DIGITRON™ Semiconductors

High-reliability discrete products
and engineering services since 1977

MCR69 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) 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°C)	$I_{T(RMS)}$	25	A
Average on-state current (180° conduction angles, T_C = 85°C)	$I_{T(AV)}$	16	A
Peak non-repetitive surge current (half-cycle, sine wave, 60Hz, T_J = 125°C)	I_{TSM}	300	A
Circuit fusing consideration (t = 8.3ms)	I^2t	375	A^2s
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.
Note 3: Test conditions: I_G = 150mA, V_D = rated V_{DRM}, I_{TM} = rated value, T_J = 125°C.

THERMAL CHARACTERISTICS

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

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ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise specified)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Peak forward or reverse blocking current (V_{AK} = Rated V_{DRM} or V_{RRM}, gate open) T_C = 25°C T_C = 125°C	$I_{DRM,}$ I_{RRM}	 - -	 - -	 10 2.0	 µA mA
ON CHARACTERISTICS					
Peak forward on-state voltage* (I_{TM} = 50A)(4) (I_{TM} = 750A, t_w = 1ms)(5)	V_{TM}	 - -	 - 6.0	 1.8 -	 V
Gate trigger current (continuous dc) (V_{AK} = 12V, R_L = 100Ω)	I_{GT}	2.0	7.0	30	mA
Gate trigger voltage (continuous dc) (V_{AK} = 12V, R_L = 100Ω)	V_{GT}	-	0.65	1.5	V
Gate non-trigger voltage (V_{AK} = 12V, R_L = 100Ω, T_J = 125°C)	V_{GD}	0.2	0.40	-	V
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 = 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 = rated V_{DRM}, gate open, exponential waveform, T_J = 125°C)	dv/dt	10	-	-	V/µs
Critical rate of rise of on-state current(6) (I_G = 150mA, T_J = 125°C)	di/dt	-	-	100	A/µs

Note 4: Pulse width ≤ 300µs, duty cycle ≤ 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.

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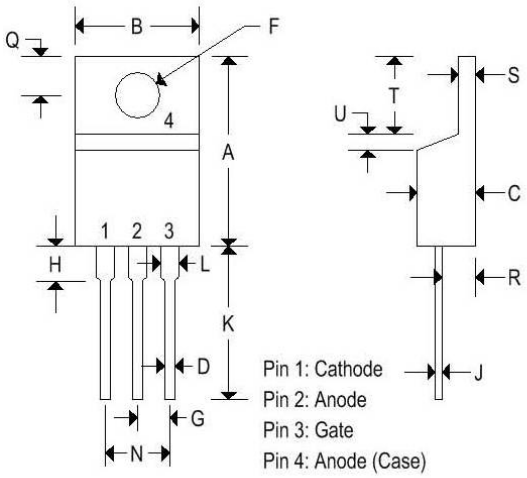
MECHANICAL CHARACTERISTICS

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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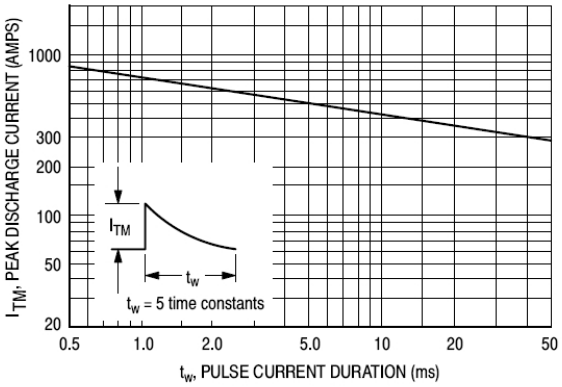

Figure 1. Peak Capacitor Discharge Current

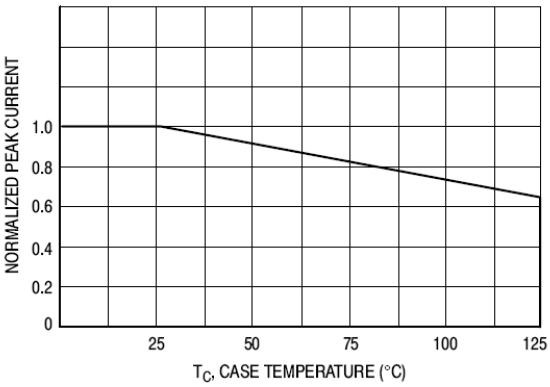

Figure 2. Peak Capacitor Discharge Current Derating

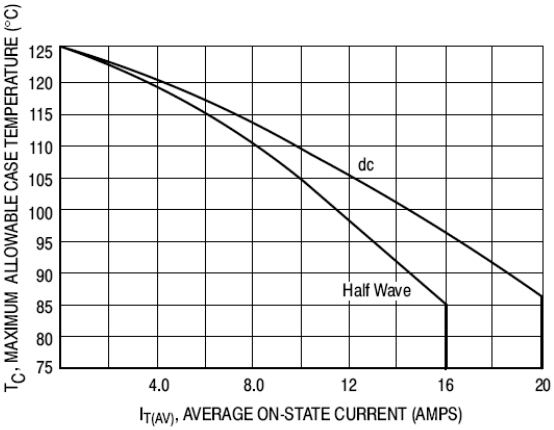

Figure 3. Current Derating

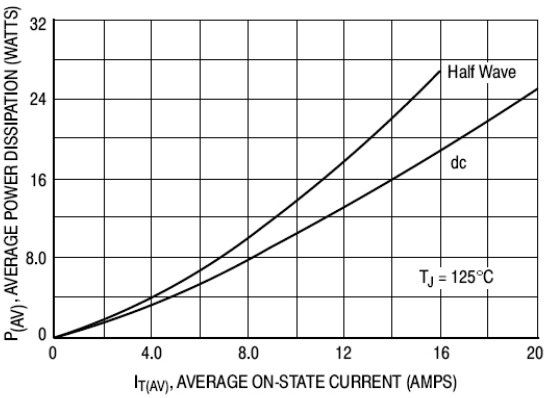

Figure 4. Maximum Power Dissipation

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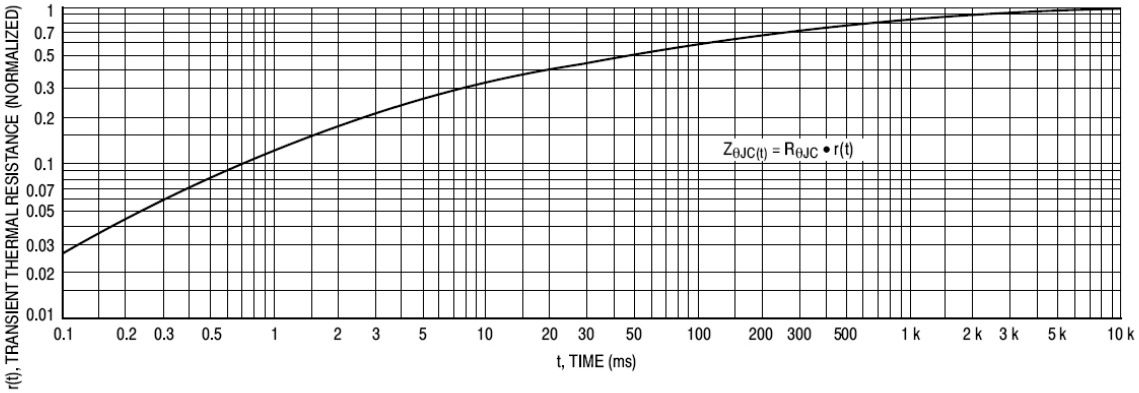

Figure 5. Thermal Response

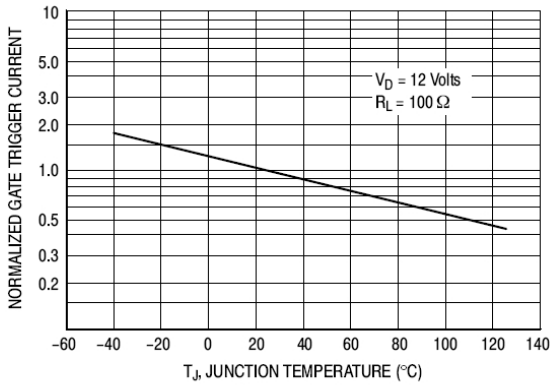

Figure 6. Gate Trigger Current

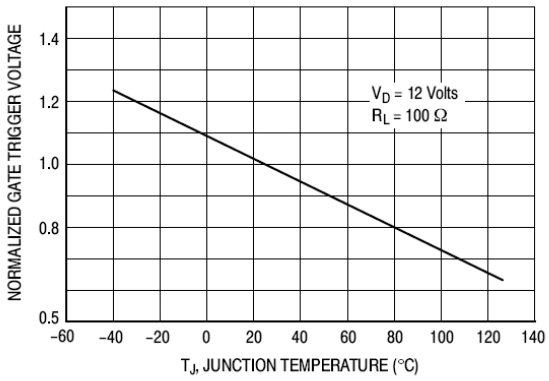

Figure 7. Gate Trigger Voltage

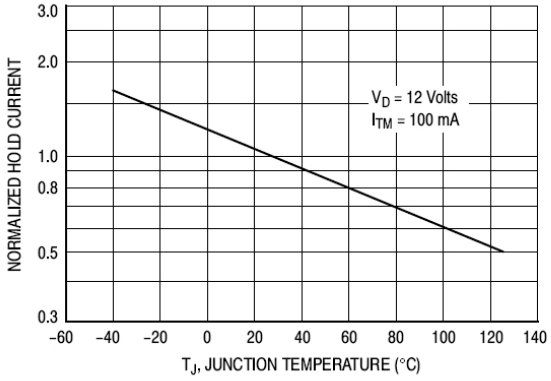

Figure 8. Holding Current