

SOT-223 SCR

Silicon Controlled Rectifiers

Reverse Blocking Triode Thyristors

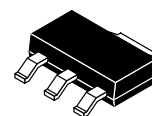
MCR08BT1 Series*

*Motorola preferred devices

PNPN devices designed for line powered consumer applications such as relay and lamp drivers, small motor controls, gate drivers for larger thyristors, and sensing and detection circuits. Supplied in surface mount package for use in automated manufacturing.

- Sensitive Gate Trigger Current
- Blocking Voltage to 600 Volts
- Glass Passivated Surface for Reliability and Uniformity
- Surface Mount Package
- Devices Supplied on 1 K Reel

SCR
0.8 AMPERE RMS
200 thru 600 Volts



CASE 318E-04
(SOT-223)
STYLE 10

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

Rating	Symbol	Value	Unit
Peak Repetitive Forward and Reverse Blocking Voltage ⁽¹⁾ (1/2 Sine Wave, $R_{GK} = 1000 \Omega$, $T_J = 25$ to 110°C)	V_{DRM} , V_{RRM}	200 400 600	Volts
On-State Current RMS ($T_C = 80^\circ\text{C}$)	$I_T(\text{RMS})$	0.8	Amps
Peak Non-repetitive Surge Current (One Full Cycle, 60 Hz, $T_C = 25^\circ\text{C}$)	I_{TSM}	10	Amps
Circuit Fusing Considerations ($t = 8.3$ ms)	I^2t	0.4	A^2s
Peak Gate Power, Forward, $T_A = 25^\circ\text{C}$	P_{GM}	0.1	Watts
Average Gate Power ($T_C = 80^\circ\text{C}$, $t = 8.3$ ms)	$P_{G(AV)}$	0.01	Watts
Operating Junction Temperature Range	T_J	-40 to +110	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-40 to +150	$^\circ\text{C}$
Maximum Device Temperature for Soldering Purposes (for 10 Seconds Maximum)	T_L	260	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient PCB Mounted per Figure 1	$R_{\theta JA}$	156	$^\circ\text{C/W}$
Thermal Resistance, Junction to Tab Measured on Anode Tab Adjacent to Epoxy	$R_{\theta JT}$	25	$^\circ\text{C/W}$

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 source such that the voltage ratings of the devices are exceeded.

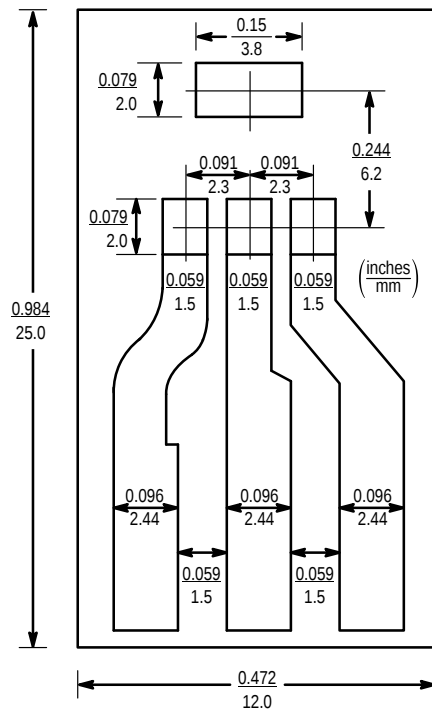
Preferred devices are Motorola recommended choices for future use and best overall value.

MCR08BT1 Series

ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted, $R_{GK} = 1\text{ K}\Omega$)

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Repetitive Forward or Reverse Blocking Current ($V_{AK} = \text{Rated } V_{DRM} \text{ or } V_{RRM}$, $R_{GK} = 1000\ \Omega$) $T_J = 25^\circ\text{C}$ $T_J = 110^\circ\text{C}$	I_{DRM} , I_{RRM}	— —	— —	10 200	μA μA
Maximum On-State Voltage (Either Direction)* ($I_T = 1.0\text{ A Peak}$, $T_A = 25^\circ\text{C}$)	V_{TM}	—	—	1.7	Volts
Gate Trigger Current (Continuous dc) (Anode Voltage = 7.0 Vdc, $R_L = 100\ \Omega$)	I_{GT}	—	—	200	μA
Holding Current ($V_D = 7.0\text{ Vdc}$, Initializing Current = 20 mA, $R_{GK} = 1000\ \Omega$)	I_H	—	—	5.0	mA
Gate Trigger Voltage (Continuous dc) (Anode Voltage = 7.0 Vdc, $R_L = 100\ \Omega$)	V_{GT}	—	—	0.8	Volts
Critical Rate-of-Rise of Off State Voltage ($V_{pk} = \text{Rated } V_{DRM}$, $T_C = 110^\circ\text{C}$, $R_{GK} = 1000\ \Omega$, Exponential Method)	dv/dt	10	—	—	$\text{V}/\mu\text{s}$

* Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2\%$.



BOARD MOUNTED VERTICALLY IN CINCH 8840 EDGE CONNECTOR.
BOARD THICKNESS = 65 MIL., FOIL THICKNESS = 2.5 MIL.
MATERIAL: G10 FIBERGLASS BASE EPOXY

Figure 1. PCB for Thermal Impedance and Power Testing of SOT-223

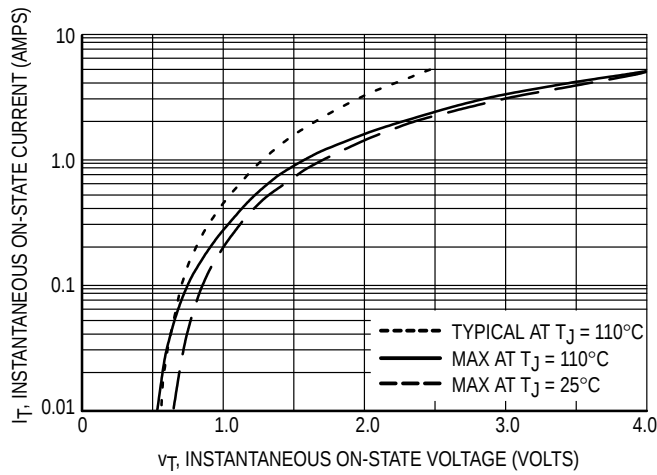


Figure 2. On-State Characteristics

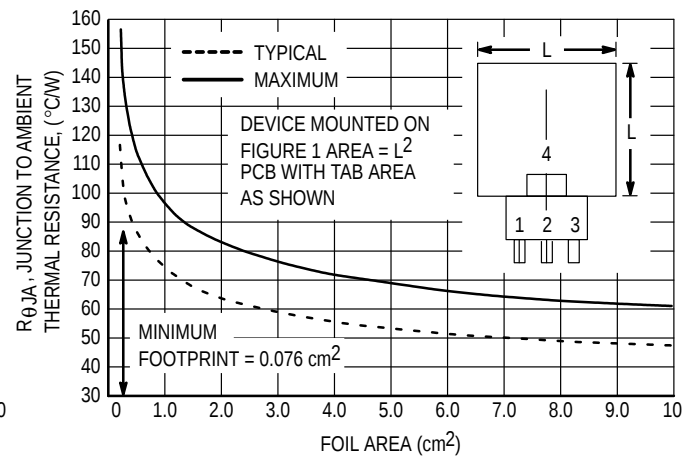
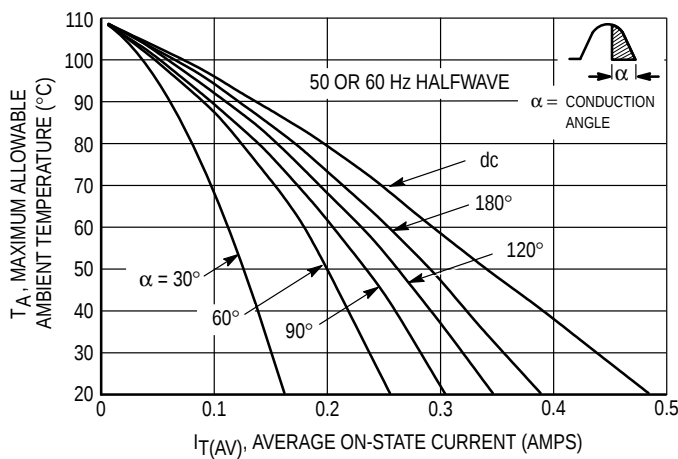
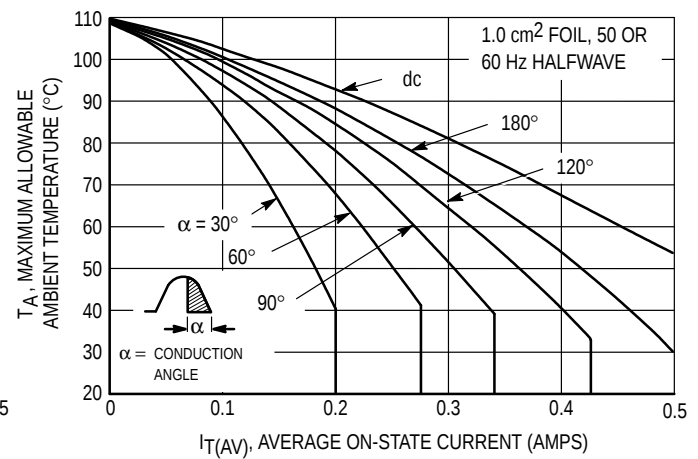
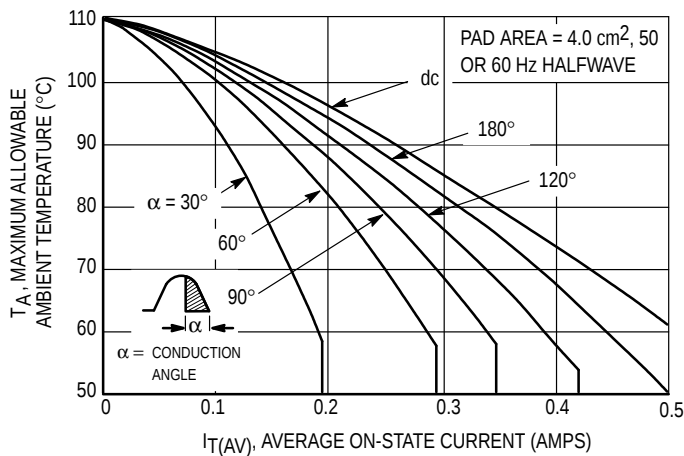
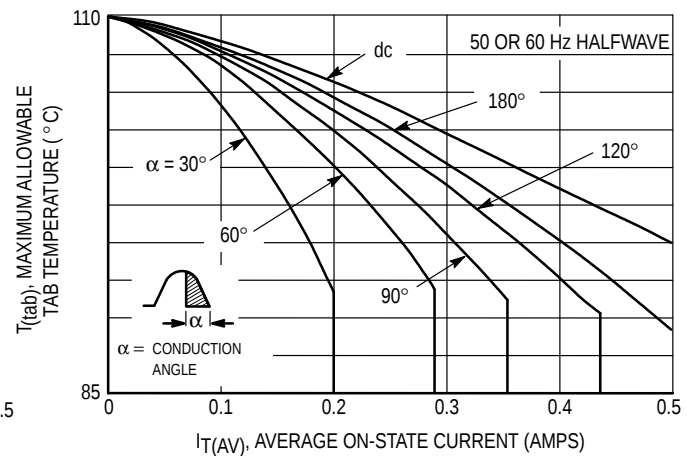


Figure 3. Junction to Ambient Thermal Resistance versus Copper Tab Area

Figure 4. Current Derating, Minimum Pad Size
Reference: Ambient TemperatureFigure 5. Current Derating, 1.0 cm Square Pad
Reference: Ambient TemperatureFigure 6. Current Derating, 2.0 cm Square Pad
Reference: Ambient TemperatureFigure 7. Current Derating
Reference: Anode Tab

MCR08BT1 Series

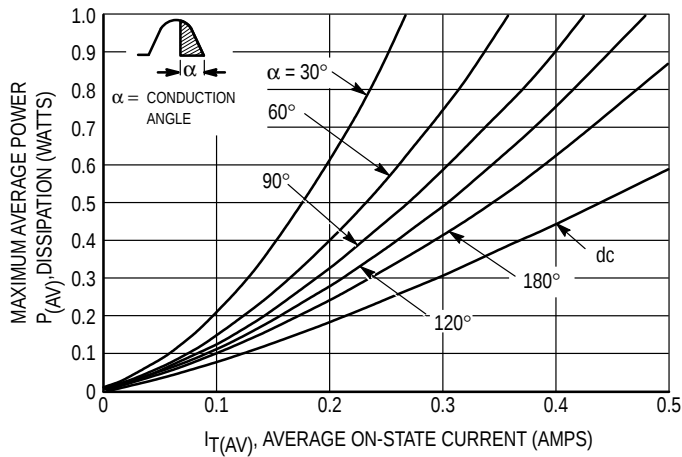


Figure 8. Power Dissipation

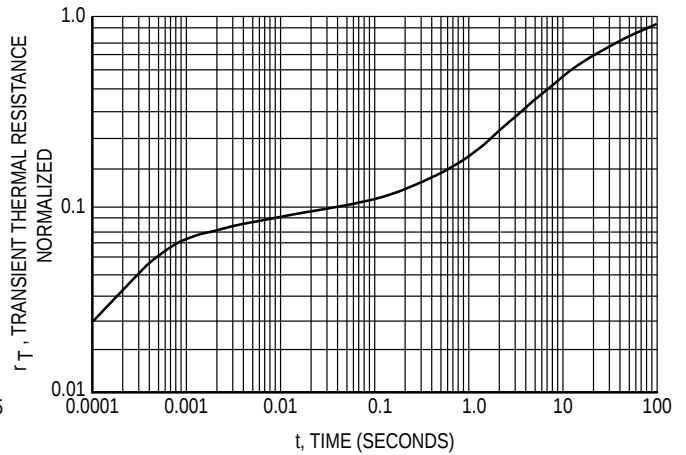


Figure 9. Thermal Response Device Mounted on Figure 1 Printed Circuit Board

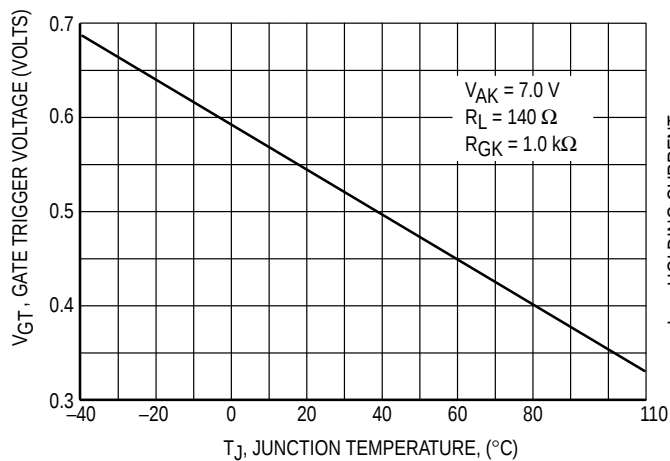


Figure 10. Typical Gate Trigger Voltage versus Junction Temperature

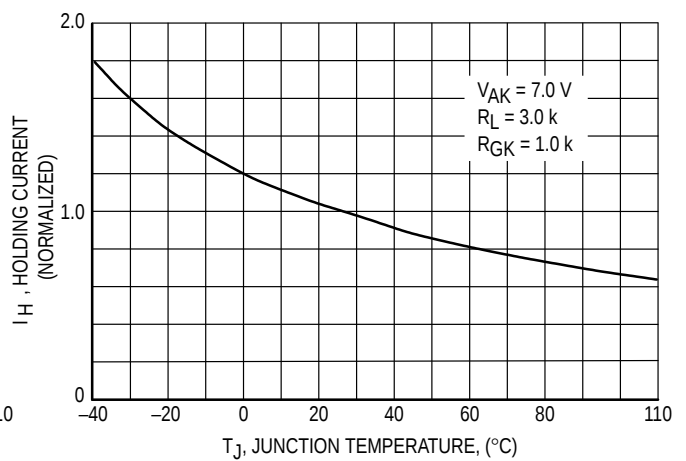


Figure 11. Typical Normalized Holding Current versus Junction Temperature

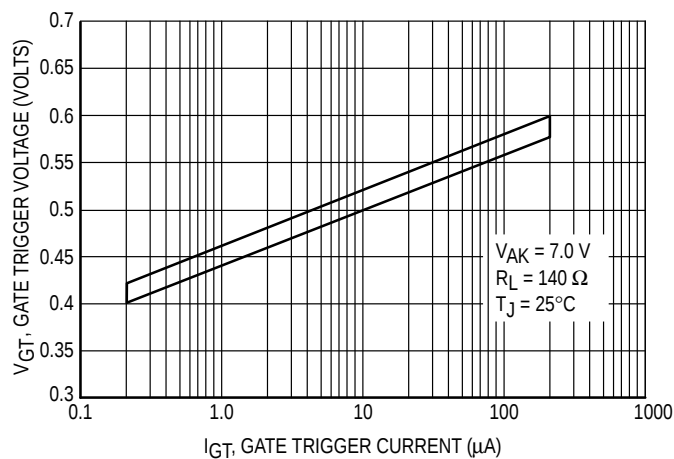


Figure 12. Typical Range of V_{GT} versus Measured I_{GT}

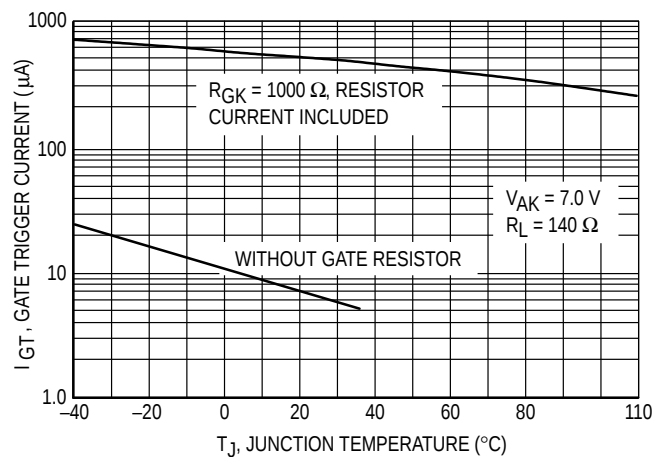


Figure 13. Typical Gate Trigger Current versus Junction Temperature

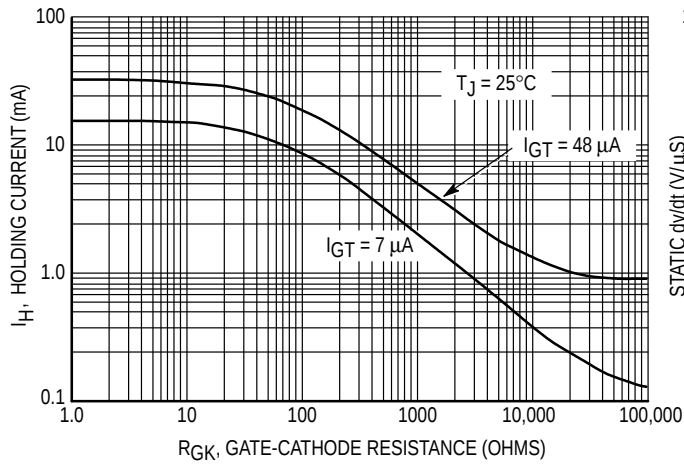


Figure 14. Holding Current Range versus Gate-Cathode Resistance

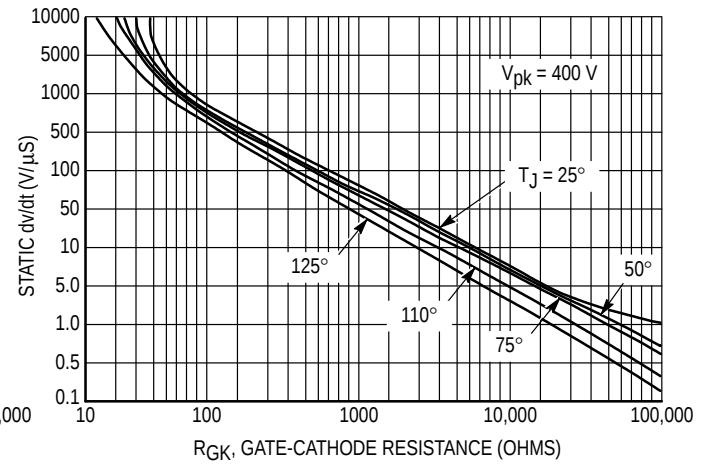


Figure 15. Exponential Static dv/dt versus Junction Temperature and Gate-Cathode Termination Resistance

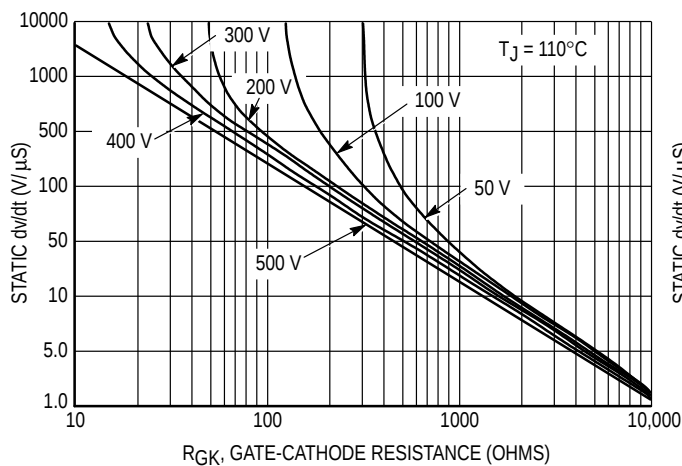


Figure 16. Exponential Static dv/dt versus Peak Voltage and Gate-Cathode Termination Resistance

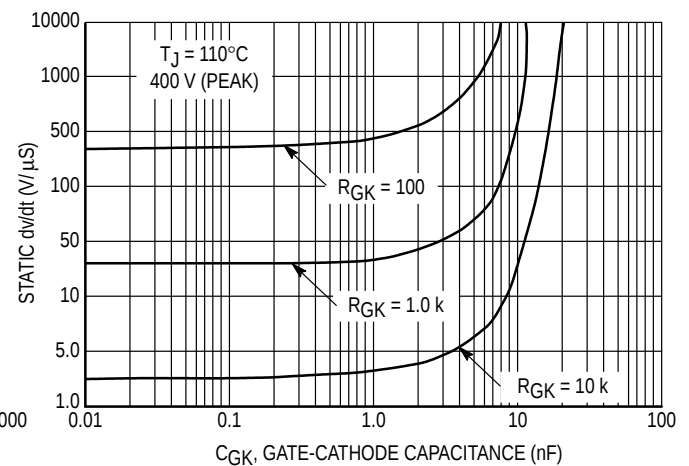


Figure 17. Exponential Static dv/dt versus Gate-Cathode Capacitance and Resistance

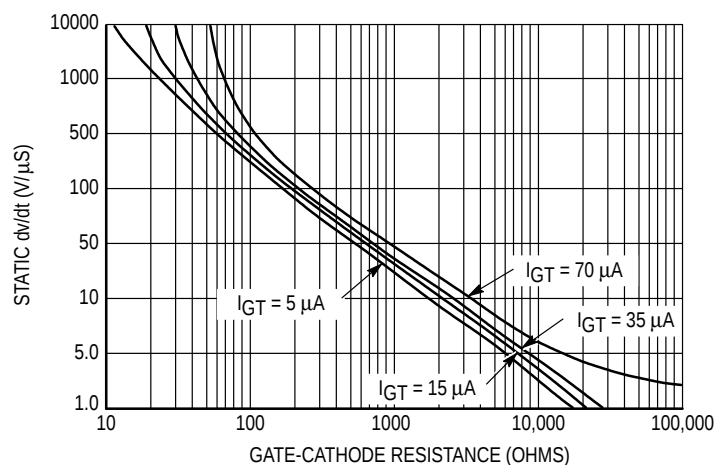
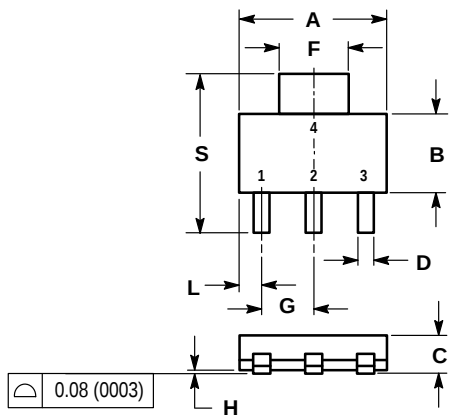
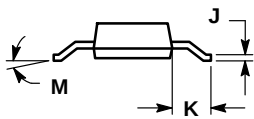


Figure 18. Exponential Static dv/dt versus Gate-Cathode Termination Resistance and Product Trigger Current Sensitivity

PACKAGE DIMENSIONS



STYLE 10:
PIN 1. CATHODE
2. ANODE
3. GATE
4. ANODE



NOTES:
2 DIMENSIONING AND TOLERANCING PER ANSI
Y14.5M, 1982.
3 CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.249	0.263	6.30	6.70
B	0.130	0.145	3.30	3.70
C	0.060	0.068	1.50	1.75
D	0.024	0.035	0.60	0.89
F	0.115	0.126	2.90	3.20
G	0.087	0.094	2.20	2.40
H	0.0008	0.0040	0.020	0.100
J	0.009	0.014	0.24	0.35
K	0.060	0.078	1.50	2.00
L	0.033	0.041	0.85	1.05
M	0 °	10 °	0 °	10 °
S	0.264	0.287	6.70	7.30

CASE 318E-04
(SOT-223)

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.

Literature Distribution Centers:
USA: Motorola Literature Distribution; P.O. Box 20912; Phoenix, Arizona 85036.
EUROPE: Motorola Ltd.; European Literature Centre; 88 Tanners Drive, Blakelands, Milton Keynes, MK14 5BP, England.
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.

