

# MTL2400RU

# MTL2420RU

(Electrically Similar to HCC240/HCC242)

**Features:**

- High Reliability
- Base lead eliminated for improved noise immunity
- Rugged surface mount package
- Stability over wide temperature
- +1kV electrical isolation

**Applications:**

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

**DESCRIPTION**

The **MTL2400RU & MTL2420RU** contain a proton tolerant LED optically coupled to a silicon planar phototransistor. The optocoupler is built in a 4 pin leadless chip carrier. This optocoupler is capable of transmitting signals between two galvanic sources. The potential difference between transmitter and receiver should not go over the maximum isolation voltage. The internal base connection has been eliminated for improved noise immunity.

**ABSOLUTE MAXIMUM RATINGS**

Input to Output Voltage.....	1000V
Emitter-Collector Voltage.....	5V
Collector-Emitter Voltage (Value applies to emitter-base open-circuited & the input-diode equal to zero).....	30V
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 +150°C
Operating Free-Air Temperature Range.....	-55°C to +125°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 mA/°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	$\mu A$
Input Current, High Level	$I_{FH}$	2	10	mA
Supply Voltage	$V_{CE}$	5	50	V
Operating Temperature	$T_A$	-55	125	°C

**SELECTION GUIDE**

PART NUMBER	PART DESCRIPTION
MTL24X0U.001.X	Single Channel optocoupler, commercial (0° to +70°C operating temperature range)
MTL24X0U.002.X	Single Channel optocoupler, commercial (-40° to +85°C operating temperature range)
MTL24X0U.003.X	Single Channel optocoupler, commercial (-55° to +100°C operating temperature range)
MTL24X0U.004.X	Single Channel optocoupler, screened to JANTX level (-55° to +100°C operating temperature range)

**NOTE:** Replace first X with 0 or 2 to indicate type of part required.

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

# MTL2400RU & MTL2420RU

## SINGLE CHANNEL OPTOCOUPLER

### ELECTRICAL CHARACTERISTICS

T<sub>A</sub> = 25°C unless otherwise specified.

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Input Diode Static Reverse Current	I <sub>R</sub>			100	μA	V <sub>R</sub> = 2.0V
Input Diode Static Forward Voltage	V <sub>F</sub>		1.68	2.0	V	I <sub>F</sub> = 10mA
Input Diode Static Forward Voltage	V <sub>F</sub>	-55°C		2.1	V	I <sub>F</sub> = 10mA
Input Diode Static Forward Voltage	V <sub>F</sub>	+100°C		2.0	V	I <sub>F</sub> = 10mA

### OUTPUT TRANSISTOR

T<sub>A</sub> = 25°C unless otherwise specified.

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Collector-Emitter Breakdown Voltage	V <sub>(BR)CEO</sub>	30			V	I <sub>C</sub> = 1mA, I <sub>B</sub> = 0, I <sub>F</sub> = 0
Emitter-Collector Breakdown Voltage	V <sub>(BR)ECO</sub>	5			V	I <sub>C</sub> = 0mA, I <sub>E</sub> = 100μA, I <sub>F</sub> = 0
Collector-Emitter Dark Current	I <sub>CEO1</sub>			100	nA	V <sub>CE</sub> = 20V, I <sub>F</sub> = 0mA
	I <sub>CEO2</sub>			100	nA	V <sub>CE</sub> = 20V, I <sub>F</sub> = 0mA

### COUPLED CHARACTERISTICS

T<sub>A</sub> = 25°C unless otherwise specified.

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
On State Collector Current	I <sub>C(ON)</sub>	0.15 0.40			mA	V <sub>CE</sub> = 5V, I <sub>F</sub> = 2.0mA
On State Collector Current	I <sub>C(ON)</sub>	2.5 10	8 15		mA	V <sub>CE</sub> = 5V, I <sub>F</sub> = 10mA
On State Collector Current	I <sub>C(ON)</sub>	1.0 4.0			mA	V <sub>CE</sub> = 5V, I <sub>F</sub> = 10mA, T <sub>A</sub> = -55°C
On State Collector Current	I <sub>C(ON)</sub>	1.0 4.0			mA	V <sub>CE</sub> = 5V, I <sub>F</sub> = 10mA, T <sub>A</sub> = +100°C
Collector-Emitter Saturation Voltage	V <sub>CE(SAT)</sub>			0.3 0.3	V	I <sub>F</sub> = 20mA, I <sub>C</sub> = 2.5mA I <sub>F</sub> = 20mA, I <sub>C</sub> = 10mA
Isolation Resistance	R <sub>ISO</sub>	10 <sup>11</sup>			Ω	V <sub>IN-OUT</sub> = 1000V
Input to Output Capacitance	C <sub>IO</sub>		2	5.0	pF	f = 1MHz
Rise Time	t <sub>r</sub>			15 20	μs	V <sub>CC</sub> = 10V, I <sub>F</sub> = 10.0mA, R <sub>L</sub> = 100Ω
Fall Time	t <sub>f</sub>			15 20	μs	V <sub>CC</sub> = 10V, I <sub>F</sub> = 10.0mA, R <sub>L</sub> = 100Ω

### Package Dimensions

### Schematic Diagram

