DIGITRON™ Semiconductors

High-reliability discrete products
and engineering services since 1977

MCR100 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 +110°C, sine wave, 50 to 60Hz, gate open) MCR100-3 MCR100-4 MCR100-5 MCR100-6 MCR100-7 MCR100-8	V_{DRM} V_{RRM}	 100 200 300 400 500 600	V
On-state RMS current (180° conduction angles, T_C = 80°C)	$I_{T(RMS)}$	0.8	A
Peak non-repetitive surge current (half-cycle, sine wave, 60Hz, T_J = 25°C)	I_{TSM}	10	A
Circuit fusing consideration (t = 8.3ms)	I^2t	0.415	A^2s
Forward peak gate power (pulse width ≤ 1.0µs, T_A = 25°C)	P_{GM}	0.1	W
Forward average gate power (t = 8.3ms, T_A = 25°C)	$P_{G(AV)}$	0.10	W
Forward peak gate current (pulse width ≤ 1.0µs, T_A = 25°C)	I_{GM}	1.0	A
Reverse peak gate voltage (pulse width ≤ 1.0µs, T_A = 25°C)	V_{GRM}	5.0	V
Operating junction temperature range @ rated V_{RRM} and V_{DRM}	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	$R_{\Theta JC}$	75	°C/W
Thermal resistance, junction to ambient	$R_{\Theta JA}$	200	°C/W
Lead solder temperature (lead length < 1/16” 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[2]					
(V_{AK} = Rated V_{DRM} or V_{RRM}, R_{GK} = 1kΩ)	$I_{DRM,}$				
T_C = 25°C	I_{RRM}	-	-	10	µA
T_C = 110°C		-	-	100	
ON CHARACTERISTICS					
Peak forward on-state voltage*	V_{TM}				V
(I_{TM} = 1.0A peak, @ T_A = 25°C)		-	-	1.7	
Gate trigger current (continuous dc)[3]	I_{GT}				µA
(V_{AK} = 7V, R_L = 100Ω, T_C = 25°C)		-	40	200	
Holding current [2]					
(V_{AK} = 7V, initiating current = 20mA)	I_H				mA
T_C = 25°C		-	0.5	5.0	
T_C = -40°C		-	-	10	
Latch current					
(V_{AK} = 7V, I_g = 200µA)	I_L				mA
T_C = 25°C		-	0.6	10	
T_C = -40°C		-	-	15	
Gate trigger voltage (continuous dc) [3]	V_{GT}				V
(V_{AK} = 7V, R_L = 100Ω)					
T_C = 25°C		-	0.62	0.8	
T_C = -40°C		-	-	1.2	
DYNAMIC CHARACTERISTICS					
Critical rate of rise of off-state voltage	dv/dt				V/µs
(V_D = rated V_{DRM}, exponential waveform, R_{GK} = 1000Ω, T_J = 110°C)		20	35	-	
Critical rate of rise of on-state current	di/dt				A/µs
(I_{PK} = 20A, PW = 10µsec, di_G/dt = I_{gt} = 20mA)		-	-	50	

Note 2: R_{GK} = 1000Ω included in measurement.
Note 3: Does not include R_{GK} in measurement.
* Pulse test: pulse width ≤ 1.0ms, duty cycle ≤ 1%.

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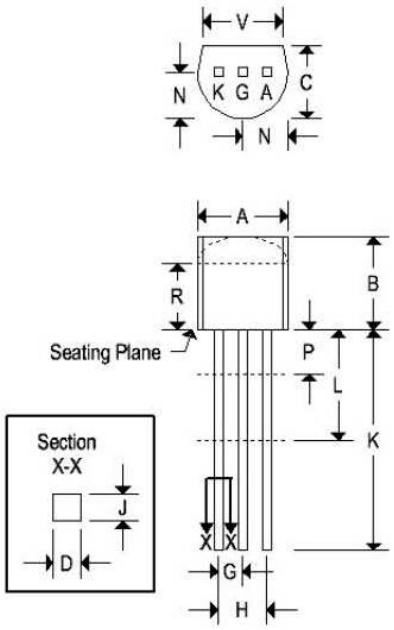
MECHANICAL CHARACTERISTICS

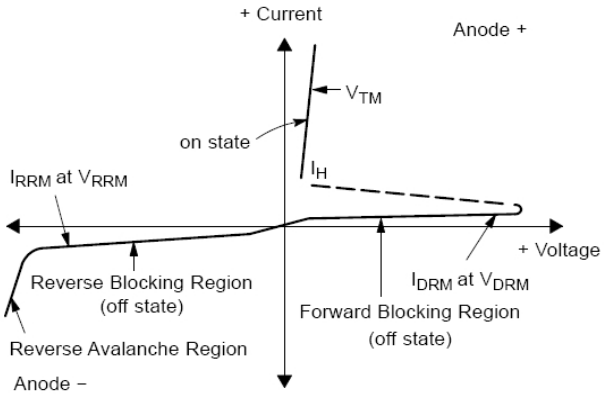
Case:	TO-92
Marking:	Body painted, alpha-numeric
Pin out:	See below



	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	0.080	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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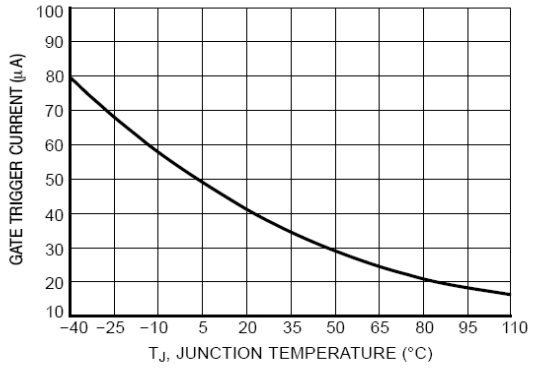

Figure 1. Typical Gate Trigger Current versus Junction Temperature

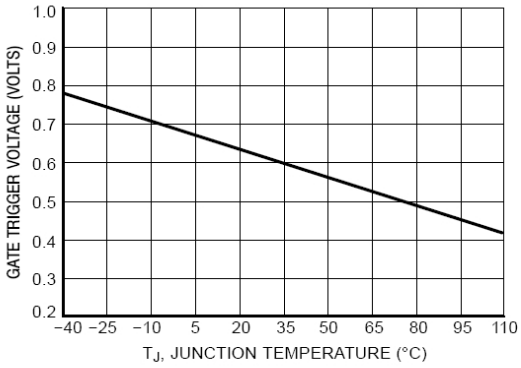

Figure 2. Typical Gate Trigger Voltage versus Junction Temperature

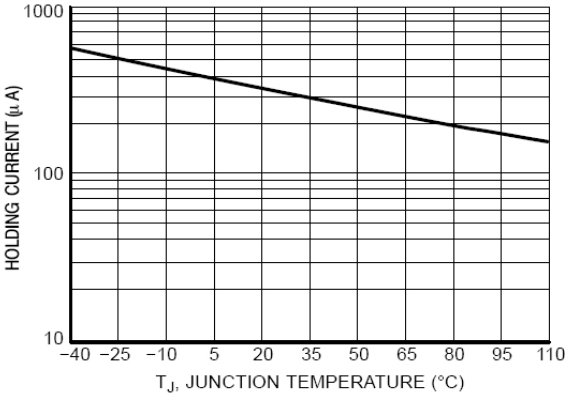

Figure 3. Typical Holding Current versus Junction Temperature

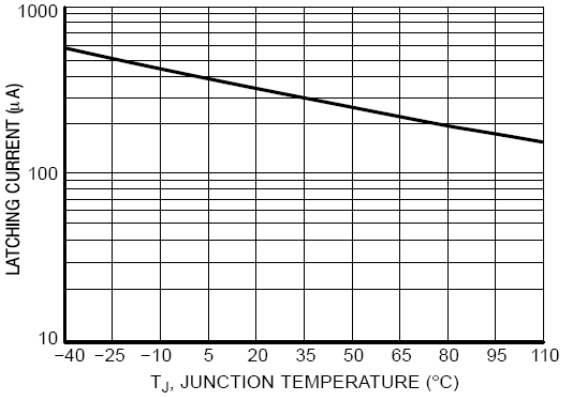

Figure 4. Typical Latching Current versus Junction Temperature

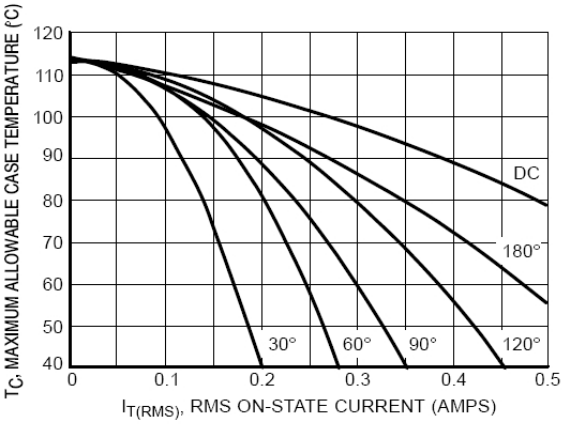

Figure 5. Typical RMS Current Derating

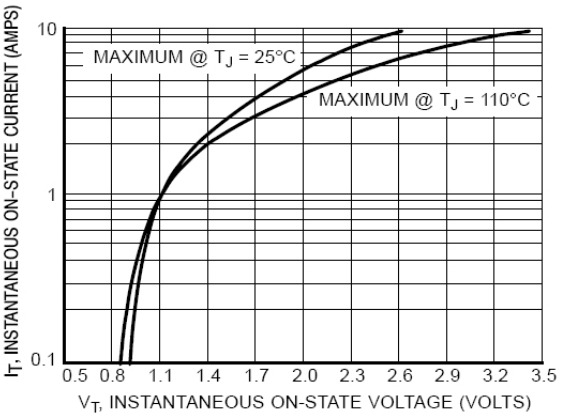

Figure 6. Typical On−State Characteristics