

# DIGITRON SEMICONDUCTORS

**MCR70 SERIES**  
**MCR71 SERIES**

**35 AMP SILICON CONTROLLED RECTIFIER**  
**55 AMP SILICON CONTROLLED RECTIFIER**

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
			MCR70	MCR71	
Repetitive peak forward or reverse blocking voltage <sup>(1)</sup>	MCR70	$V_{DRM}/V_{RRM}$	25		Volts
	MCR71		50		
			100		
Peak discharge current <sup>(2)</sup>		$I_{TM}$	850	1700	Amps
On-state current ( $T_C \leq 75^\circ\text{C}$ )		$I_{T(RMS)}$	35	55	Amps
		$I_{T(AV)}$	22	35	
Peak non-repetitive surge current (1/2 cycle, sine wave, 60Hz, $T_J = 125^\circ\text{C}$ )		$I_{TSM}$	350	550	Amps
Circuit fusing ( $t = 8.3$ ms)		$I^2t$	510	1255	$A^2s$
Critical rate of rise of current <sup>(3)</sup>		$di/dt$	100	200	$A/\mu s$
Forward peak gate power ( $t \leq 20\mu s$ )		$P_{GM}$	20		Watts
Forward average gate power		$P_{G(AV)}$	0.5		Watts
Forward peak gate current ( $t \leq 20\mu s$ )		$I_{GM}$	2		Amps
Operating junction storage temperature range		$T_J$	-40 to +125		$^\circ\text{C}$
Storage temperature range		$T_{stg}$	-40 to +150		$^\circ\text{C}$
Mounting torque		-	30		In. lb.

1. The rated voltage can be applied over the rated operating junction temperatures without incurring damage. Ratings apply for shorted-open or shorted-gate conditions or negative voltage on the gate. Devices should not be tested for blocking capability in a manner such that the voltage supplied exceeds the rated blocking voltages.
2. Rating is for  $t_w = 1$  ms.
3. Test conditions:  $I_G = 150\text{mA}$ ,  $V_D = \text{Rated } V_{DRM}$ ,  $I_{TM} = \text{Rated value}$ ,  $T_J = 125^\circ\text{C}$ .

## THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal resistance, junction to case	$R_{\theta JC}$	1	$^\circ\text{C}/\text{W}$

## ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Min	Typ	Max	Unit
Peak forward or reverse blocking current (rated $V_{DRM}$ or $V_{RRM}$ ) ( $T_J = 25^\circ\text{C}$ ) ( $T_J = 125^\circ\text{C}$ )	$I_{DRM}, I_{RRM}$	-	-	10	$\mu\text{A}$
		-	-	2	$\text{mA}$
On-state voltage <sup>(1)</sup> ( $I_{TM} = 70\text{A}$ ) ( $I_{TM} = 175\text{A}$ ) ( $I_{TM} = 850\text{A}$ , $t_w = 1\text{ms}$ ) <sup>(2)</sup> ( $I_{TM} = 1700\text{A}$ , $t_w = 1\text{ms}$ ) <sup>(2)</sup>	$V_{TM}$	MCR70 SERIES	1.5	1.85	Volts
		MCR71 SERIES	1.7	2.1	
		MCR70 SERIES	6	-	
		MCR71 SERIES	7	-	
Gate trigger current (continuous dc) ( $V_D = 12\text{V}$ , $R_L = 100\Omega$ )	$I_{GT}$	2	10	30	$\text{mA}$
Gate trigger voltage (continuous dc) ( $V_D = 12\text{V}$ , $R_L = 100\Omega$ ) ( $V_D = \text{rated } V_{DRM}$ , $R_L = 1\text{k}\Omega$ , $T_J = 125^\circ\text{C}$ )	$V_{GT}$	-	1	1.5	Volts
		0.2	-	-	
Holding current ( $I_{TM} = 0.5\text{A}$ , gate open)	$I_H$	3	15	50	$\text{mA}$
Latching current ( $V_D = 12\text{Vdc}$ , $I_G = 150\text{mA}$ , $t_r \leq 50\mu s$ )	$I_L$	-	30	60	$\text{mA}$
Critical rate of rise off state voltage ( $V_D = \text{rated } V_{DRM}$ , gate open, exponential waveform, $T_C = 125^\circ\text{C}$ )	$dv/dt$	10	-	-	$\text{V}/\mu\text{s}$

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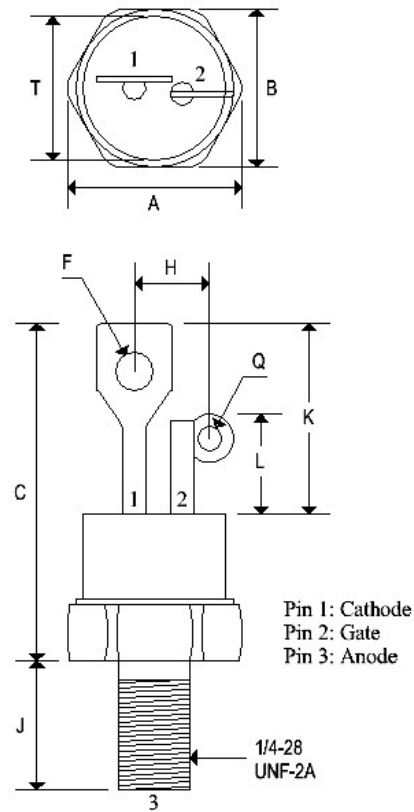
<b>Turn on time</b> <sup>(3)</sup> ( $V_D = \text{rated } V_{DRM}, I_G = 150\text{mA}$ ) ( $I_{TM} = 70\text{A, peak}$ ) ( $I_{TM} = 110\text{A, peak}$ )	MCR70 SERIES MCR71 SERIES	$t_{on}$	- -	1 1.2	$\mu\text{S}$
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**Notes:**

1. Duty cycle  $\leq 1\%$ . Pulse width  $\leq 300\mu\text{s}$ .
2. Characteristic applies for  $t_w = 1\text{ms}$ .  $t_w$  is defined as 5 time constants of an exponentially decaying current pulse.
3. The gate controlled turn-on time in a crowbar circuit will be influenced by the circuit inductance.

**MECHANICAL CHARACTERISTICS**

<b>Case</b>	TO-48
<b>Marking</b>	Body painted, alpha-numeric
<b>Polarity</b>	Cathode is stud



	TO-48			
	Inches		Millimeters	
	Min	Max	Min	Max
A	0.604	0.614	15.340	15.600
B	0.551	0.559	14.000	14.200
C	1.050	1.190	2.670	30.230
F	0.135	0.160	3.430	4.060
H	-	0.265	-	6.730
J	0.420	0.455	10.670	11.560
K	0.620	0.670	15.750	17.020
L	0.300	0.350	7.620	8.890
Q	0.055	0.085	1.400	2.160
T	0.501	0.505	12.730	12.830

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FIGURE 1 - PEAK CAPACITOR DISCHARGE CURRENT

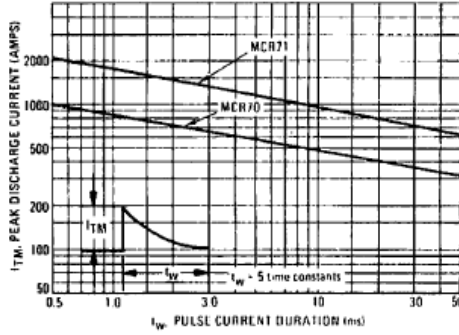


FIGURE 2 - PEAK CAPACITOR DISCHARGE CURRENT DERATING

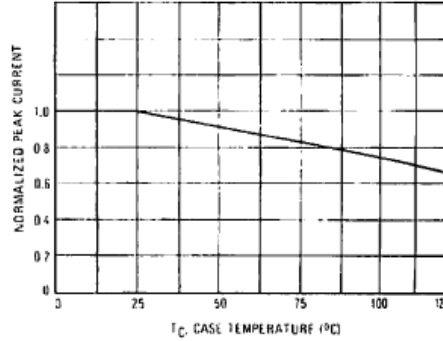


FIGURE 3 - AVERAGE CURRENT DERATING MCR70

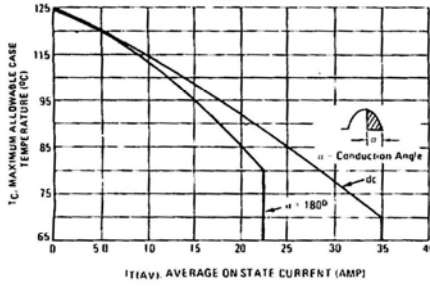


FIGURE 4 - POWER DISSIPATION MCR70

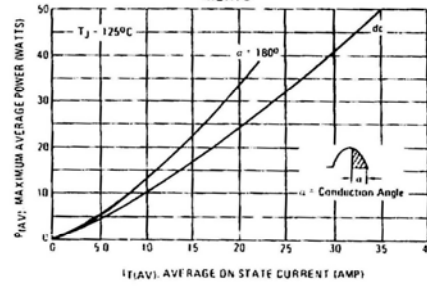


FIGURE 5 - CURRENT DERATING MCR71

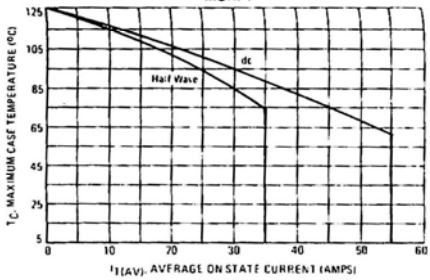


FIGURE 6 - POWER DISSIPATION MCR71

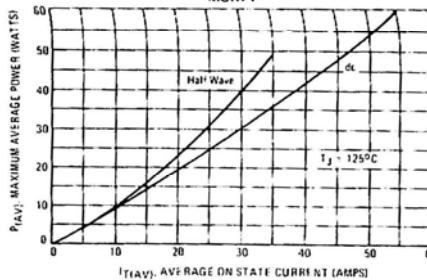
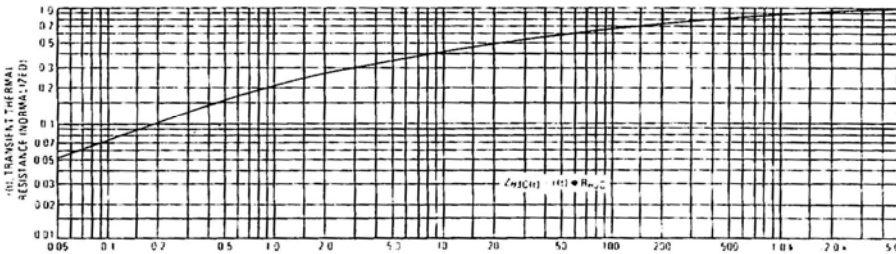


FIGURE 7 - TYPICAL THERMAL RESPONSE



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FIGURE 8 - GATE TRIGGER CURRENT

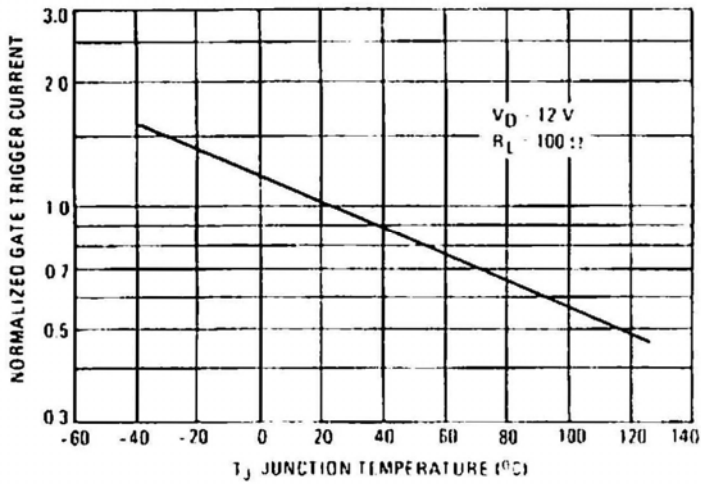


FIGURE 9 - GATE TRIGGER VOLTAGE

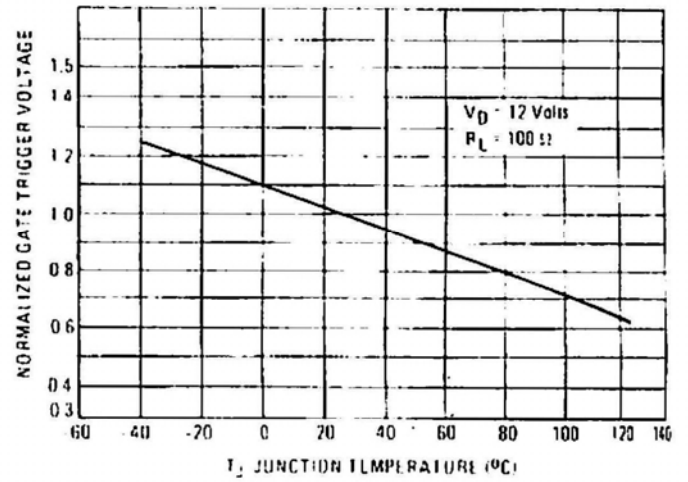


FIGURE 10 - HOLDING CURRENT

