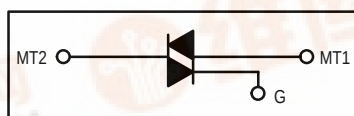


Triacs

Silicon Bidirectional Thyristors

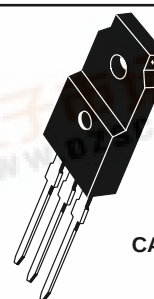
... designed primarily for full-wave ac control applications, such as solid-state relays, motor controls, heating controls and power supplies; or wherever full-wave silicon gate controlled solid-state devices are needed. Triac type thyristors switch from a blocking to a conducting state for either polarity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



CASE 221C-02
STYLE 3

MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$ unless otherwise noted.)

Rating	Symbol	Value	Unit
Peak Repetitive Off-State Voltage ⁽¹⁾ ($T_J = -40$ to $+125^\circ\text{C}$, 1/2 Sine Wave 50 to 60 Hz, Gate Open)	V_{DRM}	200 400 600 800	Volts
Peak Gate Voltage	V_{GM}	10	Volts
On-State RMS Current ($T_C = +75^\circ\text{C}$, Full Cycle Sine Wave 50 to 60 Hz) ⁽²⁾	$I_{T(RMS)}$	20	Amps
Peak Nonrepetitive Surge Current (One Full Cycle, 60 Hz, $T_C = +75^\circ\text{C}$, preceded and followed by rated current)	I_{TSM}	150	Amps
Peak Gate Power ($T_C = +75^\circ\text{C}$, Pulse Width = 2 μs)	P_{GM}	20	Watts
Average Gate Power ($T_C = +75^\circ\text{C}$, $t = 8.3$ ms)	$P_{G(AV)}$	0.5	Watt
Peak Gate Current	I_{GM}	2	Amps
RMS Isolation Voltage ($T_A = 25^\circ\text{C}$, Relative Humidity $\leq 20\%$)	$V_{(ISO)}$	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	$R_{\theta JC}$	1.8	$^\circ\text{C/W}$
Thermal Resistance, Case to Sink	$R_{\theta CS}$	2.2 (typ)	$^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	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.

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	μA 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 μs) 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 μs) 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 μs , Pulse Width = 2 μs)	t_{gt}	—	1.5	10	μs
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/ μs

TYPICAL CHARACTERISTICS

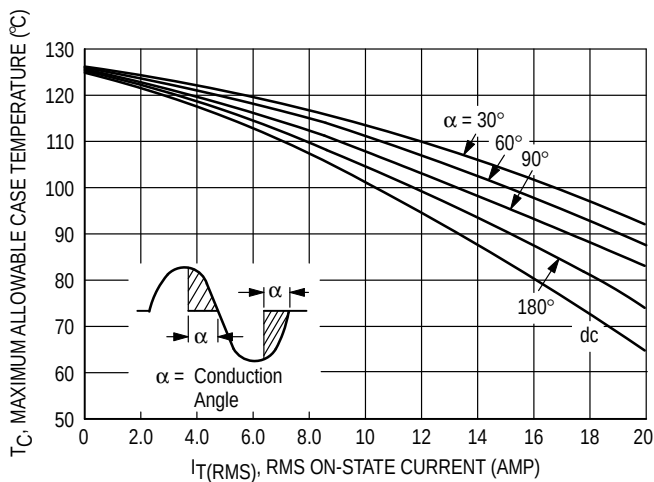


Figure 1. RMS Current Derating

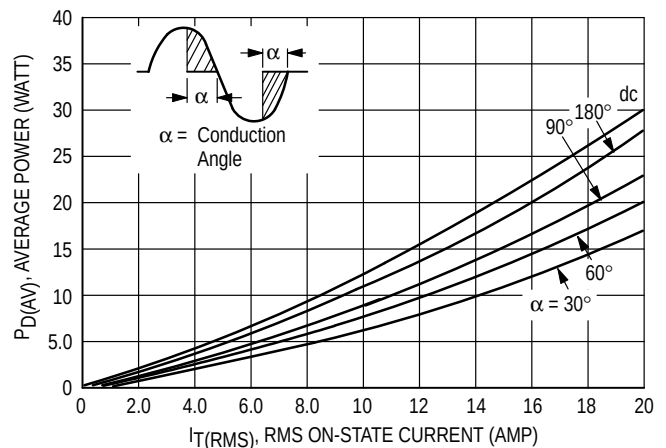


Figure 2. On-State Power Dissipation

MAC320FP Series MAC320AFP Series

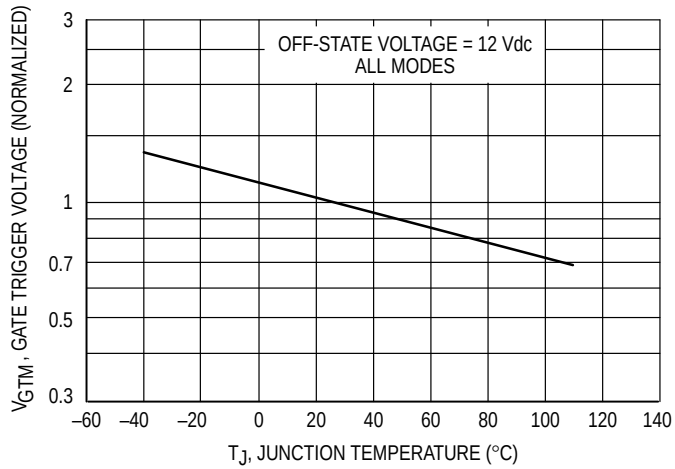


Figure 3. Typical Gate Trigger Voltage

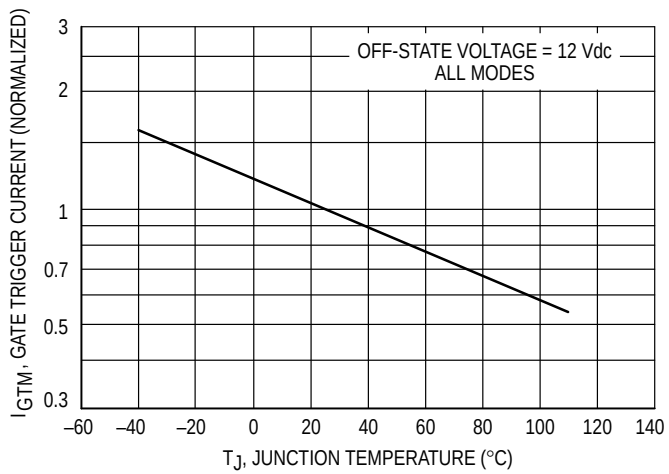


Figure 4. Typical Gate Trigger Current

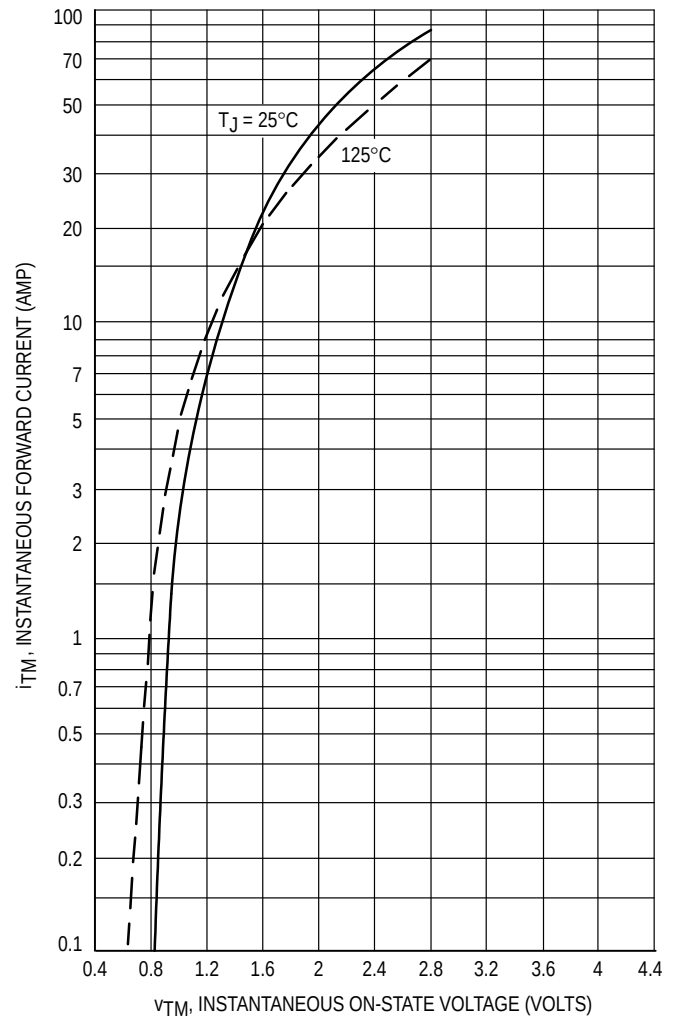


Figure 5. Maximum On-State Characteristics

MAC320FP Series MAC320AFP Series

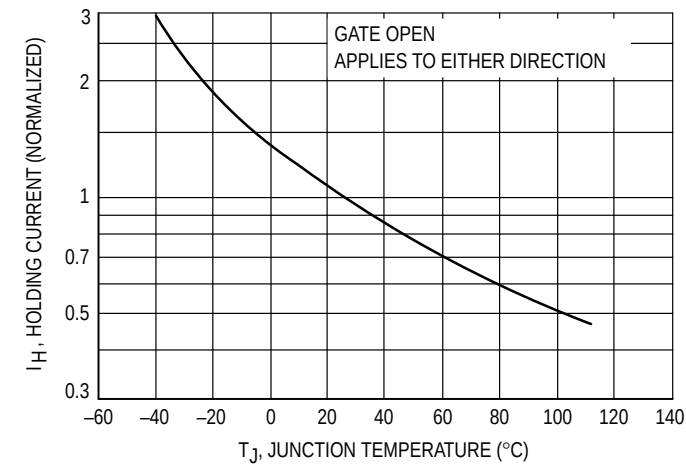


Figure 6. Typical Holding Current

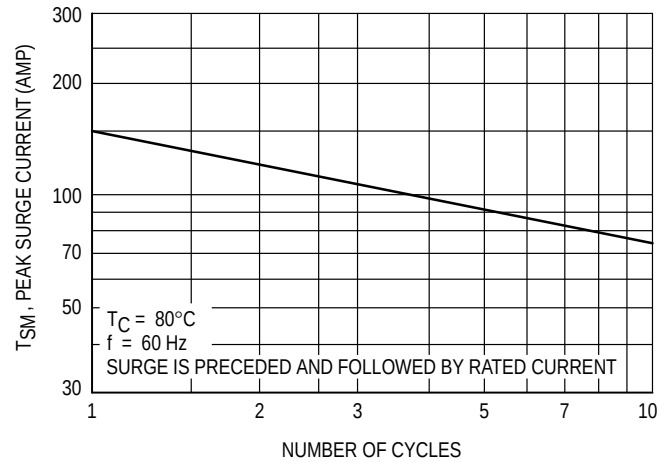


Figure 7. Maximum Nonrepetitive Surge Current

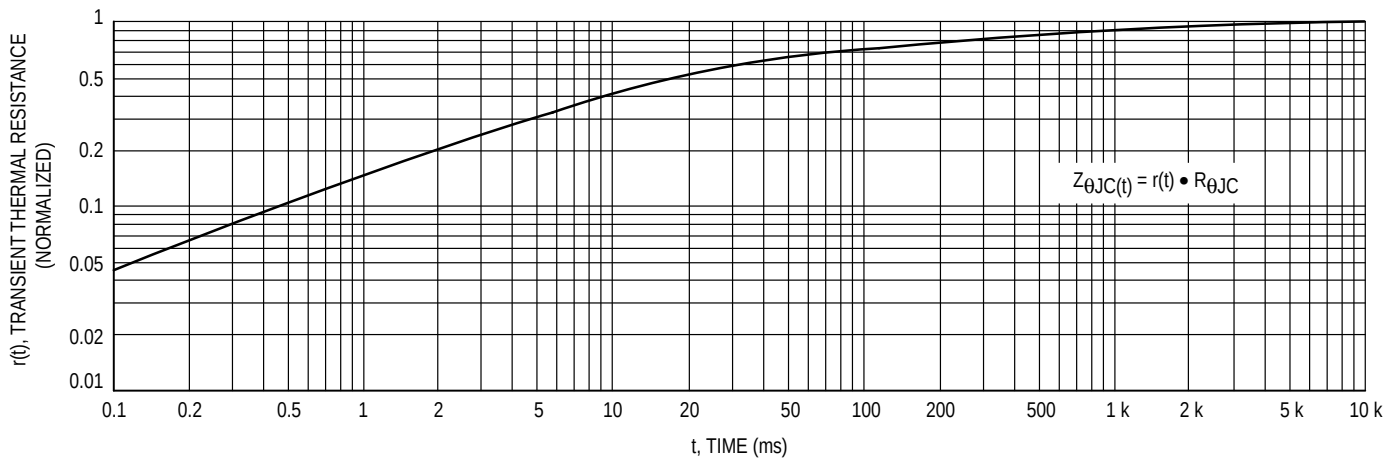
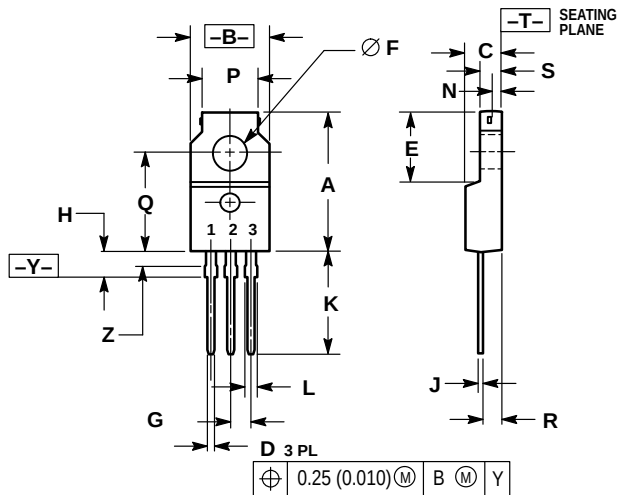


Figure 8. Thermal Response

MAC320FP Series MAC320AFP Series

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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