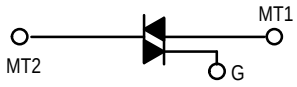
MAC212 Series MAC212A Series

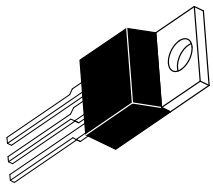
Triacs
Silicon Bidirectional Thyristors

. . . designed primarily for full-wave ac control applications, such as light dimmers, 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 (MAC212 Series) or Four Modes (MAC212A Series)

TRIACs
12 AMPERES RMS
200 thru 800 VOLTS





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

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

Rating	Symbol	Value	Unit
Repetitive Peak Off-State Voltage(1) (T_J = –40 to +125°C, 1/2 Sine Wave 50 to 60 Hz, Gate Open) MAC212-4, MAC212A4 MAC212-6, MAC212A6 MAC212-8, MAC212A8 MAC212-10, MAC212A10	V_{DRM}	 200 400 600 800	Volts
On-State Current RMS (T_C = +85°C) Full Cycle Sine Wave 50 to 60 Hz	$I_{T(RMS)}$	12	Amp
Peak Non-repetitive Surge Current (One Full Cycle, 60 Hz, T_C = +85°C) preceded and followed by Rated Current	I_{TSM}	100	Amp
Circuit Fusing Considerations (t = 8.3 ms)	I^2t	40	A^2s
Peak Gate Power (T_C = +85°C, Pulse Width = 10 µs)	P_{GM}	20	Watts
Average Gate Power (T_C = +85°C, t = 8.3 ms)	$P_{G(AV)}$	0.35	Watt
Peak Gate Current (T_C = +85°C, Pulse Width = 10 µs)	I_{GM}	2	Amp
Operating Junction Temperature Range	T_J	–40 to +125	°C
Storage Temperature Range	T_{stg}	–40 to +150	°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.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.1	°C/W

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Blocking Current (Either Direction) (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 (Either Direction) I_{TM} = 17 A Peak; Pulse Width = 1 to 2 ms, Duty Cycle ⩽ 2%	V_{TM}	—	1.3	1.75	Volts
Gate Trigger Current (Continuous dc) (Main Terminal Voltage = 12 Vdc, R_L = 100 Ohms) MT2(+), G(+) MT2(+), G(–) MT2(–), G(–) MT2(–), G(+) "A" SUFFIX ONLY	I_{GT}	 — — — —	 12 12 20 35	 50 50 50 75	mA
Gate Trigger Voltage (Continuous dc) (Main Terminal Voltage = 12 Vdc, R_L = 100 Ohms) MT2(+), G(+) MT2(+), G(–) MT2(–), G(–) MT2(–), G(+) "A" SUFFIX ONLY (Main Terminal Voltage = Rated V_{DRM}, R_L = 10 kΩ, T_J = +125°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) (Main Terminal Voltage = 12 Vdc, Gate Open, Initiating Current = 500 mA)	I_H	—	6	50	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} = 17 A, Commutating di/dt = 6.1 A/ms, Gate Unenergized, T_C = +85°C)	$dv/dt_{(c)}$	—	5	—	V/μs
Critical Rate of Rise of Off-State Voltage (V_D = Rated V_{DRM}, Exponential Voltage Rise, Gate Open, T_C = +85°C)	dv/dt	—	100	—	V/μs

FIGURE 1 — CURRENT DERATING

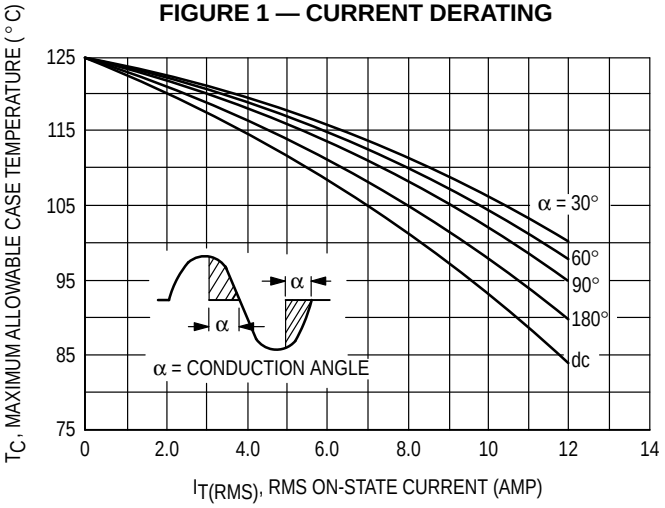


FIGURE 2 — POWER DISSIPATION

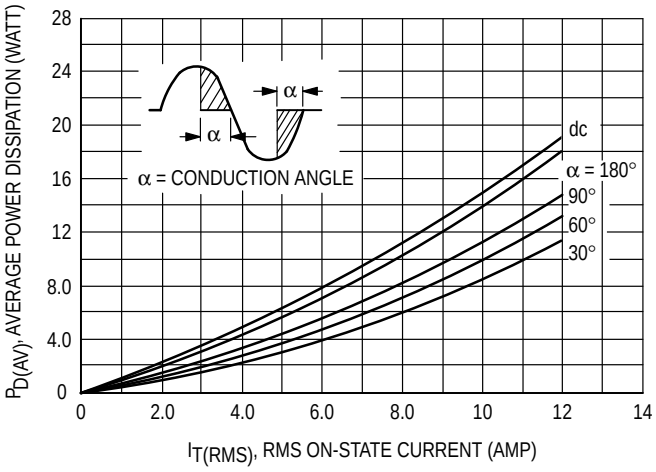


FIGURE 3 — MAXIMUM ON-STATE CHARACTERISTICS

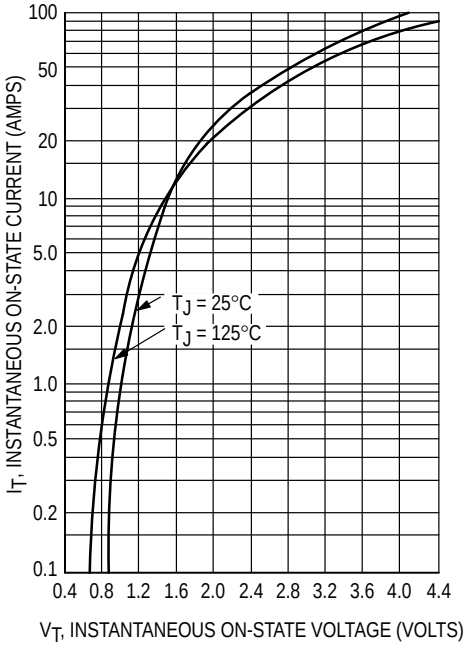


FIGURE 4 — MAXIMUM NON-REPETITIVE SURGE CURRENT

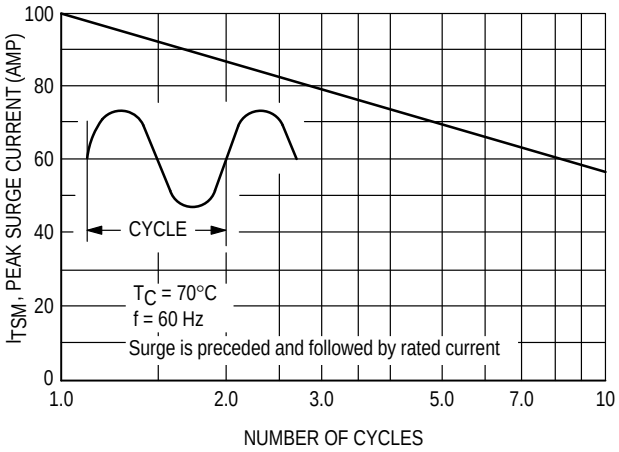


FIGURE 5 — TYPICAL GATE TRIGGER VOLTAGE

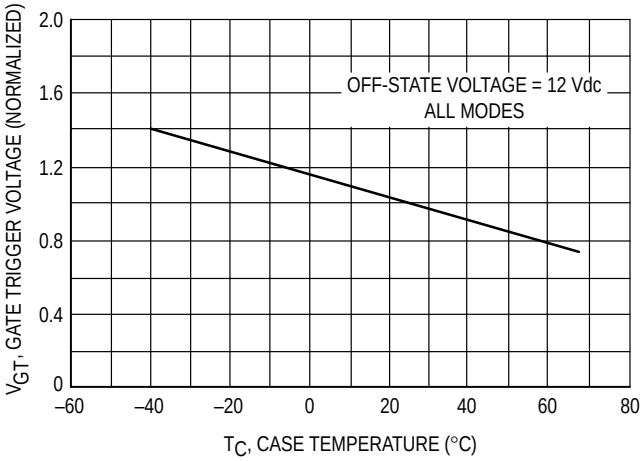


FIGURE 6 — TYPICAL GATE TRIGGER CURRENT

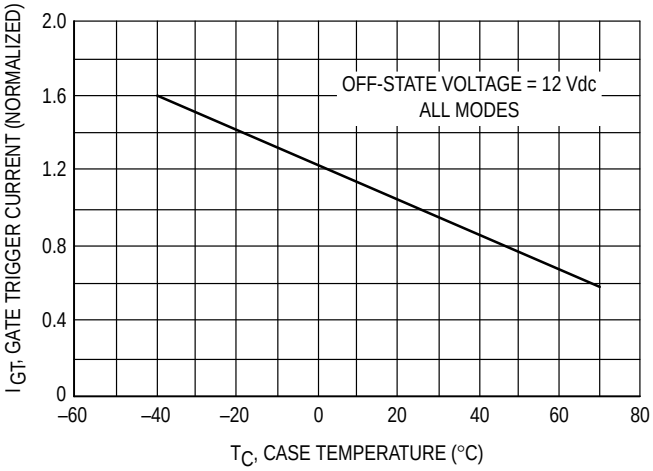


FIGURE 7 — TYPICAL HOLDING CURRENT

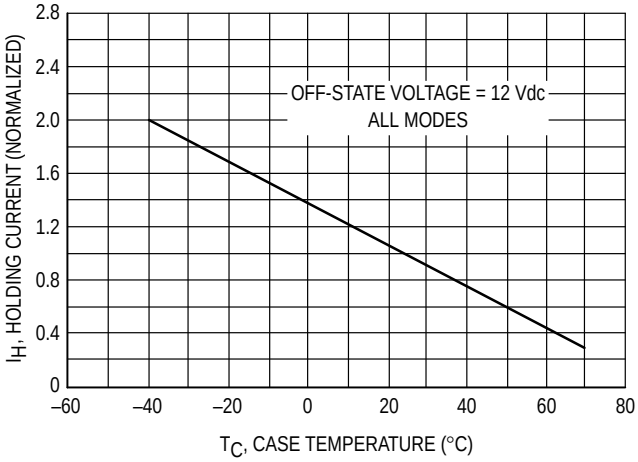


FIGURE 8 – THERMAL RESPONSE