



# MOC8050

## Photodarlington Optocoupler

### FEATURES

- **High Current Transfer Ratio 500% at 50 mA Output**
- **High Collector to Emitter Breakdown Voltage: 80 V Min.**
- **High Isolation Voltage  $V_{ISO}=5300 V_{RMS}$**
- **Base Lead Not Connected**
- **Solid State Reliability**
- **Standard DIP Package**
- **Underwriters Lab File #E52744**
- **VDE 0884 Available with Option 1**

### DESCRIPTION

The MOC8050 is an optically coupled isolator with a Gallium Arsenide infrared emitter and a silicon photodarlington sensor. Switching can be achieved while maintaining a high degree of isolation between driving and load circuits, with no cross talk between channels. These optocouplers can be used to replace reed and mercury relays with advantages of long life, high speed switching and elimination of magnetic fields.

### Maximum Ratings

#### Emitter

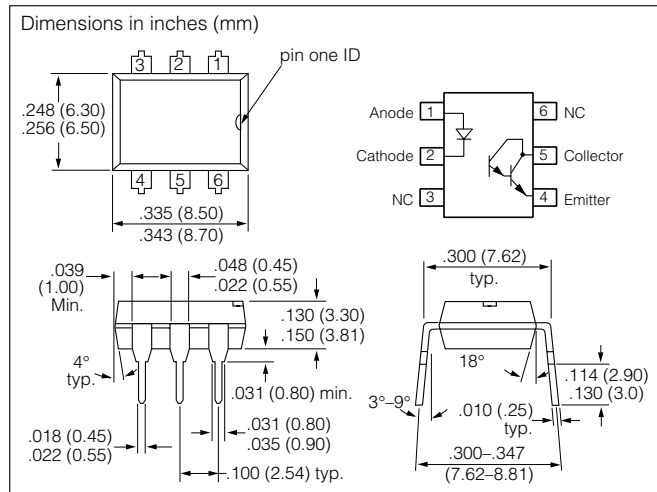
Peak Reverse Voltage ..... 3.0 V  
 Continuous Forward Current ..... 60 mA  
 Power Dissipation at 25°C ..... 100 mW  
 Derate Linearly from 25°C ..... 1.33 mW/°C

#### Detector

Collector-Emitter Reverse Voltage ..... 80 V  
 Collector Load Current ..... 125 mA  
 Power Dissipation at 25°C Ambient ..... 150 mW  
 Derate Linearly from 25°C ..... 2.0 mW/°C

#### Package

Total Package Dissipation at 25°C ..... 250 mW  
 Derate Linearly from 25°C ..... 3.3 mW/°C  
 Isolation Test Voltage ..... 5300  $V_{RMS}$   
 Isolation Resistance  
 $V_{IO}=500 V, T_A=25^\circ C$  .....  $10^{12} \Omega$   
 $V_{IO}=500 V, T_A=100^\circ C$  .....  $10^{11} \Omega$   
 Creepage Path .....  $\geq 7.0$  mm  
 Clearance Path .....  $\geq 7.0$  mm  
 Comparative Tracking Index ..... 175  
 Storage Temperature Range ..... -55°C to +125°C  
 Operating Temperature Range ..... -55°C to +100°C  
 Lead Soldering Time at 260°C ..... 10 sec.



### Electrical Characteristics ( $T_A=25^\circ C$ )

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
<b>Emitter</b>						
Forward Voltage	$V_F$	—	1.25	1.5	V	$I_F=20$ mA
Reverse Current	$I_R$	—	0.1	10	$\mu A$	$V_R=3.0$ V
Capacitance	$C_O$	—	25	—	pF	$V_R=0$
<b>Detector</b>						
Collector-Emitter Breakdown Voltage	$BV_{CEO}$	80	—	—	V	$I_C=10$ $\mu A$
Collector-Emitter Leakage Current	$I_{CEO}$	—	25	1000	nA	$V_{CE}=60$ V $I_F=0$
Emitter-Collector Breakdown Voltage	$V_{ECO}$	5.0	8.0	—	V	$I_C=10$ $\mu A$
<b>Package</b>						
Current Transfer Ratio	CTR	500	—	—	%	$I_F=10$ mA $V_{CE}=1.5$ V
Collector-Emitter Saturation Voltage	$V_{CEsat}$	—	0.9	1.0	V	$I_C=50$ mA $I_F=50$ mA
Isolation Test Voltage	$V_{ISO}$	5300	—	—	$V_{RMS}$	1.0 s, 60 Hz
Coupling Capacitance	$C_{ISOL}$	—	0.5	—	pF	—
Rise Time	$t_r$	—	10	—	$\mu s$	$V_{CC}=13.5$ V $I_F=50$ mA
Fall Time	$t_f$	—	35	—	$\mu s$	$R_L=100 \Omega$

Figure 1. Forward voltage vs. forward current

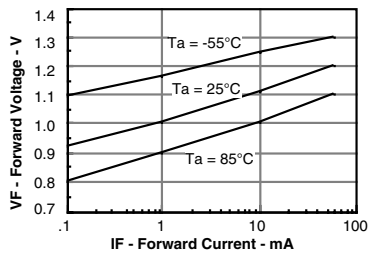


Figure 2. Typical IC vs. VCE

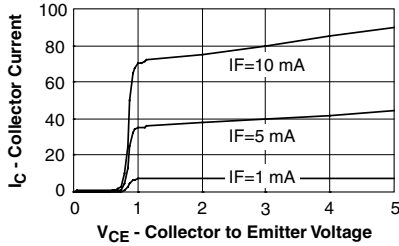


Figure 3. Typical IC vs. VCE vs. temperature

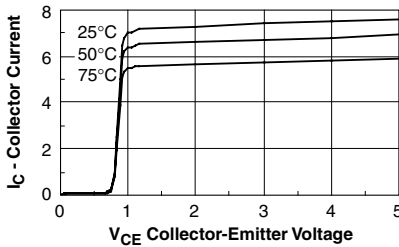


Figure 4. Typical NCTR vs. LED current

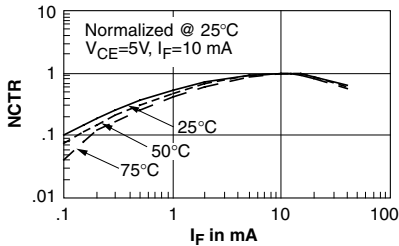


Figure 9. Switching waveform

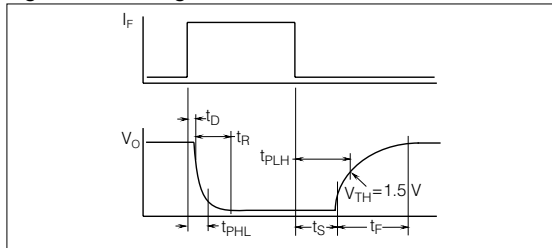


Figure 5. Typical IC vs. VCE (sat. region)

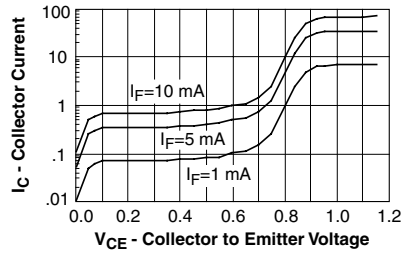


Figure 6. Typical ICEO vs. temperature

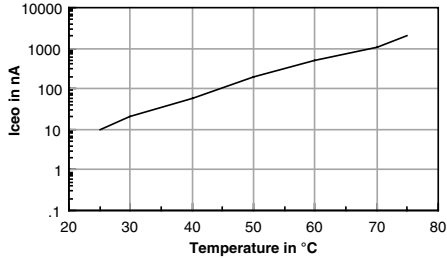


Figure 7. Low to high propagation delay vs. collector load resistance and LED current

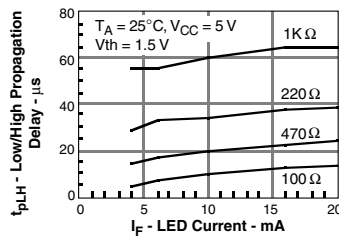


Figure 8. High to low propagation delay vs. collector load resistance and LED current

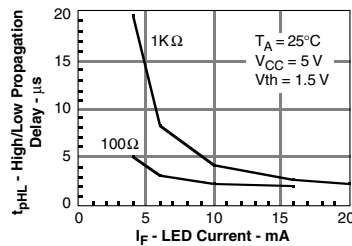


Figure 10. Switching schematic

