

# Triacs

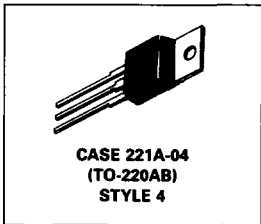
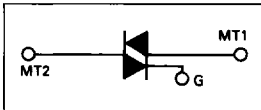
## Silicon Bidirectional Thyristors

... 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**



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

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

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.

Devices listed in bold, italic are Motorola preferred devices.

## MAC212 Series • MAC212A Series

### THEMAL CHARACTERISTICS

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

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

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Blocking Current (Either Direction) ( $V_D = \text{Rated } V_{DRM}$ , Gate Open) $T_J = 25^{\circ}C$ $T_J = +125^{\circ}C$	$I_{DRM}$	—	—	10 2	$\mu A$ 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 = 12 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 = 12 Vdc, $R_L = 100 \text{ Ohms}$ ) MT2(+), G(+) MT2(+), G(-) MT2(-), G(-) MT2(-), G(+) "A" SUFFIX ONLY (Main Terminal Voltage = Rated $V_{DRM}$ , $R_L = 10 \text{ k}\Omega$ , $T_J = +125^{\circ}C$ ) 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 = 12 Vdc, Gate Open, Initiating Current = 500 mA)	$I_H$	—	6	50	mA
Turn-On Time ( $V_D = \text{Rated } V_{DRM}$ , $I_{TM} = 17 \text{ A}$ , $I_{GT} = 120 \text{ mA}$ , Rise Time = 0.1 $\mu s$ , Pulse Width = 2 $\mu s$ )	$t_{gt}$	—	1.5	—	$\mu s$
Critical Rate of Rise of Commutation Voltage ( $V_D = \text{Rated } V_{DRM}$ , $I_{TM} = 17 \text{ A}$ , Commutating $di/dt = 6.1 \text{ A/ms}$ , Gate Unenergized, $T_C = +85^{\circ}C$ )	$dv/dt(c)$	—	5	—	$V/\mu s$
Critical Rate of Rise of Off-State Voltage ( $V_D = \text{Rated } V_{DRM}$ , Exponential Voltage Rise, Gate Open, $T_C = +85^{\circ}C$ )	$dv/dt$	—	100	—	$V/\mu s$

3

FIGURE 1 — CURRENT DERATING

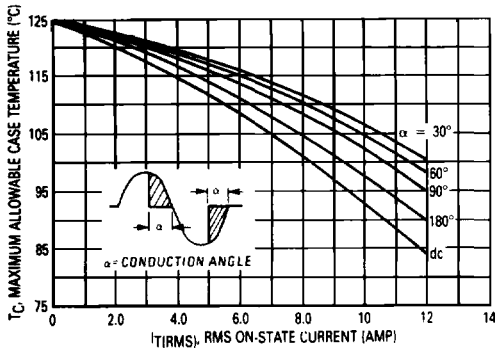
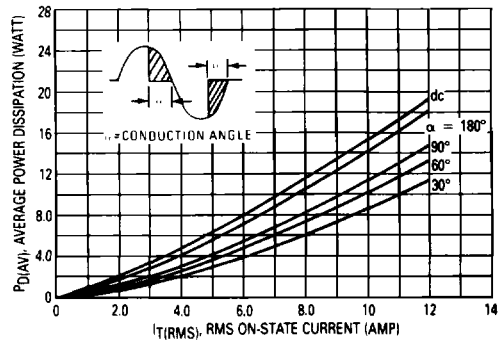


FIGURE 2 — POWER DISSIPATION



MAC212 Series • MAC212A Series

FIGURE 3 — MAXIMUM ON-STATE CHARACTERISTICS

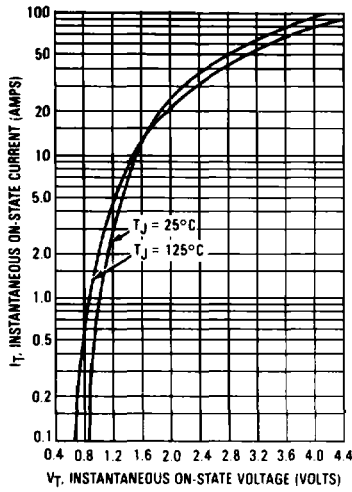


FIGURE 4 — MAXIMUM NON-REPETITIVE SURGE CURRENT

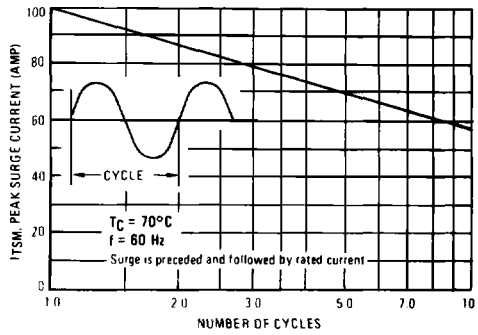


FIGURE 5 — TYPICAL GATE TRIGGER VOLTAGE

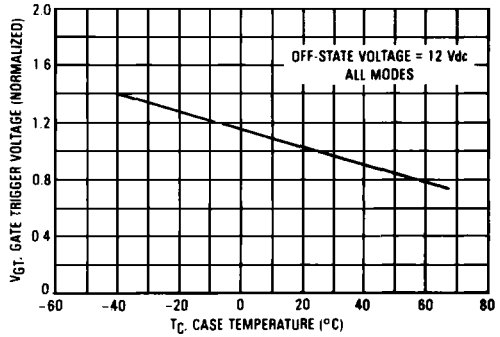


FIGURE 6 — TYPICAL GATE TRIGGER CURRENT

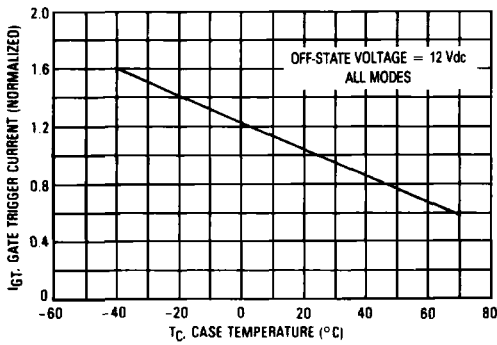
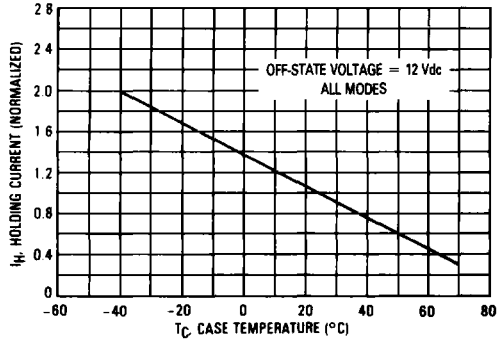


FIGURE 7 — TYPICAL HOLDING CURRENT



MAC212 Series • MAC212A Series

FIGURE 8 — THERMAL RESPONSE

