

Triacs

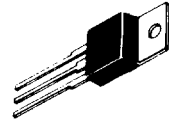
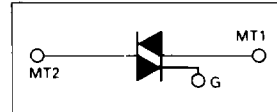
Silicon Bidirectional Thyristors

... 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)

**MAC212
Series
MAC212A
Series**

**TRIACs
12 AMPERES RMS
200 thru 800 VOLTS**



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

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Repetitive Peak Off-State Voltage, Note 1 (T_J 40 to \pm 125 $^{\circ}$ C) 1:2 Sine Wave 50 to 60 Hz, Gate Open	V_{DRM}	200 400 600 800	Volts
On-State Current RMS (T_C \pm 85 $^{\circ}$ 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 \pm 85 $^{\circ}$ 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 \pm 85 $^{\circ}$ C, Pulse Width \leq 10 μs)	P_{GM}	20	Watts
Average Gate Power (T_C \pm 85 $^{\circ}$ C, t 8.3 ms)	$P_{G(AV)}$	0.35	Watt
Peak Gate Current (T_C \pm 85 $^{\circ}$ C, Pulse Width \leq 10 μs)	I_{GM}	2	Amp
Operating Junction Temperature Range	T_J	40 to \pm 125	$^{\circ}$ C
Storage Temperature Range	T_{stg}	40 to \pm 150	$^{\circ}$ C

Note 1. Ratings apply for open gate conditions. Thyristor devices shall not be tested with a constant current source for blocking capability such that the voltage applied exceeds the rated blocking voltage.

MAC212 Series • MAC212A Series

THERMAL CHARACTERISTICS

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

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

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Blocking Current (Either Direction) Rated V_{DRM} , Gate Open $T_J = 25^{\circ}\text{C}$ $T_J = +125^{\circ}\text{C}$	I_{DRM}	—	—	10 2	μA mA
Peak On-State Voltage (Either Direction) $I_{TM} = 17\text{ A Peak}$; Pulse Width 1 to 2 ms, Duty Cycle $\leq 2\%$	V_{TM}	—	1.3	1.75	Volts
Gate Trigger Current (Continuous dc) Main Terminal Voltage $\leq 12\text{ Vdc}$, $R_L = 100\text{ Ohms}$ 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 $\leq 12\text{ Vdc}$, $R_L = 100\text{ Ohms}$ MT2(+), G(+) MT2(+), G(-) MT2(-), G(-) MT2(-), G(+) "A" SUFFIX ONLY Main Terminal Voltage Rated V_{DRM} , $R_L = 10\text{ k}\Omega$, $T_J = +125^{\circ}\text{C}$ MT2(+), G(+); MT2(-), G(-); MT2(+), G(-) MT2(-), G(+) "A" SUFFIX ONLY	V_{GT}	—	0.9 0.9 1.1 1.4	2 2 2 2.5	Volts
Holding Current (Either Direction) Main Terminal Voltage $\leq 12\text{ Vdc}$, Gate Open, Initiating Current $\leq 500\text{ mA}$, $T_C = +25^{\circ}\text{C}$	I_H	—	6	50	mA
Turn-On Time Rated V_{DRM} , $I_{TM} = 17\text{ A}$, $I_{GT} = 120\text{ mA}$, Rise Time $0.1\text{ }\mu\text{s}$, Pulse Width $\leq 2\text{ }\mu\text{s}$	t_{gt}	—	1.5	—	μs
Critical Rate of Rise of Commutation Voltage Rated V_{DRM} , $I_{TM} = 17\text{ A}$, Commutating $di/dt = 4.3\text{ A/ms}$, Gate Unenergized, $T_C = +85^{\circ}\text{C}$	$dv/dt(c)$	—	5	—	$\text{V}/\mu\text{s}$
Critical Rate of Rise of Off-State Voltage ($V_D = V_{DROM}$, Exponential Voltage Rise, Gate Open, $T_C = +85^{\circ}\text{C}$)	dv/dt	—	100	—	$\text{V}/\mu\text{s}$

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FIGURE 1 — CURRENT DERATING

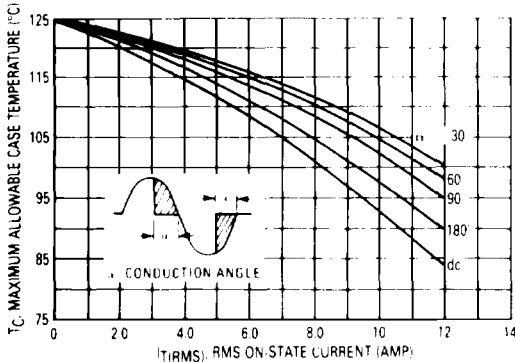
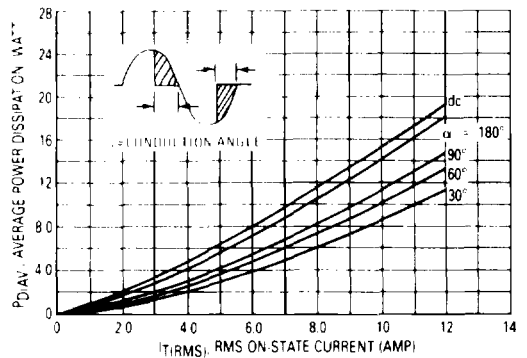


FIGURE 2 — POWER DISSIPATION



MAC212 Series • MAC212A Series

FIGURE 3 — MAXIMUM ON-STATE CHARACTERISTICS

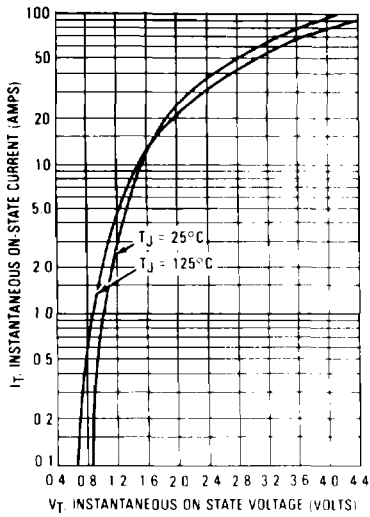


FIGURE 4 -- MAXIMUM NON REPETITIVE SURGE CURRENT

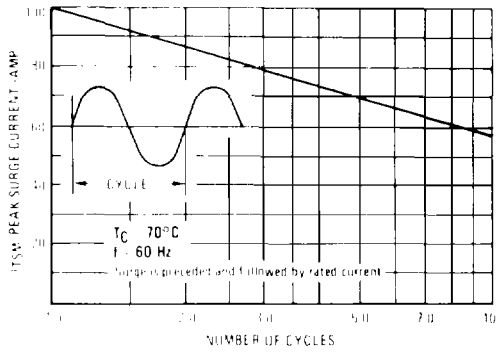


FIGURE 5 TYPICAL GATE TRIGGER VOLTAGE

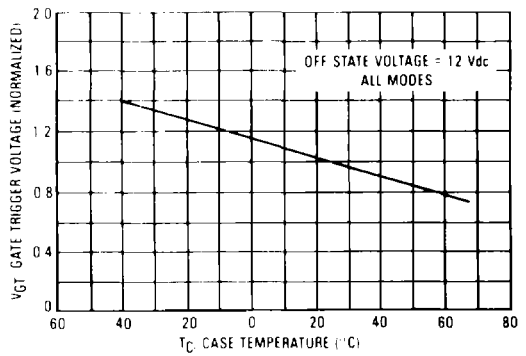


FIGURE 6 - TYPICAL GATE TRIGGER CURRENT

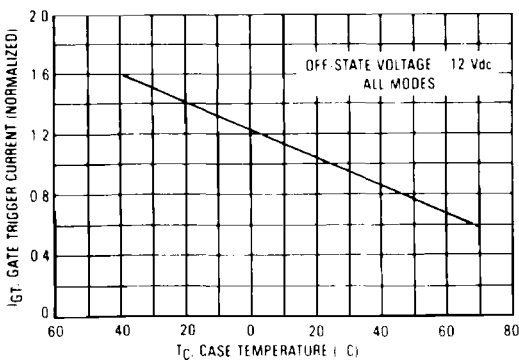
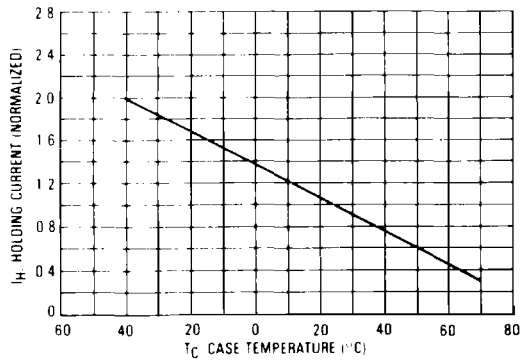


FIGURE 7 TYPICAL HOLDING CURRENT



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FIGURE 8 — THERMAL RESPONSE

