



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



MAC15M, MAC15N

Triacs

Silicon Bidirectional Thyristors

Designed for high performance full-wave AC control applications where high noise immunity and high commutating di/dt are required.

Features

- Blocking Voltage to 800 Volts
- On-State Current Rating of 15 Amperes RMS at 80°C
- Uniform Gate Trigger Currents in Three Modes
- High Immunity to dv/dt – 250 V/ μ s minimum at 125°C
- Minimizes Snubber Networks for Protection
- Industry Standard TO-220 Package
- High Commutating di/dt – 9.0 A/ms minimum at 125°C
- Operational in Three Quadrants, Q1, Q2, and Q3
- These Devices are Pb-Free and are RoHS Compliant

MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
Peak Repetitive Off-State Voltage (Note 1) (-40 to 125°C, Sine Wave, 50 to 60 Hz, Gate Open) MAC15M MAC15N	V_{DRM} , V_{RRM}	600 800	V
On-State RMS Current (Full Cycle Sine Wave, 60 Hz, $T_C = 80^\circ\text{C}$)	$I_{T(RMS)}$	15	A
Peak Non-repetitive Surge Current (One Full Cycle Sine Wave, 60 Hz, $T_J = 125^\circ\text{C}$)	I_{TSM}	150	A
Circuit Fusing Consideration ($t = 8.3$ ms)	I^2t	93	A^2s
Peak Gate Power (Pulse Width ≤ 1.0 μs , $T_C = 80^\circ\text{C}$)	P_{GM}	20	W
Average Gate Power ($t = 8.3$ ms, $T_C = 80^\circ\text{C}$)	$P_{G(AV)}$	0.5	W
Operating Junction Temperature Range	T_J	-40 to +125	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-40 to +150	$^\circ\text{C}$

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

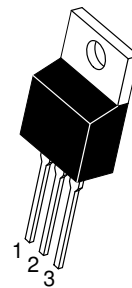
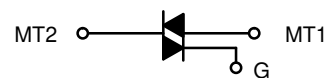
1. V_{DRM} and V_{RRM} for all types can be applied on a continuous basis. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.



Expertise Applied | Answers Delivered

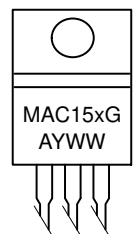
Littelfuse.com

TRIACS 15 AMPERES RMS 600 thru 800 VOLTS



TO-220
CASE 221A
STYLE 4

MARKING DIAGRAM



- x = M or N
- A = Assembly Location
- Y = Year
- WW = Work Week
- G = Pb-Free Package

PIN ASSIGNMENT

Pin	Assignment
1	Main Terminal 1
2	Main Terminal 2
3	Gate
4	Main Terminal 2

ORDERING INFORMATION

Device	Package	Shipping
MAC15MG	TO-220 (Pb-Free)	50 Units / Rail
MAC15NG	TO-220 (Pb-Free)	50 Units / Rail

MAC15M, MAC15N

THERMAL CHARACTERISTICS

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2.0	$^{\circ}\text{C}/\text{W}$
Junction-to-Ambient	$R_{\theta JA}$	62.5	
Maximum Lead Temperature for Soldering Purposes 1/8" from Case for 10 Seconds	T_L	260	$^{\circ}\text{C}$

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

Characteristic	Symbol	Min	Typ	Max	Unit
----------------	--------	-----	-----	-----	------

OFF CHARACTERISTICS

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

ON CHARACTERISTICS

Peak On-State Voltage (Note 2) ($I_{TM} = \pm 21 \text{ A Peak}$)	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 5.0 5.0	13 16 18	35 35 35	mA
Hold Current ($V_D = 12 \text{ Vdc}, \text{ Gate Open}, \text{ Initiating Current} = \pm 150 \text{ mA}$)	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	- - -	33 36 33	50 80 50	mA
Gate Trigger Voltage ($V_D = 12 \text{ V}, R_L = 100 \Omega$) MT2(+), G(+) MT2(+), G(-) MT2(-), G(-)	V_{GT}	0.5 0.5 0.5	0.75 0.72 0.82	1.5 1.5 1.5	V

DYNAMIC CHARACTERISTICS

Rate of Change of Commutating Current; See Figure 10. ($V_D = 400 \text{ V}, I_{TM} = 6.0 \text{ A}, \text{ Commutating } dv/dt = 24 \text{ V}/\mu\text{s},$ Gate Open, $T_J = 125^{\circ}\text{C}, f = 250 \text{ Hz}, \text{ No Snubber}$)	$(di/dt)_C$	9.0	-	-	A/ms
					$C_L = 10 \mu\text{F}$ $L_L = 40 \text{ mH}$
Critical Rate of Rise of Off-State Voltage ($V_D = \text{Rated } V_{DRM}, \text{ Exponential Waveform}, \text{ Gate Open}, T_J = 125^{\circ}\text{C}$)	dv/dt	250	-	-	V/ μs

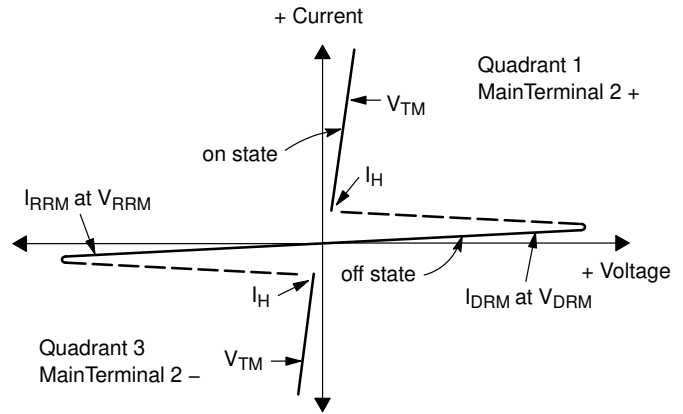
Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

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

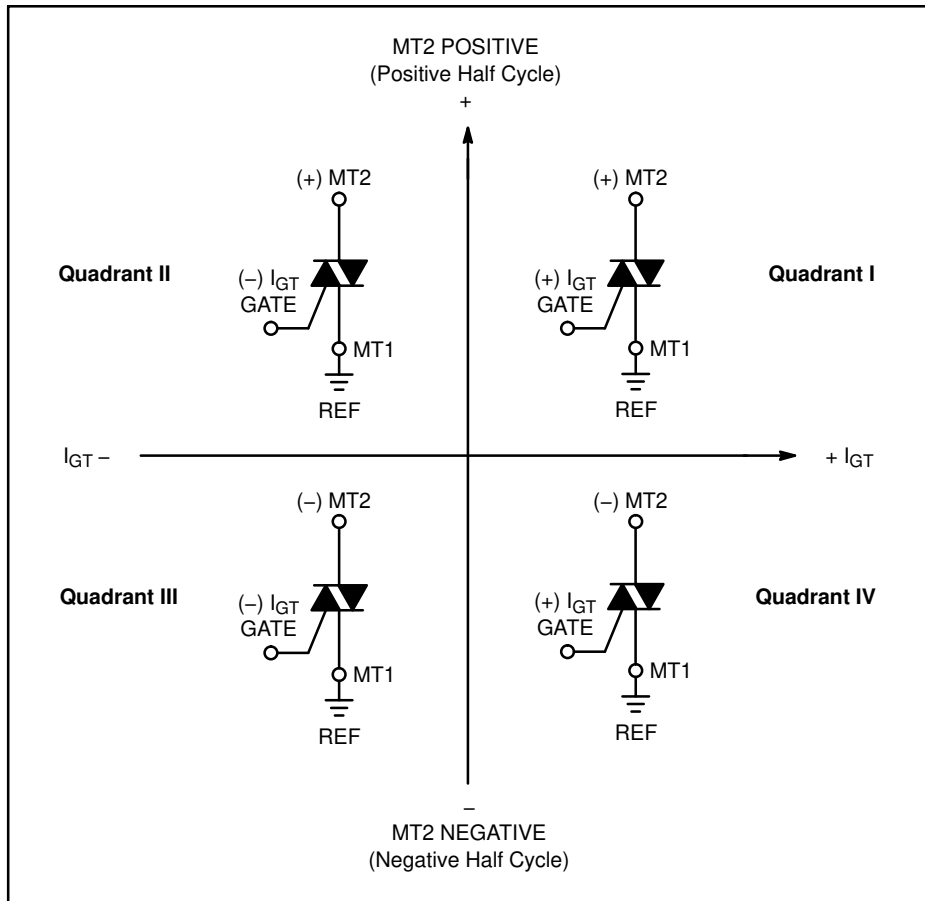
MAC15M, MAC15N

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.

MAC15M, MAC15N

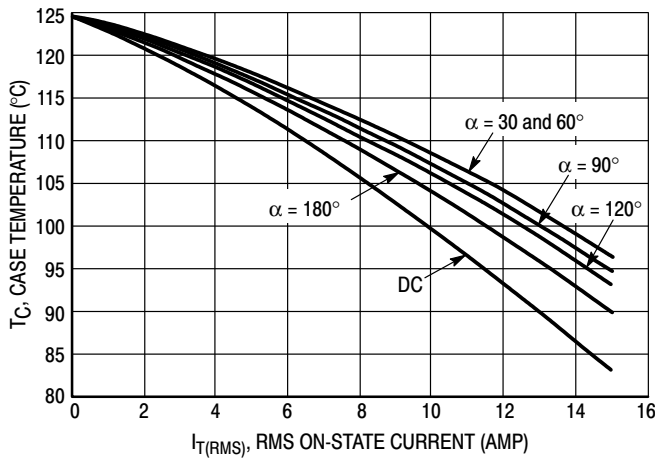


Figure 1. RMS Current Derating

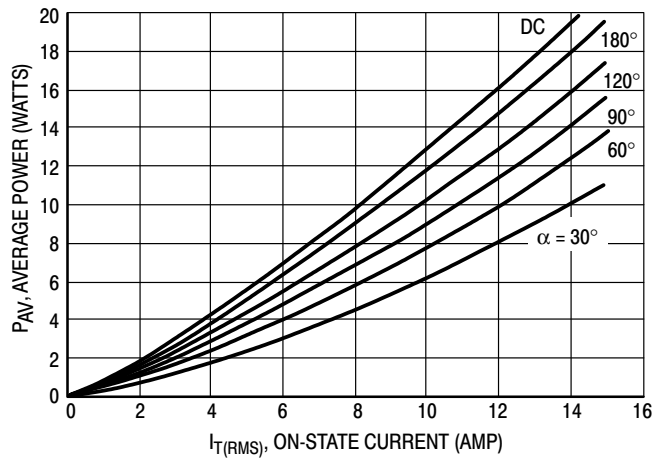


Figure 2. On-State Power Dissipation

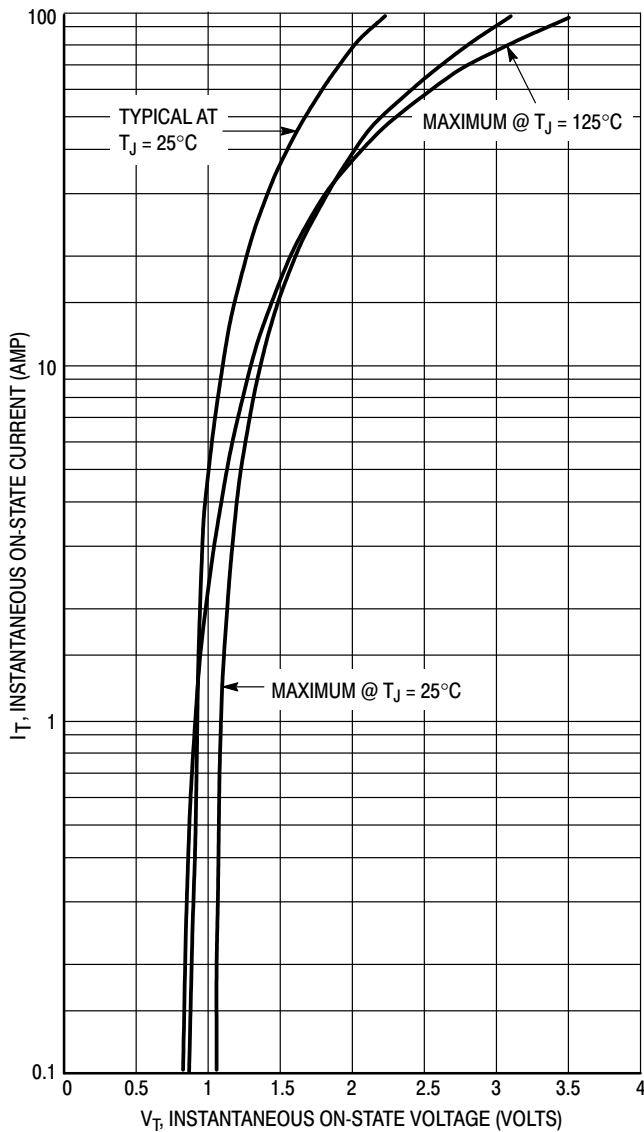


Figure 3. On-State Characteristics

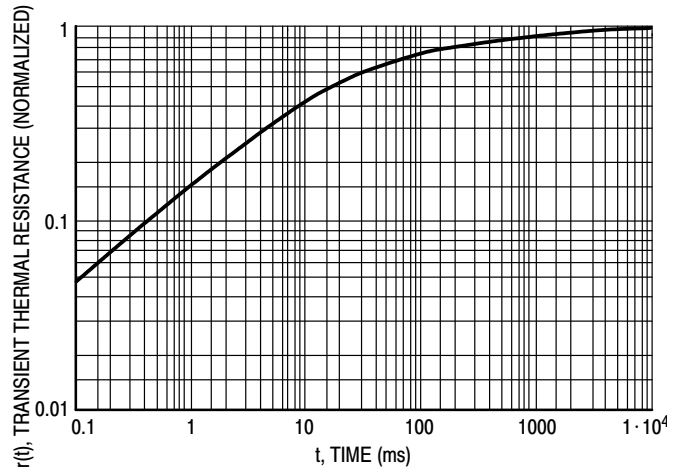


Figure 4. Transient Thermal Response

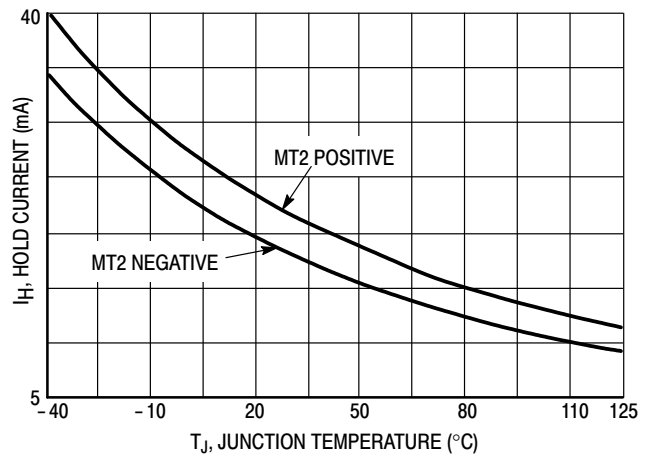


Figure 5. Hold Current Variation

MAC15M, MAC15N

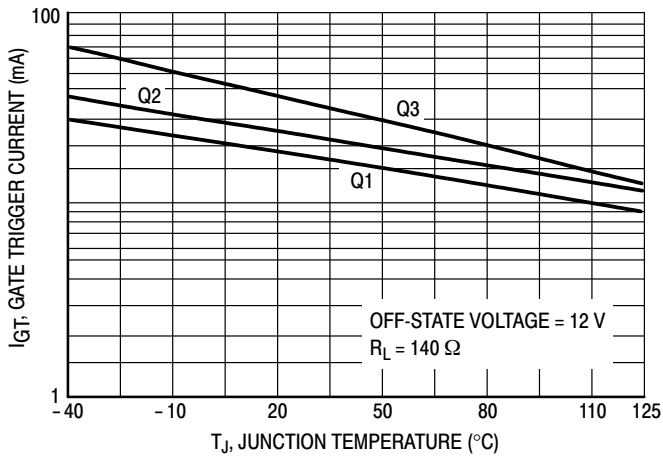


Figure 6. Typical Holding Current versus Junction Temperature

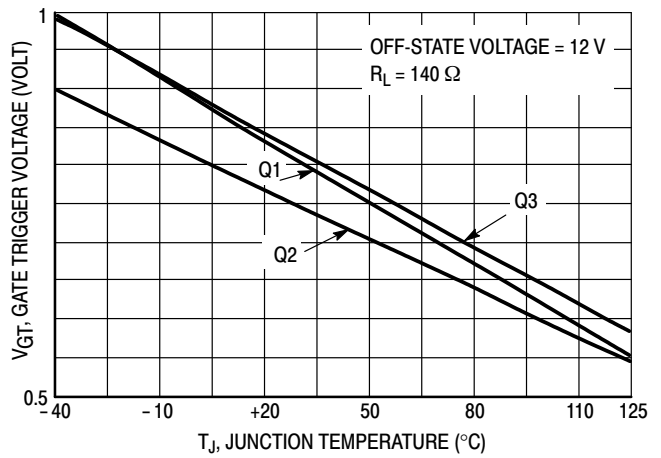


Figure 7. Gate Trigger Voltage versus Junction Temperature

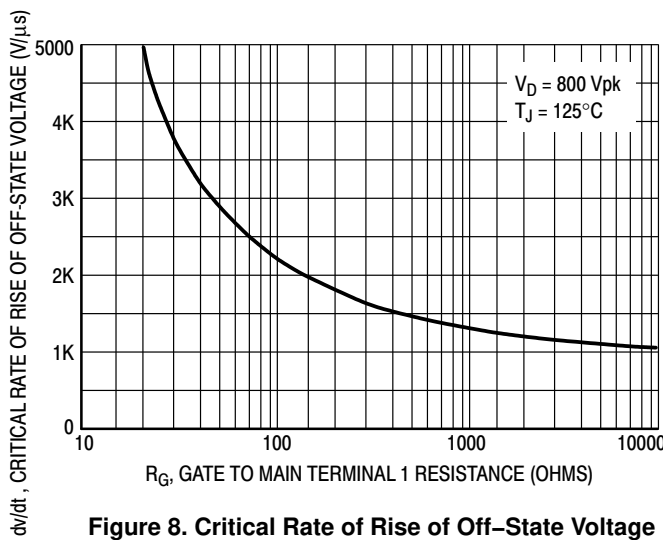


Figure 8. Critical Rate of Rise of Off-State Voltage (Exponential)

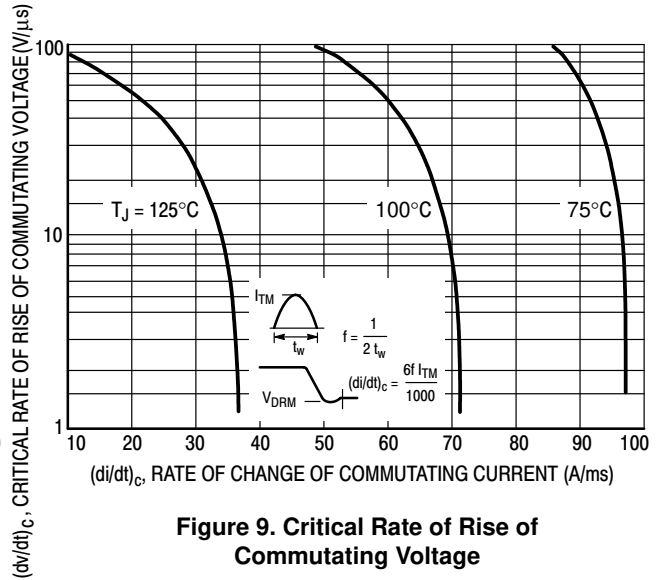
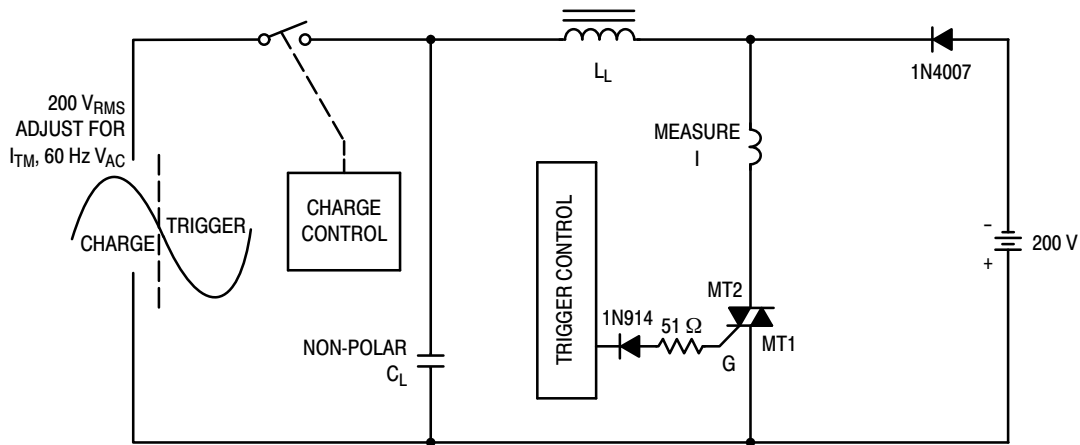


Figure 9. Critical Rate of Rise of Commutating Voltage



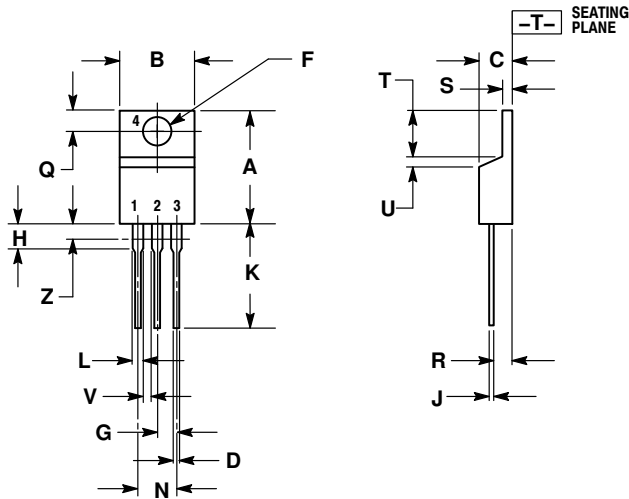
Note: Component values are for verification of rated $(di/dt)_c$. See AN1048 for additional information.

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

MAC15M, MAC15N

PACKAGE DIMENSIONS

TO-220
CASE 221A-09
ISSUE AH



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	0.415	9.66	10.53
C	0.160	0.190	4.07	4.83
D	0.025	0.038	0.64	0.96
F	0.142	0.161	3.61	4.09
G	0.095	0.105	2.42	2.66
H	0.110	0.161	2.80	4.10
J	0.014	0.024	0.36	0.61
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
- PIN 2. MAIN TERMINAL 2
- PIN 3. GATE
- PIN 4. MAIN TERMINAL 2

Littelfuse products are not designed for, and shall not be used for, any purpose (including, without limitation, automotive, military, aerospace, medical, life-saving, life-sustaining or nuclear facility applications, devices intended for surgical implant into the body, or any other application in which the failure or lack of desired operation of the product may result in personal injury, death, or property damage) other than those expressly set forth in applicable Littelfuse product documentation. Warranties granted by Littelfuse shall be deemed void for products used for any purpose not expressly set forth in applicable Littelfuse documentation. Littelfuse shall not be liable for any claims or damages arising out of products used in applications not expressly intended by Littelfuse as set forth in applicable Littelfuse documentation. The sale and use of Littelfuse products is subject to Littelfuse Terms and Conditions of Sale, unless otherwise agreed by Littelfuse.

Littelfuse.com