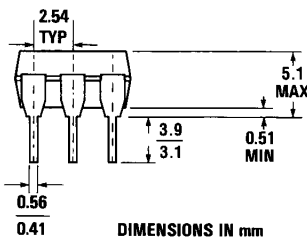
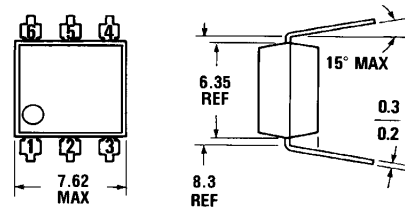


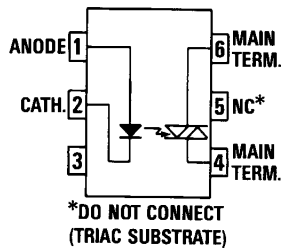
**MOC3009 MOC3010  
MOC3011 MOC3012**

**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

<b>ABSOLUTE MAXIMUM RATINGS</b>	
<b>TOTAL PACKAGE</b>	
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)
<b>INPUT DIODE</b>	
Forward DC current	50 mA
Reverse voltage	3 V
Peak forward current (1 μs pulse, 300 pps)	3.0 A
Power dissipation (25°C ambient)	100 mW
Derate linearly (above 25°C)	1.33 mW/°C
<b>OUTPUT DRIVER</b>	
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 (PW=10 ms, DC=10%)	1.2 A
Total power dissipation @ $T_A=25^\circ\text{C}$	300 mW
Derate above 25°C	4.0 mW/°C

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

**INDIVIDUAL COMPONENT CHARACTERISTICS**

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
<b>INPUT DIODE</b>						
Forward voltage	$V_f$		1.2	1.50	V	$I_f=10$ mA
Junction capacitance	$C_j$		50		pF	$V_f=0$ V, $f=1$ MHz
Reverse leakage current	$I_r$			100	$\mu$ A	$V_r=3.0$ V
<b>OUTPUT DETECTOR</b>						
Peak blocking current, either direction	$I_{DRM}$	—		100	nA	$V_{DRM}=250$ V, Note 1
Peak on-state voltage, either direction	$V_{TM}$	—	2.0	3.0	Volts	$I_{TM}=100$ 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	—	$\mu$ A	Either direction	

**TRANSFER CHARACTERISTICS**

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

**ISOLATION CHARACTERISTICS**

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

**TYPICAL ELECTRICAL CHARACTERISTIC CURVES**  
(25°C Free Air Temperature Unless Otherwise Specified)

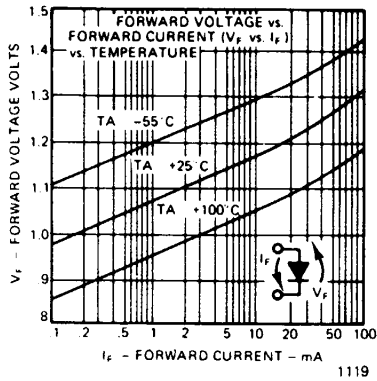


Fig. 1. Forward Voltage Drop vs. Forward Current

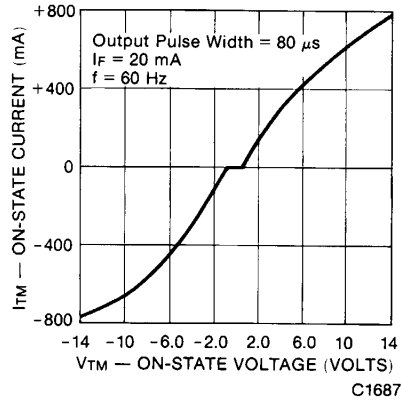


Fig. 2. On-State Characteristics

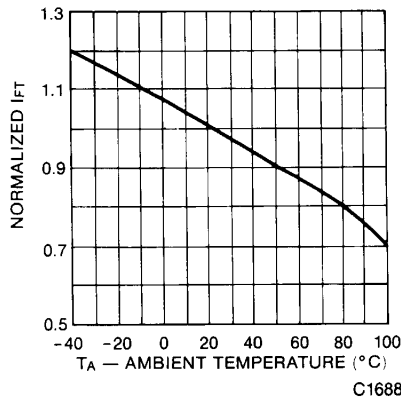


Fig. 3. Trigger Current vs. Temperature

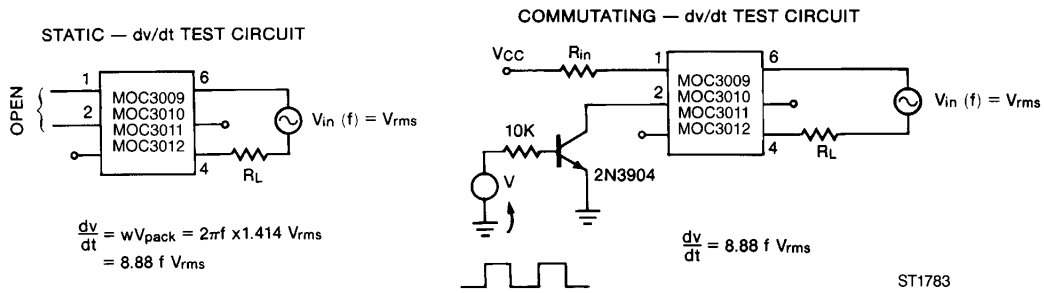
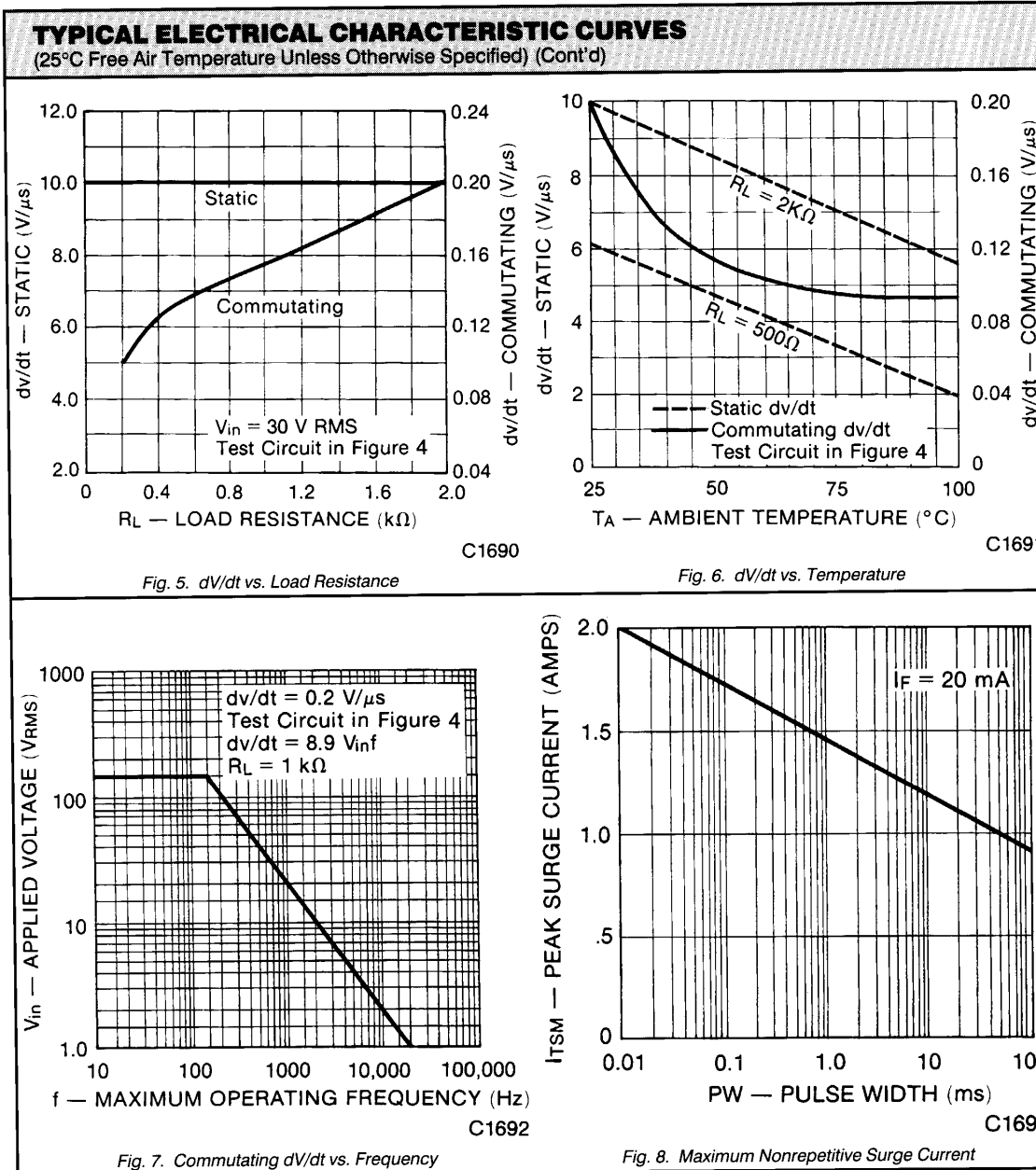
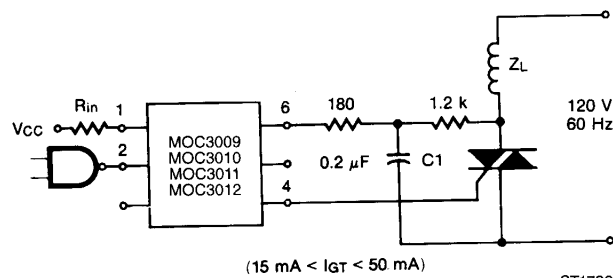
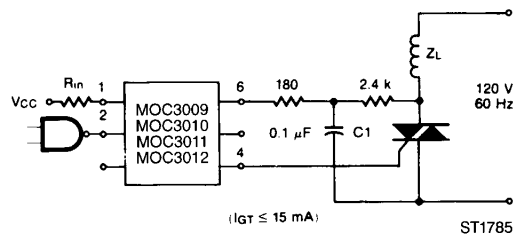
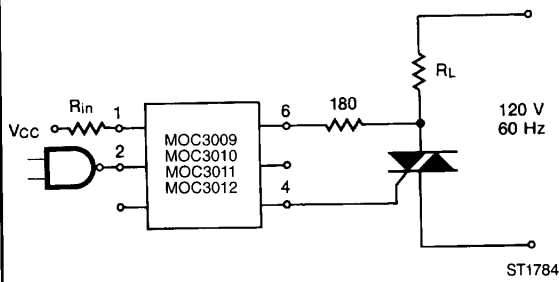


Fig. 4. dv/dt Test Circuits

ST1783



**TYPICAL APPLICATION CIRCUITS**



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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.