

# MAC8D, MAC8M, MAC8N

## THERMAL CHARACTERISTICS

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2.2	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	°C/W
Maximum Lead Temperature for Soldering Purposes 1/8" from Case for 10 Seconds	$T_L$	260	°C

## ELECTRICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$ unless otherwise noted; Electricals apply in both directions)

Characteristic	Symbol	Min	Typ	Max	Unit
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### OFF CHARACTERISTICS

Peak Repetitive Blocking Current ( $V_D = \text{Rated } V_{DRM}, V_{RRM}$ ; Gate Open) $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$	$I_{DRM}$	-	-	0.01	mA
	$I_{RRM}$	-	-	2.0	mA

### ON CHARACTERISTICS

Peak On-State Voltage (Note 2), ( $I_{TM} = \pm 11 \text{ A Peak}$ )	$V_{TM}$	-	1.2	1.6	V
Gate Trigger Current (Continuous DC) ( $V_D = 12 \text{ V}$ , $R_L = 100 \Omega$ ) MT2(+), G(+) MT2(+), G(-) MT2(-), G(-)	$I_{GT}$	5.0	13	35	mA
		5.0	16	35	
		5.0	18	35	
Holding Current, ( $V_D = 12 \text{ V}$ , Gate Open, Initiating Current = $\pm 150 \text{ mA}$ )	$I_H$	-	20	40	mA
Latching Current ( $V_D = 24 \text{ V}$ , $I_G = 35 \text{ mA}$ ), MT2(+), G(+); MT2(-), G(-) MT2(+), G(-)	$I_L$	-	20	50	mA
		-	30	80	
Gate Trigger Voltage ( $V_D = 12 \text{ V}$ , $R_L = 100 \Omega$ ) MT2(+), G(+) MT2(+), G(-) MT2(-), G(-)	$V_{GT}$	0.5	0.69	1.5	V
		0.5	0.77	1.5	
		0.5	0.72	1.5	
Gate Non-Trigger Voltage ( $V_D = 12 \text{ V}$ , $R_L = 100 \Omega$ , $T_J = 125^\circ\text{C}$ ) MT2(+), G(+); MT2(+), G(-); MT2(-), G(-)	$V_{GD}$	0.2	-	-	V

### DYNAMIC CHARACTERISTICS

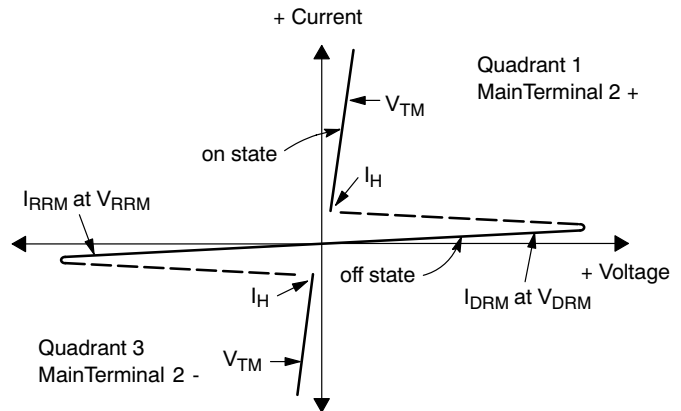
Rate of Change of Commutating Current See Figure 10. ( $V_D = 400 \text{ V}$ , $I_{TM} = 4.4 \text{ A}$ , Commutating $dv/dt = 18 \text{ V}/\mu\text{s}$ , Gate Open, $T_J = 125^\circ\text{C}$ , $f = 250 \text{ Hz}$ , No Snubber) $C_L = 10 \mu\text{F}$ $L_L = 40 \text{ mH}$	$(di/dt)_C$	6.5	-	-	A/ms
Critical Rate of Rise of Off-State Voltage ( $V_D = \text{Rated } V_{DRM}$ , Exponential Waveform, Gate Open, $T_J = 125^\circ\text{C}$ )	$dv/dt$	250	-	-	V/ $\mu\text{s}$

2. Indicates Pulse Test: Pulse Width  $\leq 2.0 \text{ ms}$ , Duty Cycle  $\leq 2\%$ .

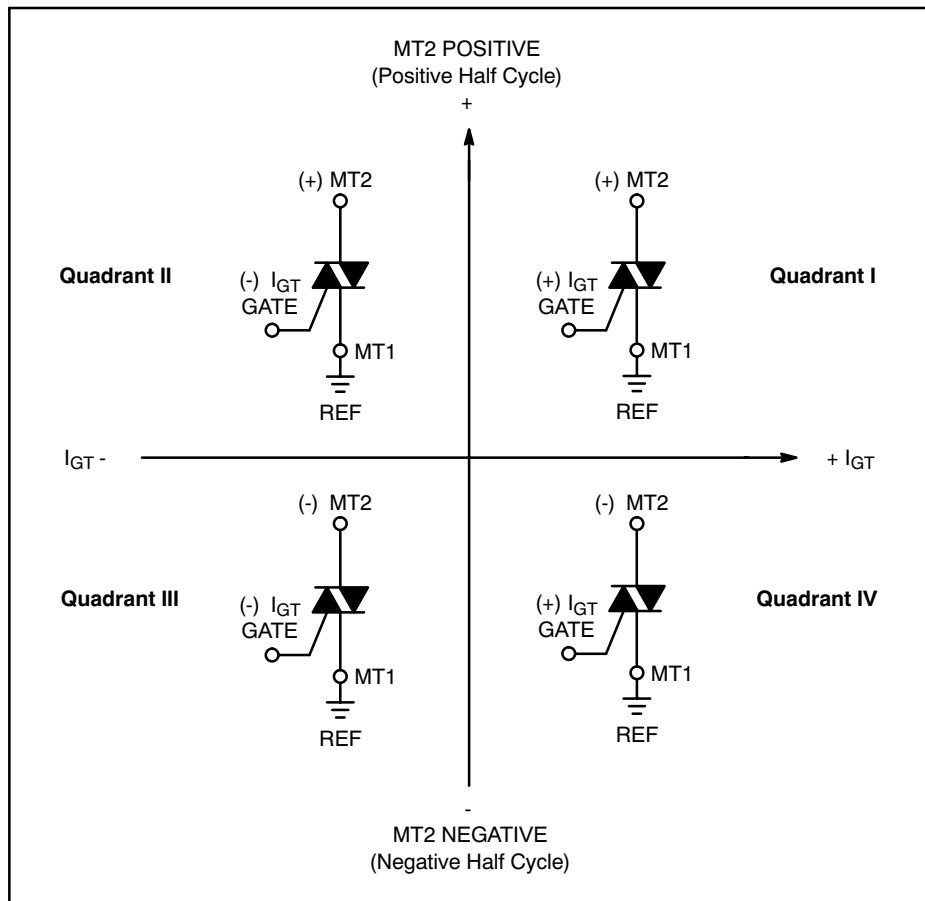
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## Voltage Current Characteristic of Triacs (Bidirectional Device)

Symbol	Parameter
$V_{DRM}$	Peak Repetitive Forward Off State Voltage
$I_{DRM}$	Peak Forward Blocking Current
$V_{RRM}$	Peak Repetitive Reverse Off State Voltage
$I_{RRM}$	Peak Reverse Blocking Current
$V_{TM}$	Maximum On State Voltage
$I_H$	Holding Current



### Quadrant Definitions for a Triac



All polarities are referenced to MT1.  
With in-phase signals (using standard AC lines) quadrants I and III are used.

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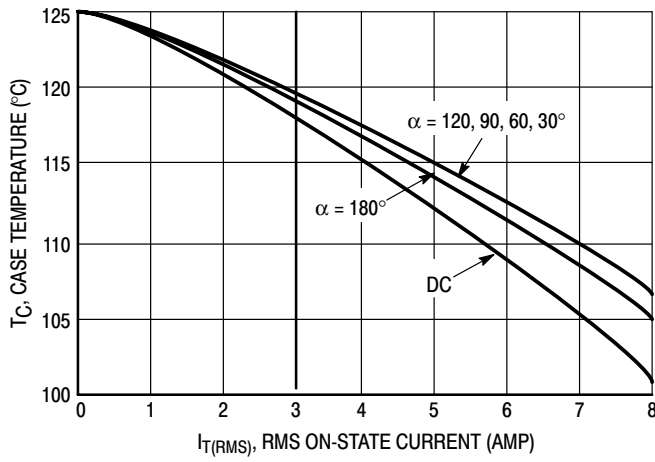


Figure 1. RMS Current Derating

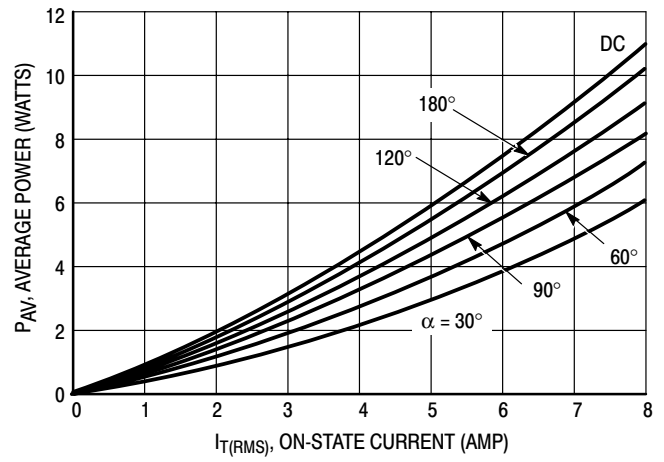


Figure 2. On-State Power Dissipation

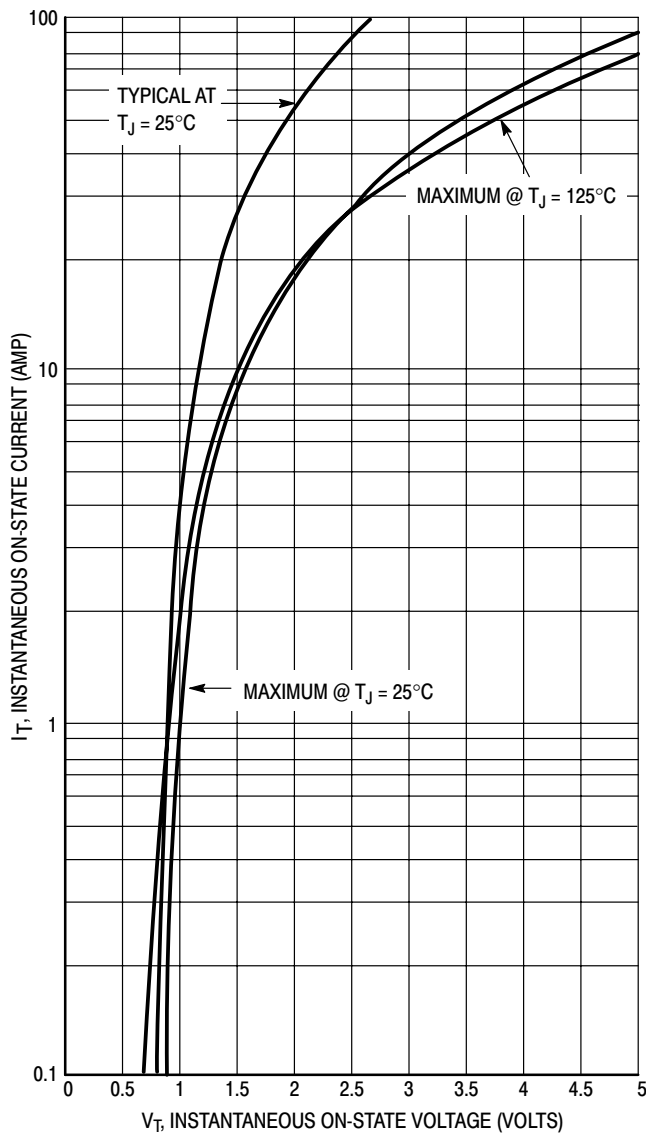


Figure 3. On-State Characteristics

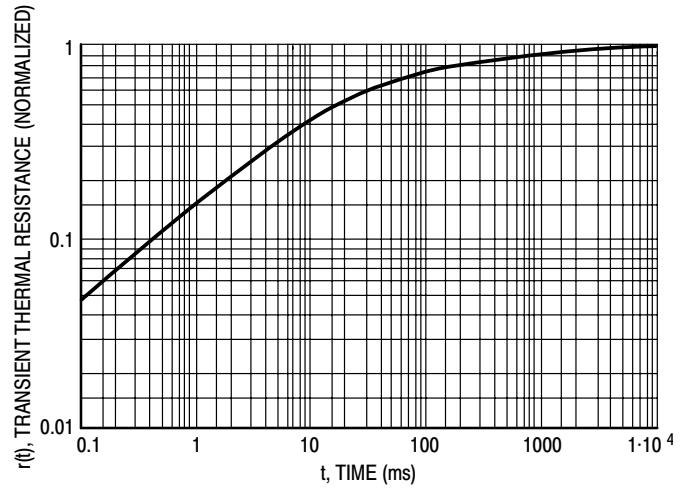


Figure 4. Thermal Response

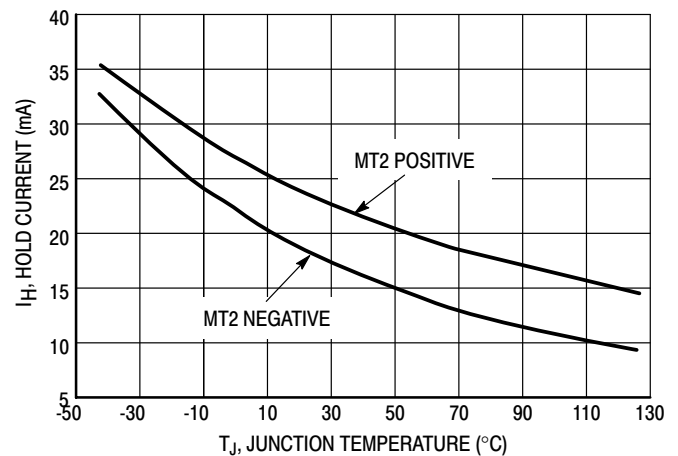


Figure 5. Hold Current Variation

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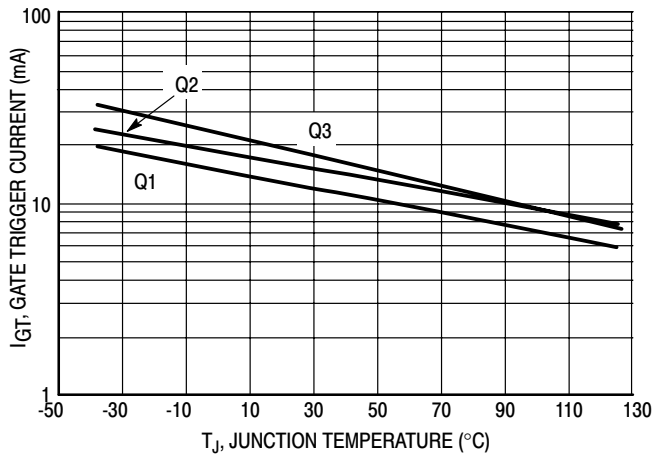


Figure 6. Gate Trigger Current Variation

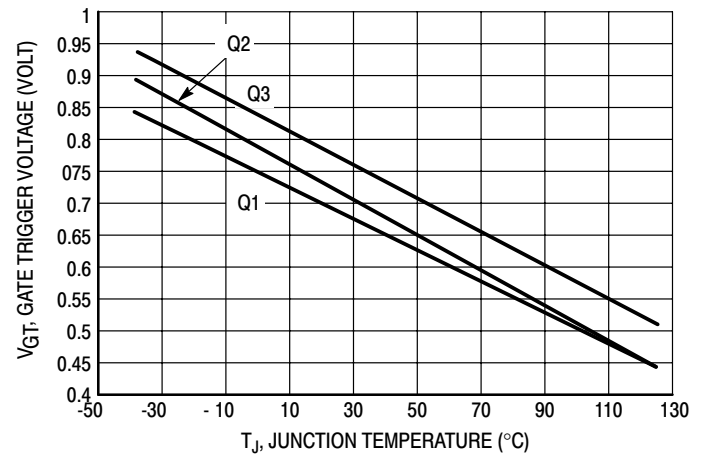


Figure 7. Gate Trigger Voltage Variation

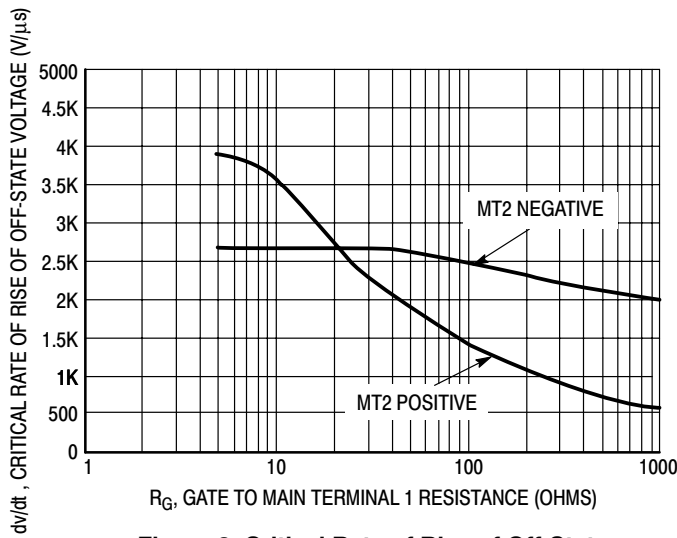


Figure 8. Critical Rate of Rise of Off-State Voltage (Exponential)

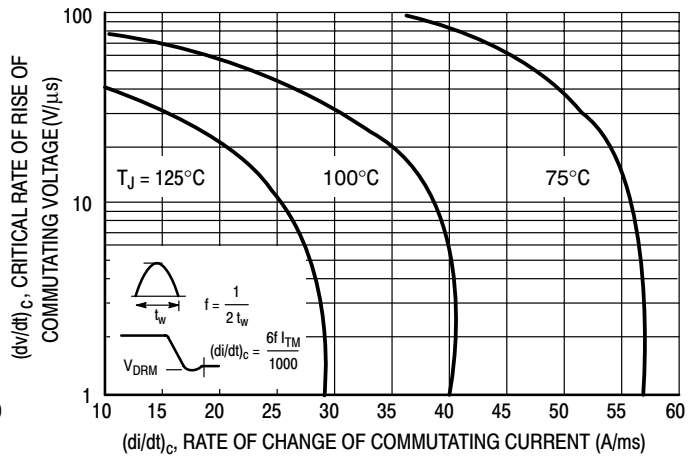
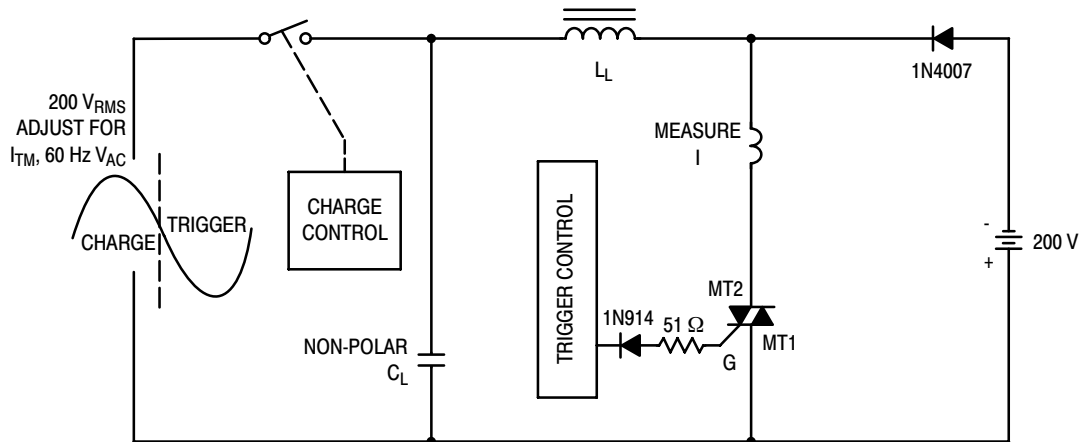


Figure 9. Critical Rate of Rise of Commutating Voltage



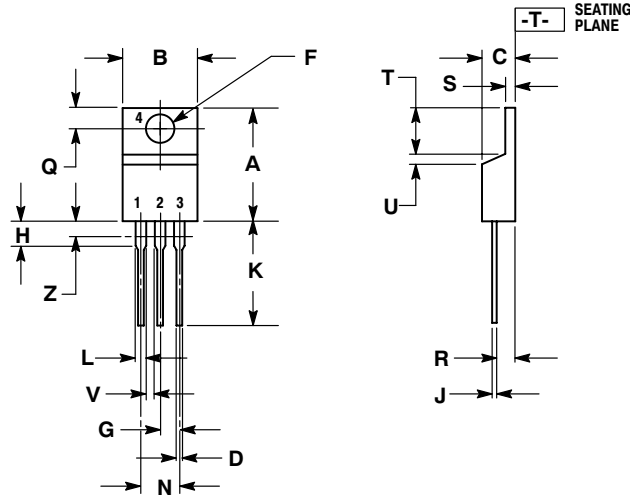
Note: Component values are for verification of rated  $(di/dt)_c$ . See AN1048 for additional information.

Figure 10. Simplified Test Circuit to Measure the Critical Rate of Rise of Commutating Current ( $di/dt$ )

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## PACKAGE DIMENSIONS

TO-220  
CASE 221A-09  
ISSUE AE




### 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	0.161	3.61	4.09
G	0.095	0.105	2.42	2.66
H	0.110	0.155	2.80	3.93
J	0.014	0.025	0.36	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

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