OPTICALLY COUPLED ISOLATOR
PHOTODARLINGTON OUTPUT

DESCRIPTION
The MCA230, MCA231, MCA255 series of optically coupled isolators consist of an infrared light emitting diode and NPN silicon photodarlington in a space efficient dual in line plastic package.

FEATURES
- Options:
  10mm lead spread - add G after part no.
  Surface mount - add SM after part no.
  Tape&reel - add SMT&R after part no.
- High Current Transfer Ratio
- High Isolation Voltage (5.3kV_{RMS}, 7.5kV_{PK})
- All electrical parameters 100% tested
- Custom electrical selections available

APPLICATIONS
- Computer terminals
- Industrial systems controllers
- Measuring instruments
- Signal transmission between systems of different potentials and impedances

ABSOLUTE MAXIMUM RATINGS
(25°C unless otherwise specified)
- Storage Temperature: -55°C to + 150°C
- Operating Temperature: -55°C to + 100°C
- Lead Soldering Temperature: (1/16 inch (1.6mm) from case for 10 secs) 260°C

INPUT DIODE
- Forward Current: 60mA
- Reverse Voltage: 5V
- Power Dissipation: 105mW

OUTPUT TRANSISTOR
- Collector-emitter Voltage \(B_{CEO}\):
  - MCA255: 55V
  - MCA230, MCA231: 30V
- Collector-base Voltage \(B_{CBO}\):
  - MCA255: 55V
  - MCA230, MCA231: 30V
- Emitter-collector Voltage \(B_{ECO}\):
  - 7V
- Power Dissipation: 150mW

POWER DISSIPATION
- Total Power Dissipation: 250mW (derate linearly 3.3mW/°C above 25°C)
## ELECTRICAL CHARACTERISTICS ( $T_A = 25°C$ Unless otherwise noted )

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>UNITS</th>
<th>TEST CONDITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input  Forward Voltage ($V_f$)</td>
<td>1.2</td>
<td>1.5</td>
<td>V</td>
<td></td>
<td>$I_f = 20mA$</td>
</tr>
<tr>
<td>Reverse Voltage ($V_r$)</td>
<td>3</td>
<td></td>
<td>V</td>
<td>$I_r = 10μA$</td>
<td></td>
</tr>
<tr>
<td>Reverse Current ($I_r$)</td>
<td>10</td>
<td>μA</td>
<td></td>
<td>$V_r = 3V$</td>
<td></td>
</tr>
<tr>
<td>Output Collector-emitter Breakdown (BV_{CEO})</td>
<td>30</td>
<td>V</td>
<td></td>
<td>$I_c = 100μA$ (note 2)</td>
<td></td>
</tr>
<tr>
<td>MCA230, MCA231</td>
<td>55</td>
<td>V</td>
<td></td>
<td>$I_c = 100μA$ (note 2)</td>
<td></td>
</tr>
<tr>
<td>Collector-base Breakdown (BV_{CBO})</td>
<td>30</td>
<td>V</td>
<td></td>
<td>$I_c = 10μA$ (note 2)</td>
<td></td>
</tr>
<tr>
<td>MCA230, MCA231</td>
<td>55</td>
<td>V</td>
<td></td>
<td>$I_c = 10μA$ (note 2)</td>
<td></td>
</tr>
<tr>
<td>Collector-emitter Breakdown (BV_{CEO})</td>
<td>5</td>
<td>V</td>
<td>100</td>
<td>nA</td>
<td>$V_{CE} = 10V$</td>
</tr>
<tr>
<td>Collector-emitter Dark Current ($I_{CED}$)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coupled Collector Output Current ($I_c$) (Note 2)</td>
<td>100</td>
<td>%</td>
<td>10mA</td>
<td>$I_f$, 5V $V_{CE}$</td>
<td></td>
</tr>
<tr>
<td>MCA230, MCA255</td>
<td>200</td>
<td>%</td>
<td>10mA</td>
<td>$I_f$, 5V $V_{CE}$</td>
<td></td>
</tr>
<tr>
<td>Collector-emitter Saturation Voltage ($V_{CE\text{SAT}}$)</td>
<td></td>
<td>1.0</td>
<td>V</td>
<td></td>
<td>50mA $I_f$, 50mA $I_c$</td>
</tr>
<tr>
<td>MCA230, MCA255</td>
<td></td>
<td>1.0</td>
<td>V</td>
<td></td>
<td>1mA $I_f$, 2mA $I_c$</td>
</tr>
<tr>
<td>MCA231</td>
<td></td>
<td>1.0</td>
<td>V</td>
<td></td>
<td>5mA $I_f$, 10mA $I_c$</td>
</tr>
<tr>
<td>Input to Output Isolation Voltage ($V_{ISO}$)</td>
<td>5300</td>
<td>V</td>
<td>RMS</td>
<td></td>
<td>(note 1)</td>
</tr>
<tr>
<td>MCA230, MCA255</td>
<td>7500</td>
<td>V</td>
<td>PK</td>
<td></td>
<td>(note 1)</td>
</tr>
<tr>
<td>Collector-emitter Isolation Resistance ($R_{ISO}$)</td>
<td>5x10^10</td>
<td>Ω</td>
<td>$V_{ISO} = 500V$ (note 1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output Turn on Time ($t_{on}$)</td>
<td>10</td>
<td>μs</td>
<td></td>
<td></td>
<td>$V_{CC} = 2V$, $R_L = 100Ω$, $I_f = 10mA$, $I_c = 10μA$</td>
</tr>
<tr>
<td>Output Turn off Time ($t_{off}$)</td>
<td>100</td>
<td>μs</td>
<td></td>
<td></td>
<td>$V_{ISO}$</td>
</tr>
</tbody>
</table>

**Note 1**  Measured with input leads shorted together and output leads shorted together.

**Note 2**  Special Selections are available on request. Please consult the factory.

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**FIGURE 1**

![Figure 1](image-url)
Collector Power Dissipation vs. Ambient Temperature

![Collector Power Dissipation vs. Ambient Temperature graph]

Current Transfer Ratio vs. Forward Current

![Current Transfer Ratio vs. Forward Current graph]

Forward Current vs. Ambient Temperature

![Forward Current vs. Ambient Temperature graph]

Collector Current vs. Collector-emitter Voltage

![Collector Current vs. Collector-emitter Voltage graph]

Collector-emitter Saturation Voltage vs. Ambient Temperature

![Collector-emitter Saturation Voltage vs. Ambient Temperature graph]

Relative Current Transfer Ratio vs. Ambient Temperature

![Relative Current Transfer Ratio vs. Ambient Temperature graph]