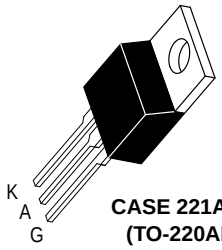
Silicon Controlled Rectifiers
Reverse Blocking Triode Thyristors

. . . 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

MCR310 Series

SCRs
10 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} = 1 kΩ)	V_{DRM} or V_{RRM}		Volts
MCR310-2		50	
MCR310-3		100	
MCR310-4		200	
MCR310-6		400	
MCR310-8		600	
MCR310-10		800	
On-State RMS Current (T_C = 75°C)	$I_{T(RMS)}$	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 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	Watt
Operating Junction Temperature Range	T_J	–40 to +110	°C
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

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.

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

Characteristic		Symbol	Min	Typ	Max	Unit
Peak Forward Blocking Current(1) (T_J = 110°C, V_D = Rated V_{DRM})	T_C = 110°C T_C = 25°C	I_{DRM}	— —	— —	500 10	μA μA
Peak Reverse Blocking Current(1) (T_J = 110°C, V_R = Rated V_{RRM})	T_C = 110°C T_C = 25°C	I_{RRM}	— —	— —	500 10	μA μA
On-State Voltage (I_{TM} = 20 A Peak, Pulse Width ≤ 1 ms, Duty Cycle ≤ 2%)		V_{TM}	—	1.7	2.2	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} = 20 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.

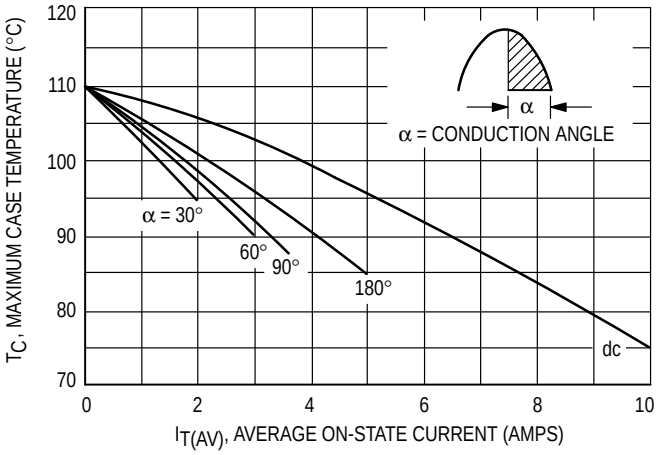


Figure 1. Average Current Derating

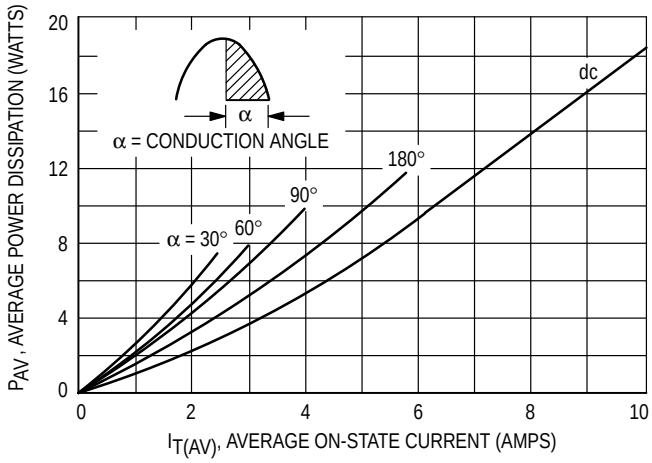


Figure 2. On-State Power Dissipation

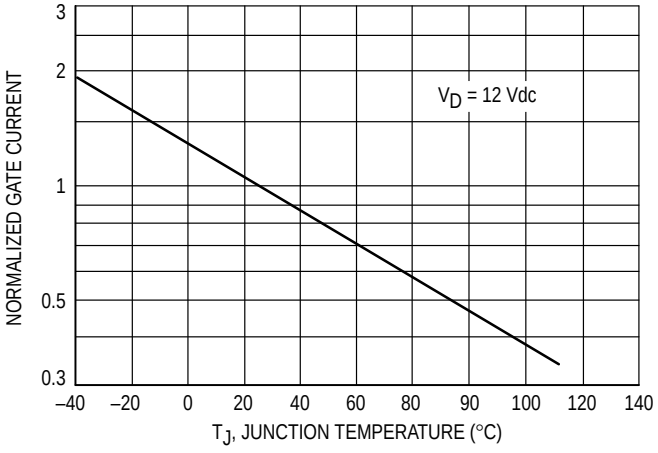


Figure 3. Normalized Gate Current

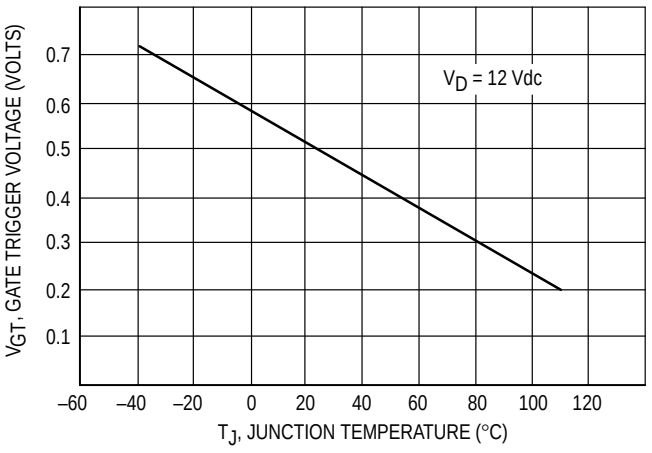
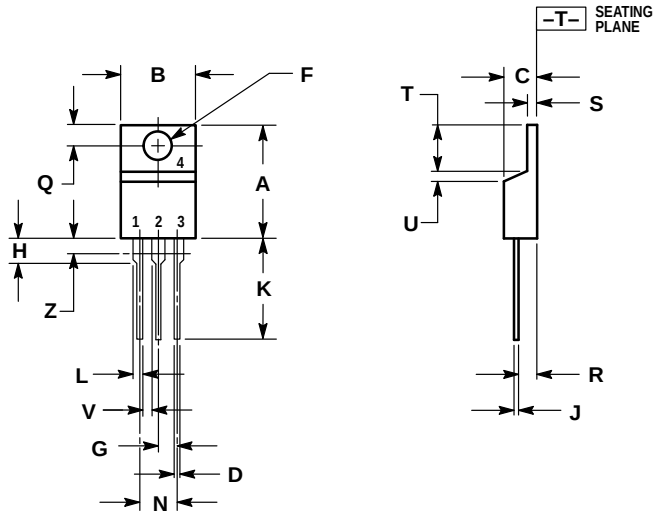


Figure 4. Gate Voltage

PACKAGE DIMENSIONS



STYLE 3:
PIN 1. CATHODE
2. ANODE
3. GATE
4. ANODE

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.

	INCHES		MILLIMETERS	
DIM	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	0.014	0.022	0.36	0.55
K	0.500	0.562	12.70	14.27
L	0.045	0.055	1.15	1.39
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

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(TO–220AB)

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