No Base Connection Phototransistor Optocoupler

FEATURES

- **High Current Transfer Ratio**
  MOC8101, 50-80%
  MOC8102, 73-117%
  MOC8103, 108-173%
  MOC8104, 160-256%
  MOC8105, 65-133%
- **High Isolation Voltage, 5300 V_{RMS}**
- **No Base Terminal Connection for Improved Common Mode Interface Immunity**
- **Field-Effect Stable by TRIOS***
- **Long Term Stability**
- **Industry Standard Dual-in-Line Package**
- **Underwriters Lab File #E52744**
- **VDE 0884 Available with Option 1**

Maximum Ratings (T_A=25°C)

Emitter

Reverse Voltage ..... 6.0 V
Continuous Forward Current ..... 60 mA
Surge Forward Current (t≤10 µs) ..... 2.5 A
Derate Linearly from 25°C ..... 1.33 mW/°C
Power Dissipation ..... 100 mW

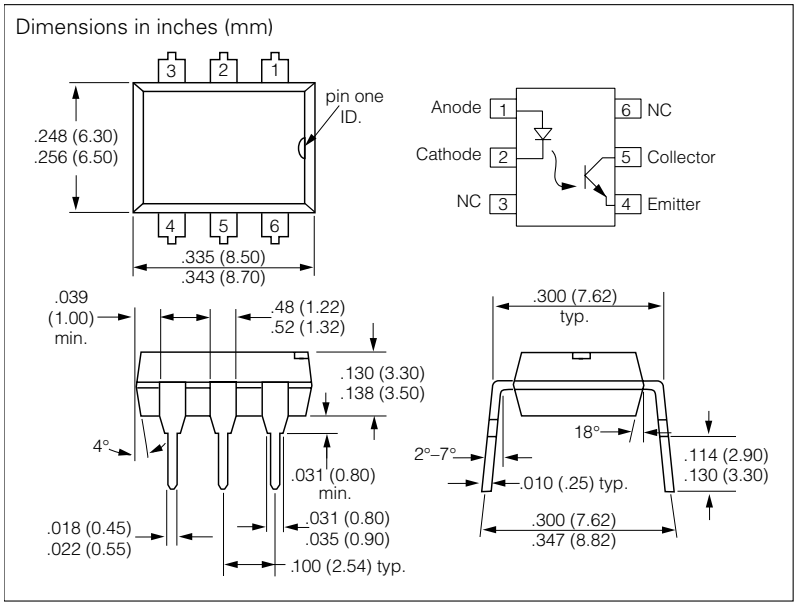
Detector

Collector–Emitter Breakdown Voltage ..... 30 V
Emitter–Collector Breakdown Voltage ..... 7.0 V
Collector Current ..... 50 mA
Collector Current (t≤1.0 ms) ..... 100 mA
Derate Linearly from 25°C ..... 2.00 mW/°C
Power Dissipation ..... 150 mW

Package

Isolation Test Voltage (t=1.0 sec) ..... 5300 V_{RMS}
Creepage ..... ≥7.0 mm
Clearance ..... ≥7.0 mm
Isolation Thickness between Emitter and Detector ..... ≥0.4 mm
Comparative Tracking Index per DIN IEC 112/VDE 0303, part 1 175
Isolation Resistance (V_{IO}=500 V) ..... ≥10^{12} Ω
Derate Linearly from 25°C ..... 3.33 mW/°C
Total Power Dissipation ..... 250 mW
Storage Temperature Range ..... –55 to +150°C
Ambient Temperature Range ..... –55 to +100°C
Junction Temperature ..... 100°C
Soldering Temperature (max. 10 s, dip soldering: distance to seating plane ≥1.5 mm) ..... 260°C

*__TRIOS—TR__ansparent __IO__n __S__hield



DESCRIPTION

The MOC810X is an optocoupler consisting of a Gallium Arsenide infrared emitting diode optically coupled to a silicon planar phototransistor detector in a plastic plug-in DIP-6 package.

The coupling device is suitable for signal transmission between two electrically separated circuits. The potential difference between the circuits to be coupled is not allowed to exceed the maximum permissible reference voltages.

The base terminal of the MOC810X is not connected, resulting in a substantially improved common-mode interference immunity.

Characteristics, (T_A=25°C) unless otherwise specified

Parameter	Sym.	Min.	Typ.	Max.	Unit	Condition
Emitter						
Forward Voltage	V_F	—	1.25	1.5	V	I_F=10 mA
Breakdown Voltage	V_{BR}	6.0	—	—	V	I_R=10 µA
Reverse Current	I_R	—	0.01	10	µA	V_R=6.0 V
Capacitance	C_O	—	25	—	pF	V_R=0 V, f=1.0 MHz
Thermal Resistance	R_{thJA}	—	750	—	K/W	—
Detector						
Capacitance	C_{CE}	—	5.2	—	pF	V_{CE}=5.0 V, f=1.0 MHz
Collector–Emitter Dark Current	I_{CEO1}	—	1.0	50	nA	V_{CE}=10 V, T_A=25°C
	I_{CEO2}	—	1.0	—	µA	V_{CE}=10 V, T_A=100°C
Collector–Emitter Breakdown Voltage	V_{CEO}	30	—	—	—	I_C=1.0 mA
Emitter–Collector Breakdown Voltage	V_{ECO}	7.0	—	—	V	I_E=100 µA
Thermal Resistance	R_{thJA}	—	500	—	K/W	—

Characteristics (T_A=25°C) (continued)

Parameter	Sym.	Min.	Typ.	Max.	Unit	Condition
Package						
Saturation Voltage, Collector-Emitter	V_{CEsat}	—	0.25	0.4	V	I_F=5.0 mA, I_C=500 µA
Coupling Capacitance	C_C	—	0.6	—	pF	
Current Transfer Ratio MOC8101 MOC8102 MOC8103 MOC8104 MOC8105	CTR	 50 73 108 160 65	—	 80 117 173 256 133	%	V_{CE}=10 V, I_F=10 mA
Turn-on Time	t_{ON}	—	3.0	—	µs	I_C=2.0 mA, V_{CC}=10 V, R_L=100 Ω
Turn-off Time	t_{OFF}	—	2.3	—		
Rise Time	t_r	—	2.0	—		
Fall Time	t_f	—	2.0	—		
Cut off Frequency	f_{CO}	—	250	—	kHz	—

Figure 1. Switching Time Test Circuit and Waveforms

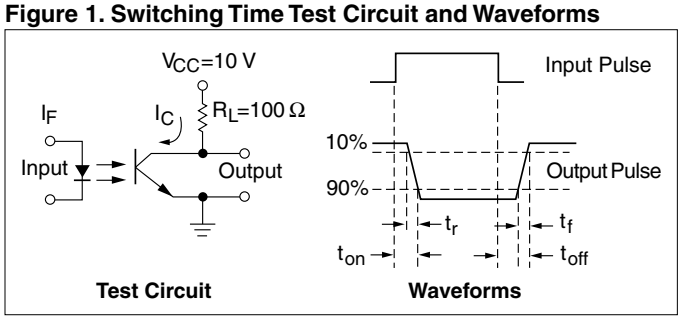


Figure 2. Forward Voltage vs. Forward Current

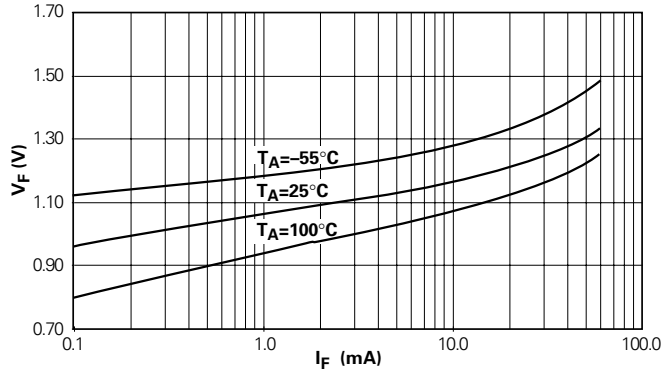


Figure 3. Collector Current vs. LED Forward Current (Normalized to I_F=10 mA)

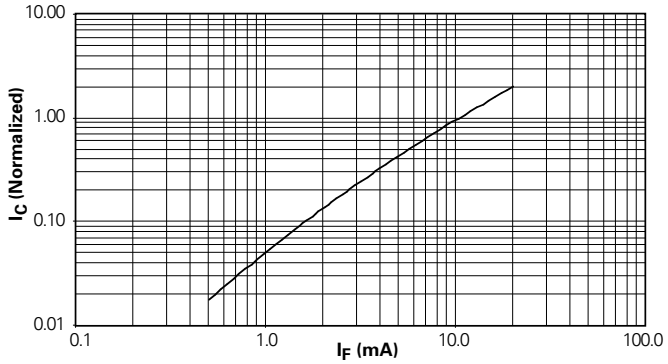


Figure 4. Collector Current vs. Collector–Emitter Voltage

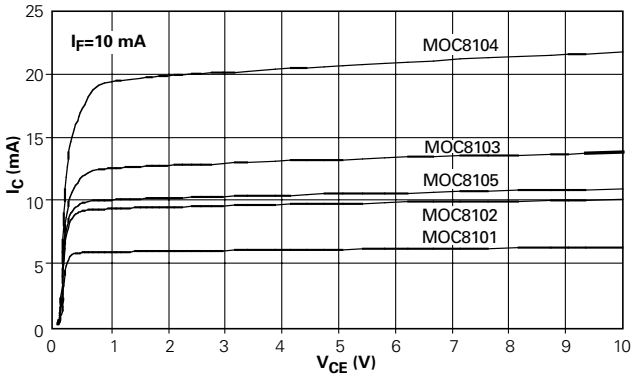


Figure 5. Collector Current vs. Ambient Temperature

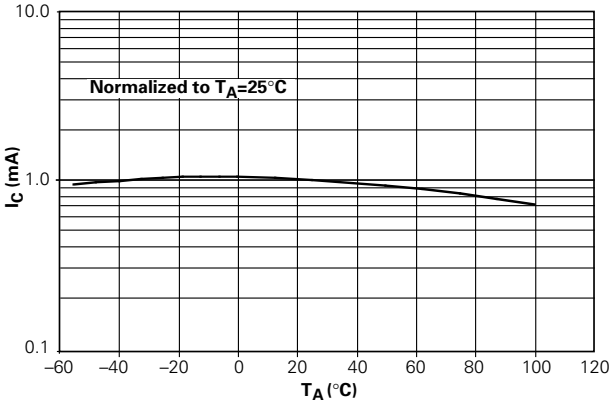


Figure 6. Collector–Emitter Dark Current vs. Ambient Temperature

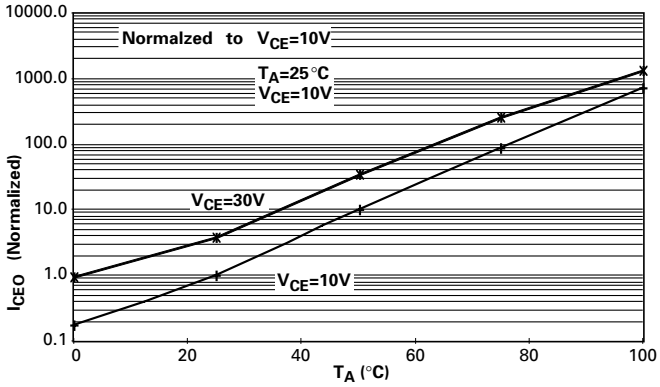


Figure 7. Capacitance vs. Voltage