

# DIGITRON SEMICONDUCTORS

## MCR106 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
<b>Peak repetitive off-state voltage<sup>(1)</sup></b> ( $T_J = -40$ to $+110^\circ\text{C}$ , sine wave, 50 to 60Hz, gate open)			
MCR106-1		30	
MCR106-2		60	
MCR106-3	$V_{\text{DRM}}$	100	V
MCR106-4	$V_{\text{RRM}}$	200	
MCR106-5		300	
MCR106-6		400	
MCR106-7		500	
MCR106-8		600	
<b>On-state RMS current</b> (180° conduction angles, $T_C = 93^\circ\text{C}$ )	$I_{\text{T(RMS)}}$	4.0	A
<b>Average on-state current</b> (180° conduction angles, $T_C = 93^\circ\text{C}$ )	$I_{\text{T(AV)}}$	2.55	A
<b>Peak non-repetitive surge current</b> (half-cycle, sine wave, 60Hz, $T_J = 110^\circ\text{C}$ )	$I_{\text{TSM}}$	25	A
<b>Circuit fusing consideration</b> ( $t = 8.3\text{ms}$ )	$I^2t$	2.6	$\text{A}^2\text{s}$
<b>Forward peak gate power</b> (pulse width $\leq 1.0\mu\text{s}$ , $T_C = 93^\circ\text{C}$ )	$P_{\text{GM}}$	0.5	W
<b>Forward average gate power</b> ( $t = 8.3\text{ms}$ , $T_C = 93^\circ\text{C}$ )	$P_{\text{G(AV)}}$	0.1	W
<b>Forward peak gate current</b> (pulse width $\leq 1.0\mu\text{s}$ , $T_C = 93^\circ\text{C}$ )	$I_{\text{GM}}$	0.2	A
<b>Peak reverse gate voltage</b> (pulse width $\leq 1.0\mu\text{s}$ , $T_C = 93^\circ\text{C}$ )	$V_{\text{RGM}}$	6.0	V
<b>Operating junction temperature range</b>	$T_J$	-40 to +110	$^\circ\text{C}$
<b>Storage temperature range</b>	$T_{\text{stg}}$	-40 to +150	$^\circ\text{C}$
<b>Mounting torque<sup>(2)</sup></b>	-	6.0	In. lb.

Note 1:  $V_{\text{DRM}}$  and  $V_{\text{RRM}}$  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.

Note 2: Torque rating applies with use of compression washer. Mounting torque in excess of 6 in. lb. does not appreciably lower case-to-sink thermal resistance. Anode lead and heatsink contact pad are common. For soldering purposes, soldering temperatures should not exceed  $+200^\circ\text{C}$ . For optimum results, an activated flux is recommended.

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Maximum	Unit
<b>Thermal resistance, junction to case</b>	$R_{\theta\text{JC}}$	3.0	$^\circ\text{C/W}$
<b>Thermal resistance, junction to ambient</b>	$R_{\theta\text{JA}}$	75	$^\circ\text{C/W}$
<b>Lead solder temperature</b> (lead length $\geq 1/8''$ from case, 10s max)	$T_L$	260	$^\circ\text{C}$

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

Characteristic	Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>					
<b>Peak forward or reverse blocking current</b> ( $V_{\text{AK}} = \text{Rated } V_{\text{DRM}} \text{ or } V_{\text{RRM}}, R_{\text{GK}} = 1000\Omega$ ) $T_C = 25^\circ\text{C}$ $T_C = 110^\circ\text{C}$	$I_{\text{DRM}}$ $I_{\text{RRM}}$	- -	- -	10 200	$\mu\text{A}$
<b>ON CHARACTERISTICS</b>					
<b>Peak forward on-state voltage<sup>(3)</sup></b> ( $I_{\text{TM}} = 4.0\text{A peak}$ )	$V_{\text{TM}}$	-	-	2.0	V

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**Gate trigger current** (continuous dc) <sup>(4)</sup>

( $V_{AK} = 7V, R_L = 100\Omega$ )

( $T_C = -40^\circ C$ )

**Gate trigger voltage** (continuous dc)<sup>(4)</sup>

( $V_{AK} = 7V, R_L = 100\Omega$ )

**Gate non-trigger voltage**<sup>(4)</sup>

( $V_{AK} = 12V, R_L = 100\Omega, T_J = 110^\circ C$ )

**Holding current**

( $V_{AK} = 7V$ , initiating current = 200mA, gate open)

### DYNAMIC CHARACTERISTICS

**Critical rate of rise of off-state voltage**

( $T_C = 110^\circ C$ )

dv/dt

-

10

-

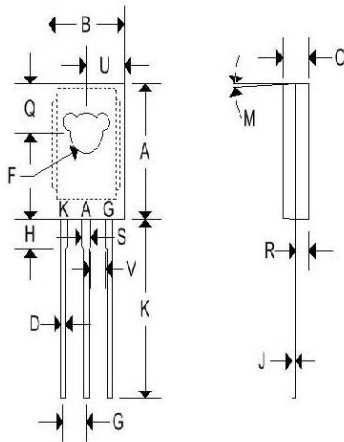
V/ $\mu s$

Note 3: Pulse width  $\leq 1.0ms$ , duty cycle  $\leq 1\%$ .

Note 4:  $R_{GK}$  current is not included in measurement.

### MECHANICAL CHARACTERISTICS

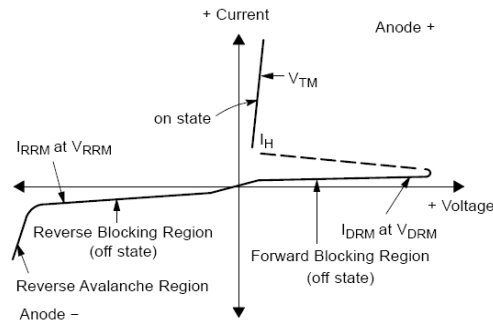
<b>Case</b>	TO-126
<b>Marking</b>	Alpha-numeric
<b>Pin out</b>	See below



TO-126				
	Inches		Millimeters	
	Min	Max	Min	Max
A	0.425	0.435	10.80	11.050
B	0.295	0.305	7.490	7.750
C	0.095	0.105	2.410	2.670
D	0.020	0.026	0.510	0.660
F	0.115	0.125	2.920	3.180
G	0.091	0.097	2.310	2.460
H	0.050	0.095	1.270	2.410
J	0.015	0.025	0.380	0.640
K	0.595	0.655	15.110	16.640
M	3° TYP		3° TYP	
Q	0.148	0.158	3.760	4.010
R	0.045	0.055	1.140	1.400
S	0.025	0.035	0.640	0.890
U	0.145	0.155	3.680	3.940
V	0.040	-	1.020	-

### Voltage Current Characteristic of SCR

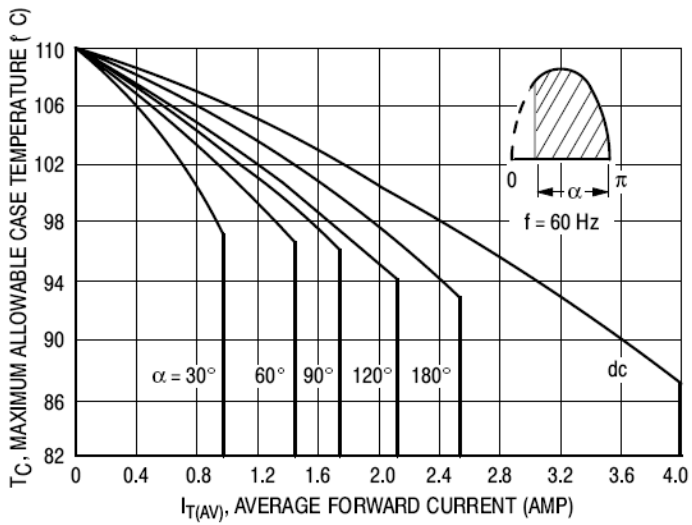
Symbol	Parameter
$V_{DRM}$	Peak Repetitive Off State Forward Voltage
$I_{DRM}$	Peak Forward Blocking Current
$V_{RRM}$	Peak Repetitive Off State Reverse Voltage
$I_{RRM}$	Peak Reverse Blocking Current
$V_{TM}$	Peak On State Voltage
$I_H$	Holding Current



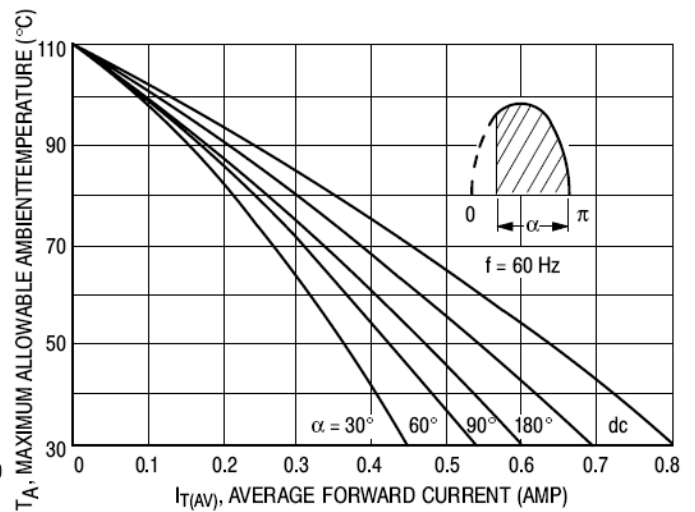
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### CURRENT DERATING



**Figure 1. Maximum Case Temperature**



**Figure 2. Maximum Ambient Temperature**