MOTOROLA

SEMICONDUCTORS

P.O. BOX 20912 • PHOENIX, ARIZONA 85036

MOC3030
MOC3031
MOC3032
MOC3033

OPTO COUPLER/ISOLATOR

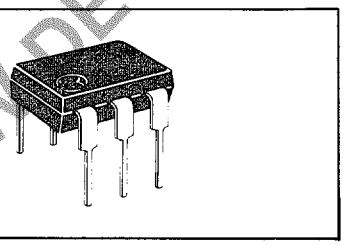
ZERO CROSSING TRIAC DRIVER 250 VOLTS

ZERO VOLTAGE CROSSING OPTICALLY ISOLATED TRIAC DRIVER

These devices consist of gallium arsenide infrared-emitting diodes optically coupled to monolithic silicon detectors performing the functions 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 115 Vac lines, such as teletypewriters, CRTs, printers, motors, solenoids and consumer appliances, etc.

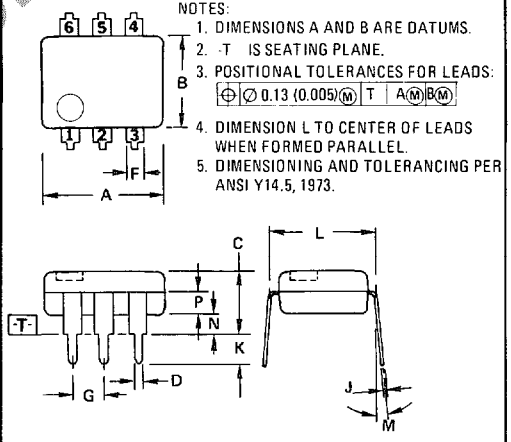
- Simplifies Logic Control of 110 Vac Power
- Zero Voltage Crossing
- High Breakdown Voltage: V_{DRM} = 250 V Min
- High Isolation Voltage: V_{ISO} = 7500 V Min
- Small, Economical, 6-Pin DIP Package
- Same Pin Configuration as MOC3010/3011
- UL Recognized, File No. E54915
- dv/dt of 100 V/μs Typ



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

Rating	Symbol	Value	Unit
INFRARED EMITTING DIODE MAXIMUM RATINGS			
Reverse Voltage	V_R	3.0	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}	250	Volts
On-State RMS Current T_A = 25°C	$I_{T(RMS)}$	100	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 +85	°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.

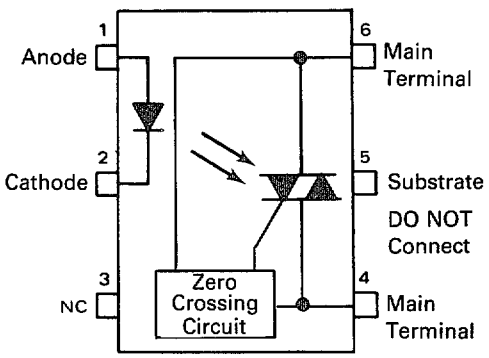


DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	8.13	8.89	0.320	0.350
B	6.10	6.60	0.240	0.260
C	2.92	5.08	0.115	0.200
D	0.41	0.51	0.016	0.020
F	1.02	1.78	0.040	0.070
G	2.54 BSC		0.100 BSC	
J	0.20	0.30	0.008	0.012
K	2.54	3.81	0.100	0.150
L	7.62 BSC		0.300 BSC	
M	0°	15°	0°	15°
N	0.38	2.54	0.015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

COUPLER SCHEMATIC



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

Characteristic	Symbol	Min	Typ	Max	Unit
LED CHARACTERISTICS					
Reverse Leakage Current (V_R = 3.0 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_{DRM}	—	10	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) MOC3030	I_{FT}	—	—	30	mA
MOC3031		—	—	15	
MOC3032		—	—	10	
MOC3033		—	—	5.0	
Holding Current, Either Direction	I_H	—	100	—	μA
ZERO CROSSING CHARACTERISTICS					
Inhibit Voltage (I_F = Rated I_{FT}, MT1–MT2 Voltage above which device will not trigger.)	V_{IH}	—	15	25	Volts
Leakage in Inhibited State (I_F = Rated I_{FT}, Rated V_{DRM}, Off State)	I_R	—	100	200	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}.

TYPICAL ELECTRICAL CHARACTERISTICS
T_A = 25°C

FIGURE 1 — ON-STATE CHARACTERISTICS

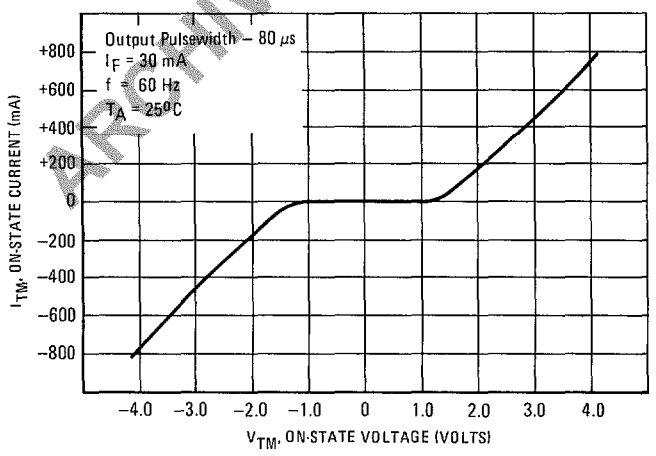


FIGURE 2 — TRIGGER CURRENT versus TEMPERATURE

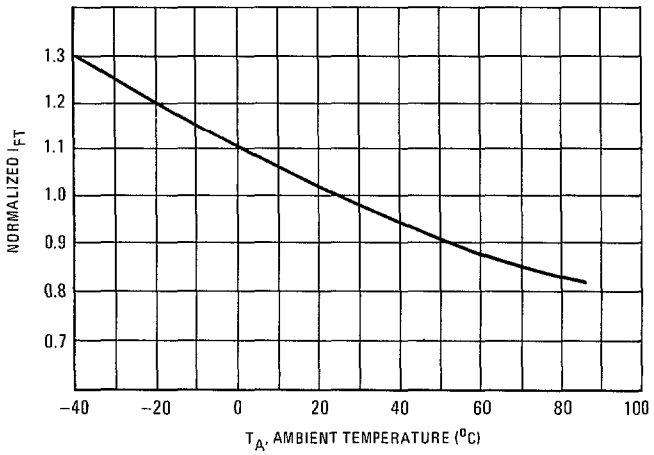
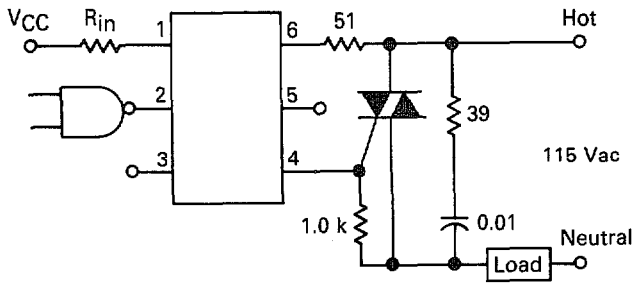
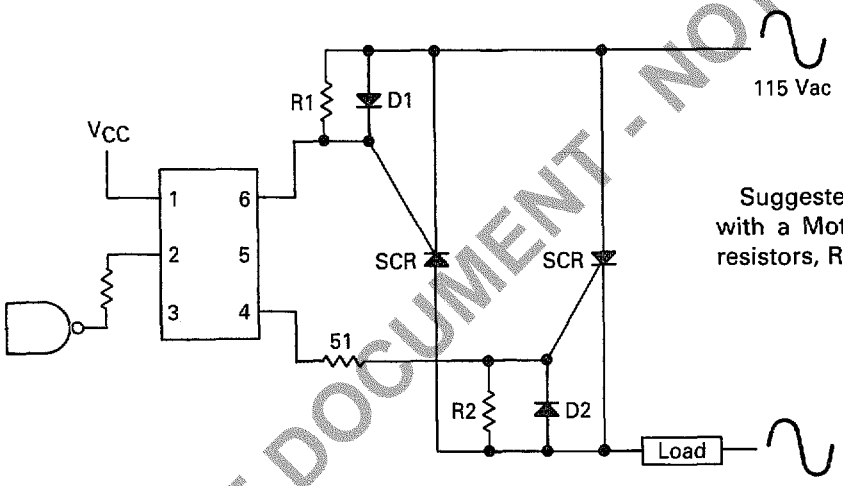


FIGURE 3 — HOT-LINE SWITCHING APPLICATION CIRCUIT



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. 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 1.0 k ohm.

When operating in environments subject to high line transients, it is suggested that an appropriate line suppressor be placed across the 115 Vac line to prevent voltage spikes from exceeding the maximum voltage rating of the device.

MOTOROLA *Semiconductor Products Inc.*

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