

**MAC16
SERIES***

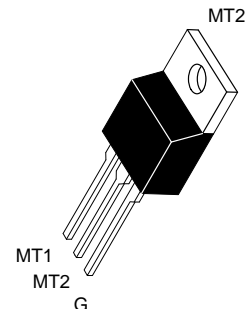
*Motorola preferred devices

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 MAC16M MAC16N 400 600 800	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
P_{GM}	Peak Gate Power (Pulse Width ≤ 1.0 μs, $T_C = 80^\circ\text{C}$)	20	Watts
$P_{G(AV)}$	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

$R_{\theta JC}$ $R_{\theta JA}$	Thermal Resistance — Junction to Case — Junction to Ambient	2.0 62.5	°C/W
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°C unless otherwise noted)

Symbol	Characteristic	Min	Typ	Max	Unit	
OFF CHARACTERISTICS						
I _{DRM}	Peak Repetitive Blocking Current (V _D = Rated V _{DRM} , Gate Open)	T _J = 25°C	—	—	0.01	mA
		T _J = 125°C	—	—	2.0	

ON CHARACTERISTICS

V _{TM}	Peak On-State Voltage* (I _{TM} = ±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	
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	

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/μs, Gate Open, T _J = 125°C, f = 250 Hz, No Snubber)	9.0	—	—	A/ms
dv/dt	Critical Rate of Rise of Off-State Voltage (V _D = Rated V _{DRM} , Exponential Waveform, Gate Open, T _J = 125°C)	500	—	—	V/μs

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

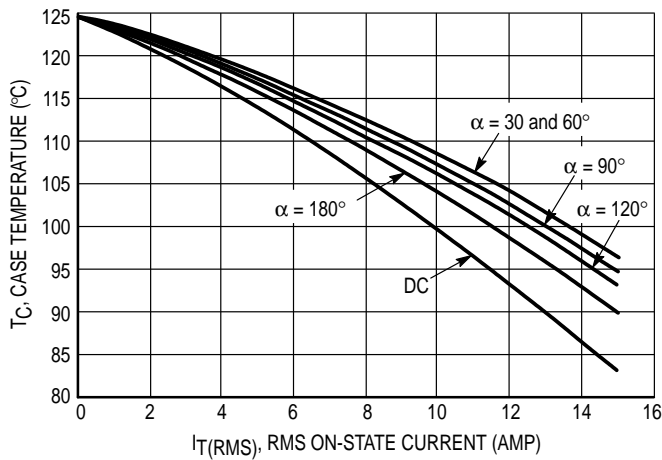


Figure 1. RMS Current Derating

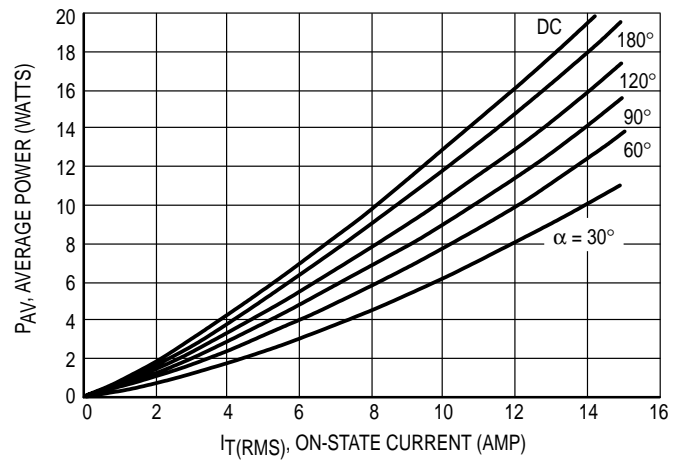


Figure 2. On-State Power Dissipation

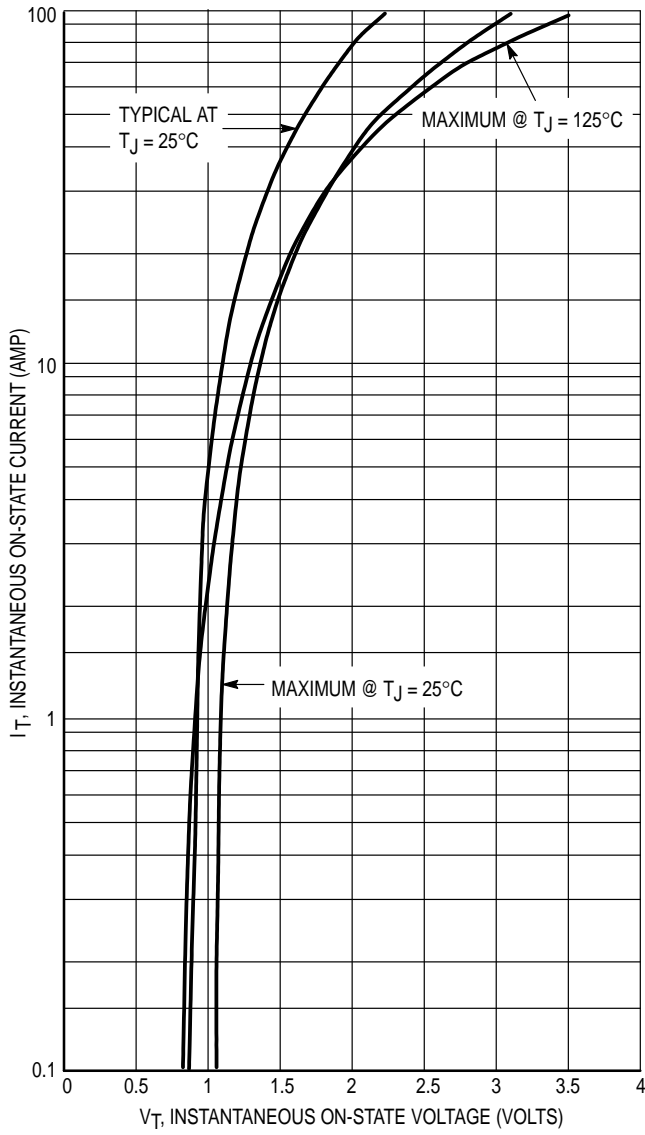


Figure 3. On-State Characteristics

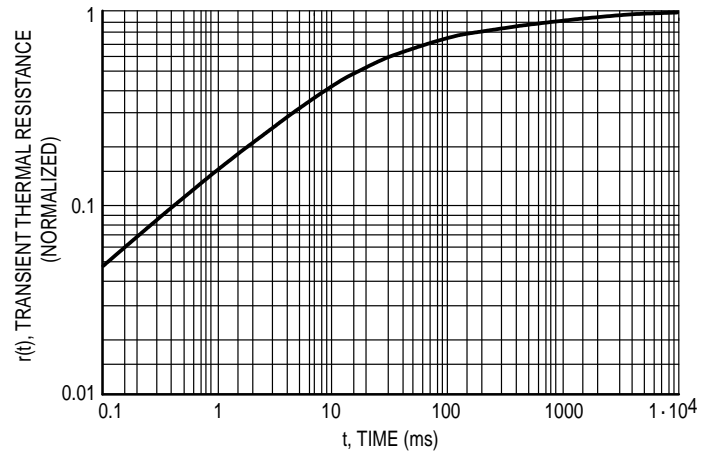


Figure 4. Thermal Response

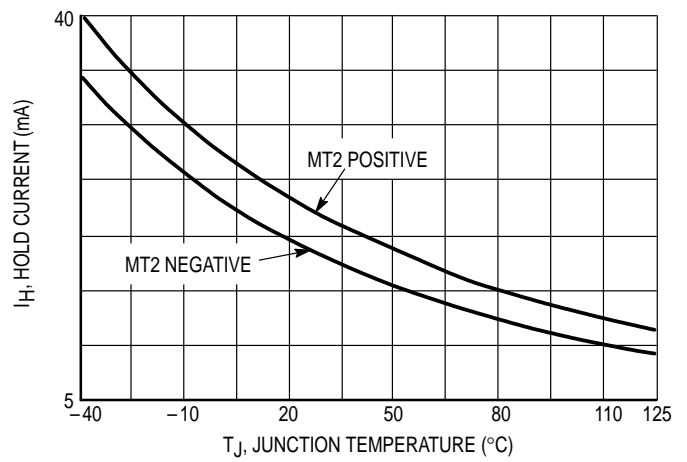


Figure 5. Hold Current Variation

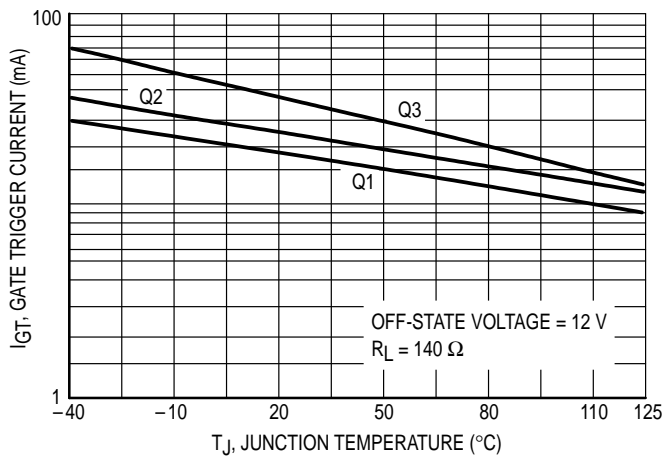


Figure 6. Gate Trigger Current Variation

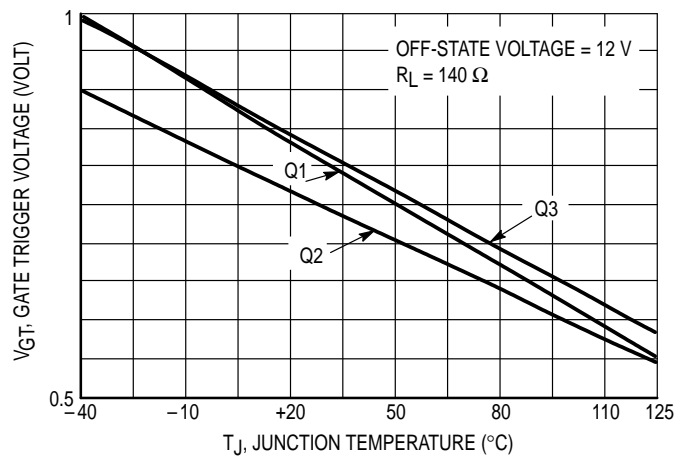


Figure 7. Gate Trigger Voltage Variation

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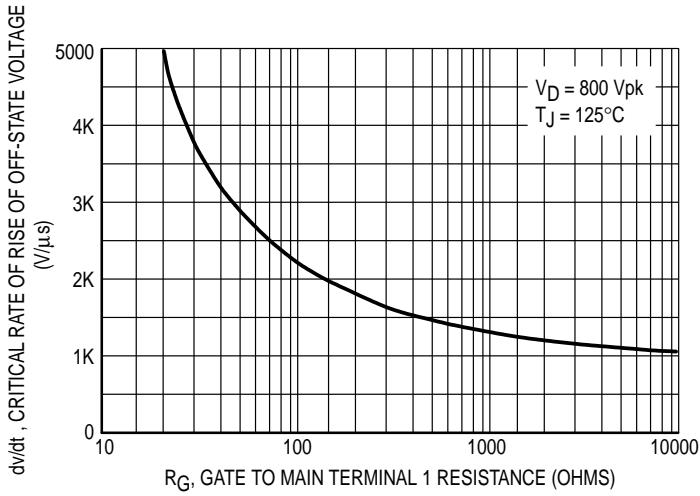


Figure 8. Critical Rate of Rise of Off-State Voltage (Exponential)

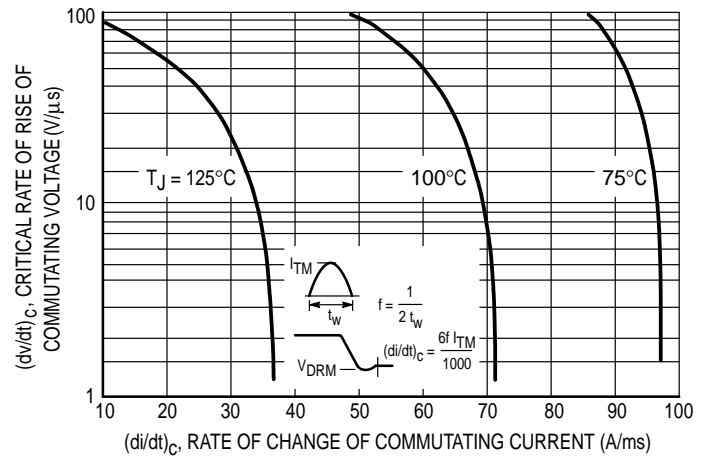
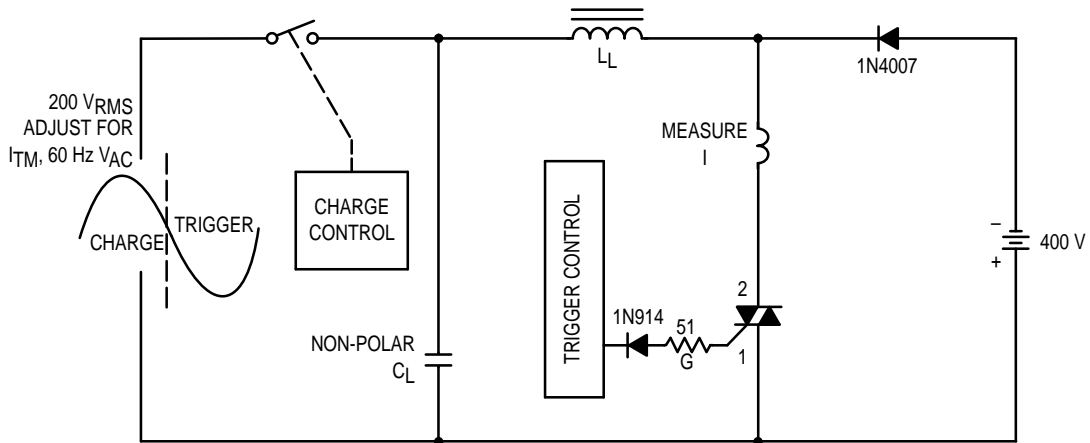


Figure 9. Critical Rate of Rise of Commutating Voltage



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