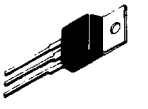
Silicon Controlled Rectifiers
Reverse Blocking Triode Thyristors

MCR68 Series
MCR69 Series

SCRs
12 and 25 AMPERES RMS
50 thru 400 VOLTS



CASE 221A-04
(TO-220AB)
STYLE 3

. . . designed for overvoltage protection in crowbar circuits.

- Glass-Passivated Junctions for Greater Parameter Stability and Reliability
- Center-Gate Geometry for Uniform Current Spreading Enabling High Discharge Current
- Small Rugged, Thermowatt or Metal Packages Constructed for Low Thermal Resistance for Maximum Power Dissipation and Durability
- High Capacitor Discharge Current
  300 Amps (MCR68)
  750 Amps (MCR69)

MAXIMUM RATINGS

Rating	Symbol	Value		Unit
		MCR68	MCR69	
Repetitive Peak Forward or Reverse Blocking Voltage, Note 1 (T_J = −40 to +125°C) -2 / MCR68, 69 -3 / -6	V_{DRM} or V_{RRM}	50 / 100 / 400		Volts
Peak Discharge Current, Note 2	I_{TM}	300	750	Amps
On-State Current (T_C = 85°C) (1/2 Cycle, Sine Wave, 60 Hz)	$I_{T(RMS)}$ / $I_{T(AV)}$	12 / 8	25 / 16	Amps
Peak Non-Repetitive Surge Current (1/2 Cycle, Sine Wave, 60 Hz, T_J = 125°C)	I_{TSM}	100	300	Amps
Circuit Fusing (t = 8.3 ms)	I^2t	40	375	A^2s
Critical Rate-of-Rise of Current (Note 3)	di/dt	75	100	A/μs
Peak Gate Current (t ≤ 2 μs)	I_{GM}	2		Amps
Peak Gate Power (t ≤ 2 μs)	P_{GM}	20		Watts
Average Gate Power	$P_{G(AV)}$	0.5		Watt
Operating Junction Temperature Range	T_J	−40 to +125		°C
Storage Temperature Range	T_{stg}	−40 to +150		°C
Mounting Torque	—	8		in. lb.

THERMAL CHARACTERISTICS

Thermal Resistance, Junction to Case	$R_{\theta JC}$	2	1.5	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	60		°C/W

Notes: 1. V_{DRM} for all types can be applied on a continuous basis over the operating junction temperature range without recurring damage. Ratings apply for open or shorted gate conditions or negative voltage on the gate. Devices should not be tested for blocking voltages such that the supply voltage exceeds the rating of the device.
2. Ratings apply for t_w = 1 ms. See Figure 1 for I_{TM} capability for various duration of an exponentially decaying current waveform, t_w is defined as 5 time constants of an exponentially decaying current pulse.
3. Test Conditions: I_G = 150 mA, V_D = Rated V_{DRM}, I_{TM} = Rated Value, T_J = 125°C.

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ELECTRICAL CHARACTERISTICS (T_C = 25 C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Forward or Reverse Blocking Current	I_{DRM}, I_{RRM}				
(Rated V_{DRM} or V_{RRM}) T_J = 25 C		—	—	10	μA
T_J = 125 C		—	—	2	mA
Forward On-State Voltage	V_{TM}				Volts
(I_{TM} = 24 Amps), Note 1 MCR68		—	—	2.2	
(I_{TM} = 50 Amps), Note 1 MCR69		—	—	1.8	
(I_{TM} = 300 Amps, t_w = 1 ms), Note 2 MCR68		—	6	—	
(I_{TM} = 750 Amps, t_w = 1 ms), Note 2 MCR69		—	6	—	
Gate Trigger Current (Continuous dc)	I_{GT}	2	7	30	mA
(V_D = 12 V, R_L = 100 Ω)					
Gate Trigger Voltage (Continuous dc)	V_{GT}				volts
(V_D = 12 Volts, R_L = 100 Ω)		—	0.65	1.5	
(V_D = Rated V_{DRM}, R_L = 1 kΩ, T_J = 125°C)		0.2	0.40	—	
Holding Current	I_H	3	15	50	mA
(I_{TM} = 100 mA, Gate-Open)					
Latching Current	I_L	—	—	60	mA
(V_D = 12 Vdc, I_G = 150 mA, t_r = 50 μs)					
Critical Rate-of-Rise of Off-State Voltage	dv/dt	10	—	—	V/μs
(V_D = Rated V_{DRM}, Gate Open, Exponential Waveform, T_J = 125°C)					
Gate Controlled Turn-On Time, Note 3	t_{gt}				μs
(V_D = Rated V_{DRM}, I_G = 150 mA)					
(I_{TM} = 24 Amps, peak) MCR68		—	1	—	
(I_{TM} = 50 Amps, peak) MCR69		—	1	—	

Notes: 1. Pulse duration = 300 μs, duty cycle = 2%.
2. Ratings apply for t_w = 1 ms. See Figure 1 for I_{TM} capability for various durations of an exponentially decaying current waveform. 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.

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FIGURE 1 – PEAK CAPACITOR DISCHARGE CURRENT

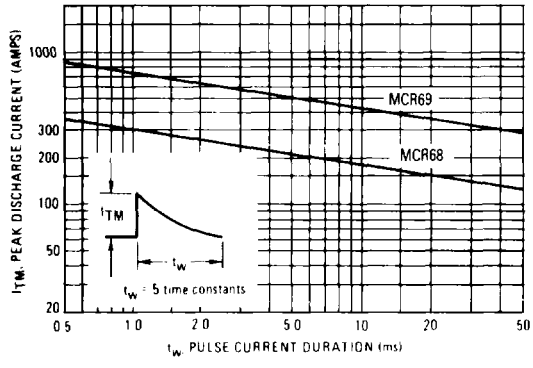

FIGURE 2 – PEAK CAPACITOR DISCHARGE CURRENT DERATING

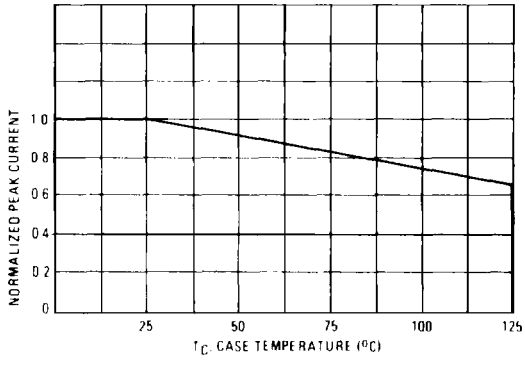

FIGURE 3 — CURRENT DERATING
MCR68

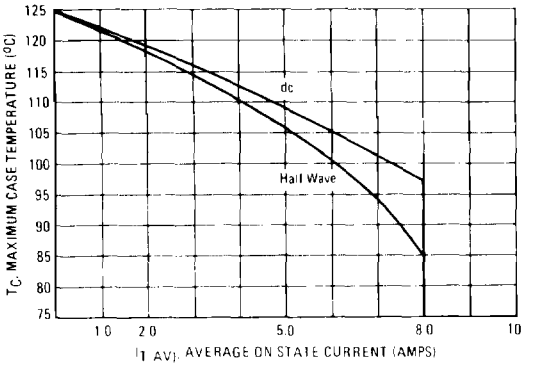

FIGURE 4 – CURRENT DERATING
MCR69

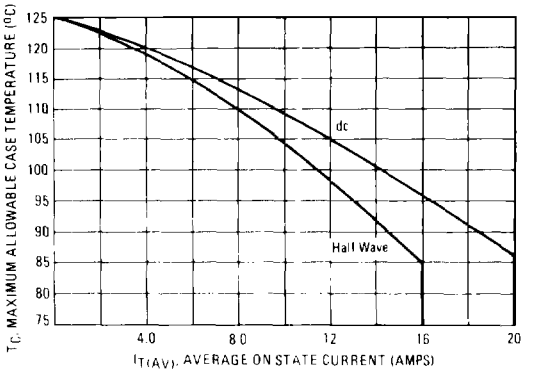

FIGURE 5 — MAXIMUM POWER DISSIPATION
MCR68

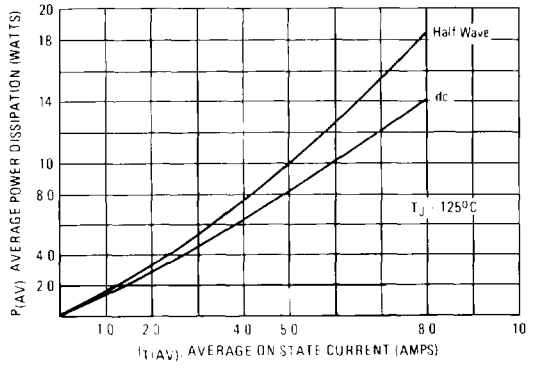

FIGURE 6 – MAXIMUM POWER DISSIPATION
MCR69

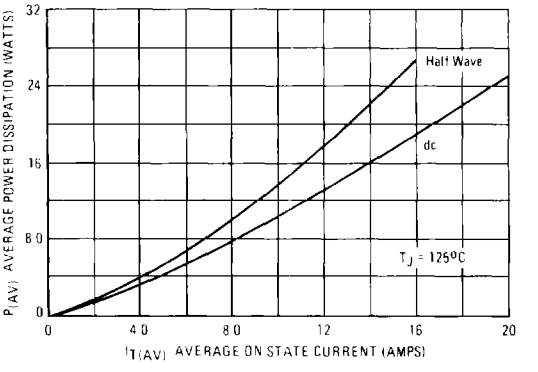

FIGURE 7 – THERMAL RESPONSE

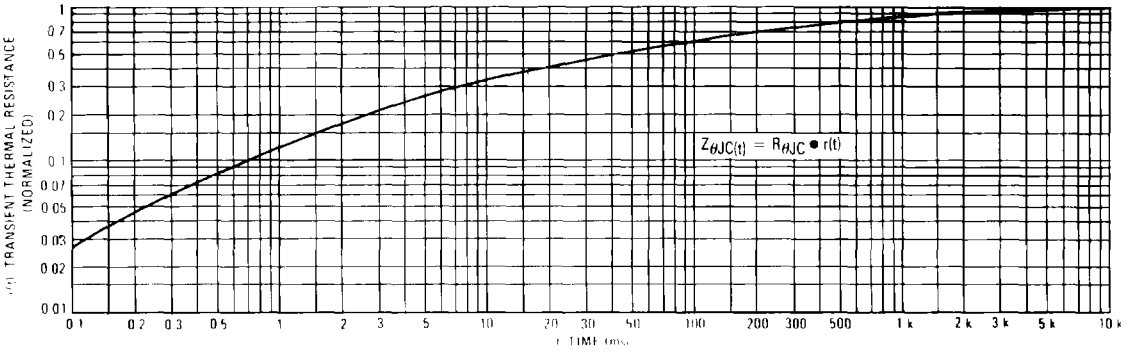

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FIGURE 8 – GATE TRIGGER CURRENT

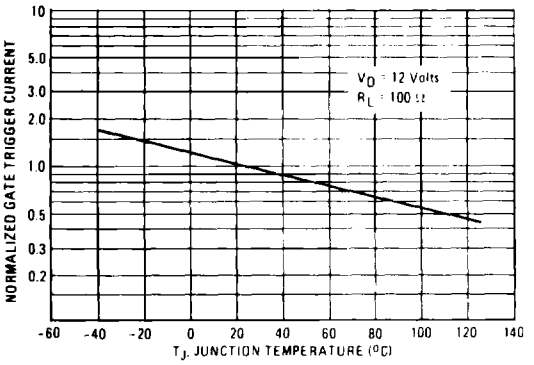


FIGURE 9 – GATE TRIGGER VOLTAGE

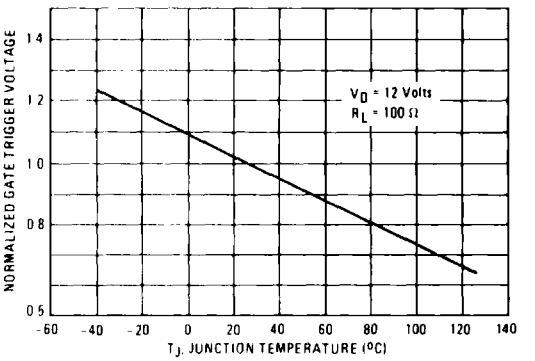
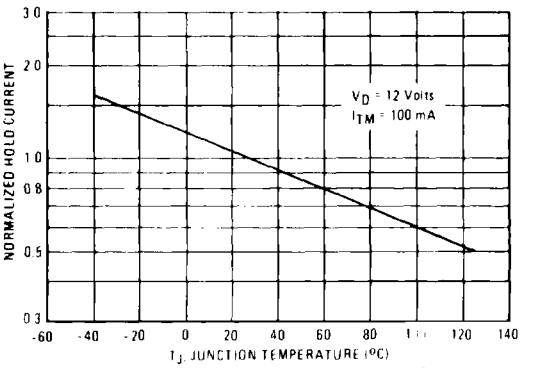


FIGURE 10 – HOLDING CURRENT



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