

## Triacs

### Silicon Bidirectional Thyristors

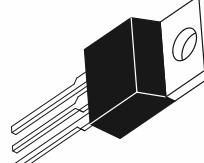
... designed primarily for full-wave ac control applications, such as solid-state relays, motor controls, heating controls and power supplies; or wherever full-wave silicon gate controlled solid-state devices are needed. Triac type thyristors switch from a blocking to a conducting state for either polarity 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 <sup>(1)</sup> ( $T_J = -40$ to $+125^\circ\text{C}$ , 1/2 Sine Wave 50 to 60 Hz, Gate Open)	$V_{DRM}$		Volts
MAC320-4, MAC320A4 MAC320-6, MAC320A6 MAC320-8, MAC320A8 MAC320-10, MAC320A10		200 400 600 800	
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)	$I_{T(RMS)}$	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 $\mu\text{s}$ )	$P_{GM}$	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	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	$R_{\theta JC}$	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	$\mu\text{A}$ $\text{mA}$
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
Gate Trigger Current (Continuous dc) (Main Terminal Voltage = 12 Vdc, $R_L = 100 \text{ Ohms}$ ) 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, $R_L = 100 \text{ Ohms}$ ) MT2 (+), G(+); MT2 (+), G(-); MT2 (-), G(-) MT2 (-), G(+) "A" SUFFIX ONLY (Main Terminal Voltage = Rated $V_{DRM}$ , $R_L = 10 \text{ k}\Omega$ , $T_J = +110^\circ\text{C}$ ) 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 $V_{DRM}$ , $I_{TM} = 28 \text{ A}$ , $I_{GT} = 120 \text{ mA}$ , Rise Time = 0.1 $\mu\text{s}$ , Pulse Width = 2 $\mu\text{s}$ )	$t_{gt}$	—	1.5	—	$\mu\text{s}$
Critical Rate of Rise of Commutation Voltage ( $V_D$ = 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	—	$\text{V}/\mu\text{s}$

FIGURE 1 — RMS CURRENT DERATING

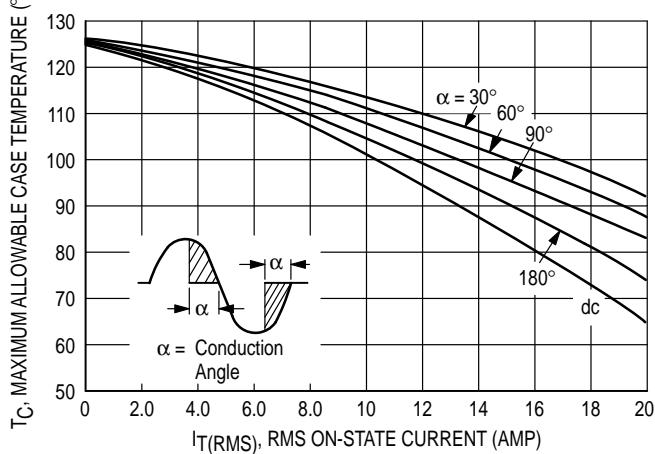
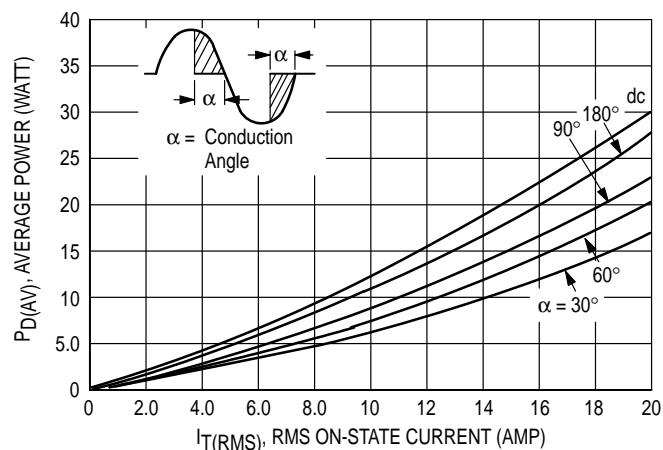


FIGURE 2 — ON-STATE POWER DISSIPATION



## MAC320 Series MAC320A Series

FIGURE 3 — TYPICAL GATE TRIGGER VOLTAGE

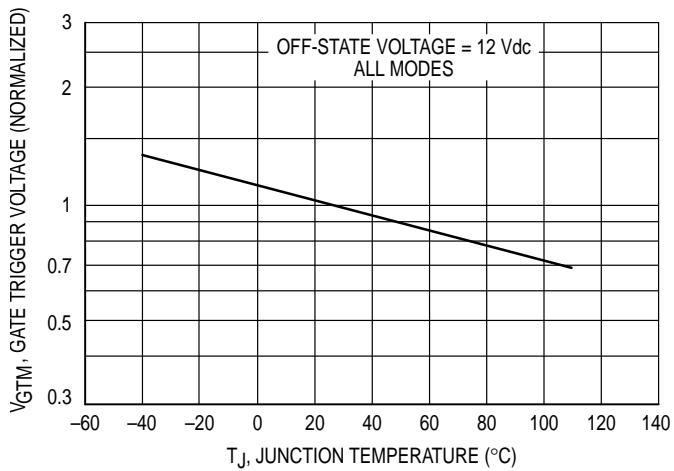


FIGURE 4 — TYPICAL GATE TRIGGER CURRENT

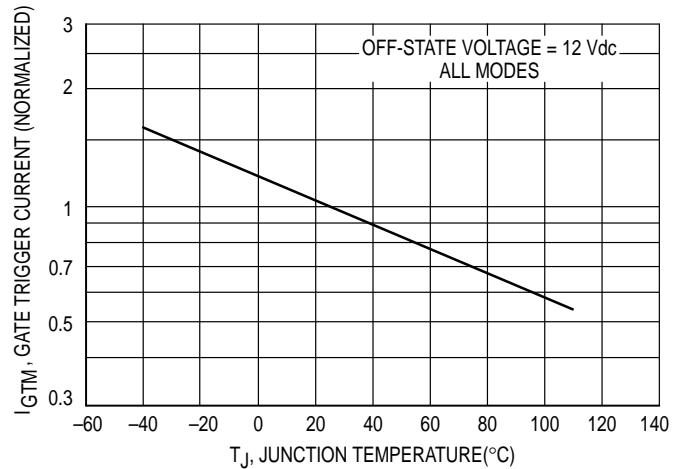
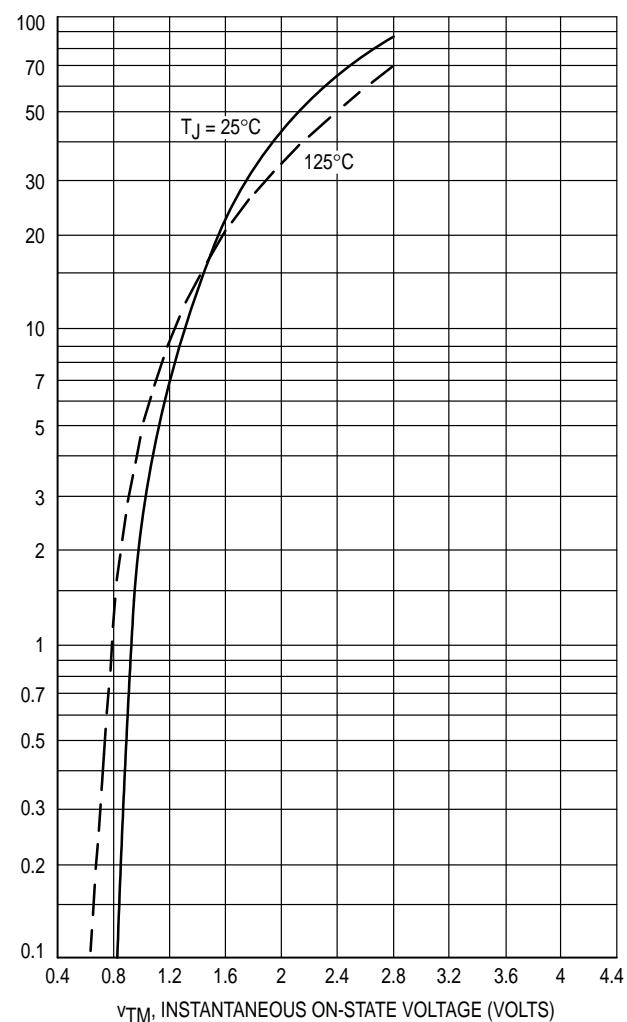


FIGURE 5 — MAXIMUM ON-STATE CHARACTERISTICS



## MAC320 Series MAC320A Series

FIGURE 6 — TYPICAL HOLDING CURRENT

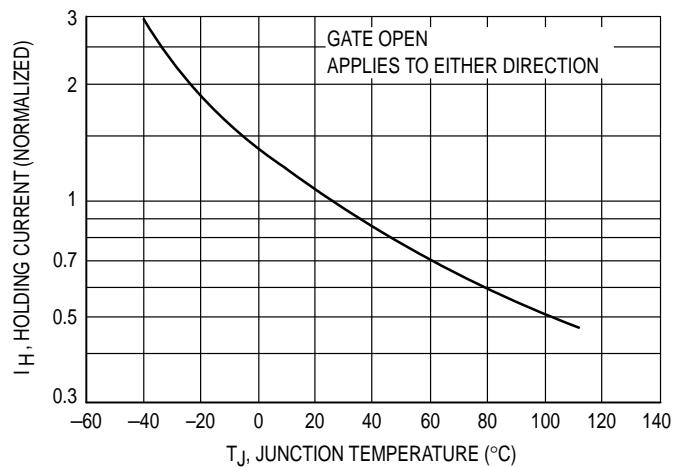


FIGURE 7 — MAXIMUM ON-REPETITIVE SURGE CURRENT

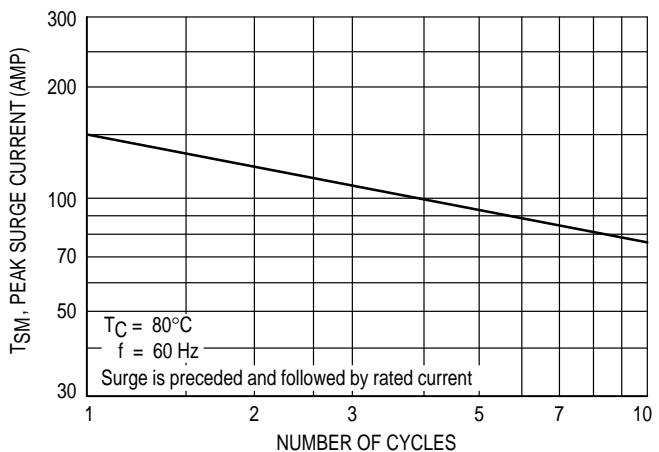
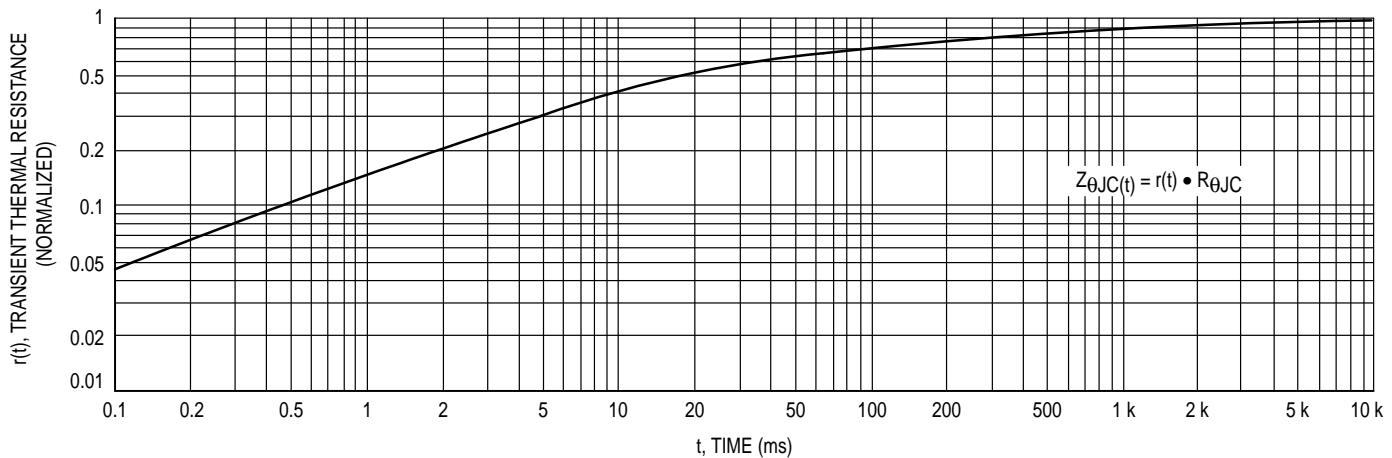
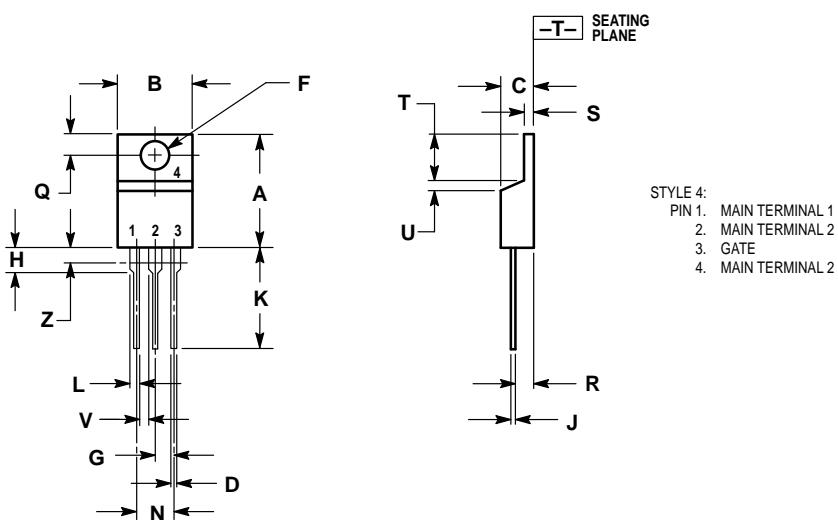


FIGURE 8 — THERMAL RESPONSE



# MAC320 Series MAC320A Series

## PACKAGE DIMENSIONS



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
F	0.142	0.147	3.61	3.73
G	0.095	0.105	2.42	2.66
H	0.110	0.155	2.80	3.93
J	0.014	0.022	0.36	0.55
K	0.500	0.562	12.70	14.27
L	0.045	0.055	1.15	1.39
N	0.190	0.210	4.83	5.33
Q	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.065	1.15	1.39
T	0.235	0.255	5.97	6.47
U	0.000	0.050	0.00	1.27
V	0.045	—	1.15	—
Z	—	0.080	—	2.04

CASE 221A-04  
(TO-220AB)

## **MAC320 Series MAC320A Series**

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