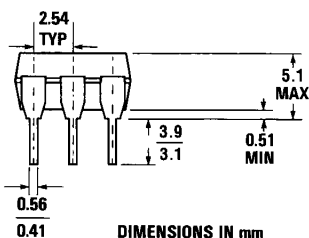
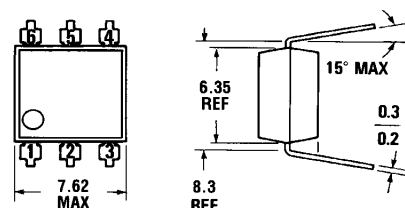


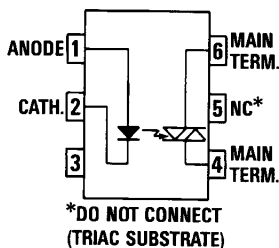
**MOC3009 MOC3010
MOC3011 MOC3012**

PACKAGE DIMENSIONS



DIMENSIONS IN mm
PACKAGE CODE E

ST1603-02



Equivalent Circuit

C2081

DESCRIPTION

The MOC3009, MOC3010, MOC3011 and MOC3012 are optically isolated triac driver devices. These devices contain a GaAs infrared emitting diode and a light activated silicon bilateral switch, which functions like a triac. This series is designed for interfacing between electronic controls and power triacs to control resistive and inductive loads for 120 VAC operations.

FEATURES

- Low input current required (typically 5mA—MOC3011)
- High isolation voltage—minimum 7500 VAC peak
- Underwriters Laboratory (UL) recognized—File E90700

APPLICATIONS

- Triac driver
- Industrial controls
- Traffic lights
- Vending machines
- Motor control
- Solid state relay

ABSOLUTE MAXIMUM RATINGS

TOTAL PACKAGE

Storage temperature -55°C to 150°C
Operating temperature -40°C to 100°C
Lead temperature
(soldering 10 sec) 260°C
Withstand test voltage ... 7500 VAC Peak (50-60 Hz)

INPUT DIODE

Forward DC current 50 mA
Reverse voltage 3 V
Peak forward current
(1 μ s pulse, 300 pps) 3.0 A
Power dissipation (25°C ambient) 100 mW
Derate linearly (above 25°C) 1.33 mW/°C

OUTPUT DRIVER

Off-state output terminal voltage 250 volts
On-state RMS current $T_A=25^\circ\text{C}$ 100 mA
(Full cycle, 50 to 60 Hz) $T_A=70^\circ\text{C}$ 50 mA
Peak nonrepetitive surge current 1.2 A
(PW=10 ms, DC=10%)
Total power dissipation @ $T_A=25^\circ\text{C}$ 300 mW
Derate above 25°C 4.0 mW/°C



NON-ZERO-CROSSING TRIACS

ELECTRO-OPTICAL CHARACTERISTICS (25°C Temperature Unless Otherwise Specified)

INDIVIDUAL COMPONENT CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
INPUT DIODE						
Forward voltage	V_F		1.2	1.50	V	$I_F = 10 \text{ mA}$
Junction capacitance	C_J		50		pF	$V_F = 0 \text{ V}$, $f = 1 \text{ MHz}$
Reverse leakage current	I_R			100	μA	$V_R = 3.0 \text{ V}$
OUTPUT DETECTOR						
Peak blocking current, either direction	I_{DRM}	—		100	nA	$V_{\text{DRM}} = 250 \text{ V}$, Note 1
Peak on-state voltage, either direction	V_{TM}	—	2.0	3.0	Volts	$I_{\text{TM}} = 100 \text{ mA Peak}$

Note 1. Test voltage must be applied within dv/dt rating.

TRANSFER CHARACTERISTICS

DC CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
LED trigger current (current required to latch output)	MOC3009 I_{FT}	—	15.0	30	mA	Main terminal voltage = 3.0 V, $R_L = 150\Omega$
	MOC3010 I_{FT}	—	10.0	15	mA	
	MOC3011 I_{FT}	—	5	10	mA	
	MOC3012 I_{FT}	—	—	5	mA	
Holding current	I_H	—	100	—	μA	Either direction

TRANSFER CHARACTERISTICS

CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
AC dv/dt RATING						
Critical rate of rise of off-state voltage	dv/dt	—	12.0	—	V/ μs	Static dv/dt (see Fig. 4)
Critical rate of rise of commutating voltage	dv/dt	—	0.2	—	V/ μs	Commutating dv/dt $I_{\text{LOAD}} = 15 \text{ mA}$ (see Fig. 4)

ISOLATION CHARACTERISTICS

CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
Isolation voltage	V_{ISO}	5300			$V_{\text{AC RMS}}$	$I_{\text{IO}} \leq 1 \mu\text{A}$, 1 Minute
	V_{ISO}	7500			$V_{\text{AC PEAK}}$	$I_{\text{IO}} \leq 1 \mu\text{A}$, 1 Minute
Isolation resistance	R_{ISO}	10^{11}			ohms	$V_{\text{IO}} = 500 \text{ VDC}$
Isolation capacitance	C_{ISO}		0.5		pF	$f = 1 \text{ MHz}$

TYPICAL ELECTRICAL CHARACTERISTIC CURVES

(25°C Free Air Temperature Unless Otherwise Specified)

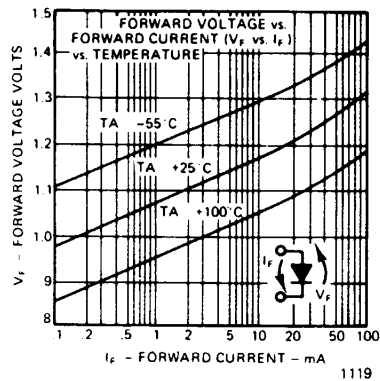


Fig. 1. Forward Voltage Drop vs. Forward Current

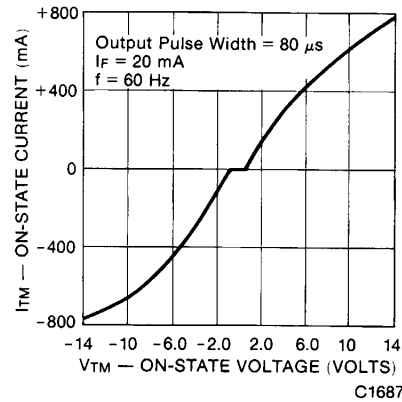


Fig. 2. On-State Characteristics

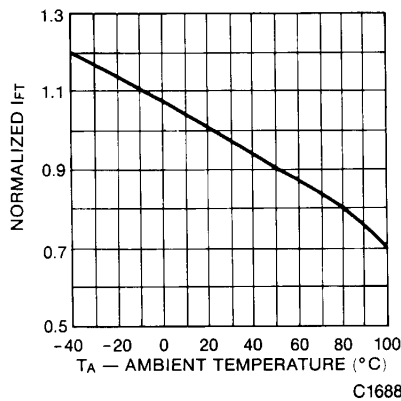


Fig. 3. Trigger Current vs. Temperature

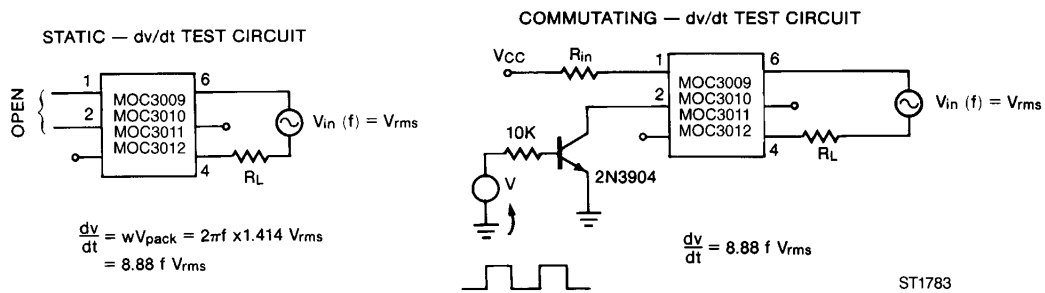
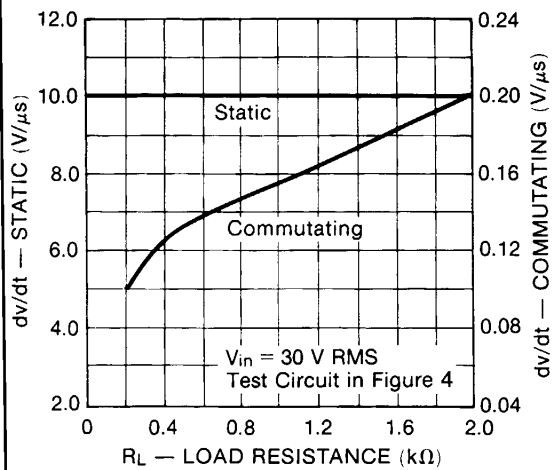


Fig. 4. dv/dt Test Circuits

ST1783

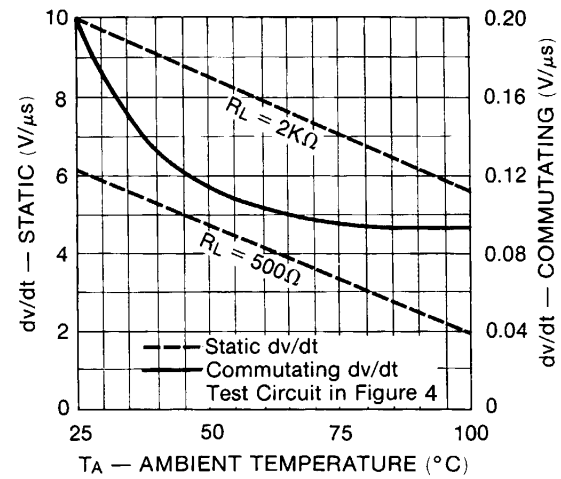
TYPICAL ELECTRICAL CHARACTERISTIC CURVES

(25°C Free Air Temperature Unless Otherwise Specified) (Cont'd)



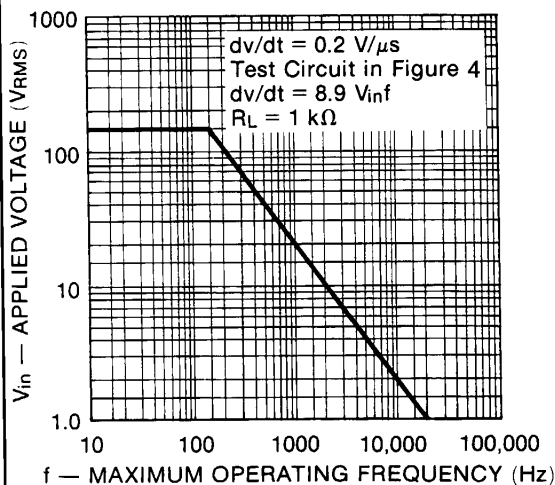
C1690

Fig. 5. dV/dt vs. Load Resistance



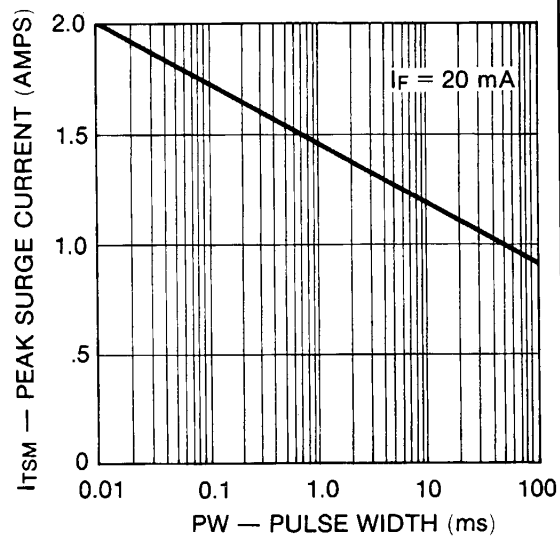
C1691

Fig. 6. dV/dt vs. Temperature



C1692

Fig. 7. Commutating dV/dt vs. Frequency



C1696

Fig. 8. Maximum Nonrepetitive Surge Current

TYPICAL APPLICATION CIRCUITS

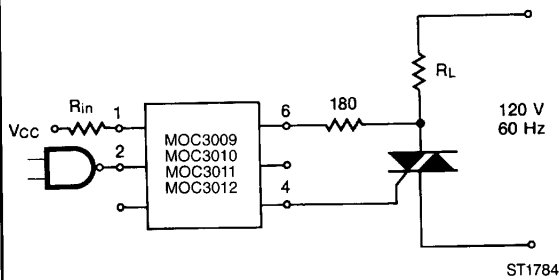


Fig. 9. Resistive Load

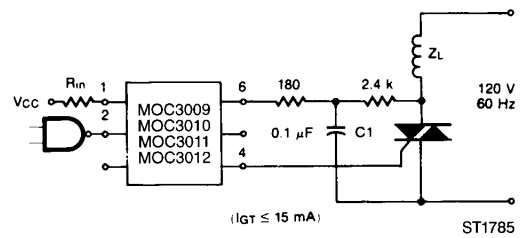


Fig. 10. Inductive Load With Sensitive Gate Triac

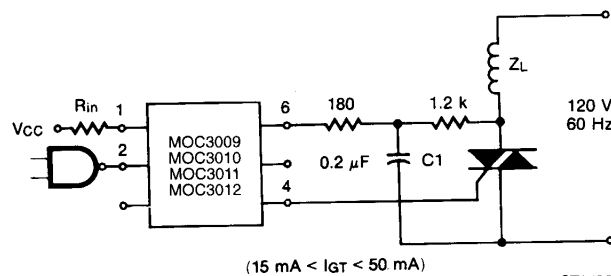


Fig. 11. Inductive Load With Non-Sensitive Gate Triac