DIGITRON™ Semiconductors

High-reliability discrete products
and engineering services since 1977

MCR8SD, MCR8SM, MCR8SN

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] **Peak repetitive reverse voltage** (T_J = -40 to +110°C, sine wave, 50 to 60Hz, gate open) MCR8SD MCR8SM MCR8SN	V_{DRM} V_{RRM}	 400 600 800	V
On-state RMS current (180° conduction angles, T_C = 80°C)	$I_{T(RMS)}$	8	A
Peak non-repetitive surge current (one half-cycle, sine wave, 60Hz, T_J = 110°C)	I_{TSM}	80	A
Circuit fusing (t = 8.3ms)	I^2t	26.5	A^2s
Forward peak gate power (pulse width ≤ 1.0µs, T_C = 80°C)	P_{GM}	5	W
Forward average gate power (t = 8.3ms, T_C = 80°C)	$P_{G(AV)}$	0.5	W
Forward peak gate current (pulse width ≤ 1.0µs, T_C = 80°C)	I_{GM}	2	A
Operating temperature range	T_J	-40 to +110	°C
Storage temperature range	T_{stg}	-40 to +150	°C

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.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Maximum	Unit
Thermal resistance, junction to case	$R_{\Theta JC}$	2.2	°C/W
Thermal resistance, junction to ambient	$R_{\Theta JA}$	62.5	°C/W
Maximum lead temperature for soldering purposes 1/8" from case for 10s	T_L	260	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Peak forward blocking current or reverse blocking current[2] (V_D = Rated V_{DRM} or V_{RRM}, R_{GK} = 1kΩ) T_J = 25°C T_J = 110°C	I_{DRM}, I_{RRM}	 - -	 - -	 10 500	µA
ON CHARACTERISTICS					
Peak on-state voltage[3] (I_{TM} = 16A)	V_{TM}	-	-	1.8	V
Gate trigger current (continuous dc) [4] (V_D = 12V, R_L = 100Ω)	I_{GT}	5.0	25	200	µA

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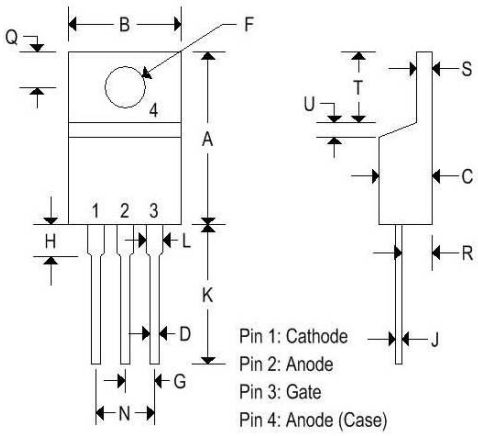
Characteristic	Symbol	Min	Typ	Max	Unit
Holding current [4] (V_D = 12V, gate open, initiating current = 200mA)	I_H	-	0.5	6.0	mA
Latch current [4] (V_D = 12V, I_G = 200µA)	I_L	-	0.6	8.0	mA
Gate trigger voltage (continuous dc) [4] (V_D = 12V, R_L = 100Ω) T_J = 25°C T_J = -40°C	V_{GT}	 0.3 -	 0.65 -	 1.0 1.5	V
DYNAMIC CHARACTERISTICS					
Critical rate of rise of off-state voltage (V_D = 67% V_{DRM}, R_{GK} = 1KΩ, C_{GK} = 0.1µF, T_J = 110°C)	dv/dt	5.0	15	-	V/µs
Critical rate of rise of on-state current (I_{PK} = 50A, PW = 40µsec, di_G/dt = 1 A/µsec, I_{gt} = 10mA)	di/dt	-	-	100	A/µs

* Pulse width ≤ 2.0ms, duty cycle ≤ 2%.

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

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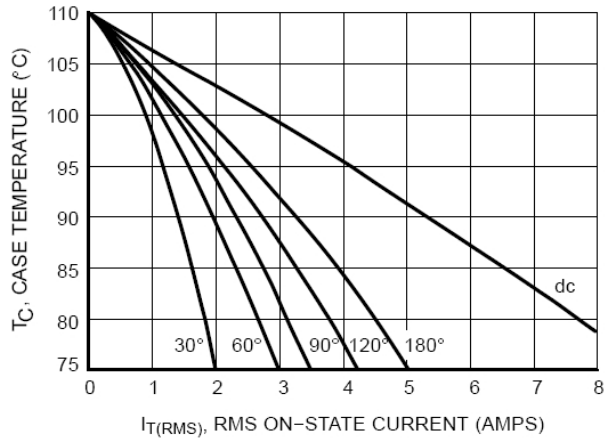

Figure 1. Typical RMS Current Derating

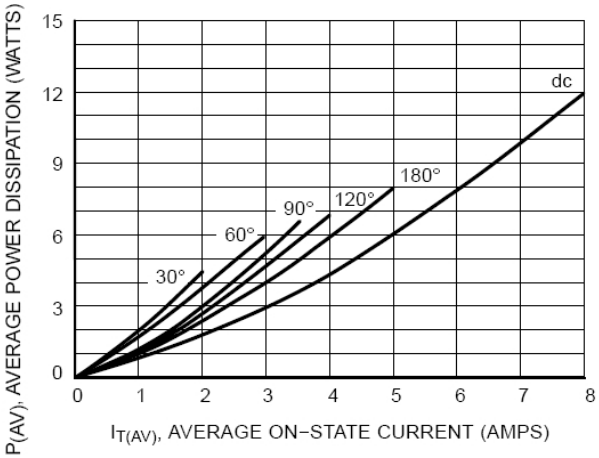

Figure 2. On−State Power Dissipation

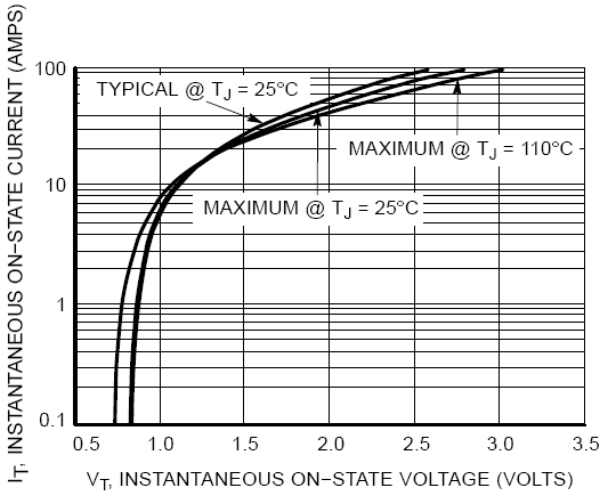

Figure 3. Typical On−State Characteristics

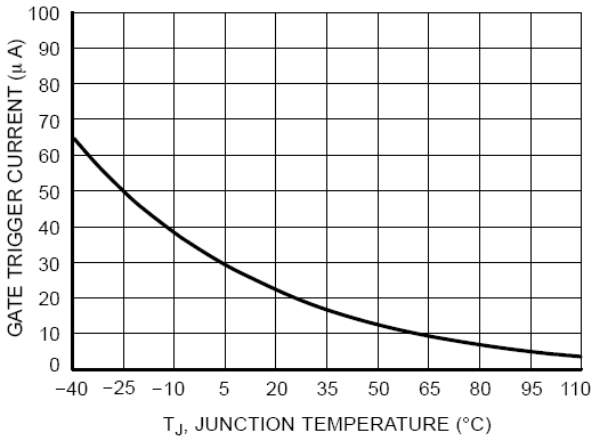

Figure 4. Typical Gate Trigger Current versus Junction Temperature

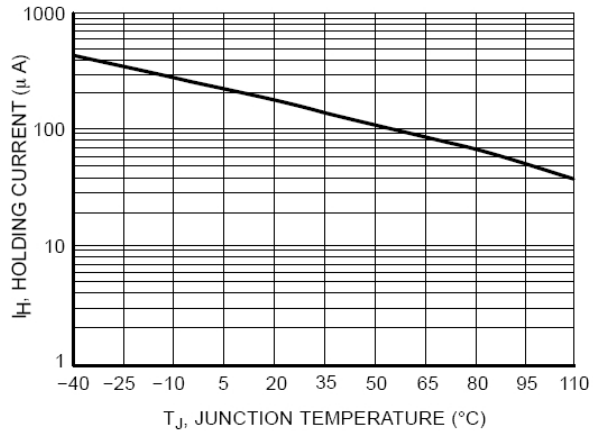

Figure 5. Typical Holding Current versus Junction Temperature

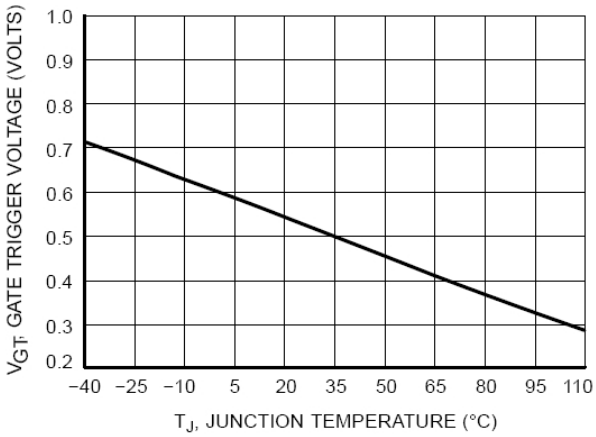

Figure 6. Typical Gate Trigger Voltage versus Junction Temperature

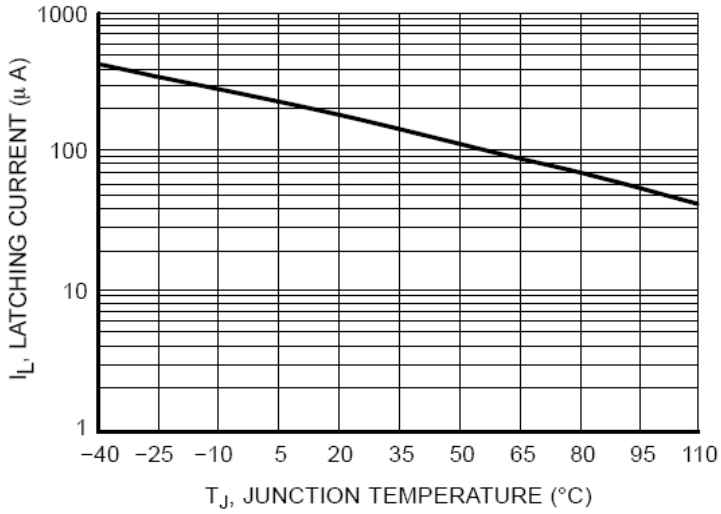

Figure 7. Typical Latching Current versus Junction Temperature