

Silicon Controlled Rectifiers

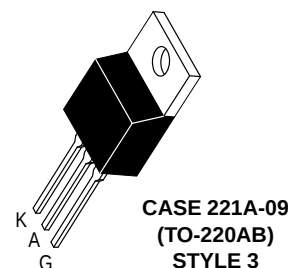
Reverse Blocking Triode Thyristors

... 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 μ 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(1) ($T_J = -40$ to 110°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°C)	I_{TSM}	100	Amps
Circuit Fusing ($t = 8.3\text{ ms}$)	I^2t	40	A^2s
Peak Gate Voltage ($t \leq 10\text{ }\mu\text{s}$)	V_{GM}	± 5	Volts
Peak Gate Current ($t \leq 10\text{ }\mu\text{s}$)	I_{GM}	1	Amp
Peak Gate Power ($t \leq 10\text{ }\mu\text{s}$)	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 ⁽¹⁾ ($T_J = 110^\circ\text{C}$, $V_D = \text{Rated } V_{DRM}$)	I_{DRM}	—	—	500	μA
Peak Reverse Blocking Current ⁽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 ⁽²⁾ ($V_D = 12\text{ V}$, $R_L = 100\ \Omega$)	I_{GT}	—	30	200	μA
Gate Trigger Voltage, Continuous dc ($V_D = 12\text{ V}$, $R_L = 100\ \Omega$) ($V_D = \text{Rated } V_{DRM}$, $R_L = 10\text{ k}\Omega$, $T_J = 110^\circ\text{C}$)	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	—	μs

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.

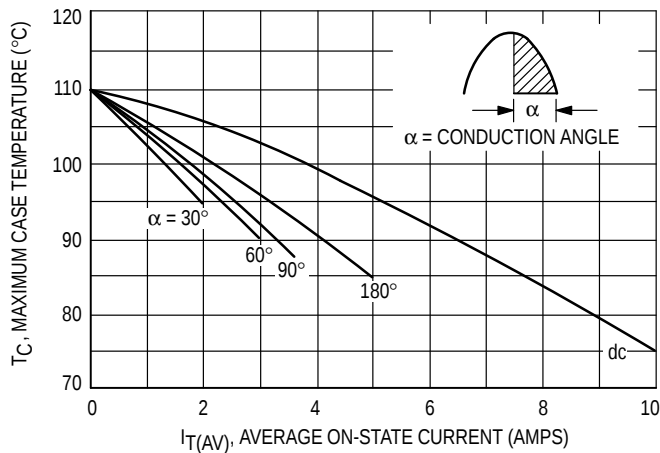


Figure 1. Average Current Derating

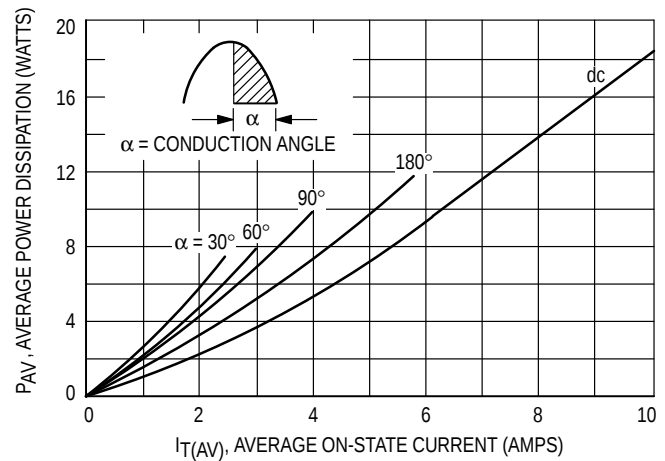


Figure 2. On-State Power Dissipation

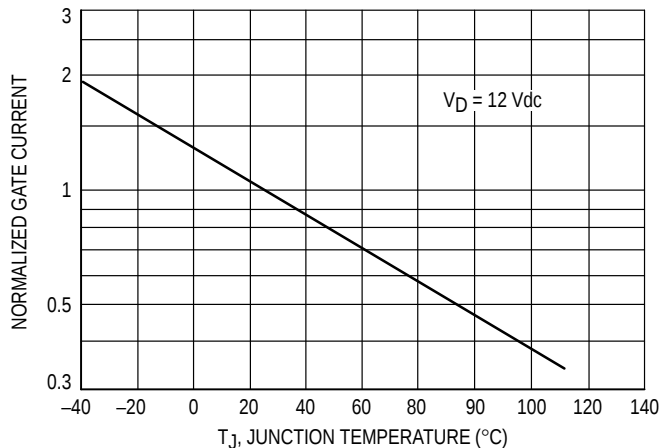


Figure 3. Normalized Gate Current

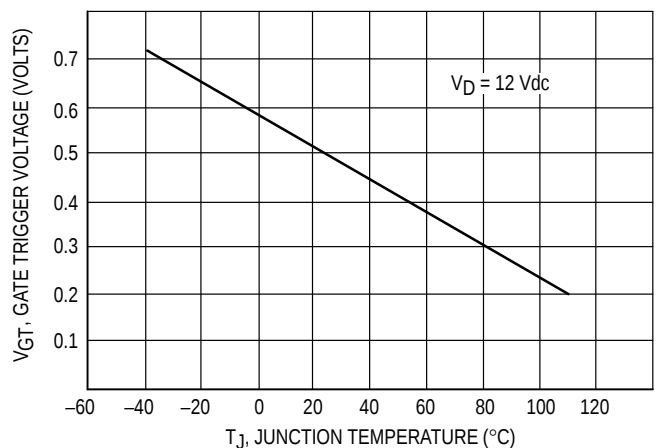
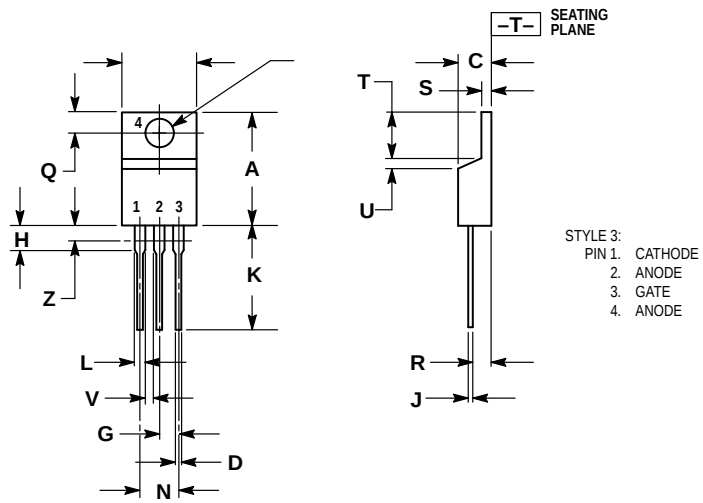


Figure 4. Gate Voltage

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

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