

**MAC16
SERIES***

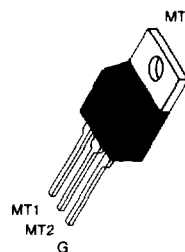
*Motorola preferred devices

TRIACS
Silicon Bidirectional Thyristors

Designed for high performance full-wave ac control applications where high noise immunity and high commutating di/dt are required.

- Blocking Voltage to 800 Volts
- On-State Current Rating of 15 Amperes RMS at 80°C
- Uniform Gate Trigger Currents in Three Modes
- High Immunity to dv/dt — 500 V/μs minimum at 125°C
- Minimizes Snubber Networks for Protection
- Industry Standard TO-220AB Package
- High Commutating di/dt — 9.0 A/ms minimum at 125°C

TRIACS
15 AMPERES RMS
400 thru 800
VOLTS



CASE 221A-06
(TO-220AB)
Style 4

MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Value	Unit
V_{DRM}	Peak Repetitive Off-State Voltage, (1) (-40 to 125°C, Sine Wave, 50 to 60 Hz, Gate Open)	MAC16D 400 MAC16M 600 MAC16N 800	Volts
$I_T(\text{RMS})$	On-State RMS Current (60 Hz, $T_C = 80^\circ\text{C}$)	15	A
I_{TSM}	Peak Non-repetitive Surge Current (One Full Cycle, 60 Hz, $T_J = 125^\circ\text{C}$)	150	A
I^2t	Circuit Fusing Consideration ($t = 8.3$ ms)	93	A ² sec
PGM	Peak Gate Power (Pulse Width ≤ 1.0 μs, $T_C = 80^\circ\text{C}$)	20	Watts
$P_G(\text{AV})$	Average Gate Power ($t = 8.3$ ms, $T_C = 80^\circ\text{C}$)	0.5	Watts
T_J	Operating Junction Temperature Range	-40 to +125	°C
T_{stg}	Storage Temperature Range	-40 to +150	°C

THERMAL CHARACTERISTICS

$R_{\theta JC}$	Thermal Resistance — Junction to Case	2.0	°C/W
$R_{\theta JA}$	— Junction to Ambient	62.5	
T_L	Maximum Lead Temperature for Soldering Purposes 1/8" from Case for 10 Seconds	260	°C

(1) V_{DRM} for all types can be applied on a continuous basis. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.

Preferred devices are Motorola recommended choices for future use and best overall value.

REV 1

MAC16 SERIES

ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Characteristic	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

I_{DRM}	Peak Repetitive Blocking Current ($V_D = \text{Rated } V_{DRM}$, Gate Open)	$T_J = 25^\circ\text{C}$	—	—	0.01	mA
		$T_J = 125^\circ\text{C}$	—	—	2.0	

ON CHARACTERISTICS

V_{TM}	Peak On-State Voltage* ($I_{TM} = \pm 21$ A Peak)	—	1.2	1.6	Volts
I_{GT}	Continuous Gate Trigger Current ($V_D = 12$ V, $R_L = 100$ Ω) MT2(+), G(+) MT2(+), G(-) MT2(-), G(-)	10	16	50	mA
		10	18	50	
		10	22	50	
I_H	Hold Current ($V_D = 12$ V, Gate Open, Initiating Current = ± 150 mA)	—	20	50	mA
I_L	Latch Current ($V_D = 24$ V, $I_G = 50$ mA) MT2(+), G(+) MT2(+), G(-) MT2(-), G(-)	—	33	50	mA
		—	36	80	
		—	33	50	
		—	33	50	
V_{GT}	Gate Trigger Voltage ($V_D = 12$ V, $R_L = 100$ Ω) MT2(+), G(+) MT2(+), G(-) MT2(-), G(-)	0.5	0.75	1.5	Volts
		0.5	0.72	1.5	
		0.5	0.82	1.5	
		0.5	0.82	1.5	

DYNAMIC CHARACTERISTICS

$(di/dt)_C$	Rate of Change of Commutating Current* See Figure 10. ($V_D = 400$ V, $I_{TM} = 6.0$ A, Commutating $dv/dt = 24$ V/ μ s, Gate Open, $T_J = 125^\circ\text{C}$, $f = 250$ Hz, No Snubber)	9.0	—	—	A/ms
dv/dt	Critical Rate of Rise of Off-State Voltage ($V_D = \text{Rated } V_{DRM}$, Exponential Waveform, Gate Open, $T_J = 125^\circ\text{C}$)	500	—	—	V/ μ s

*Indicates Pulse Test: Pulse Width ≤ 2.0 ms, Duty Cycle $\leq 2\%$.

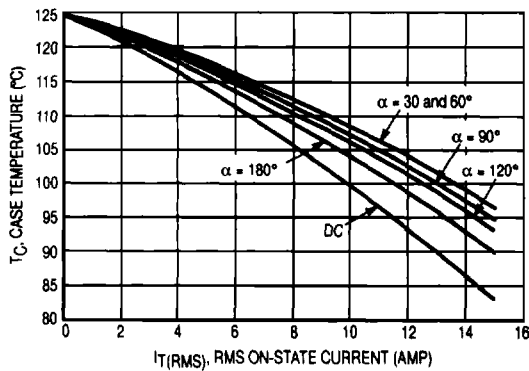


Figure 1. RMS Current Derating

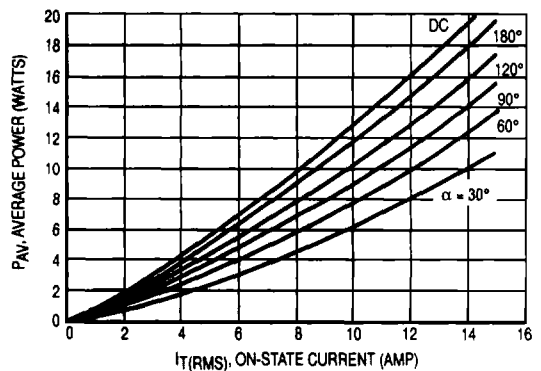


Figure 2. On-State Power Dissipation

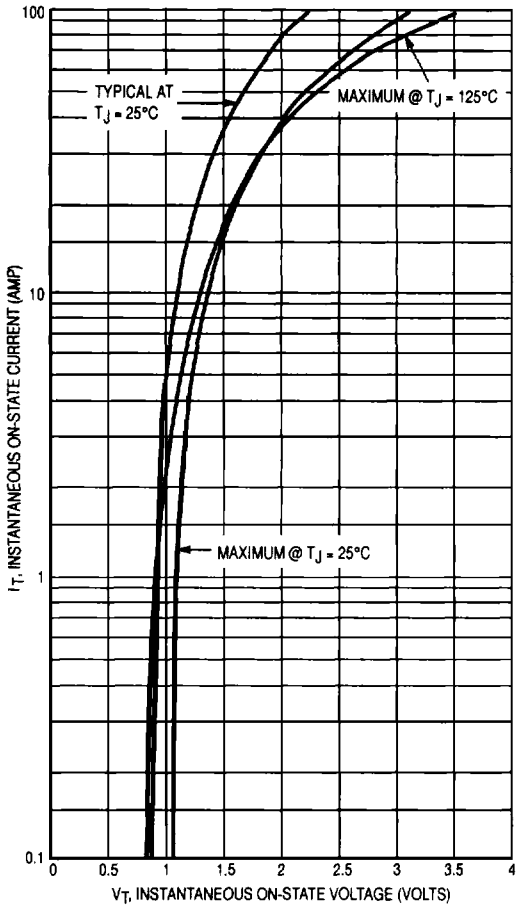


Figure 3. On-State Characteristics

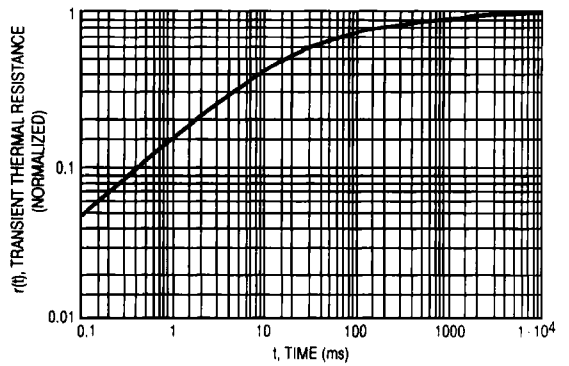


Figure 4. Thermal Response

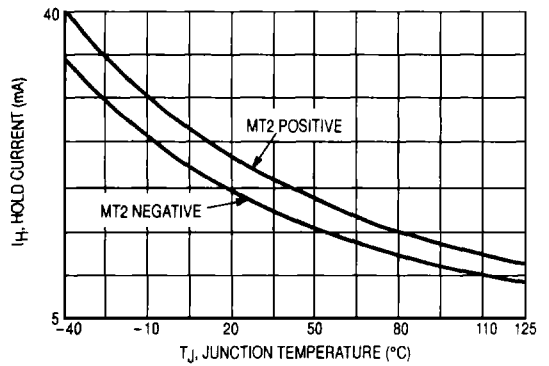


Figure 5. Hold Current Variation

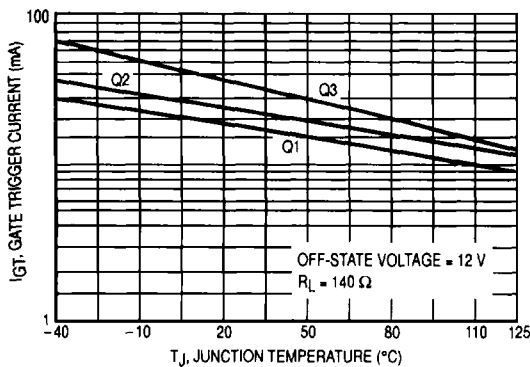


Figure 6. Gate Trigger Current Variation

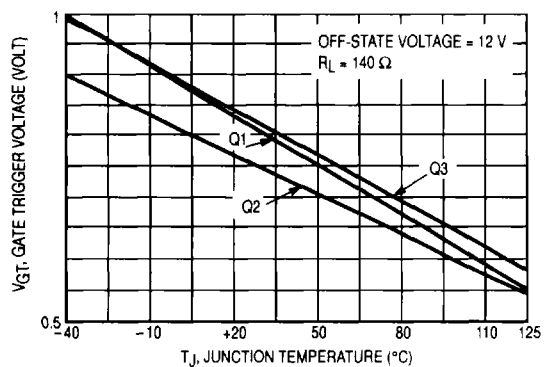


Figure 7. Gate Trigger Voltage Variation

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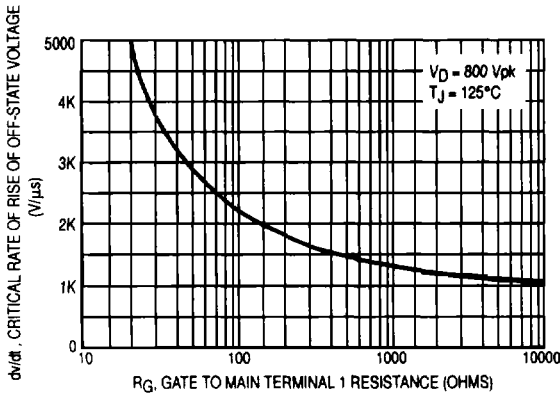


Figure 8. Critical Rate of Rise of Off-State Voltage (Exponential)

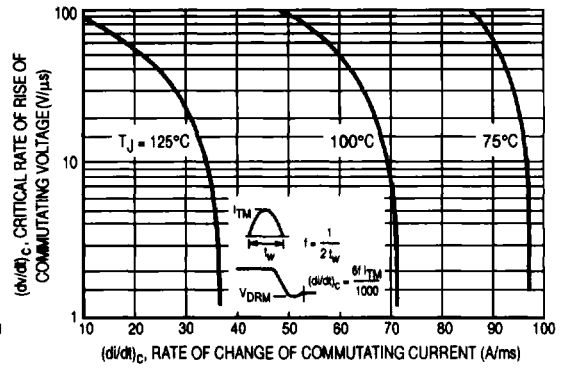
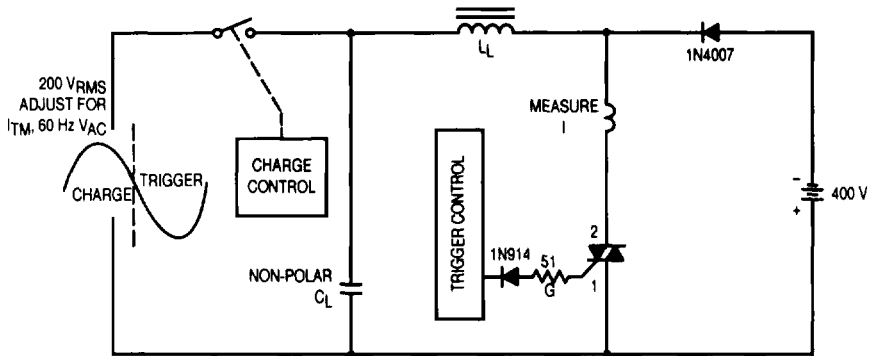


Figure 9. Critical Rate of Rise of Commutating Voltage



Note: Component values are for verification of rated $(dv/dt)_c$. See AN1048 for additional information.

Figure 10. Simplified Test Circuit to Measure the Critical Rate of Rise of Commutating Voltage