

## Triacs

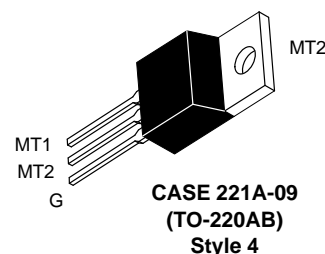
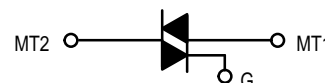
### Silicon Bidirectional Triode Thyristors

... 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 (MAC15 Series) or Four Modes (MAC15A Series)

## MAC15 Series MAC15A Series

**TRIACs**  
**15 AMPERES RMS**  
**400 thru 800 VOLTS**



#### MAXIMUM RATINGS (T<sub>J</sub> = 25°C unless otherwise noted.)

Rating	Symbol	Value	Unit
Peak Repetitive Off-State Voltage <sup>(1)</sup> (Gate Open, T <sub>J</sub> = -40 to +125°C) MAC15A6 MAC15-8, MAC15A8 MAC15-10, MAC15A10	V <sub>DRM</sub>	400 600 800	Volts
Peak Gate Voltage	V <sub>GM</sub>	10	Volts
On-State Current RMS Full Cycle Sine Wave 50 to 60 Hz (T <sub>C</sub> = +90°C)	I <sub>T(RMS)</sub>	15	Amps
Circuit Fusing (t = 8.3 ms)	I <sup>2</sup> t	93	A <sup>2</sup> s
Peak Surge Current (One Full Cycle, 60 Hz, T <sub>C</sub> = +80°C) Preceded and followed by rated current	I <sub>TSM</sub>	150	Amps
Peak Gate Power (T <sub>C</sub> = +80°C, Pulse Width = 2 μs)	P <sub>GM</sub>	20	Watts
Average Gate Power (T <sub>C</sub> = +80°C, t = 8.3 ms)	P <sub>G(AV)</sub>	0.5	Watt
Peak Gate Current	I <sub>GM</sub>	2	Amps
Operating Junction Temperature Range	T <sub>J</sub>	-40 to +125	°C
Storage Temperature Range	T <sub>stg</sub>	-40 to +150	°C

1. V<sub>DRM</sub> 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.

#### THERMAL CHARACTERISTICS

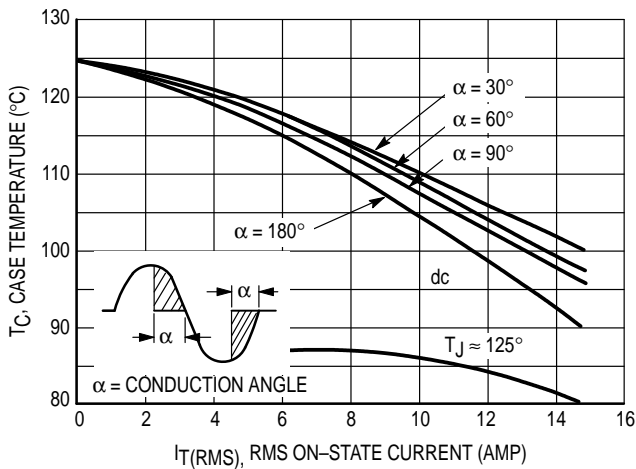
Symbol	Parameter	Value	Unit
R <sub>θJC</sub> R <sub>θJA</sub>	Thermal Resistance — Junction to Case — Junction to Ambient	2.0 62.5	°C/W
T <sub>L</sub>	Maximum Lead Temperature for Soldering Purposes 1/8" from Case for 10 Seconds	260	°C

# MAC15 Series MAC15A Series

**ELECTRICAL CHARACTERISTICS** ( $T_C = 25^\circ\text{C}$ , and either polarity of MT2 to MT1 Voltage, 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	$\mu\text{A}$ mA
Peak On-State Voltage ( $I_{TM} = 21 \text{ A Peak}$ ; Pulse Width = 1 or 2 ms, Duty Cycle $\leq 2\%$ )	$V_{TM}$	—	1.3	1.6	Volts
Gate Trigger Current (Continuous dc) ( $V_D = 12 \text{ Vdc}$ , $R_L = 100 \text{ Ohms}$ ) MT2(+), G(+) MT2(+), G(-) MT2(-), G(-) MT2(-), G(+) "A" SUFFIX ONLY	$I_{GT}$	— — — —	— — — —	50 50 50 75	mA
Gate Trigger Voltage (Continuous dc) ( $V_D = 12 \text{ Vdc}$ , $R_L = 100 \text{ Ohms}$ ) MT2(+), G(+) MT2(+), G(-) MT2(-), G(-) MT2(-), G(+) "A" SUFFIX ONLY ( $V_D = \text{Rated } V_{DRM}$ , $R_L = 10 \text{ k Ohms}$ , $T_J = 110^\circ\text{C}$ ) 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) ( $V_D = 12 \text{ Vdc}$ , Gate Open) ( $I_T = 200 \text{ mA}$ )	$I_H$	—	6	40	mA
Turn-On Time ( $V_D = \text{Rated } V_{DRM}$ , $I_{TM} = 17 \text{ A}$ ) ( $I_{GT} = 120 \text{ mA}$ , 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 ( $V_D = \text{Rated } V_{DRM}$ , $I_{TM} = 21 \text{ A}$ , Commutating $di/dt = 7.6 \text{ A/ms}$ , Gate Unenergized, $T_C = 80^\circ\text{C}$ )	$dv/dt(c)$	—	5	—	$\text{V}/\mu\text{s}$

**FIGURE 1 – RMS CURRENT DERATING**



**FIGURE 2 – ON-STATE POWER DISSIPATION**

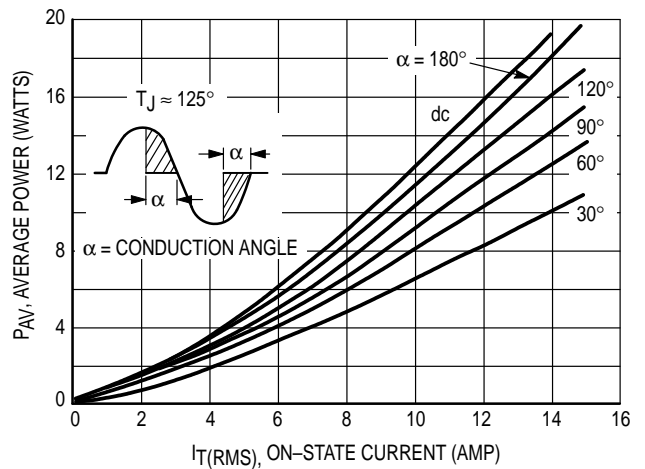


FIGURE 3 – TYPICAL GATE TRIGGER VOLTAGE

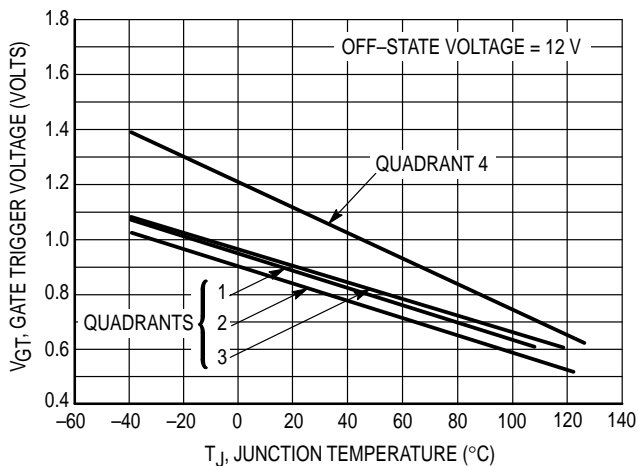


FIGURE 4 – TYPICAL GATE TRIGGER CURRENT

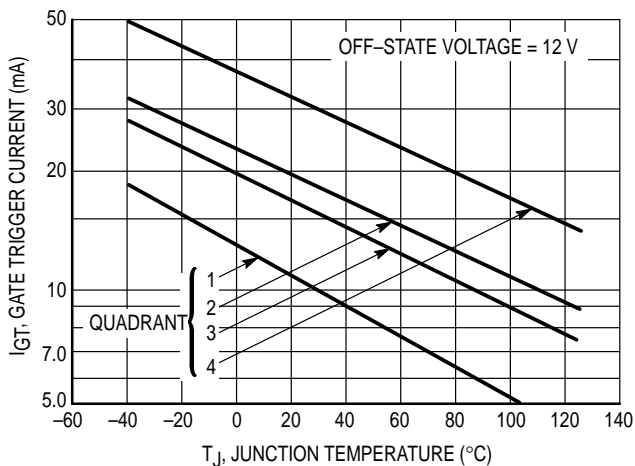


FIGURE 5 – ON-STATE CHARACTERISTICS

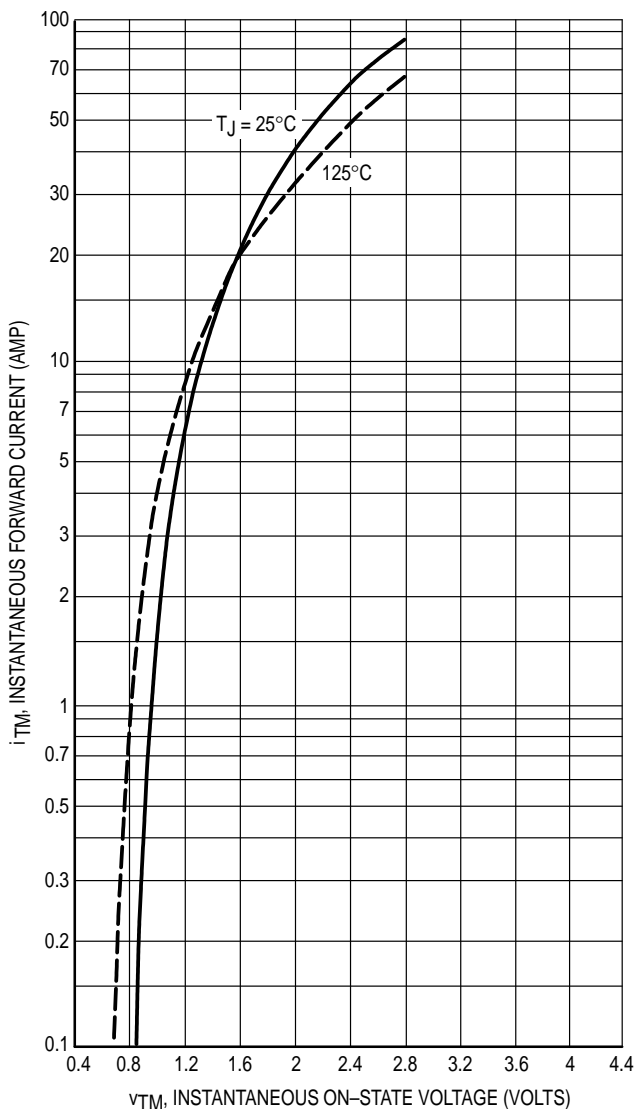


FIGURE 6 – TYPICAL HOLDING CURRENT

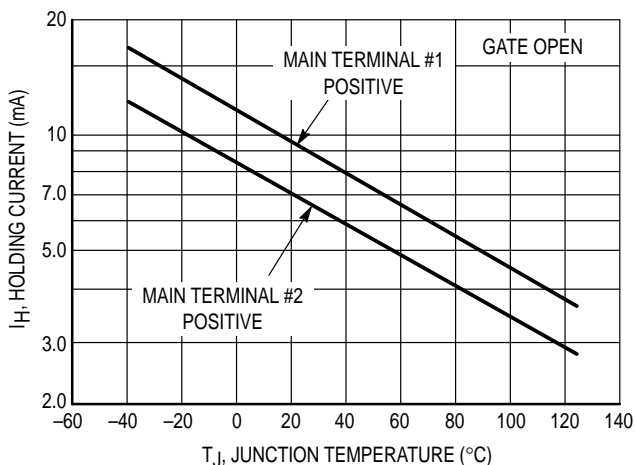


FIGURE 7 – MAXIMUM NON-REPETITIVE SURGE CURRENT

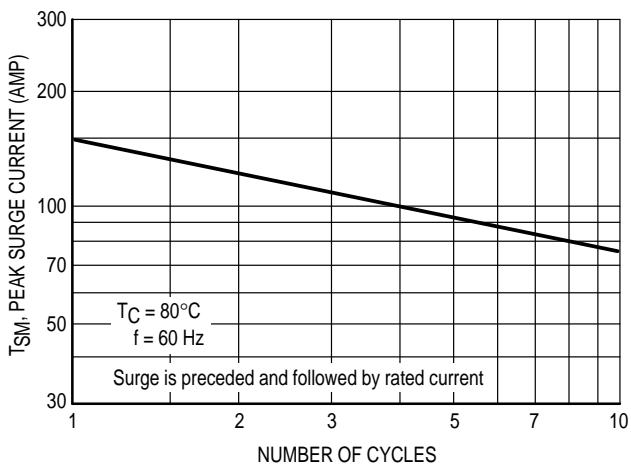
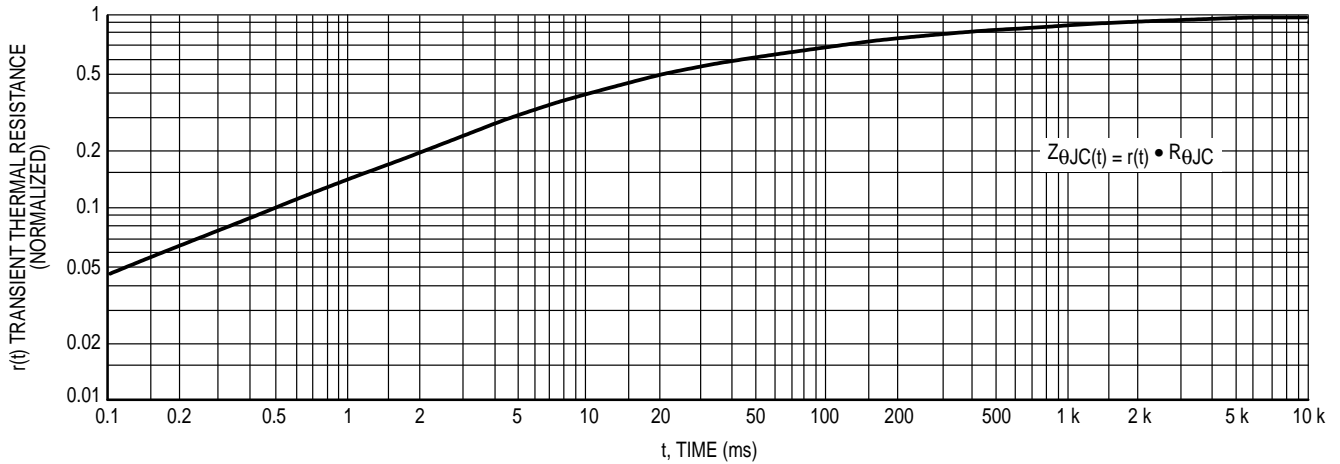


FIGURE 8 – THERMAL RESPONSE



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	0.018	0.025	0.46	0.64
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.15	1.52
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

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

**CASE 221A-09  
(TO-220AB)  
ISSUE Z**

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