MAC8DG, MAC8MG, MAC8NG

Surface Mount – 400V -800V

Maximum Ratings (TJ = 25°C unless otherwise noted)

Rating		Symbol	Value	Unit
Peak Repetitive Off-State Voltage (Note 1) (Gate Open, Sine Wave 50 to 60 Hz, T_J = -40° to 125°C)	MAC8DG MAC8MG MAC8NG	V_{DRM}, V_{RRM}	400 600 800	V
On-State RMS Current (Full Cycle Sine Wave, 60 Hz, T_C = 100°C)		$I_{T\ (RMS)}$	8.0	A
Peak Non-Repetitive Surge Current (One Full Cycle Sine Wave, 60 Hz, T_C= 125°C)		I_{TSM}	80	A
Circuit Fusing Consideration (t = 8.3 ms)		I^2t	26	A^2sec
Peak Gate Power (Pulse Width ≤ 1.0 µs, T_C = 80°C)		P_{GM}	16	W
Average Gate Power (t=8.3ms, T_J = 80°C)		$P_{G(AV)}$	0.35	W
Operating Junction Temperature Range		T_J	-40 to +125	°C
Storage Temperature Range		T_{stg}	-40 to +150	°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. V_{DRM} and V_{RRM} for all types can be applied on a continuous basis. Ratings apply for zero or negative gate voltage; however, positive gate voltage shall not be applied concurrent with negative potential on the anode. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.

Thermal Characteristics

Rating		Symbol	Value	Unit
Thermal Resistance,	Junction−to−Case (AC) Junction−to−Ambient	$R_{\theta JC}$ $R_{\theta JA}$	2.2 62.5	°C/W
Maximum Lead Temperature for Soldering Purposes, 1/8” from case for 10 seconds		T_L	260	°C

Electrical Characteristics - OFF (TJ = 25°C unless otherwise noted ; Electricals apply in both directions)

Characteristic		Symbol	Min	Typ	Max	Unit
Peak Repetitive Blocking Current (V_D = V_{DRM} = V_{RRM}; Gate Open)	T_J = 25°C	I_{DRM}, I_{RRM}	-	-	0.01	mA
	T_J = 125°C		-	-	2.0	

Electrical Characteristics - ON (TJ = 25°C unless otherwise noted; Electricals apply in both directions)

Characteristic		Symbol	Min	Typ	Max	Unit
Peak On−State Voltage (Note 4) (I_{TM} = ±6.0 A)		V_{TM}	–	1.3	1.6	V
Gate Trigger Current (Continuous dc) (V_D = 12 V, R_L = 100 Ω)	MT2(+), G(+)	I_{GT}	5.0	13	35.0	mA
	MT2(+), G(−)		5.0	16	35.0	
	MT2(−), G(−)		5.0	18	35.0	
Holding Current (V_D = 12 V, Gate Open, Initiating Current = ±150 mA))		I_H	–	20	40	mA
Latching Current (V_D = 24 V, I_G = 35 mA)	MT2(+), G(+)	I_L	_	20	50	mA
	MT2(+), G(−)		_	30	80	
	MT2(−), G(−)		_	20	50	
Gate Trigger Voltage (V_D = 12 V, R_L = 100 Ω)	MT2(+), G(+)	V_{GT}	0.5	0.69	1.5	V
	MT2(+), G(−)		0.5	0.77	1.5	
	MT2(−), G(−)		0.5	0.72	1.5	
Gate Non−Trigger Voltage (T_J = 125°C) (V_D = 12 V, R_L = 100 Ω)	MT2(+), G(+)	V_{GD}	0.2	–	–	V
	MT2(+), G(−)		0.2	–	–	
	MT2(−), G(−)		0.2	–	–	

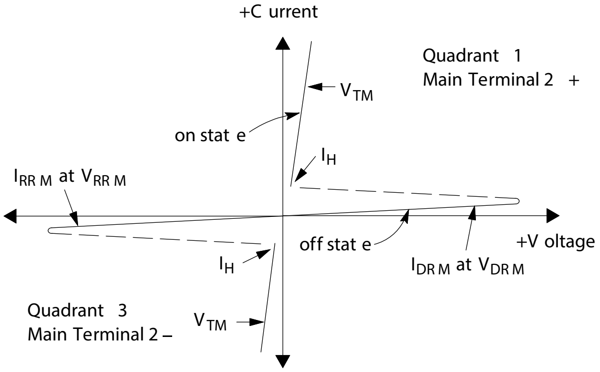
2. Indicates Pulse Test: Pulse Width ≤ 2.0 ms, Duty Cycle ≤ 2%.

Dynamic Characteristics

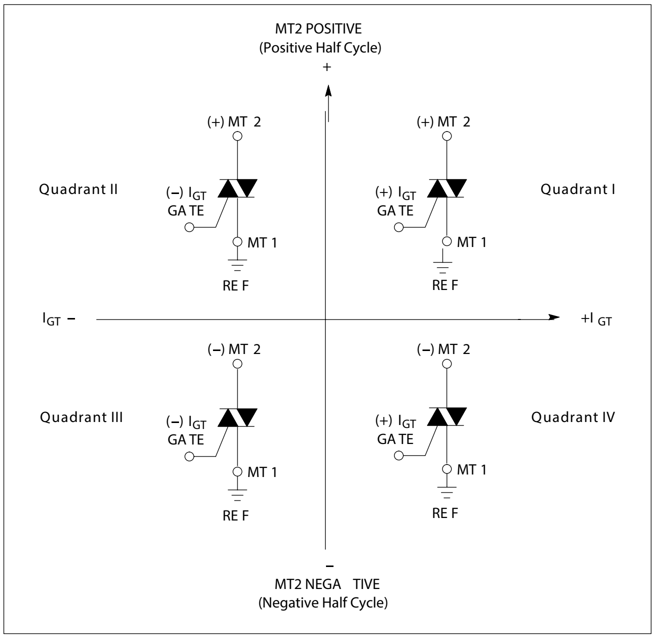
Characteristic	Symbol	Min	Typ	Max	Unit
Rate of Change of Commutating Current See Figure 10.(V_D = 400 V, I_{TM} = 4.4 A, Commutating dv/dt = 18 V/µs,Gate Open, T_J = 125°C, f = 250 Hz, No Snubber) C_L = 10 µF L_L = 40 mH	(dv/dt)c	6.5	–	–	A/ms
Critical Rate of Rise of Off-State Voltage (V_D = Rated V_{DRM}, Exponential Waveform, Gate Open, T_J = 125°C)	dV/dt	250	–	–	V/µs

Voltage Current Characteristic of SCR

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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Surface Mount – 400V -800V

Figure 1. RMS Current Derating

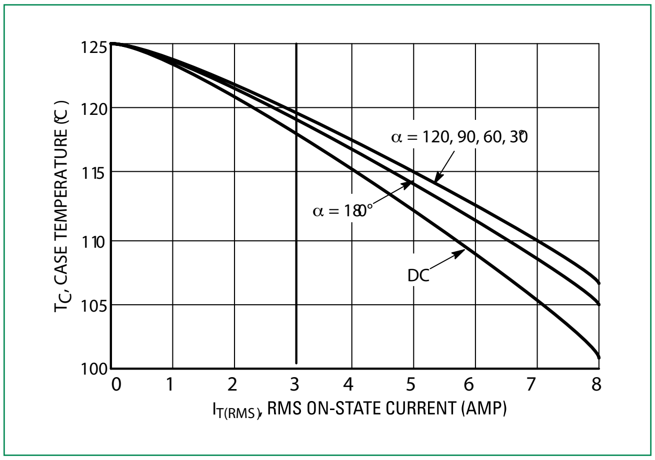


Figure 2. On-State Power Dissipation

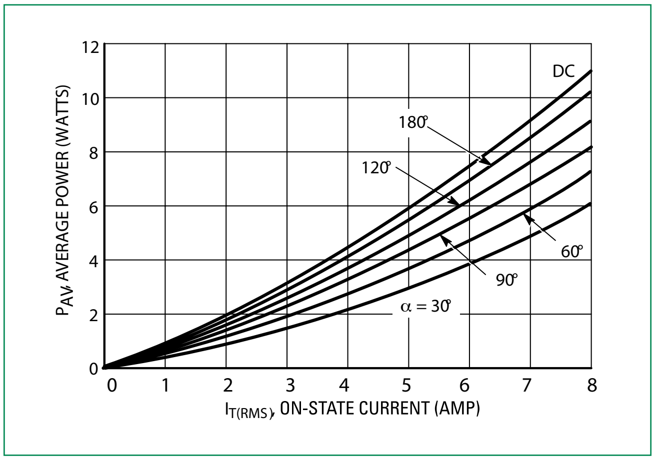


Figure 3. On–State Characteristics

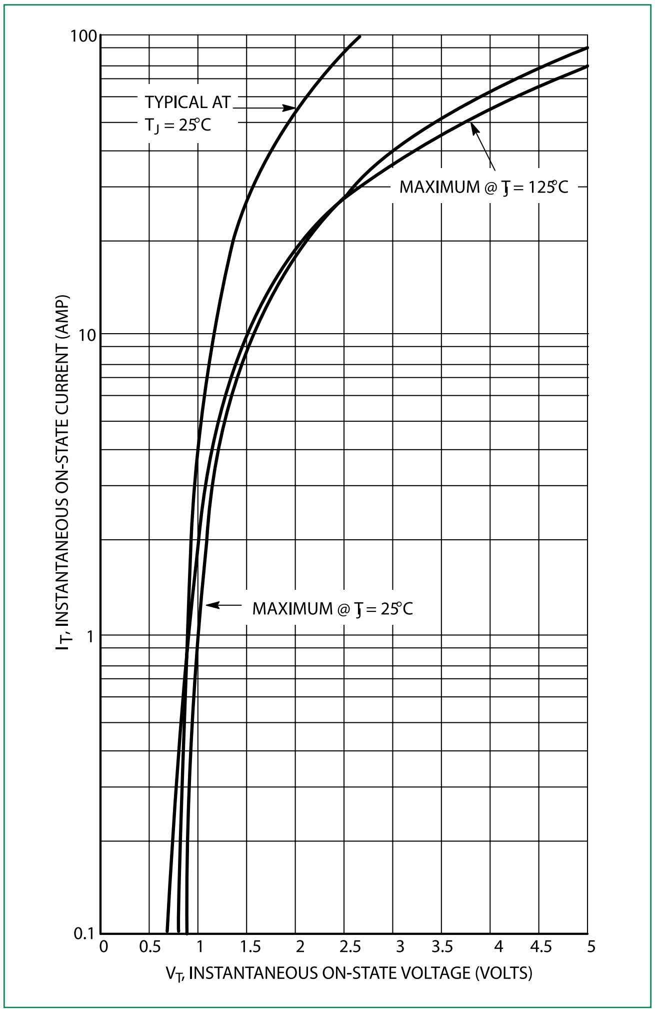


Figure 4. Thermal Response

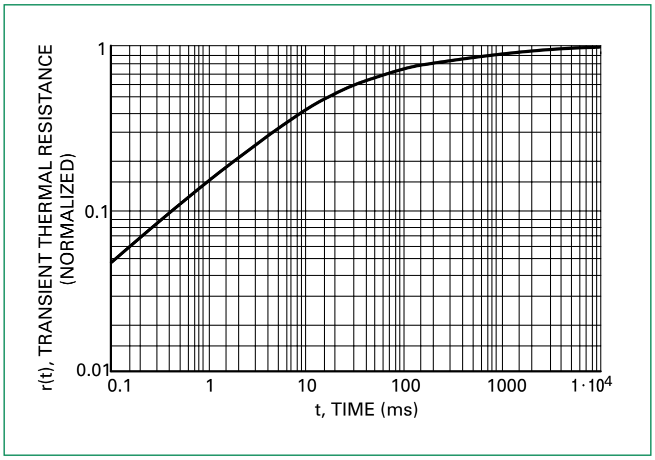
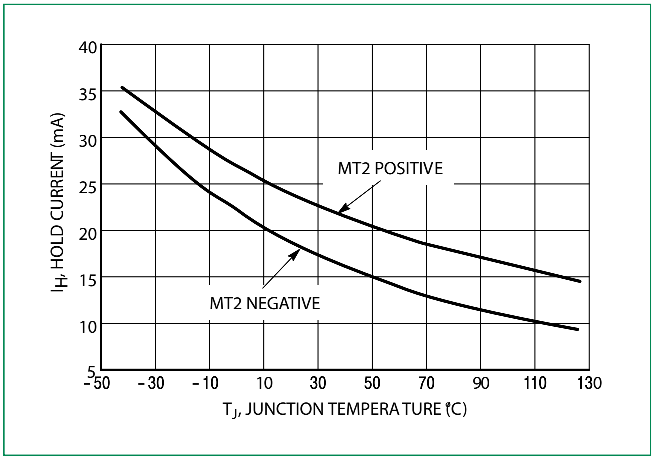


Figure 5. Hold Current Variation



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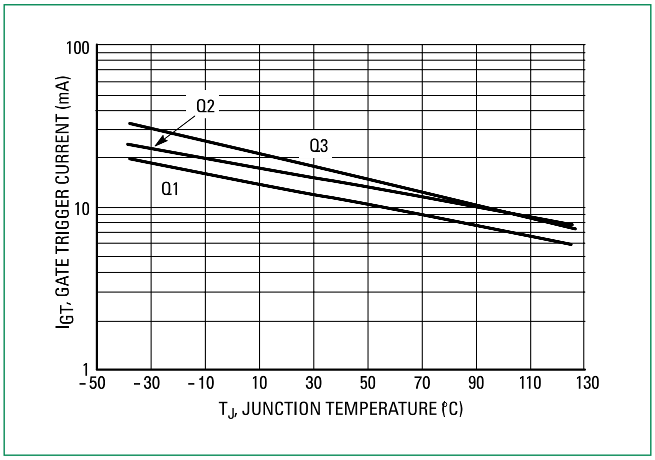


Figure 6. Gate Trigger Current Variation

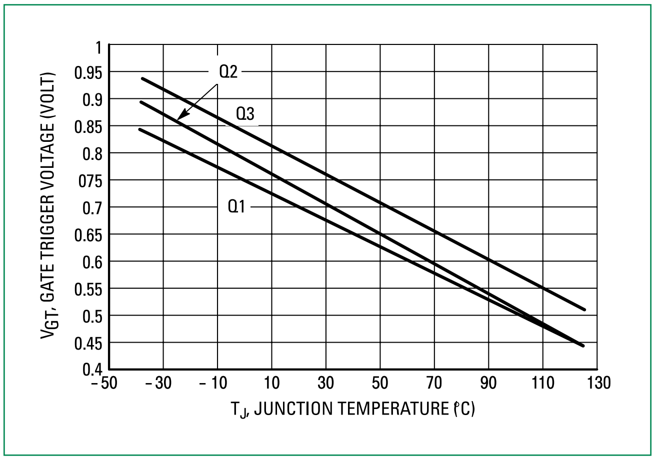


Figure 7. Gate Trigger Voltage Variation

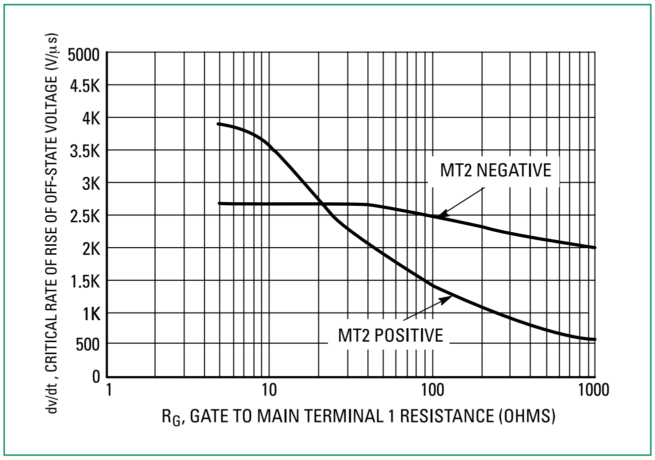


Figure 8. Critical Rate of Rise of Off-State Voltage (Exponential)

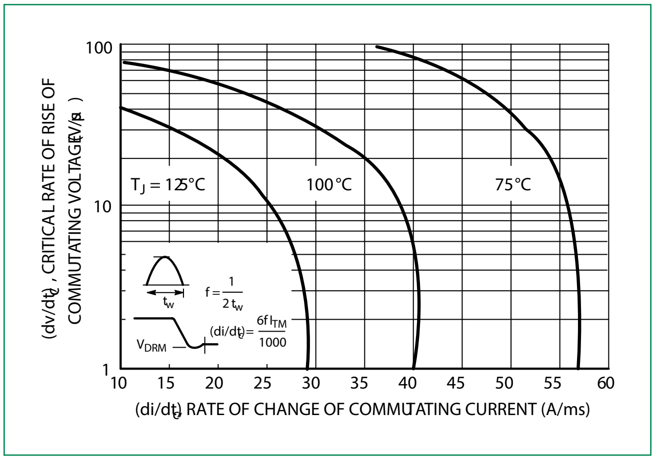
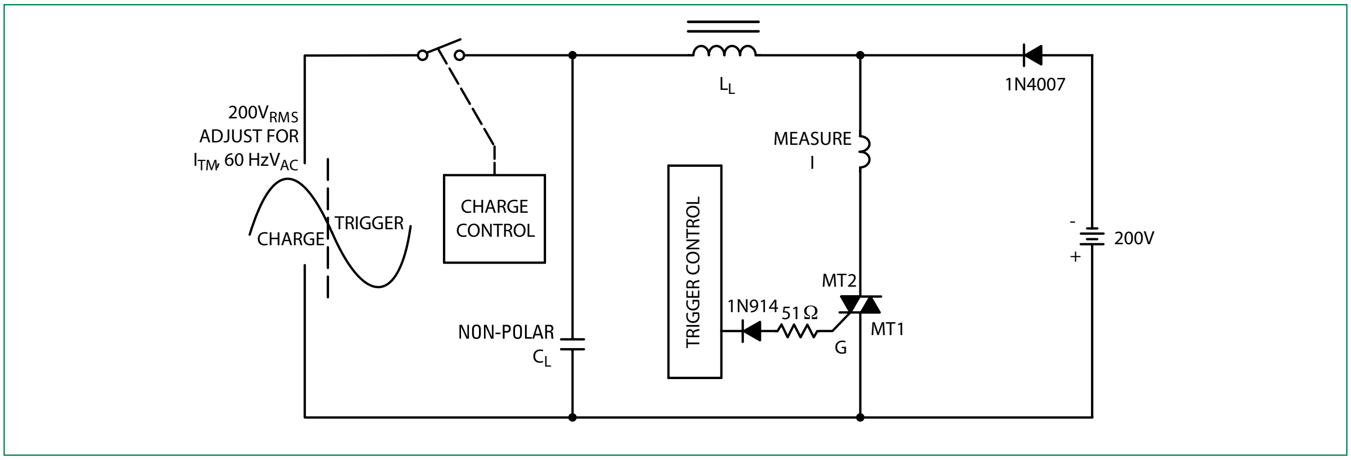


Figure 9. Critical Rate of Rise of Commutating Voltage

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

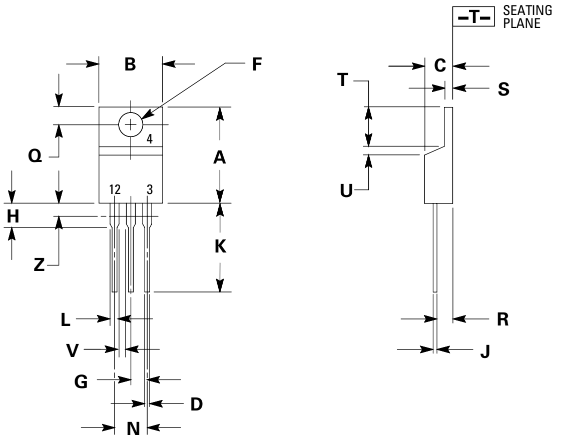


Note: Component values are for verification of rated $(di/dt)_c$. See AN1048 for additional information

MAC8DG, MAC8MG, MAC8NG

Surface Mount – 400V -800V

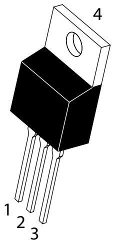
Dimensions



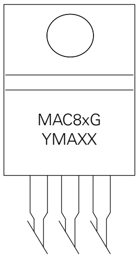
Dim	Inches		Millimeters	
	Min	Max	Min	Max
A	0.590	0.620	14.99	15.75
B	0.380	0.420	9.65	10.67
C	0.178	0.188	4.52	4.78
D	0.025	0.035	0.64	0.89
F	0.142	0.147	3.61	3.73
G	0.095	0.105	2.41	2.67
H	0.110	0.130	2.79	3.30
J	0.018	0.024	0.46	0.61
K	0.540	0.575	13.72	14.61
L	0.060	0.075	1.52	1.91
N	0.195	0.205	4.95	5.21
Q	0.105	0.115	2.67	2.92
R	0.085	0.095	2.16	2.41
S	0.045	0.060	1.14	1.52
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

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.

Part Marking System



TO–220AB
CASE 221A
STYLE 12



x =D, M, or N
Y =Year
M =Month
A =Assembly Site
XX =Lot Serial Code
G =Pb-Free Package

Pin Assignment	
1	Main Terminal 1
2	Main Terminal 2
3	Gate
4	No Connection

Ordering Information

Device	Package	Shipping
MAC8DG	TO-220AB (Pb-Free)	1000 Units / Box
MAC8MG		
MAC8NG		