

## Silicon Controlled Rectifiers

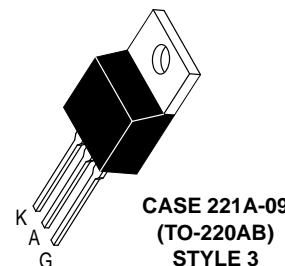
### Reverse Blocking Triode Thyristors

... 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  $\mu$ A Maximum for Direct Driving from Integrated Circuits

## MCR310 Series

**SCRs**  
**10 AMPERES RMS**  
**400 thru 800 VOLTS**



#### MAXIMUM RATINGS ( $T_J = 25^\circ\text{C}$ unless otherwise noted.)

Rating	Symbol	Value	Unit
Peak Repetitive Forward and Reverse Blocking Voltage <sup>(1)</sup> ( $T_J = -40$ to $110^\circ\text{C}$ ) (1/2 Sine Wave, $R_{GK} = 1 \text{ k}\Omega$ )	$V_{DRM}$ or $V_{RRM}$		Volts
MCR310-6		400	
MCR310-8		600	
MCR310-10		800	
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 $110^\circ\text{C}$ )	$I_{TSM}$	100	Amps
Circuit Fusing ( $t = 8.3 \text{ ms}$ )	$I^2t$	40	$\text{A}^2\text{s}$
Peak Gate Voltage ( $t \leq 10 \mu\text{s}$ )	$V_{GM}$	$\pm 5$	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.

#### 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	$^\circ\text{C/W}$

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.

REV 1

## MCR310 Series

### 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 <sup>(1)</sup> ( $T_J = 110^\circ\text{C}$ , $V_D = \text{Rated } V_{DRM}$ )	$I_{DRM}$	—	—	500	$\mu\text{A}$
Peak Reverse Blocking Current <sup>(1)</sup> ( $T_J = 110^\circ\text{C}$ , $V_R = \text{Rated } V_{RRM}$ )	$I_{RRM}$	—	—	500	$\mu\text{A}$
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 <sup>(2)</sup> ( $V_D = 12\text{ V}$ , $R_L = 100\ \Omega$ )	$I_{GT}$	—	30	200	$\mu\text{A}$
Gate Trigger Voltage, Continuous dc ( $V_D = 12\text{ V}$ , $R_L = 100\ \Omega$ ) ( $V_D = \text{Rated } V_{DRM}$ , $R_L = 10\text{ k}\Omega$ , $T_J = 110^\circ\text{C}$ )	$V_{GT}$	— 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	—	$\text{V}/\mu\text{s}$
Gate Controlled Turn-On Time ( $V_D = \text{Rated } V_{DRM}$ , $I_{TM} = 20\text{ A}$ , $I_G = 2\text{ mA}$ )	$t_{gt}$	—	1	—	$\mu\text{s}$

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.

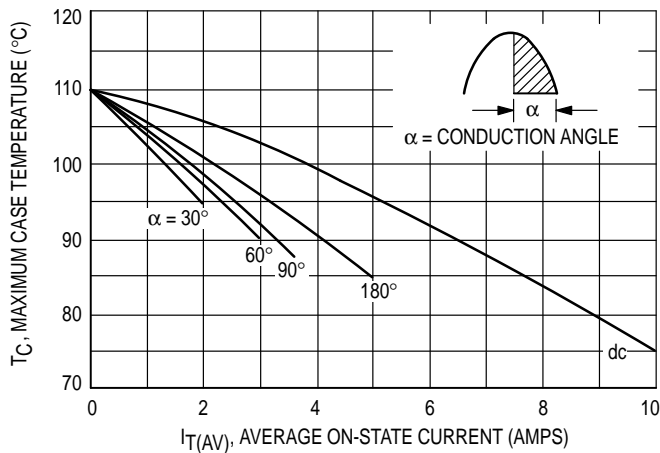


Figure 1. Average Current Derating

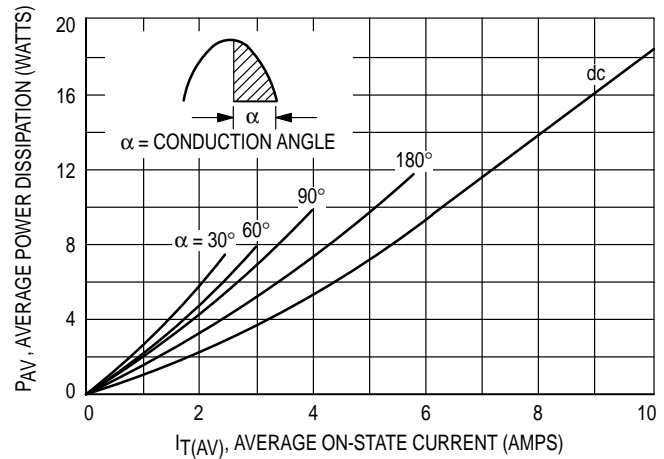


Figure 2. On-State Power Dissipation

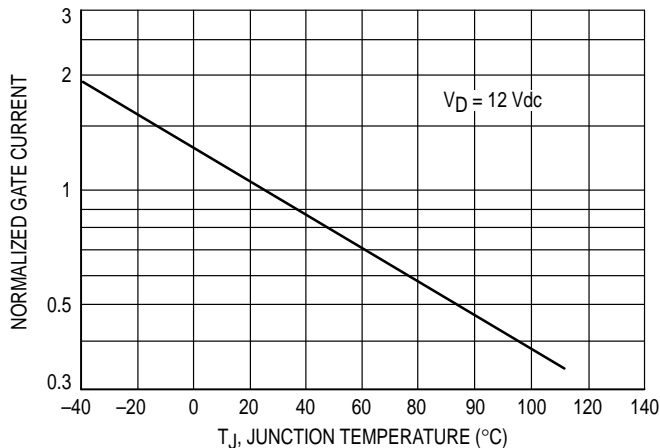


Figure 3. Normalized Gate Current

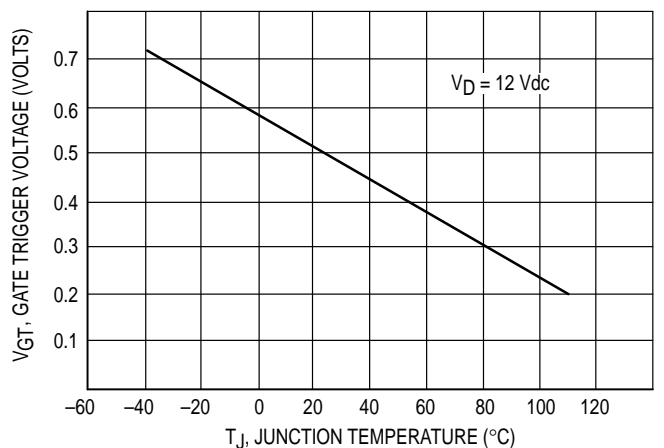
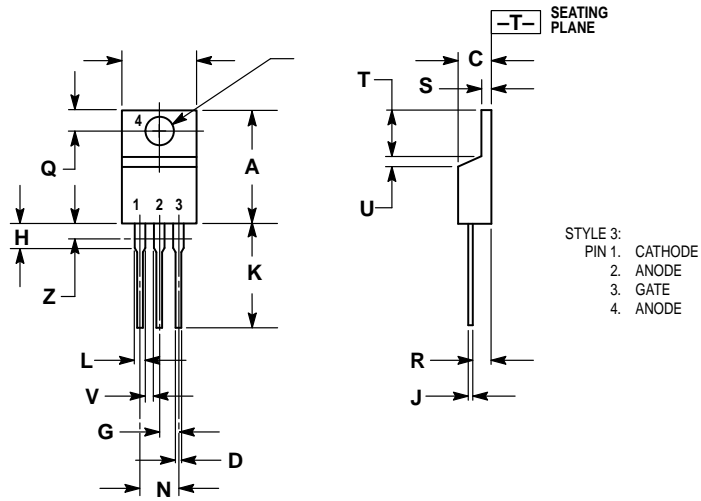


Figure 4. Gate Voltage

## PACKAGE DIMENSIONS




## NOTES:

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

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.570	0.620	14.48	15.75
B	0.380	0.405	9.66	10.28
C	0.160	0.190	4.07	4.82
D	0.025	0.035	0.64	0.88
F	0.142	0.147	3.61	3.73
G	0.095	0.105	2.42	2.66
H	0.110	0.155	2.80	3.93
J	0.018	0.025	0.46	0.64
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.15	1.52
N	0.190	0.210	4.83	5.33
Q	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.15	1.39
T	0.235	0.255	5.97	6.47
U	0.000	0.050	0.00	1.27
V	0.045	—	1.15	—
Z	—	0.080	—	2.04

CASE 221A-09  
(TO-220AB)  
ISSUE Z

## MCR310 Series

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**MCR310/D**