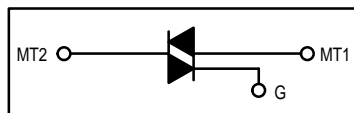


## Triacs

### Silicon Bidirectional Thyristors

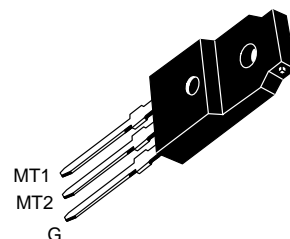
... designed primarily for full-wave ac control applications, such as light dimmers, motor controls, heating controls and power supplies; or wherever full-wave silicon gate controlled solid-state devices are needed. Triac type thyristors switch from a blocking to a conducting state for either polarity 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 Four Modes



## MAC210AFP Series

**ISOLATED TRIACs  
THYRISTORS  
10 AMPERES RMS  
600 thru 800 VOLTS**



**CASE 221C-02  
STYLE 3**

#### 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  MAC210A8FP MAC210A10FP	$V_{\text{DRM}}$	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.



## MAC210AFP 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	$\mu\text{A}$ mA
Peak On-State Voltage (Either Direction) ( $I_{TM} = 14\text{ A Peak}$ ; Pulse Width = 1 to 2 ms, Duty Cycle $\leq 2\%$ )	$V_{TM}$	—	1.2	1.65	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(+)	$I_{GT}$	— — — —	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(+) (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(+)	$V_{GT}$	— — — — 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, $T_C = +25^\circ\text{C}$ )	$I_H$	—	6	50	mA
Turn-On Time (Rated $V_{DRM}$ , $I_{TM} = 14\text{ A}$ , $I_{GT} = 120\text{ mA}$ , 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 ( $V_D = \text{Rated } V_{DRM}$ , $I_{TM} = 14\text{ A}$ , Commutating $di/dt = 5.0\text{ A/ms}$ , Gate Unenergized, $T_C = +70^\circ\text{C}$ )	$dv/dt(c)$	—	5	—	V/ $\mu\text{s}$
Critical Rate of Rise of Off-State Voltage ( $V_D = \text{Rated } V_{DRM}$ , Exponential Voltage Rise, Gate Open, $T_C = +70^\circ\text{C}$ )	$dv/dt$	—	100	—	V/ $\mu\text{s}$

## TYPICAL CHARACTERISTICS

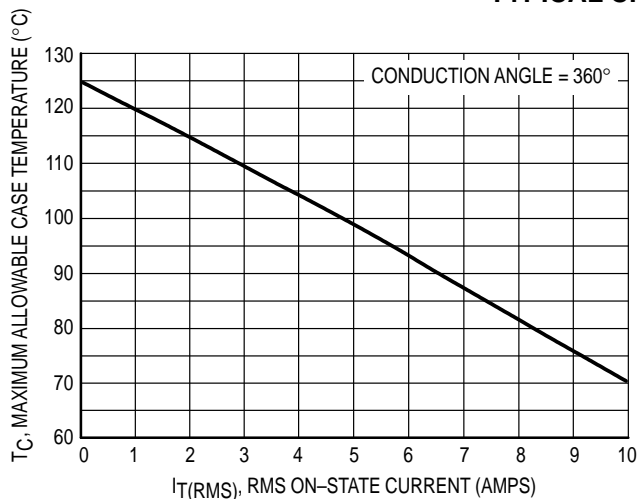


Figure 1. Current Derating

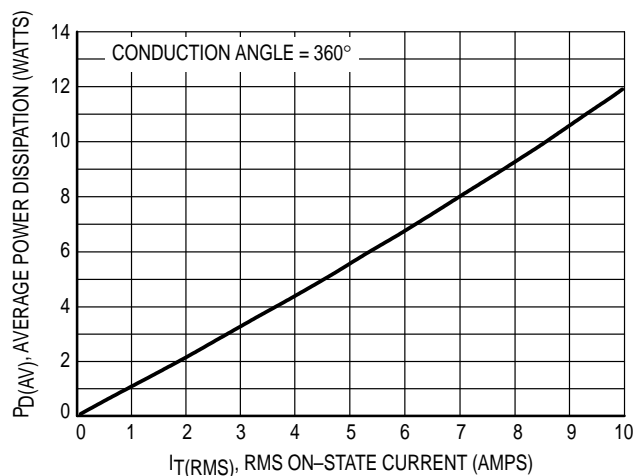


Figure 2. Power Dissipation

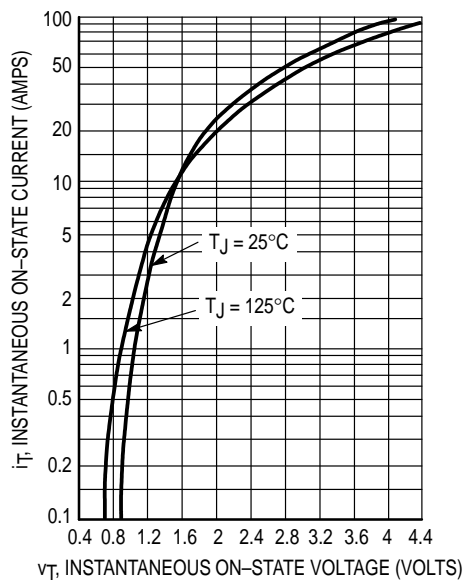


Figure 3. Maximum On-State Characteristics

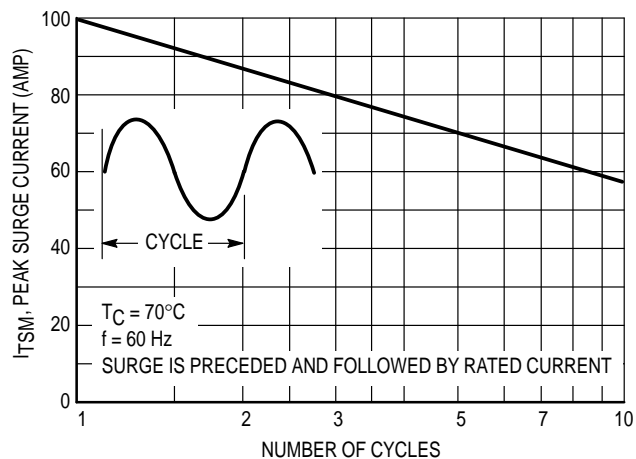


Figure 4. Maximum Nonrepetitive Surge Current

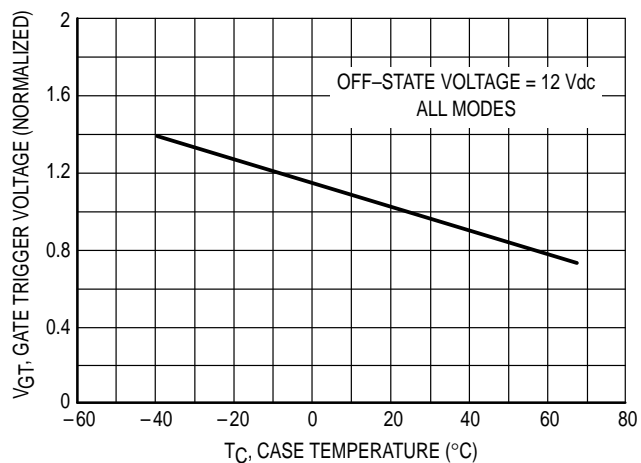


Figure 5. Typical Gate Trigger Voltage

## MAC210AFP Series

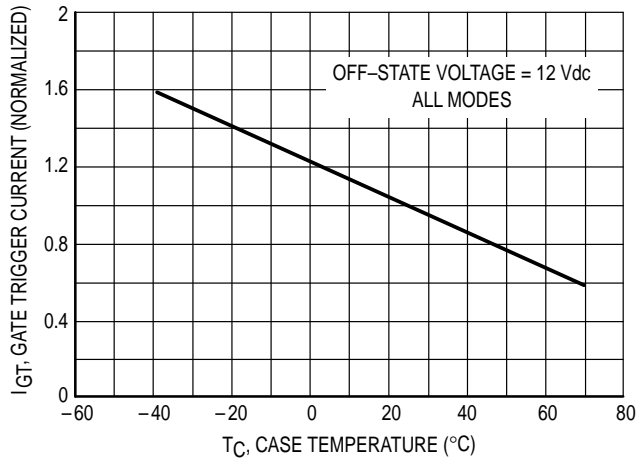


Figure 6. Typical Gate Trigger Current

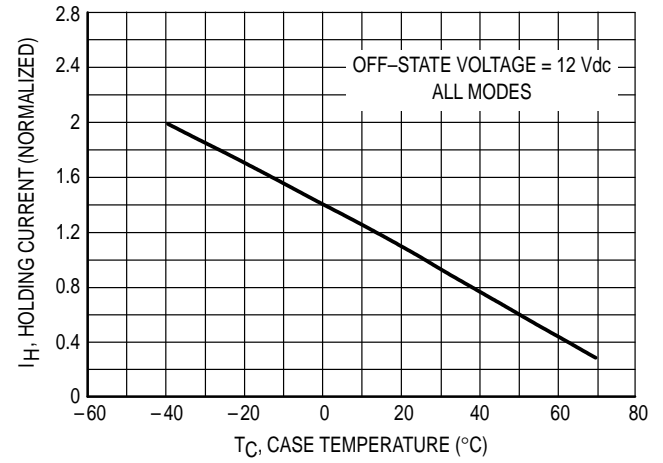


Figure 7. Typical Holding Current

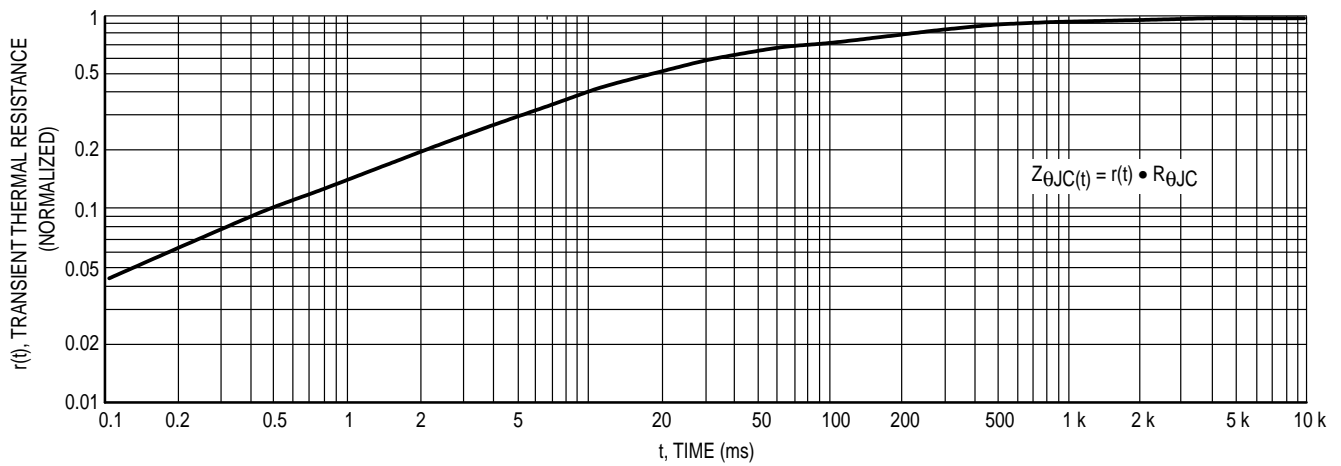
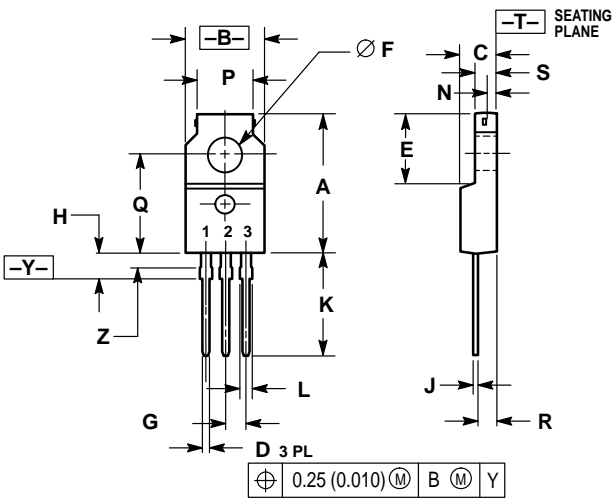


Figure 8. Thermal Response

PACKAGE DIMENSIONS




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

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

CASE 221C-02  
ISSUE B

**NOTES**

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