

DIGITRON SEMICONDUCTORS

MCR22 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⁾ ($R_{GK} = 1K$, $T_J = -40$ to $+110^{\circ}C$, sine wave, 50 to 60Hz)			
MCR22-2		50	
MCR22-3		100	
MCR22-4	V_{DRM}	200	V
MCR22-5	V_{RRM}	300	
MCR22-6		400	
MCR22-7		500	
MCR22-8		600	
On-state RMS current (180° conduction angles, $T_C = 80^{\circ}C$)	$I_{T(RMS)}$	1.5	A
Peak non-repetitive surge current (half-cycle, sine wave, 60Hz, $T_A = 25^{\circ}C$)	I_{TSM}	15	A
Circuit fusing consideration (t = 8.3ms)	I^2t	0.9	A ² s
Forward peak gate power (pulse width $\leq 1.0\mu s$, $T_A = 25^{\circ}C$)	P_{GM}	0.5	W
Forward average gate power (t = 8.3ms, $T_A = 25^{\circ}C$)	$P_{G(AV)}$	0.1	W
Forward peak gate current (pulse width $\leq 1.0\mu s$, $T_A = 25^{\circ}C$)	I_{GM}	0.2	A
Reverse peak gate voltage (pulse width $\leq 1.0\mu s$, $T_A = 25^{\circ}C$)	V_{RGM}	5.0	V
Operating temperature range @ rated V_{RRM} and V_{DRM}	T_J	-40 to +110	$^{\circ}C$
Storage temperature range	T_{stg}	-40 to +150	$^{\circ}C$

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	$R_{\theta JC}$	50	$^{\circ}C/W$
Thermal resistance, junction to ambient	$R_{\theta JA}$	160	$^{\circ}C/W$
Lead solder temperature (lead length $\geq 1/16"$ from case, 10s max)	T_L	260	$^{\circ}C$

ELECTRICAL CHARACTERISTICS ($T_C = 25^{\circ}C$, unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Peak forward or reverse blocking current ($V_{AK} = \text{Rated } V_{DRM} \text{ or } V_{RRM}$, $R_{GK} = 1000\Omega$) $T_C = 25^{\circ}C$ $T_C = 110^{\circ}C$	I_{DRM} , I_{RRM}	- -	- -	10 200	μA
ON CHARACTERISTICS					
Peak forward on-state voltage* ($I_{TM} = 1A$)	V_{TM}	-	1.2	1.7	V
Gate trigger current (continuous dc) ⁽²⁾ ($V_{AK} = 6V$, $R_L = 100\Omega$) $T_C = 25^{\circ}C$ $T_C = -40^{\circ}C$	I_{GT}	- -	30 -	200 500	μA
Gate trigger voltage (continuous dc) ⁽²⁾ ($V_{AK} = 7V$, $R_L = 100\Omega$) $T_C = 25^{\circ}C$ $T_C = -40^{\circ}C$	V_{GT}	- -	- -	0.8 1.2	V

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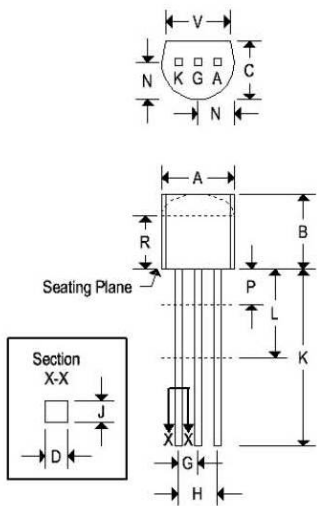
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Gate non-trigger voltage* ($V_{AK} = 12V$, $R_L = 100\Omega$, $T_C = 110^\circ C$)	V_{GD}	0.1	-	-	V
Holding current ($V_{AK} = 12V$, gate open, initiating current = 200mA) $T_C = 25^\circ C$ $T_C = -40^\circ C$	I_H	-	2.0	5.0	mA
DYNAMIC CHARACTERISTICS					
Critical rate of rise of off-state voltage ($T_C = 110^\circ C$)	dv/dt	-	25	-	V/ μs

* Pulse width $\leq 1.0ms$, duty cycle $\leq 1\%$.
Note 2: R_{GK} current not included in measurement.

MECHANICAL CHARACTERISTICS

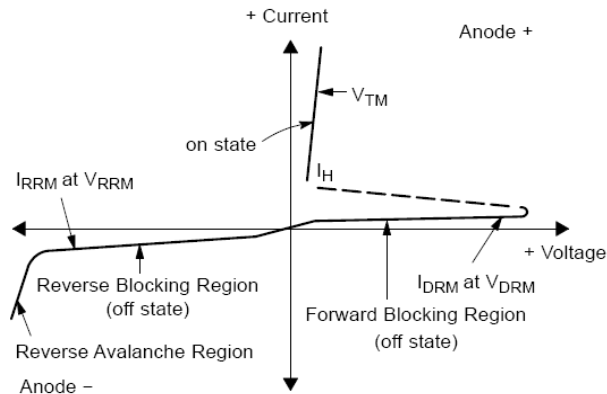
Case	TO-92
Marking	Alpha-numeric
Pin out	See below



	TO-92			
	Inches		Millimeters	
	Min	Max	Min	Max
A	0.175	0.205	4.450	5.200
B	0.170	0.210	4.320	5.330
C	0.125	0.165	3.180	4.190
D	0.016	0.022	0.410	0.550
F	0.016	0.019	0.410	0.480
G	0.045	0.055	1.150	1.390
H	0.095	0.105	2.420	2.660
J	0.015	0.020	0.390	0.500
K	0.500	-	12.700	-
L	0.250	-	6.350	-
N	0.090	0.105	2.040	2.660
P	-	0.100	-	2.540
R	0.115	-	2.930	-
V	0.135	-	3.430	-

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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CURRENT DERATING

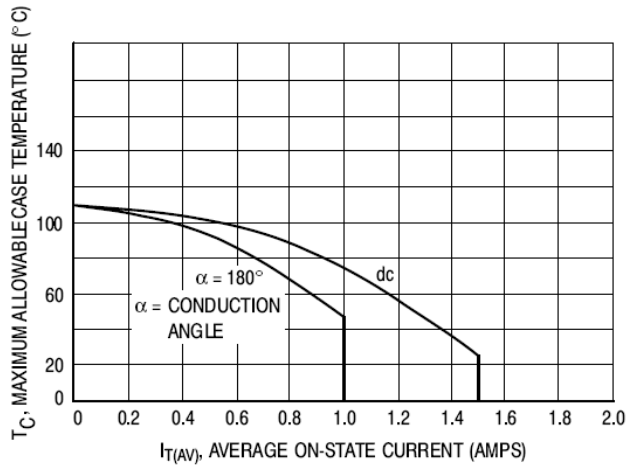


Figure 1. Maximum Case Temperature

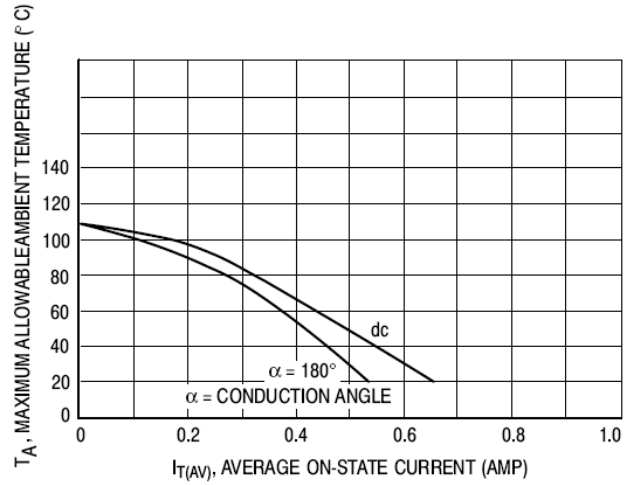


Figure 2. Maximum Ambient Temperature

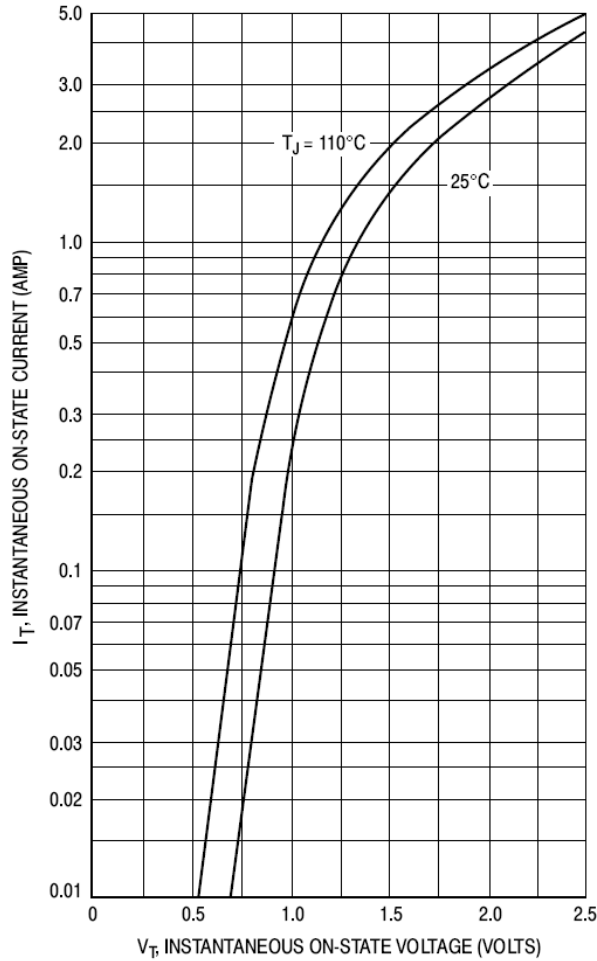


Figure 3. Typical Forward Voltage

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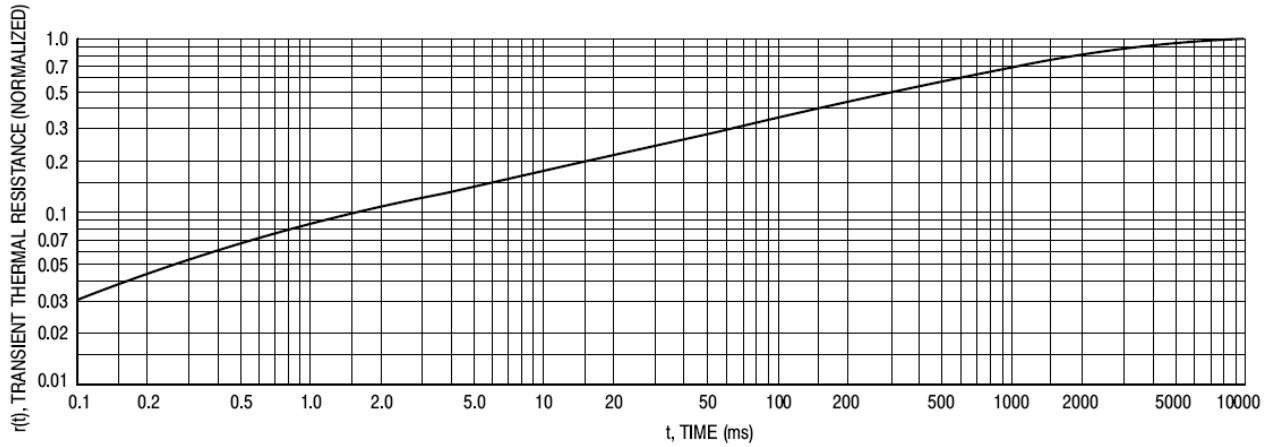


Figure 4. Thermal Response

TYPICAL CHARACTERISTICS

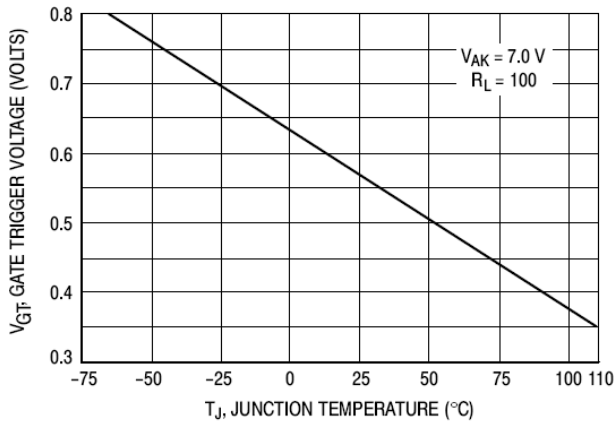


Figure 5. Typical Gate Trigger Voltage

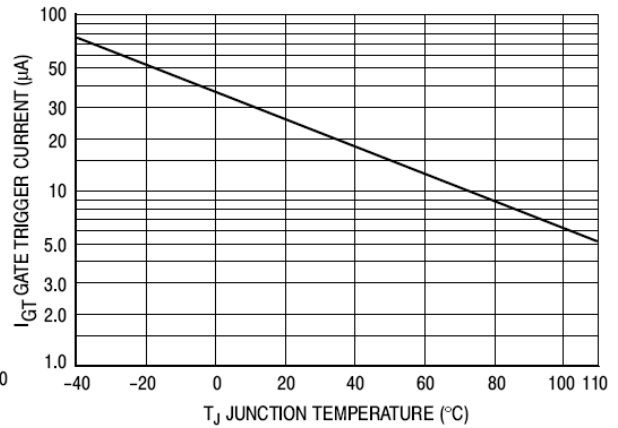


Figure 6. Typical Gate Trigger Current

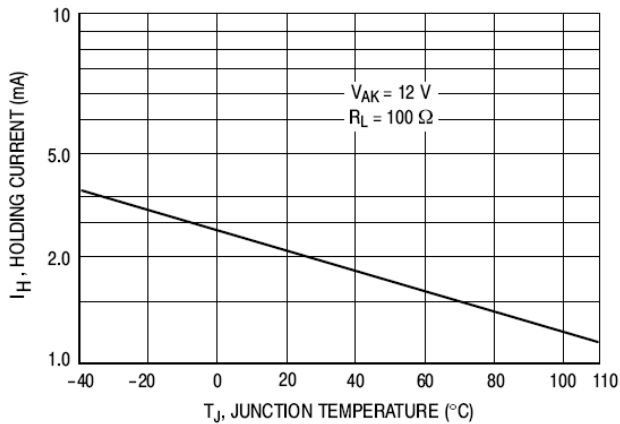


Figure 7. Typical Holding Current

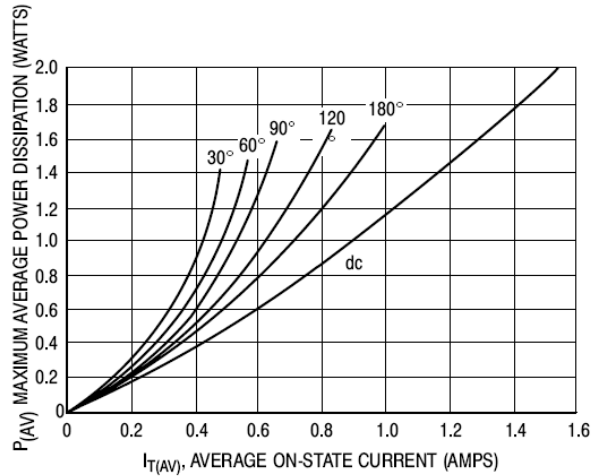


Figure 8. Power Dissipation