FAIRCHILD
SEMICONDUCTOR™

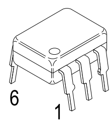
GlobalOptoisolator™

VDE | UL | CSA | SETI | SEMKO | DEMKO | NEMKO | BABT

6-Pin DIP Zero-Cross Optoisolators Triac Driver Output

(800 Volts Peak)

MOC3081
MOC3082
MOC3083



STANDARD THRU HOLE

The MOC3081, MOC3082 and MOC3083 devices consist of gallium arsenide infrared emitting diodes optically coupled to monolithic silicon detectors performing the function of Zero Voltage Crossing bilateral triac drivers.

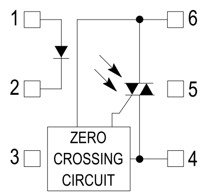
They are designed for use with a triac in the interface of logic systems to equipment powered from 240 Vac lines, such as solid–state relays, industrial controls, motors, solenoids and consumer appliances, etc.

- Simplifies Logic Control of 240 Vac Power
- Zero Voltage Crossing
- dv/dt of 1500 V/µs Typical, 600 V/µs Guaranteed
- ***To order devices that are tested and marked per VDE 0884 requirements, the suffix ”V” must be included at end of part number. VDE 0884 is a test option.***

Recommended for 240 Vac(rms) Applications:

- Solenoid/Valve Controls
- Lighting Controls
- Static Power Switches
- AC Motor Drives
- Temperature Controls
- E.M. Contactors
- AC Motor Starters
- Solid State Relays

COUPLER SCHEMATIC



1. ANODE
2. CATHODE
3. NC
4. MAIN TERMINAL
5. SUBSTRATE DO NOT CONNECT
6. MAIN TERMINAL

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
INPUT LED			
Reverse Voltage	V_R	6	Volts
Forward Current — Continuous	I_F	60	mA
Total Power Dissipation @ T_A = 25°C Negligible Power in Output Driver Derate above 25°C	P_D	120 1.41	mW mW/°C
OUTPUT DRIVER			
Off–State Output Terminal Voltage	V_{DRM}	800	Volts
Peak Repetitive Surge Current (PW = 100 µs, 120 pps)	I_{TSM}	1	A
Total Power Dissipation @ T_A = 25°C Derate above 25°C	P_D	150 1.76	mW mW/°C
TOTAL DEVICE			
Isolation Surge Voltage(1) (Peak ac Voltage, 60 Hz, 1 Second Duration)	V_{ISO}	7500	Vac(pk)
Total Power Dissipation @ T_A = 25°C Derate above 25°C	P_D	250 2.94	mW mW/°C
Junction Temperature Range	T_J	–40 to +100	°C
Ambient Operating Temperature Range	T_A	–40 to +85	°C
Storage Temperature Rang	T_{stg}	–40 to +150	°C
Soldering Temperature (10 s)	T_L	260	°C

1. Isolation surge voltage, V_{ISO}, is an internal device dielectric breakdown rating. For this test, Pins 1 and 2 are common, and Pins 4, 5 and 6 are common.

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
INPUT LED					
Reverse Leakage Current (V_R = 6 V)	I_R	—	0.05	100	μA
Forward Voltage (I_F = 30 mA)	V_F	—	1.3	1.5	Volts
OUTPUT DETECTOR (I_F = 0)					
Leakage with LED Off, Either Direction (V_{DRM} = 800 V(1))	I_{DRM1}	—	80	500	nA
Critical Rate of Rise of Off–State Voltage(3)	dv/dt	600	1500	—	V/μs
COUPLED					
LED Trigger Current, Current Required to Latch Output (Main Terminal Voltage = 3 V(2)) MOC3081	I_{FT}	—	—	15	mA
MOC3082		—	—	10	
MOC3083		—	—	5	
Peak On–State Voltage, Either Direction (I_{TM} = 100 mA, I_F = Rated I_{FT})	V_{TM}	—	1.8	3	Volts
Holding Current, Either Direction	I_H	—	250	—	μA
Inhibit Voltage (MT1–MT2 Voltage above which device will not trigger) (I_F = Rated I_{FT})	V_{INH}	—	5	20	Volts
Leakage in Inhibited State (I_F = Rated I_{FT}, V_{DRM} = 800 V, Off State)	I_{DRM2}	—	300	500	μA

1. Test voltage must be applied within dv/dt rating.
2. All devices are guaranteed to trigger at an I_F value less than or equal to max I_{FT}. Therefore, recommended operating I_F lies between max I_{FT} (15 mA for MOC3081, 10 mA for MOC3082, 5 mA for MOC3083) and absolute max I_F (60 mA).
3. This is static dv/dt. See Figure 7 for test circuit. Commutating dv/dt is a function of the load–driving thyristor(s) only.

TYPICAL CHARACTERISTICS

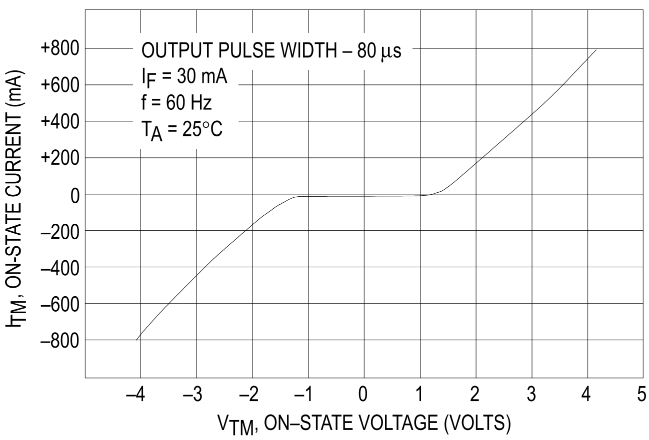


Figure 1. On–State Characteristics

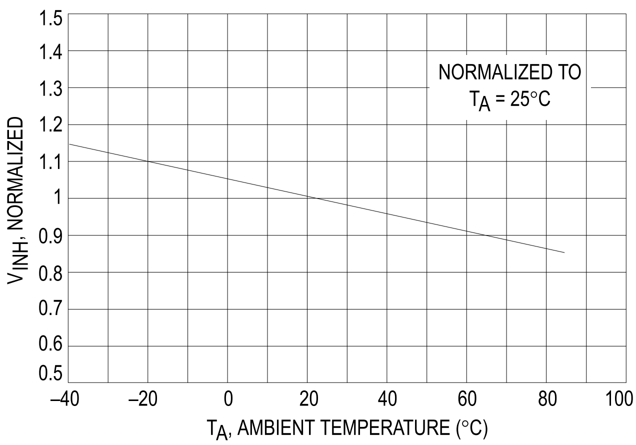


Figure 2. Inhibit Voltage versus Temperature

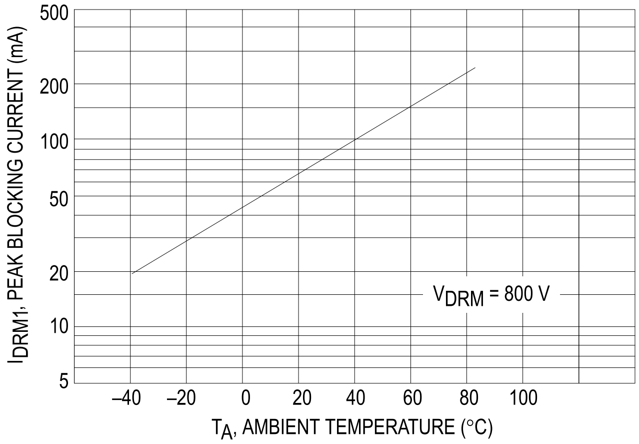


Figure 3. Leakage with LED Off versus Temperature

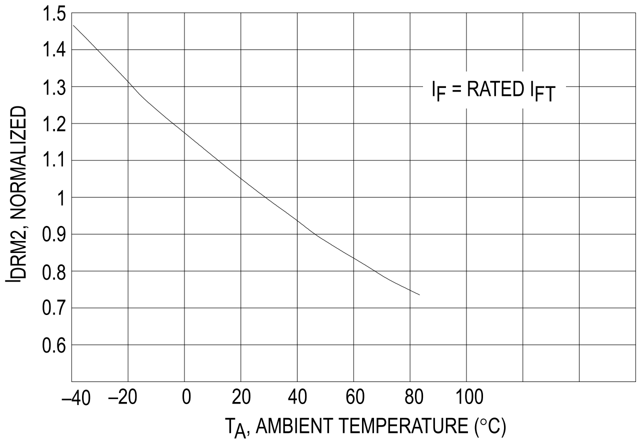


Figure 4. I_{DRM2}, Leakage in Inhibit State versus Temperature

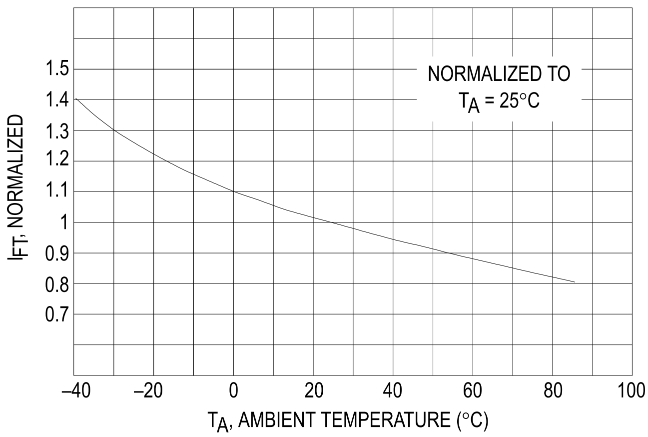


Figure 5. Trigger Current versus Temperature

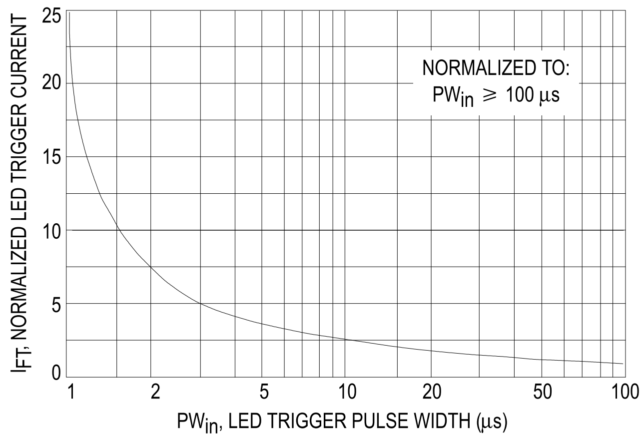
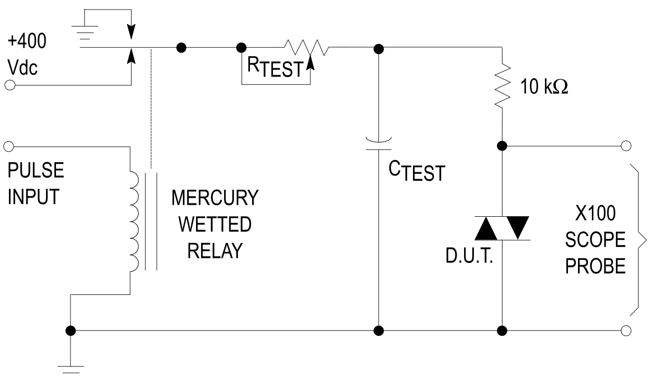
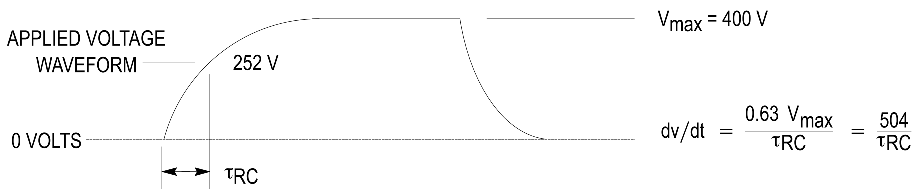


Figure 6. LED Current Required to Trigger versus LED Pulse Width

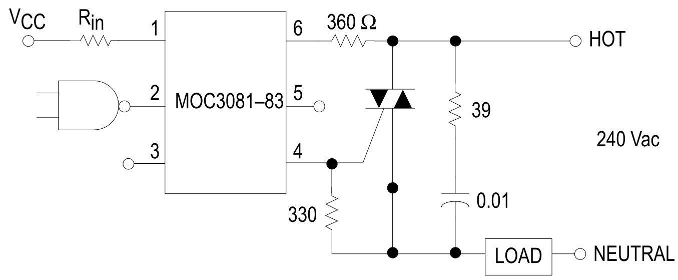


1. The mercury wetted relay provides a high speed repeated pulse to the D.U.T.
2. 100x scope probes are used, to allow high speeds and voltages.
3. The worst–case condition for static dv/dt is established by triggering the D.U.T. with a normal LED input current, then removing the current. The variable R_{TEST} allows the dv/dt to be gradually increased until the D.U.T. continues to trigger in response to the applied voltage pulse, even after the LED current has been removed. The dv/dt is then decreased until the D.U.T. stops triggering. τ_{RC} is measured at this point and recorded.



$$dv/dt = \frac{0.63\ V_{max}}{\tau_{RC}} = \frac{504}{\tau_{RC}}$$

Figure 7. Static dv/dt Test Circuit

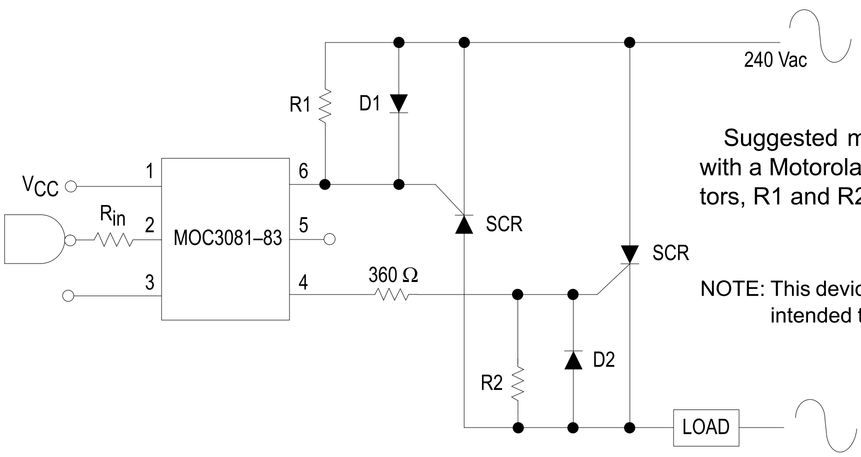


Typical circuit for use when hot line switching is required. In this circuit the “hot” side of the line is switched and the load connected to the cold or neutral side. The load may be connected to either the neutral or hot line.

R_{in} is calculated so that I_F is equal to the rated I_{FT} of the part, 15 mA for the MOC3081, 10 mA for the MOC3082, and 5 mA for the MOC3083. The 39 ohm resistor and 0.01 µF capacitor are for snubbing of the triac and may or may not be necessary depending upon the particular triac and load used.

* For highly inductive loads (power factor < 0.5), change this value to 360 ohms.

Figure 8. Hot–Line Switching Application Circuit

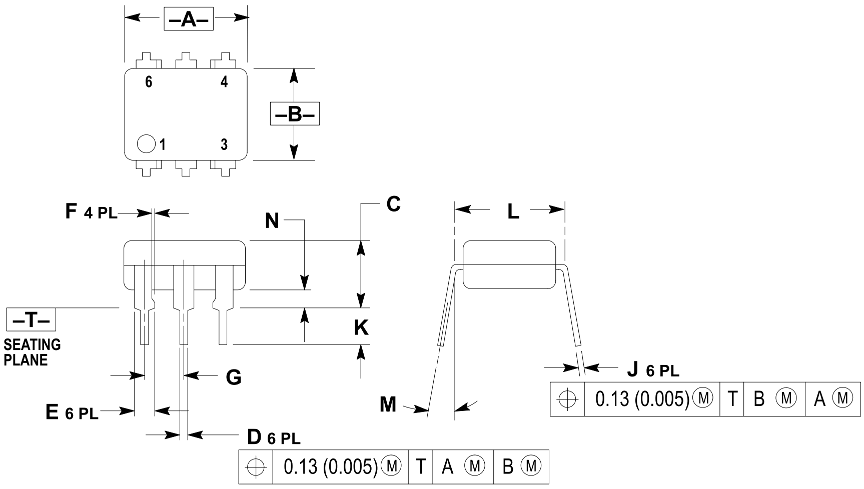


Suggested method of firing two, back–to–back SCR’s, with a Motorola triac driver. Diodes can be 1N4001; resistors, R1 and R2, are optional 330 ohms.

NOTE: This device should not be used to drive a load directly. It is intended to be a trigger device only.

Figure 9. Inverse–Parallel SCR Driver Circuit

PACKAGE DIMENSIONS

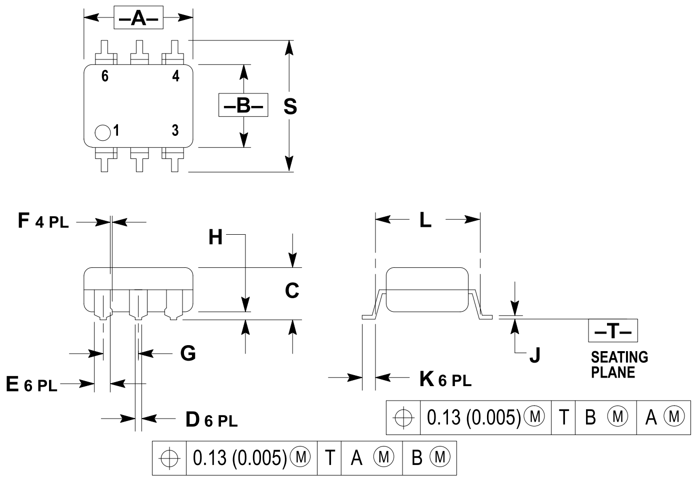


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.320	0.350	8.13	8.89
B	0.240	0.260	6.10	6.60
C	0.115	0.200	2.93	5.08
D	0.016	0.020	0.41	0.50
E	0.040	0.070	1.02	1.77
F	0.010	0.014	0.25	0.36
G	0.100 BSC		2.54 BSC	
J	0.008	0.012	0.21	0.30
K	0.100	0.150	2.54	3.81
L	0.300 BSC		7.62 BSC	
M	0°	15°	0°	15°
N	0.015	0.100	0.38	2.54

STYLE 6:
PIN 1. ANODE
2. CATHODE
3. NC
4. MAIN TERMINAL
5. SUBSTRATE
6. MAIN TERMINAL

THRU HOLE



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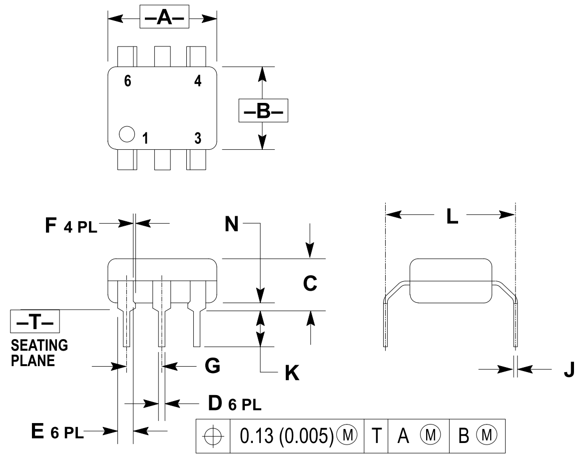
B	0.240	0.260	6.10	6.60
C	0.115	0.200	2.93	5.08
D	0.016	0.020	0.41	0.50
E	0.040	0.070	1.02	1.77
F	0.010	0.014	0.25	0.36
G	0.100 BSC		2.54 BSC	
H	0.020	0.025	0.51	0.63
J	0.008	0.012	0.20	0.30
K	0.006	0.035	0.16	0.88
L	0.320 BSC		8.13 BSC	
S	0.332	0.390	8.43	9.90

SURFACE MOUNT



NOTES:
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2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.320	0.350	8.13	8.89
B	0.240	0.260	6.10	6.60
C	0.115	0.200	2.93	5.08
D	0.016	0.020	0.41	0.50
E	0.040	0.070	1.02	1.77
F	0.010	0.014	0.25	0.36
G	0.100 BSC		2.54 BSC	
J	0.008	0.012	0.21	0.30
K	0.100	0.150	2.54	3.81
L	0.400	0.425	10.16	10.80
N	0.015	0.040	0.38	1.02

0.4" LEAD SPACING

FAIRCHILD SEMICONDUCTOR™

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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.