

Triacs

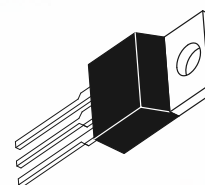
Silicon Bidirectional Thyristors

... 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 (MAC320 Series) or Four Modes (MAC320A Series)

MAC320 Series MAC320A Series

TRIACs
20 AMPERES RMS
200 thru 800 VOLTS



**CASE 221A-04
(TO-220AB)
STYLE 4**

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
MAC320-4, MAC320A4 MAC320-6, MAC320A6 MAC320-8, MAC320A8 MAC320-10, MAC320A10			
Peak Gate Voltage	V_{GM}	10	Volts
On-State Current RMS ($T_C = +75^\circ\text{C}$) (Full Cycle, Sine Wave, 50 to 60 Hz)	$I_{\text{T(RMS)}}$	20	Amp
Peak Surge Current (One Full Cycle, 60 Hz, $T_C = +75^\circ\text{C}$) preceded and followed by rated current	I_{TSM}	150	Amp
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)	$P_{\text{G(AV)}}$	0.5	Watt
Peak Gate Current	I_{GM}	2	Amp
Operating Junction Temperature Range	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	$R_{\theta\text{JC}}$	1.8	$^\circ\text{C/W}$

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.

MAC320 Series MAC320A Series

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

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Blocking Current (V_D 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) ($I_{TM} = 28$ A Peak; Pulse Width = 1 to 2 ms, Duty Cycle $\leq 2\%$)	V_{TM}	—	1.4	1.7	Volts
Gate Trigger Current (Continuous dc) (Main Terminal Voltage = 12 Vdc, $R_L = 100$ Ohms) MT2 (+), G(+); MT2 (+), G(-); MT2 (-), G(-) MT2 (-), G(+) "A" SUFFIX ONLY	I_{GT}	— —	— —	50 75	mA
Gate Trigger Voltage (Continuous dc) (Main Terminal Voltage = 12 Vdc, $R_L = 100$ Ohms) MT2 (+), G(+); MT2 (+), G(-); MT2 (-), G(-) MT2 (-), G(+) "A" SUFFIX ONLY (Main Terminal Voltage = Rated V_{DRM} , $R_L = 10$ k Ω , $T_J = +110^\circ\text{C}$) MT2 (+), G(+); MT2 (-), G(-); MT2 (+), G(-); MT2 (-), G(+) "A" SUFFIX ONLY	V_{GT}	— — 0.2 0.2	0.9 1.4 — —	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	—	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, $T_C = +75^\circ\text{C}$)	$dv/dt(C)$	—	5	—	V/ μs

FIGURE 1 — RMS CURRENT DERATING

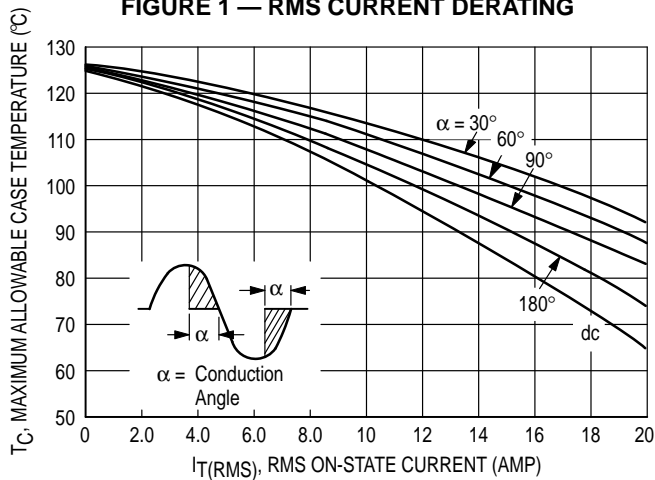
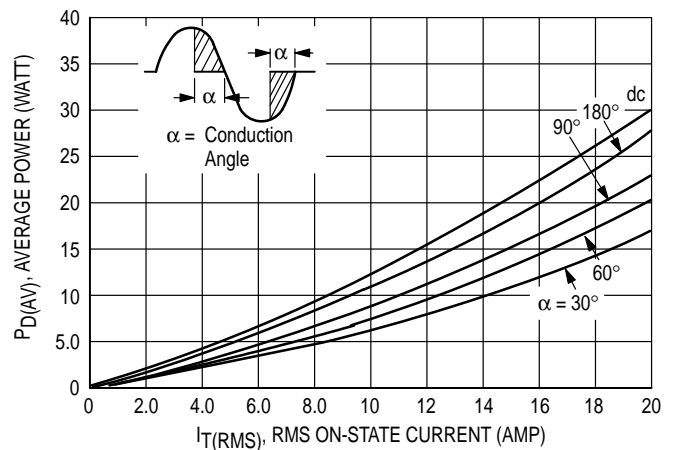


FIGURE 2 — ON-STATE POWER DISSIPATION



MAC320 Series MAC320A Series

FIGURE 3 — TYPICAL GATE TRIGGER VOLTAGE

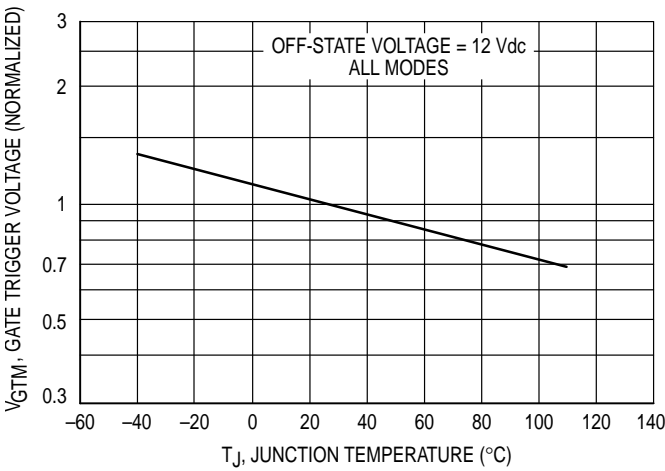


FIGURE 4 — TYPICAL GATE TRIGGER CURRENT

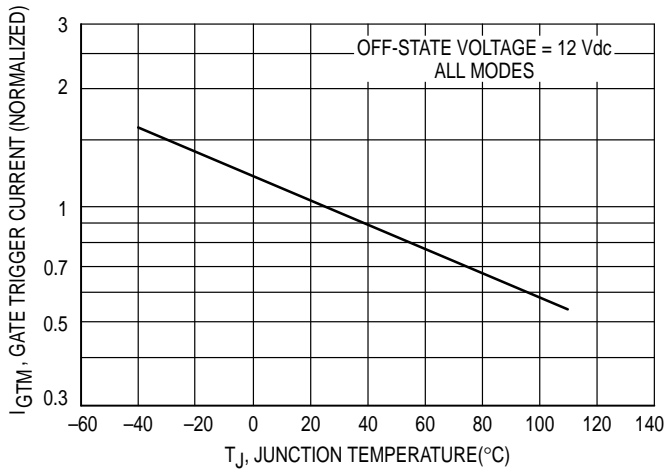
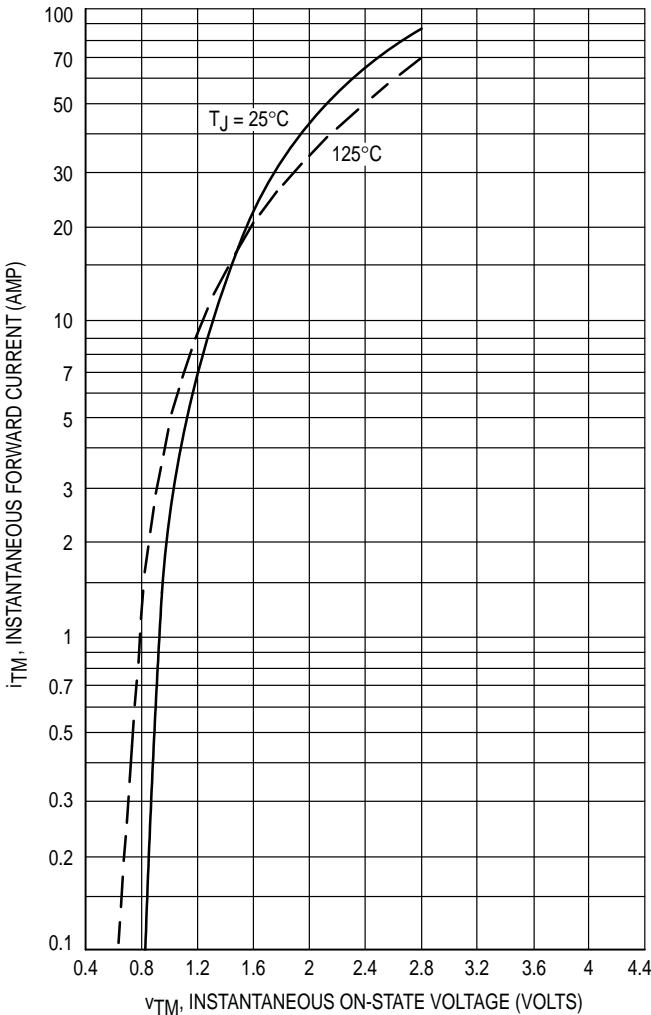


FIGURE 5 — MAXIMUM ON-STATE CHARACTERISTICS



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FIGURE 6 — TYPICAL HOLDING CURRENT

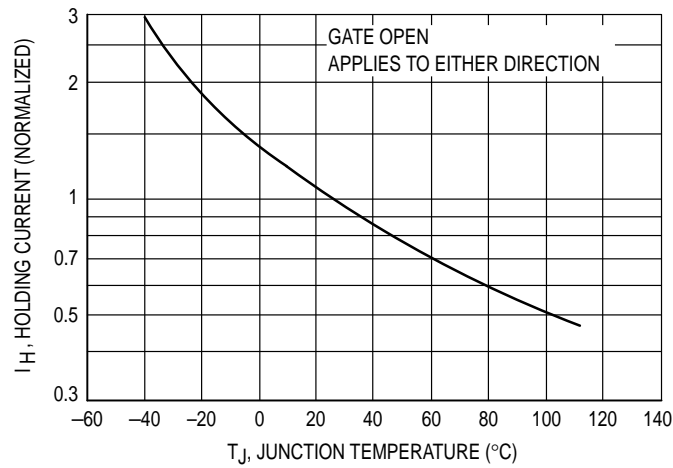


FIGURE 7 — MAXIMUM ON-REPETITIVE SURGE CURRENT

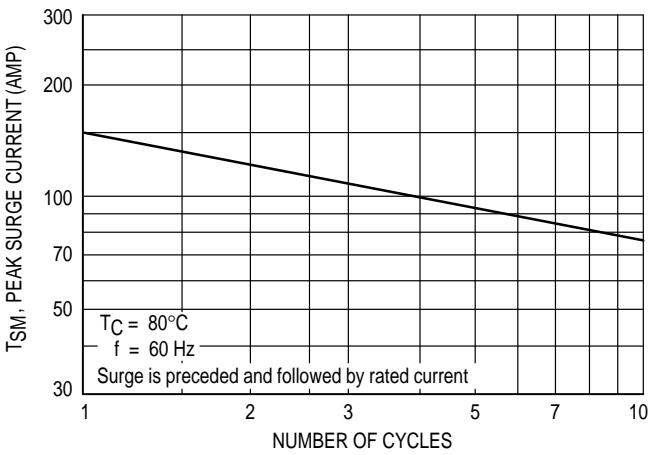
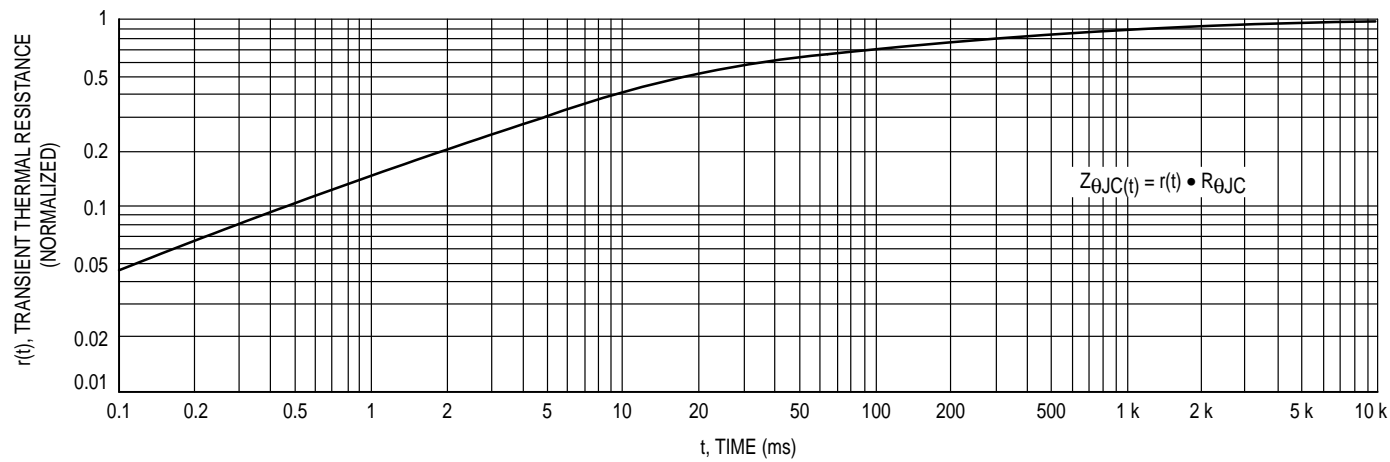
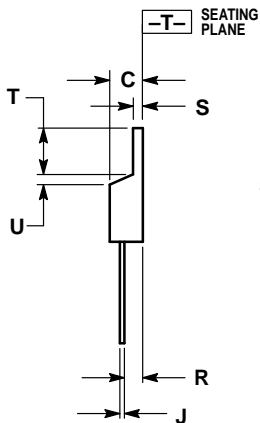
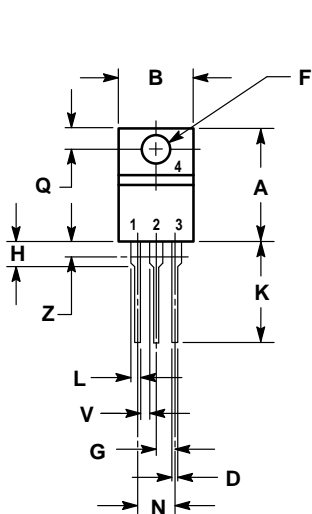


FIGURE 8 — THERMAL RESPONSE



MAC320 Series MAC320A Series

PACKAGE DIMENSIONS




STYLE 4:
PIN 1. MAIN TERMINAL 1
2. MAIN TERMINAL 2
3. GATE
4. MAIN TERMINAL 2

- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.570	0.620	14.48	15.75
B	0.380	0.405	9.66	10.28
C	0.160	0.190	4.07	4.82
D	0.025	0.035	0.64	0.88
E	0.142	0.147	3.61	3.73
F	0.095	0.105	2.42	2.66
G	0.110	0.155	2.80	3.93
H	0.014	0.022	0.36	0.55
I	0.500	0.562	12.70	14.27
J	0.045	0.055	1.15	1.39
K	0.190	0.210	4.83	5.33
L	0.100	0.120	2.54	3.04
M	0.080	0.110	2.04	2.79
N	0.045	0.055	1.15	1.39
O	0.235	0.255	5.97	6.47
P	0.000	0.050	0.00	1.27
Q	0.045	—	1.15	—
R	—	0.080	—	2.04

CASE 221A-04
(TO-220AB)

MAC320 Series MAC320A Series

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