

MTL4N22A MTL4N23A & MTL4N24A

SINGLE CHANNEL OPTOCOUPLER



MINCO
TECHNOLOGY LABS, INC.

Features:

- Overall current gain ... 1.5 typical
- 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:

The **MTL4N22A-4A's** are very high gain optocouplers that utilize a GaAlAs infrared LED optically coupled to an N-P-N silicon phototransistor packaged in a hermetically sealed TO-5 package. The MTL4N22A, MTL4N23A and MTL4N24A optocouplers can be supplied to customer specifications as well as tested and screened in accordance with MIL-PRF-19500 to JANTX level.

ABSOLUTE MAXIMUM RATINGS

Input to Output Voltage	+1kV
Emitter-Base Voltage	4V
Collector-Emitter Voltage (Value applies to emitter-base open-circuited & the input-diode equal to zero)	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 +100°C
Lead Solder Temperature (10 seconds max.)	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 3 mW/°C.

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 _{CE}	5	10	V

SELECTION GUIDE

PART NUMBER	PART DESCRIPTION
MTL4N22A.001X	Single Channel Commercial Optocoupler (0° to +70°C operating temperature range)
MTL4N22A.002X	Single Channel Commercial Optocoupler (-40° to +85°C operating temperature range)
MTL4N22A.003X	Single Channel Commercial Optocoupler (-55° to 125°C operating temperature range)
MTL4N22A.004X	Single Channel Optocoupler Screened to JANTX level (-55° to 125°C operating temperature range)
MTL4N23A.001X	Single Channel Commercial Optocoupler (0° to +70°C operating temperature range)
MTL4N23A.002X	Single Channel Commercial Optocoupler (-40° to +85°C operating temperature range)
MTL4N23A.003X	Single Channel Commercial Optocoupler (-55° to 125°C operating temperature range)
MTL4N23A.004X	Single Channel Optocoupler Screened to JANTX level (-55° to 125°C operating temperature range)
MTL4N24A.001X	Single Channel Commercial Optocoupler (0° to +70°C operating temperature range)
MTL4N24A.002X	Single Channel Commercial Optocoupler (-40° to +85°C operating temperature range)
MTL4N24A.003X	Single Channel Commercial Optocoupler (-55° to 125°C operating temperature range)
MTL4N24A.004X	Single Channel Optocoupler Screened to JANTX level (-55° to 125°C operating temperature range)

NOTE: X at end of part number represents lead finish. Replace with A for gold and S for solder.

MTL4N22A, MTL4N23A & MTL4N24A

SINGLE CHANNEL OPTOCOUPLER

ELECTRICAL CHARACTERISTICS

T_A = 25°C unless otherwise specified.

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS	NOTE
Input Diode Static Reverse Current	I _R			100	μA	V _R = 2V	
Input Diode Static Forward Voltage -55°C	V _F	1.0		1.5	V	I _F = 10mA	
Input Diode Static Forward Voltage +25°C	V _F	0.8		1.3	V	I _F = 10mA	
Input Diode Static Forward Voltage +100°C	V _F	0.7		1.2	V	I _F = 10mA	

OUTPUT TRANSISTOR

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS	NOTE
Collector-Base Breakdown Voltage	V _{(BR)CBO}	35			V	I _C = 100μA, I _B = 0, I _F = 0	
Collector-Emitter Breakdown Voltage	V _{(BR)CEO}	35			V	I _C = 1mA, I _B = 0, I _F = 0	
Emitter-Base Breakdown Voltage	V _{(BR)EBO}	4			V	I _C = 0mA, I _E = 100μA, I _F = 0	
Off-State Collector Current +25°C	I _{C(OFF)}			100	nA	V _{CE} = 20V, I _F = 0mA, I _B = 0	
+100°C	I _{C(OFF)}			100	μA	V _{CE} = 20V, I _F = 0mA, I _B = 0	

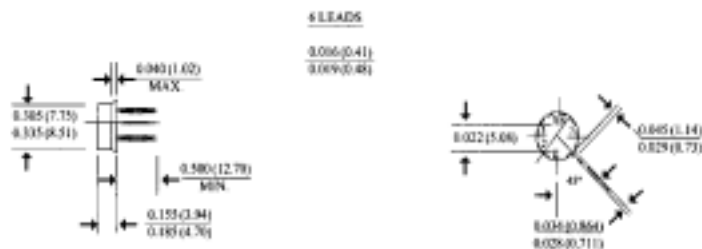
COUPLED CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS	NOTE
On State Collector Current MTL4N22A	I _{C(ON)}	0.15			mA	V _{CE} = 5V, I _F = 2mA	
MTL4N23A		0.2					
MTL4N24A		0.4					
On State Collector Current MTL4N22A	I _{C(ON)}	2.5			mA	V _{CE} = 5V, I _F = 10mA	
MTL4N23A		6					
MTL4N24A		10					
On State Collector Current -55°C	I _{C(ON)}	1			mA	V _{CE} = 5V, I _F = 10mA	
& +100°C		2.5					
		4					
Collector-Emitter Saturation Voltage MTL4N22A	V _{CE(SAT)}			0.3	V	I _F = 20mA, I _C = 2.5mA, I _B = 0	
MTL4N23A	V _{CE(SAT)}			0.3	V	I _F = 20mA, I _C = 5mA, I _B = 0	
MTL4N24A	V _{CE(SAT)}			0.3	V	I _F = 20mA, I _C = 10mA, I _B = 0	
Input to Output Internal Resistance	R _{IO}	10 ¹¹				V _{IN-OUT} = 1kV	1
Input to Output Capacitance	C _{IO}			5	pF	f = 1MHz, V _{IN-OUT} = 0kV	1
Rise Time-Phototransistor Operation MTL4N22A	t _r			15	μs	V _{CC} = 10V, I _F = 10mA, R _L = 100Ω,	
MTL4N23A				15			
MTL4N24A				20			
Fall Time-Phototransistor Operation MTL4N22A	t _f			15	μs	V _{CC} = 10V, I _F = 10mA, R _L = 100Ω,	
MTL4N23A				15			
MTL4N24A				20			

NOTES:

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

Package Dimensions



NOTE: ALL LINEAR DIMENSIONS ARE IN INCHES (MILLIMETERS)

Schematic Diagram

