

Silicon Controlled Rectifiers

Reverse Blocking Triode Thyristors

- ... 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 (MCR67, 68)
750 Amps (MCR69)

**MCR67
Series
MCR68
Series
MCR69
Series**

**SCRs
12 and 25 AMPERES RMS
50 thru 400 VOLTS**

MAXIMUM RATINGS

Rating	Symbol	Value			Unit
		MCR67	MCR68	MCR69	
Repetitive Peak Forward or Reverse Blocking Voltage, Note 1 ($T_J = -40$ to $+125^\circ\text{C}$)	V_{DRM} or V_{RRM}				Volts
MCR67, 68, 69		-2	50		
		-3	100		
		-6	400		
Peak Discharge Current, Note 2	I_{TM}	300	300	750	Amps
On-State Current ($T_C = 85^\circ\text{C}$) (1/2 Cycle, Sine Wave, 60 Hz)	$I_T(\text{RMS})$	12	12	25	Amps
	$I_T(\text{AV})$	8	8	16	
Peak Non-Repetitive Surge Current (1/2 Cycle, Sine Wave, 60 Hz, $T_J = 125^\circ\text{C}$)	I_{TSM}	100	100	300	Amps
Circuit Fusing ($t = 8.3$ ms)	I^2t	40	40	375	A^2s
Critical Rate-of-Rise of Current (Note 3)	di/dt	75		100	$\text{A}/\mu\text{s}$
Peak Gate Current ($t \leq 2 \mu\text{s}$)	I_{GM}	2			Amps
Peak Gate Power ($t \leq 2 \mu\text{s}$)	P_{GM}	20			Watts
Average Gate Power	$P_{G(\text{AV})}$	0.5			Watt
Operating Junction Temperature Range	T_J	-40 to +125			$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-40 to +150			$^\circ\text{C}$
Mounting Torque	—	15	8	8	in. lb.



**CASE 221A-04
(TO-220AB)
STYLE 3
MCR68/MCR69 Series**



**CASE 86-01
STYLE 1
MCR67 Series**

THERMAL CHARACTERISTICS

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

- 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, $V_D = \text{Rated } V_{DRM}$. $I_{TM} = \text{Rated Value}$, $T_J = 125^\circ\text{C}$.

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

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Forward or Reverse Blocking Current (Rated V _{DRM} or V _{RRM}) T _J = 25°C T _J = 125°C	I _{DRM} , I _{RRM}	— —	— —	10 2	μA mA
Forward On-State Voltage (I _{TM} = 24 Amps), Note 1 (I _{TM} = 50 Amps), Note 1 (I _{TM} = 300 Amps, t _w = 1 ms), Note 2 (I _{TM} = 750 Amps, t _w = 1 ms), Note 2	V _{TM}	— — — —	— — 6 6	2.2 1.8 — —	Volts
Gate Trigger Current (Continuous dc) (V _D = 12 V, R _L = 100 Ω)	I _{GT}	2	7	30	mA
Gate Trigger Voltage (Continuous dc) (V _D = 12 Volts, R _L = 100 Ω) (V _D = Rated V _{DRM} , R _L = 1 kΩ, T _J = 125°C)	V _{GT}	— 0.2	— 0.40	1.5 —	volts
Holding Current (I _{TM} = 100 mA, Gate-Open)	I _H	3	15	50	mA
Latching Current (V _D = 12 Vdc, I _G = 150 mA, t _r ≤ 50 μs)	I _L	—	—	60	mA
Critical Rate-of-Rise of Off-State Voltage (V _D = Rated V _{DRM} , Gate Open, Exponential Waveform, T _J = 125°C)	dv/dt	10	—	—	V/μs
Gate Controlled Turn-On Time, Note 3 (V _D = Rated V _{DRM} , I _G = 150 mA) (I _{TM} = 24 Amps, peak) (I _{TM} = 50 Amps, peak)	t _{gt}	— —	— 1 1	— — —	μs

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.

MOTOROLA SC (DIODES/OPTO) 25E D

FIGURE 1 — PEAK CAPACITOR DISCHARGE CURRENT

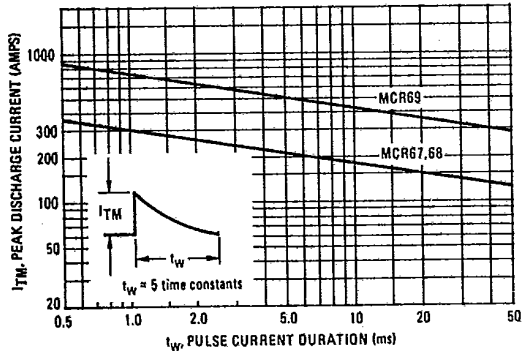


FIGURE 2 — PEAK CAPACITOR DISCHARGE CURRENT DERATING

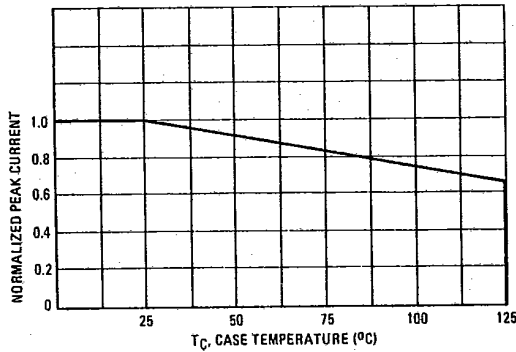


FIGURE 3 - CURRENT DERATING
MCR67,68

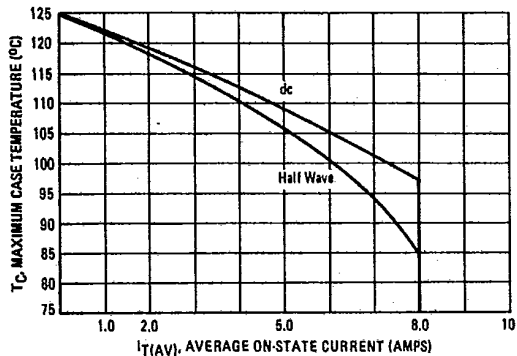
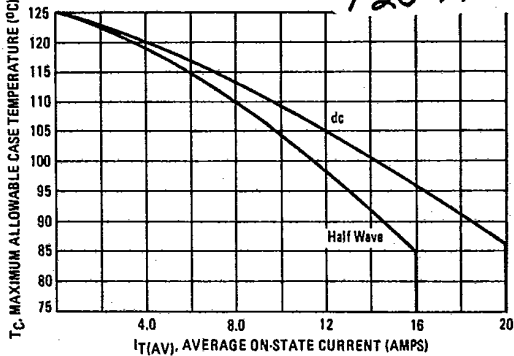


FIGURE 4 - CURRENT DERATING
MCR69



MOTOROLA SC (DIODES/OPTO) 25E D

FIGURE 5 - MAXIMUM POWER DISSIPATION
MCR67,68

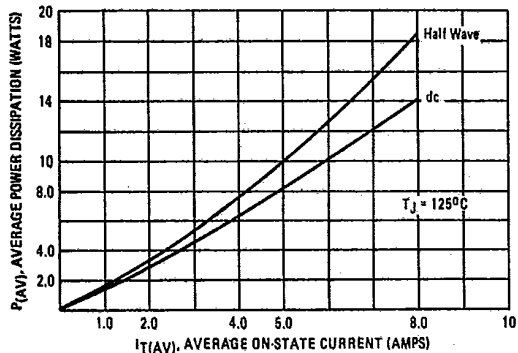


FIGURE 6 - MAXIMUM POWER DISSIPATION
MCR69

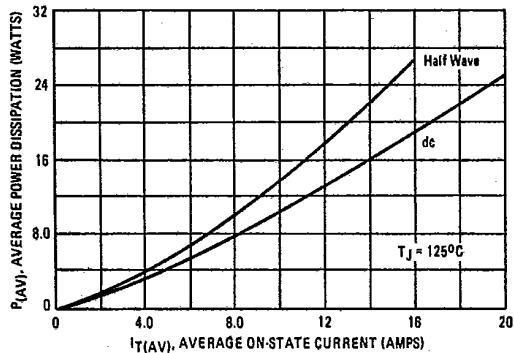


FIGURE 7 - THERMAL RESPONSE

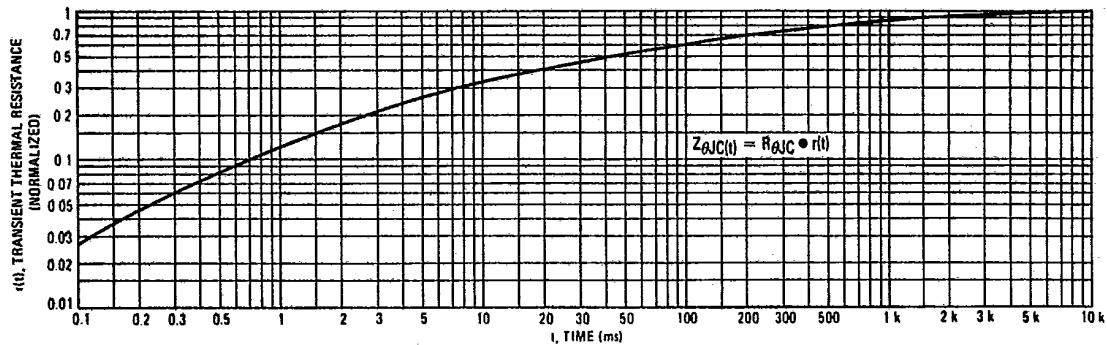


FIGURE 8 - GATE TRIGGER CURRENT

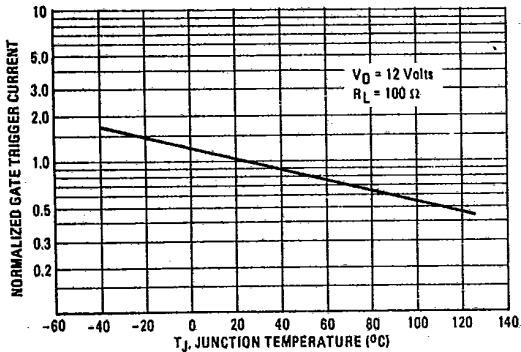
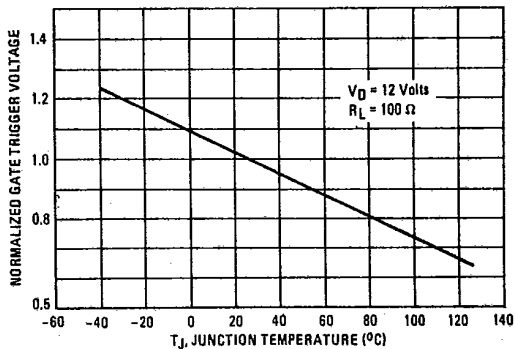


FIGURE 9 - GATE TRIGGER VOLTAGE



MOTOROLA SC (DIODES/OPTO) 25E D

FIGURE 10 - HOLDING CURRENT

