MCR68-2

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, 300 Amps
- Device Marking: Logo, Device Type, e.g., MCR68–2, Date Code

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

Rating	Symbol	Value	Unit
Peak Repetitive Off–State Voltage(1) (T_J = −40 to +125°C, Gate Open) MCR68–2	V_{DRM}, V_{RRM}	50	Volts
Peak Discharge Current(2)	I_{TM}	300	Amps
On-State RMS Current (180° Conduction Angles; T_C = 85°C)	$I_{T(RMS)}$	12	Amps
Average On-State Current (180° Conduction Angles; T_C = 85°C)	$I_{T(AV)}$	8.0	Amps
Peak Non-Repetitive Surge Current (1/2 Cycle, Sine Wave, 60 Hz, T_J = 125°C)	I_{TSM}	100	Amps
Circuit Fusing Considerations (t = 8.3 ms)	I^2t	40	A^2s
Forward Peak Gate Current (t ≤ 1.0 μs, T_C = 85°C)	I_{GM}	2.0	Amps
Forward Peak Gate Power (t ≤ 1.0 μs, T_C = 85°C)	P_{GM}	20	Watts
Forward Average Gate Power (t = 8.3 ms, T_C = 85°C)	$P_{G(AV)}$	0.5	Watt
Operating Junction Temperature Range	T_J	−40 to +125	°C
Storage Temperature Range	T_{stg}	−40 to +150	°C
Mounting Torque	—	8.0	in. lb.

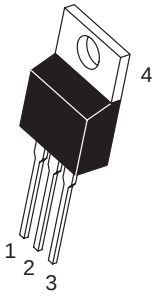
(1) V_{DRM} and V_{RRM} for all types can be applied on a continuous basis. Ratings apply for zero or negative gate voltage; however, positive gate voltage shall not be applied concurrent with negative potential on the anode. Blocking voltages shall not be tested with a constant current source such that 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.

ON Semiconductor

http://onsemi.com

SCRs
12 AMPERES RMS
50 VOLTS



TO–220AB
CASE 221A
STYLE 3

PIN ASSIGNMENT	
1	Cathode
2	Anode
3	Gate
4	Anode

ORDERING INFORMATION

Device	Package	Shipping
MCR68–2	TO220AB	500/Box

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.0	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	60	°C/W
Maximum Lead Temperature for Soldering Purposes 1/8″ from Case for 10 Seconds	T_L	260	°C

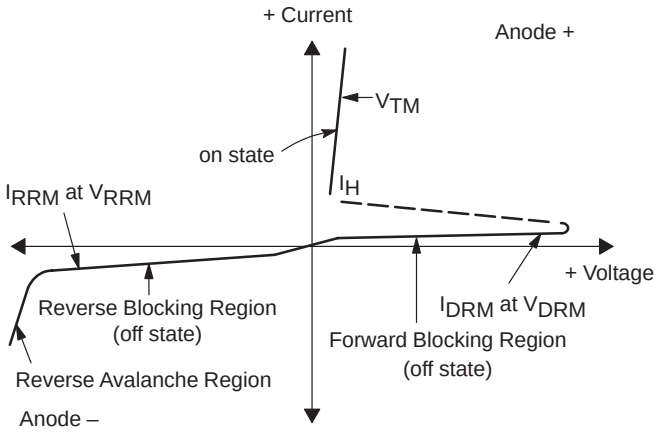
ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted.)

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Peak Repetitive Forward or Reverse Blocking Current (V_{AK} = Rated V_{DRM} or V_{RRM}, Gate Open)	T_J = 25°C T_J = 125°C	I_{DRM}, I_{RRM}	— —	— —	10 2.0	μA mA
ON CHARACTERISTICS						
Peak Forward On-State Voltage (I_{TM} = 24 A)(1) (I_{TM} = 300 A, t_w = 1 ms)(2)		V_{TM}	— —	— 6.0	2.2 —	Volts
Gate Trigger Current (Continuous dc) (V_D = 12 V, R_L = 100 Ω)		I_{GT}	2.0	7.0	30	mA
Gate Trigger Voltage (Continuous dc) (V_D = 12 V, R_L = 100 Ω)		V_{GT}	—	0.65	1.5	Volts
Gate Non–Trigger Voltage (V_D = 12 Vdc, R_L = 100 Ω, T_J = 125°C)		V_{GD}	0.2	0.40	—	Volts
Holding Current (V_D = 12 V, Initiating Current = 200 mA, Gate Open)		I_H	3.0	15	50	mA
Latching Current (V_D = 12 Vdc, I_G = 150 mA)		I_L	—	—	60	mA
Gate Controlled Turn-On Time(3) (V_D = Rated V_{DRM}, I_G = 150 mA) (I_{TM} = 24 A Peak)		t_{gt}	—	1.0	—	μs
DYNAMIC CHARACTERISTICS						
Critical Rate-of-Rise of Off-State Voltage (V_D = Rated V_{DRM}, Gate Open, Exponential Waveform, T_J = 125°C)		dv/dt	10	—	—	V/μs
Critical Rate-of-Rise of On-State Current I_G = 150 mA	T_J = 125°C	di/dt	—	—	75	A/μs

(1) Pulse duration ≤ 300 μs, duty cycle ≤ 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



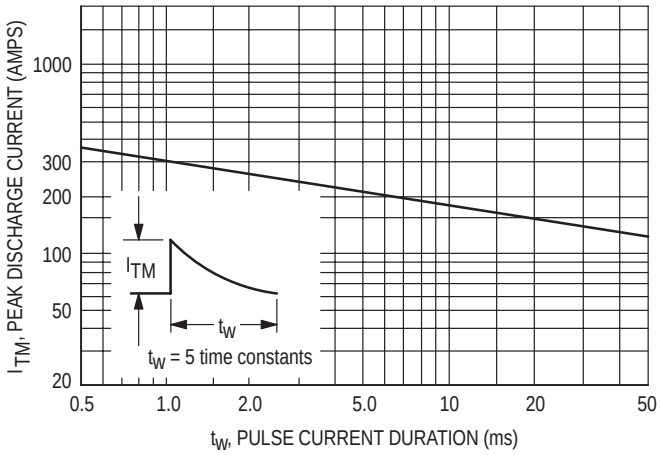


Figure 1. Peak Capacitor Discharge Current

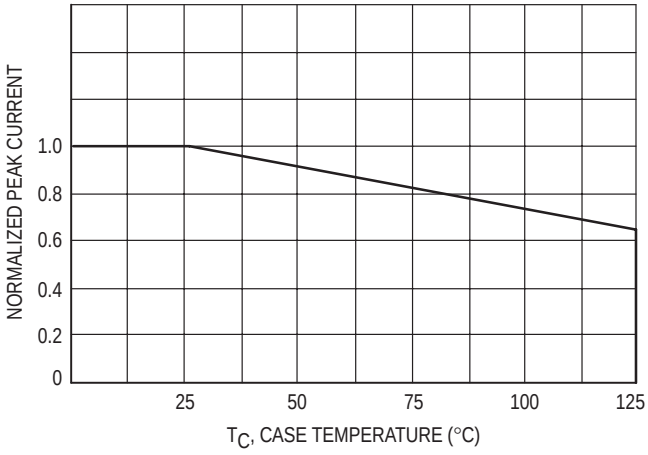


Figure 2. Peak Capacitor Discharge Current Derating

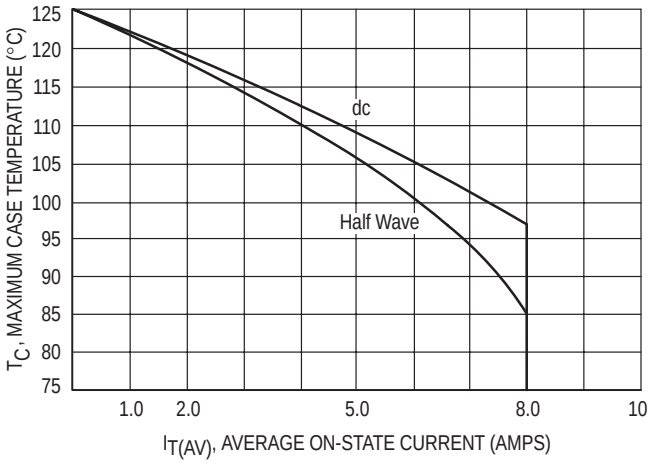


Figure 3. Current Derating

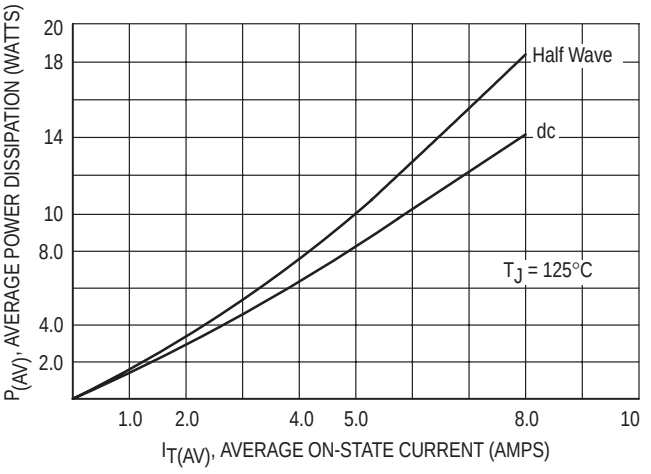


Figure 4. Maximum Power Dissipation

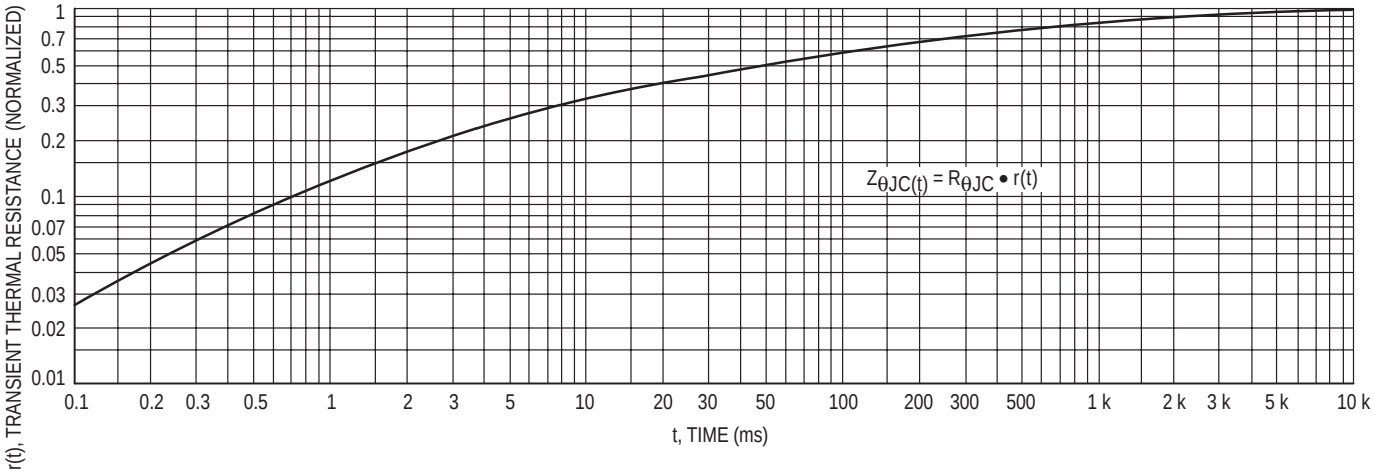


Figure 5. Thermal Response

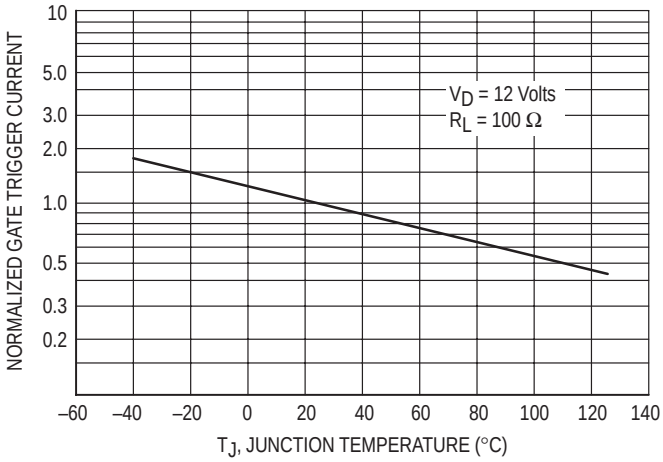


Figure 6. Gate Trigger Current

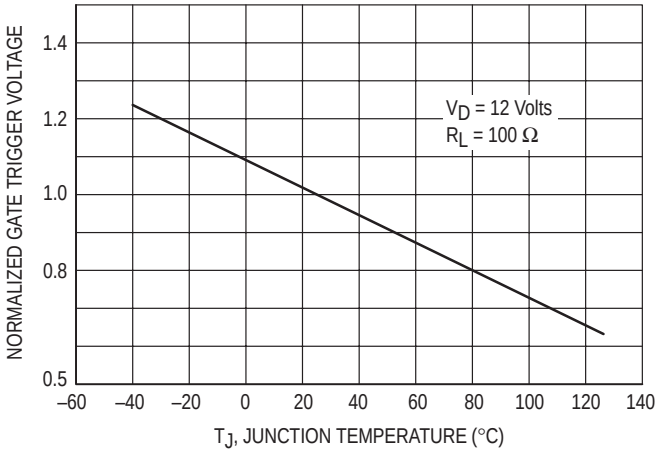


Figure 7. Gate Trigger Voltage

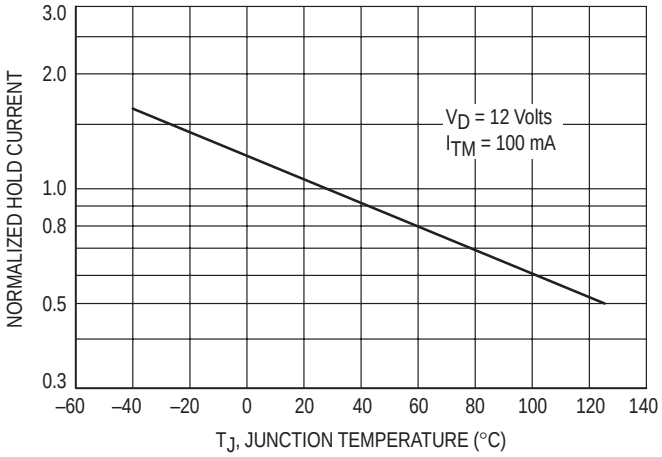
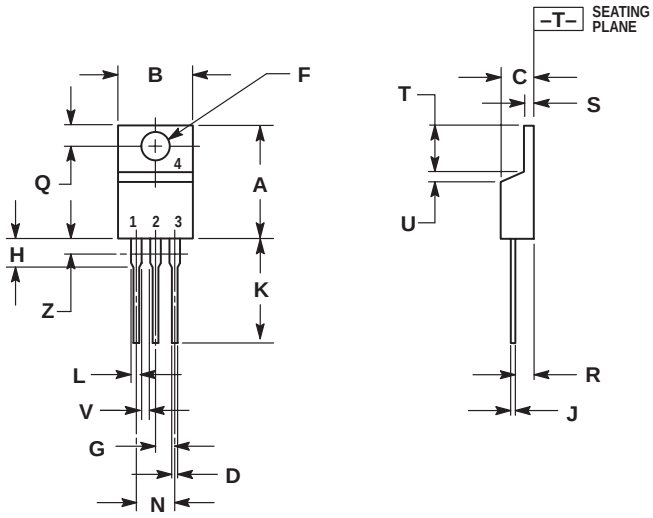


Figure 8. Holding Current

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.

	INCHES		MILLIMETERS	
DIM	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
2. ANODE
3. GATE
4. ANODE

Notes

Notes

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Toll Free from Hong Kong & Singapore:
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JAPAN: ON Semiconductor, Japan Customer Focus Center
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Phone: 81–3–5740–2745
Email: r14525@onsemi.com

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