MOTOROLA
SEMICONDUCTOR TECHNICAL DATA

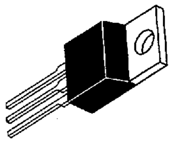
Silicon Controlled Rectifiers
Reverse Blocking Triode Thyristors

. . . designed for industrial and consumer applications such as temperature, light and speed control; process and remote controls; warning systems; capacitive discharge circuits and MPU interface.

- Center Gate Geometry for Uniform Current Density
- All Diffused and Glass-Passivated Junctions for Parameter Uniformity and Stability
- Small, Rugged Thermowatt Construction for Low Thermal Resistance, High Heat Dissipation and Durability
- Low Trigger Currents, 200 μA Maximum for Direct Driving from Integrated Circuits

MCR72 Series

SCRs
8 AMPERES RMS
50 thru 800 VOLTS



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

MAXIMUM RATINGS (T_J = 25°C unless otherwise noted.)

Rating	Symbol	Value	Unit
Peak Repetitive Forward and Reverse Blocking Voltage(1) (T_J = −40 to 110°C, 1/2 Sine Wave, R_{GK} = 1kΩ)	V_{DRM} or V_{RRM}		Volts
MCR72-2		50	
MCR72-3		100	
MCR72-4		200	
MCR72-6		400	
MCR72-8		600	
MCR72-10		800	
On-State RMS Current (T_C = 83°C)	$I_{T(RMS)}$	8	Amps
Peak Non-repetitive Surge Current (1/2 Cycle, 60 Hz, T_J = −40 to 110°C)	I_{TSM}	100	Amps
Circuit Fusing (t = 8.3 ms)	I^2t	40	A^2s
Peak Gate Voltage (t ≤ 10 μs)	V_{GM}	±5	Volts
Peak Gate Current (t ≤ 10 μs)	I_{GM}	1	Amp
Peak Gate Power (t ≤ 10 μs)	P_{GM}	5	Watts
Average Gate Power	$P_{G(AV)}$	0.75	Watts
Operating Junction Temperature Range	T_J	−40 to +110	°C

(cont.)

1. V_{DRM} and V_{RRM} for all types can be applied on a continuous basis. Ratings apply for zero or negative gate voltage; however, 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.

MAXIMUM RATINGS — continued

Rating	Symbol	Value	Unit
Storage Temperature Range	T_{stg}	–40 to + 150	°C
Mounting Torque	—	8	in. lb.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.2	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	60	°C/W

ELECTRICAL CHARACTERISTICS (T_C = 25°C, R_{GK} = 1 kΩ unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Forward or Reverse Blocking Current(1) (V_{AK} = Rated V_{DRM} or V_{RRM}) T_J = 25°C T_J = 110°C	I_{DRM}, I_{RRM}	— —	— —	10 500	μA μA
On-State Voltage (I_{TM} = 16 A Peak, Pulse Width ≤ 1 ms, Duty Cycle ≤ 2%)	V_{TM}	—	1.7	2	Volts
Gate Trigger Current (Continuous dc)(2) (V_D = 12 V, R_L = 100 Ω)	I_{GT}	—	30	200	μA
Gate Trigger Voltage (Continuous dc) (V_D = 12 V, R_L = 100 Ω) (V_D = Rated V_{DRM}, R_L = 10 kΩ, T_J = 110°C)	V_{GT}	— 0.1	0.5 —	1.5 —	Volts
Holding Current (V_D = 12 V, I_{TM} = 100 mA)	I_H	—	—	6	mA
Critical Rate-of-Rise of Forward Blocking Voltage (V_D = Rated V_{DRM}, T_J = 110°C, Exponential Waveform)	dv/dt	—	10	—	V/μs
Gate Controlled Turn-On Time (V_D = Rated V_{DRM}, I_{TM} = 16 A, I_G = 2 mA)	t_{gt}	—	1	—	μs

1. Ratings apply for negative gate voltage or R_{GK} = 1 kΩ. Devices shall not have a positive gate voltage concurrently with a negative voltage on the anode. Devices should not be tested with a constant current source for forward and reverse blocking capability such that the voltage applied exceeds the rated blocking voltage.
2. Does not include R_{GK} current.

FIGURE 1 – AVERAGE CURRENT DERATING

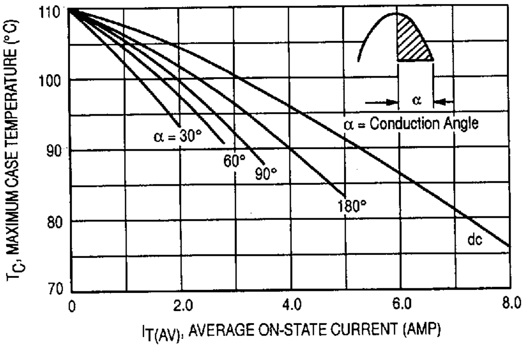


FIGURE 2 – ON-STATE POWER DISSIPATION

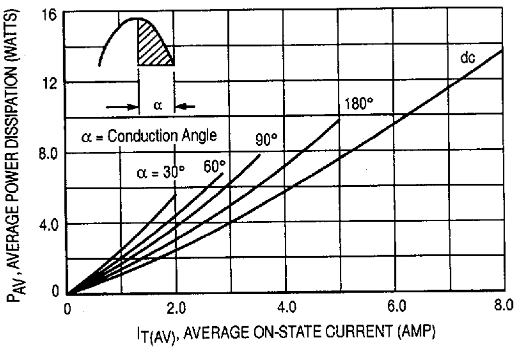


FIGURE 3 – NORMALIZED GATE CURRENT

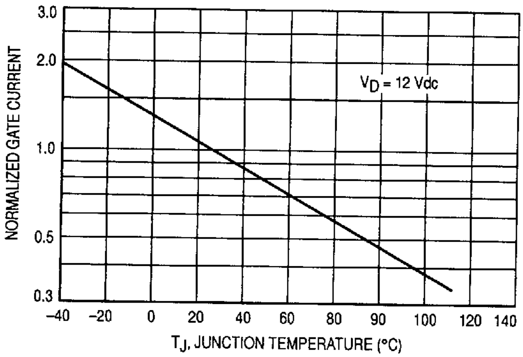


FIGURE 4 – GATE VOLTAGE