

**4N22A**

**4N23A** JAN, JANTX, JANTXV, AND JANS SINGLE CHANNEL OPTOCOUPPLERS

**4N24A**



**OPTOELECTRONIC PRODUCTS  
DIVISION**

01/14/2011

**Features:**

- Qualified to MIL-PRF-19500/486
- 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
- $\pm 1$  kV electrical isolation

**Applications:**

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

**DESCRIPTION**

A 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 differ from the 4N22, 4N23, and 4N24 only in that the collector of the transistor is isolated from the case. The **4N22A**, **4N23A** and **4N24A** can be tested to customer specifications.

**\*ABSOLUTE MAXIMUM RATINGS**

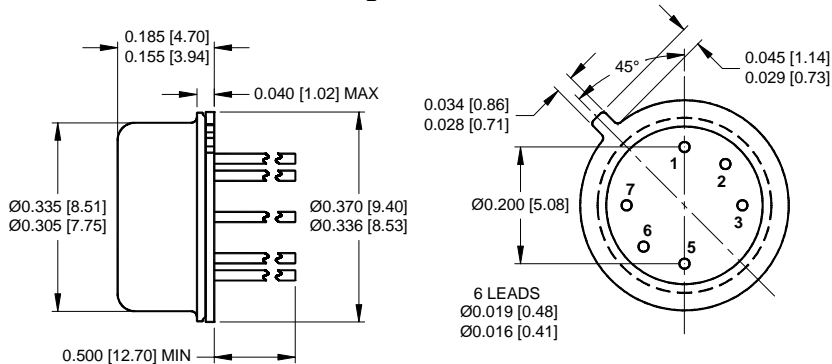
Input to Output Voltage .....	$\pm 1$ kV
Emitter-Collector Voltage .....	7 V
Collector-Emitter Voltage .....	40 V
Collector-Base Voltage .....	45 V
Reverse Input Voltage .....	2 V
Input Diode Continuous Forward Current at (or below) 25°C Free-Air Temperature (see note 1) .....	40 mA
Peak Forward Input Current (Value applies for $t_w \leq 1 \mu s$ PRR < 300 pps) .....	1 A
Continuous Collector Current .....	50 mA
Continuous Transistor Power Dissipation at (or below) 25°C Free-Air Temperature (see Note 2) .....	300 mW
Storage Temperature .....	-65°C to +125°C
Operating Free-Air Temperature Range .....	-55°C to +125°C
Lead Solder Temperature (10 seconds max., 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 5 mW/°C above 65°C.

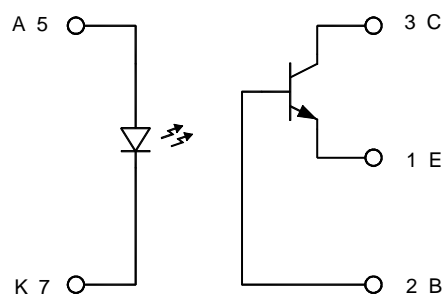
- JEDEC registered data

**Package Dimensions**



ALL LINEAR DIMENSIONS ARE IN INCHES [MILLIMETERS].

**Schematic Diagram**



THE COLLECTOR OF THE TRANSISTOR IS ISOLATED FROM THE CASE.

**4N22A, 4N23A, and 4N24A**

**JAN, JANTX, JANTXV, AND JANS SINGLE CHANNEL OPTOCOUPLEDERS**

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**\*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	nA	$V_R = 2\text{ V}$	
Input Diode Static Forward Voltage	$V_F$	1	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	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-Base Breakdown Voltage	$V_{(BR)EBO}$	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	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	$I_{C(OFF)}$		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	$I_C = 2.5\text{ mA}, I_B = 0, I_F = 20\text{ mA}$	
			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	$R_{I-O}$	$10^{11}$		$\Omega$	$V_{IN-OUT} = 1\text{ kV}$	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			
			20			
Fall Time	$t_f$		15	$\mu\text{s}$	$V_{CC} = 10\text{ V}, I_F = 10\text{ mA}, R_L = 100\ \Omega$	
			15			
			20			

**NOTES:**

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

**RECOMMENDED OPERATING CONDITIONS:**

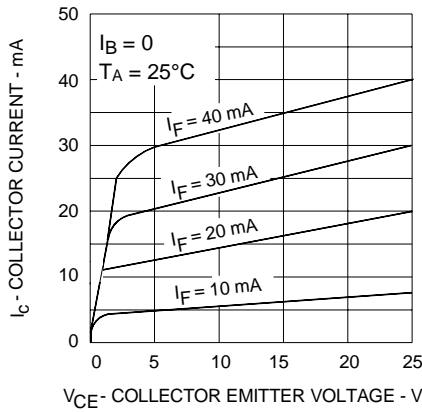
PARAMETER	SYMBOL	MIN	MAX	UNITS
Input Current, Low Level	$I_{FL}$	0	1	$\mu\text{A}$
Input Current, High Level	$I_{FH}$	2	10	mA
Supply Voltage	$V_{CC}$	5	10	V

SELECTION GUIDE

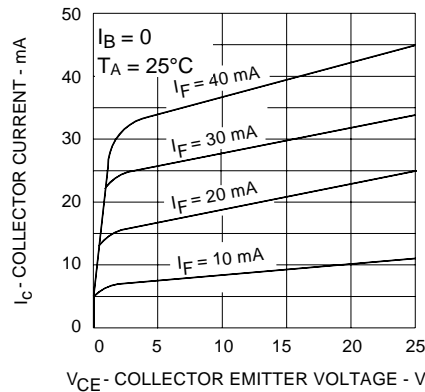
PART NUMBER	PART DESCRIPTION
4N22A	Commercial
4N23A	Commercial
4N24A	Commercial
JAN4N22A	JAN Screened
JAN4N23A	JAN Screened
JAN4N24A	JAN Screened
JANTX4N22A	JANTX Screened
JANTX4N23A	JANTX Screened
JANTX4N24A	JANTX Screened
JANTXV4N22A	JANTXV Screened
JANTXV4N23A	JANTXV Screened
JANTXV4N24A	JANTXV Screened
JANS4N22A	JANS Screened
JANS4N23A	JANS Screened
JANS4N24A	JANS Screened

\* JEDEC registered

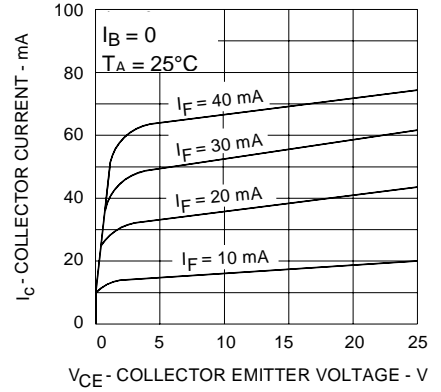
**4N22A**  
COLLECTOR CURRENT  
VS  
COLLECTOR-EMITTER VOLTAGE



**4N23A**  
COLLECTOR CURRENT  
VS  
COLLECTOR-EMITTER VOLTAGE



**4N24A**  
COLLECTOR CURRENT  
VS  
COLLECTOR-EMITTER VOLTAGE



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