MOTOROLA Semiconductors
Boîte postale 1029 - 31023 Toulouse CEDEX - FRANCE

MOC3040
MOC3041

ZERO VOLTAGE CROSSING OPTICALLY ISOLATED TRIAC DRIVER

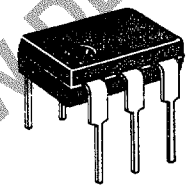
This device consists of a gallium arsenide infrared emitting diode optically coupled to a monolithic silicon detector performing the function of a Zero Voltage Crossing bilateral triac driver.

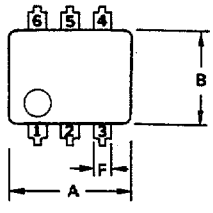
They are designed for use with a triac in the interface of logic systems to equipment powered from 220 Vac lines, such as solid-state relays, industrial controls, motors, solenoids and consumer appliances, etc.

- Simplifies Logic Control of 220 Vac Power
- Zero Voltage Crossing
- High Breakdown Voltage: V_{DRM} = 400 V Min
- High Isolation Voltage: V_{ISO} = 7500 V Min
- Small, Economical, 6-Pin DIP Package
- Same Pin Configuration as MOC3020/3021
- UL Recognized, File No. E54915
- dv/dt of 100 V/μs Typ

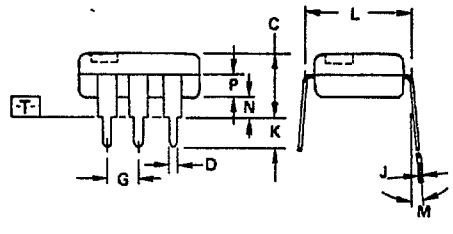
OPTO COUPLER / ISOLATOR ZERO CROSSING TRIAC DRIVER

400 VOLTS





NOTES:
1. DIMENSIONS A AND B ARE DATUMS.
2. -T- IS SEATING PLANE.
3. POSITIONAL TOLERANCES FOR LEADS: ⌖ Ø 0.13 (0.005) M T A M B M
4. DIMENSION L TO CENTER OF LEADS WHEN FORMED PARALLEL.
5. DIMENSIONING AND TOLERANCING PER ANSI Y14.5, 1973.



DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	8.13	8.89	0.320	0.350
B	6.10	6.60	0.240	0.260
C	2.92	5.08	0.115	0.200
D	0.41	0.51	0.016	0.020
F	1.02	1.78	0.040	0.070
G	2.54 BSC		0.100 BSC	
J	0.20	0.30	0.008	0.012
K	2.54	3.81	0.100	0.150
L	7.62 BSC		0.300 BSC	
M	0°	15°	0°	15°
N	0.38	2.54	0.015	0.100
P	1.27	2.03	0.050	0.080

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

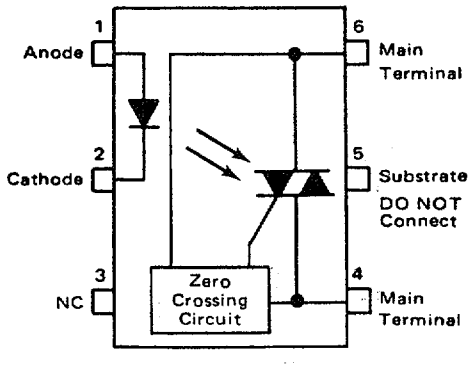
CASE 730A-01

MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
INFRARED EMITTING DIODE MAXIMUM RATINGS			
Reverse Voltage	V_R	6.0	Volts
Forward Current — Continuous	I_F	50	mA
Total Power Dissipation @ T_A = 25°C Negligible Power in Output Driver Derate above 25°C	P_D	120 1.33	mW mW/°C
OUTPUT DRIVER MAXIMUM RATINGS			
Off-State Output Terminal Voltage	V_{DRM}	400	Volts
On-State RMS Current (T_A = 25°C) (Full Cycle, 50 to 60 Hz) (T_A = 70°C)	$I_{T(RMS)}$	100 50	mA mA
Peak Nonrepetitive Surge Current (PW = 10 ms)	I_{TSM}	1.2	A
Total Power Dissipation @ T_A = 25°C Derate above 25°C	P_D	300 4.0	mW mW/°C
TOTAL DEVICE MAXIMUM RATINGS			
Isolation Surge Voltage (1) (Peak ac Voltage, 60 Hz, 5 Second Duration)	V_{ISO}	7500	Vac
Total Power Dissipation @ T_A = 25°C Derate above 25°C	P_D	330 4.4	mW mW/°C
Junction Temperature Range	T_J	-40 to +100	°C
Ambient Operating Temperature Range	T_A	-40 to +70	°C
Storage Temperature Range	T_{stg}	-40 to +150	°C
Soldering Temperature (10 s)	–	260	°C

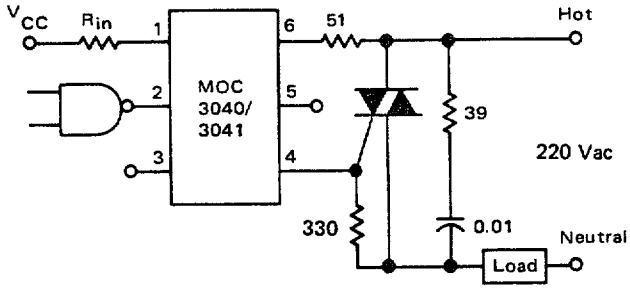
(1) Isolation surge voltage, V_{ISO}, is an internal device dielectric breakdown rating.

COUPLER SCHEMATIC



Specifications are subject to change without notice.

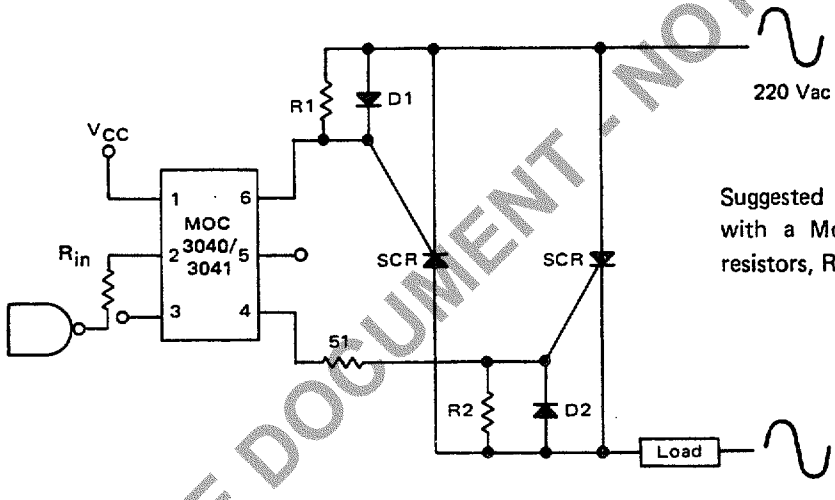
FIGURE 3 – HOT-LINE SWITCHING APPLICATION CIRCUIT



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 MOC3041 or 30 mA for the MOC3040. 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.

FIGURE 4 – INVERSE-PARALLEL SCR DRIVER 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.

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

Characteristic		Symbol	Min	Typ	Max	Unit
LED CHARACTERISTICS						
Reverse Leakage Current (V_R = 6.0 V)		I_R	–	0.05	100	μA
Forward Voltage (I_F = 30 mA)		V_F	–	1.3	1.5	Volts
DETECTOR CHARACTERISTICS (I_F = 0 unless otherwise noted)						
Peak Blocking Current, Either Direction (Rated V_{DRM}, Note 1)		I_{DRM1}	–	2.0	100	nA
Peak On-State Voltage, Either Direction (I_{TM} = 100 mA Peak)		V_{TM}	–	1.8	3.0	Volts
Critical Rate of Rise of Off-State Voltage		dv/dt	–	100	–	V/μs
COUPLED CHARACTERISTICS						
LED Trigger Current, Current Required to Latch Output (Main Terminal Voltage = 3.0 V, Note 2)	MOC3040 MOC3041	I_{FT}	– –	– –	30 15	mA
Holding Current, Either Direction		I_H	–	200	–	μA
ZERO CROSSING CHARACTERISTICS						
Inhibit Voltage (I_F = Rated I_{FT}, MT1-MT2 Voltage above which device will not trigger.)		V_{IH}	–	15	40	Volts
Leakage in Inhibited State (I_F = Rated I_{FT}, Rated V_{DRM}, Off State)		I_{DRM2}	–	100	300	μA

Note 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} (30 mA for MOC3040, 15 mA for MOC3041) and absolute max I_F (50 mA).

TYPICAL ELECTRICAL CHARACTERISTICS

FIGURE 1 – ON-STATE CHARACTERISTICS

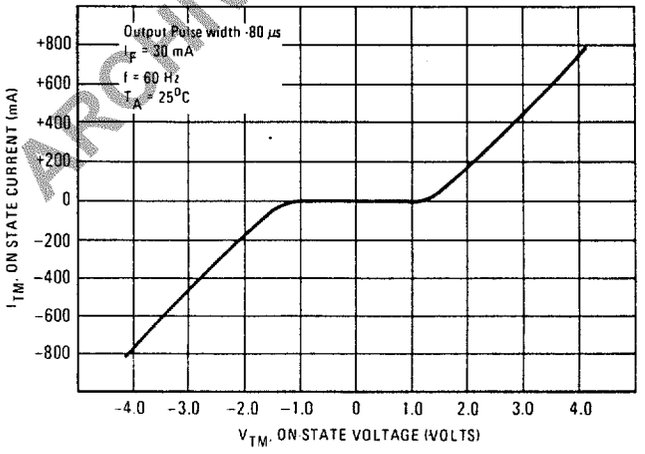


FIGURE 2 – TRIGGER CURRENT versus TEMPERATURE