

**4N22A****4N23A JAN, JANTX, JANTXV, SINGLE CHANNEL OPTOCOUPLERS****4N24A****Mii****OPTOELECTRONIC PRODUCTS  
DIVISION****Features:**

- Collector is electrically isolated from the case.
- Overall current gain...1.5 typical (4N24A)
- 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 metal case. The **4N22A**, **4N23A** and **4N24A** can be tested to customer specifications, as well as to MIL-PRF-19500 JAN, JANS, JANTX, and JANTXV quality levels.

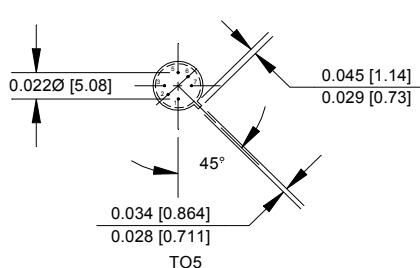
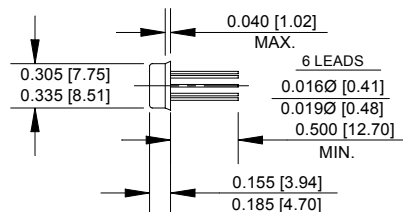
**\*ABSOLUTE MAXIMUM RATINGS**

Input to Output Voltage .....	±1kV
Emitter-Collector Voltage .....	4V
Collector-Emitter Voltage .....	35V
Collector-Base Voltage .....	35V
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

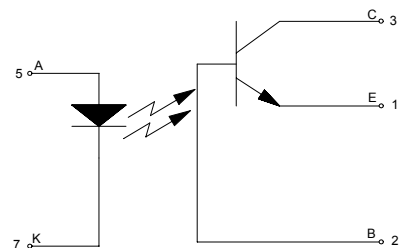
**Notes:**

1. Derate linearly to 125°C free-air temperature at the rate of 0.67 mW/°C above 65°C.
2. Derate linearly to 125°C free-air temperature at the rate of 5 mW/°C.

\* JEDEC registered data

**Package Dimensions**

NOTE: ALL LINEAR DIMENSIONS ARE IN INCHES (MILLIMETERS)

**Schematic Diagram**

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

PARAMETER	SYMBOL	MIN	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	1.5	V	$I_F = 10\text{mA}$	
-55°C		0.8	1.3			
+25°C		0.7	1.2			
+125°C						

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

PARAMETER	SYMBOL	MIN	MAX	UNITS	TEST CONDITIONS	NOTE
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	35		V	$I_C = 100\mu\text{A}$ , $I_B = 0$ , $I_F = 0$	
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	35		V	$I_C = 1\text{mA}$ , $I_B = 0$ , $I_F = 0$	
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	4		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	MAX	UNITS	TEST CONDITIONS	NOTE
On State Collector Current	$I_{C(ON)}$	0.15		mA	$V_{CE} = 5\text{V}$ , $I_B = 0$ , $I_F = 2\text{mA}$	
4N22A		0.2				
4N23A		0.4				
On State Collector Current	$I_{C(ON)}$	2.5		mA	$V_{CE} = 5\text{V}$ , $I_B = 0$ , $I_F = 10\text{mA}$	
4N22A		6				
4N23A		10				
On State Collector Current	$I_{C(ON)}$	1		mA	$V_{CE} = 5\text{V}$ , $I_B = 0$ , $I_F = 10\text{mA}$	
-55°C		2.5				
4N22A		4				
On State Collector Current	$I_{C(ON)}$	1		mA	$V_{CE} = 5\text{V}$ , $I_B = 0$ , $I_F = 10\text{mA}$	
+100°C		2.5				
4N22A		4				
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	$I_C = 2.5\text{mA}$ , $I_B = 0$ , $I_F = 20\text{mA}$	
4N22A			0.3	V	$I_C = 5\text{mA}$ , $I_B = 0$ , $I_F = 20\text{mA}$	
4N23A			0.3	V	$I_C = 10\text{mA}$ , $I_B = 0$ , $I_F = 20\text{mA}$	
4N24A						
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	$t_r$		15	$\mu\text{s}$	$V_{CC} = 10\text{V}$ , $I_F = 10\text{mA}$ , $R_L = 100\Omega$	
4N22A			15	$\mu\text{s}$		
4N23A			20	$\mu\text{s}$		
Fall Time	$t_f$		15	$\mu\text{s}$	$V_{CC} = 10\text{V}$ , $I_F = 10\text{mA}$ , $R_L = 100\Omega$	
4N22A			15	$\mu\text{s}$		
4N23A			20	$\mu\text{s}$		
4N24A						

**NOTES:**

- These parameters are measured between all phototransistor leads shorted together and with both input diode leads shorted together.

**RECOMMENDED OPERATING CONDITIONS:**

PARAMETER	SYMBOL	MIN	MAX	UNITS
Input Current, Low Level	I <sub>FL</sub>	0	100	μA
Input Current, High Level	I <sub>FH</sub>	2	10	mA
Supply Voltage	V <sub>CE</sub>	5	10	V

**SELECTION GUIDE**

PART NUMBER	PART DESCRIPTION
JAN4N22A	4N22A Optocoupler, JAN Screening level
JAN4N23A	4N23A Optocoupler, JAN Screening level
JAN4N24A	4N24A Optocoupler, JAN Screening level
JANTX4N22A	4N22A Optocoupler, JANTX Screening level
JANTX4N23A	4N23A Optocoupler, JANTX Screening level
JANTX4N24A	4N24A Optocoupler, JANTX Screening level
JANTXV4N22A	4N22A Optocoupler, JANTXV Screening level
JANTXV4N23A	4N23A Optocoupler, JANTXV Screening level
JANTXV4N24A	4N24A Optocoupler, JANTXV Screening level

\* JEDEC registered data

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