

## Triacs

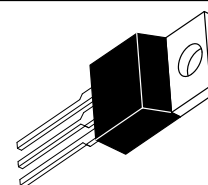
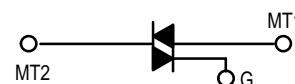
### Silicon Bidirectional Thyristors

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

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

1.  $V_{\text{DRM}}$  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.

# MAC212 Series MAC212A Series

## THERMAL 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) $I_{TM} = 17 A$ 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, $R_L = 100$ 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 $V_{DRM}$ , $R_L = 10$ k $\Omega$ , $T_J = +125^{\circ}C$ ) 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 ( $V_D = \text{Rated } V_{DRM}$ , $I_{TM} = 17 A$ , $I_{GT} = 120$ 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 ( $V_D = \text{Rated } V_{DRM}$ , $I_{TM} = 17 A$ , Commutating $di/dt = 6.1$ 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/ $\mu s$

FIGURE 1 — CURRENT DERATING

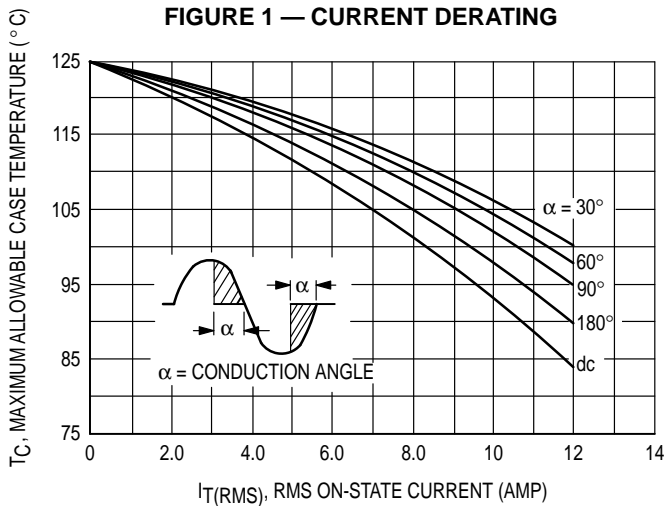


FIGURE 2 — POWER DISSIPATION

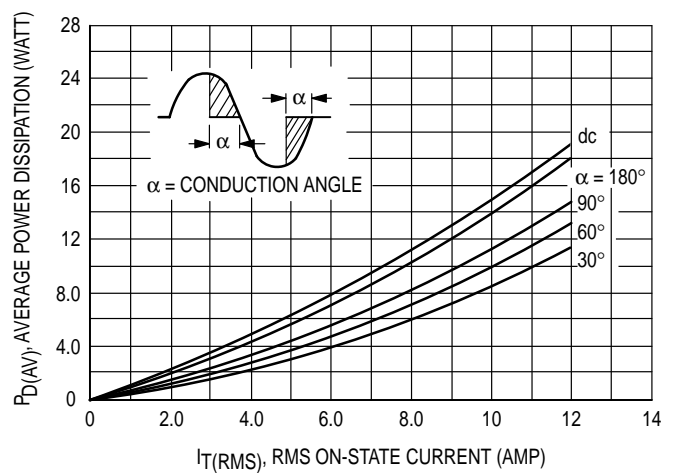


FIGURE 3 — MAXIMUM ON-STATE CHARACTERISTICS

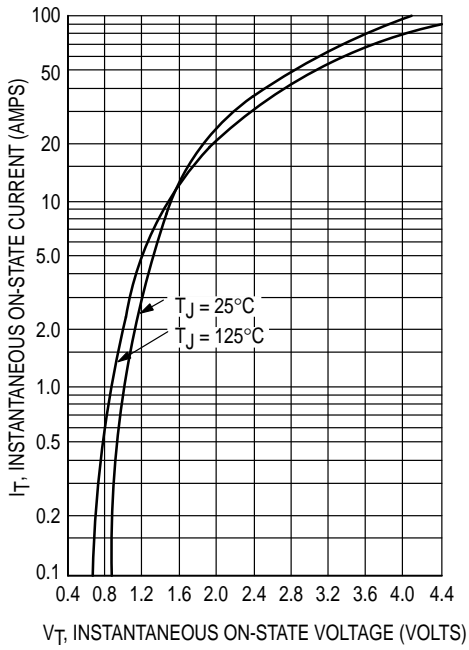


FIGURE 4 — MAXIMUM NON-REPETITIVE SURGE CURRENT

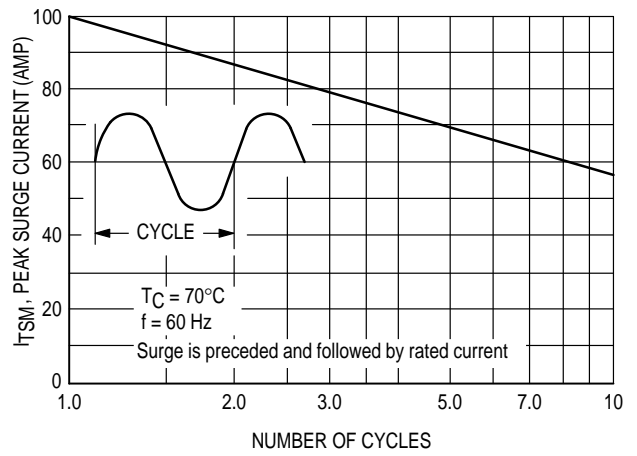


FIGURE 5 — TYPICAL GATE TRIGGER VOLTAGE

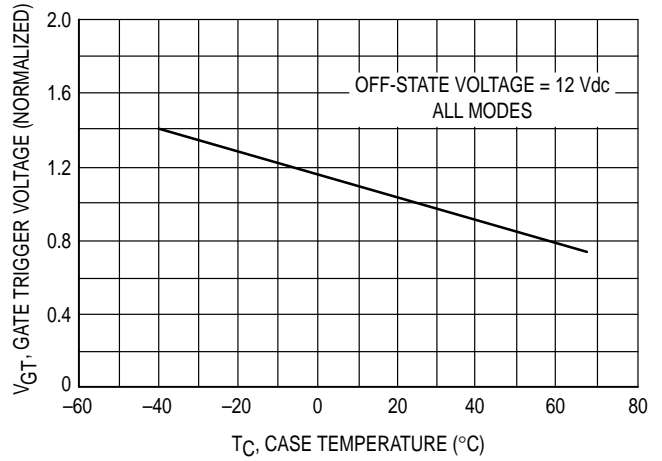


FIGURE 6 — TYPICAL GATE TRIGGER CURRENT

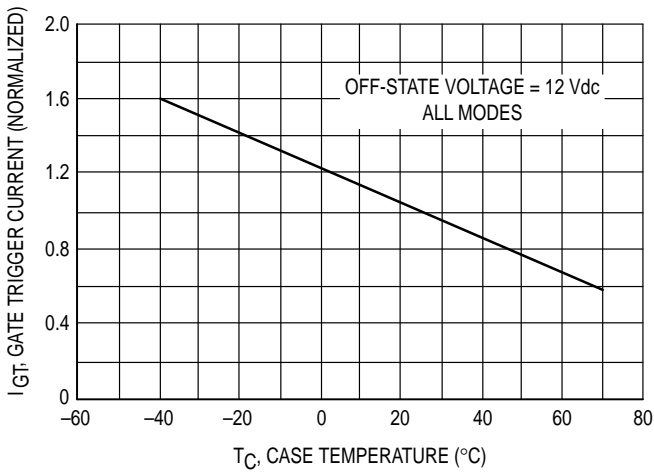


FIGURE 7 — TYPICAL HOLDING CURRENT

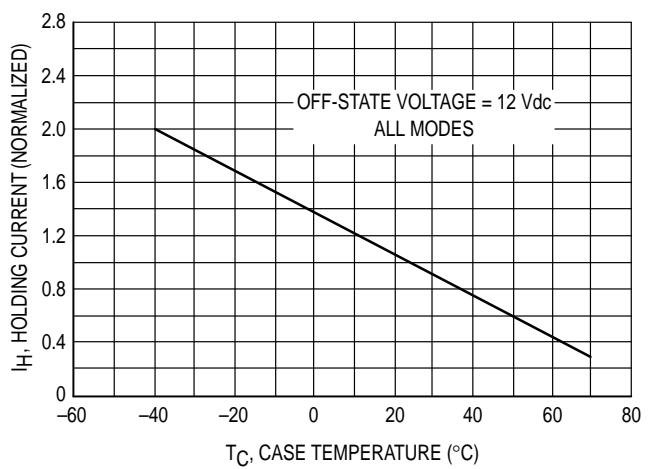


FIGURE 8 – THERMAL RESPONSE

