MTL4N22U-MTL4N23U-MTL4N24U

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 ***MTL4N22U-4U'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 in al 6-pin leadless chip carrier. The MTL4N22U, MTL4N23U and MTL4N24U 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 tw ≤1µs, 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
MTL4N22U.001X	Single Channel Commercial Optocoupler (0° to +70°C operating temperature range)
MTL4N22U.002X	Single Channel Commercial Optocoupler (-40° to +85°C operating temperature range)
MTL4N22U.003X	Single Channel Commercial Optocoupler (-55° to 125°C operating temperature range)
MTL4N22U.004X	Single Channel Optocoupler Screened to JANTX level (-55° to 125°C operating temperature range)
MTL4N23U.001X	Single Channel Commercial Optocoupler (0° to +70°C operating temperature range)
MTL4N23U.002X	Single Channel Commercial Optocoupler (-40° to +85°C operating temperature range)
MTL4N23U.003X	Single Channel Commercial Optocoupler (-55° to 125°C operating temperature range)
MTL4N23U.004X	Single Channel Optocoupler Screened to JANTX level (-55° to 125°C operating temperature range)
MTL4N24U.001X	Single Channel Commercial Optocoupler (0° to +70°C operating temperature range)
MTL4N24U.002X	Single Channel Commercial Optocoupler (-40° to +85°C operating temperature range)
MTL4N24U.003X	Single Channel Commercial Optocoupler (-55° to 125°C operating temperature range)
MTL4N24U.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.

MTL4N22U, MTL4N23U & MTL4N24U

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	

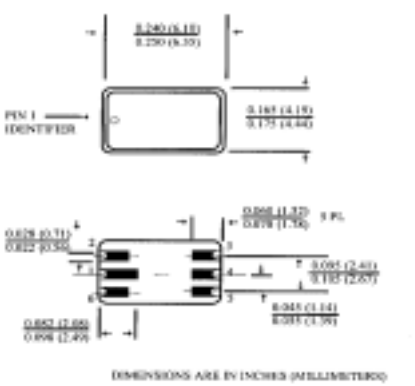
COUPLED CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS	NOTE
On State Collector Current MTL4N22U	$I_{C(ON)}$	0.15			mA	V_{CE} = 5V, I_F = 2mA	
MTL4N23U		0.2					
MTL4N24U		0.4					
On State Collector Current MTL4N22U	$I_{C(ON)}$	2.5			mA	V_{CE} = 5V, I_F = 10mA	
MTL4N23U		6					
MTL4N24U		10					
On State Collector Current -55°C & MTL4N22U	$I_{C(ON)}$	1			mA	V_{CE} = 5V, I_F = 10mA	
+100°C MTL4N23U		2.5					
MTL4N24U		4					
Collector-Emitter Saturation Voltage MTL4N22U	$V_{CE(SAT)}$			0.3	V	I_F = 20mA, I_C= 2.5mA, I_B = 0	
MTL4N23U	$V_{CE(SAT)}$			0.3	V	I_F = 20mA, I_C= 5mA, I_B = 0	
MTL4N24U	$V_{CE(SAT)}$			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} = 1kV	1
Rise Time-Phototransistor Operation MTL4N22U	t_r			15	µs	V_{CC} = 10V, I_F = 10mA, R_L = 100Ω,	
MTL4N23U				15			
MTL4N24U				20			
Fall Time-Phototransistor Operation MTL4N22U	t_f			15	µs	V_{CC} = 10V, I_F = 10mA, R_L = 100Ω,	
MTL4N23U				15			
MTL4N24U				20			

NOTES:

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

Package Dimensions



DIMENSIONS ARE IN INCHES (MILLIMETERS)

Schematic Diagram