

MOTOROLA
SEMICONDUCTOR
TECHNICAL DATA

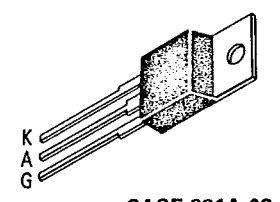
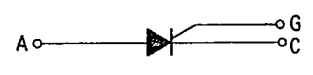
Silicon Controlled Rectifiers
Reverse Blocking Triode Thyristor

... 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 μ A Maximum for Direct Driving from Integrated Circuits

MCR310
Series

SCRs
10 AMPERES RMS
25 thru 600 VOLTS

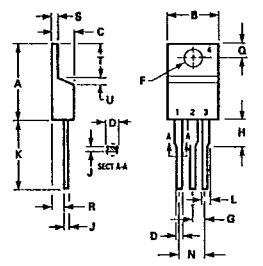


CASE 221A-02
TO-220AB

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak Repetitive Forward and Reverse Blocking Voltage (Note 1) ($T_J = -40$ to 110°C) (1/2 Sine Wave, $R_{GK} = 1 \text{ k}\Omega$)	V_{DRM} or V_{RRM}		Volts
-1		25	
-2		50	
-3		100	
-4	MCR310	200	
-5		300	
-6		400	
-7		500	
-8		600	
On-State RMS Current ($T_C = 75^\circ\text{C}$)	$I_T(\text{RMS})$	10	Amps
Peak Non-Repetitive Surge Current (1/2 Cycle, 60 Hz, $T_J = -40$ to 110°C)	I_{TSM}	100	Amps
Circuit Fusing ($t = 1$ to 8.3 ms)	I^2t	40	A^2s
Peak Gate Voltage ($t \leq 10 \mu\text{s}$)	V_{GM}	± 5	Volts
Peak Gate Current ($t \leq 10 \mu\text{s}$)	I_{GM}	1	Amp
Peak Gate Power ($t \leq 10 \mu\text{s}$)	P_{GM}	5	Watts
Average Gate Power	$P_{G(AV)}$	0.75	Watt
Operating Junction Temperature Range	T_J	-40 to $+110$	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-40 to $+150$	$^\circ\text{C}$
Mounting Torque	—	8	in-lb

OUTLINE DIMENSIONS



NOTES:
1. DIMENSION H APPLIES TO ALL LEADS.
2. DIMENSION L APPLIES TO LEADS 1 AND 3.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.
4. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
5. CONTROLLING DIMENSION: INCH.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	14.60	15.75	0.575	0.620
B	8.65	10.29	0.340	0.405
C	4.06	4.87	0.160	0.190
D	0.64	0.89	0.025	0.035
F	3.61	3.73	0.142	0.147
G	2.41	2.67	0.095	0.105
H	2.73	3.33	0.110	0.130
J	0.36	0.56	0.014	0.022
K	12.70	14.27	0.500	0.562
L	1.14	1.29	0.045	0.050
M	4.83	5.33	0.190	0.210
N	2.54	3.04	0.100	0.120
R	2.04	2.73	0.080	0.110
S	1.14	1.39	0.045	0.055
T	5.97	6.46	0.235	0.255
U	0.59	1.27	0.020	0.050
V	1.14	—	0.045	—
Z	—	2.01	—	0.080

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THERMAL CHARACTERISTICS

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

NOTE 1: Ratings apply for negative gate voltage or $R_{GK} = 1 \text{ k}\Omega$. 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.

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ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$, $R_{GK} = 1\text{ k}\Omega$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Forward Blocking Current (Note 1) ($T_J = 110^\circ\text{C}$, $V_D = \text{Rated } V_{DRM}$)	I_{DRM}	—	—	500	μA
Peak Reverse Blocking Current (Note 1) ($T_J = 110^\circ\text{C}$, $V_R = \text{Rated } V_{RRM}$)	I_{RRM}	—	—	500	μA
On-State Voltage ($I_{TM} = 20\text{ A Peak}$, Pulse Width $\leq 1\text{ ms}$, Duty Cycle $\leq 2\%$)	V_{TM}	—	1.7	2.2	Volts
Gate Trigger Current, Continuous dc (Note 2) ($V_D = 12\text{ V}$, $R_L = 100\ \Omega$)	I_{GT}	—	30	200	μA
Gate Trigger Voltage, Continuous dc ($V_D = 12\text{ V}$, $R_L = 100\ \Omega$) ($V_D = \text{Rated } V_{DRM}$, $R_L = 10\text{ k}\Omega$, $T_J \approx 110^\circ\text{C}$)	V_{GT}	— 0.1	0.5 —	1.5 —	Volts
Holding Current ($V_D = 12\text{ V}$, $I_{TM} = 100\text{ mA}$)	I_H	—	—	6	mA
Critical Rate of Rise of Forward Blocking Voltage ($V_D = \text{Rated } V_{DRM}$, $T_J = 110^\circ\text{C}$, Exponential Waveform)	dv/dt	—	10	—	V/ μs
Gate Controlled Turn On Time ($V_D = \text{Rated } V_{DRM}$, $I_{TM} = 20\text{ A}$, $I_G = 2\text{ mA}$)	t_{gt}	—	1	—	μs

NOTES:

1. Ratings apply for negative gate voltage or $R_{GK} = 1\text{ k}\Omega$. 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.

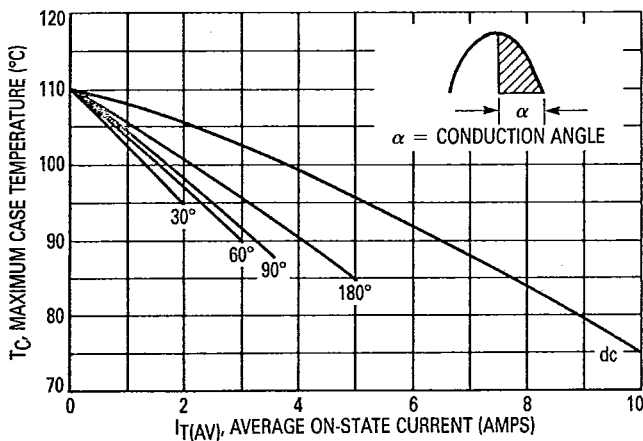


Figure 1. Average Current Derating

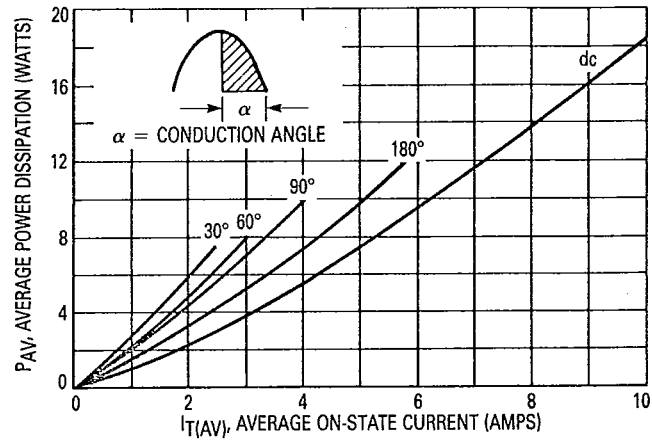


Figure 2. On-State Power Dissipation

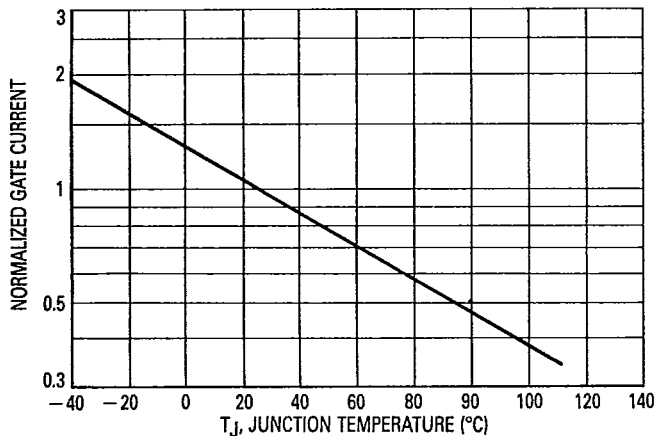


Figure 3. Normalized Gate Current

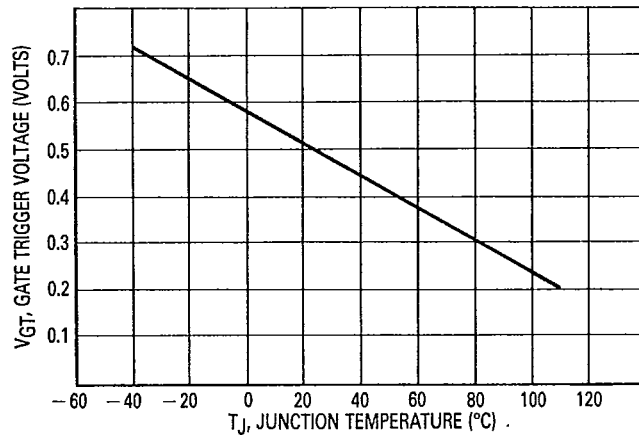


Figure 4. Gate Voltage

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MCR310 Series

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