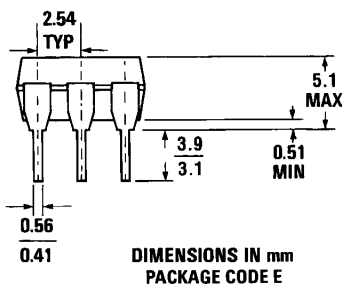
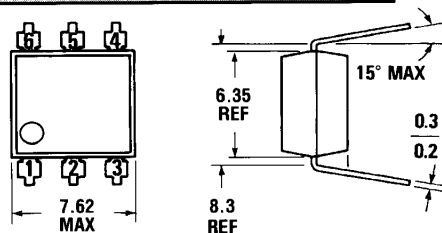
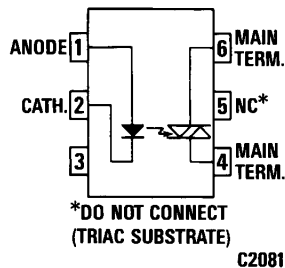


**MOC3020 MOC3021
MOC3022 MOC3023**

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 μ 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
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}	—	10	100	nA	$V_{DRM} = 400 \text{ V}$, Note 1
Peak on-state voltage, either direction	V_{TM}	—	2.5	3.0	Volts	$I_{TM} = 100 \text{ mA Peak}$

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)	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	—	μA	Either direction

TRANSFER CHARACTERISTICS

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

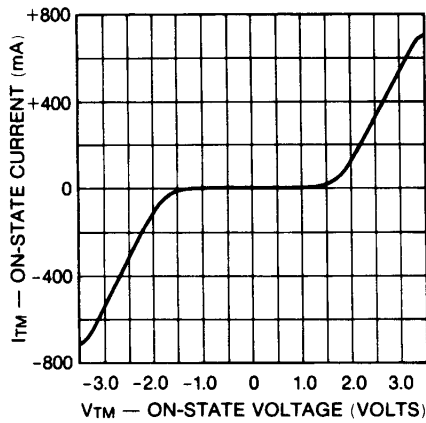
ISOLATION CHARACTERISTICS

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

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

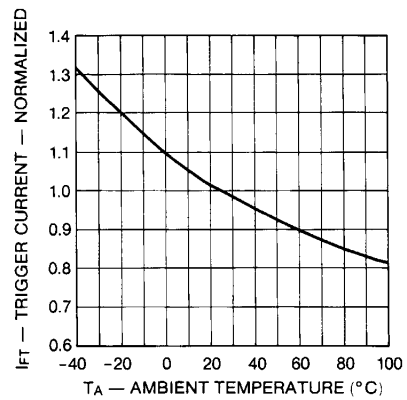
TYPICAL ELECTRICAL CHARACTERISTIC CURVES

(25°C Free Air Temperature Unless Otherwise Specified)



C1711

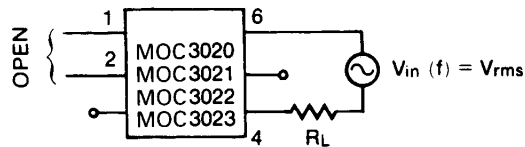
Fig. 1. On-State Characteristics



C1712

Fig. 2. Trigger Current vs. Temperature

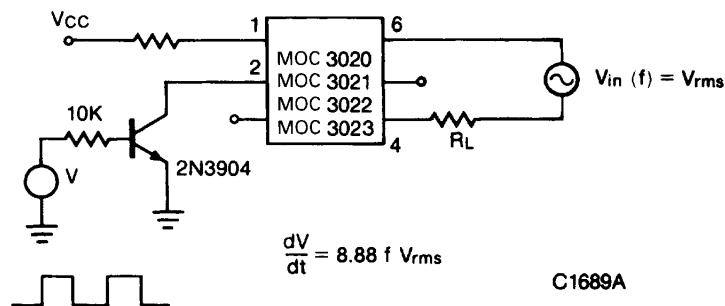
TEST CIRCUITS FOR dV/dt MEASUREMENTS



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

$$= 8.88 f V_{\text{rms}}$$

Fig. 3. Static dV/dt



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

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.