

**SOT-223 SCR**  
**Silicon Controlled Rectifiers**  
**Reverse Blocking Triode Thyristors**

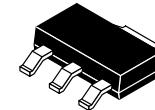
PNPN devices designed for line powered consumer applications such as relay and lamp drivers, small motor controls, gate drivers for larger thyristors, and sensing and detection circuits. Supplied in surface mount package for use in automated manufacturing.

- 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

**MCR08BT1**  
**Series\***

\*Motorola preferred devices

**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 <sup>(1)</sup> (1/2 Sine Wave, $R_{GK} = 1000 \Omega$ , $T_J = 25$ to $110^\circ\text{C}$ )	$V_{DRM}$ , $V_{RRM}$		Volts
	MCR08BT1	200	
	MCR08DT1	400	
	MCR08MT1	600	
On-State Current RMS ( $T_C = 80^\circ\text{C}$ )	$I_{T(RMS)}$	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	$\text{A}^2\text{s}$
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.

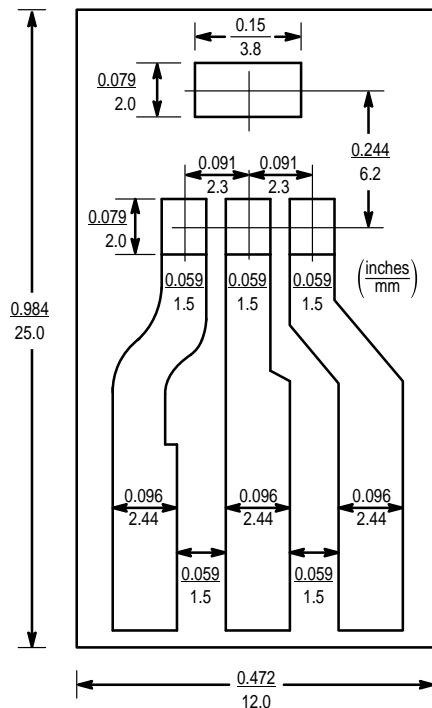
**Preferred** devices are Motorola recommended choices for future use and best overall value.

## 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 ( $V_{AK}$ = Rated $V_{DRM}$ 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	$\mu\text{A}$ $\mu\text{A}$
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	$\mu\text{A}$
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 ( $V_{pk}$ = 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

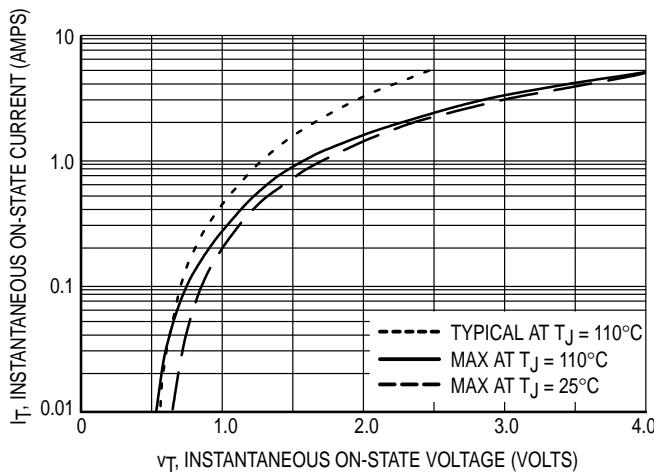


Figure 2. On-State Characteristics

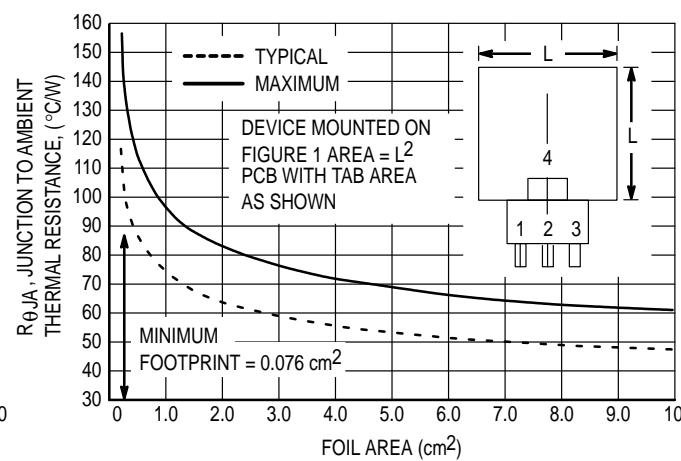


Figure 3. Junction to Ambient Thermal Resistance versus Copper Tab Area

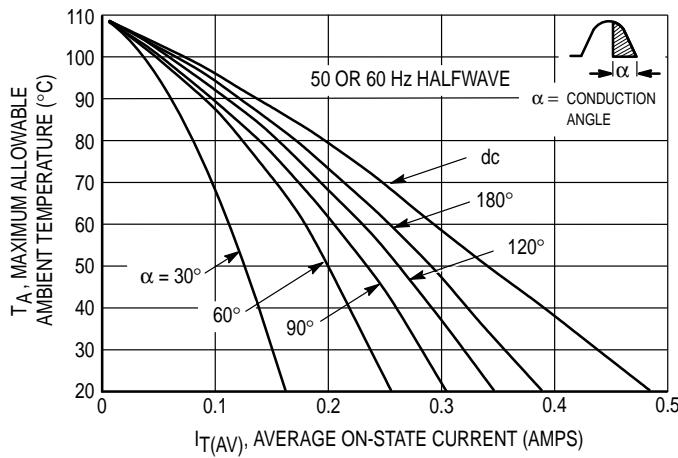


Figure 4. Current Derating, Minimum Pad Size Reference: Ambient Temperature

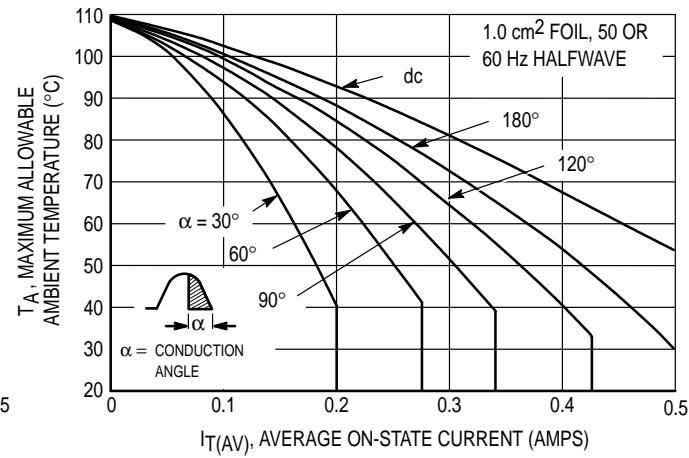


Figure 5. Current Derating, 1.0 cm Square Pad Reference: Ambient Temperature

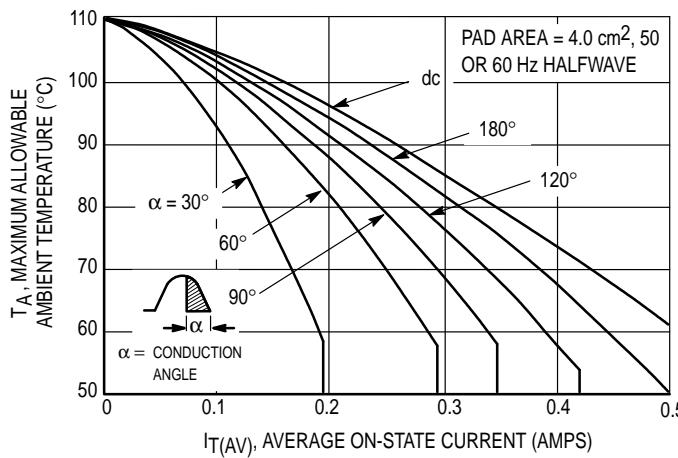


Figure 6. Current Derating, 2.0 cm Square Pad Reference: Ambient Temperature

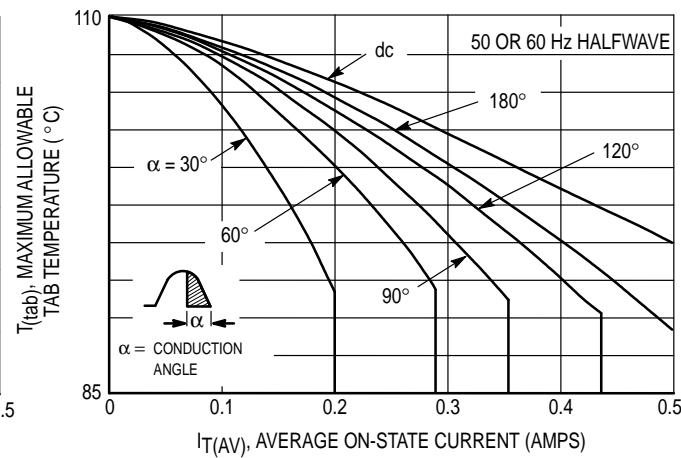
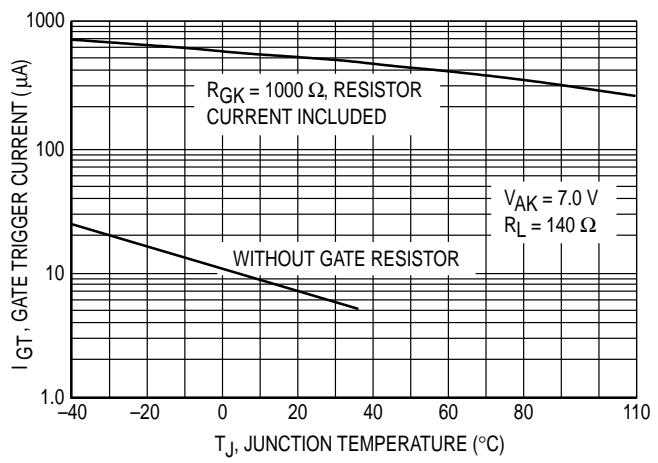
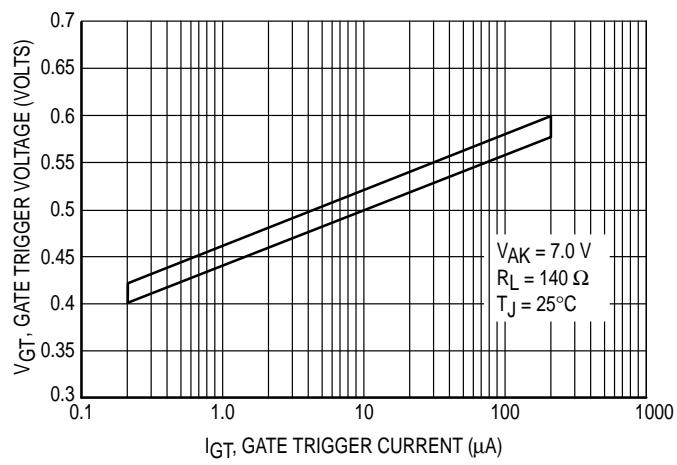
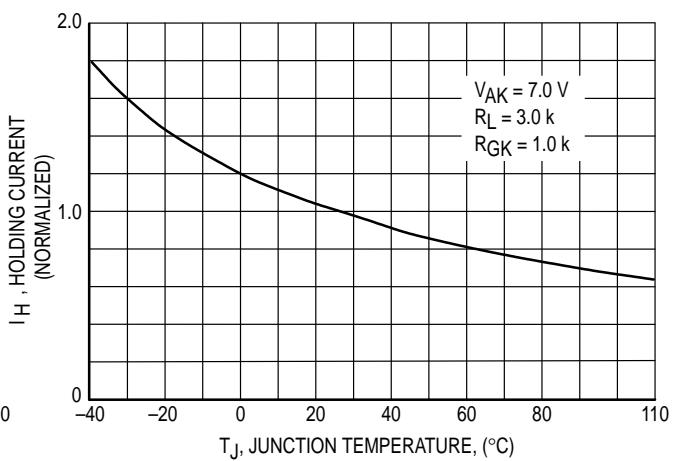
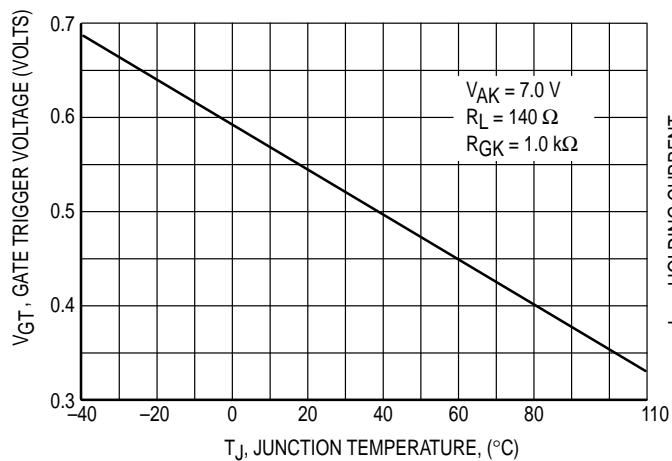
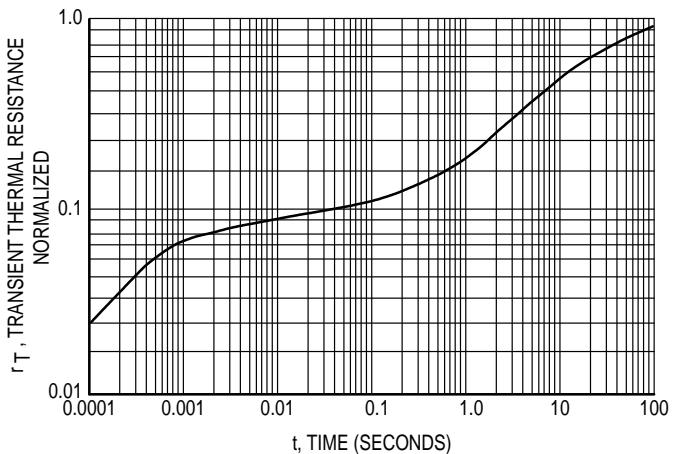
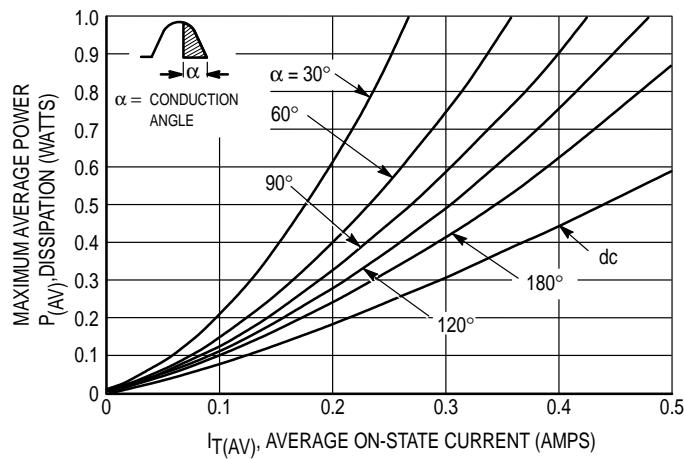
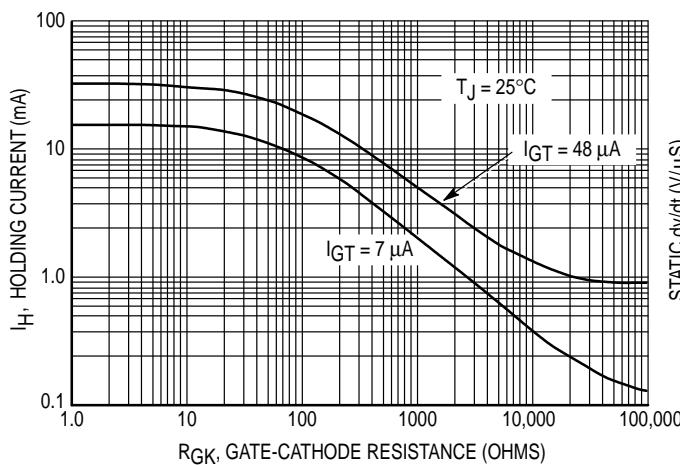


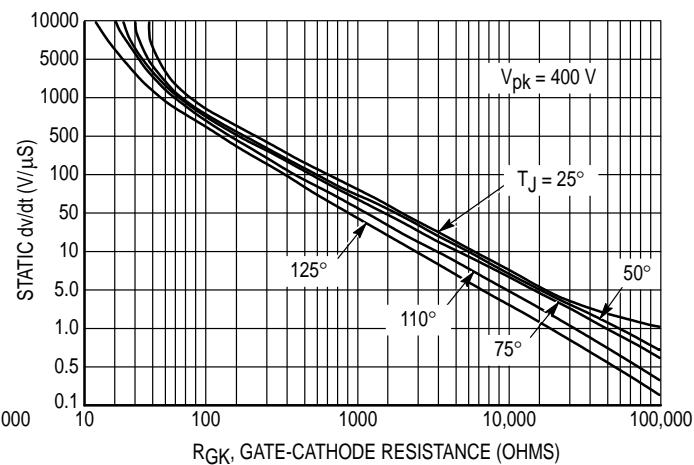
Figure 7. Current Derating Reference: Anode Tab

## MCR08BT1 Series

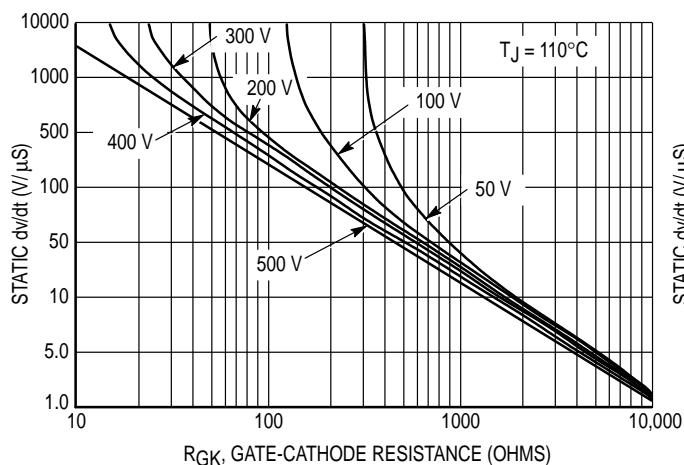




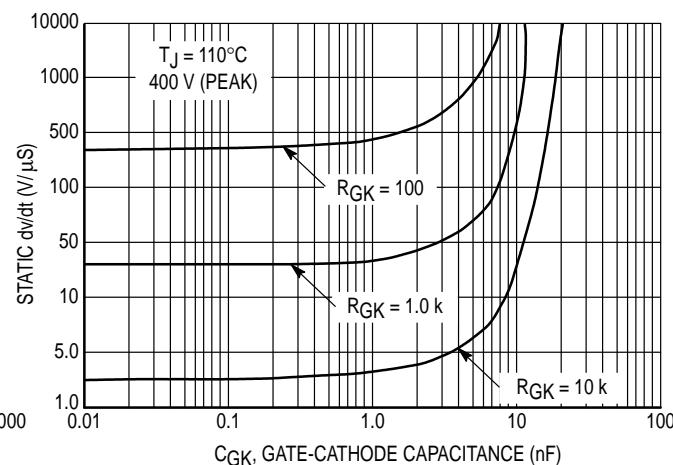
**Figure 14. Holding Current Range versus Gate-Cathode Resistance**



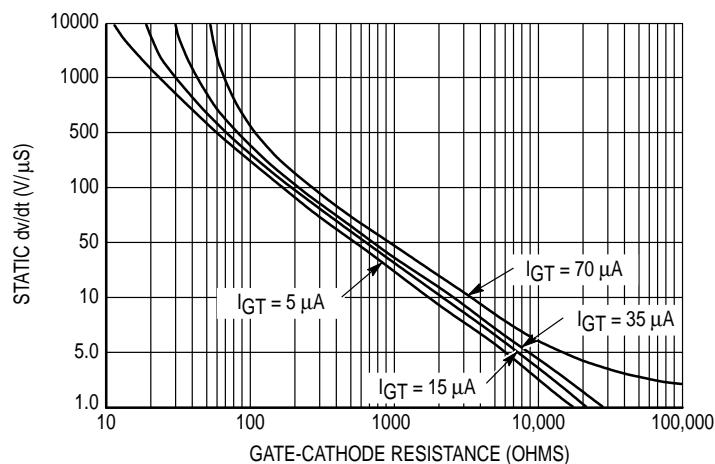
**Figure 15. Exponential Static  $dv/dt$  versus Junction Temperature and Gate-Cathode Termination Resistance**



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

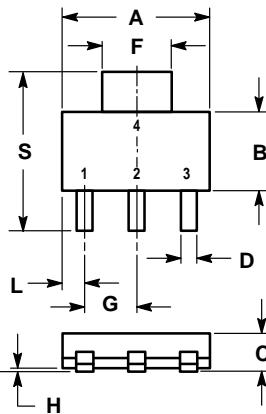


**Figure 17. Exponential Static  $dv/dt$  versus Gate-Cathode Capacitance and Resistance**

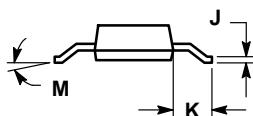


**Figure 18. Exponential Static  $dv/dt$  versus Gate-Cathode Termination Resistance and Product Trigger Current Sensitivity**

## 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)

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**MOTOROLA**



MCR08BT1/D

