

4N22A**4N23A** JAN, JANTX, JANTXV, AND JANS SINGLE CHANNEL OPTOCOUPLEDERS**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
- ± 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.

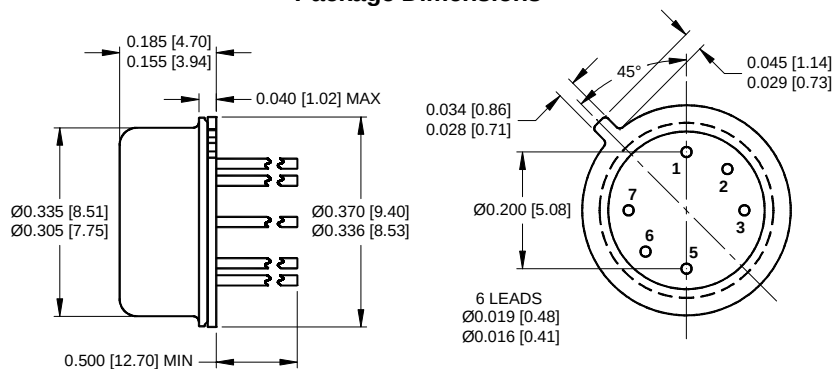
***ABSOLUTE MAXIMUM RATINGS**

Input to Output Voltage	± 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 $t_w \leq 1 \mu\text{s}$ 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

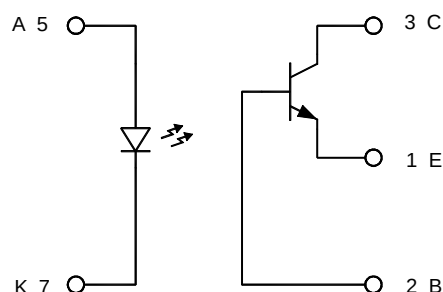
Notes:

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 DiagramTHE COLLECTOR OF THE TRANSISTOR IS
ISOLATED FROM THE CASE.

4N22A, 4N23A, and 4N24A**JAN, JANTX, JANTXV, AND JANS SINGLE CHANNEL OPTOCOUPLEDERS**

01/14/2011

***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	$I_F = 10\text{ mA}$	
-55°C		0.8	1.5			
+25°C		0.7	1.3			
+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	$V_{(BR)CBO}$	45		V	$I_C = 100\text{ }\mu\text{A}$, $I_E = 0$, $I_F = 0$	
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	$I_B = 0$, $I_E = 100\text{ }\mu\text{A}$, $I_F = 0$	

***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				
4N24A						
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				
4N24A						
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				
4N23A						
4N24A						
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				
4N23A						
4N24A						
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	μA	$V_{CE} = 20\text{ V}$, $I_B = 0$, $I_F = 0\text{ mA}$	
+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}		Ω	$V_{IN-OUT} = 1\text{ kV}$	1
ALL						
Input to Output Capacitance	C_{I-O}		5	pF	$F = 1\text{ MHz}$, $V_{IN-OUT} = 1\text{ kV}$	1
ALL						
Rise Time	t_r		15	μs	$V_{CC} = 10\text{ V}$, $I_F = 10\text{ mA}$, $R_L = 100\text{ }\Omega$	
4N22A			15			
4N23A			20			
4N24A						
Fall Time	t_f		15	μs	$V_{CC} = 10\text{ V}$, $I_F = 10\text{ mA}$, $R_L = 100\text{ }\Omega$	
4N22A			15			
4N23A			20			
4N24A						

NOTES:

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

RECOMMENDED OPERATING CONDITIONS:

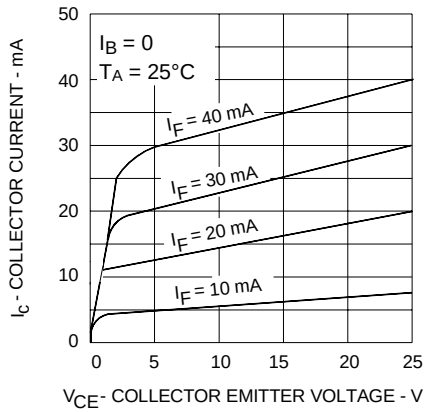
PARAMETER	SYMBOL	MIN	MAX	UNITS
Input Current, Low Level	I_{FL}	0	1	μA
Input Current, High Level	I_{FH}	2	10	mA
Supply Voltage	V_{CC}	5	10	V

SELECTION GUIDE

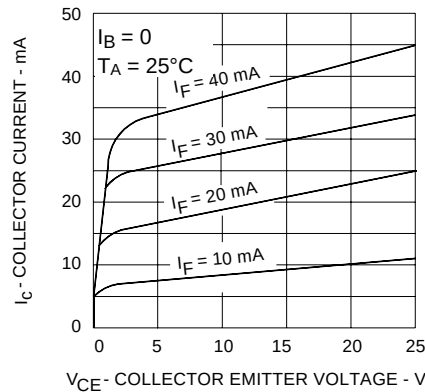
PART NUMBER	PART DESCRIPTION
4N22A	Commercial
4N23A	Commercial
4N24A	Commercial
JAN4N22A	JAN Screened
JAN4N23A	JAN Screened
JAN4N24A	JAN Screened
JANTX4N22A	JANTX Screened
JANTX4N23A	JANTX Screened
JANTX4N24A	JANTX Screened
JANTXV4N22A	JANTXV Screened
JANTXV4N23A	JANTXV Screened
JANTXV4N24A	JANTXV Screened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

