

**4N47A**

**4N48A JAN, JANTX, JANTXV, SINGLE CHANNEL OPTOCOUPERS**

**4N49A**

**Mii**

**OPTOELECTRONIC PRODUCTS  
DIVISION**

**Features:**

- 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**

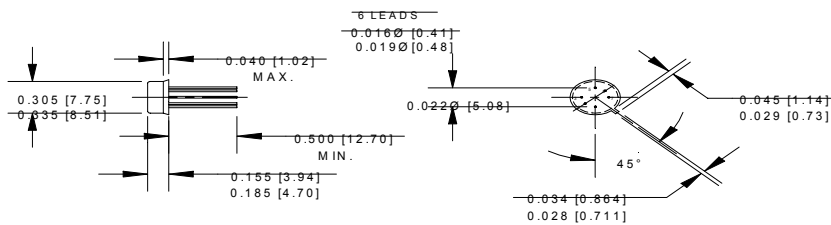
Input to Output Voltage .....	1kV
Emitter-Collector Voltage .....	7V
Collector-Emitter Voltage (Value applies to emitter-base open-circuited & the input-diode equal to zero) .....	40V
Collector-Base Voltage .....	45V
Reverse Input Voltage .....	2V
Input Diode Continuous Forward Current at (or below) 65°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 (1/16" (1.6mm) from case for 10 seconds) .....	240°C

**Notes:**

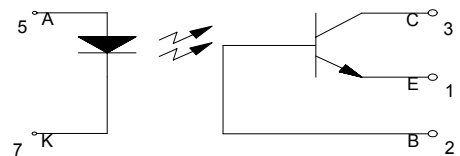
1. Derate linearly to 125°C free-air temperature at the rate of 0.67 mA/°C above 65°C.
2. Derate linearly to 125°C free-air temperature at the rate of 3 mW/°C.

\*JEDEC registered data

**Package Dimensions**



**Schematic Diagram**



**NOTE: COLLECTOR IS ISOLATED FROM CASE**

**\*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	$\mu\text{A}$	$V_R = 2\text{V}$	
Input Diode Static Forward Voltage	$V_F$	1.0	1.4	1.7	V	$I_E = 10\text{mA}$	
		-55°C					
		+25°C					
		+100°C					

**\*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	$V_{(BR)EBO}$	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	$V_{CE} = 5\text{V}, I_B = 0, I_F = 1\text{mA}$	
		4N47A					
		4N48A					
		4N49A		10			
On State Collector Current	$I_{C(ON)}$	0.7			mA	$V_{CE} = 5\text{V}, I_B = 0, I_F = 2\text{mA}$	
		-55°C					
		4N47A					
		4N48A					
		4N49A					
On State Collector Current	$I_{C(ON)}$	0.5			mA	$V_{CE} = 5\text{V}, I_B = 0, I_F = 2\text{mA}$	2
		+100°C					
		4N47A					
		4N48A					
		4N49A					
Off State Collector Current	$I_{C(OFF)}$			100	nA	$V_{CE} = 20\text{V}, I_B = 0, I_F = 0\text{mA}$	
		+25°C					
Off State Collector Current	$I_{C(OFF)}$			100	$\mu\text{A}$	$V_{CE} = 20\text{V}, I_B = 0, I_F = 0\text{mA}$	
		+100°C					
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$			0.3	V	$I_C = 0.5\text{mA}, I_B = 0, I_F = 2\text{mA}$	
		4N47A					
		4N48A		0.3	V	$I_C = 1\text{mA}, I_B = 0, I_F = 2\text{mA}$	
		4N49A		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	$\mu\text{s}$	$V_{CC} = 10\text{V}, I_F = 10\text{mA}, R_L = 100\Omega$	
Phototransistor Operation	$t_r / t_f$			25	$\mu\text{s}$		
	$t_r / t_f$			25	$\mu\text{s}$		
Rise Time/ Fall Time	$t_r / t_f$			0.85	$\mu\text{s}$	$V_{CC} = 10\text{V}, I_F = 10\text{mA}, R_L = 100\Omega$	
Photodiode Operation	$t_r / t_f$			0.85	$\mu\text{s}$		
	$t_r / t_f$			0.85	$\mu\text{s}$		

**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	$\mu\text{A}$
Input Current, High Level	$I_{FH}$	2	10	mA
Supply Voltage	$V_{CE}$	5	10	V

**SELECTION GUIDE**

PART NUMBER	PART DESCRIPTION
JAN4N47A	4N47A Optocoupler, JAN Screening level
JAN4N48A	4N48A Optocoupler, JAN Screening level
JAN4N49A	4N49A Optocoupler, JAN Screening level
JANTX4N47A	4N47A Optocoupler, JANTX Screening level
JANTX4N48A	4N48A Optocoupler, JANTX Screening level
JANTX4N49A	4N49A Optocoupler, JANTX Screening level
JANTXV4N47A	4N47A Optocoupler, JANTXV Screening level
JANTXV4N48A	4N48A Optocoupler, JANTXV Screening level
JANTXV4N49A	4N49A Optocoupler, JANTXV Screening level
JANS4N47A	4N47A Optocoupler, JANS Screening level
JANS4N48A	4N48A Optocoupler, JANS Screening level
JANS4N49A	4N49A Optocoupler, JANS Screening level

\*JEDEC registered data