4N47A
4N48A JAN, JANTX, JANTXV, AND JANS SINGLE CHANNEL OPTOCOUPLERS
4N49A

OPTOELECTRONIC PRODUCTS DIVISION

06/23/03

Features:

- Certified to MIL-PRF-19500/548
- Collector electrically isolated from 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 ***4N47A***, ***4N48A*** and ***4N49A***'s can be tested to customer specifications, as well as to MIL-PRF-19500 JAN, JANTX, JANTXV and JANS quality levels.

*ABSOLUTE MAXIMUM RATINGS

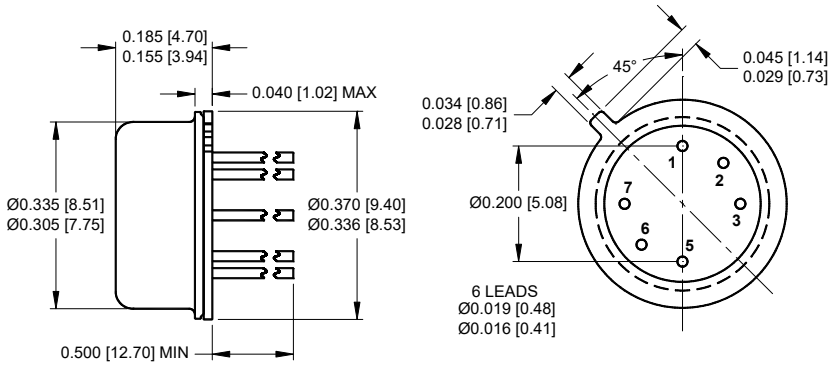
Input to Output Voltage	1kV
Emitter-Collector Voltage	7V
Collector-Emitter Voltage	40V
Collector-Base Voltage	45V
Reverse Input Voltage	2V
Input Diode Continuous Forward Current at (or below) 25°C Free-Air Temperature (see note 1)	40mA
Peak Forward Input Current (Value applies for tw ≤ 1μs, PRR < 300 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:

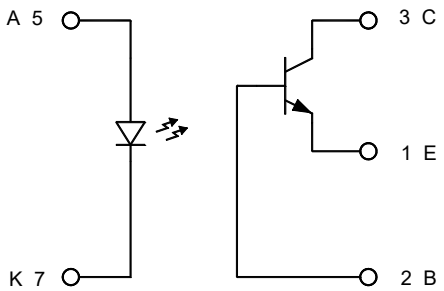
1. Derate linearly to 125°C free-air temperature at the rate of 0.40 mA/°C above 65°C.
2. Derate linearly to 125°C free-air temperature at the rate of 3 mW/°C.

*JEDEC registered data

Package Dimensions



Schematic Diagram



ALL LINEAR DIMENSIONS ARE IN INCHES [MILLIMETERS].

***ELECTRICAL CHARACTERISTICS** T_A = 25°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 -55°C	V_F	1.0	1.4	1.7	V	I_F = 10mA	
+25°C		0.8		1.5			
+100°C		0.7		1.3			

***OUTPUT TRANSISTOR** T_A = 25°C Unless otherwise specified

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

***COUPLED CHARACTERISTICS** T_A = 25°C Unless otherwise specified

PARAMETER		SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS	NOTE
On State Collector Current	4N47A	$I_{C(ON)}$	0.5			mA	V_{CE} = 5V, I_B = 0, I_F = 1mA	
	4N48A		1.0		5			
	4N49A		2.0		10			
On State Collector Current -55°C	4N47A	$I_{C(ON)}$	0.7			mA	V_{CE} = 5V, I_B = 0, I_F = 2mA	
	4N48A		1.4					
	4N49A		2.8					
On State Collector Current +100°C	4N47A	$I_{C(ON)}$	0.5			mA	V_{CE} = 5V, I_B = 0, I_F = 2mA	2
	4N48A		1.0					
	4N49A		2.0					
Off State Collector Current +25°C		$I_{C(OFF)}$			100	nA	V_{CE} = 20V, I_B = 0, I_F = 0mA	
Off State Collector Current +100°C		$I_{C(OFF)}$			100	μA	V_{CE} = 20V, I_B = 0, I_F = 0mA	
Collector-Emitter Saturation Voltage	4N47A	$V_{CE(SAT)}$			0.3	V	I_C = 0.5mA, I_B = 0, I_F = 2mA	
	4N48A	$V_{CE(SAT)}$			0.3	V	I_C = 1mA, I_B = 0, I_F = 2mA	
	4N49A	$V_{CE(SAT)}$			0.3	V	I_C = 2mA, I_B = 0, I_F = 2mA	
Input to Output Resistance		R_{I-O}	10^{11}		Ω		V_{IN-OUT} = 1kV	1
Input to Output Capacitance		C_{I-O}			5	pF	f = 1MHz, V_{IN-OUT} = 1kV	1
Rise Time/ Fall Time Phototransistor Operation	4N47A	t_r / t_f			20	μs	V_{CC} = 10V, I_F = 10mA, R_L = 100Ω	
	4N48A	t_r / t_f			25	μs		
	4N49A	t_r / t_f			25	μs		
Rise Time/ Fall Time Photodiode Operation	4N47A	t_r / t_f			0.85	μs	V_{CC} = 10V, I_F = 10mA, R_L = 100Ω	
	4N48A	t_r / t_f			0.85	μs		
	4N49A	t_r / t_f			0.85	μs		

NOTES:

1. These parameters are measured between all phototransistor leads shorted together and with both input diode leads shorted together.
2. This parameter measured using pulse techniques t_W = 100 μs, duty cycle ≤ 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	MICROPAC PART NUMBER	PART DESCRIPTION
4N47A	66092-007	Commercial
4N48A	66092-008	Commercial
4N49A	66092-009	Commercial
JAN4N47A	66092-607	JAN Screened
JAN4N48A	66092-608	JAN Screened
JAN4N49A	66092-609	JAN Screened
JANTX4N47A	66092-707	JANTX Screened
JANTX4N48A	66092-708	JANTX Screened
JANTX4N49A	66092-709	JANTX Screened
JANTXV4N47A	66092-807	JANTXV Screened
JANTXV4N48A	66092-808	JANTXV Screened
JANTXV4N49A	66092-809	JANTXV Screened
JANS4N47A	66092-347	JANS Screened
JANS4N48A	66092-348	JANS Screened
JANS4N49A	66092-349	JANS Screened

*JEDEC registered data