

MCR69-2, MCR69-3

Silicon Controlled Rectifiers Reverse Blocking Thyristors

Designed for overvoltage protection in crowbar circuits.

- Glass-Passivated Junctions for Greater Parameter Stability and Reliability
- Center-Gate Geometry for Uniform Current Spreading Enabling High Discharge Current
- Small Rugged, Thermowatt Package Constructed for Low Thermal Resistance and Maximum Power Dissipation and Durability
- High Capacitor Discharge Current, 750 Amps
- Device Marking: Logo, Device Type, e.g., MCR69-2, Date Code

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

Rating	Symbol	Value	Unit
Peak Repetitive Off-State Voltage ⁽¹⁾ ($T_J = -40$ to $+125^\circ\text{C}$, Gate Open) MCR69-2 MCR69-3	V_{DRM} , V_{RRM}	50 100	Volts
Peak Discharge Current ⁽²⁾	I_{TM}	750	Amps
On-State RMS Current (180° Conduction Angles; $T_C = 85^\circ\text{C}$)	$I_{T(RMS)}$	25	Amps
Average On-State Current (180° Conduction Angles; $T_C = 85^\circ\text{C}$)	$I_{T(AV)}$	16	Amps
Peak Non-Repetitive Surge Current (1/2 Cycle, Sine Wave, 60 Hz, $T_J = 125^\circ\text{C}$)	I_{TSM}	300	Amps
Circuit Fusing Considerations ($t = 8.3$ ms)	I^2t	375	A^2s
Forward Peak Gate Current ($t \leq 1.0$ μs , $T_C = 85^\circ\text{C}$)	I_{GM}	2.0	Amps
Forward Peak Gate Power ($t \leq 1.0$ μs , $T_C = 85^\circ\text{C}$)	P_{GM}	20	Watts
Forward Average Gate Power ($t = 8.3$ ms, $T_C = 85^\circ\text{C}$)	$P_{G(AV)}$	0.5	Watt
Operating Junction Temperature Range	T_J	-40 to +125	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-40 to +150	$^\circ\text{C}$
Mounting Torque	—	8.0	in. lb.

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

(2) Ratings apply for $t_w = 1$ ms. See Figure 1 for I_{TM} capability for various duration of an exponentially decaying current waveform, t_w is defined as 5 time constants of an exponentially decaying current pulse.

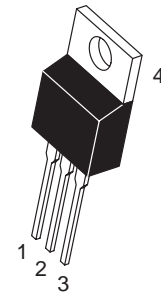
(3) Test Conditions: $I_G = 150$ mA, $V_D = \text{Rated } V_{DRM}$, $I_{TM} = \text{Rated Value}$, $T_J = 125^\circ\text{C}$.



ON Semiconductor

<http://onsemi.com>

SCRs
25 AMPERES RMS
50 thru 100 VOLTS



TO-220AB
CASE 221A
STYLE 3

PIN ASSIGNMENT	
1	Cathode
2	Anode
3	Gate
4	Anode

ORDERING INFORMATION

Device	Package	Shipping
MCR69-2	TO220AB	500/Box
MCR69-3	TO220AB	500/Box

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THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.5	$^{\circ}C/W$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	60	$^{\circ}C/W$
Maximum Lead Temperature for Soldering Purposes 1/8" from Case for 10 Seconds	T_L	260	$^{\circ}C$

ELECTRICAL CHARACTERISTICS ($T_C = 25^{\circ}C$ unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Peak Repetitive Forward or Reverse Blocking Current ($V_{AK} = \text{Rated } V_{DRM} \text{ or } V_{RRM}$, Gate Open)	I_{DRM}, I_{RRM}	—	—	10	μA
$T_J = 25^{\circ}C$		—	—	2.0	$m A$
$T_J = 125^{\circ}C$		—	—		

ON CHARACTERISTICS

Peak Forward On-State Voltage ($I_{TM} = 50 A$) ⁽¹⁾ ($I_{TM} = 750 A, t_w = 1 ms$) ⁽²⁾	V_{TM}	—	—	1.8	Volts
		—	6.0	—	
Gate Trigger Current (Continuous dc) ($V_D = 12 V, R_L = 100 \Omega$)	I_{GT}	2.0	7.0	30	$m A$
Gate Trigger Voltage (Continuous dc) ($V_D = 12 V, R_L = 100 \Omega$)	V_{GT}	—	0.65	1.5	Volts
Gate Non-Trigger Voltage ($V_D = 12 V_{dc}, R_L = 100 \Omega, T_J = 125^{\circ}C$)	V_{GD}	0.2	0.40	—	Volts
Holding Current ($V_D = 12 V$, Initiating Current = 200 $m A$, Gate Open)	I_H	3.0	15	50	$m A$
Latching Current ($V_D = 12 V_{dc}, I_G = 150 m A$)	I_L	—	—	60	$m A$
Gate Controlled Turn-On Time ⁽³⁾ ($V_D = \text{Rated } V_{DRM}, I_G = 150 m A$) ($I_{TM} = 50 A \text{ Peak}$)	t_{gt}	—	1.0	—	μs

DYNAMIC CHARACTERISTICS

Critical Rate-of-Rise of Off-State Voltage ($V_D = \text{Rated } V_{DRM}$, Gate Open, Exponential Waveform, $T_J = 125^{\circ}C$)	dv/dt	10	—	—	$V/\mu s$
Critical Rate-of-Rise of On-State Current $I_G = 150 m A$	di/dt	—	—	100	$A/\mu s$
					$T_J = 125^{\circ}C$

(1) Pulse duration $\leq 300 \mu s$, duty cycle $\leq 2\%$.

(2) Ratings apply for $t_w = 1 ms$. See Figure 1 for I_{TM} capability for various durations of an exponentially decaying current waveform. t_w is defined as 5 time constants of an exponentially decaying current pulse.

(3) The gate controlled turn-on time in a crowbar circuit will be influenced by the circuit inductance.

Voltage Current Characteristic of SCR

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

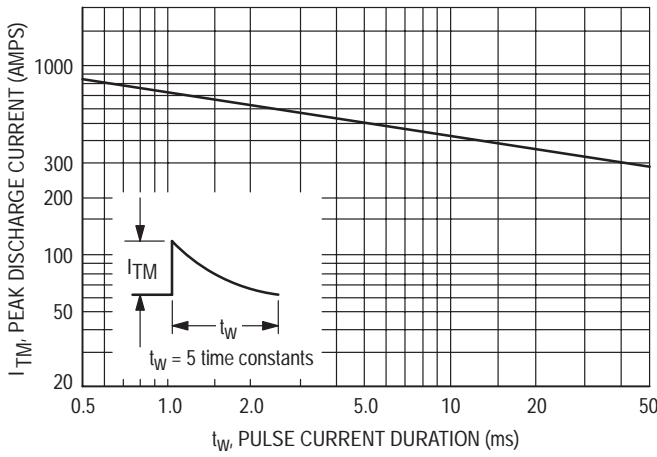
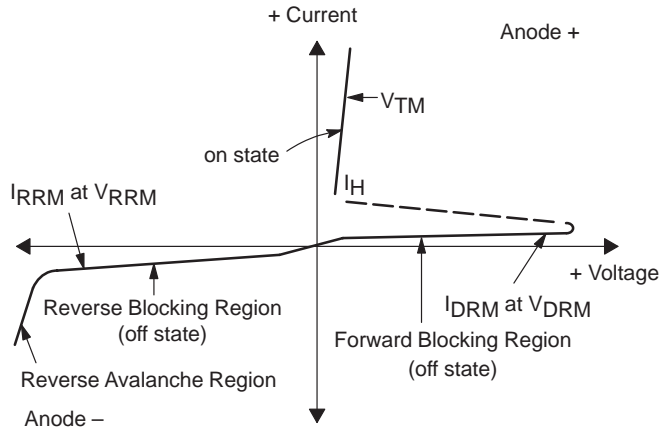


Figure 1. Peak Capacitor Discharge Current

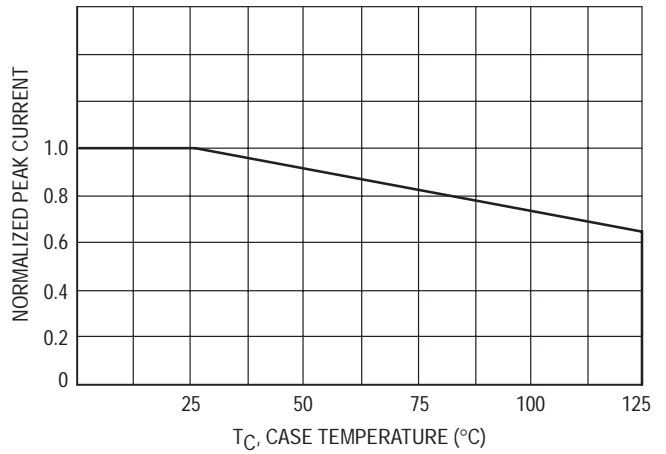


Figure 2. Peak Capacitor Discharge Current Derating

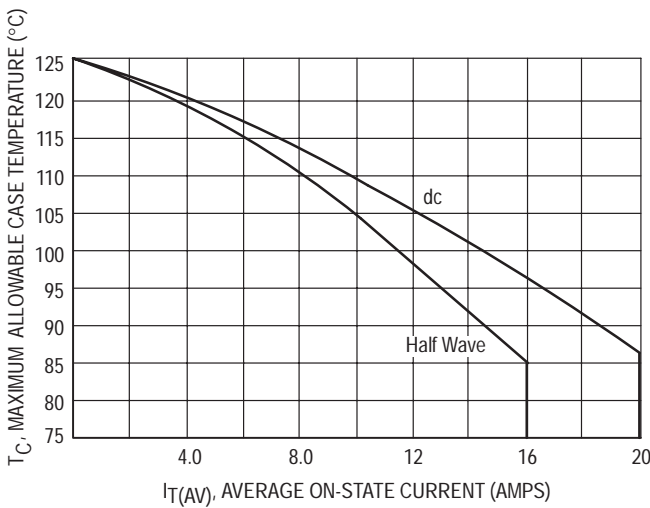


Figure 3. Current Derating

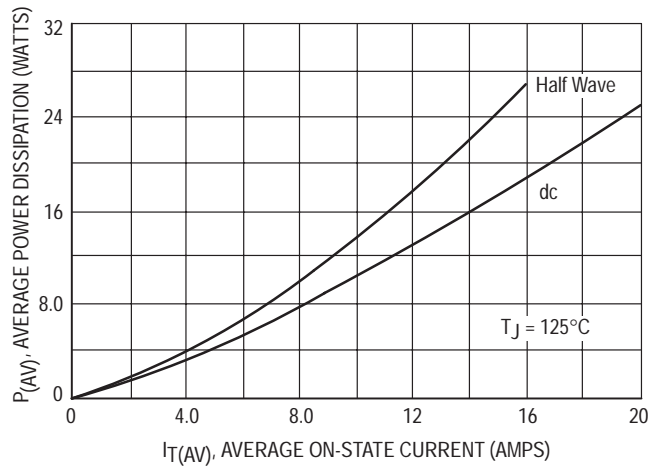


Figure 4. Maximum Power Dissipation

MCR69-2, MCR69-3

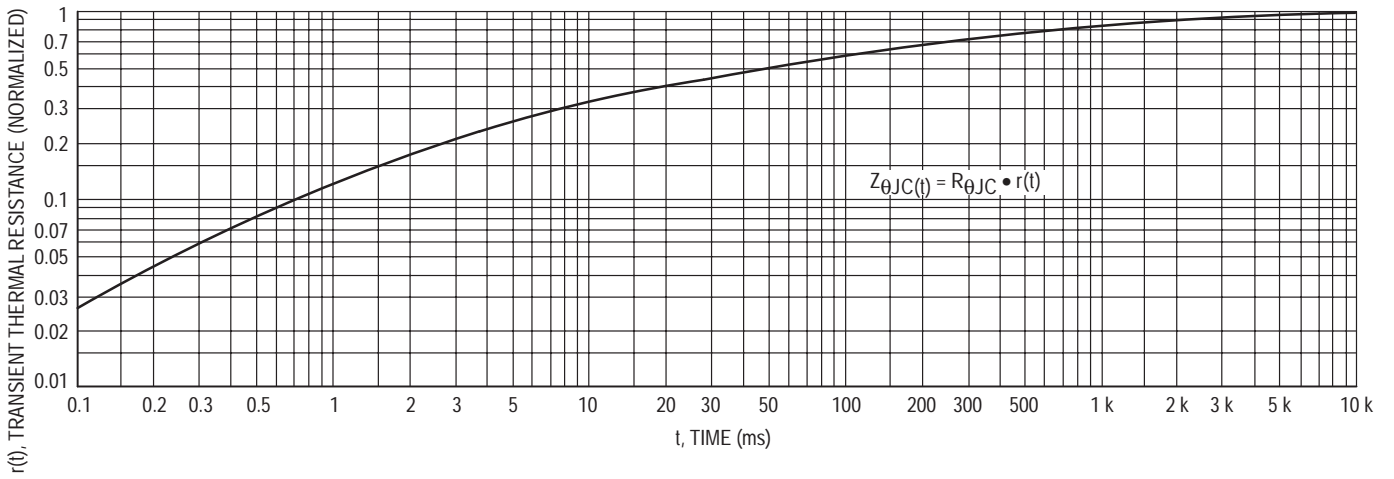


Figure 5. Thermal Response

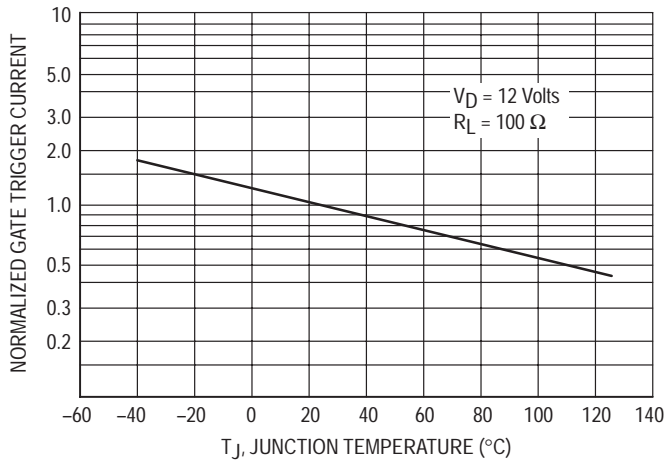


Figure 6. Gate Trigger Current

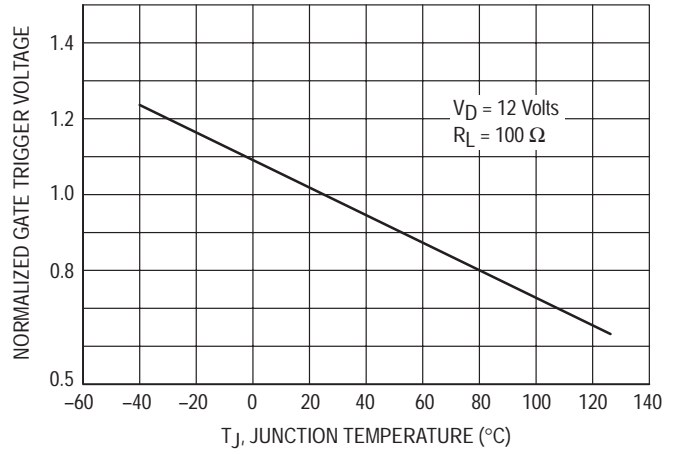


Figure 7. Gate Trigger Voltage

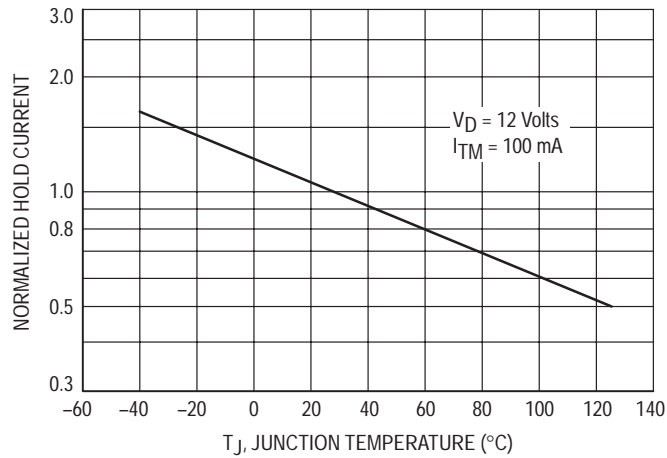
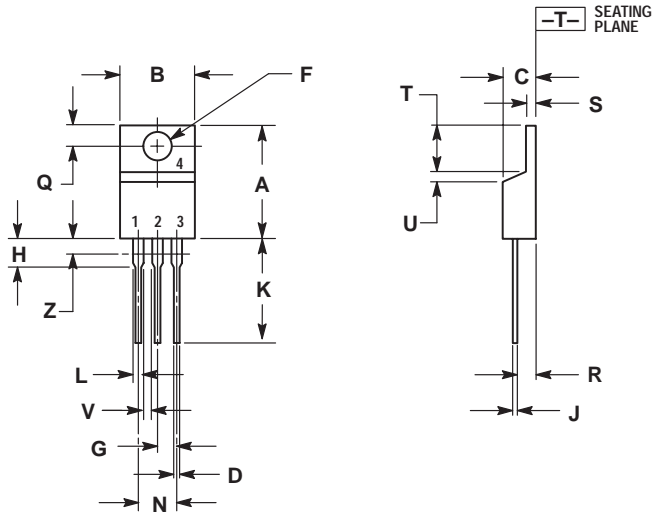


Figure 8. Holding Current

MCR69-2, MCR69-3

PACKAGE DIMENSIONS

TO-220AB
CASE 221A-07
ISSUE Z



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	0.405	9.66	10.28
C	0.160	0.190	4.07	4.82
D	0.025	0.035	0.64	0.88
F	0.142	0.147	3.61	3.73
G	0.095	0.105	2.42	2.66
H	0.110	0.155	2.80	3.93
J	0.014	0.022	0.36	0.55
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 3:

- PIN 1. CATHODE
- ANODE
- GATE
- ANODE

Notes

Notes

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