Triacs
Silicon Bidirectional Triode Thyristors

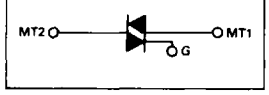
MAC15 Series* MAC15A Series*

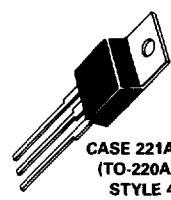
*Motorola preferred devices

TRIACs
15 AMPERES RMS
200 thru 800 VOLTS

. . . designed primarily for full-wave ac control applications, such as solid-state relays, motor controls, heating controls and power supplies; or wherever full-wave silicon gate controlled solid-state devices are needed. Triac type thyristors switch from a blocking to a conducting state for either polarity of applied anode voltage with positive or negative gate triggering.

- Blocking Voltage to 800 Volts
- All Diffused and Glass Passivated Junctions for Greater Parameter Uniformity and Stability
- Small, Rugged, Thermowatt Construction for Low Thermal Resistance, High Heat Dissipation and Durability
- Gate Triggering Guaranteed in Three Modes (MAC15 Series) or Four Modes (MAC15A Series)





CASE 221A-04
(TO-220AB)
STYLE 4

3

MAXIMUM RATINGS (T_J = 25°C unless otherwise noted.)

Rating	Symbol	Value	Unit
Peak Repetitive Off-State Voltage, Note 1 (Gate Open, T_J = −40 to 125°C) MAC15-4, MAC15A4	V_{DRM}	200	Volts
MAC15-6, MAC15A6		400	
MAC15-8, MAC15A8		600	
MAC15-10, MAC15A10		800	
Peak Gate Voltage	V_{GM}	10	Volts
On-State Current RMS Full Cycle Sine Wave 50 to 60 Hz (T_C = +90°C)	$I_{T(RMS)}$	15	Amps
Circuit Fusing (t = 8.3 ms)	I^2t	93	A^2s
Peak Surge Current (One Full Cycle, 60 Hz, T_C = +80°C) Preceded and followed by rated current	I_{TSM}	150	Amps
Peak Gate Power (T_C = +80°C, Pulse Width = 2 μs)	P_{GM}	20	Watts
Average Gate Power (T_C = +80°C, t = 8.3 ms)	$P_{G(AV)}$	0.5	Watt
Peak Gate Current	I_{GM}	2	Amps
Operating Junction Temperature Range	T_J	−40 to +125	°C
Storage Temperature Range	T_{stg}	−40 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2	°C/W

Note 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.

ELECTRICAL CHARACTERISTICS (T_C = 25°C, and either polarity of MT2 to MT1 Voltage, unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Blocking Current (V_D = Rated V_{DRM}, Gate Open) T_J = 25°C T_J = 125°C	I_{DRM}	— —	— —	10 2	μA mA
Peak On-State Voltage (I_{TM} = 21 A Peak; Pulse Width = 1 to 2 ms, Duty Cycle ≤ 2%)	V_{TM}	—	1.3	1.6	Volts
Gate Trigger Current (Continuous dc) (V_D = 12 Vdc, R_L = 100 Ohms) MT2(+), G(+) MT2(+), G(−) MT2(−), G(−) MT2(−), G(+) "A" SUFFIX ONLY	I_{GT}	 — — — —	 — — — —	 50 50 50 75	mA
Gate Trigger Voltage (Continuous dc) (V_D = 12 Vdc, R_L = 100 Ohms) MT2(+), G(+) MT2(+), G(−) MT2(−), G(−) MT2(−), G(+) "A" SUFFIX ONLY (V_D = Rated V_{DRM}, R_L = 10 k Ohms, T_J = 110°C) MT2(+), G(+); MT2(−), G(−); MT2(+), G(−) MT2(−), G(+) "A" SUFFIX ONLY	V_{GT}	 — — — — 0.2 0.2	 0.9 0.9 1.1 1.4 — —	 2 2 2 2.5 — —	Volts
Holding Current (Either Direction) (V_D = 12 Vdc, Gate Open) (I_T = 200 mA)	I_H	—	6	40	mA
Turn-On Time (V_D = Rated V_{DRM}, I_{TM} = 17 A) (I_{GT} = 120 mA, Rise Time = 0.1 μs, Pulse Width = 2 μs)	t_{gt}	—	1.5	—	μs
Critical Rate of Rise of Commutation Voltage (V_D = Rated V_{DRM}, I_{TM} = 21 A, Commutating di/dt = 7.6 A/ms, Gate Unenergized, T_C = 80°C)	dv/dt(c)	—	5	—	V/μs

3

FIGURE 1 – RMS CURRENT DERATING

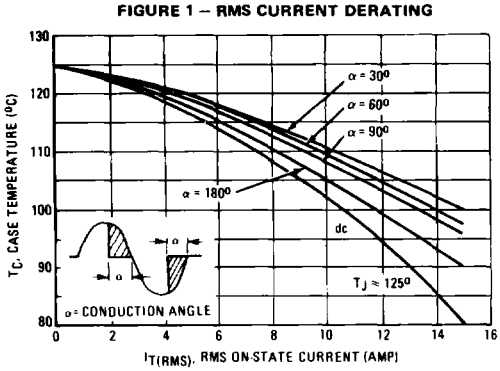


FIGURE 2 – ON-STATE POWER DISSIPATION

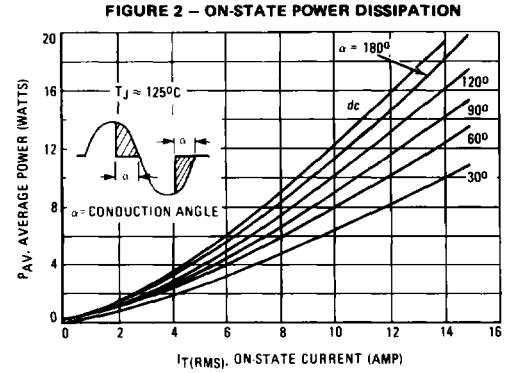


FIGURE 3 – TYPICAL GATE TRIGGER VOLTAGE

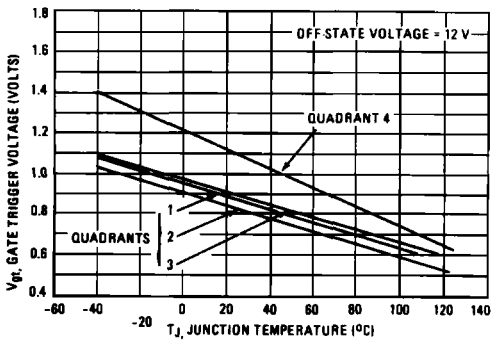


FIGURE 4 – TYPICAL GATE TRIGGER CURRENT

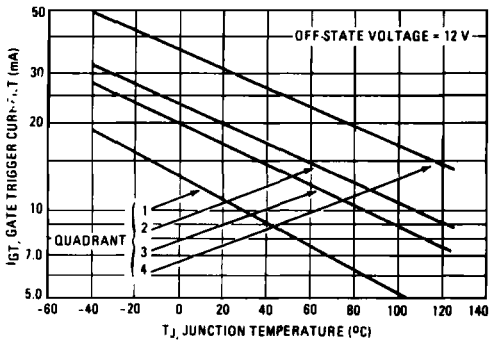


FIGURE 5 – ON-STATE CHARACTERISTICS

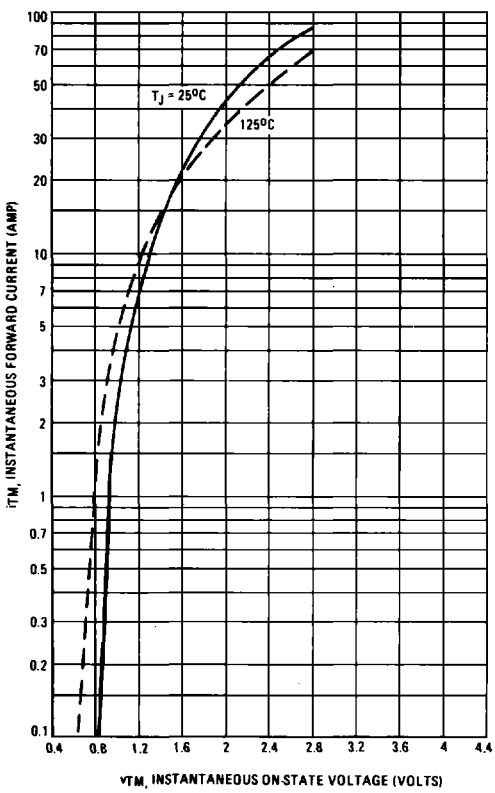


FIGURE 6 – TYPICAL HOLDING CURRENT

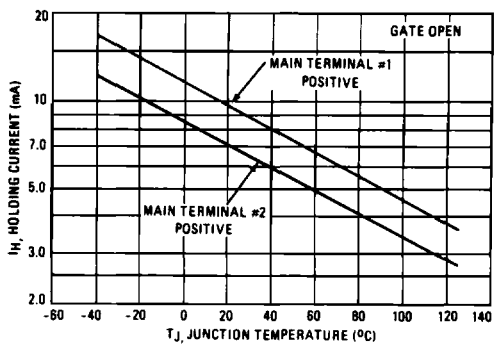


FIGURE 7 – MAXIMUM NON-REPETITIVE SURGE CURRENT

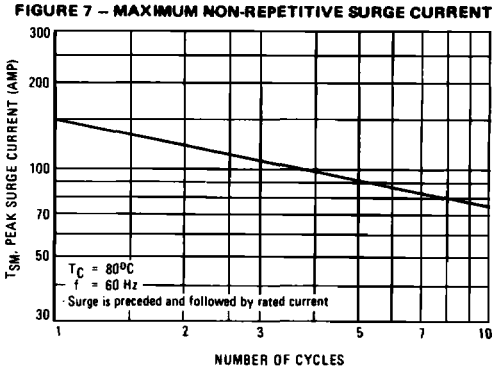


FIGURE 8 – THERMAL RESPONSE