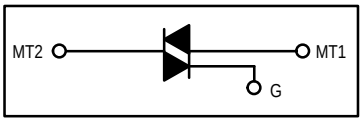
Triacs
Silicon Bidirectional Thyristors

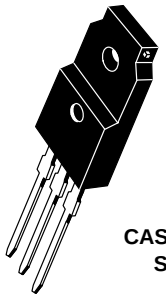
MAC320FP Series
MAC320AFP Series

ISOLATED TRIACs
THYRISTORS
20 AMPERES RMS
200 thru 800 VOLTS

. . . 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)





CASE 221C-02
STYLE 3

MAXIMUM RATINGS (T_C = 25°C unless otherwise noted.)

Rating	Symbol	Value	Unit
Peak Repetitive Off-State Voltage(1) (T_J = –40 to +125°C, 1/2 Sine Wave 50 to 60 Hz, Gate Open) MAC320-4FP, MAC320A4FP MAC320-6FP, MAC320A6FP MAC320-8FP, MAC320A8FP MAC320-10FP, MAC320A10FP	V_{DRM}	 200 400 600 800	Volts
Peak Gate Voltage	V_{GM}	10	Volts
On-State RMS Current (T_C = +75°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°C, preceded and followed by rated current)	I_{TSM}	150	Amps
Peak Gate Power (T_C = +75°C, Pulse Width = 2 μs)	P_{GM}	20	Watts
Average Gate Power (T_C = +75°C, t = 8.3 ms)	$P_{G(AV)}$	0.5	Watt
Peak Gate Current	I_{GM}	2	Amps
RMS Isolation Voltage (T_A = 25°C, Relative Humidity ≤ 20%)	$V_{(ISO)}$	1500	Volts
Operating Junction Temperature	T_J	–40 to +125	°C
Storage Temperature Range	T_{stg}	–40 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.8	°C/W
Thermal Resistance, Case to Sink	$R_{\theta CS}$	2.2 (typ)	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	60	°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.

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

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Blocking Current (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} = 28 A Peak; Pulse Width = 1 to 2 ms, Duty Cycle ≤ 2%)	V_{TM}	—	1.4	1.7	Volts
Peak Gate Trigger Current (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}	 — — — —	 — — — —	 50 50 50 75	mA
Peak Gate Trigger Voltage (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 , T_J = +110°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 = Rated V_{DRM}, I_{TM} = 28 A, I_{GT} = 120 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 = Rated V_{DRM}, I_{TM} = 28 A, Commutating di/dt = 10 A/ms, Gate Unenergized, T_C = +75°C)	dv/dt(c)	—	5	—	V/μs

TYPICAL CHARACTERISTICS

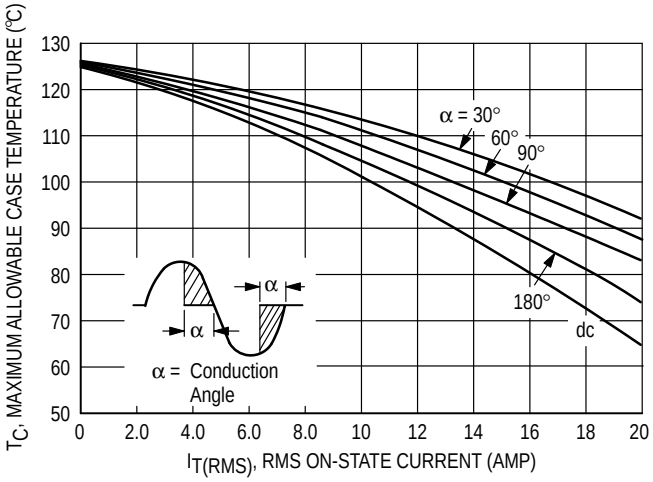


Figure 1. RMS Current Derating

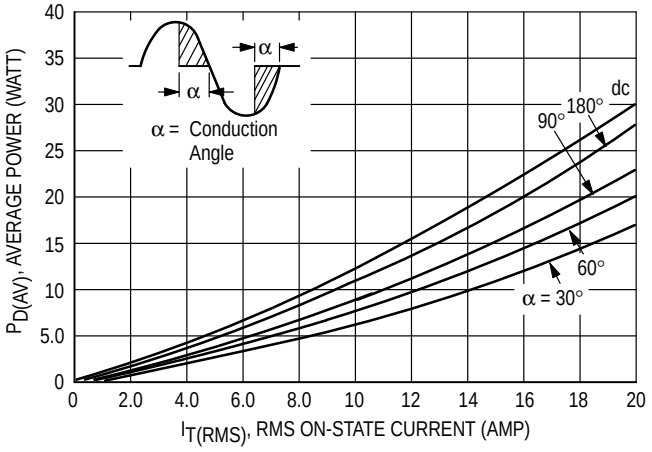


Figure 2. On-State Power Dissipation

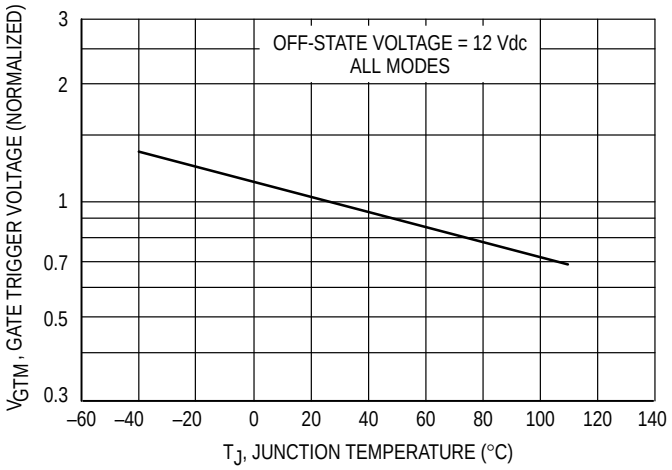


Figure 3. Typical Gate Trigger Voltage

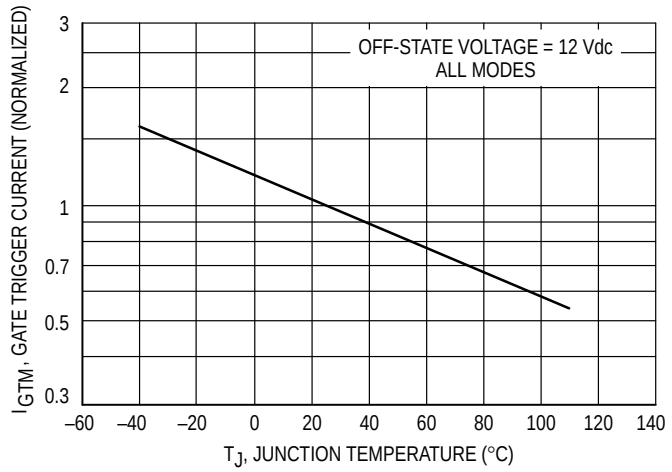


Figure 4. Typical Gate Trigger Current

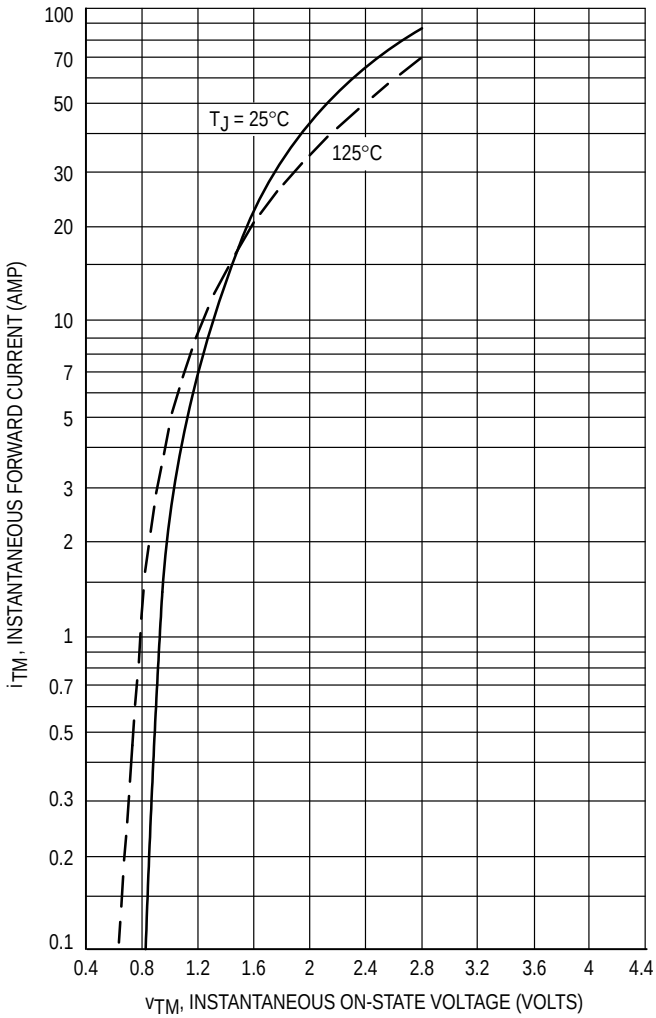


Figure 5. Maximum On-State Characteristics

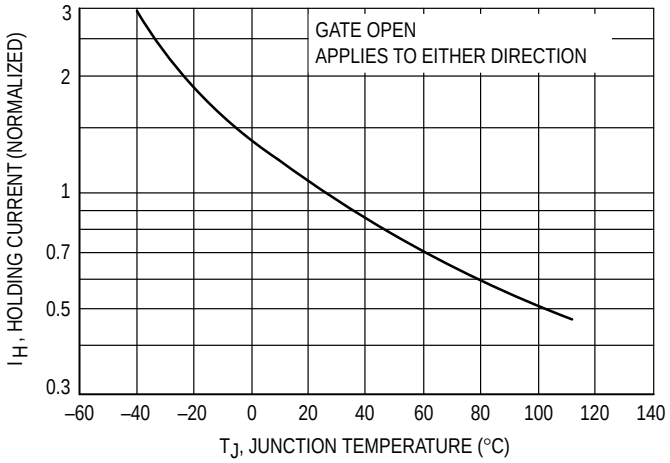


Figure 6. Typical Holding Current

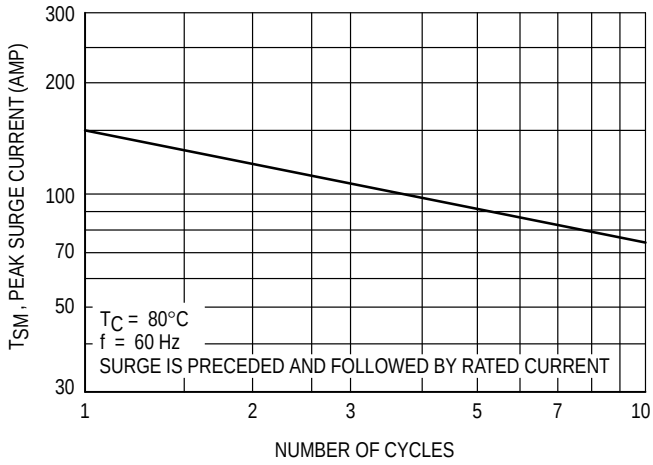


Figure 7. Maximum Nonrepetitive Surge Current

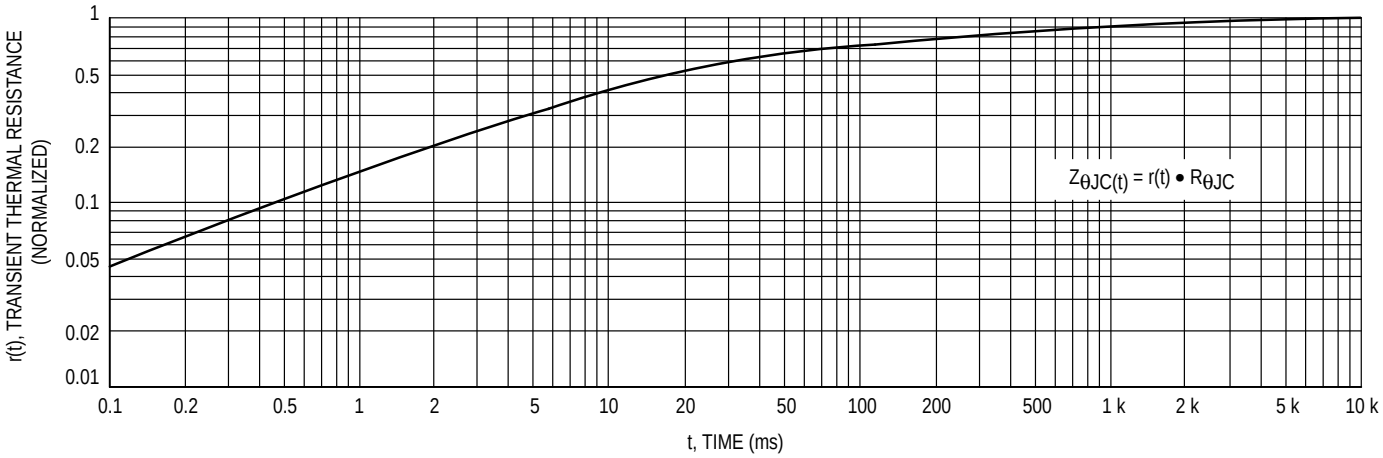
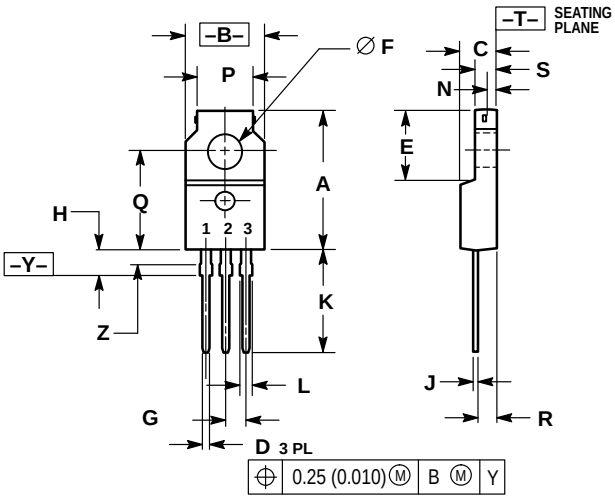


Figure 8. Thermal Response

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.

	INCHES		MILLIMETERS	
DIM	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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