

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 $+125^\circ\text{C}$, sine wave, 50 to 60Hz) MCR25D MCR25M MCR25N	V_{DRM} V_{RRM}	400 600 800	V
On-state RMS current (180° conduction angles, $T_C = 80^\circ\text{C}$)	$I_{T(RMS)}$	25	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	373	A^2s
Forward peak gate power (pulse width $\leq 1.0\mu\text{s}$, $T_C = 80^\circ\text{C}$)	P_{GM}	20	W
Forward average gate power ($t = 8.3\text{ms}$, $T_C = 80^\circ\text{C}$)	$P_{G(AV)}$	0.5	W
Forward peak gate current (pulse width $\leq 1.0\mu\text{s}$, $T_C = 80^\circ\text{C}$)	I_{GM}	2.0	A
Operating junction temperature range	T_J	-40 to +125	$^\circ\text{C}$
Storage temperature range	T_{stg}	-40 to +150	$^\circ\text{C}$

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	$^\circ\text{C}/\text{W}$
Thermal resistance, junction to ambient	$R_{\theta JA}$	62.5	$^\circ\text{C}/\text{W}$
Lead solder temperature (lead length $\geq 1/8"$ 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 start here					
Peak forward or reverse blocking current ($V_{AK} = \text{Rated } V_{DRM} \text{ or } V_{RRM}$, gate open) $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$	I_{DRM} , I_{RRM}	- -	- -	0.01 2.0	mA
ON CHARACTERISTICS					
Peak forward on-state voltage* ($I_{TM} = 50\text{A}$)	V_{TM}	-	-	1.8	V
Gate trigger current (continuous dc) ($V_D = 12\text{V}$, $R_L = 100\Omega$)	I_{GT}	4.0	12	30	mA
Gate trigger voltage (continuous dc) ($V_D = 12\text{V}$, $R_L = 100\Omega$)	V_{GT}	0.5	0.67	1.0	V
Holding current ($V_D = 12\text{V}$, gate open, initiating current = 200mA)	I_H	5.0	13	40	mA
Latching current ($V_D = 12\text{V}$, $I_G = 30\text{mA}$)	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, $T_J = 125^\circ\text{C}$)	dv/dt	100	250	-	V/ μs
Critical rate of rise of on-state current ($I_{PK} = 50\text{A}$, $PW = 30\mu\text{sec}$, $di_c/dt = 1\text{A}/\mu\text{sec}$, $I_{gt} = 50\text{mA}$)	di/dt	-	-	50	A/ μs

* Pulse width $\leq 2.0\text{ms}$, duty cycle $\leq 2\%$.

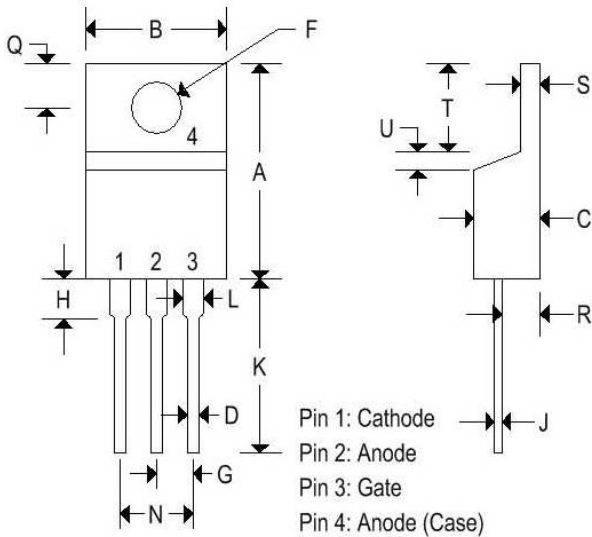
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MECHANICAL CHARACTERISTICS

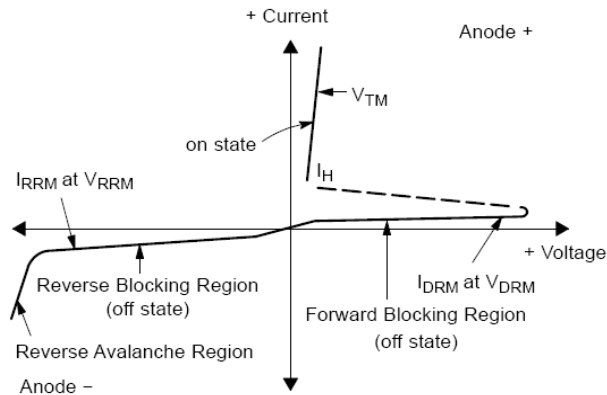
Case	TO-220AB
Marking	Alpha-numeric
Pin out	See below



	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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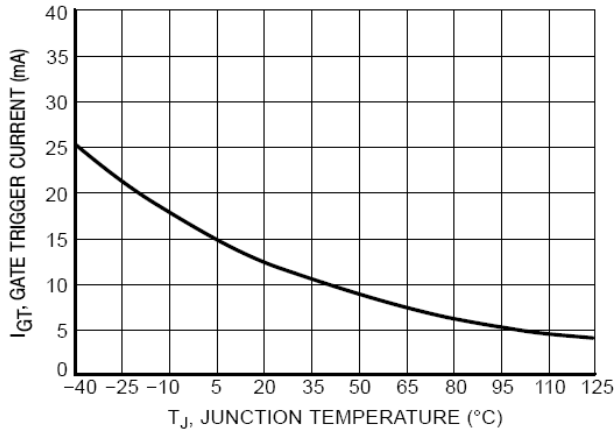


Figure 1. Typical Gate Trigger Current versus Junction Temperature

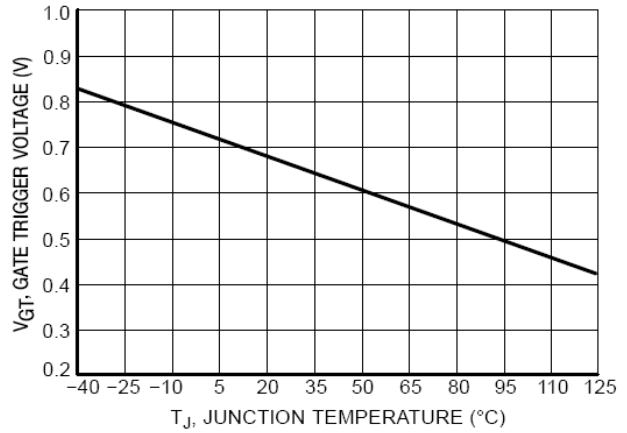


Figure 2. Typical Gate Trigger Voltage versus Junction Temperature

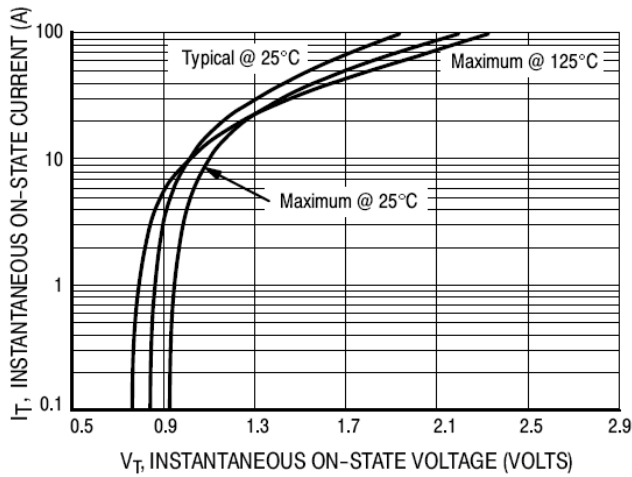


Figure 3. Typical On-State Characteristics

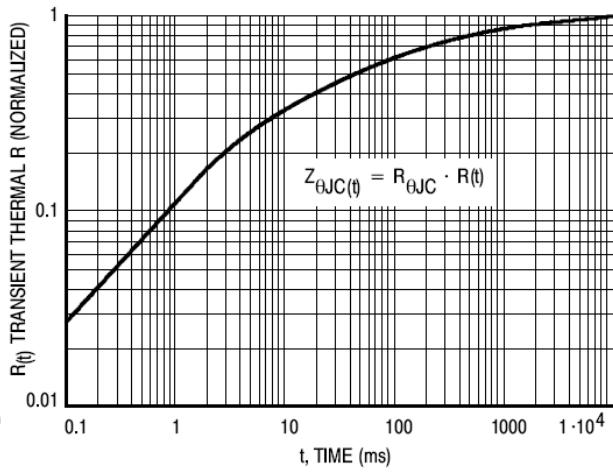


Figure 4. Transient Thermal Response

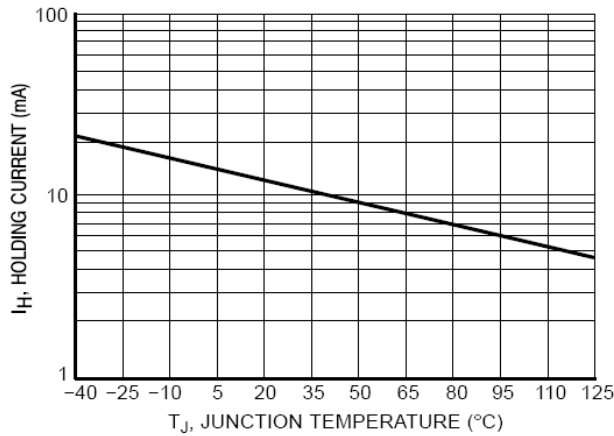


Figure 5. Typical Holding Current versus Junction Temperature

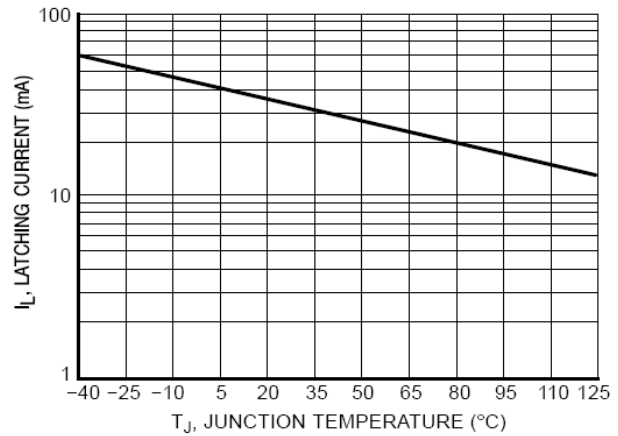


Figure 6. Typical Latching Current versus Junction Temperature

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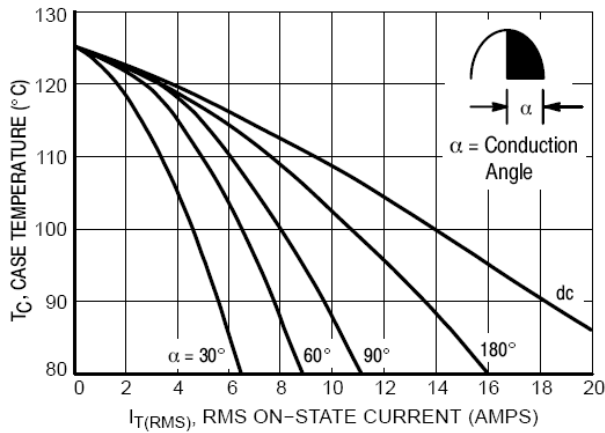


Figure 7. Typical RMS Current Derating

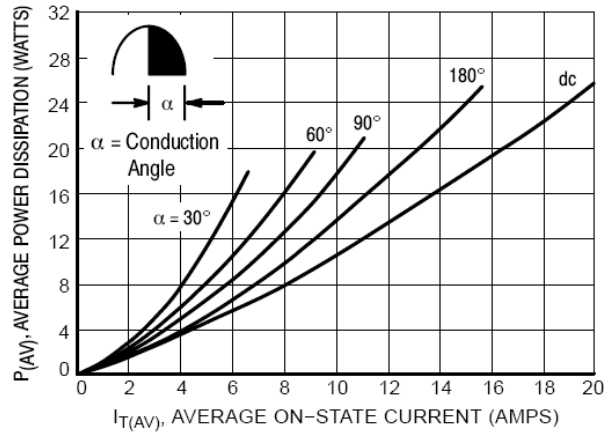


Figure 8. On State Power Dissipation

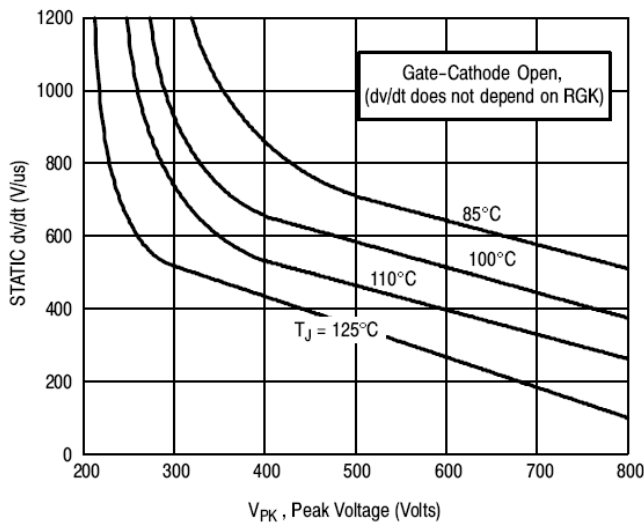


Figure 9. Typical Exponential Static dv/dt Versus Peak Voltage

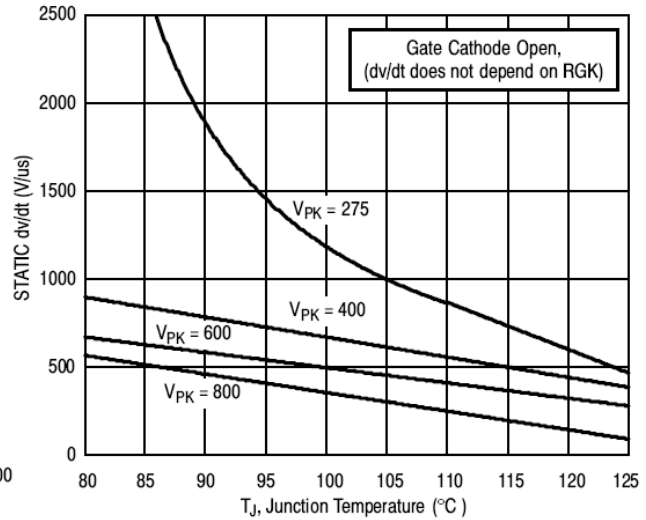


Figure 10. Typical Exponential Static dv/dt Versus Junction Temperature

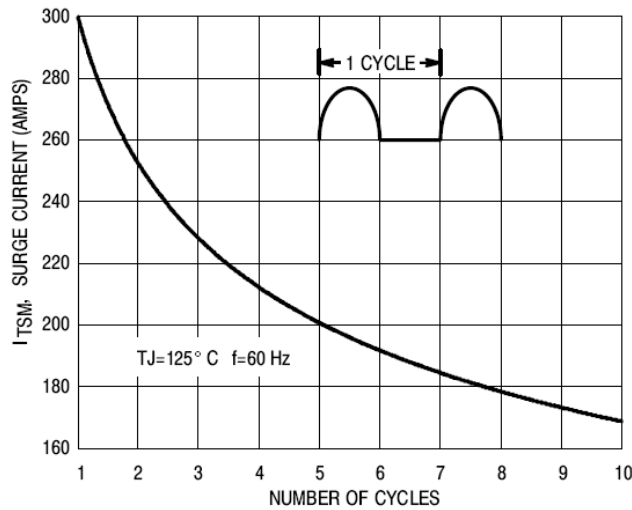


Figure 11. Maximum Non-Repetitive Surge Current