emitter-base diode open-circuited and the input-diode current equal to zero.
2. Derate linearly to 125°C free-air temperature at the rate of 0.67 mW/°C.
3. This value applies for $t_w \leq 1\mu s$. PRR < 300 pps.
4. Derate linearly to 125°C free-air temperature at the rate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

* JEDEC registered data

Package Dimensions



Schematic Diagram



4N47U, 4N48U, and 4N49U**JAN, JANTX, JANTXV, OPTOCOUPERS****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			
		2.0					
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	$I_C = 0.5\text{mA}$, $I_B = 0$, $I_F = 2\text{mA}$	
	$V_{CE(SAT)}$			0.3	V	$I_C = 1\text{mA}$, $I_B = 0$, $I_F = 2\text{mA}$	
	$V_{CE(SAT)}$			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		
	t_r / t_f			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		
	t_r / t_f			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