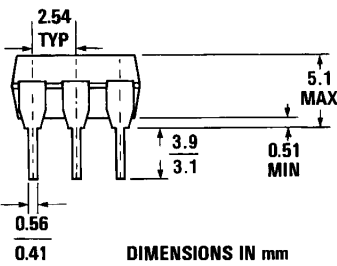
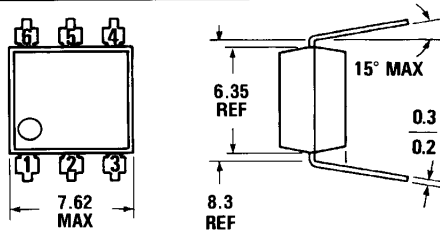
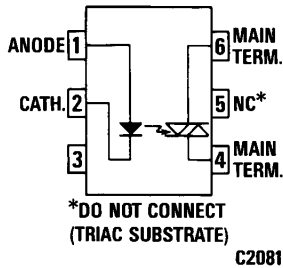


**MOC3020 MOC3021  
MOC3022 MOC3023**

**PACKAGE DIMENSIONS**



ST1603



Equivalent Circuit

**DESCRIPTION**

The MOC3020, MOC3021, MOC3022 and MOC3023 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 is designed for interfacing between electronic controls and power triacs to control resistive and inductive loads for 240 VAC operations.

**FEATURES**

- Excellent  $I_{FT}$  stability—IR emitting diode has low degradation
- High isolation voltage—minimum 7500 VAC peak
- Underwriters Laboratory (UL) recognized—File #E90700

**APPLICATIONS**

- European applications for 240 VAC
- 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

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

OUTPUT DRIVER	
Off-state output terminal voltage	400 Volts
On-state RMS current (Full cycle, 50 to 60 Hz)	$T_A=25^\circ\text{C}$ 100 mA $T_A=70^\circ\text{C}$ 50 mA
Peak nonrepetitive surge current (PW=10 ms, DC=10%)	1.2 A
Total power dissipation (25°C ambient)	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	$I_{DRM}$	—	10	100	nA	$V_{DRM}=400$ V, Note 1
Peak on-state voltage, either direction	$V_{TM}$	—	2.5	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)	MOC3020	$I_{FT}$	—	—	30	mA	Main terminal voltage=3.0 V, $R_L=150\Omega$
	MOC3021	$I_{FT}$	—	—	15	mA	
	MOC3022	$I_{FT}$	—	—	10	mA	
	MOC3023	$I_{FT}$	—	—	5	mA	
Holding current	$I_H$	—	100	—	$\mu$ A	Either direction	

**TRANSFER CHARACTERISTICS**

CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
<b>dv/dt RATING</b>						
Critical rate of rise of off-state voltage	dv/dt	—	12	—	V/ $\mu$ s	Static dv/dt, $T_A=85^\circ$ C (see Fig. 3)
Critical rate of rise of commutating voltage	dv/dt	—	0.2	—	V/ $\mu$ s	Commutating dv/dt $I_{LOAD}=15$ mA (see Fig. 4)

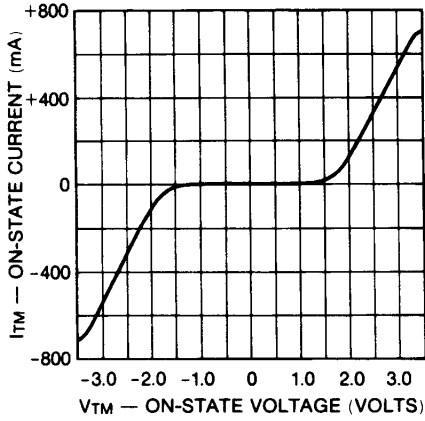
**ISOLATION CHARACTERISTICS**

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

Note 1: Ratings apply to either polarity of pin 6 — referenced to pin 4. Voltages must be applied within dv/dt rating.

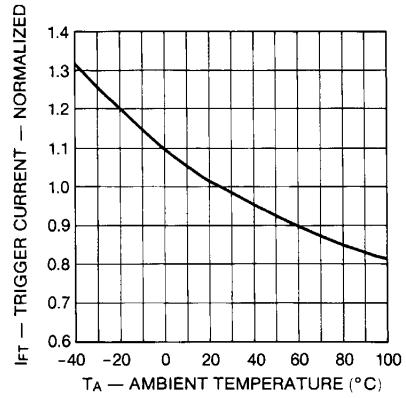
**TYPICAL ELECTRICAL CHARACTERISTIC CURVES**

(25°C Free Air Temperature Unless Otherwise Specified)



C1711

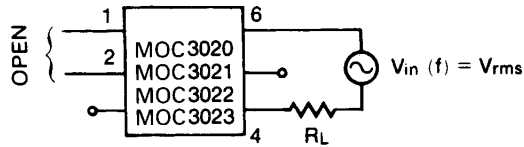
Fig. 1. On-State Characteristics



C1712

Fig. 2. Trigger Current vs. Temperature

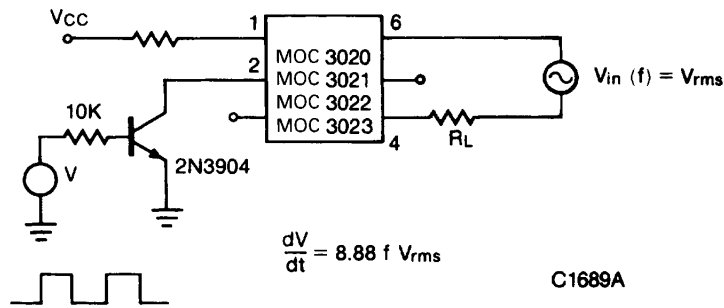
**TEST CIRCUITS FOR dV/dt MEASUREMENTS**



$$\frac{dV}{dt} = \omega V_{pack} = 2\pi f \times 1.414 V_{rms}$$

$$= 8.88 f V_{rms}$$

Fig. 3. Static dV/dt



$$\frac{dV}{dt} = 8.88 f V_{rms}$$

C1689A

Fig. 4. Commutating dV/dt

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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.