

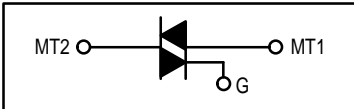
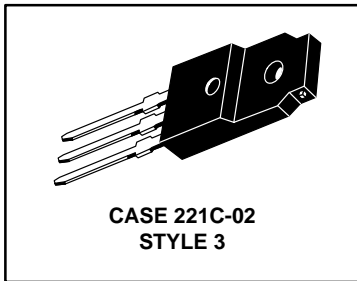
**MAC210FP  
Series  
MAC210AFP  
Series**

**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 (MAC210FP Series) or Four Modes (MAC210AFP Series)

**ISOLATED TRIACs  
THYRISTORS  
10 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 MAC210-4FP, MAC210A4FP MAC210-6FP, MAC210A6FP MAC210-8FP, MAC210A8FP MAC210-10FP, MAC210A10FP	$V_{\text{DRM}}$	200 400 600 800	Volts
On-State RMS Current ( $T_C = +70^\circ\text{C}$ ) Full Cycle Sine Wave 50 to 60 Hz <sup>(2)</sup>	$I_{\text{T(RMS)}}$	10	Amps
Peak Nonrepetitive Surge Current (One Full Cycle, 60 Hz, $T_C = +70^\circ\text{C}$ ) preceded and followed by rated current	$I_{\text{TSM}}$	100	Amps
Circuit Fusing ( $t = 8.3$ ms)	$I^2t$	40	$\text{A}^2\text{s}$
Peak Gate Power ( $T_C = +70^\circ\text{C}$ , Pulse Width = 10 $\mu\text{s}$ )	$P_{\text{GM}}$	20	Watts
Average Gate Power ( $T_C = +70^\circ\text{C}$ , $t = 8.3$ ms)	$P_{\text{G(AV)}}$	0.35	Watt
Peak Gate Current ( $T_C = +70^\circ\text{C}$ , Pulse Width = 10 $\mu\text{s}$ )	$I_{\text{GM}}$	2	Amps
RMS Isolation Voltage ( $T_A = 25^\circ\text{C}$ , Relative Humidity $\leq 20\%$ )	$V_{\text{(ISO)}}$	1500	Volts
Operating Junction Temperature	$T_J$	-40 to +125	$^\circ\text{C}$
Storage Temperature Range	$T_{\text{stg}}$	-40 to +125	$^\circ\text{C}$

**THERMAL CHARACTERISTICS**

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

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.

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.



## MAC210FP Series MAC210AFP Series

### ELECTRICAL CHARACTERISTICS (T<sub>C</sub> = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Blocking Current (Either Direction) (V <sub>D</sub> = Rated V <sub>DRM</sub> , Gate Open) T <sub>J</sub> = 25°C T <sub>J</sub> = +125°C	I <sub>DRM</sub>	— —	— —	10 2	μA mA
Peak On-State Voltage (Either Direction) (I <sub>TM</sub> = 14 A Peak; Pulse Width = 1 to 2 ms, Duty Cycle ≤ 2%)	V <sub>TM</sub>	—	1.2	1.65	Volts
Gate Trigger Current (Continuous dc) (Main Terminal Voltage = 12 Vdc, R <sub>L</sub> = 100 Ohms Minimum Gate Pulse Width = 2 μs) MT2(+), G(+) MT2(+), G(-) MT2(-), G(-) MT2(-), G(+) "A" SUFFIX ONLY	I <sub>GT</sub>	— — — —	12 12 20 35	50 50 50 75	mA
Gate Trigger Voltage (Continuous dc) (Main Terminal Voltage = 12 Vdc, R <sub>L</sub> = 100 Ohms Minimum Gate Pulse Width = 2 μs) MT2(+), G(+) MT2(+), G(-) MT2(-), G(-) MT2(-), G(+) "A" SUFFIX ONLY (Main Terminal Voltage = Rated V <sub>DRM</sub> , R <sub>L</sub> = 10 kΩ, T <sub>J</sub> = +125°C) MT2(+), G(+); MT2(+), G(-); MT2(-), G(-) MT2(-), G(+) "A" SUFFIX ONLY	V <sub>GT</sub>	— — — — 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, T <sub>C</sub> = +25°C)	I <sub>H</sub>	—	6	50	mA
Turn-On Time (Rated V <sub>DRM</sub> , I <sub>TM</sub> = 14 A, I <sub>GT</sub> = 120 mA, Rise Time = 0.1 μs, Pulse Width = 2 μs)	t <sub>gt</sub>	—	1.5	—	μs
Critical Rate of Rise of Commutation Voltage (V <sub>D</sub> = Rated V <sub>DRM</sub> , I <sub>TM</sub> = 14 A, Commutating di/dt = 5.0 A/ms, Gate Unenergized, T <sub>C</sub> = +70°C)	dv/dt <sub>(c)</sub>	—	5	—	V/μs
Critical Rate of Rise of Off-State Voltage (V <sub>D</sub> = Rated V <sub>DRM</sub> , Exponential Voltage Rise, Gate Open, T <sub>C</sub> = +70°C)	dv/dt	—	100	—	V/μs

TYPICAL CHARACTERISTICS

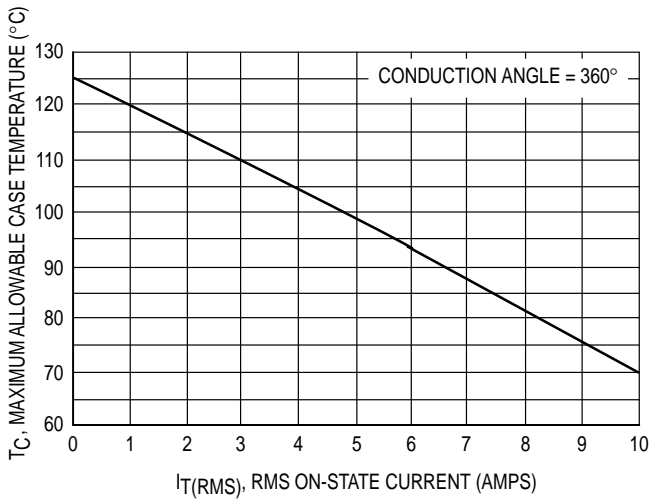


Figure 1. Current Derating

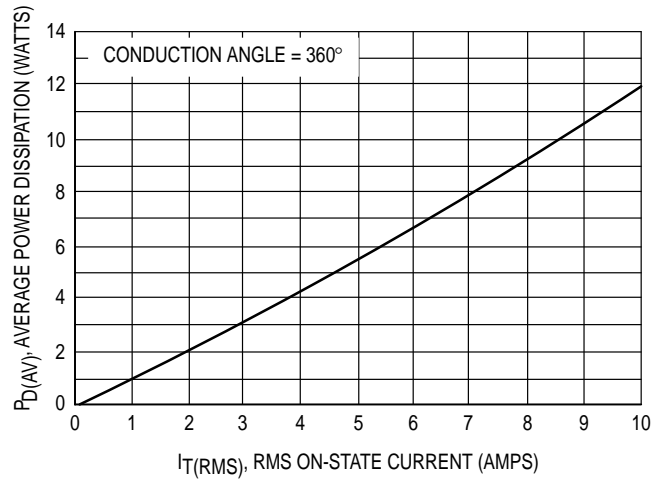


Figure 2. Power Dissipation

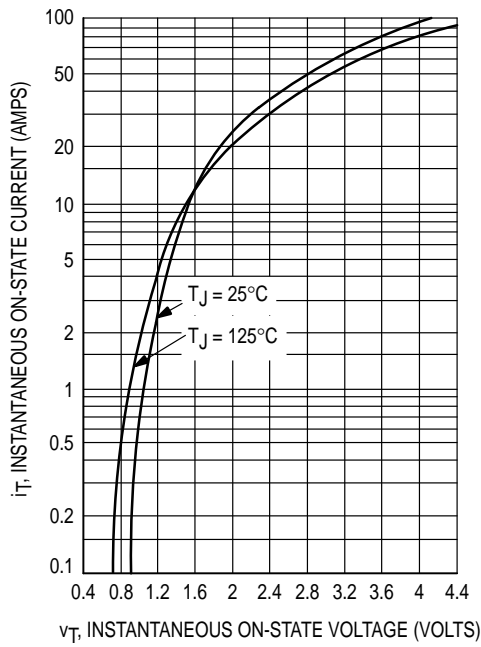


Figure 3. Maximum On-State Characteristics

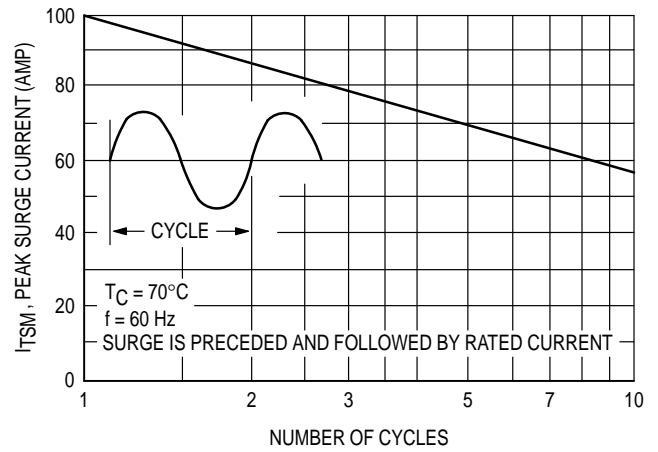


Figure 4. Maximum Nonrepetitive Surge Current

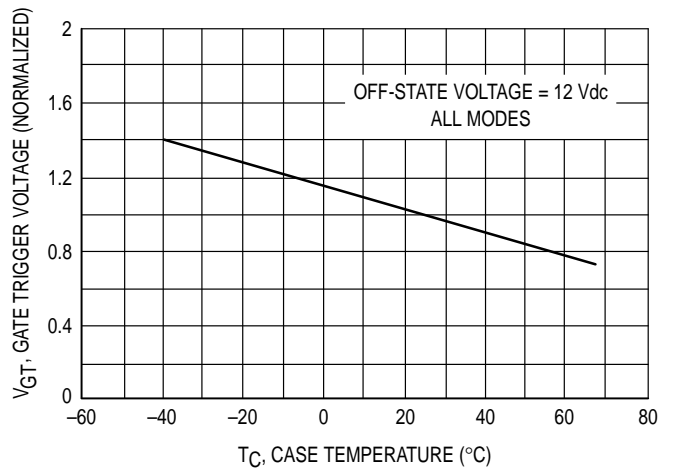
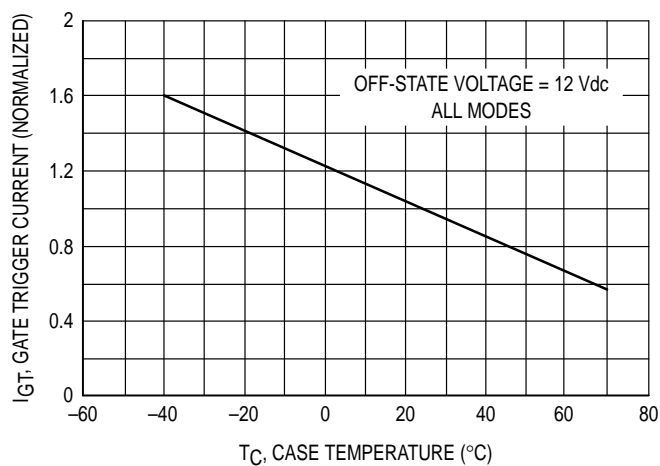
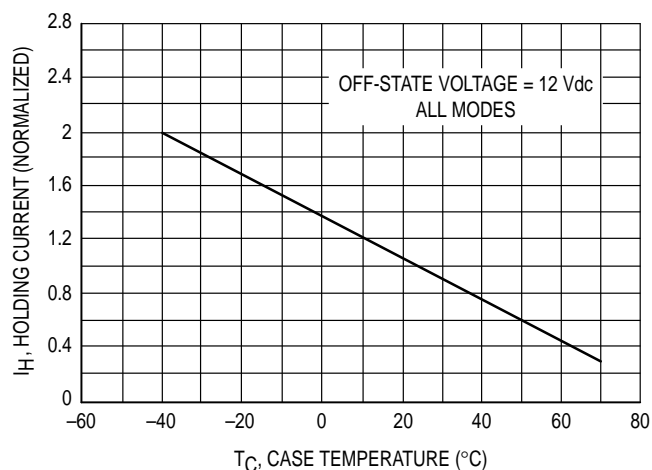


Figure 5. Typical Gate Trigger Voltage

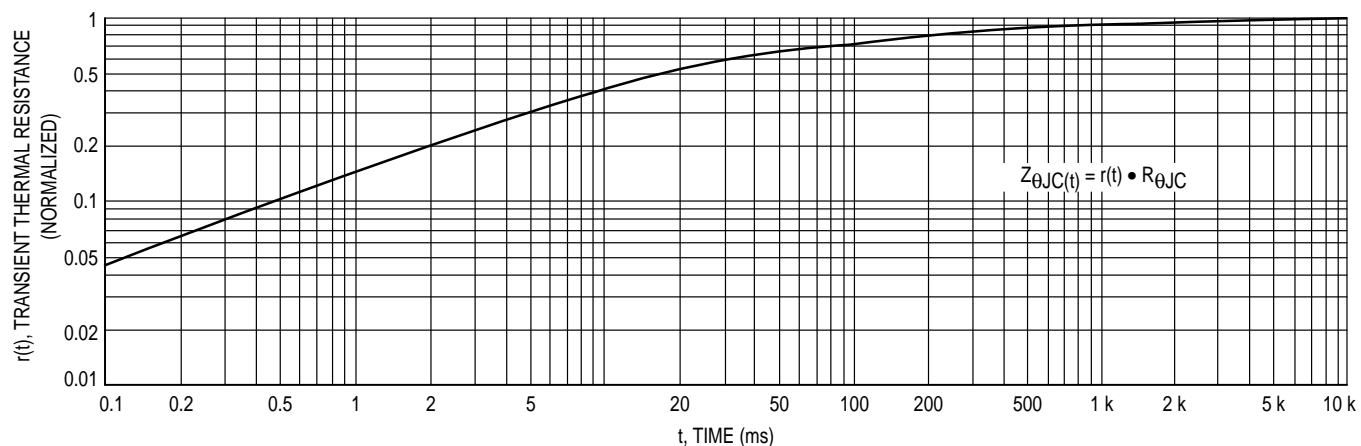
**MAC210FP Series MAC210AFP Series**



**Figure 6. Typical Gate Trigger Current**

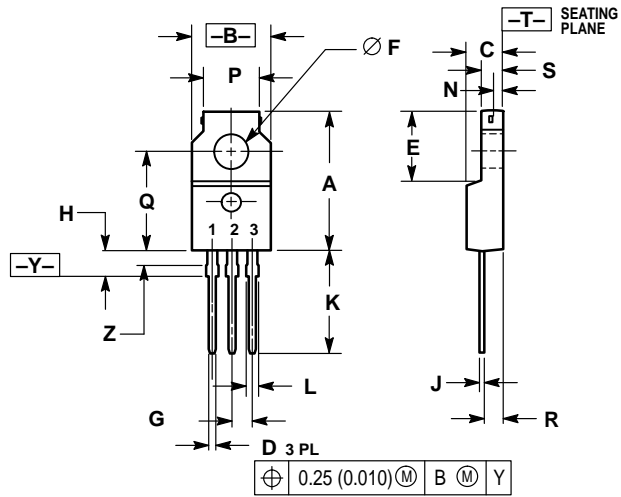


**Figure 7. Typical Holding Current**



**Figure 8. Thermal Response**

PACKAGE DIMENSIONS



STYLE 3:  
 PIN 1. MT 1  
 2. MT 2  
 3. GATE

- NOTES:  
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.  
 2. CONTROLLING DIMENSION: INCH.  
 3. LEAD DIMENSIONS UNCONTROLLED WITHIN DIMENSION Z.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.680	0.700	17.28	17.78
B	0.388	0.408	9.86	10.36
C	0.175	0.195	4.45	4.95
D	0.025	0.040	0.64	1.01
E	0.340	0.355	8.64	9.01
F	0.140	0.150	3.56	3.81
G	0.100 BSC		2.54 BSC	
H	0.110	0.155	2.80	3.93
J	0.018	0.028	0.46	0.71
K	0.500	0.550	12.70	13.97
L	0.045	0.070	1.15	1.77
N	0.049	—	1.25	—
P	0.270	0.290	6.86	7.36
Q	0.480	0.500	12.20	12.70
R	0.090	0.120	2.29	3.04
S	0.105	0.115	2.67	2.92
Z	0.070	0.090	1.78	2.28

CASE 221C-02

## MAC210FP Series MAC210AFP Series

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MAC210FP/D

