

DIGITRON SEMICONDUCTORS

MCR69 SERIES

SILICON CONTROLLED RECTIFIERS

Available Non-RoHS (standard) or RoHS compliant (add PBF suffix).

Available as "HR" (high reliability) screened per MIL-PRF-19500, JANTX level. Add "HR" suffix to base part number.

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak repetitive off-state voltage⁽¹⁾ ($T_J = -40$ to $+125^\circ\text{C}$, gate open) MCR69-1 MCR69-2 MCR69-3	V_{DRM} V_{RRM}	25 50 100	V
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	$^\circ\text{C/W}$
Thermal resistance, junction to ambient	$R_{\theta\text{JA}}$	60	$^\circ\text{C/W}$
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 noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Peak forward or reverse blocking current ($V_{\text{AK}} = \text{Rated } V_{\text{DRM}}$ or V_{RRM} , 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* ($I_{\text{TM}} = 50\text{A}$) ⁽⁴⁾ ($I_{\text{TM}} = 750\text{A}$, $t_w = 1\text{ms}$) ⁽⁵⁾	V_{TM}	- -	- 6.0	1.8 -	V
Gate trigger current (continuous dc) ($V_{\text{AK}} = 12\text{V}$, $R_L = 100\Omega$)	I_{GT}	2.0	7.0	30	mA
Gate trigger voltage (continuous dc) ($V_{\text{AK}} = 12\text{V}$, $R_L = 100\Omega$)	V_{GT}	-	0.65	1.5	V
Gate non-trigger voltage ($V_{\text{AK}} = 12\text{V}$, $R_L = 100\Omega$, $T_J = 125^\circ\text{C}$)	V_{GD}	0.2	0.40	-	V

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Holding current ($V_D = 12V$, initiating current = 200mA, gate open)	I_H	3.0	15	50	mA
Latching current ($V_D = 12V$, $I_G = 150mA$)	I_L	-	-	60	mA
Gate controlled turn-on time⁽⁶⁾ ($V_D = \text{rated } V_{DRM}$, $I_G = 150mA$) ($I_{TM} = 50A$ 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/ μs
Critical rate of rise of on-state current⁽⁶⁾ ($I_G = 150mA$, $T_J = 125^\circ C$)	di/dt	-	-	100	A/ μs

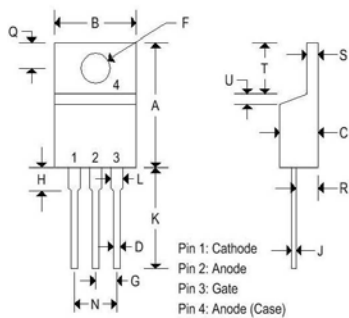
Note 4: Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

Note 5: Ratings apply for $t_w = 1ms$.

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

MECHANICAL CHARACTERISTICS

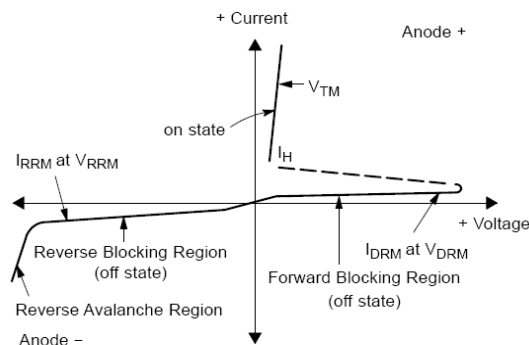
Case	TO-220AB
Marking	Alpha-numeric
Pin out	See below



	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

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



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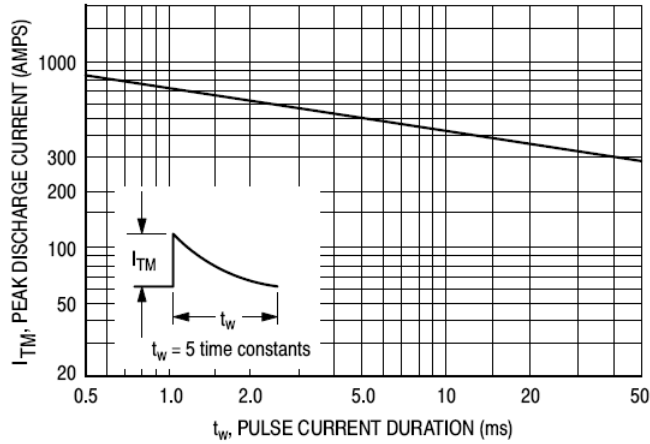


Figure 1. Peak Capacitor Discharge Current

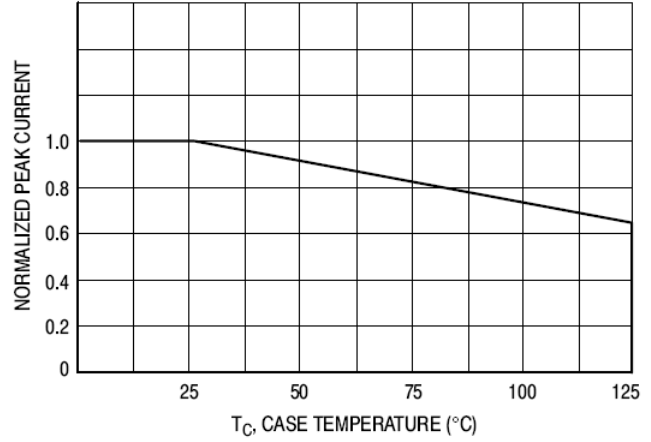


Figure 2. Peak Capacitor Discharge Current Derating

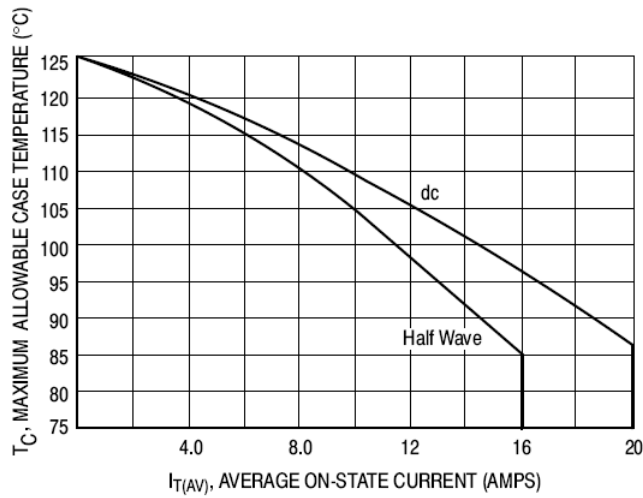


Figure 3. Current Derating

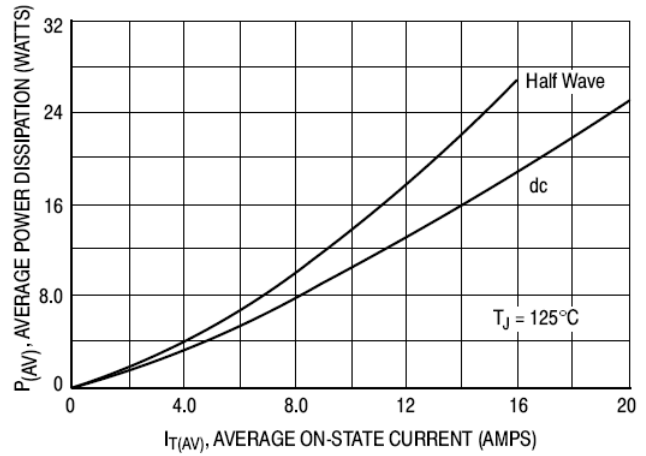


Figure 4. Maximum Power Dissipation

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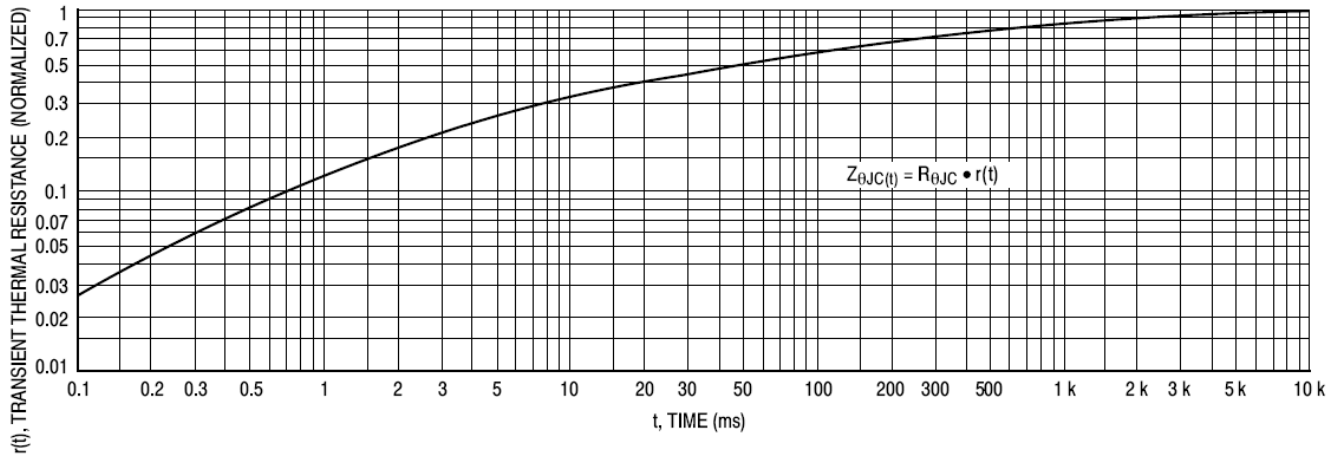


Figure 5. Thermal Response

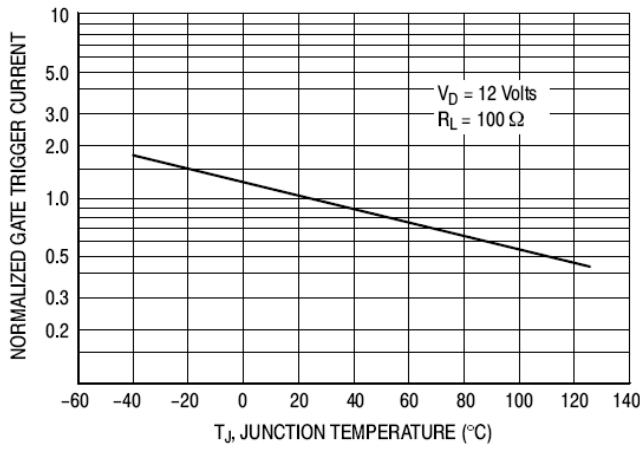


Figure 6. Gate Trigger Current

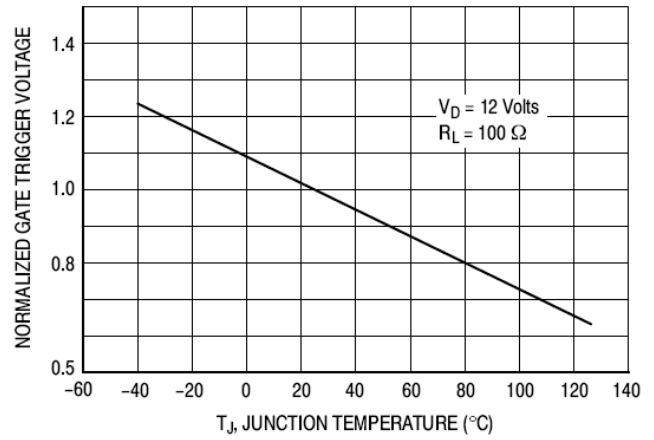


Figure 7. Gate Trigger Voltage

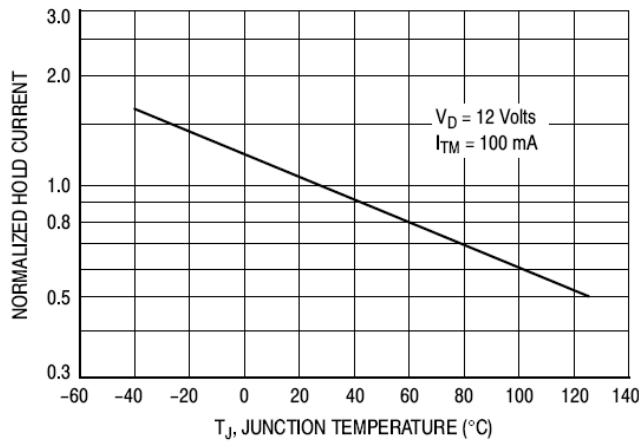


Figure 8. Holding Current