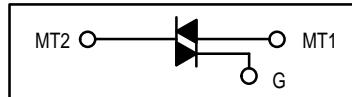


## Triacs

### 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.

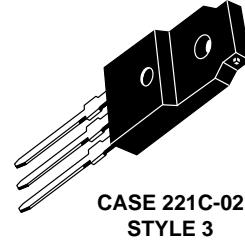
- Blocking Voltage to 800 Volts
- All Diffused and Glass Passivated Junctions for Greater Parameter Uniformity and Stability
- Small, Rugged, Thermowatt Construction for Low Thermal Resistance, High Heat Dissipation and Durability
- Gate Triggering Guaranteed in Three Modes (MAC212FP Series) or Four Modes (MAC212AFP Series)



## MAC212FP Series

## MAC212AFP Series

ISOLATED TRIACS  
THYRISTORS  
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 <sup>(1)</sup> ( $T_J = -40$ to $+125^\circ\text{C}$ , 1/2 Sine Wave 50 to 60 Hz, Gate Open)	$V_{DRM}$		Volts
MAC212-4FP, MAC212A4FP		200	
MAC212-6FP, MAC212A6FP		400	
MAC212-8FP, MAC212A8FP		600	
MAC212-10FP, MAC212A10FP		800	
On-State RMS Current ( $T_C = +85^\circ\text{C}$ ) Full Cycle Sine Wave 50 to 60 Hz <sup>(2)</sup>	$I_{T(RMS)}$	12	Amps
Peak Nonrepetitive Surge Current (One Full Cycle, 60 Hz, $T_C = +85^\circ\text{C}$ preceded and followed by rated current)	$I_{TSM}$	100	Amps
Circuit Fusing ( $t = 8.3$ 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	Amps
RMS Isolation Voltage ( $T_A = 25^\circ\text{C}$ , Relative Humidity $\leq 20\%$ )	$V_{(ISO)}$	1500	Volts
Operating Junction Temperature	$T_J$	-40 to +125	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-40 to +150	$^\circ\text{C}$

#### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.1	$^\circ\text{C/W}$
Thermal Resistance, Case to Sink	$R_{\theta CS}$	2.2 (typ)	$^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	60	$^\circ\text{C/W}$

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.
2. The case temperature reference point for all  $T_C$  measurements is a point on the center lead of the package as close as possible to the plastic body.

## MAC212FP Series MAC212AFP Series

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

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Blocking Current (Either Direction) ( $V_D = \text{Rated } V_{DRM}$ , Gate Open) $T_J = 25^\circ\text{C}$ $T_J = +125^\circ\text{C}$	$I_{DRM}$	— —	— —	10 2	$\mu\text{A}$ $\text{mA}$
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, $R_L = 100 \text{ Ohms}$ , Minimum Gate Pulse Width = 2 $\mu\text{s}$ ) 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, $R_L = 100 \text{ Ohms}$ , Minimum Gate Pulse Width = 2 $\mu\text{s}$ ) 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	$V_{GT}$	— — — — 0.2 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 ( $V_D = \text{Rated } V_{DRM}$ , $I_{TM} = 17 \text{ A}$ , $I_{GT} = 120 \text{ mA}$ , Rise Time = 0.1 $\mu\text{s}$ , Pulse Width = 2 $\mu\text{s}$ )	$t_{gt}$	—	1.5	—	$\mu\text{s}$
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, $T_C = +85^\circ\text{C}$ )	$dv/dt(c)$	—	5	—	$\text{V}/\mu\text{s}$
Critical Rate of Rise of Off-State Voltage ( $V_D = \text{Rated } V_{DRM}$ , Exponential Voltage Rise, Gate Open, $T_C = +85^\circ\text{C}$ )	$dv/dt$	—	100	—	$\text{V}/\mu\text{s}$

### TYPICAL CHARACTERISTICS

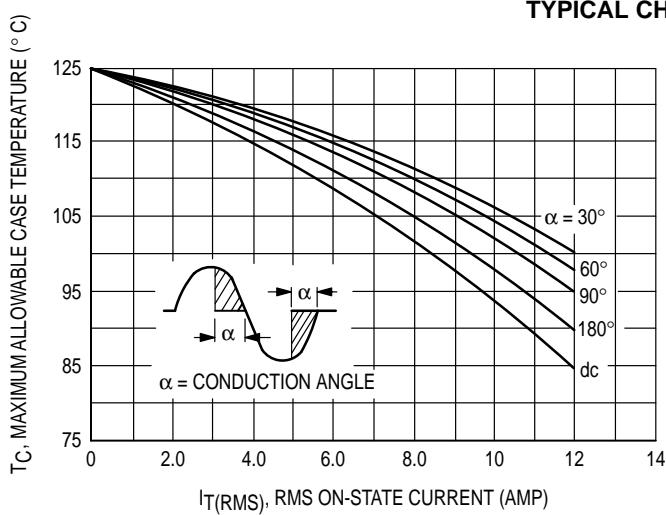


Figure 1. Current Derating

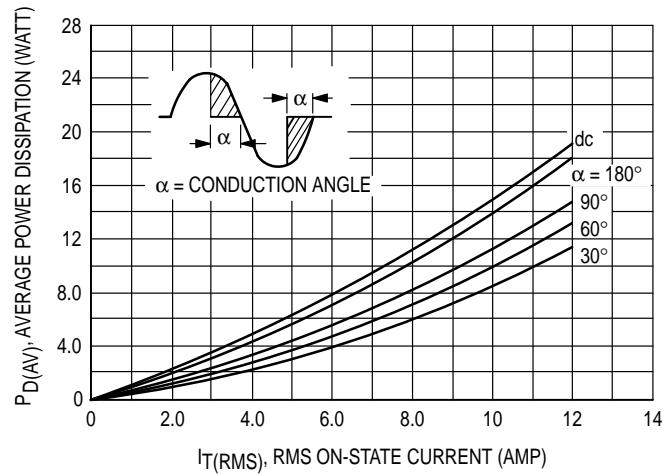
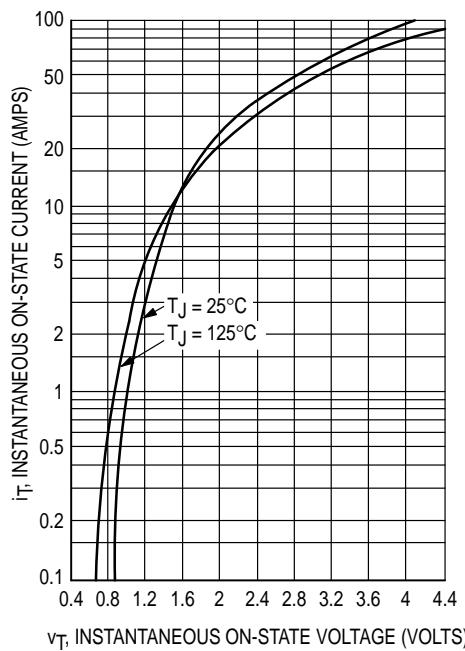
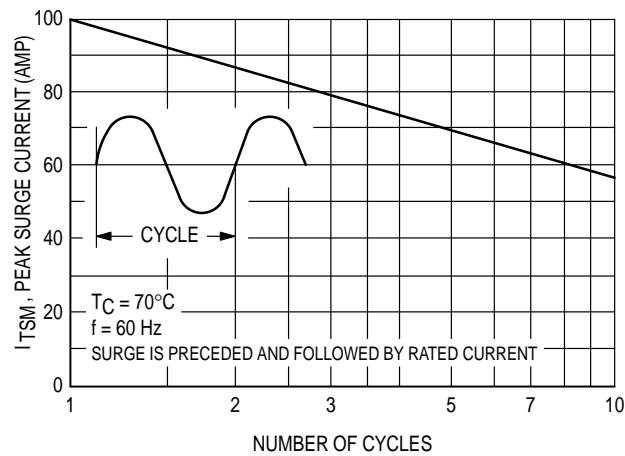


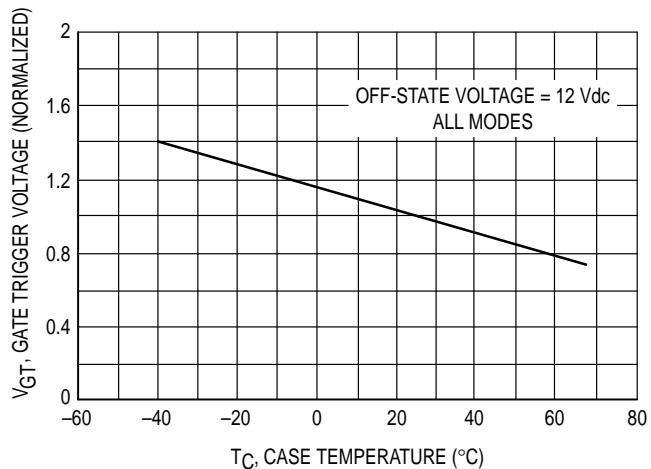
Figure 2. Power Dissipation



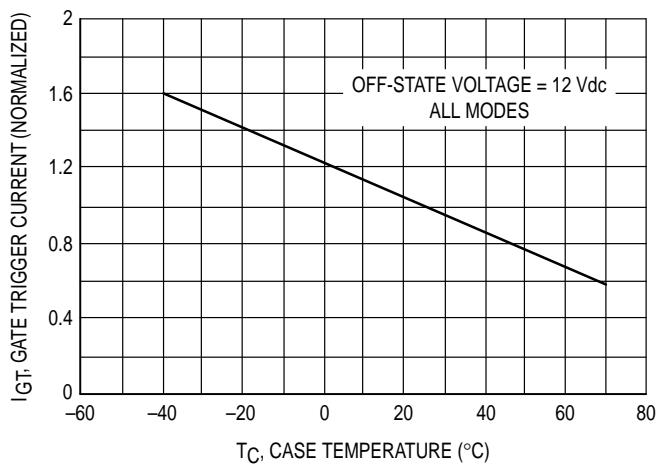
**Figure 3. Maximum On-State Characteristics**



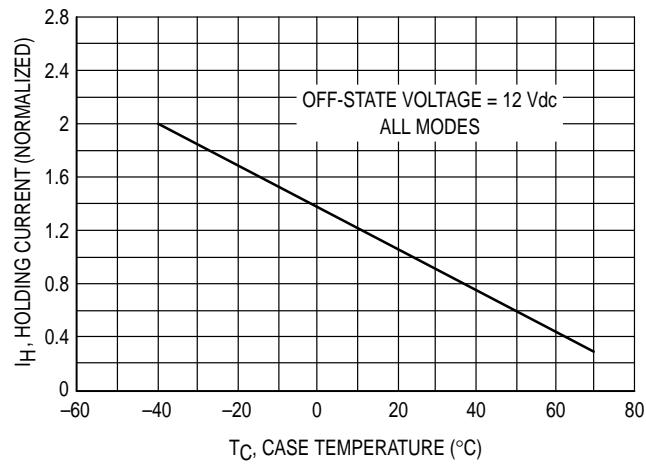
**Figure 4. Maximum Nonrepetitive Surge Current**



**Figure 5. Typical Gate Trigger Voltage**



**Figure 6. Typical Gate Trigger Current**



**Figure 7. Typical Holding Current**

## MAC212FP Series MAC212AFP Series

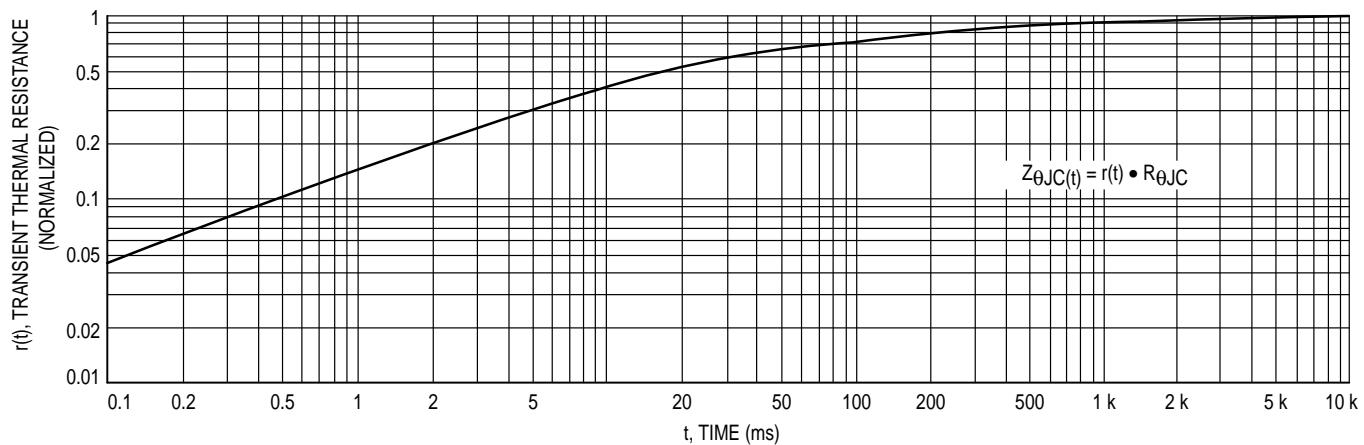
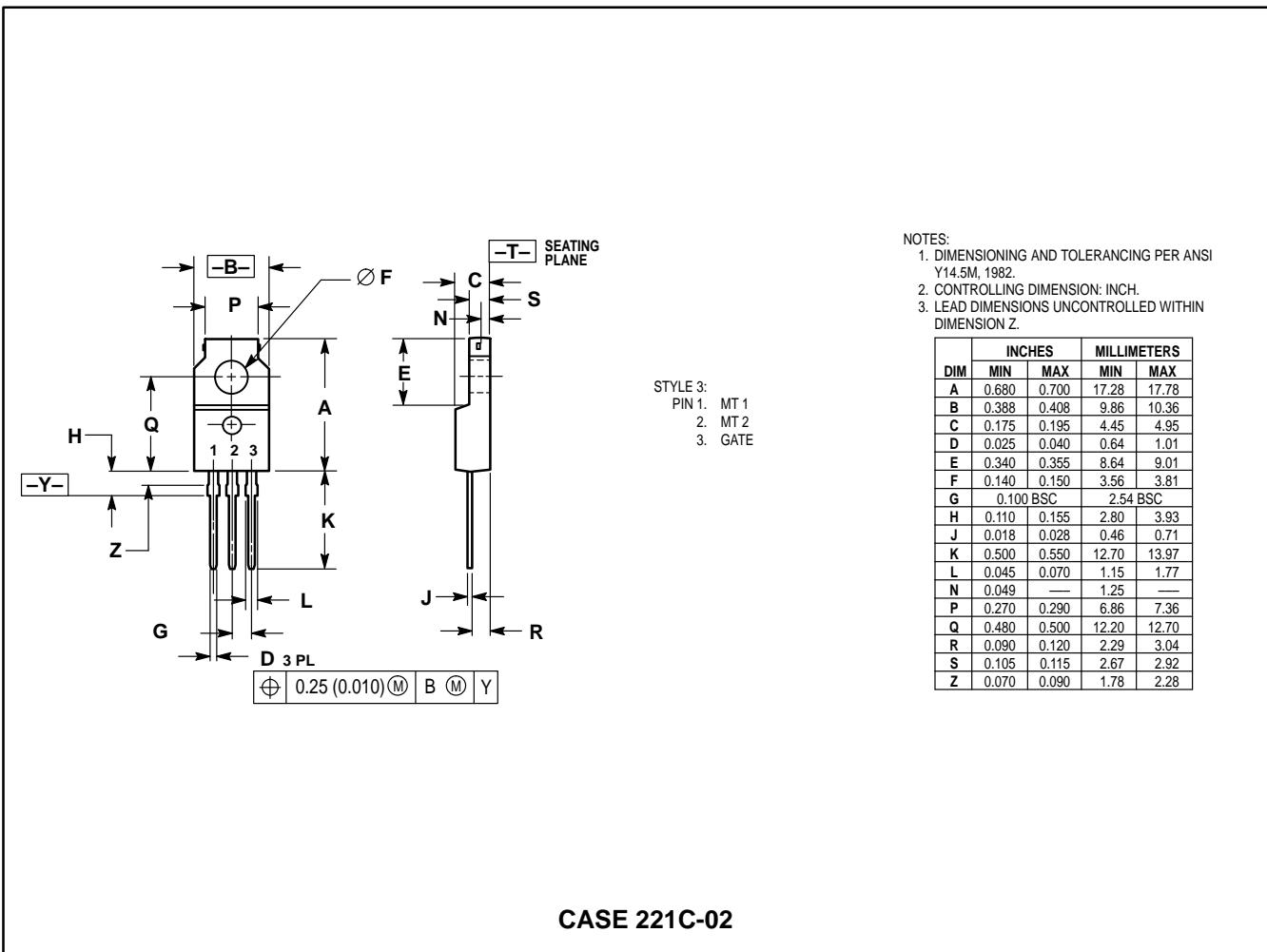


Figure 8. Thermal Response

## PACKAGE DIMENSIONS



## MAC212FP Series MAC212AFP Series

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MAC212FP/D

