

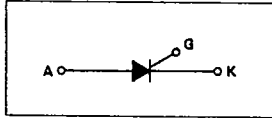
T-25-17

# Silicon Controlled Rectifiers

## Reverse Blocking Triode Thyristors

... designed for industrial and consumer applications such as power supplies, battery chargers, temperature, motor, light and welder controls.

- Economical for a Wide Range of Uses
- High Surge Current —  $I_{TSM} = 300$  Amps
- Low Forward "On" Voltage — 1.2 V (Typ) @  $I_{TM} = 25$  Amps
- Practical Level Triggering and Holding Characteristics — 10 mA (Typ) @  $T_C = 25^\circ\text{C}$
- Rugged Construction in Either Pressfit, Stud, or Isolated Stud
- Glass Passivated Junctions for Maximum Reliability



### MAXIMUM RATINGS

Rating	Suffix	Symbol	Value	Unit
Peak Repetitive Off-State Voltage, Note 1 ( $T_C = -40$ to $+100^\circ\text{C}$ ) All Types	F	$V_{DRM}$	50	Volts
	A	and	100	
	B	$V_{RRM}$	200	
	D		400	
	M		600	
Non-Repetitive Reverse Voltage ( $T_C = -40$ to $100^\circ\text{C}$ ) All Types	F	$V_{RSM}$	75	Volts
	A		150	
	B		300	
	D		500	
	M		720	
Forward Current RMS		$I_T(\text{RMS})$	25	Amps
Peak Surge Current (One Cycle, 60 Hz, $T_C = -40$ to $100^\circ\text{C}$ )		$I_{TSM}$	250	Amps
Circuit Fusing ( $t = 8.3$ ms)		$I^2t$	260	$\text{A}^2\text{s}$
Peak Gate Power		PGM	5	Watts
Average Gate Power		PG(AV)	0.5	Watt
Peak Forward Gate Current		$I_{GM}$	2	Amps
Operating Junction Temperature Range		$T_J$	-40 to +100	$^\circ\text{C}$
Storage Temperature Range		$T_{stg}$	-40 to +125	$^\circ\text{C}$
Stud Torque		—	30	in. lb.

MCR229 Series  
(See C228)

MCR230, 231  
MCR230( )3,  
231( )3  
C232, 233  
Series

SCRs  
25 AMPERES RMS  
50 thru 600 VOLTS

CASE 174-04  
(TO-203AA)  
STYLE 1  
C232 and C233 Series

CASE 263-04  
STYLE 1  
MCR230 and 231 Series

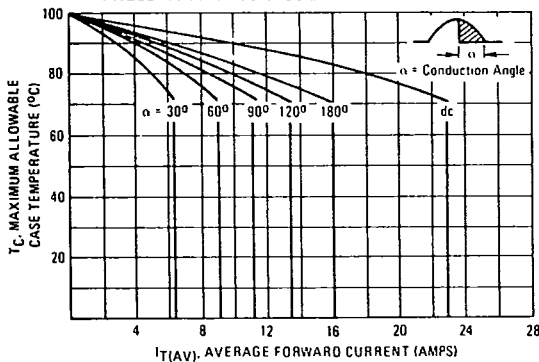
CASE 311-02  
STYLE 1  
MCR230( )3 and  
MCR231( )3 Series

T-25-17

ELECTRICAL CHARACTERISTICS (T<sub>C</sub> = 25°C unless otherwise noted.)

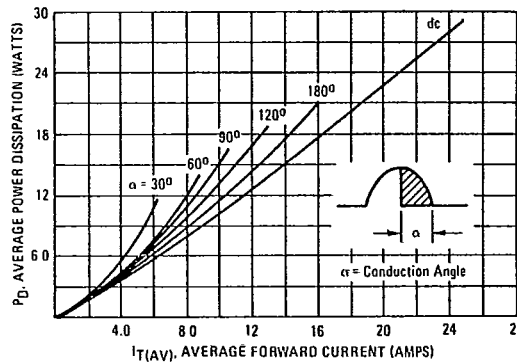
Characteristic	Symbol	Min	Typ	Max	Unit
Peak Forward or Reverse Blocking Current (Rated V <sub>DRM</sub> or V <sub>RRM</sub> , gate open) T <sub>C</sub> = 25°C T <sub>C</sub> = 100°C	I <sub>DRM</sub> , I <sub>RRM</sub>	—	—	10 1	μA mA
Forward "On" Voltage (I <sub>TM</sub> = 100 A Peak, Pulse Width ≤ 1 ms, Duty Cycle ≤ 2%)	V <sub>TM</sub>	—	—	1.9	Volts
Gate Trigger Current, MCR230, MCR230( )3, C232 series (V <sub>D</sub> = 12 Vdc, R <sub>L</sub> = 120 Ohms) (V <sub>D</sub> = 12 Vdc, R <sub>L</sub> = 60 Ohms) T <sub>C</sub> = -40°C	I <sub>GT</sub>	—	—	25 40	mA
Gate Trigger Current, MCR231, MCR231( )3, C233 (Continuous dc) (V <sub>D</sub> = 12 Vdc, R <sub>L</sub> = 120 Ohms) (V <sub>D</sub> = 12 Vdc, R <sub>L</sub> = 60 Ohms) T <sub>C</sub> = -40°C	I <sub>GT</sub>	—	—	9 20	mA
Gate Trigger Voltage (Continuous dc) (V <sub>D</sub> = 12 Vdc, R <sub>L</sub> = 120 Ohms) (V <sub>D</sub> = 12 Vdc, R <sub>L</sub> = 60 Ohms) (V <sub>D</sub> = Rated V <sub>DRM</sub> , R <sub>L</sub> = 1000 Ohms) T <sub>C</sub> = -40°C T <sub>C</sub> = +100°C	V <sub>GT</sub>	— — 0.2	— — —	1.5 2 —	Volts
Holding Current (V <sub>D</sub> = 24 V, gate open, I <sub>T</sub> = 0.5 A) T <sub>C</sub> = -40°C	I <sub>H</sub>	—	—	50 100	mA
Turn-On Time (t <sub>d</sub> + t <sub>r</sub> ) (I <sub>TM</sub> = 25 Adc, I <sub>GT</sub> = 40 mAdc, V <sub>D</sub> = Rated V <sub>DRM</sub> )	t <sub>gt</sub>	—	1	—	μs
Turn-Off Time (I <sub>TM</sub> = 10 A, I <sub>R</sub> = 10 A, Pulse Width = 50 μs, dv/dt = 20 V.μs, V <sub>D</sub> = Rated V <sub>DRM</sub> ) T <sub>C</sub> = 100°C	t <sub>q</sub>	—	25 35	—	μs
Forward Voltage Application Rate (V <sub>D</sub> = Rated V <sub>DRM</sub> ) T <sub>C</sub> = 100°C	dv/dt	—	100	—	V/μs

FIGURE 1 — CURRENT DERATING FOR PRESSFIT AND NON-ISOLATED STUD



NOTE Derating is for Pressfit and Stud Devices. Isolated stud devices must be derated an additional 15%. For example, the max T<sub>C</sub> @ 16 A (180° conduction angle) is 70°C, a derating of 30°C. Isolated stud devices must be derated 34.5°C, therefore the maximum T<sub>C</sub> is 65.5°C.

FIGURE 2 — ON-STATE POWER DISSIPATION versus ON-STATE CURRENT



T-25-17

FIGURE 3 - GATE CURRENT VARIATION WITH TEMPERATURE

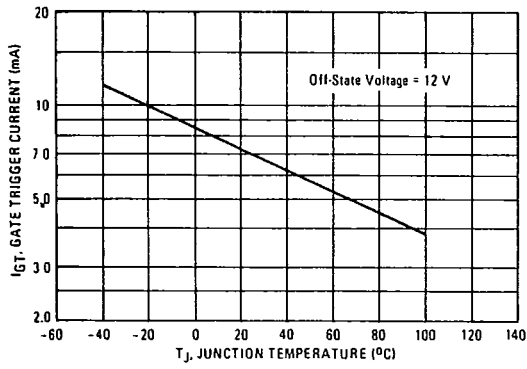


FIGURE 4 - GATE VOLTAGE VARIATION WITH TEMPERATURE

