

# Silicon Controlled Rectifier Reverse Blocking Triode Thyristor

... 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

**C230, 231  
C230( )3,  
231( )3  
C232, 233  
Series**

**SCRs  
25 AMPERES RMS  
50 thru 600 VOLTS**



### 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 ( $T_C = -40$ to $100^\circ\text{C}$ , $t = 1$ to 8.3 ms)		$I^2t$	260	$\text{A}^2\text{s}$
Peak Gate Power		$P_{GM}$	5	Watts
Average Gate Power		$P_{G(\text{AV})}$	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.

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case Pressfit and Stud Isolated Stud	$R_{\theta JC}$	1 1.15	$^\circ\text{C/W}$

Note 1.  $V_{DRM}$  and  $V_{RRM}$  for all types can be applied on a continuous dc basis without incurring damage. Ratings apply for zero or negative gate voltage. Devices shall not have a positive bias applied to the gate concurrently with a negative potential on the anode.



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



**CASE 175-03  
STYLE 1  
C230 and 231 Series**



**CASE 235-03  
STYLE 1  
C230( )3 and C231( )3 Series**

3

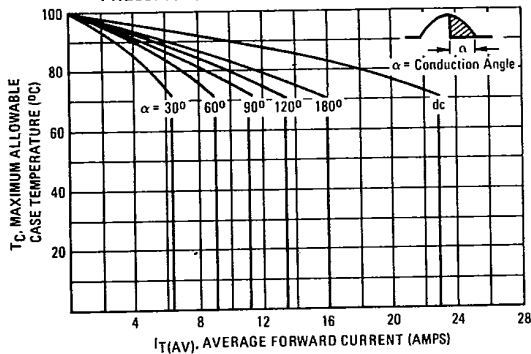
**C230, 231 • C230( )3, 231( )3 • C232, 233 Series**

**ELECTRICAL CHARACTERISTICS** ( $T_C = 25^\circ\text{C}$  unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Forward or Reverse Blocking Current (Rated $V_{DRM}$ or $V_{RRM}$ , gate open) $T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$	$I_{DRM}$ , $I_{RRM}$	—	—	10 1	$\mu\text{A}$ mA
Forward "On" Voltage ( $I_{TM} = 100$ A Peak, Pulse Width $\leq 1$ ms, Duty Cycle $\leq 2\%$ )	$V_{TM}$	—	—	1.9	Volts
Gate Trigger Current, C230, C230( )3, C232 series ( $V_D = 12$ Vdc, $R_L = 120$ Ohms) ( $V_D = 12$ Vdc, $R_L = 60$ Ohms) $T_C = -40^\circ\text{C}$	$I_{GT}$	—	—	25 40	mA
Gate Trigger Current, C231, C231( )3, C233 (Continuous dc) ( $V_D = 12$ Vdc, $R_L = 120$ Ohms) ( $V_D = 12$ Vdc, $R_L = 60$ Ohms) $T_C = -40^\circ\text{C}$	$I_{GT}$	—	—	9 20	mA
Gate Trigger Voltage (Continuous dc) ( $V_D = 12$ Vdc, $R_L = 120$ Ohms) ( $V_D = 12$ Vdc, $R_L = 60$ Ohms) ( $V_D = \text{Rated } V_{DRM}$ , $R_L = 1000$ Ohms) $T_C = -40^\circ\text{C}$ $T_C = +100^\circ\text{C}$	$V_{GT}$	—	—	1.5 2 —	Volts
Holding Current ( $V_D = 24$ V, gate open, $I_T = 0.5$ A) $T_C = -40^\circ\text{C}$	$I_H$	—	—	50 100	mA
Turn-On Time ( $t_d + t_r$ ) ( $I_{TM} = 25$ Adc, $I_{GT} = 40$ mAdc, $V_D = \text{Rated } V_{DRM}$ )	$t_{gt}$	—	1	—	$\mu\text{s}$
Turn-Off Time ( $I_{TM} = 10$ A, $I_R = 10$ A, Pulse Width = $50 \mu\text{s}$ , $dv/dt = 20$ V/ $\mu\text{s}$ , $V_D = \text{Rated } V_{DRM}$ ) $T_C = 100^\circ\text{C}$	$t_q$	—	25 35	—	$\mu\text{s}$
Forward Voltage Application Rate ( $V_D = \text{Rated } V_{DRM}$ ) $T_C = 100^\circ\text{C}$	$dv/dt$	—	100	—	V/ $\mu\text{s}$

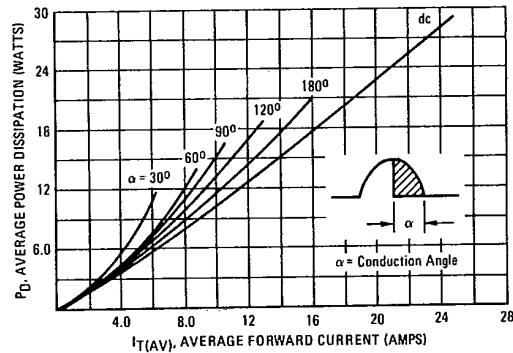
3

**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  $T_C$  @ 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  $T_C$  is 65.5°C.

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



C230, 231 • C230( )3, 231( )3 • C232, 233 Series

FIGURE 3 - GATE CURRENT VARIATION WITH TEMPERATURE

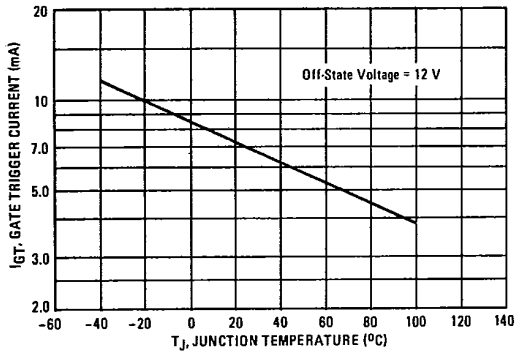
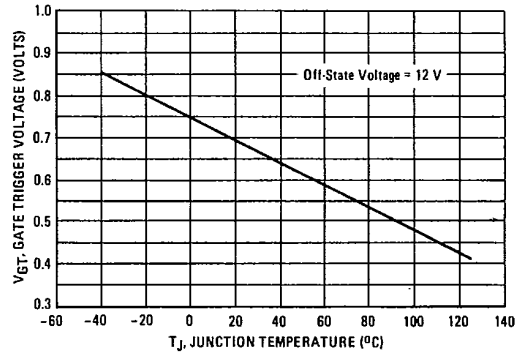


FIGURE 4 - GATE VOLTAGE VARIATION WITH TEMPERATURE



3