

MCR68 SERIES

SILICON CONTROLLED RECTIFIERS

FEATURES

- Available as "HR" (high reliability) screened per MIL-PRF-19500, JANTX level. Add "HR" suffix to base part number.
- Available as non-RoHS (Sn/Pb plating), standard, and as RoHS by adding "-PBF" suffix.

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak repetitive off-state voltage ⁽¹⁾ (T _j = -40 to +125°C, gate open) MCR68-1 MCR68-2 MCR68-3	V _{DRM} V _{RRM}	25 50 100	V
Peak discharge current ⁽²⁾	I _{TM}	300	A
On-state RMS current (180° conduction angles, T _C = 85°C)	I _{T(RMS)}	12	A
Average on-state current (180° conduction angles, T _C = 85°C)	I _{T(AV)}	8.0	A
Peak non-repetitive surge current (half-cycle, sine wave, 60Hz, T _j = 125°C)	I _{TSM}	100	A
Circuit fusing consideration (t = 8.3ms)	I ² t	40	A ² s
Forward peak gate current (pulse width ≤ 1.0μs, T _C = 85°C)	I _{GM}	2.0	A
Forward peak gate power (pulse width ≤ 1.0μs, T _C = 85°C)	P _{GM}	20	W
Forward average gate power (t = 8.3ms, T _C = 85°C)	P _{G(AV)}	0.5	W
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.

Note 1: V_{DRM} and V_{RRM} for all types can be applied on a continuous basis. Ratings apply for zero or negative gate voltage; 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.

Note 2: Ratings apply for t_w = 1ms,

THERMAL CHARACTERISTICS

Characteristic	Symbol	Maximum	Unit
Thermal resistance, junction to case	R _{θJC}	2.0	°C/W
Thermal resistance, junction to ambient	R _{θJA}	60	°C/W
Maximum lead temperature for soldering purposes 1/8" from case for 10s	T _L	260	°C

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ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Peak forward or reverse blocking current ($V_{AK} = \text{Rated } V_{DRM} \text{ or } V_{RRM}, \text{ gate open}$) $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$	$I_{DRM},$ I_{RRM}	- -	- -	10 2.0	μA mA
ON CHARACTERISTICS					
Peak forward on-state voltage ($I_{TM} = 24\text{A}$) ⁽³⁾ ($I_{TM} = 300\text{A}, t_w = 1\text{ms}$) ⁽⁴⁾	V_{TM}	- -	- 6.0	2.2 -	V
Gate trigger current (continuous dc) ($V_D = 12\text{V}, R_L = 100\Omega$)	I_{GT}	2.0	7.0	30	mA
Gate trigger voltage (continuous dc) ($V_D = 12\text{V}, R_L = 100\Omega$)	V_{GT}	-	0.65	1.5	V
Gate non-trigger voltage ($V_D = 12\text{V}, R_L = 100\Omega, T_J = 125^\circ\text{C}$)	V_{GD}	0.2	0.40	-	V
Holding current ($V_D = 12\text{V}, \text{ gate open, initiating current} = 200\text{mA}$)	I_H	3.0	15	50	mA
Latching current ($V_D = 12\text{V}, I_G = 150\text{mA}$)	I_L	-	-	60	mA
Gate controlled turn-on time ⁽⁵⁾ ($V_D = \text{rated } V_{DRM}, I_G = 150\text{mA}$) ($I_{TM} = 24\text{A peak}$)	t_{gt}	-	1.0	-	μs
DYNAMIC CHARACTERISTICS					
Critical rate of rise of off-state voltage ($V_D = \text{rated } V_{DRM}, \text{ exponential waveform, gate open, } T_J = 125^\circ\text{C}$)	dv/dt	10	-	-	$\text{V}/\mu\text{s}$
Critical rate of rise of on-state current ($I_G = 150\text{mA}, T_J = 125^\circ\text{C}$)	di/dt	-	-	75	$\text{A}/\mu\text{s}$

Note 3: Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.

Note 4: Ratings apply for $t_w = 1\text{ms}$.

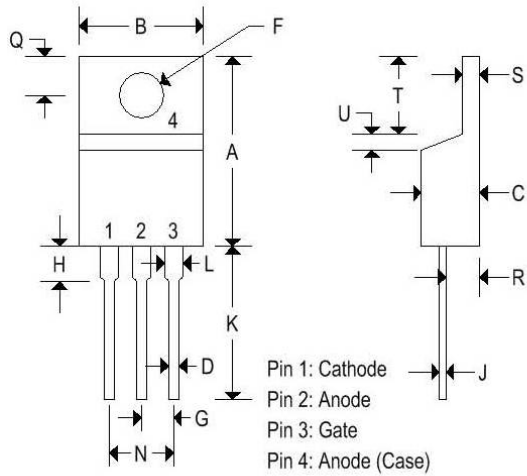
Note 5: The gate controlled turn-on time in a crowbar circuit will be influenced by the circuit inductance.

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MECHANICAL CHARACTERISTICS

Case:	TO-220AB
Marking:	Body painted, alpha-numeric
Pin out:	See below



	TO-220AB			
	Inches		Millimeters	
	Min	Max	Min	Max
A	0.575	0.620	14.600	15.750
B	0.380	0.405	9.650	10.290
C	0.160	0.190	4.060	4.820
D	0.025	0.035	0.640	0.890
F	0.142	0.147	3.610	3.730
G	0.095	0.105	2.410	2.670
H	0.110	0.155	2.790	3.930
J	0.014	0.022	0.360	0.560
K	0.500	0.562	12.700	14.270
L	0.045	0.055	1.140	1.390
N	0.190	0.210	4.830	5.330
Q	0.100	0.120	2.540	3.040
R	0.080	0.110	2.040	2.790
S	0.045	0.055	1.140	1.390
T	0.235	0.255	5.970	6.480
U	-	0.050	-	1.270
V	0.045	-	1.140	-
Z	-	0.080	-	2.030



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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

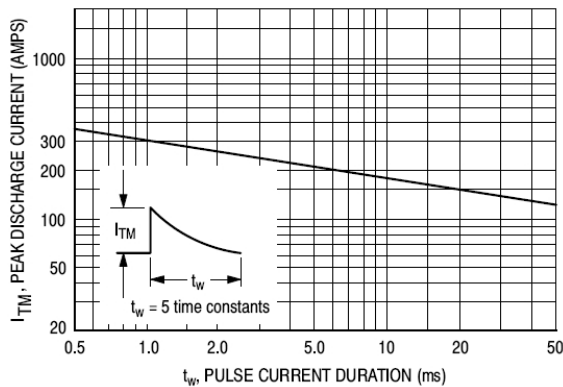
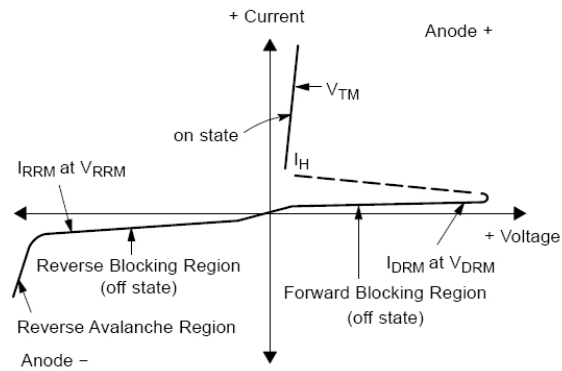


Figure 1. Peak Capacitor Discharge Current

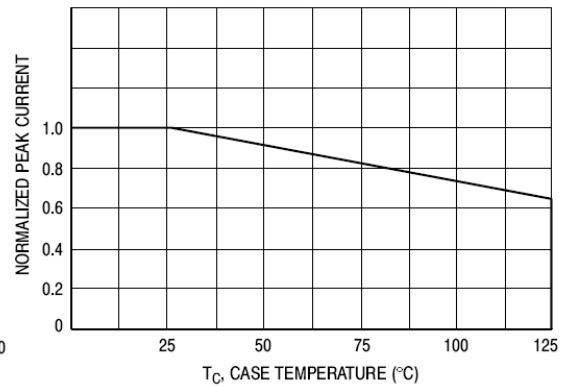


Figure 2. Peak Capacitor Discharge Current Derating

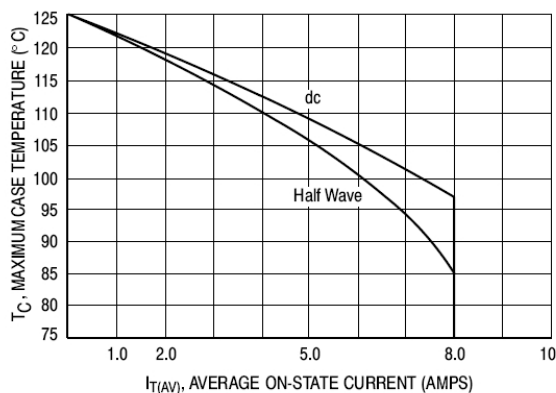


Figure 3. Current Derating

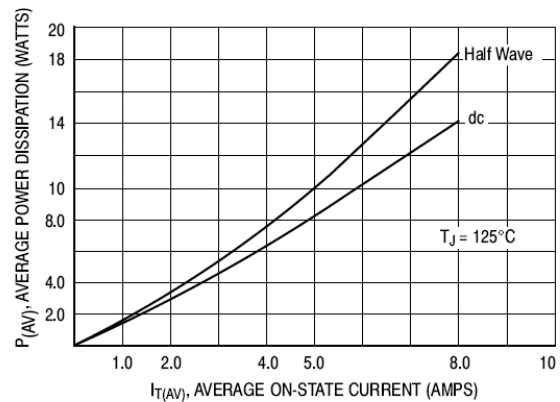


Figure 4. Maximum Power Dissipation

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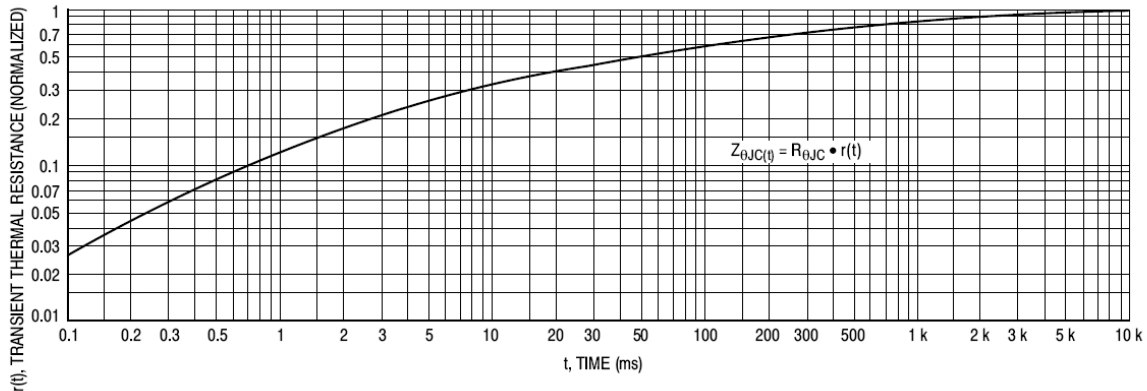


Figure 5. Thermal Response

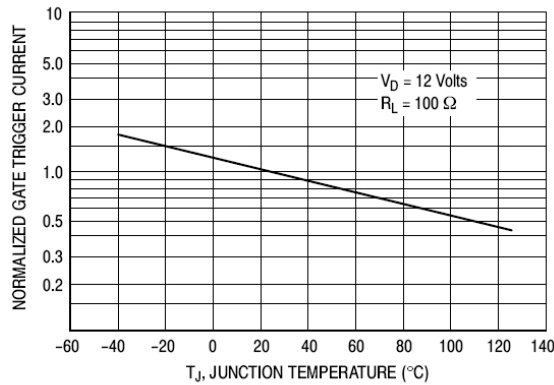


Figure 6. Gate Trigger Current

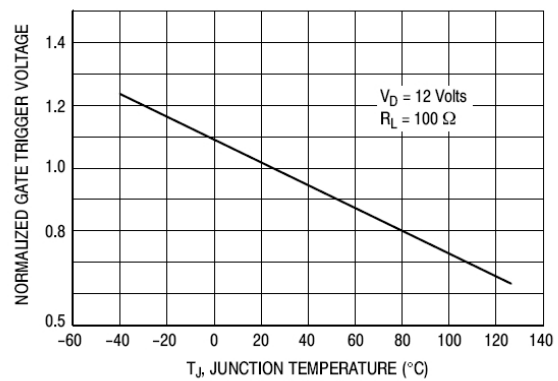


Figure 7. Gate Trigger Voltage

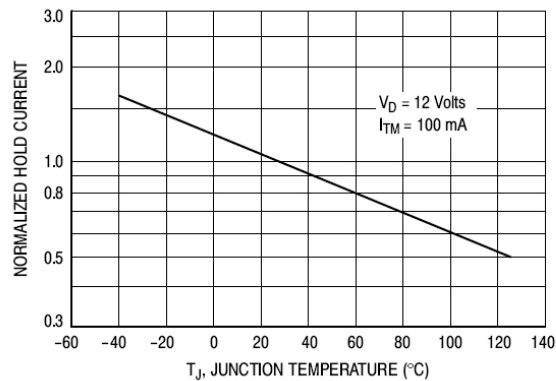


Figure 8. Holding Current