Jameco Part Number 2020478

MCR08B, MCR08M

Preferred Device

Sensitive Gate Silicon Controlled Rectifiers

Reverse Blocking 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.

Features

- Sensitive Gate Trigger Current
- Blocking Voltage to 600 V
- Glass Passivated Surface for Reliability and Uniformity
- Surface Mount Package
- Pb−Free Packages are Available

MAXIMUM RATINGS (T_J = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Peak Repetitive Off−State Voltage (Note 1) (Sine Wave, R_{GK} = 1000 Ω T_J = 25 to 110°C) MCR08BT1 MCR08MT1	V_{DRM}, V_{RRM}	200 600	V
On-State Current RMS (All Conduction Angles; T_C = 80°C)	$I_{T(RMS)}$	0.8	A
Peak Non-repetitive Surge Current (1/2 Cycle Sine Wave, 60 Hz, T_C = 25°C)	I_{TSM}	8.0	A
Circuit Fusing Considerations (t = 8.3 ms)	I^2t	0.4	A^2s
Forward Peak Gate Power (T_C = 80°C, t = 1.0 μs)	P_{GM}	0.1	W
Average Gate Power (T_C = 80°C, t = 8.3 ms)	$P_{G(AV)}$	0.01	W
Operating Junction Temperature Range	T_J	−40 to +110	°C
Storage Temperature Range	T_{stg}	−40 to +150	°C

THERMAL CHARACTERISTICS

Rating	Symbol	Value	Unit
Thermal Resistance, Junction−to−Ambient PCB Mounted per Figure 1	$R_{\theta JA}$	156	°C/W
Thermal Resistance, Junction−to−Tab Measured on Anode Tab Adjacent to Epoxy	$R_{\theta JT}$	25	°C/W
Maximum Device Temperature for Soldering Purposes (for 10 Seconds Maximum)	T_L	260	°C

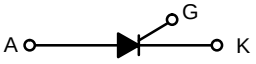
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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

ON Semiconductor®

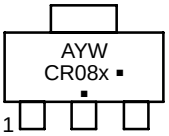
http://onsemi.com

SCRs
0.8 AMPERES RMS
200 thru 600 VOLTS



MARKING DIAGRAM

SOT−223
CASE 318E
STYLE 10



CR08x = Device Code
x = B or M
A = Assembly Location
Y = Year
W = Work Week
▪ = Pb−Free Package
(Note: Microdot may be in either location)

PIN ASSIGNMENT	
1	Cathode
2	Anode
3	Gate
4	Anode

ORDERING INFORMATION

Device	Package	Shipping†
MCR08BT1	SOT−223	1000/Tape &Reel
MCR08BT1G	SOT−223 (Pb−Free)	1000/Tape &Reel
MCR08MT1	SOT−223	1000/Tape & Reel
MCR08MT1G	SOT−223 (Pb−Free)	1000/Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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

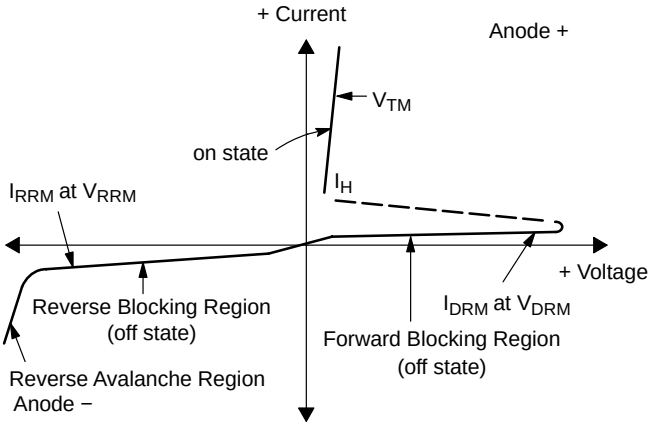
ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

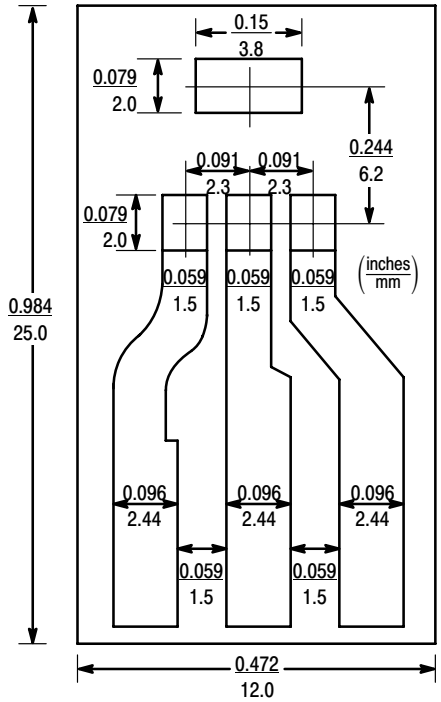
Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Peak Repetitive Forward or Reverse Blocking Current (Note 2) (V_{AK} = Rated V_{DRM} or V_{RRM}, R_{GK} = 1000 Ω)	I_{DRM}, I_{RRM}				
T_J = 25°C		–	–	10	μA
T_J = 110°C		–	–	200	μA
ON CHARACTERISTICS					
Peak Forward On-State Voltage (Note 1) (I_T = 1.0 A Peak)	V_{TM}	–	–	1.7	V
Gate Trigger Current (Continuous dc) (Note 3) (V_{AK} = 12 Vdc, R_L = 100 Ω)	I_{GT}	–	–	200	μA
Holding Current (Note 3) (V_{AK} = 12 Vdc, Initiating Current = 20 mA)	I_H	–	–	5.0	mA
Gate Trigger Voltage (Continuous dc) (Note 3) (V_{AK} = 12 Vdc, R_L = 100 Ω)	V_{GT}	–	–	0.8	V
DYNAMIC CHARACTERISTICS					
Critical Rate-of-Rise of Off State Voltage (V_{pk} = Rated V_{DRM}, T_C = 110°C, R_{GK} = 1000 Ω, Exponential Method)	dv/dt	10	–	–	V/μs

2. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.
3. R_{GK} = 1000 Ω is included in measurement.
4. R_{GK} is not included in measurement.

Symbol	Parameter
V_{DRM}	Peak Repetitive Off State Forward Voltage
I_{DRM}	Peak Forward Blocking Current
V_{RRM}	Peak Repetitive Off State Reverse Voltage
I_{RRM}	Peak Reverse Blocking Current
V_{TM}	Peak On State Voltage
I_H	Holding Current

Voltage Current Characteristic of SCR





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

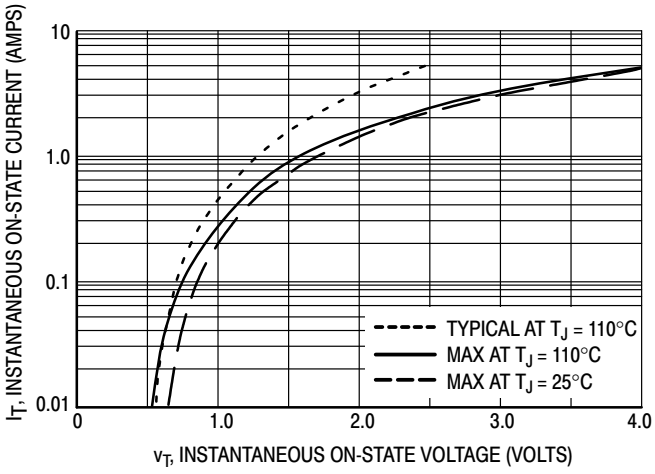


Figure 2. On-State Characteristics

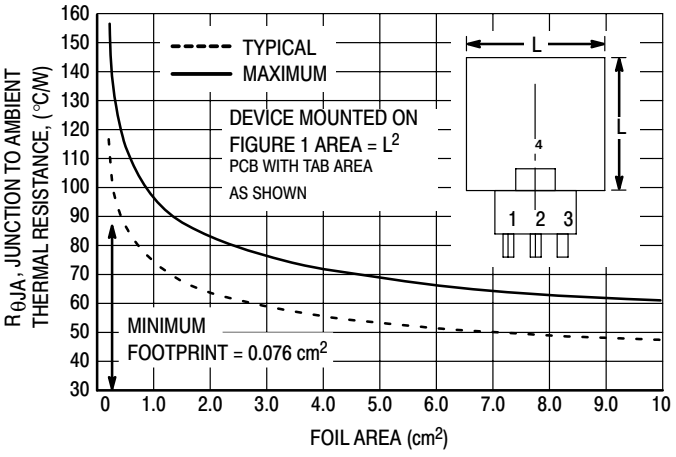


Figure 3. Junction to Ambient Thermal Resistance versus Copper Tab Area

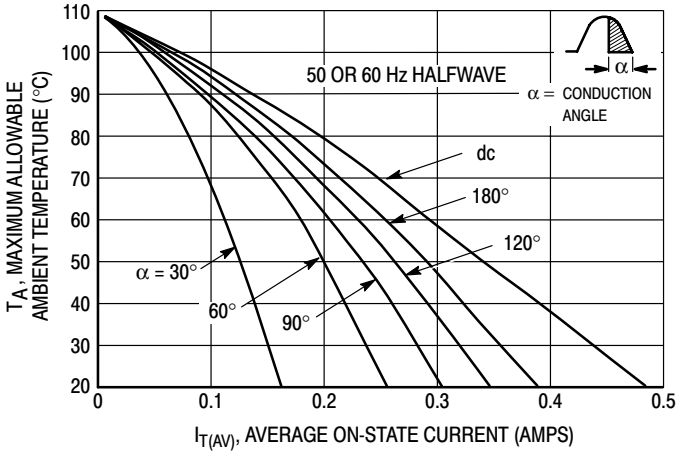


Figure 4. Current Derating, Minimum Pad Size Reference: Ambient Temperature

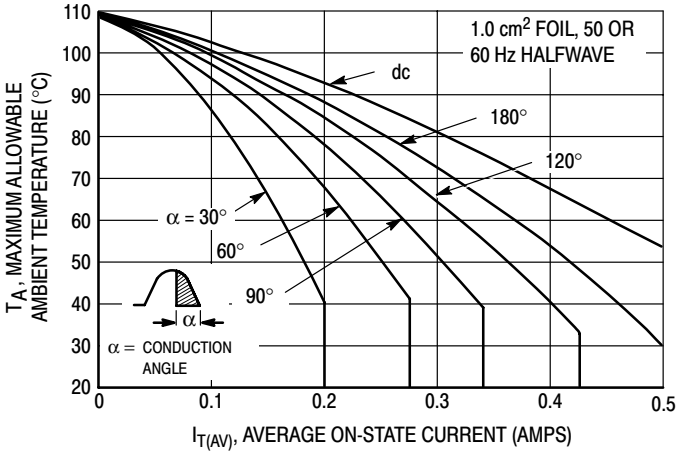


Figure 5. Current Derating, 1.0 cm Square Pad Reference: Ambient Temperature

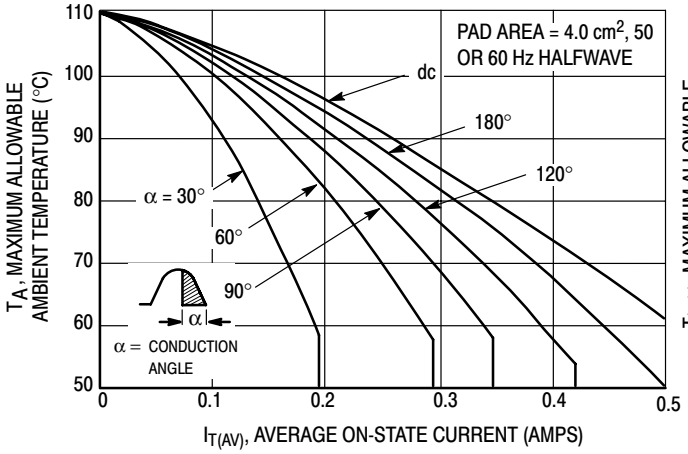


Figure 6. Current Derating, 2.0 cm Square Pad Reference: Ambient Temperature

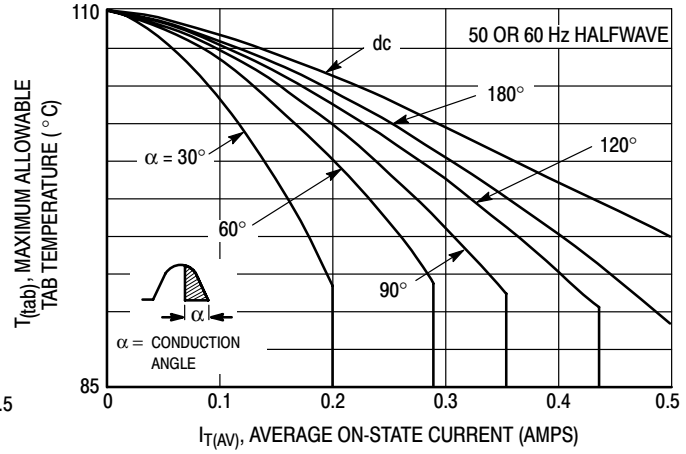


Figure 7. Current Derating Reference: Anode Tab

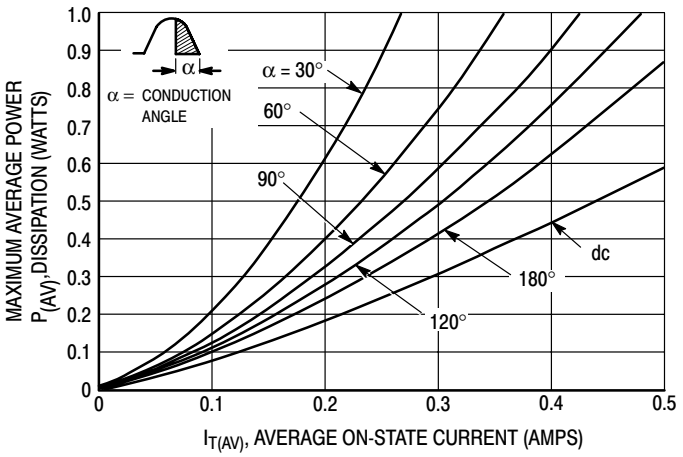


Figure 8. Power Dissipation

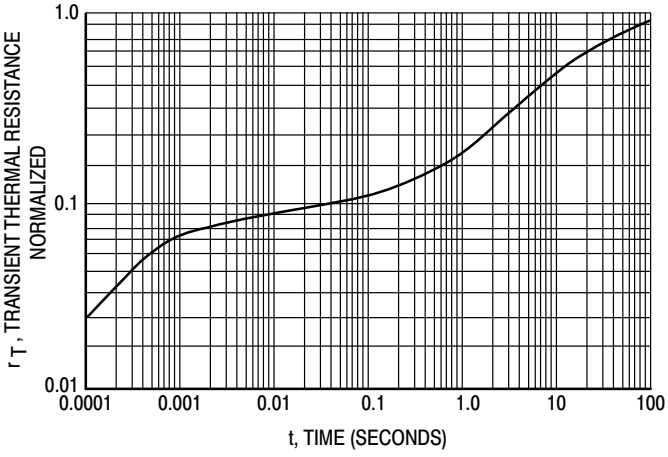


Figure 9. Thermal Response Device Mounted on Figure 1 Printed Circit Board

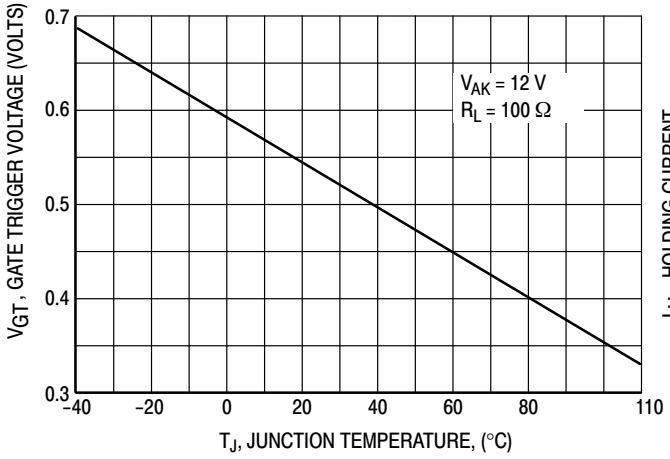


Figure 10. Typical Gate Trigger Voltage versus Junction Temperature

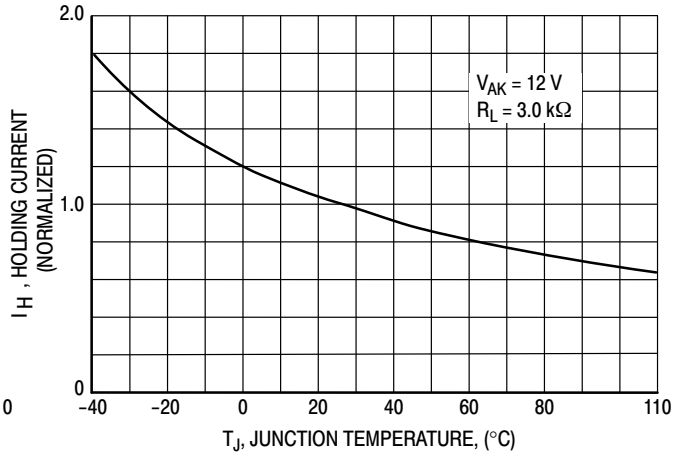


Figure 11. Typical Normalized Holding Current versus Junction Temperature

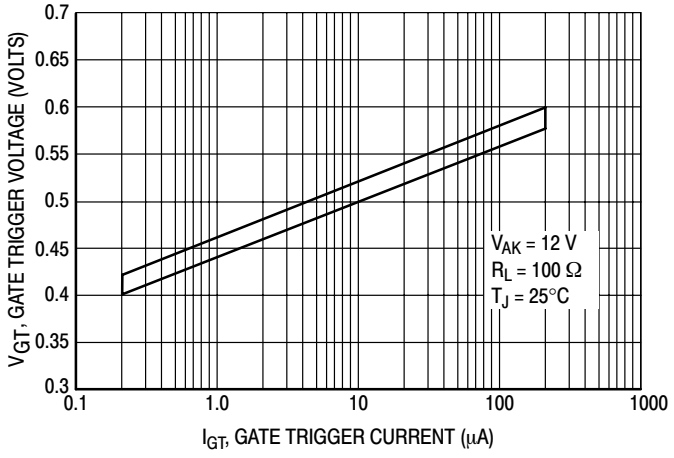


Figure 12. Typical Range of V_{GT} versus Measured I_{GT}

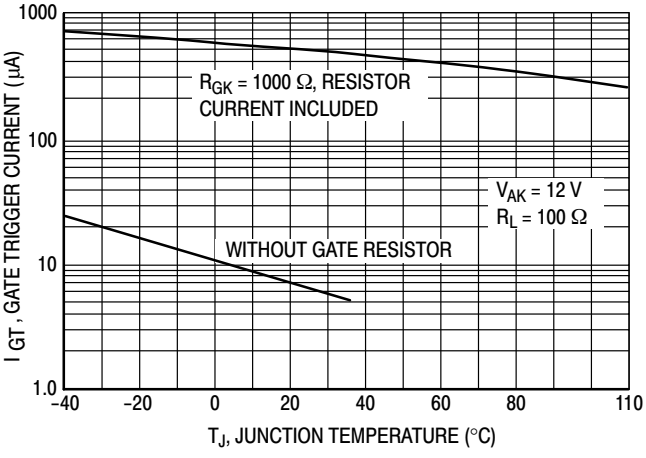


Figure 13. Typical Gate Trigger Current versus Junction Temperature

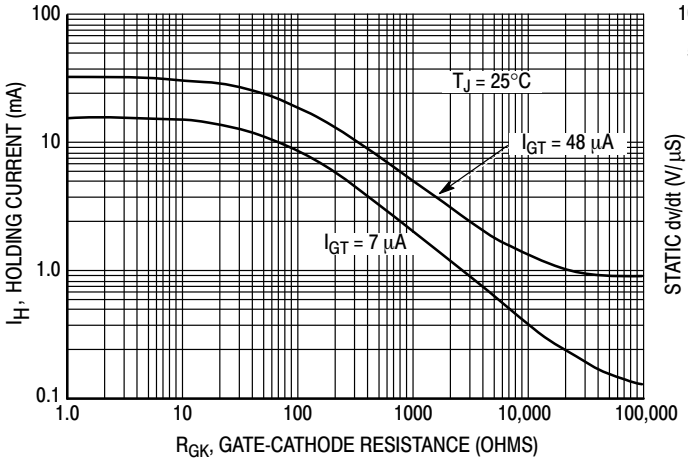


Figure 14. Holding Current Range versus Gate-Cathode Resistance

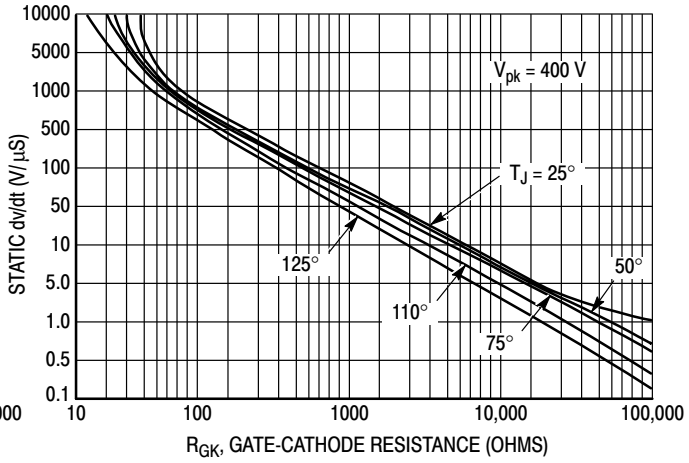


Figure 15. Exponential Static dv/dt versus Junction Temperature and Gate-Cathode Termination Resistance

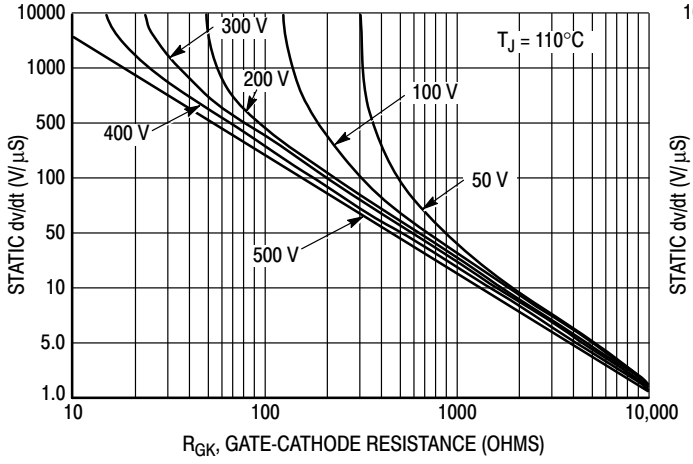


Figure 16. Exponential Static dv/dt versus Peak Voltage and Gate-Cathode Termination Resistance

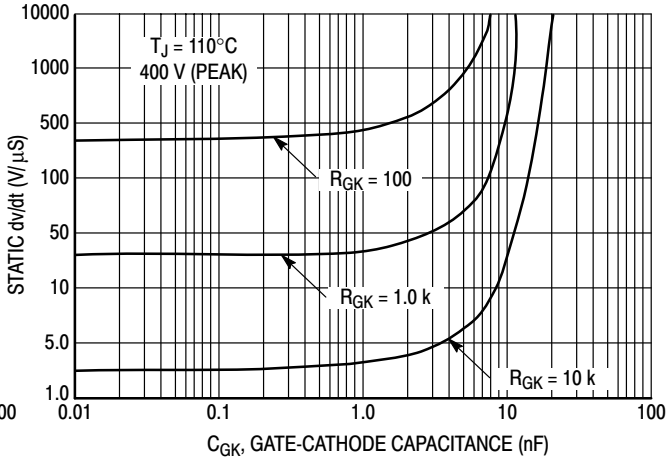


Figure 17. Exponential Static dv/dt versus Gate-Cathode Capacitance and Resistance

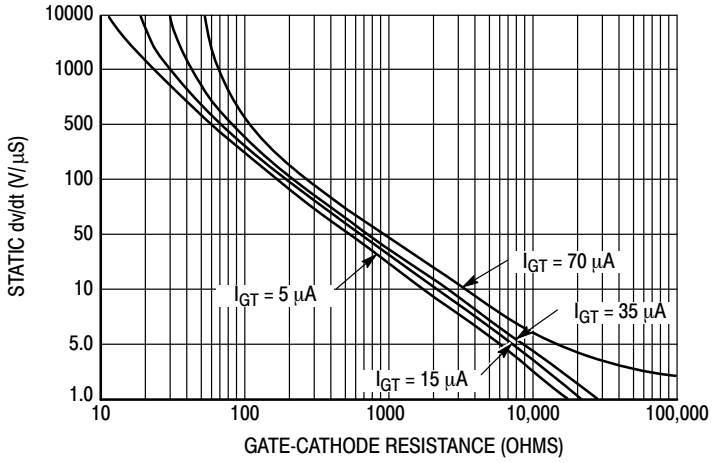
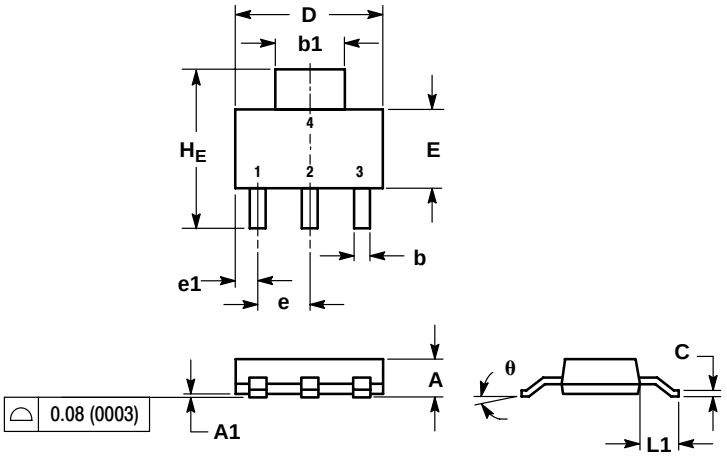


Figure 18. Exponential Static dv/dt versus Gate-Cathode Termination Resistance and Product Trigger Current Sensitivity

PACKAGE DIMENSIONS

SOT−223 (TO−261)
CASE 318E−04
ISSUE L

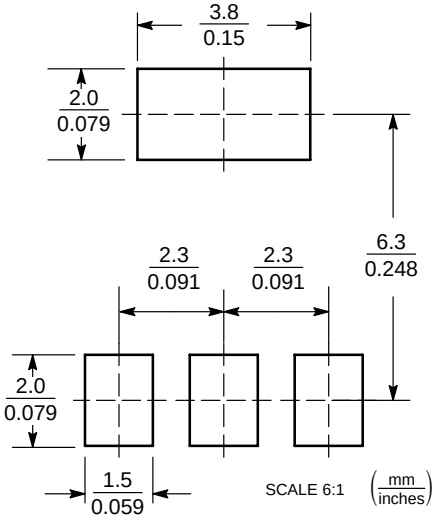


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
A	1.50	1.63	1.75	0.060	0.064	0.068
A1	0.02	0.06	0.10	0.001	0.002	0.004
b	0.60	0.75	0.89	0.024	0.030	0.035
b1	2.90	3.06	3.20	0.115	0.121	0.126
c	0.24	0.29	0.35	0.009	0.012	0.014
D	6.30	6.50	6.70	0.249	0.256	0.263
E	3.30	3.50	3.70	0.130	0.138	0.145
e	2.20	2.30	2.40	0.087	0.091	0.094
e1	0.85	0.94	1.05	0.033	0.037	0.041
L1	1.50	1.75	2.00	0.060	0.069	0.078
H_E	6.70	7.00	7.30	0.264	0.276	0.287
θ	0°	–	10°	0°	–	10°

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

SOLDERING FOOTPRINT*



*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
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Fax: 480−829−7709 or 800−344−3867 Toll Free USA/Canada
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