

**4N22**

**4N23**

**4N24**

JAN, JANTX, JANTXV, SINGLE CHANNEL OPTOCOUPLERS

**Mii**

OPTOELECTRONIC PRODUCTS  
DIVISION

**Features:**

- Overall current gain...1.5 typical (4N24)
- 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 **4N22**, **4N23** and **4N24**'s 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 ( $V_{CEO}$ , $I_F = 0$ ).....	35V
Collector-Base Voltage ( $V_{CEO}$ , $I_F = 0$ ).....	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

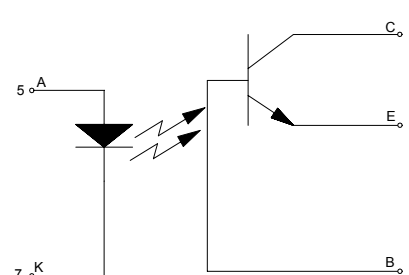
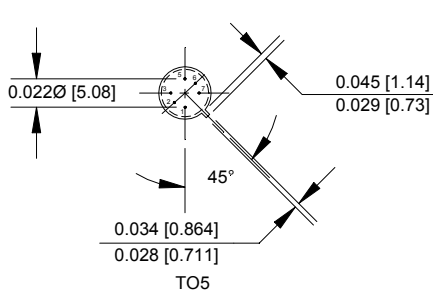
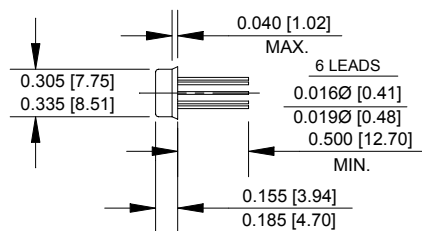
**Notes:**

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

\* JEDEC registered data

**Package Dimensions**

**Schematic Diagram**



NOTE: ALL LINEAR DIMENSIONS ARE IN INCHES (MILLIMETERS)

**\*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	$I_F = 10\text{mA}$	
		0.8	1.3			
		0.7	1.2			

**\*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	$V_{CE} = 5\text{V}, I_B = 0, I_F = 2\text{mA}$	
		0.2				
		0.4				
On State Collector Current	$I_{C(ON)}$	2.5		mA	$V_{CE} = 5\text{V}, I_B = 0, I_F = 10\text{mA}$	
		6				
		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				
		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				
		4				
Off State Collector Current +25°C	$I_{C(OFF)}$		100	nA	$V_{CE} = 20\text{V}, I_B = 0, I_F = 0\text{mA}$	
Off State Collector Current +100°C	$I_{C(OFF)}$		100	$\mu\text{A}$	$V_{CE} = 20\text{V}, I_B = 0, I_F = 0\text{mA}$	
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$		0.3	V	$I_C = 2.5\text{mA}, I_B = 0, I_F = 20\text{mA}$	
			0.3	V	$I_C = 5\text{mA}, I_B = 0, I_F = 20\text{mA}$	
			0.3	V	$I_C = 10\text{mA}, I_B = 0, I_F = 20\text{mA}$	
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	$t_r$		15	$\mu\text{s}$	$V_{CC} = 10\text{V}, I_F = 10\text{mA}, R_L = 100\Omega$	
			15	$\mu\text{s}$		
			20	$\mu\text{s}$		
Fall Time	$t_f$		15	$\mu\text{s}$	$V_{CC} = 10\text{V}, I_F = 10\text{mA}, R_L = 100\Omega$	
			15	$\mu\text{s}$		
			20	$\mu\text{s}$		

**NOTES:**

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

**RECOMMENDED OPERATING CONDITIONS:**

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PARAMETER	SYMBOL	MIN	MAX	UNITS
Input Current, Low Level	$I_{FL}$	0	1	$\mu A$
Input Current, High Level	$I_{FH}$	2	10	mA
Supply Voltage	$V_{CE}$	5	10	V

#### SELECTION GUIDE

PART NUMBER	PART DESCRIPTION
JAN4N22	4N22 Optocoupler, JAN Screening level
JAN4N23	4N23 Optocoupler, JAN Screening level
JAN4N24	4N24 Optocoupler, JAN Screening level
JANTX4N22	4N22 Optocoupler, JANTX Screening level
JANTX4N23	4N23 Optocoupler, JANTX Screening level
JANTX4N24	4N24 Optocoupler, JANTX Screening level
JANTXV4N22	4N22 Optocoupler, JANTXV Screening level
JANTXV4N23	4N23 Optocoupler, JANTXV Screening level
JANTXV4N24	4N24 Optocoupler, JANTXV Screening level

\* JEDEC registered data

THESE CHARTS APPLY TO:

4N22, 4N23, and 4N24

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4N22A, 4N23A, and 4N24A

JAN, JANTX, JANTXV, OPTOCOUPLEDERS Page

4N22U, 4N23U, and 4N24U

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