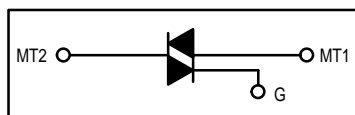


## Triacs

### Silicon Bidirectional Thyristors

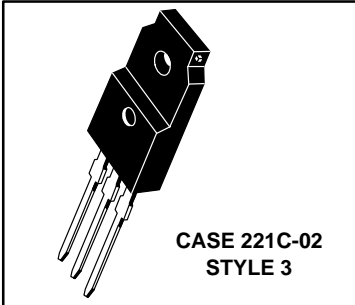
... designed primarily for full-wave ac control applications, such as solid-state relays, motor controls, heating controls and power supplies; or wherever full-wave silicon gate controlled solid-state devices are needed. Triac type thyristors switch from a blocking to a conducting state for either polarity 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 (MAC320FP Series) or Four Modes (MAC320AFP Series)



**MAC320FP**  
**Series**  
**MAC320AFP**  
**Series**

**ISOLATED TRIACs**  
**THYRISTORS**  
**20 AMPERES RMS**  
**200 thru 800 VOLTS**



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

Rating	Symbol	Value	Unit
Peak Repetitive Off-State Voltage <sup>(1)</sup> (T <sub>J</sub> = -40 to +125°C, 1/2 Sine Wave 50 to 60 Hz, Gate Open)	V <sub>DRM</sub>	200 400 600 800	Volts
Peak Gate Voltage	V <sub>GM</sub>	10	Volts
On-State RMS Current (T <sub>C</sub> = +75°C, Full Cycle Sine Wave 50 to 60 Hz) <sup>(2)</sup>	I <sub>T(RMS)</sub>	20	Amps
Peak Nonrepetitive Surge Current (One Full Cycle, 60 Hz, T <sub>C</sub> = +75°C, preceded and followed by rated current)	I <sub>TSM</sub>	150	Amps
Peak Gate Power (T <sub>C</sub> = +75°C, Pulse Width = 2 μs)	P <sub>GM</sub>	20	Watts
Average Gate Power (T <sub>C</sub> = +75°C, t = 8.3 ms)	P <sub>G(AV)</sub>	0.5	Watt
Peak Gate Current	I <sub>GM</sub>	2	Amps
RMS Isolation Voltage (T <sub>A</sub> = 25°C, Relative Humidity ≤ 20%)	V <sub>(ISO)</sub>	1500	Volts
Operating Junction Temperature	T <sub>J</sub>	-40 to +125	°C
Storage Temperature Range	T <sub>stg</sub>	-40 to +150	°C

#### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	R <sub>θJC</sub>	1.8	°C/W
Thermal Resistance, Case to Sink	R <sub>θCS</sub>	2.2 (typ)	°C/W
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	60	°C/W

1. V<sub>DRM</sub> 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<sub>C</sub> measurements is a point on the center lead of the package as close as possible to the plastic body.

# MAC320FP Series MAC320AFP Series

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

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Blocking Current ( $V_D = \text{Rated } V_{DRM}$ , 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) ( $I_{TM} = 28 \text{ A Peak}$ ; Pulse Width = 1 to 2 ms, Duty Cycle $\leq 2\%$ )	$V_{TM}$	—	1.4	1.7	Volts
Peak Gate Trigger Current (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	$I_{GT}$	— — — —	— — — —	50 50 50 75	mA
Peak Gate Trigger Voltage (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 $V_{DRM}$ , $R_L = 10$ , $T_J = +110^\circ\text{C}$ ) 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 = 200 mA)	$I_H$	—	6	40	mA
Turn-On Time ( $V_D = \text{Rated } V_{DRM}$ , $I_{TM} = 28 \text{ A}$ , $I_{GT} = 120 \text{ mA}$ , Rise Time = 0.1 $\mu\text{s}$ , Pulse Width = 2 $\mu\text{s}$ )	$t_{gt}$	—	1.5	10	$\mu\text{s}$
Critical Rate of Rise of Commutation Voltage ( $V_D = \text{Rated } V_{DRM}$ , $I_{TM} = 28 \text{ A}$ , Commutating $di/dt = 10 \text{ A/ms}$ , Gate Unenergized, $T_C = +75^\circ\text{C}$ )	$dv/dt(c)$	—	5	—	V/ $\mu\text{s}$

### TYPICAL CHARACTERISTICS

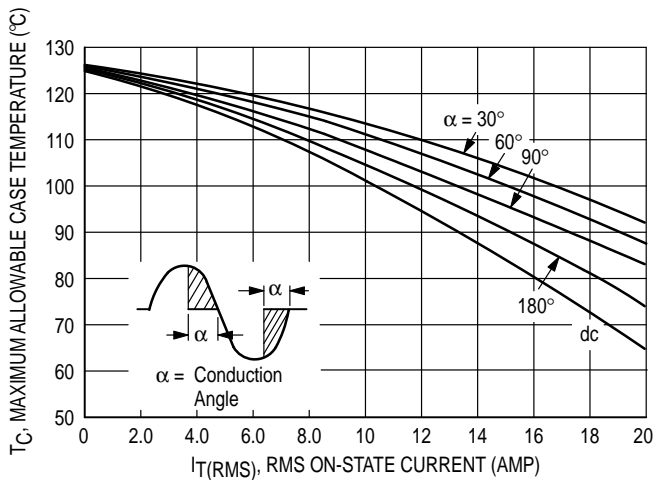


Figure 1. RMS Current Derating

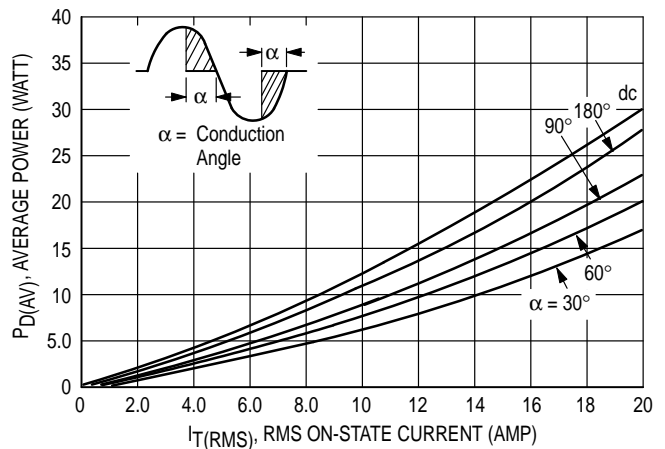


Figure 2. On-State Power Dissipation

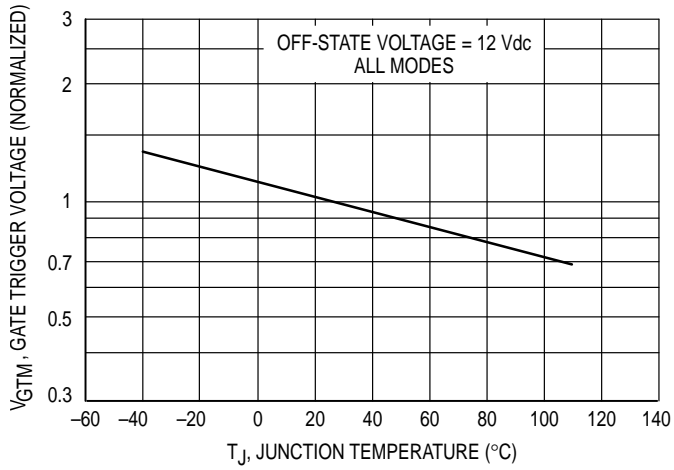


Figure 3. Typical Gate Trigger Voltage

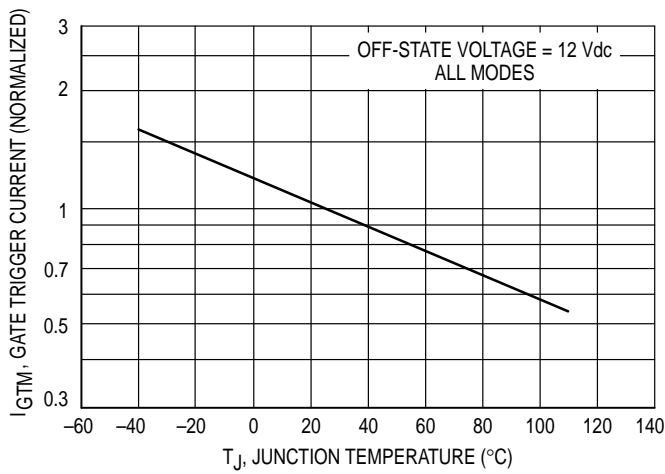


Figure 4. Typical Gate Trigger Current

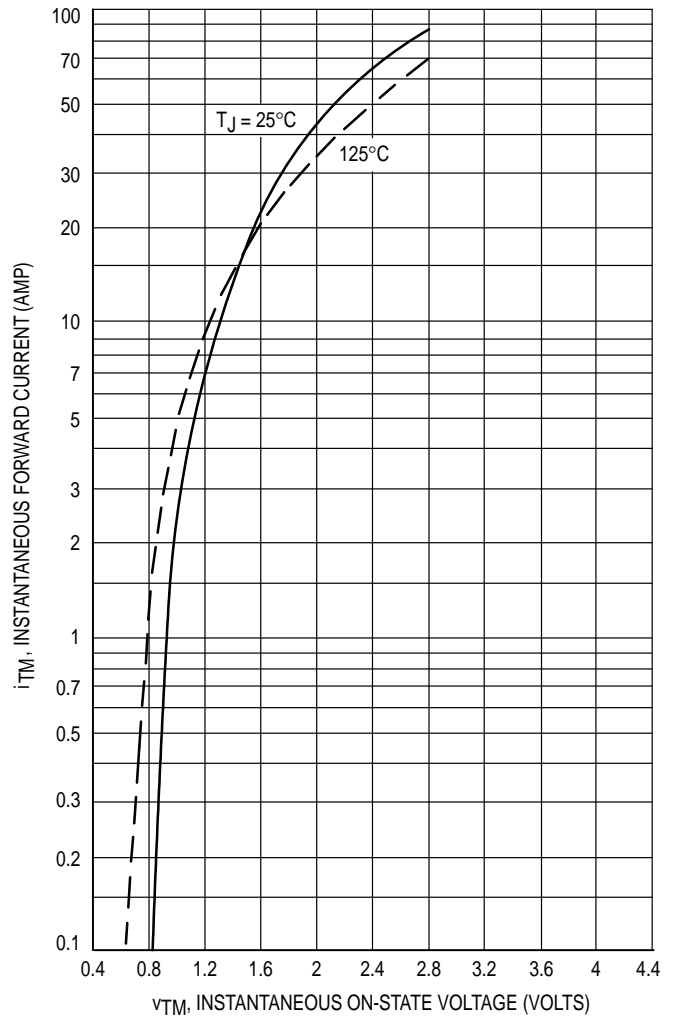
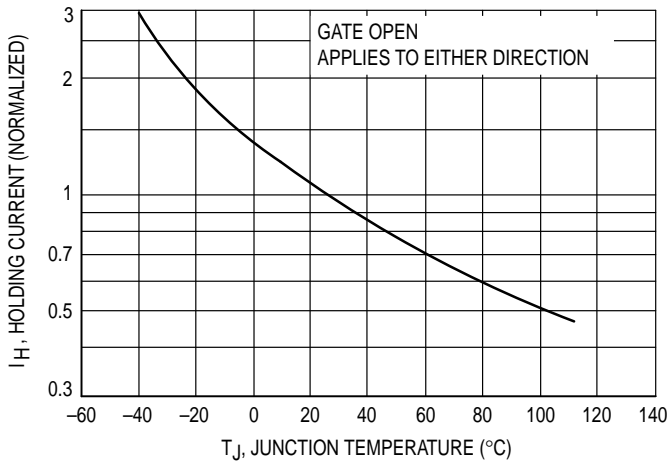
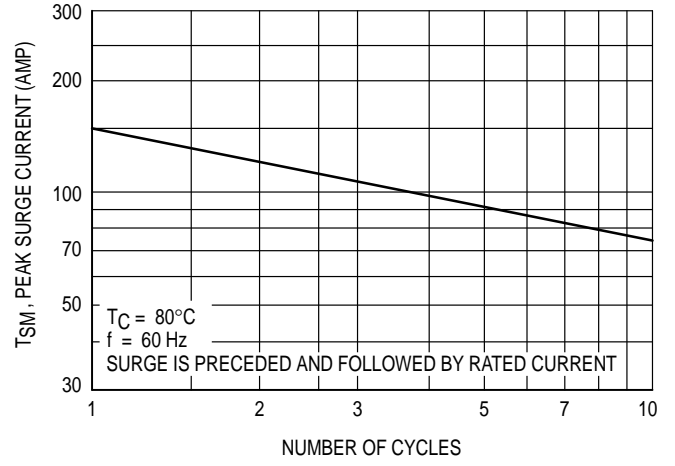


Figure 5. Maximum On-State Characteristics

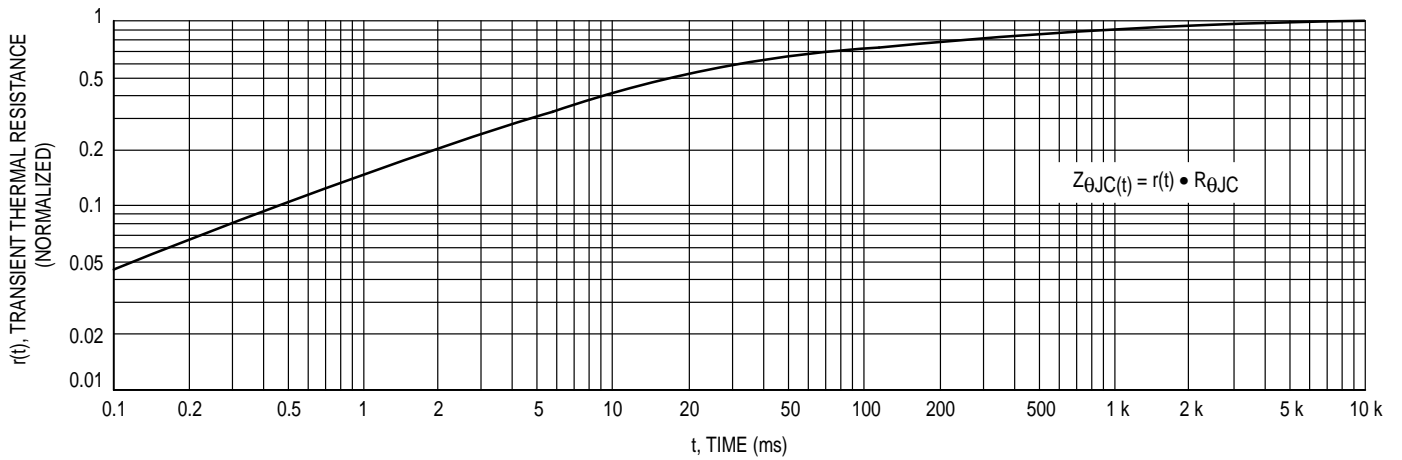
**MAC320FP Series MAC320AFP Series**



**Figure 6. Typical Holding Current**

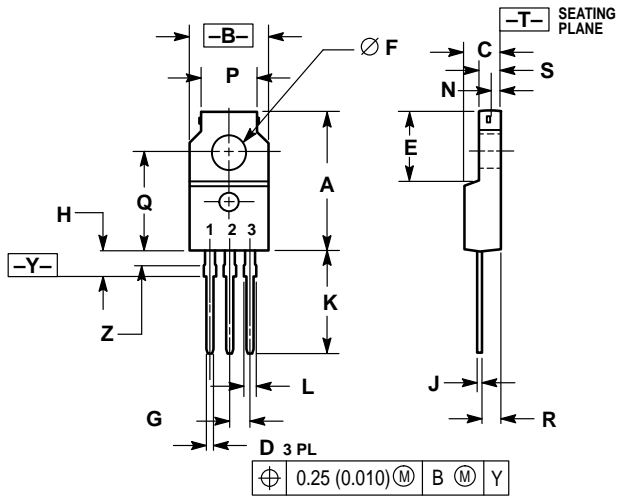


**Figure 7. Maximum Nonrepetitive Surge Current**



**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

## MAC320FP Series MAC320AFP Series

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MAC320FP/D

