

**FAIRCHILD**  
SEMICONDUCTOR®

# PHOTODARLINGTON OPTOCOUPLERS (NO BASE CONNECTION)

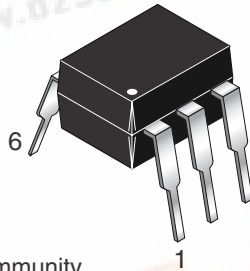
**MOC8030**  
**MOC8050**

## DESCRIPTION

The MOC8030 and MOC8050 are photodarlington-type optically coupled optocouplers. The devices have a gallium arsenide infrared emitting diode coupled with a silicon darlington phototransistor.

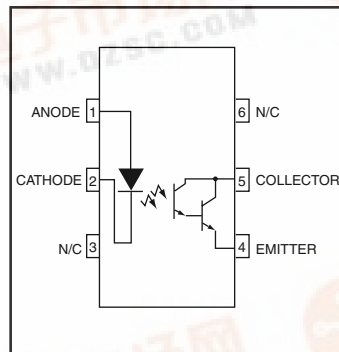
## FEATURES

- High  $BV_{CEO}$   
-Minimum 80 V
- High current transfer ratio  
-300% (MOC8030)  
-500% (MOC8050)
- No base connection for improved noise immunity
- Underwriters Laboratory (UL) recognized File# E90700

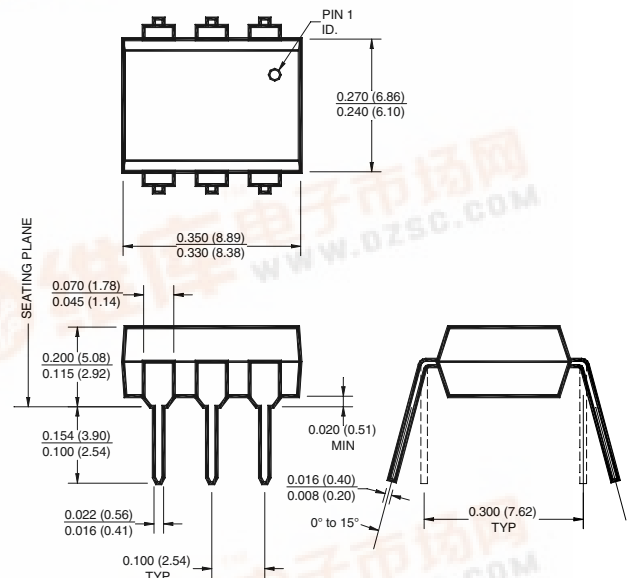


## APPLICATIONS

- Appliances, measuring instruments
- I/O interface for computers
- Programmable controllers
- Portable electronics
- Interfacing and coupling systems of different potentials and impedance
- Solid state relays



## PACKAGE DIMENSIONS



### NOTE

All dimensions are in inches (millimeters)

## ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ Unless otherwise specified.)

| Parameter                                              | Symbol           | Value          | Units    |
|--------------------------------------------------------|------------------|----------------|----------|
| TOTAL DEVICE                                           |                  |                |          |
| Storage Temperature                                    | T <sub>STG</sub> | -55 to +150    | °C       |
| Operating Temperature                                  | T <sub>OPR</sub> | -55 to +100    | °C       |
| Lead Solder Temperature                                | T <sub>SOL</sub> | 260 for 10 sec | °C       |
| Total Device Power Dissipation @ T <sub>A</sub> = 25°C | P <sub>D</sub>   | 250            | mW       |
| Derate above 25°C                                      |                  | 2.94           | mW/°C    |
| Input-Output Isolation Voltage                         | V <sub>ISO</sub> | 5300           | Vac(rms) |
| EMITTER                                                |                  |                |          |
| DC/Average Forward Input Current                       | I <sub>F</sub>   | 60             | mA       |
| Reverse Input Voltage                                  | V <sub>R</sub>   | 3              | V        |
| LED Power Dissipation @ T <sub>A</sub> = 25°C          | P <sub>D</sub>   | 120            | mW       |
| Derate above 25°C                                      |                  | 1.41           | mW/°C    |
| DETECTOR                                               |                  |                |          |
| Collector-Emitter Voltage                              | V <sub>CEO</sub> | 80             | V        |
| Detector Power Dissipation @ T <sub>A</sub> = 25°C     | P <sub>D</sub>   | 150            | mW       |
| Derate above 25°C                                      |                  | 1.76           | mW/°C    |
| Continuous Collector Current                           | I <sub>C</sub>   | 150            | mA       |



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## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C Unless otherwise specified.)

### INDIVIDUAL COMPONENT CHARACTERISTICS

| Parameter                           | Test Conditions                 | Symbol            | Min | Typ** | Max | Unit |
|-------------------------------------|---------------------------------|-------------------|-----|-------|-----|------|
| <b>EMITTER</b>                      |                                 |                   |     |       |     |      |
| Input Forward Voltage               | (I <sub>F</sub> = 10 mA)        | V <sub>F</sub>    |     | 1.15  | 2   | V    |
| Input Capacitance                   | (V <sub>F</sub> = 0, f = 1 MHz) | C <sub>IN</sub>   |     | 18    |     | pF   |
| Reverse Leakage Current             | (V <sub>R</sub> = 3.0 V)        | I <sub>R</sub>    |     | 0.05  | 10  | μA   |
| <b>DETECTOR</b>                     |                                 |                   |     |       |     |      |
| Collector-Emitter Breakdown Voltage | (I <sub>C</sub> = 1.0 mA)       | BV <sub>CEO</sub> | 80  |       |     | V    |
| Emitter-Collector Breakdown Voltage | (I <sub>E</sub> = 100 μA)       | BV <sub>ECO</sub> | 5   |       |     | V    |
| Collector-Emitter Dark Current      | (V <sub>CE</sub> = 60 V)        | I <sub>CEO</sub>  |     |       | 1   | μA   |

### TRANSFER CHARACTERISTICS

| DC Characteristic                            | Test Conditions                                           | Symbol | Min | Typ** | Max | Units |
|----------------------------------------------|-----------------------------------------------------------|--------|-----|-------|-----|-------|
| Current Transfer Ratio,<br>Collector-Emitter | MOC8030 (I <sub>F</sub> = 10 mA, V <sub>CE</sub> = 1.5 V) | CTR    | 300 |       |     | %     |
|                                              | MOC8050 (I <sub>F</sub> = 10 mA, V <sub>CE</sub> = 1.5 V) |        | 500 |       |     |       |

### TRANSFER CHARACTERISTICS

| Characteristic         | Test Conditions                                                        | Symbol           | Min | Typ** | Max | Units |
|------------------------|------------------------------------------------------------------------|------------------|-----|-------|-----|-------|
| <b>SWITCHING TIMES</b> |                                                                        |                  |     |       |     |       |
| Turn-on Time           | (V <sub>CC</sub> = 10 V, R <sub>L</sub> = 100Ω, I <sub>F</sub> = 5 mA) | t <sub>on</sub>  |     | 3.5   |     | μs    |
| Turn-off Time          |                                                                        | t <sub>off</sub> |     | 95    |     | μs    |

### ISOLATION CHARACTERISTICS

| Characteristic                 | Test Conditions                   | Symbol           | Min              | Typ** | Max | Units    |
|--------------------------------|-----------------------------------|------------------|------------------|-------|-----|----------|
| Input-Output Isolation Voltage | (I <sub>I-O</sub> ≤ 1 μA, 1 min.) | V <sub>ISO</sub> | 7500             |       |     | Vac(pk)  |
|                                | (I <sub>I-O</sub> ≤ 1 μA, 1 min.) |                  | 5300             |       |     | Vac(rms) |
| Isolation Resistance           | (V <sub>I-O</sub> = 500 VDC)      | R <sub>ISO</sub> | 10 <sup>11</sup> |       |     | Ω        |
| Isolation Capacitance          | (f = 1 MHz)                       | C <sub>ISO</sub> |                  | 0.5   |     | pf       |

Note

\*\* Typical values at T<sub>A</sub> = 25°C

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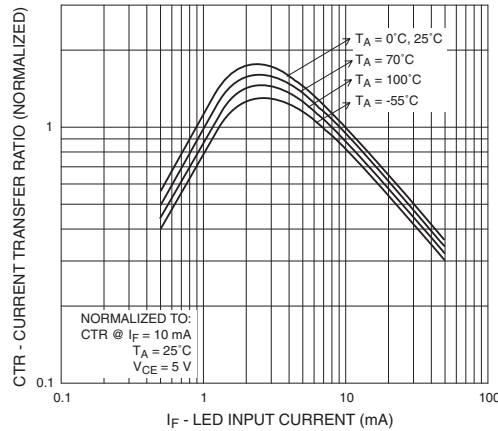


Fig. 1 Output Current vs. Input Current

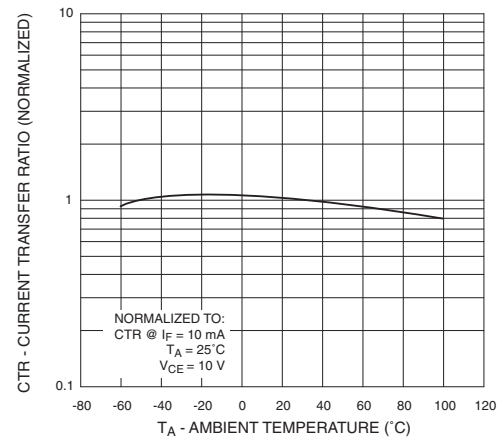


Fig. 2 Current Transfer Ratio vs. Ambient Temperature

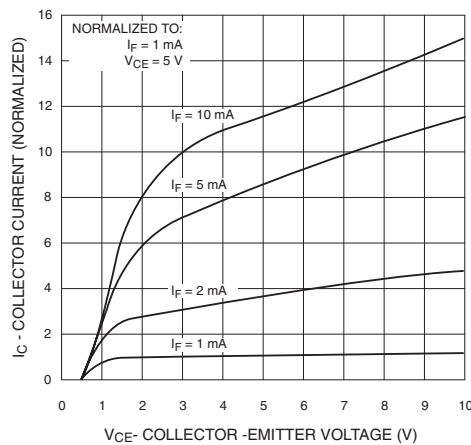


Fig. 3 Collector Current vs. Collector-Emitter Voltage

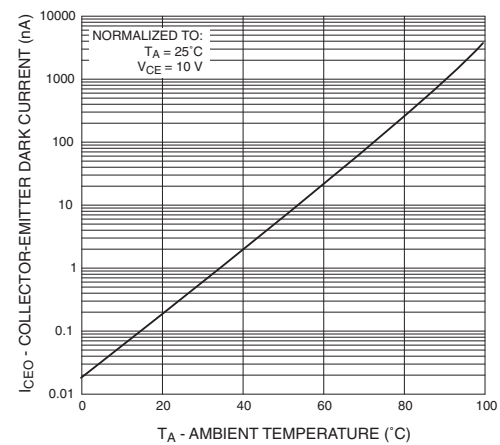


Fig. 4 Dark Current vs. Ambient Temperature

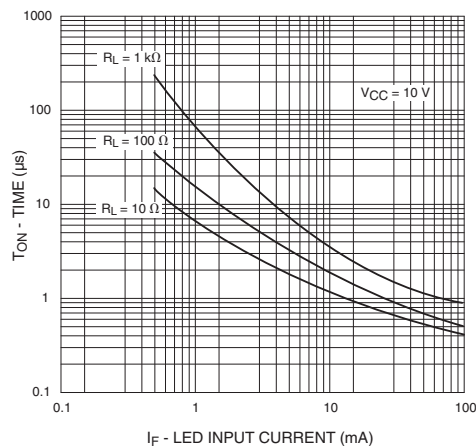


Fig. 5 Turn-On Time vs. Input Current

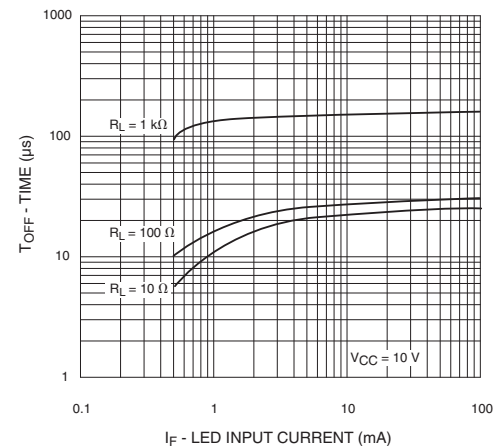


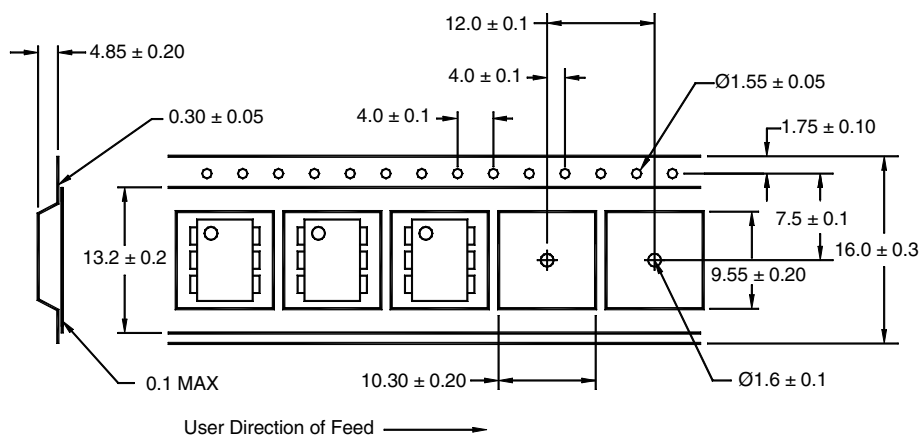
Fig. 6 Turn-Off Time vs. Input Current

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## ORDERING INFORMATION

| Option | Order Entry Identifier | Description                          |
|--------|------------------------|--------------------------------------|
| S      | .S                     | Surface Mount Lead Bend              |
| SD     | .SD                    | Surface Mount; Tape and reel         |
| W      | .W                     | 0.4" Lead Spacing                    |
| 300    | .300                   | VDE 0884                             |
| 300W   | .300W                  | VDE 0884, 0.4" Lead Spacing          |
| 3S     | .3S                    | VDE 0884, Surface Mount              |
| 3SD    | .3SD                   | VDE 0884, Surface Mount, Tape & Reel |

## QT Carrier Tape Specifications ("D" Taping Orientation)





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  2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.
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