

4N47**4N48****4N49**

JAN, JANTX, JANTXV, AND JANS SINGLE CHANNEL OPTOCOUPLEDERS



MICROPAC
OPTOELECTRONIC PRODUCTS
DIVISION

06/23/03

Features:

- Certified to MIL-PRF-19500/548
- Collector in electrical contact with case
- High Reliability
- Base lead provided for conventional transistor biasing
- Rugged package
- High gain, high voltage transistor
- +1kV electrical isolation

Applications:

- Eliminate ground loops
- Level shifting
- Line receiver
- Switching power supplies
- Motor control

DESCRIPTION

Gallium Aluminum Arsenide (GaAlAs) infrared LED and a high gain N-P-N silicon phototransistor packaged in a hermetically sealed TO-5 metal can. The **4N47**, **4N48** and **4N49**'s can be tested to customer specifications, as well as to MIL-PRF-19500 JAN, JANTX, JANTXV and JANS quality levels.

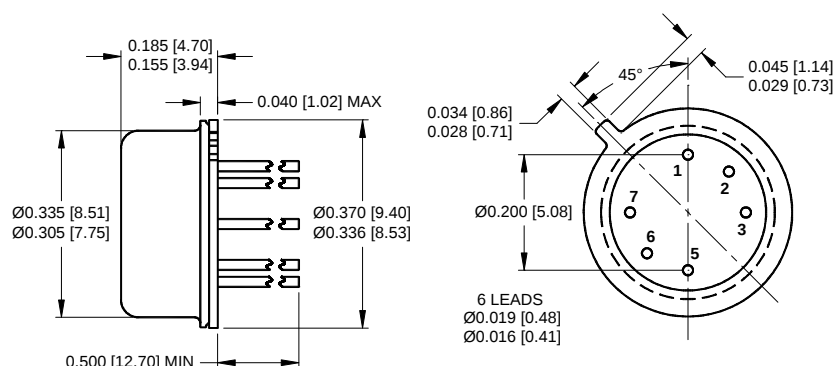
***ABSOLUTE MAXIMUM RATINGS**

Input to Output Voltage	1kV
Emitter-Collector Voltage	7V
Collector-Emitter Voltage	40V
Collector-Base Voltage	45V
Reverse Input Voltage	2V
Input Diode Continuous Forward Current at (or below) 25°C Free-Air Temperature (see note 1)	40mA
Peak Forward Input Current (Value applies for $t_w \leq 1\mu s$, PRR < 300 pps)	1A
Continuous Collector Current	50mA
Continuous Transistor Power Dissipation at (or below) 25°C Free-Air Temperature (see Note 2)	300mW
Storage Temperature	-65°C to +125°C
Operating Free-Air Temperature Range	-55°C to +125°C
Lead Solder Temperature (10 seconds, 1/16" from case)	240°C

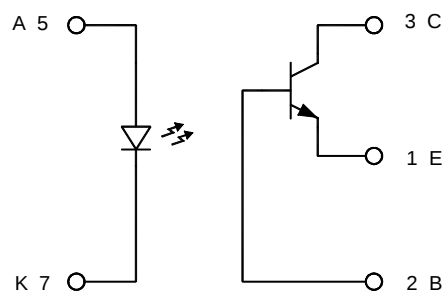
Notes:

1. Derate linearly to 125°C free-air temperature at the rate of 0.40 mA/°C above 65°C.
2. Derate linearly to 125°C free-air temperature at the rate of 3 mW/°C.

*JEDEC registered data

Package Dimensions

ALL LINEAR DIMENSIONS ARE IN INCHES [MILLIMETERS].

Schematic Diagram

COLLECTOR IS COMMON TO CASE.

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***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	nA	$V_R = 2V$	
Input Diode Static Forward Voltage	V_F	1.0	1.4	1.7	V	$I_F = 10\text{mA}$	
		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	$I_C = 100\mu\text{A}$, $I_E = 0$, $I_F = 0$	
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	$I_B = 0$, $I_E = 100\mu\text{A}$, $I_F = 0$	

***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	$V_{CE} = 5V$, $I_B = 0$, $I_F = 1\text{mA}$	
		1.0		10			
On State Collector Current	$I_{C(ON)}$	0.7			mA	$V_{CE} = 5V$, $I_B = 0$, $I_F = 2\text{mA}$	
		1.4					
		2.8					
On State Collector Current	$I_{C(ON)}$	0.5			mA	$V_{CE} = 5V$, $I_B = 0$, $I_F = 2\text{mA}$	2
		1.0					
		2.0					
Off State Collector Current	$I_{C(OFF)}$			100	nA	$V_{CE} = 20V$, $I_B = 0$, $I_F = 0\text{mA}$	
Off State Collector Current	$I_{C(OFF)}$			100	μA	$V_{CE} = 20V$, $I_B = 0$, $I_F = 0\text{mA}$	
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}		Ω		$V_{IN-OUT} = 1\text{kV}$	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	$V_{CC} = 10V$, $I_F = 10\text{mA}$, $R_L = 100\Omega$	
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	$V_{CC} = 10V$, $I_F = 10\text{mA}$, $R_L = 100\Omega$	
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_{CC}	5	35	V

SELECTION GUIDE

PART NUMBER	PART DESCRIPTION
4N47	Commercial
4N48	Commercial
4N49	Commercial
JAN4N47	JAN Screened
JAN4N48	JAN Screened
JAN4N49	JAN Screened
JANTX4N47	JANTX Screened
JANTX4N48	JANTX Screened
JANTX4N49	JANTX Screened
JANTXV4N47	JANTXV Screened
JANTXV4N48	JANTXV Screened
JANTXV4N49	JANTXV Screened
JANS4N47	JANS Screened
JANS4N48	JANS Screened
JANS4N49	JANS Screened

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