NEW DUALS

- MCT6 (20%)
- MCT62 (100%)
- MCT61 (50%)
- MCT66 (6%)

DESCRIPTION
The MCT6X optoisolators have two channels for high density applications. For four channel applications, two packages fit into a standard 16-pin DIP socket. Each channel is an NPN silicon planar phototransistor optically coupled to a gallium arsenide infrared emitting diode.

FEATURES
- Two isolated channels per package
- Two packages fit into a 16 lead DIP socket
- 2500 volt isolation
- Choice of 4 current transfer ratios
- Underwriters Laboratory (U.L.) recognized File E50151

APPLICATIONS
- AC Line/Digital Logic — Isolate high voltage transients
- Digital Logic/Digital Logic — Eliminate spurious grounds
- Digital Logic/AC Triac Control — Isolate high voltage transients
- Twisted pair line receiver — Eliminate ground loop feedthrough
- Telephone/Telegraph line receiver — Isolate high voltage transients
- High Frequency Power Supply Feedback Control — Maintain floating ground
- Relay contact monitor — Isolate floating grounds and transients
- Power Supply Monitor — Isolate transients

ABSOLUTE MAXIMUM RATINGS
- Storage Temperature: -55°C to 150°C
- Operating Temperature: -55°C to 100°C
- Lead Temperature (soldering, 10 sec.): 250°C

INPUT DIODE (each channel)
- Forward current: 60mA
- Reverse voltage: 3.0V
- Peak forward current (1µs pulse, 300 pps): 3A

TOTAL INPUT
- Power dissipation at 25°C ambient: 100mW
- Derate linearly from 25°C: 1.3mW/°C

OUTPUT TRANSISTOR (each channel)
- Power dissipation @ 25°C ambient: 150mW
- Derate linearly from 25°C: 2mW/°C
- Collector Current: 30mA

COUPLED
- Input to output breakdown voltage: 2500 volts
- Total package power dissipation @ 25°C ambient: 400mW
- Derate linearly from 25°C: 5.33mW/°C
# ELECTRO-OPTICAL CHARACTERISTICS

(25°C Free Air Temperature Unless Otherwise Specified)

<table>
<thead>
<tr>
<th>CHARACTERISTICS</th>
<th>MIN.</th>
<th>TYP.</th>
<th>MAX.</th>
<th>UNITS</th>
<th>TEST CONDITIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>INPUT DIODE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated forward voltage $V_F$</td>
<td>1.25</td>
<td>1.50</td>
<td></td>
<td>V</td>
<td>$I_F = 20mA$</td>
</tr>
<tr>
<td>Reverse voltage $V_R$</td>
<td>3.0</td>
<td>25</td>
<td></td>
<td>V</td>
<td>$I_R = 1mA$</td>
</tr>
<tr>
<td>Reverse current $I_R$</td>
<td>0.01</td>
<td>10</td>
<td></td>
<td>$\mu$A</td>
<td>$V_R = 3.0V$</td>
</tr>
<tr>
<td>Junction capacitance $C_J$</td>
<td>50</td>
<td></td>
<td></td>
<td>pF</td>
<td>$V_J = 0V$</td>
</tr>
<tr>
<td>OUTPUT TRANSISTOR ($I_F = 0$)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breakdown voltage, collector to emitter $BV_{CEO}$</td>
<td>30</td>
<td>85</td>
<td></td>
<td>V</td>
<td>$I_C = 1.0mA$</td>
</tr>
<tr>
<td>Breakdown voltage, emitter to collector $BV_{CEO}$</td>
<td>6</td>
<td>13</td>
<td></td>
<td>V</td>
<td>$I_E = 100\mu$A</td>
</tr>
<tr>
<td>Leakage current, collector to emitter $ICBO$</td>
<td>5</td>
<td>100</td>
<td></td>
<td>nA</td>
<td>$V_CE = 10V$</td>
</tr>
<tr>
<td>Capacitance collector to emitter $C_{CE}$</td>
<td>8</td>
<td></td>
<td></td>
<td>pF</td>
<td>$V_CE = 0V$</td>
</tr>
</tbody>
</table>

| COUPLED | | | | | |
| DC current transfer ratio $(I_C/I_F) = CTR$ | | | | | |
| MCT6  | 20  | %  |      | $V_CE = 10V, I_F = 10mA$ |
| MCT61 | 50  | %  |      | $V_CE = 5V, I_F = 5mA$    |
| MCT62 | 100 | %  |      | $V_CE = 5V, I_F = 5mA$    |
| MCT68 | 6   | %  |      | $V_CE = 10V, I_F = 10mA$  |
| Isolation voltage $BV_{(I-O)}$ | 2500 | | | VHM | $t = 1$ minute |
| Isolation resistance | $10^{11}$ | | | $\Omega$ | $V_o = 500VDC$ |
| Breakdown voltage – channel-to-channel | 500 | | | VDC | Relative humidity = 40% |
| Capactance between channels | 0.4 | | | pF | f = 1MHz |

| SATURATION VOLTAGE – collector to emitter $V_{CE(SAT)}$ | | | | | |
| MCT6, 61, 62 | 0.2 | 0.4 | V | $I_C = 2mA, I_F = 16mA$ |
| MCT68 | 0.2 | 0.4 | kHz | $I_C = 2mA, V_{CE} = 10V, R_L = 1000\Omega$ |
| Bandwidth $BW$ | 150 | | | | |

| SWITCHING TIMES, OUTPUT TRANSISTOR | | | | | |
| Non-saturated rise time, fall time (Note 3) | 2.4 | $\mu$S | | $I_C = 2mA, V_{CE} = 10V, R_L = 1000\Omega$ |
| Non-saturated rise time, fall time (Note 3) | 15 | $\mu$S | | $I_C = 2mA, V_{CE} = 10V, R_L = 1000\Omega$ |
| Saturated turn-on time (from 5.0V to 0.8V) | 5 | $\mu$S | | $R_L = 2K\Omega, I_F = 40mA$ |
| Saturated turn-off time (from 2.0V) | 25 | $\mu$S | | $R_L = 2K\Omega, I_F = 40mA$ |

## MCT6 TYPICAL ELECTRO-OPTICAL CHARACTERISTIC CURVES

(25°C Free Air Temperature Unless Otherwise Specified)

- **Fig. 1. I-V Curve of Phototransistor**
- **Fig. 2. I-V Curve in Saturation**
- **Fig. 3. CTR vs. Forward Current**
MCT6 TYPICAL ELECTRO-OPTICAL CHARACTERISTIC CURVES (Cont'd)
(25°C Free Air Temperature Unless Otherwise Specified)

Fig. 4. Current Transfer Ratio vs. Temperature

Fig. 5. I-V Curve of LED vs. Temperature

Fig. 6. Leakage Current vs. Temperature vs. Collector Voltage

Fig. 7. Switching Time vs. Collector Current

Fig. 8. Lifetime vs. Forward Current (Note 1)

MCT66 TYPICAL ELECTRO-OPTICAL CHARACTERISTIC CURVES
(25°C Free Air Temperature Unless Otherwise Specified)

Fig. 1. Detector Output Characteristics

Fig. 2. Input Current vs. Output Current

Fig. 3. Leakage Current vs. Temperature vs. Collector Voltage
mCT6 MCT61 MCT62 MCT66

MCT66 TYPICAL ELECTRO-OPTICAL CHARACTERISTIC CURVES (Cont'd)
(25°C Free Air Temperature Unless Otherwise Specified)

**Fig. 4. Current Output vs. Temperature**

**Fig. 5. Output vs. Frequency**

**Fig. 6. Switching Time vs. Collector Current**

**Fig. 7. Lifetime vs. Forward Current**

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**NOTES**

1. Normalized CTR degradation = \( \frac{CTR_0 - CTR}{CTR_0} \)

2. The current transfer ratio \( (I_C/I_P) \) is the ratio of the detector collector current to the LED input current with \( V_{CE} \) at 10 volts.

3. The frequency at which \( I_C \) is 3 dB down from the 1 kHz value.

4. Rise time \( (t_r) \) is the time required for the collector current to increase from 10% of its final value to 90%. Fall time \( (t_f) \) is the time required for the collector current to decrease from 90% of its initial value to 10%.