DIGITRON SEMICONDUCTORS

MCR25D, MCR25M, MCR25N 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°C, sine wave, 50 to 60Hz) MCR25D MCR25M MCR25N	V_{DRM} V_{RRM}	 400 600 800	V
On-state RMS current (180° conduction angles, T_C = 80°C)	$I_{T(RMS)}$	25	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	373	A^2s
Forward peak gate power (pulse width ≤ 1.0µs, T_C = 80°C)	P_{GM}	20	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}	2.0	A
Operating junction temperature range	T_J	-40 to +125	°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	$R_{\Theta JC}$	1.5	°C/W
Thermal resistance, junction to ambient	$R_{\Theta JA}$	62.5	°C/W
Lead solder temperature (lead length ≥ 1/8" from case, 10s max)	T_L	260	°C

ELECTRICAL CHARACTERISTICS (T_J = 25°C, unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS start here					
Peak forward or reverse blocking current (V_{AK} = Rated V_{DRM} or V_{RRM}, gate open) T_J = 25°C T_J = 125°C	I_{DRM}, I_{RRM}	 - -	 - -	 0.01 2.0	mA
ON CHARACTERISTICS					
Peak forward on-state voltage* (I_{TM} = 50A)	V_{TM}	-	-	1.8	V
Gate trigger current (continuous dc) (V_D = 12V, R_L = 100Ω)	I_{GT}	4.0	12	30	mA
Gate trigger voltage (continuous dc) (V_D = 12V, R_L = 100Ω)	V_{GT}	0.5	0.67	1.0	V
Holding current (V_D = 12V, gate open, initiating current = 200mA)	I_H	5.0	13	40	mA
Latching current (V_D = 12V, I_G = 30mA)	I_L	-	35	80	mA
DYNAMIC CHARACTERISTICS					
Critical rate of rise of off-state voltage (V_D = 67% of rated V_{DRM}, exponential waveform, gate open, T_J = 125°C)	dv/dt	100	250	-	V/µs
Critical rate of rise of on-state current (I_{PK} = 50A, PW = 30µsec, di_G/dt = 1A/µsec, I_{gt} = 50mA)	di/dt	-	-	50	A/µs

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

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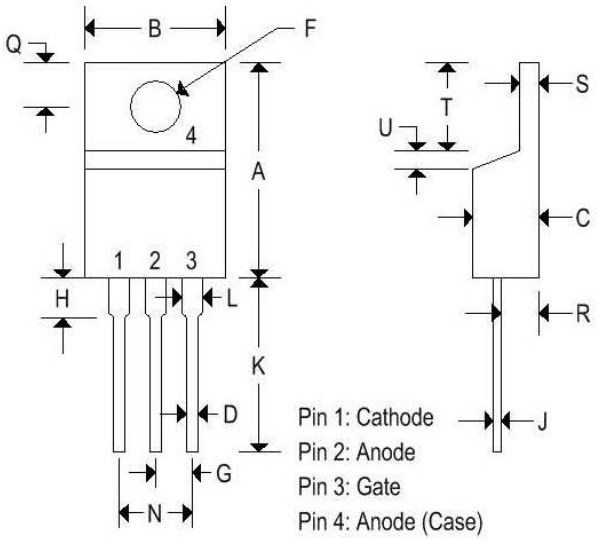
MECHANICAL CHARACTERISTICS

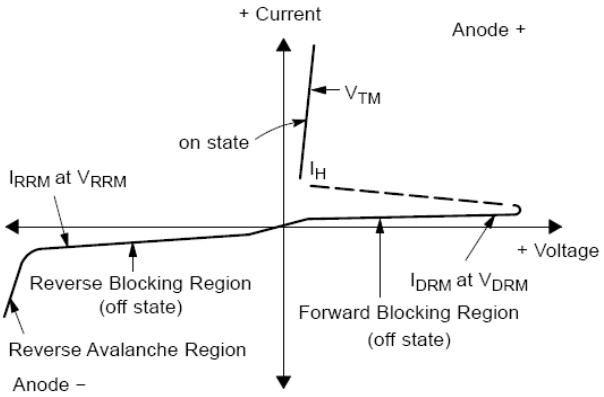
Case	TO-220AB
Marking	Alpha-numeric
Pin out	See below



	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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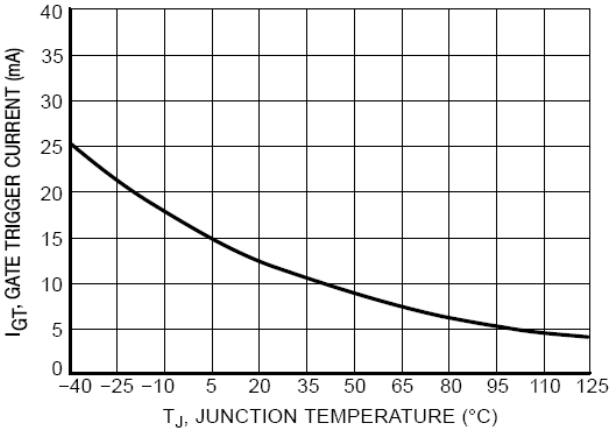

Figure 1. Typical Gate Trigger Current versus Junction Temperature

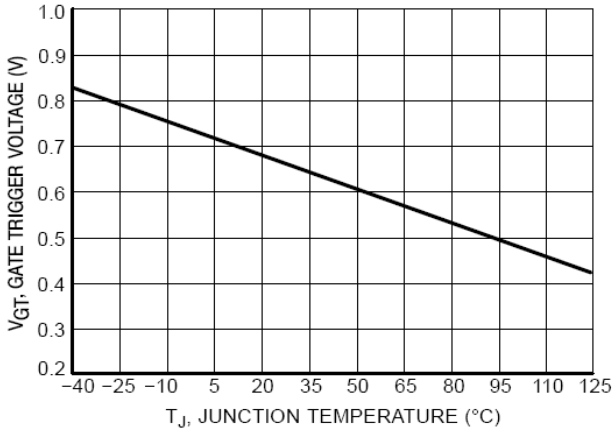

Figure 2. Typical Gate Trigger Voltage versus Junction Temperature

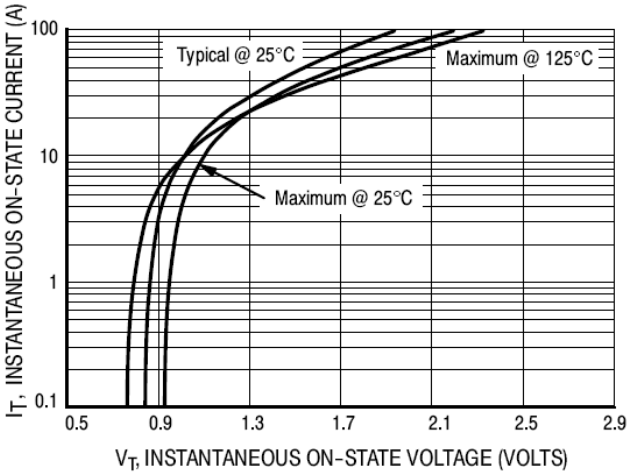

Figure 3. Typical On−State Characteristics

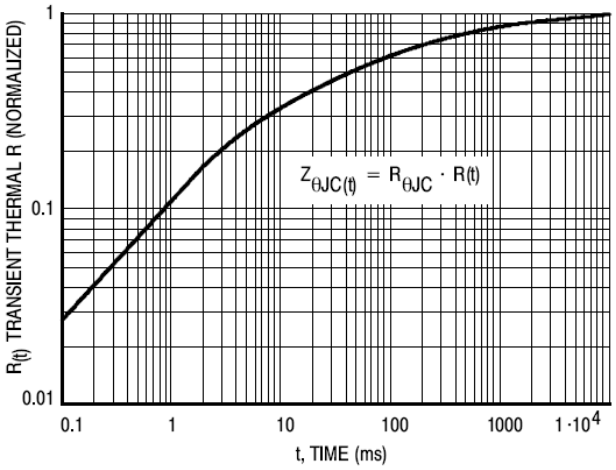

Figure 4. Transient Thermal Response

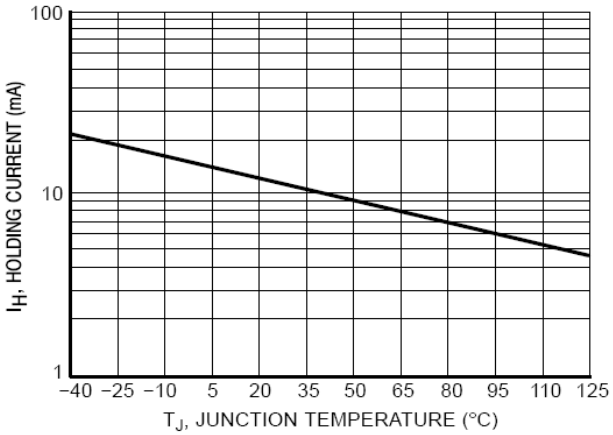

Figure 5. Typical Holding Current versus Junction Temperature

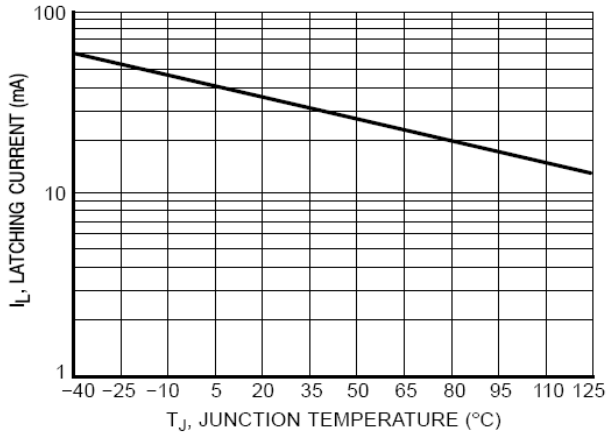

Figure 6. Typical Latching Current versus Junction Temperature

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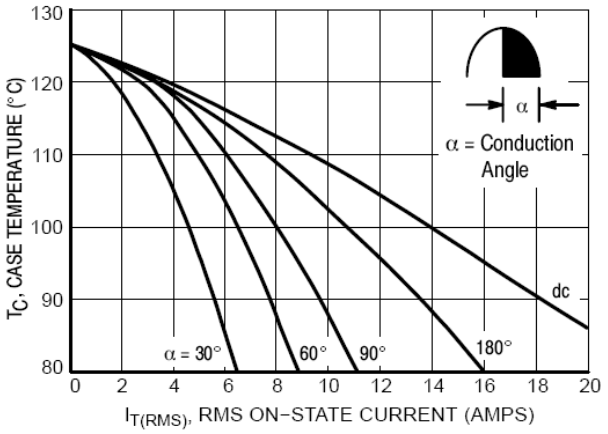

Figure 7. Typical RMS Current Derating

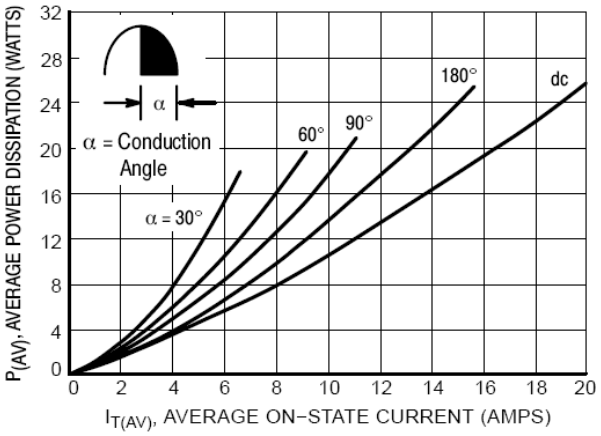

Figure 8. On State Power Dissipation

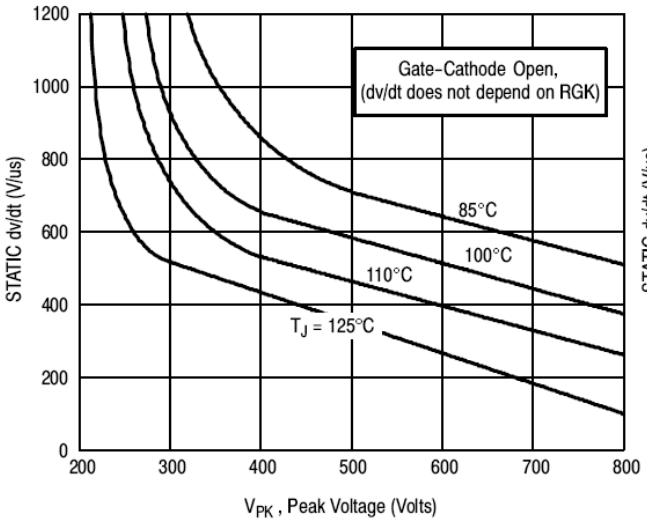

Figure 9. Typical Exponential Static dv/dt Versus Peak Voltage

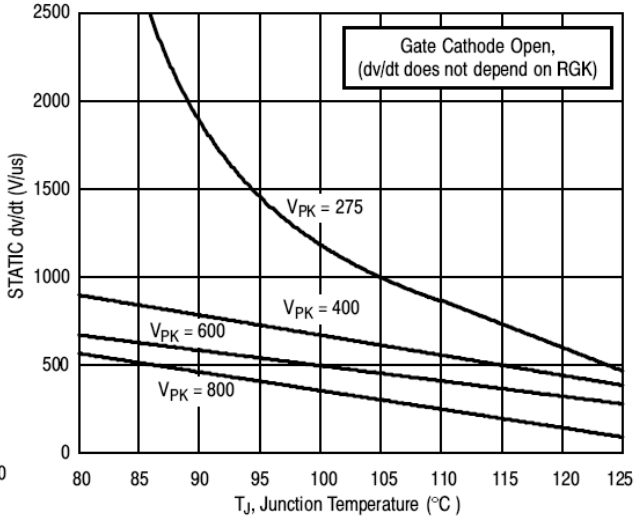

Figure 10. Typical Exponential Static dv/dt Versus Junction Temperature

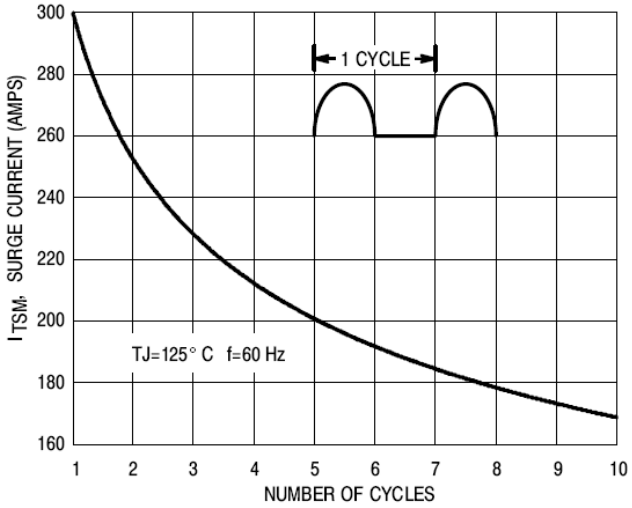

Figure 11. Maximum Non−Repetitive Surge Current

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