

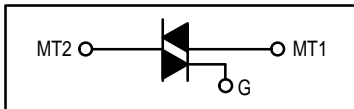
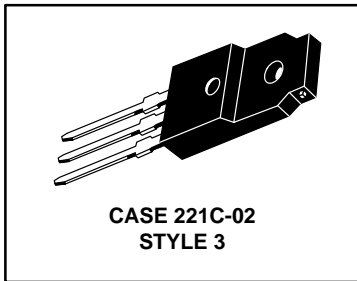
**MAC210FP
Series
MAC210AFP
Series**

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 ⁽¹⁾ ($T_J = -40$ 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_{DRM}	200 400 600 800	Volts
On-State RMS Current ($T_C = +70^\circ\text{C}$) Full Cycle Sine Wave 50 to 60 Hz ⁽²⁾	$I_{\text{T(RMS)}}$	10	Amps
Peak Nonrepetitive Surge Current (One Full Cycle, 60 Hz, $T_C = +70^\circ\text{C}$) preceded and followed by rated current	I_{TSM}	100	Amps
Circuit Fusing ($t = 8.3$ ms)	I^2t	40	A^2s
Peak Gate Power ($T_C = +70^\circ\text{C}$, Pulse Width = 10 μs)	P_{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 μs)	I_{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_{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_{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 ($T_C = 25^\circ\text{C}$ unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Blocking Current (Either Direction) ($V_D = \text{Rated } V_{\text{DRM}}$, Gate Open) $T_J = 25^\circ\text{C}$ $T_J = +125^\circ\text{C}$	I_{DRM}	— —	— —	10 2	μA mA
Peak On-State Voltage (Either Direction) ($I_{\text{TM}} = 14 \text{ A Peak}$; 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 μs) 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 μs) 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, $T_C = +25^\circ\text{C}$)	I_{H}	—	6	50	mA
Turn-On Time (Rated V_{DRM} , $I_{\text{TM}} = 14 \text{ A}$, $I_{\text{GT}} = 120 \text{ mA}$, Rise Time = 0.1 μs , Pulse Width = 2 μs)	t_{gt}	—	1.5	—	μs
Critical Rate of Rise of Commutation Voltage ($V_D = \text{Rated } V_{\text{DRM}}$, $I_{\text{TM}} = 14 \text{ A}$, Commutating $di/dt = 5.0 \text{ A/ms}$, Gate Unenergized, $T_C = +70^\circ\text{C}$)	$dv/dt_{(c)}$	—	5	—	$\text{V}/\mu\text{s}$
Critical Rate of Rise of Off-State Voltage ($V_D = \text{Rated } V_{\text{DRM}}$, Exponential Voltage Rise, Gate Open, $T_C = +70^\circ\text{C}$)	dv/dt	—	100	—	$\text{V}/\mu\text{s}$

TYPICAL CHARACTERISTICS

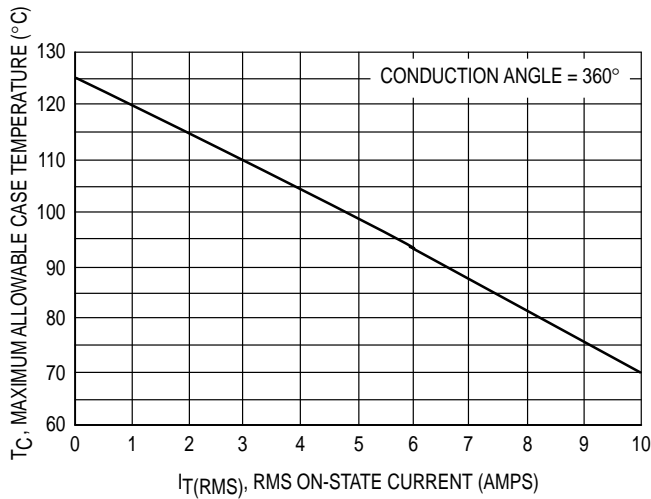


Figure 1. Current Derating

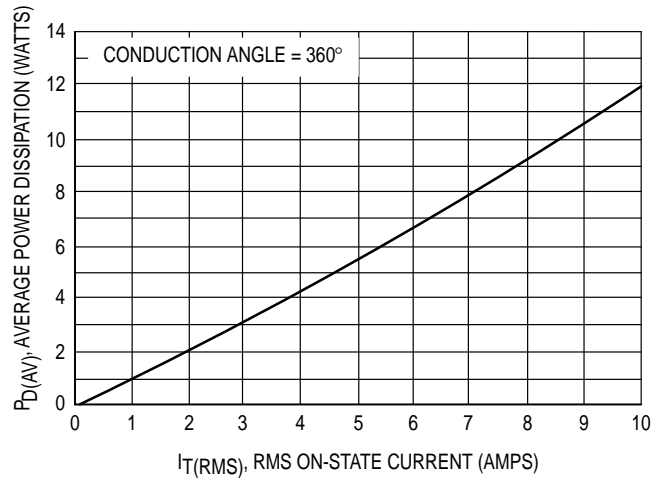


Figure 2. Power Dissipation

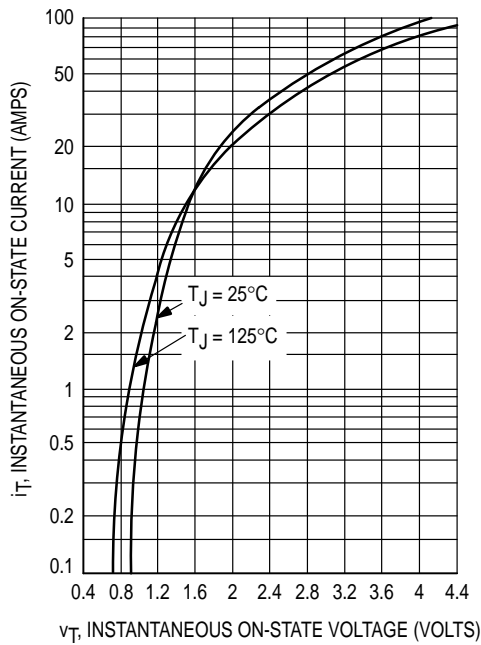


Figure 3. Maximum On-State Characteristics

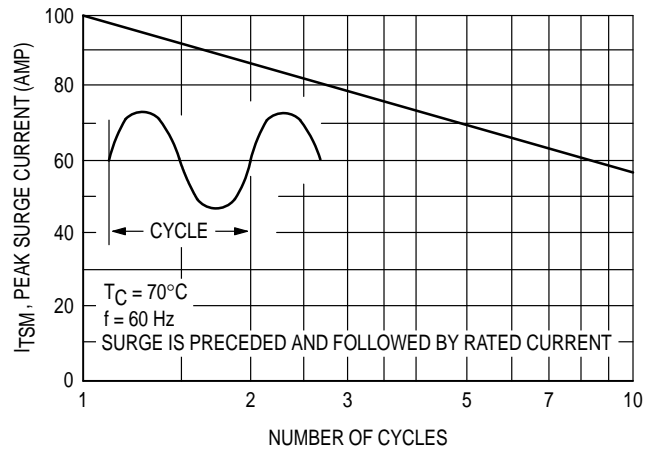


Figure 4. Maximum Nonrepetitive Surge Current

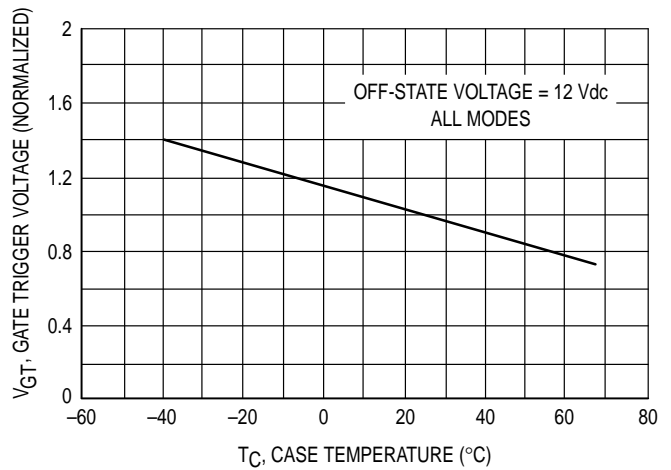


Figure 5. Typical Gate Trigger Voltage

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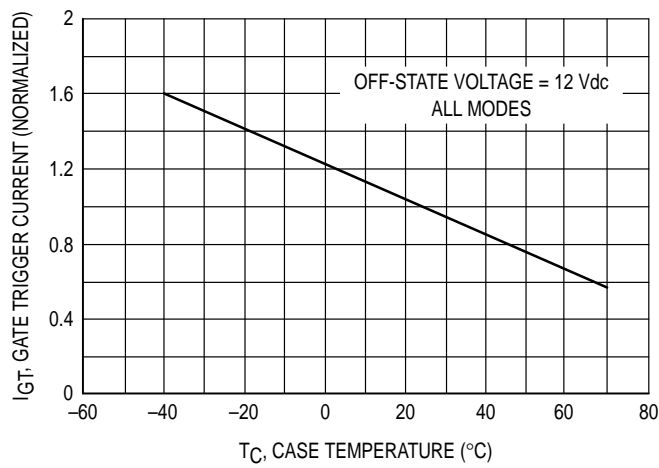


Figure 6. Typical Gate Trigger Current

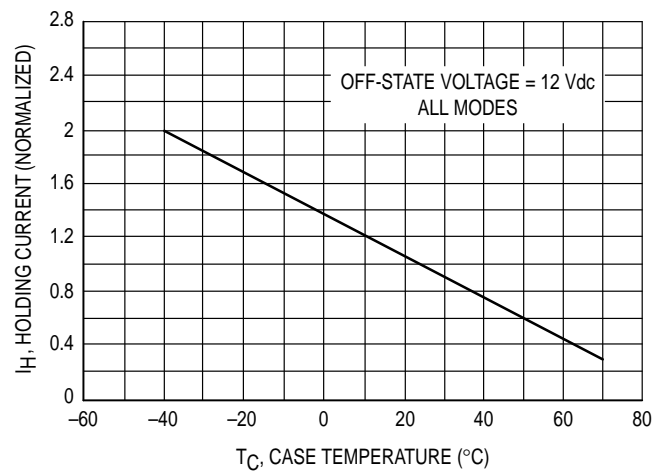


Figure 7. Typical Holding Current

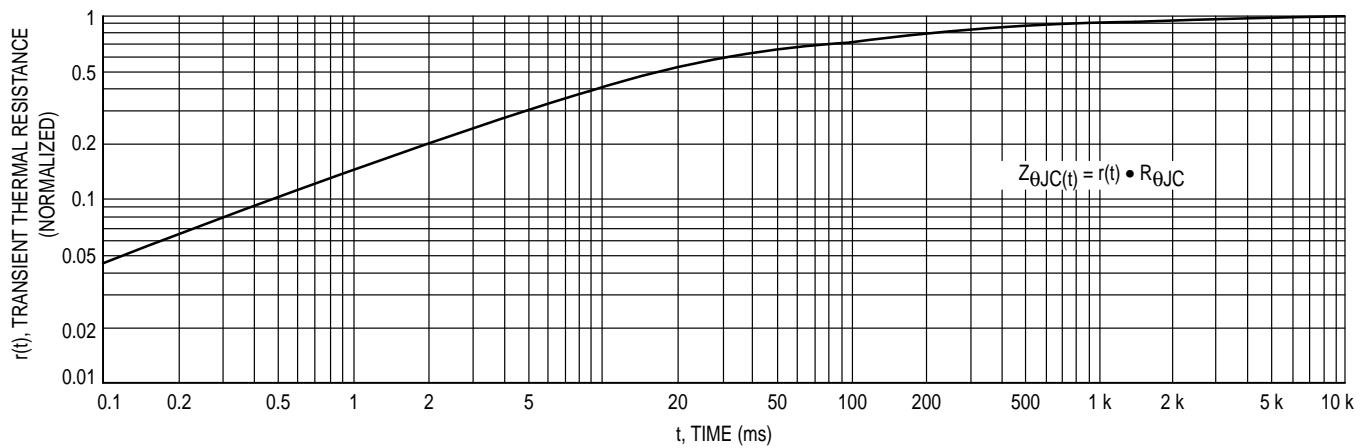
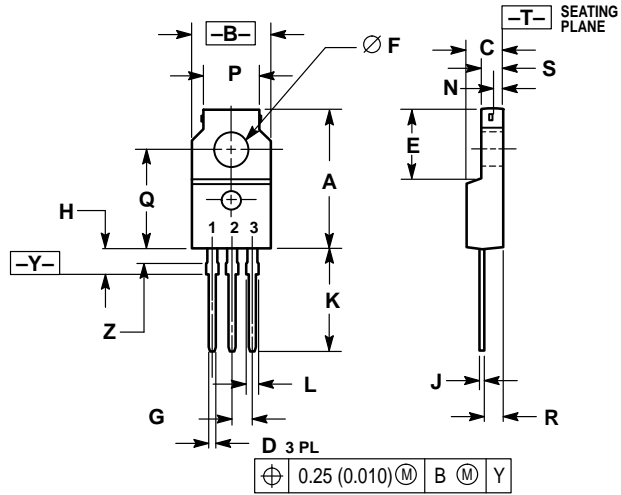


Figure 8. Thermal Response

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

