

## Triacs

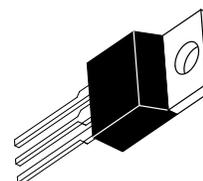
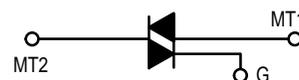
### Silicon Bidirectional Thyristors

... 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)	$V_{DRM}$	200 400 600 800	Volts
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)	$I_T(\text{RMS})$	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<sub>C</sub> = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Blocking Current (V <sub>D</sub> Rated V <sub>DRM</sub> , Gate Open) T <sub>J</sub> = 25°C T <sub>J</sub> = +125°C	I <sub>DRM</sub>	— —	— —	10 2	μA mA
Peak On-State Voltage (Either Direction) (I <sub>TM</sub> = 28 A Peak; Pulse Width = 1 to 2 ms, Duty Cycle ≤ 2%)	V <sub>TM</sub>	—	1.4	1.7	Volts
Gate Trigger Current (Continuous dc) (Main Terminal Voltage = 12 Vdc, R <sub>L</sub> = 100 Ohms) MT2 (+), G(+); MT2 (+), G(-); MT2 (-), G(-) MT2 (-), G(+) "A" SUFFIX ONLY	I <sub>GT</sub>	— —	— —	50 75	mA
Gate Trigger Voltage (Continuous dc) (Main Terminal Voltage = 12 Vdc, R <sub>L</sub> = 100 Ohms) MT2 (+), G(+); MT2 (+), G(-); MT2 (-), G(-) MT2 (-), G(+) "A" SUFFIX ONLY (Main Terminal Voltage = Rated V <sub>DRM</sub> , R <sub>L</sub> = 10 kΩ, T <sub>J</sub> = +110°C) MT2 (+), G(+); MT2 (-), G(-); MT2 (+), G(-); MT2 (-), G(+) "A" SUFFIX ONLY	V <sub>GT</sub>	— — 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 <sub>H</sub>	—	6	40	mA
Turn-On Time (V <sub>D</sub> = Rated V <sub>DRM</sub> , I <sub>TM</sub> = 28 A, I <sub>GT</sub> = 120 mA, Rise Time = 0.1 μs, Pulse Width = 2 μs)	t <sub>gt</sub>	—	1.5	—	μs
Critical Rate of Rise of Commutation Voltage (V <sub>D</sub> = Rated V <sub>DRM</sub> , I <sub>TM</sub> = 28 A, Commutating di/dt = 10 A/ms, Gate Unenergized, T <sub>C</sub> = +75°C)	dv/dt(C)	—	5	—	V/μs

FIGURE 1 — RMS CURRENT DERATING

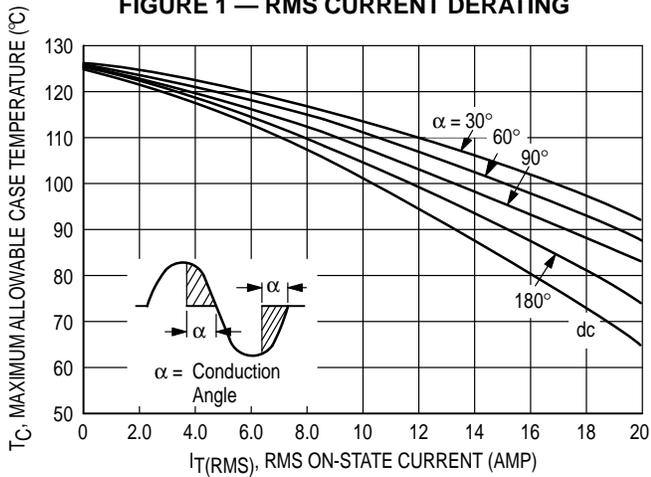


FIGURE 2 — ON-STATE POWER DISSIPATION

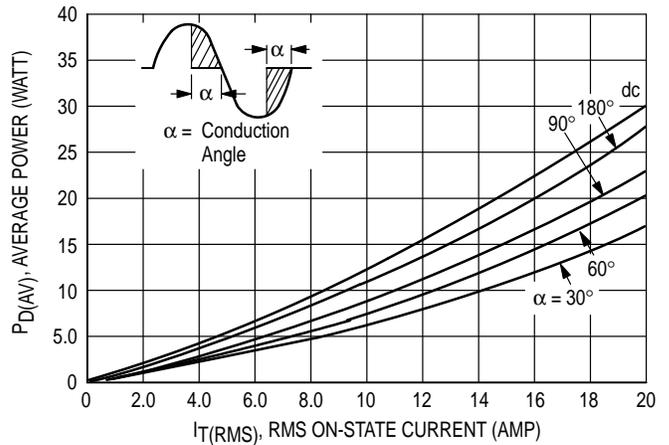


FIGURE 3 — TYPICAL GATE TRIGGER VOLTAGE

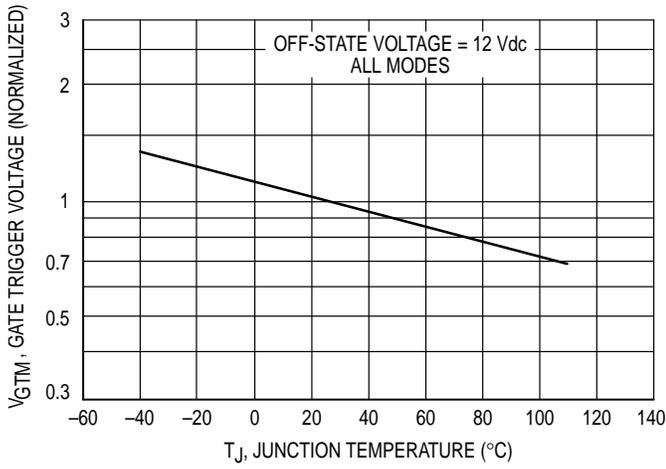


FIGURE 4 — TYPICAL GATE TRIGGER CURRENT

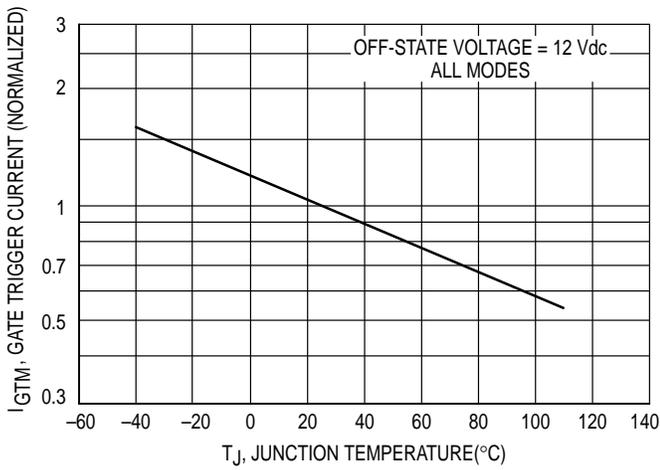
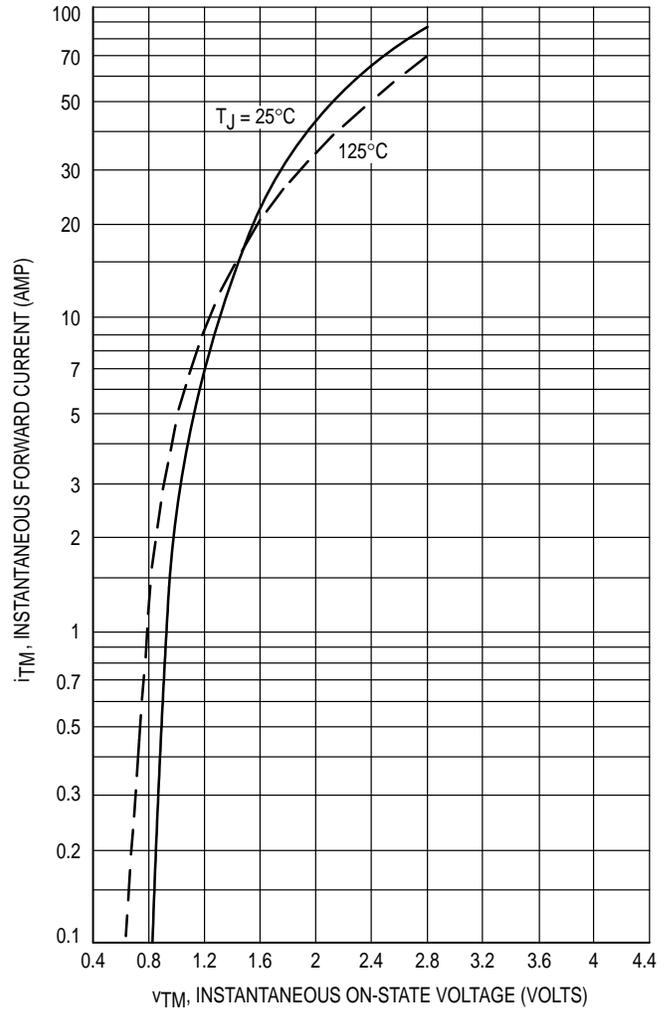
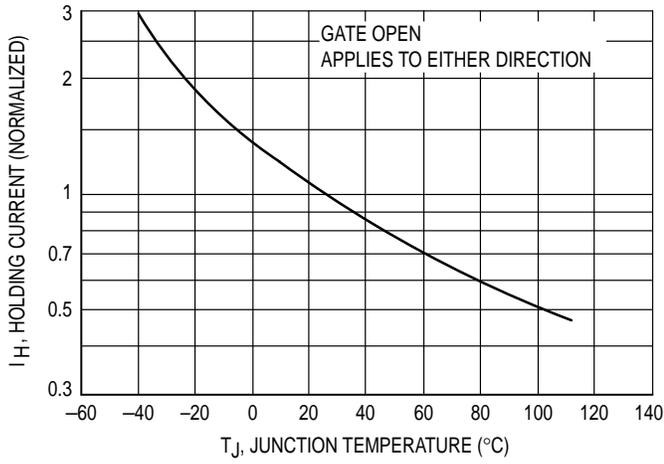


FIGURE 5 — MAXIMUM ON-STATE CHARACTERISTICS

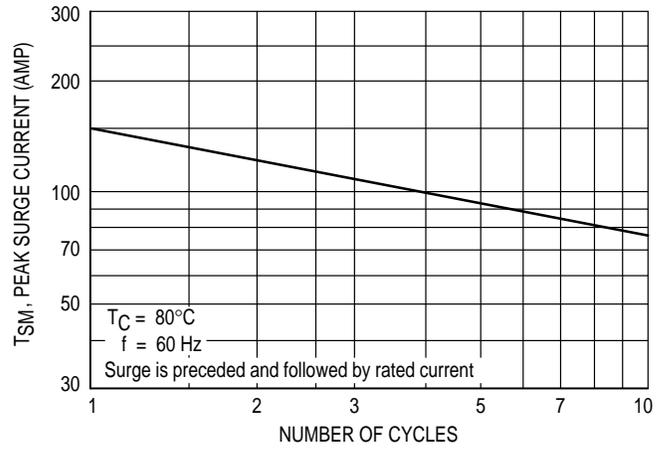


**MAC320 Series MAC320A Series**

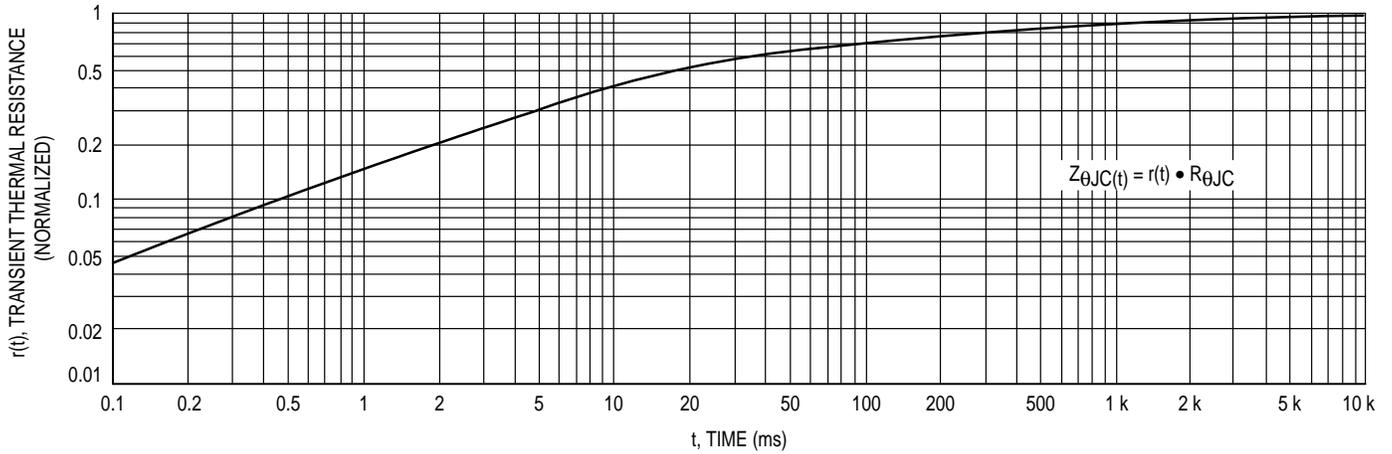
**FIGURE 6 — TYPICAL HOLDING CURRENT**



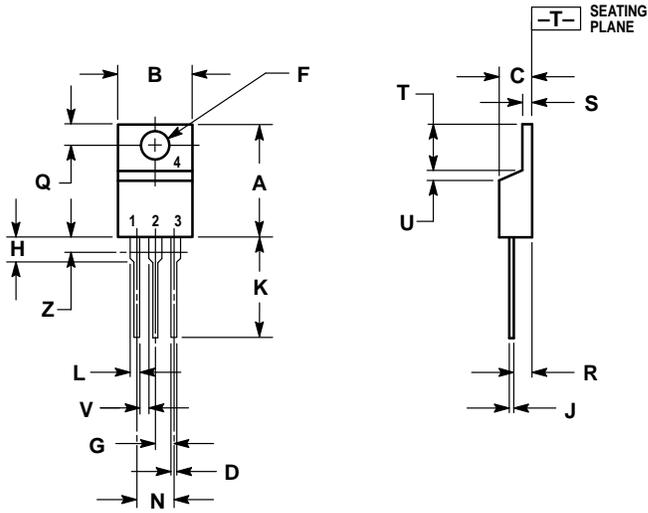
**FIGURE 7 — MAXIMUM ON-REPETITIVE SURGE CURRENT**



**FIGURE 8 — THERMAL RESPONSE**



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
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	0.055	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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MAC320/D

