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

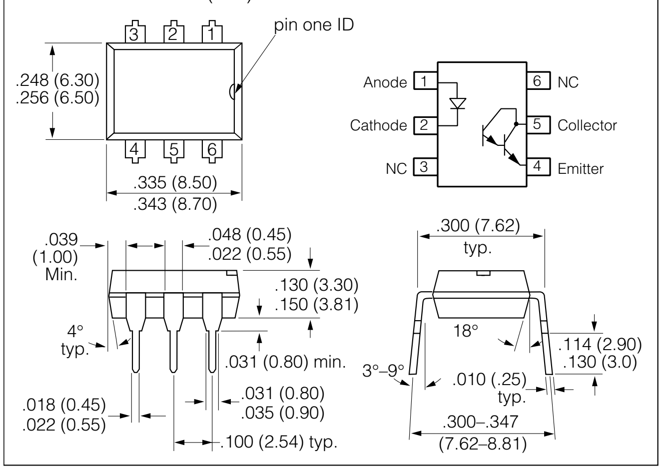
Detector

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°C.................................... 10^{12} Ω
V_{IO}=500 V, T_A=100°C................................. 10^{11} Ω
Creepage Path .... ≥7.0 mm
Clearance Path... ≥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.

Dimensions in inches (mm)



Electrical Characteristics (T_A=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Emitter						
Forward Voltage	V_F	—	1.25	1.5	V	I_F=20 mA
Reverse Current	I_R	—	0.1	10	µA	V_R=3.0 V
Capacitance	C_O	—	25	—	pF	V_R=0
Detector						
Collector-Emitter Breakdown Voltage	BV_{CEO}	80	—	—	V	I_C=10 µA
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 µA
Package						
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	—	µs	V_{CC}=13.5 V I_F=50 mA R_L=100 Ω
Fall Time	t_f	—	35	—		

Figure 1. Forward voltage vs. forward current

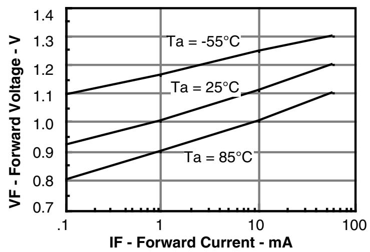


Figure 2. Typical I_C vs. V_{CE}

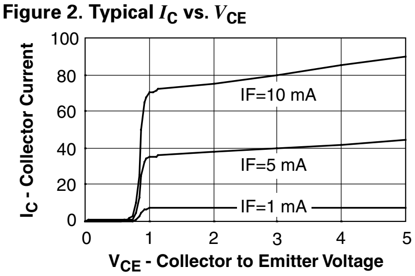


Figure 3. Typical I_C vs. V_{CE} vs. temperature

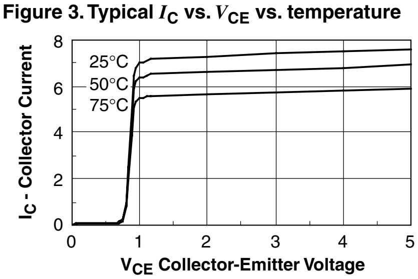


Figure 4. Typical NCTR vs. LED current

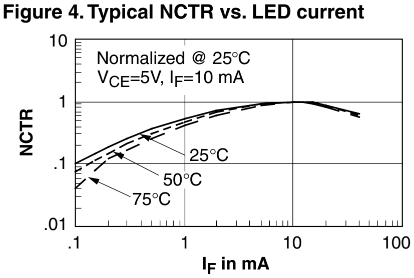


Figure 9. Switching waveform

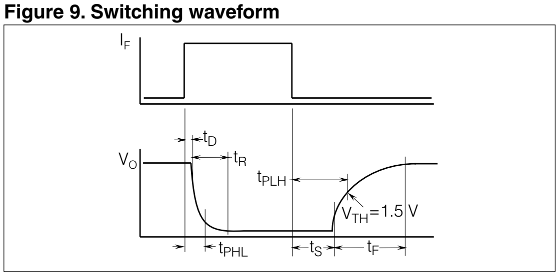


Figure 5. Typical I_C vs. V_{CE} (sat. region)

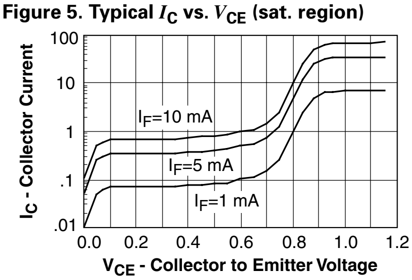


Figure 6. Typical I_{CEO} vs. temperature

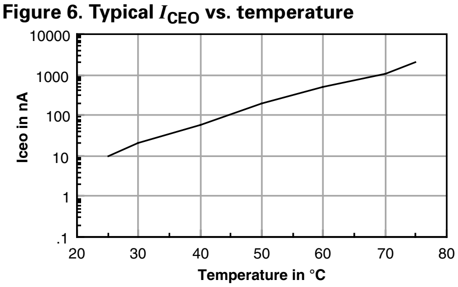


Figure 7. Low to high propagation delay vs. collector load resistance and LED current

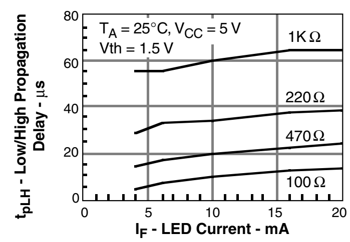


Figure 8. High to low propagation delay vs. collector load resistance and LED current

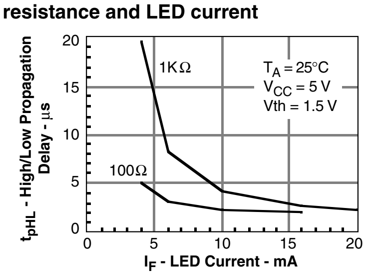


Figure 10. Switching schematic