

# Silicon Controlled Rectifiers

## Reverse Blocking Triode Thyristors

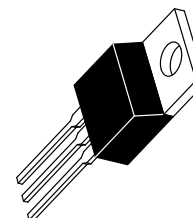
... designed primarily for half-wave ac control applications, such as motor controls, heating controls and power supplies.

- Glass Passivated Junctions with Center Gate Geometry for Greater Parameter Uniformity and Stability
- Small, Rugged, Thermowatt Construction for Low Thermal Resistance, High Heat Dissipation and Durability
- Blocking Voltage to 800 Volts

**2N6394**  
**thru**  
**2N6399**

Motorola preferred devices

**SCRs**  
**12 AMPERES RMS**  
**50 thru 800 VOLTS**



**CASE 221A-07**  
**(TO-220AB)**  
**STYLE 3**

**\*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> (Gate Open, $T_J = -40$ to $125^\circ\text{C}$ )	$V_{DRM}, V_{RRM}$	50 100 400 600 800	Volts
RMS On-State Current ( $T_C = 90^\circ\text{C}$ ) (All Conduction Angles)	$I_T(\text{RMS})$	12	Amps
Peak Non-Repetitive Surge Current (1/2 Cycle, Sine Wave, 60 Hz, $T_J = 125^\circ\text{C}$ )	$I_{TSM}$	100	Amps
Circuit Fusing ( $t = 8.3$ ms)	$I^2t$	40	$\text{A}^2\text{s}$
Forward Peak Power	$P_{GM}$	20	Watts
Forward Average Gate Power	$P_{G(AV)}$	0.5	Watt
Forward Peak Gate Current	$I_{GM}$	2	Amps
Operating Junction Temperature Range	$T_J$	$-40$ to $+125$	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	$-40$ to $+150$	$^\circ\text{C}$

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2	$^\circ\text{C/W}$

\*Indicates JEDEC Registered Data.

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.

**Preferred** devices are Motorola recommended choices for future use and best overall value.

REV 1

## 2N6394 thru 2N6399

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

Characteristic	Symbol	Min	Typ	Max	Unit
* Peak Repetitive Forward or Reverse Blocking Current ( $V_{AK} = \text{Rated } V_{DRM} \text{ or } V_{RRM}$ , Gate Open) $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$	$I_{DRM}, I_{RRM}$	— —	— —	10 2	$\mu\text{A}$ mA
* Forward "On" Voltage ( $I_{TM} = 24 \text{ A Peak}$ )	$V_{TM}$	—	1.7	2.2	Volts
* Gate Trigger Current (Continuous dc) ( $V_D = 12 \text{ Vdc}$ , $R_L = 100 \text{ Ohms}$ )	$I_{GT}$	—	5	30	mA
* Gate Trigger Voltage (Continuous dc) ( $V_D = 12 \text{ Vdc}$ , $R_L = 100 \text{ Ohms}$ ) ( $V_D = \text{Rated } V_{DRM}$ , $R_L = 100 \text{ Ohms}$ , $T_J = 125^\circ\text{C}$ )	$V_{GT}$ $V_{GD}$	— 0.2	0.7 —	1.5 —	Volts
* Holding Current ( $V_D = 12 \text{ Vdc}$ , Gate Open)	$I_H$	—	6	40	mA
Turn-On Time ( $I_{TM} = 12 \text{ A}$ , $I_{GT} = 40 \text{ mAdc}$ , $V_D = \text{Rated } V_{DRM}$ )	$t_{gt}$	—	1	2	$\mu\text{s}$
Turn-Off Time ( $V_D = \text{Rated } V_{DRM}$ ) ( $I_{TM} = 12 \text{ A}$ , $I_R = 12 \text{ A}$ ) ( $I_{TM} = 12 \text{ A}$ , $I_R = 12 \text{ A}$ , $T_J = 125^\circ\text{C}$ )	$t_q$	— —	15 35	— —	$\mu\text{s}$
Critical Rate-of-Rise of Off-State Voltage Exponential ( $V_D = \text{Rated } V_{DRM}$ , $T_J = 125^\circ\text{C}$ )	$dv/dt$	—	50	—	$\text{V}/\mu\text{s}$

\*Indicates JEDEC Registered Data.

FIGURE 1 — CURRENT DERATING

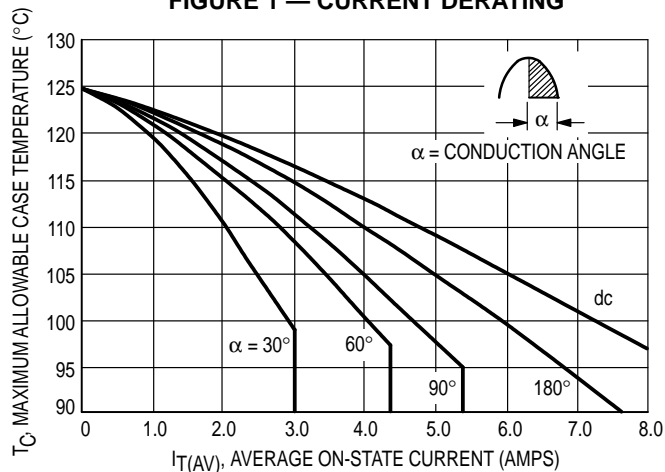


FIGURE 2 — MAXIMUM ON-STATE POWER DISSIPATION

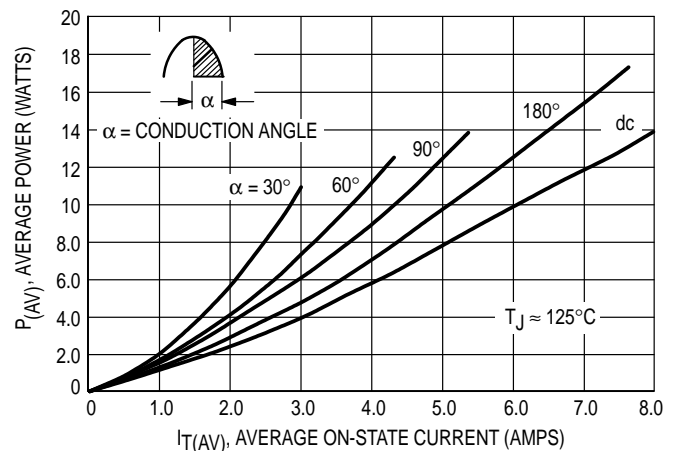


FIGURE 3 — ON-STATE CHARACTERISTICS

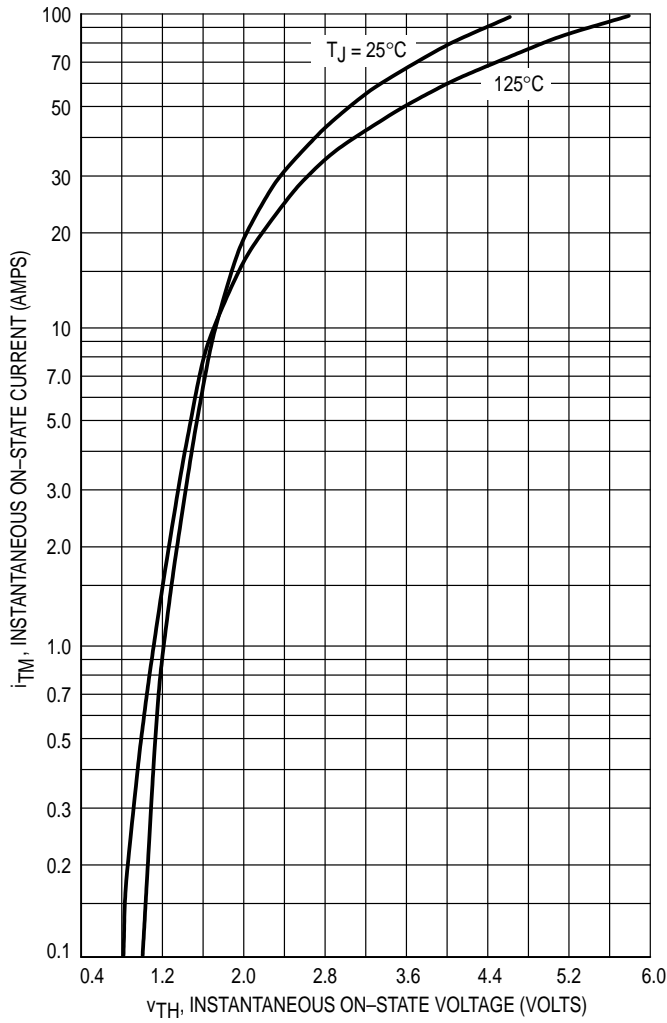


FIGURE 4 — MAXIMUM NON-REPETITIVE SURGE CURRENT

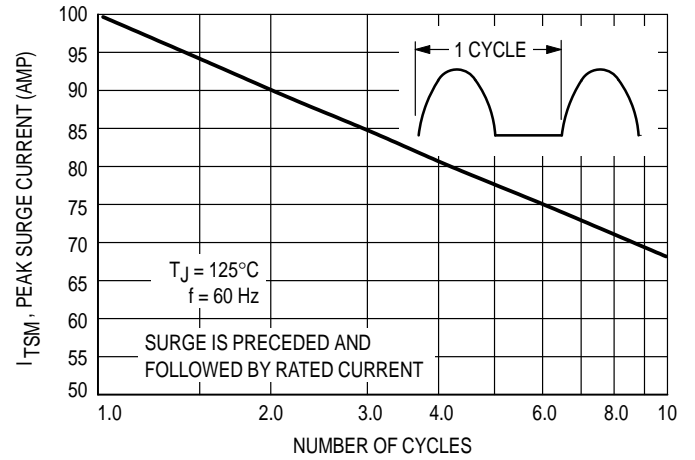
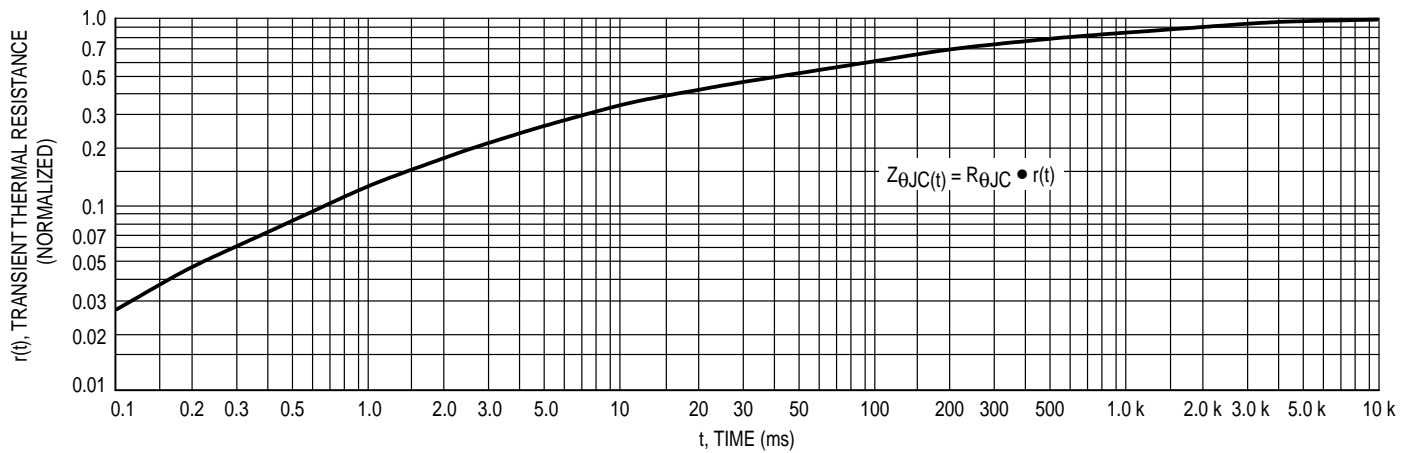


FIGURE 5 — THERMAL RESPONSE



## TYPICAL CHARACTERISTICS

FIGURE 6 — PULSE TRIGGER CURRENT

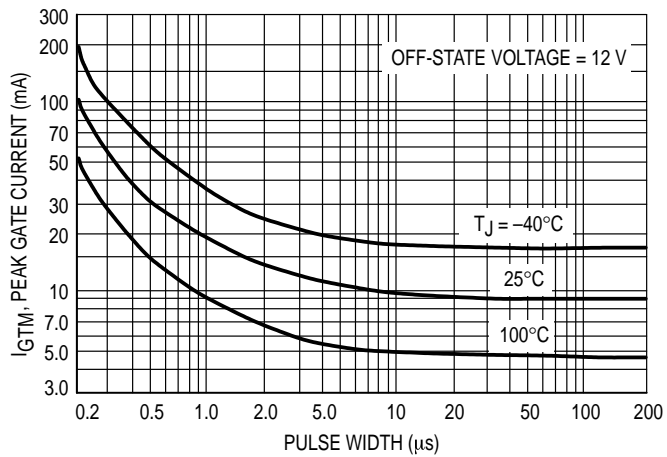


FIGURE 7 — GATE TRIGGER CURRENT

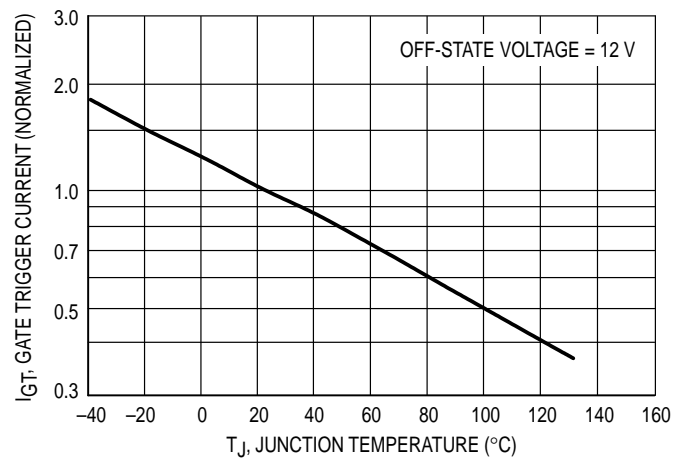


FIGURE 8 — GATE TRIGGER VOLTAGE

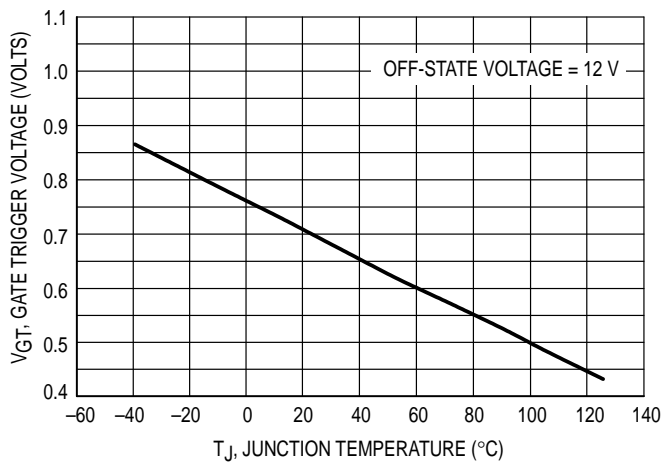
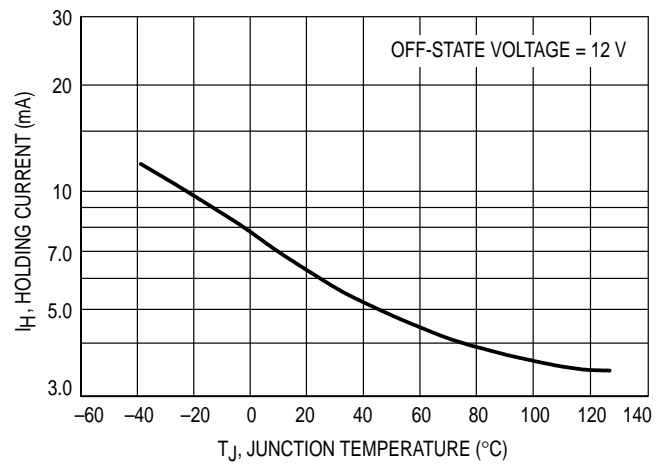
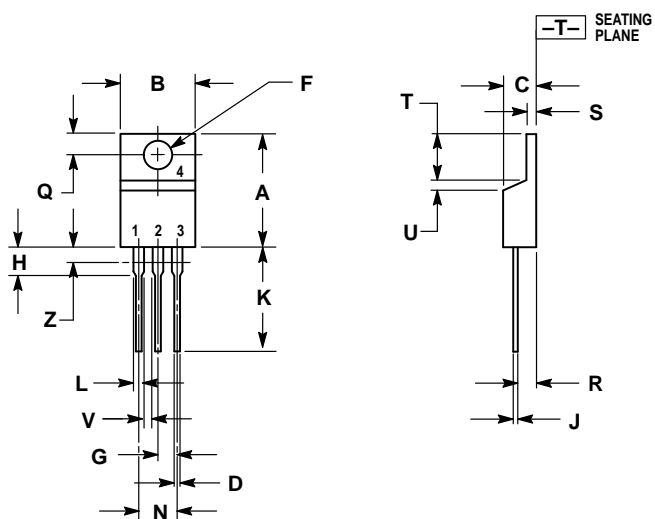


FIGURE 9 — HOLDING CURRENT



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	0.014	0.022	0.36	0.55
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

- STYLE 3:
- PIN 1. CATHODE
  - ANODE
  - GATE
  - ANODE

CASE 221A-07  
ISSUE Z

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