

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 $+125^\circ\text{C}$, gate open)			
MCR69-1	V_{DRM}	25	V
MCR69-2	V_{RRM}	50	
MCR69-3		100	
Peak discharge current⁽²⁾	I_{TM}	750	A
On-state RMS current (180° conduction angles, $T_c = 85^\circ\text{C}$)	$I_{\text{T(RMS)}}$	25	A
Average on-state current (180° conduction angles, $T_c = 85^\circ\text{C}$)	$I_{\text{T(AV)}}$	16	A
Peak non-repetitive surge current (half-cycle, sine wave, 60Hz, $T_j = 125^\circ\text{C}$)	I_{TSM}	300	A
Circuit fusing consideration ($t = 8.3\text{ms}$)	I^2t	375	A^2s
Forward peak gate current (pulse width $\leq 1.0\mu\text{s}$, $T_c = 85^\circ\text{C}$)	I_{GM}	2.0	A
Forward peak gate power (pulse width $\leq 1.0\mu\text{s}$, $T_c = 85^\circ\text{C}$)	P_{GM}	20	W
Forward average gate power ($t = 8.3\text{ms}$, $T_c = 85^\circ\text{C}$)	$P_{\text{G(AV)}}$	0.5	W
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.

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 $t_w = 1\text{ms}$.

Note 3: Test conditions: $I_G = 150\text{mA}$, $V_D = \text{rated } V_{\text{DRM}}$, $I_{\text{TM}} = \text{rated value}$, $T_j = 125^\circ\text{C}$.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Maximum	Unit
Thermal resistance, junction to case	$R_{\theta\text{JC}}$	1.5	$^\circ\text{C}/\text{W}$
Thermal resistance, junction to ambient	$R_{\theta\text{JA}}$	60	$^\circ\text{C}/\text{W}$
Lead solder temperature (lead length 1/8" from case, 10s max)	T_L	260	$^\circ\text{C}$

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 ($V_{AK} = \text{Rated } V_{DRM} \text{ or } V_{RRM}, \text{ gate open}$) $T_C = 25^\circ\text{C}$ $T_C = 125^\circ\text{C}$	I_{DRM} I_{RRM}	- -	- -	10 2.0	μA mA
ON CHARACTERISTICS					
Peak forward on-state voltage ⁴ ($I_{TM} = 50\text{A}$) ⁽⁴⁾ ($I_{TM} = 750\text{A}, t_w = 1\text{ms}$) ⁽⁵⁾	V_{TM}	- -	- 6.0	1.8 -	V
Gate trigger current (continuous dc) ($V_{AK} = 12\text{V}, R_L = 100\Omega$)	I_{GT}	2.0	7.0	30	mA
Gate trigger voltage (continuous dc) ($V_{AK} = 12\text{V}, R_L = 100\Omega$)	V_{GT}	-	0.65	1.5	V
Gate non-trigger voltage ($V_{AK} = 12\text{V}, R_L = 100\Omega, T_J = 125^\circ\text{C}$)	V_{GD}	0.2	0.40	-	V
Holding current ($V_D = 12\text{V}$, initiating current = 200mA, gate open)	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 ⁽⁶⁾ ($V_D = \text{rated } V_{DRM}, I_G = 150\text{mA}$) ($I_{TM} = 50\text{A peak}$)	t_{gt}	-	1.0	-	μs
DYNAMIC CHARACTERISTICS					
Critical rate of rise of off-state voltage ($V_D = \text{rated } V_{DRM}, \text{ gate open, exponential waveform, } T_J = 125^\circ\text{C}$)	dv/dt	10	-	-	$\text{V}/\mu\text{s}$
Critical rate of rise of on-state current ⁽⁶⁾ ($I_G = 150\text{mA}, T_J = 125^\circ\text{C}$)	di/dt	-	-	100	$\text{A}/\mu\text{s}$

Note 4: Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.

Note 5: Ratings apply for $t_w = 1\text{ms}$.

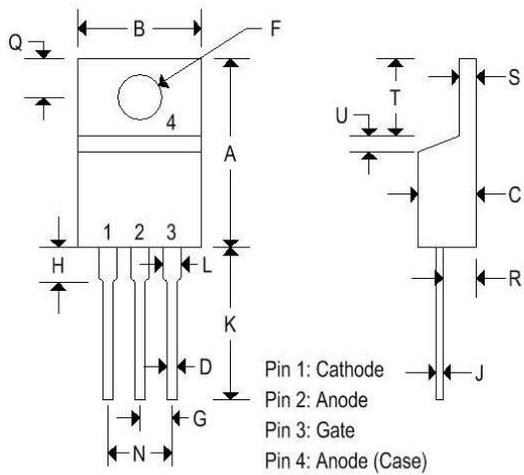
Note 6: The gate controlled turn-on time in a crowbar circuit will be influenced by the circuit inductance.

MCR69 SERIES

SILICON CONTROLLED RECTIFIERS

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

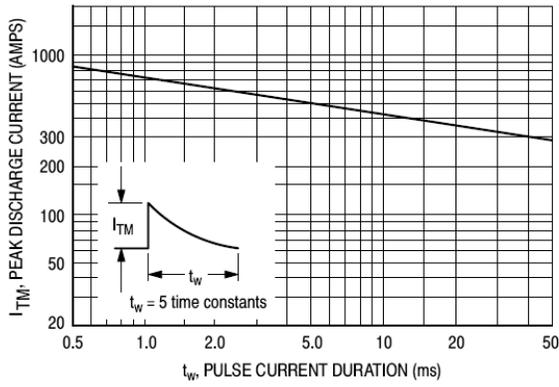


Figure 1. Peak Capacitor Discharge Current

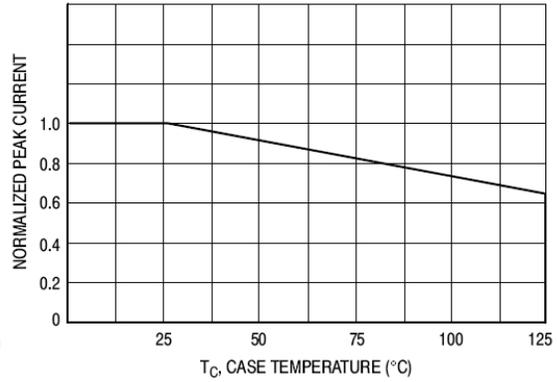


Figure 2. Peak Capacitor Discharge Current Derating

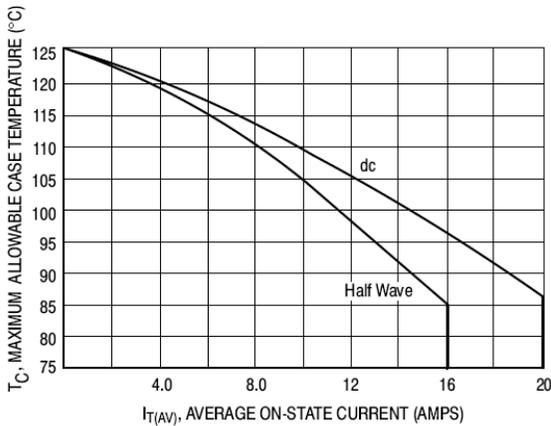


Figure 3. Current Derating

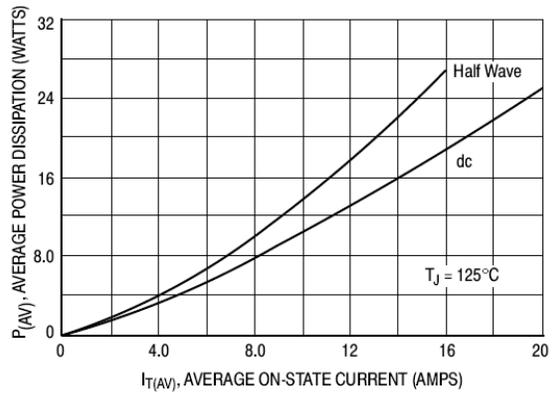


Figure 4. Maximum Power Dissipation

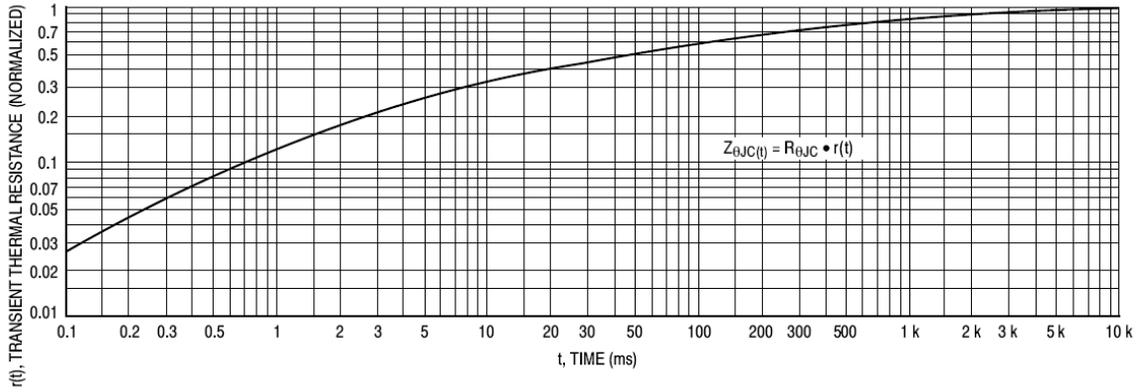


Figure 5. Thermal Response

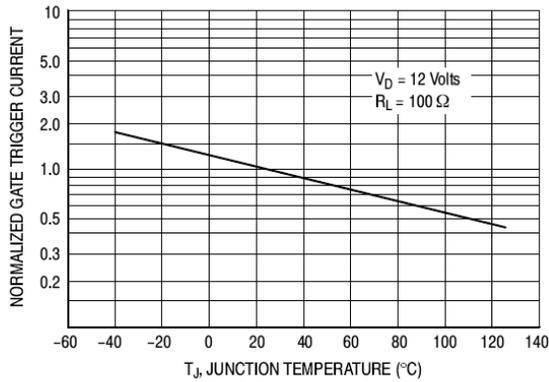


Figure 6. Gate Trigger Current

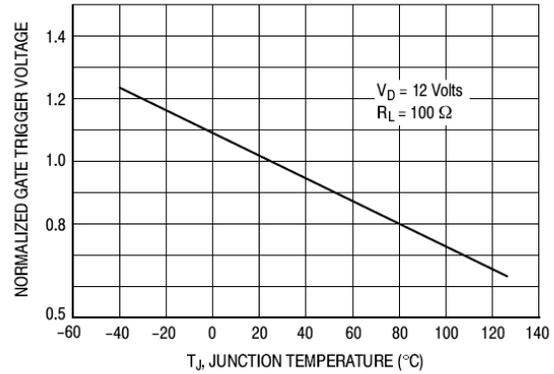


Figure 7. Gate Trigger Voltage

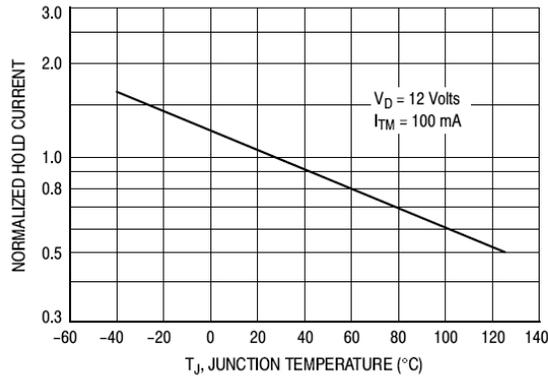


Figure 8. Holding Current