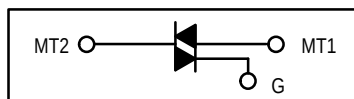


Triacs

Silicon Bidirectional Thyristors

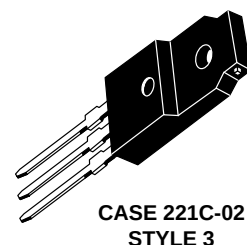
... designed primarily for full-wave ac control applications, such as light dimmers, motor controls, heating controls and power supplies; or wherever full-wave silicon gate controlled solid-state devices are needed. Triac type thyristors switch from a blocking to a conducting state for either polarity 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 ⁽¹⁾ ($T_J = -40$ to $+125^\circ\text{C}$, 1/2 Sine Wave 50 to 60 Hz, Gate Open) MAC212-4FP, MAC212A4FP MAC212-6FP, MAC212A6FP MAC212-8FP, MAC212A8FP MAC212-10FP, MAC212A10FP	V_{DRM}	200 400 600 800	Volts
On-State RMS Current ($T_C = +85^\circ\text{C}$) Full Cycle Sine Wave 50 to 60 Hz ⁽²⁾	$I_{\text{T(RMS)}}$	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	A^2s
Peak Gate Power ($T_C = +85^\circ\text{C}$, Pulse Width = 10 μs)	P_{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 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 $+150$	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta\text{JC}}$	2.1	$^\circ\text{C/W}$
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.

MAC212FP Series MAC212AFP Series

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Blocking Current (Either Direction) (V _D = Rated V _{DRM} , Gate Open) T _J = 25°C T _J = +125°C	I _{DRM}	— —	— —	10 2	μA mA
Peak On-State Voltage (Either Direction) (I _{TM} = 17 A Peak; Pulse Width = 1 to 2 ms, Duty Cycle ≤ 2%)	V _{TM}	—	1.3	1.75	Volts
Gate Trigger Current (Continuous dc) (Main Terminal Voltage = 12 Vdc, R _L = 100 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 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 kΩ, T _J = +125°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 = Rated V _{DRM} , I _{TM} = 17 A, I _{GT} = 120 mA, Rise Time = 0.1 μs, Pulse Width = 2 μs)	t _{gt}	—	1.5	—	μs
Critical Rate of Rise of Commutation Voltage (V _D = Rated V _{DRM} , I _{TM} = 17 A, Commutating di/dt = 6.1 A/ms, Gate Unenergized, T _C = +85°C)	dv/dt(c)	—	5	—	V/μs
Critical Rate of Rise of Off-State Voltage (V _D = Rated V _{DRM} , Exponential Voltage Rise, Gate Open, T _C = +85°C)	dv/dt	—	100	—	V/μs

TYPICAL CHARACTERISTICS

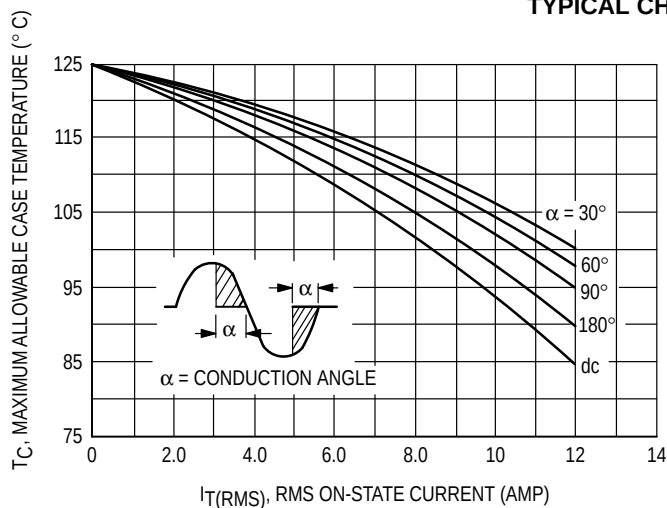


Figure 1. Current Derating

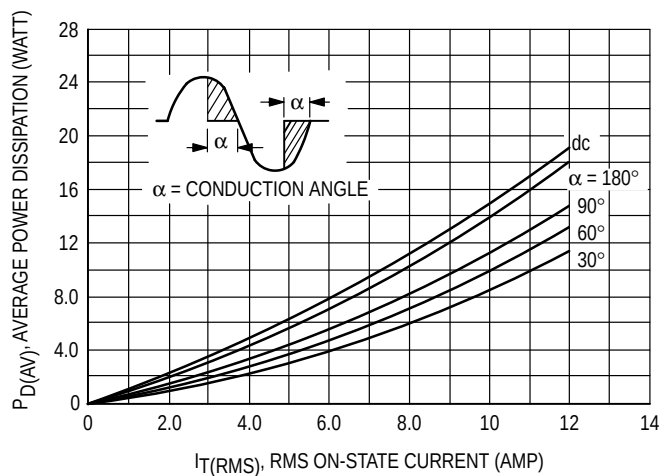


Figure 2. Power Dissipation

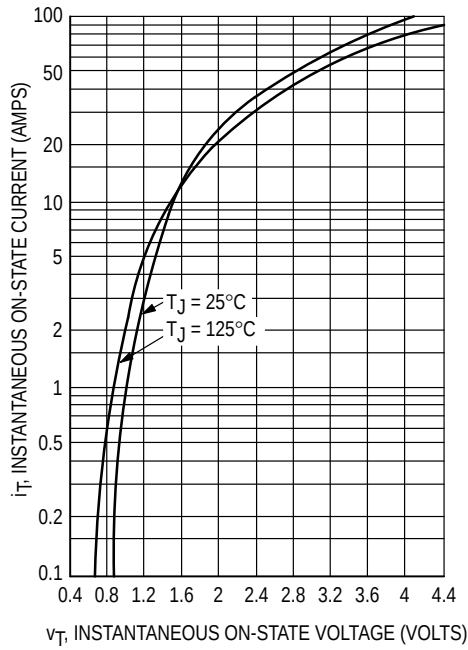


Figure 3. Maximum On-State Characteristics

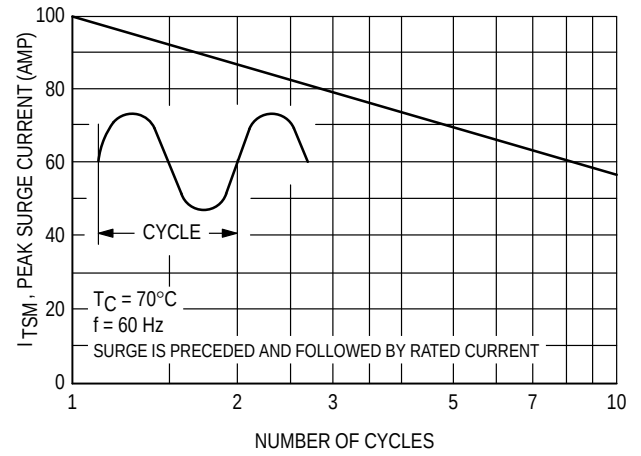


Figure 4. Maximum Nonrepetitive Surge Current

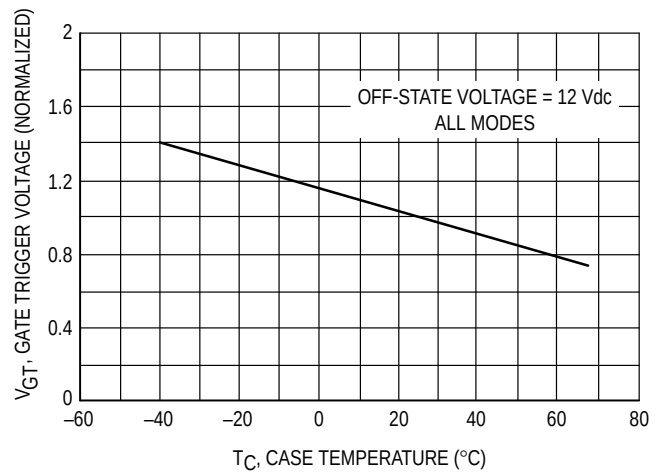


Figure 5. Typical Gate Trigger Voltage

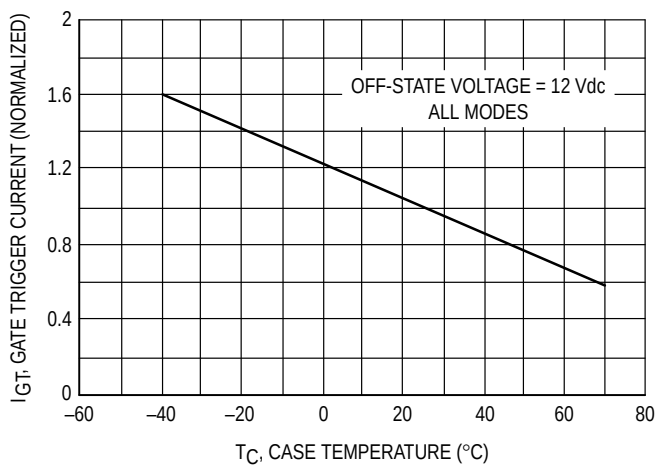


Figure 6. Typical Gate Trigger Current

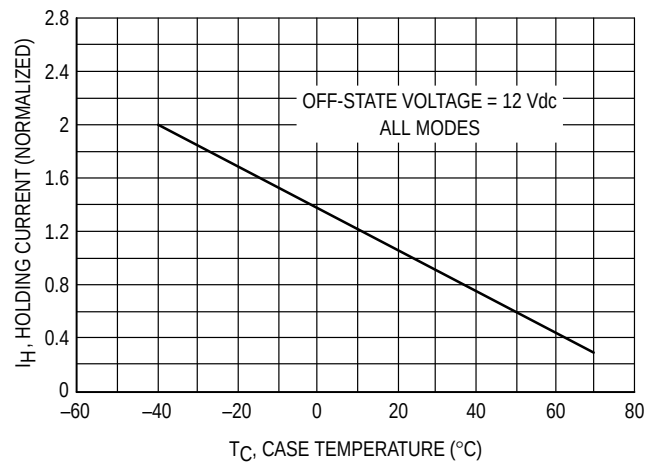


Figure 7. Typical Holding Current

MAC212FP Series MAC212AFP Series

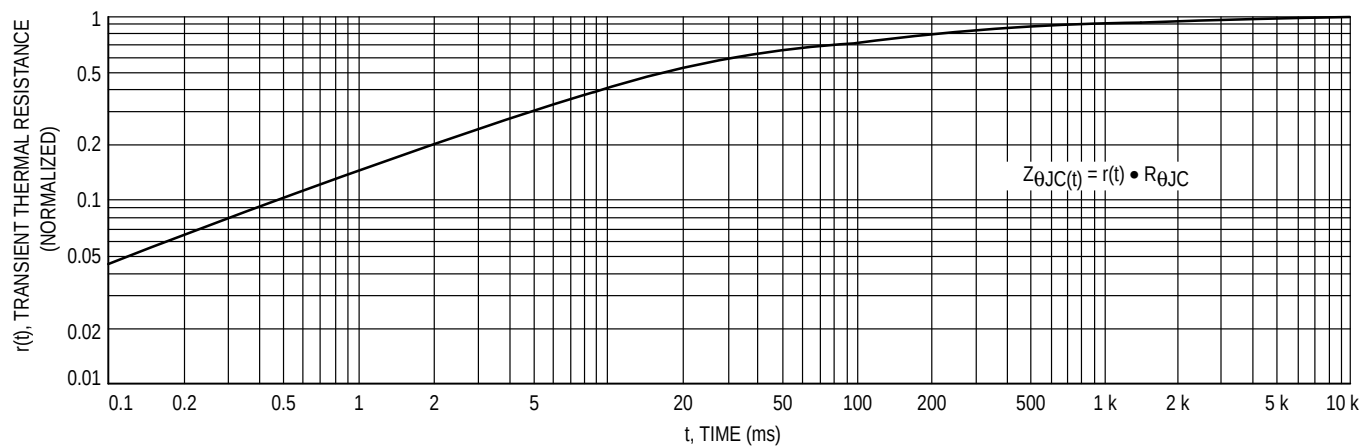
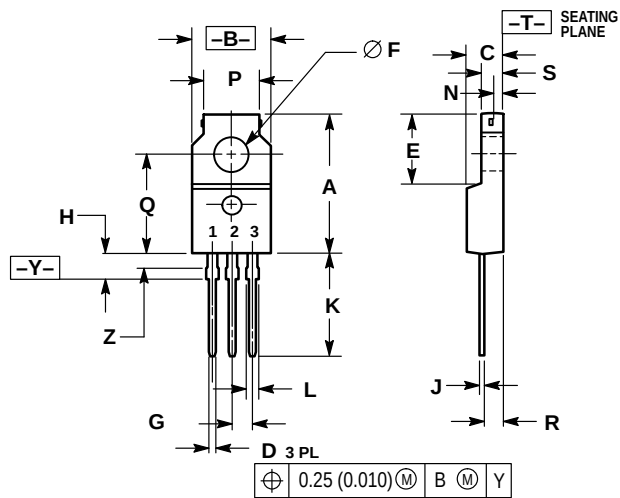


Figure 8. Thermal Response

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

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