

Advance Information

TRIACS

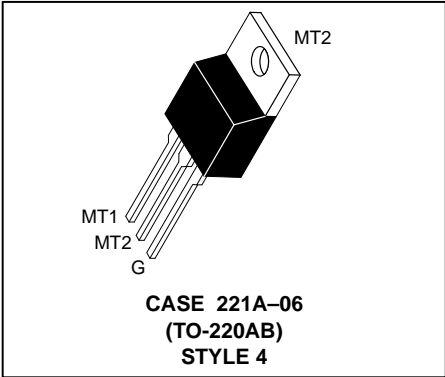
Silicon Bidirectional Thyristors

**MAC8S
SERIES**

**TRIACS
8 AMPERES RMS
400 THRU 800
VOLTS**

Designed for industrial and consumer applications for full wave control of ac loads such as appliance controls, heater controls, motor controls, and other power switching applications.

- Sensitive Gate Allows Triggering by Microcontrollers and other Logic Circuits
- High Immunity to dv/dt — 25 V/ μ s Minimum at 110°C
- High Commutating di/dt — 8.0 A/ms Minimum at 110°C
- Minimum and Maximum Values of I_{GT} , V_{GT} and I_H Specified for ease of Design
- On-State Current Rating of 8 Amperes RMS at 70°C
- High Surge Current Capability — 70 Amperes
- Blocking Voltage to 800 Volts
- Rugged, Economical TO220AB Package



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

Parameter	Symbol	Value	Unit
Peak Repetitive Off-State Voltage (1) ($T_J = -40$ to 110°C , Sine Wave, 50 to 60Hz, Gate Open)	V_{DRM}	400 600 800	Volts
On-State RMS Current (Full Cycle Sine Wave, 60Hz, $T_J = 70^\circ\text{C}$)	$I_{T(RMS)}$	8	A
Peak Non-repetitive Surge Current (One Half Cycle, 60Hz, $T_J = 110^\circ\text{C}$)	I_{TSM}	70	A
Circuit Fusing Consideration ($t = 8.3$ ms)	I^2t	20	A^2sec
Peak Gate Power (Pulse Width $\leq 1.0\mu\text{s}$, $T_C = 70^\circ\text{C}$)	P_{GM}	16	Watts
Average Gate Power ($t = 8.3\text{ms}$, $T_C = 70^\circ\text{C}$)	$P_{G(AV)}$	0.35	Watts
Operating Junction Temperature Range	T_J	-40 to +110	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-40 to +150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Thermal Resistance — Junction to Case — Junction to Ambient	$R_{\theta JC}$ $R_{\theta JA}$	2.2 62.5	$^\circ\text{C/W}$
Maximum Lead Temperature for Soldering Purposes 1/8" from Case for 5 Seconds	T_L	260	$^\circ\text{C}$

(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.

MAC8S SERIES

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted)

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

OFF CHARACTERISTICS

Peak Repetitive Blocking Current (V _D = Rated V _{DRM} , Gate Open)	I _{DRM}	—	—	0.01 2.0	mA
					T _J = 25°C T _J = 110°C

ON CHARACTERISTICS

Peak On-State Voltage* (I _{TM} = ±11A)	V _{TM}	—	—	1.85	Volts
Continuous Gate Trigger Current (V _D = 12 V, R _L = 100Ω) MT2(+), G(+) MT2(+), G(-) MT2(-), G(-)	I _{GT}	.8	2.0	5.0	mA
		.8	3.0	5.0	
		.8	3.0	5.0	
Hold Current (V _D = 12V, Gate Open, Initiating Current = ±150mA)	I _H	1.0	3.0	10	mA
Latching Current (V _D = 24V, I _G = 5mA) MT2(+), G(+) MT2(-), G(-) MT2(+), G(-)	I _L	2.0	5.0	15	mA
		2.0	10	20	
		2.0	5.0	15	
Gate Trigger Voltage (Continuous dc) (V _D = 12 V, R _L = 100Ω) MT2(+), G(+) MT2(+), G(-) MT2(-), G(-)	V _{GT}	0.45	0.62	1.5	Volts
		0.45	0.60	1.5	
		0.45	0.65	1.5	

DYNAMIC CHARACTERISTICS

Critical Rate of Rise of Off-State Voltage (V _D = 400V, I _{TM} = 3.5A, Commutating dv/dt = 10Vμ/sec, Gate Open, T _J = 110°C, f = 500 Hz, Snubber: C _S = 0.01 μF, R _S = 15Ω, see Figure 16.)	(dv/dt) _c	8.0	10	—	A/ms
Critical Rate of Rise of Off-State Voltage (V _D = Rate V _{DRM} , Exponential Waveform, R _{GK} = 510Ω, T _J = 110°C)	dv/dt	25	75	—	V/μs

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

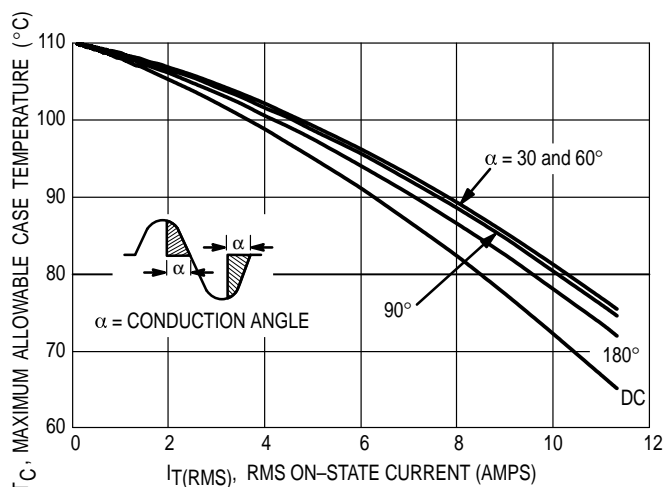


Figure 1.0 RMS Current Derating

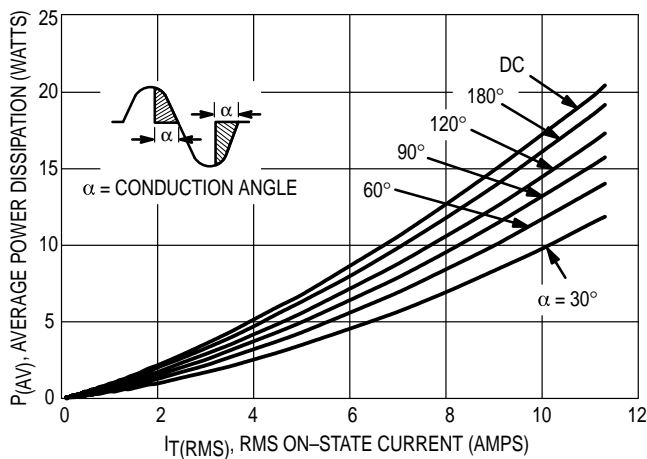


Figure 2.0 Maximum On-State Power Dissipation

MAC8S SERIES

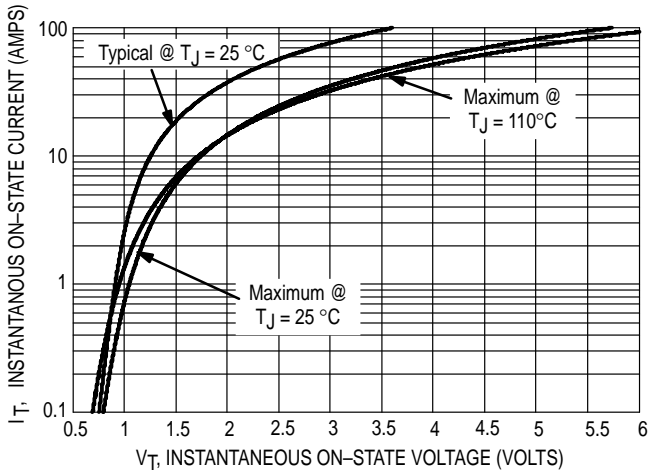


Figure 3.0 On-State Characteristics

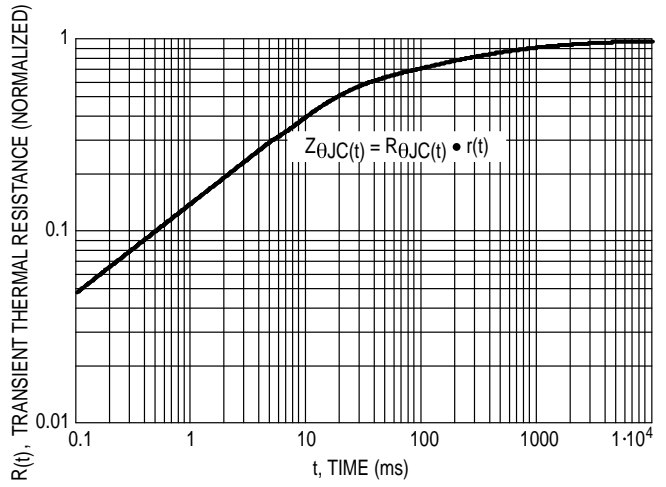


Figure 4.0 Transient Thermal Response

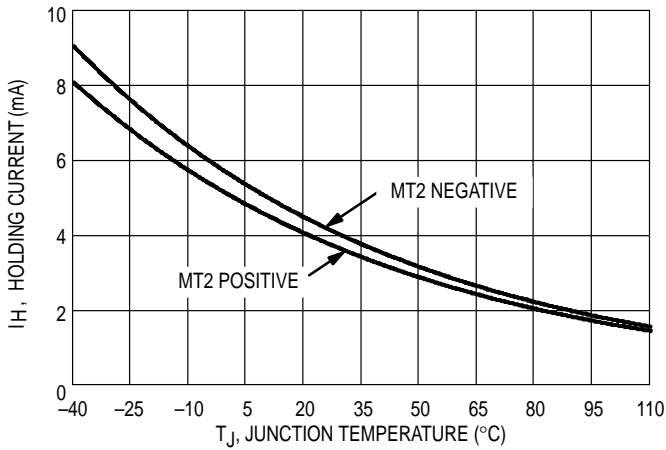


Figure 5.0 Typical Holding Current Versus Junction Temperature

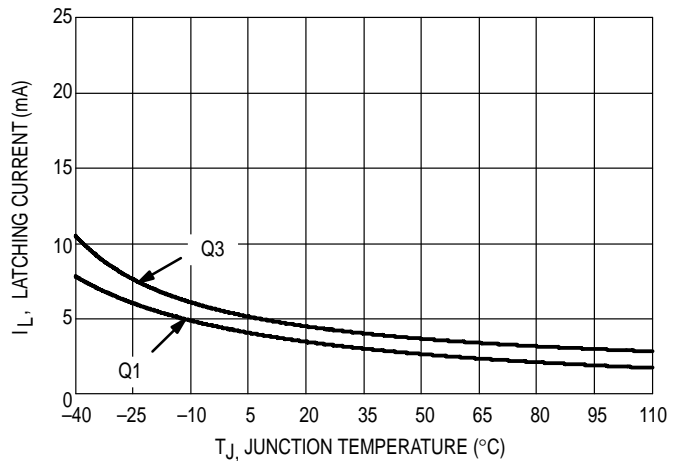


Figure 6.0 Typical Latching Current Versus Junction Temperature

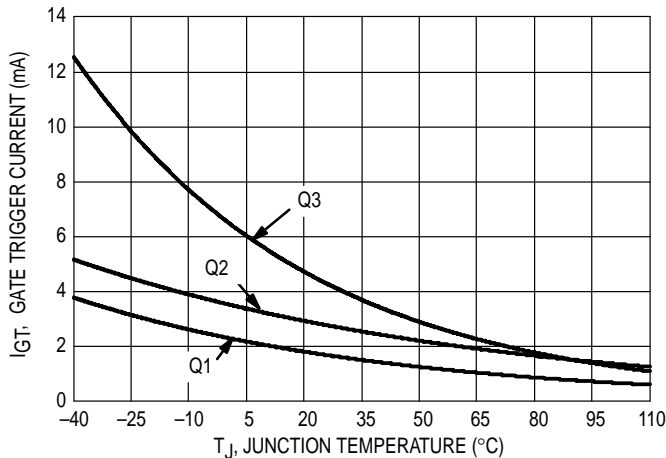


Figure 7.0 Typical Gate Trigger Current Versus Junction Temperature

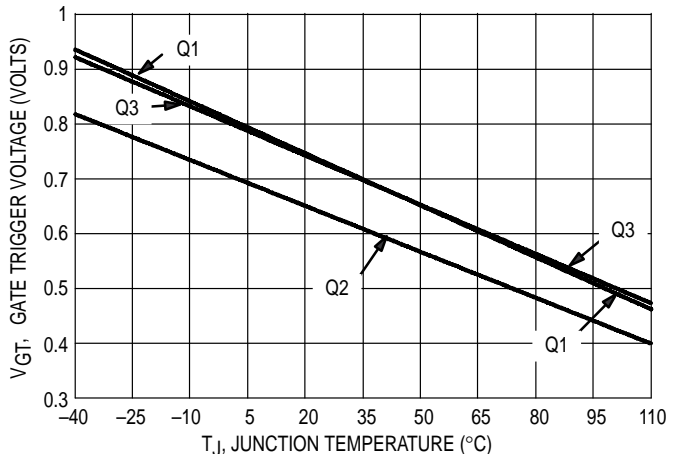


Figure 8.0 Typical Gate Trigger Voltage Versus Junction Temperature

MAC8S SERIES

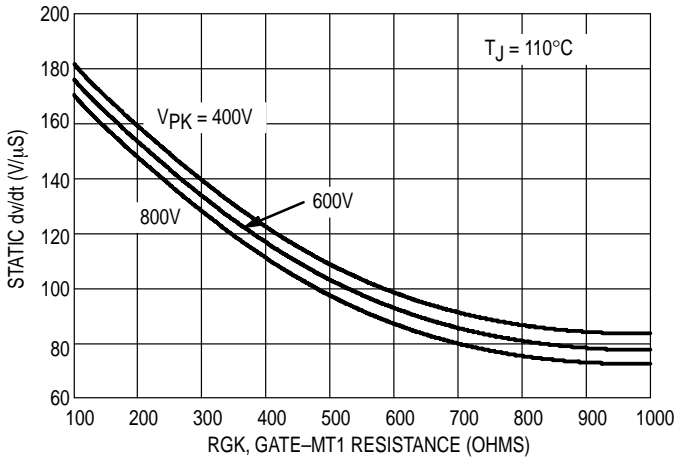


Figure 9.0 Typical Exponential Static dv/dt Versus Gate-MT1 Resistance, MT2(+)

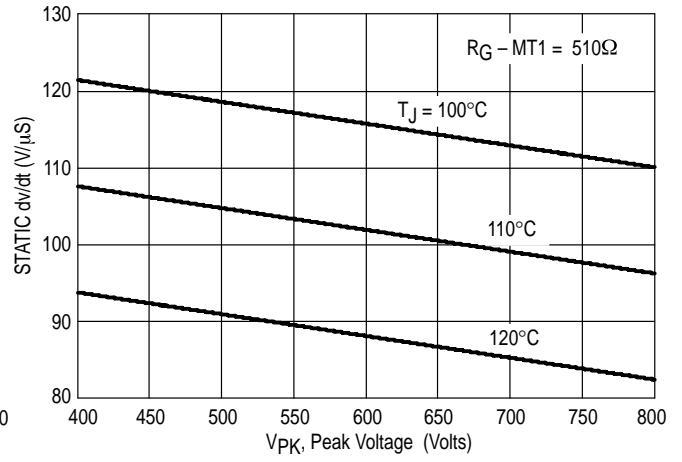


Figure 10.0 Typical Exponential Static dv/dt Versus Peak Voltage, MT2(+)

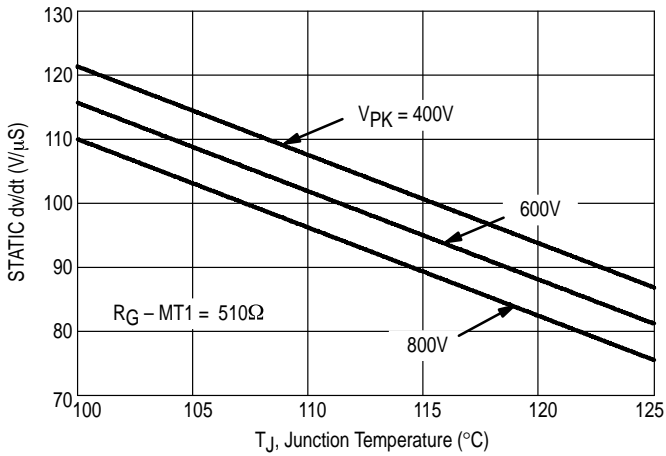


Figure 11.0 Typical Exponential Static dv/dt Versus Junction Temperature, MT2(+)

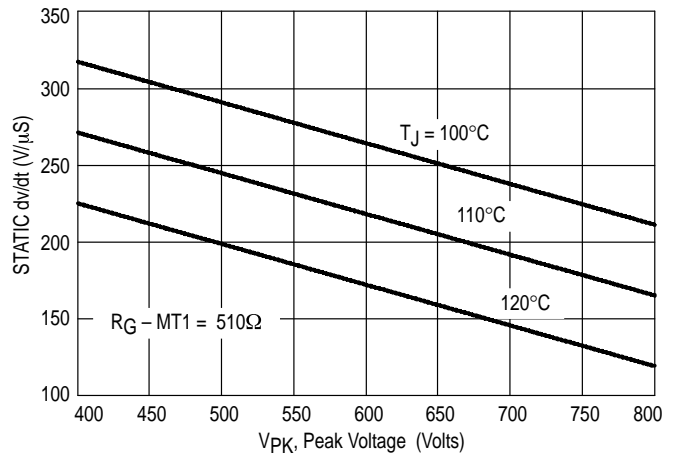


Figure 12.0 Typical Exponential Static dv/dt Versus Peak Voltage, MT2(-)

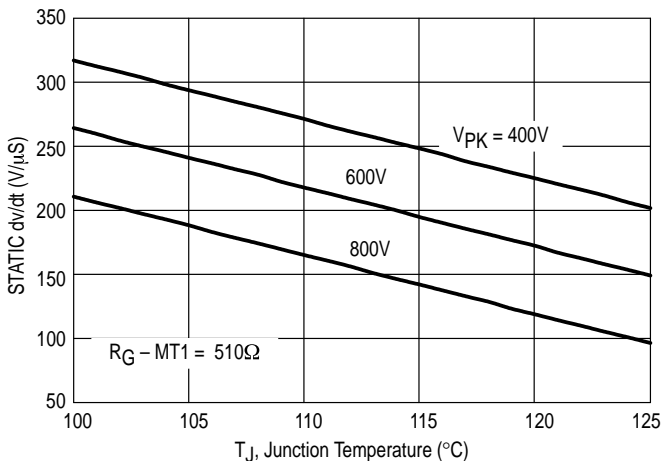


Figure 13.0 Typical Exponential Static dv/dt Versus Junction Temperature, MT2(-)

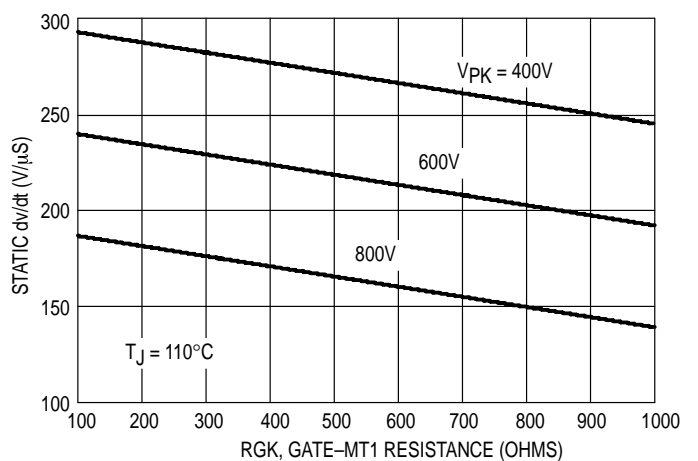


Figure 14.0 Typical Exponential Static dv/dt Versus Gate-MT1 Resistance, MT2(-)

MAC8S SERIES

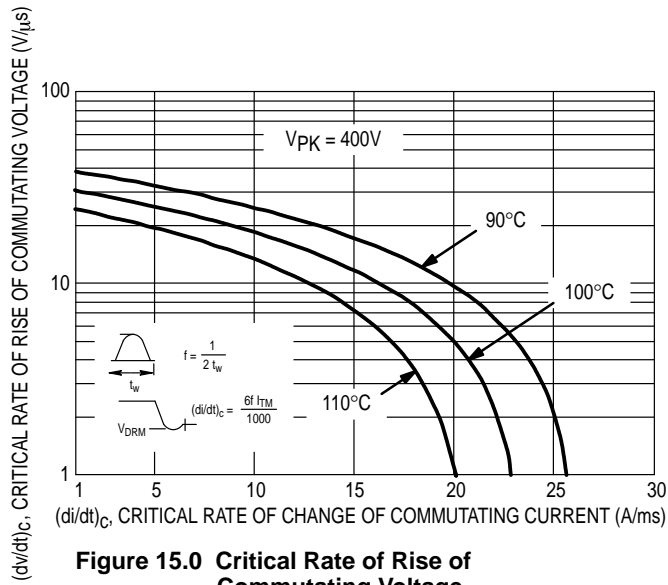
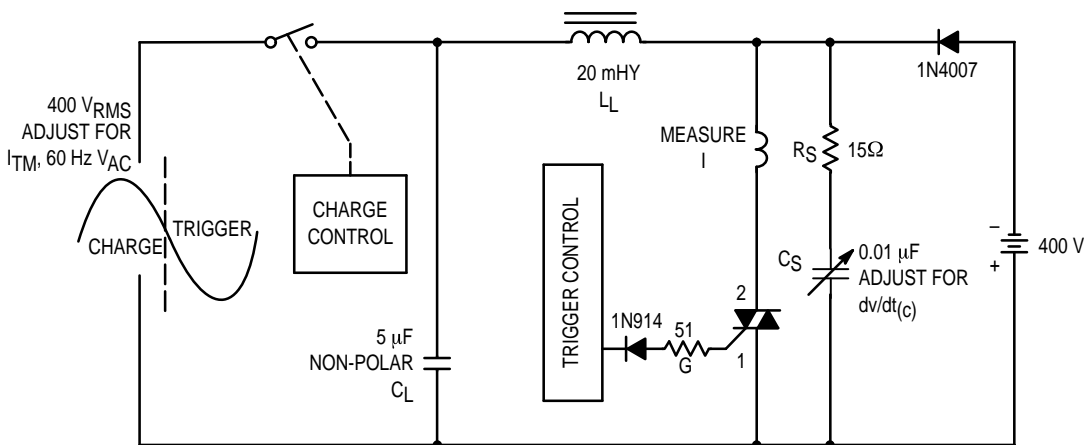


Figure 15.0 Critical Rate of Rise of Commutating Voltage



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

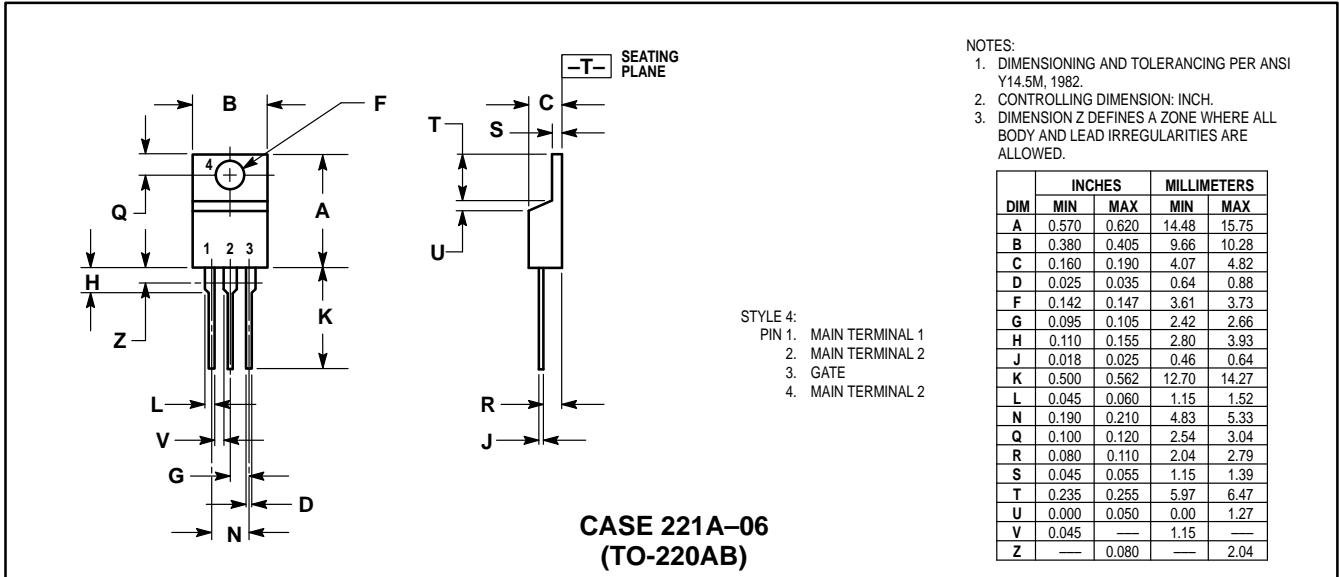
Figure 16.0 Simplified Test Circuit to Measure the Critical Rate of Rise of Commutating Voltage

MAC8S SERIES
NOTES

MAC8S SERIES
NOTES

MAC8S SERIES

PACKAGE DIMENSIONS



Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters can and do vary in different applications. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Motorola does not convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Motorola was negligent regarding the design or manufacture of the part. Motorola and are registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

To order literature by mail:

USA/EUROPE: Motorola Literature Distribution; P.O. Box 20912; Phoenix, Arizona 85036.

JAPAN: Nippon Motorola Ltd.; 4-32-1, Nishi-Gotanda, Shinagawa-ku, Tokyo 141, Japan.

ASIA PACIFIC: Motorola Semiconductors H.K. Ltd.; Silicon Harbour Center, No. 2 Dai King Street, Tai Po Industrial Estate, Tai Po, N.T., Hong Kong.

To order literature electronically:

MFAX: RMFAX0@email.sps.mot.com-TOUCHTONE (602) 244-6609

INTERNET: <http://Design-NET.com>

