

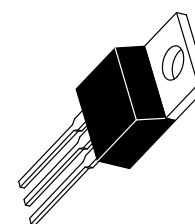
## Silicon Controlled Rectifiers Reverse Blocking Triode Thyristors

... designed primarily for half-wave ac control applications, such as motor controls, heating controls and power supplies; or wherever half-wave silicon gate-controlled, solid-state devices are needed.

- 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

**2N6400  
thru  
2N6405**

**SCRs  
16 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 Voltage <sup>(1)</sup> (Gate Open, $T_J = 25$ to $125^\circ\text{C}$ ) <b>2N6400</b> <b>2N6401</b> 2N6402 <b>2N6403</b> <b>2N6404</b> <b>2N6405</b>	$V_{DRM}, V_{RRM}$	50 100 200 400 600 800	Volts
RMS On-State Current ( $T_C = 90^\circ\text{C}$ )	$I_T(\text{RMS})$	16	Amps
Average On-State Current	$I_T(\text{AV})$	10	Amps
Peak Non-Repetitive Forward Surge Current (1/2 Cycle, Sine Wave, 60 Hz, $T_J = 125^\circ\text{C}$ )	$I_{TSM}$	160	Amps
Circuit Fusing ( $t = 8.3$ ms)	$I^2t$	145	$\text{A}^2\text{s}$
Forward Peak Gate Power	$P_{GM}$	20	Watts
Forward Average Gate Power	$P_{G(\text{AV})}$	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	$T_{\text{stg}}$	-40 to +150	$^\circ\text{C}$

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta\text{JC}}$	1.5	$^\circ\text{C}/\text{W}$

\*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.

Devices listed in **bold, italic** are Motorola preferred devices. Preferred devices are Motorola recommended choices for future use and best overall value.

# 2N6400 thru 2N6405

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

Characteristic	Symbol	Min	Typ	Max	Unit
* Peak Forward or Reverse Blocking Current (V <sub>AK</sub> = Rated V <sub>DRM</sub> or V <sub>RRM</sub> , Gate Open) T <sub>J</sub> = 25°C T <sub>J</sub> = 125°C	I <sub>DRM</sub> , I <sub>RRM</sub>	— —	— —	10 2	μA mA
* Peak On-State Voltage (I <sub>TM</sub> = 32 A Peak, Pulse Width ≤ 1 ms, Duty Cycle ≤ 2%)	V <sub>TM</sub>	—	—	1.7	Volts
* Gate Trigger Current (Continuous dc) (V <sub>D</sub> = 12 Vdc, R <sub>L</sub> = 50 Ohms)	I <sub>GT</sub>	—	5	30	mA
* Gate Trigger Voltage (Continuous dc) (V <sub>D</sub> = 12 Vdc, R <sub>L</sub> = 50 Ohms)  (V <sub>D</sub> = Rated V <sub>DRM</sub> , R <sub>L</sub> = 50 Ohms)	V <sub>GT</sub>	— — 0.2	0.7 — —	1.5 2.5 —	Volts
* Holding Current (V <sub>D</sub> = 12 Vdc, Gate Open)	I <sub>H</sub>	— —	6 —	40 60	mA
Turn-On Time (I <sub>TM</sub> = 16 A, 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> = 16 A, I <sub>R</sub> = 16 A, V <sub>D</sub> = Rated V <sub>DRM</sub> )	t <sub>q</sub>	— —	15 35	— —	μs
Critical Rate-of-Rise of Off-State Voltage (V <sub>D</sub> = Rated V <sub>DRM</sub> , Exponential Waveform)	dv/dt	—	50	—	V/μs

\*Indicates JEDEC Registered Data.

FIGURE 1 — AVERAGE CURRENT DERATING

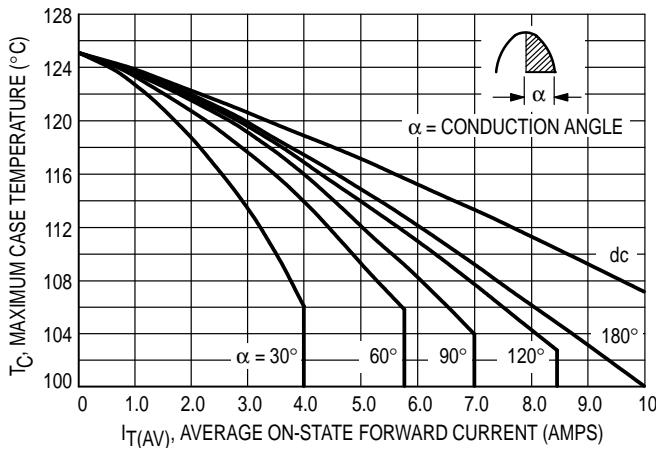


FIGURE 2 — MAXIMUM ON-STATE POWER DISSIPATION

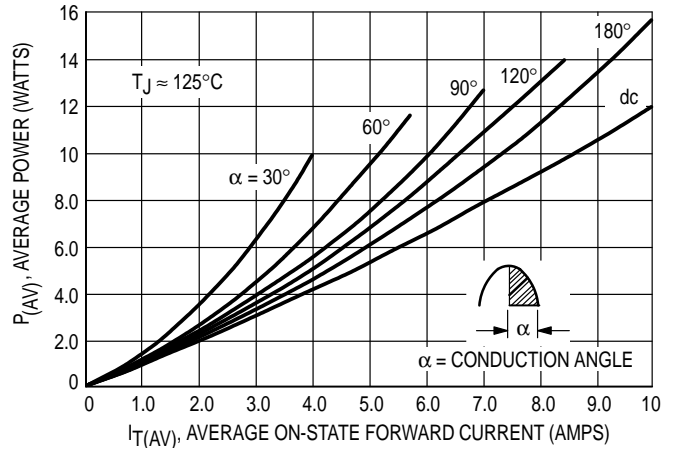


FIGURE 3 — ON-STATE CHARACTERISTICS

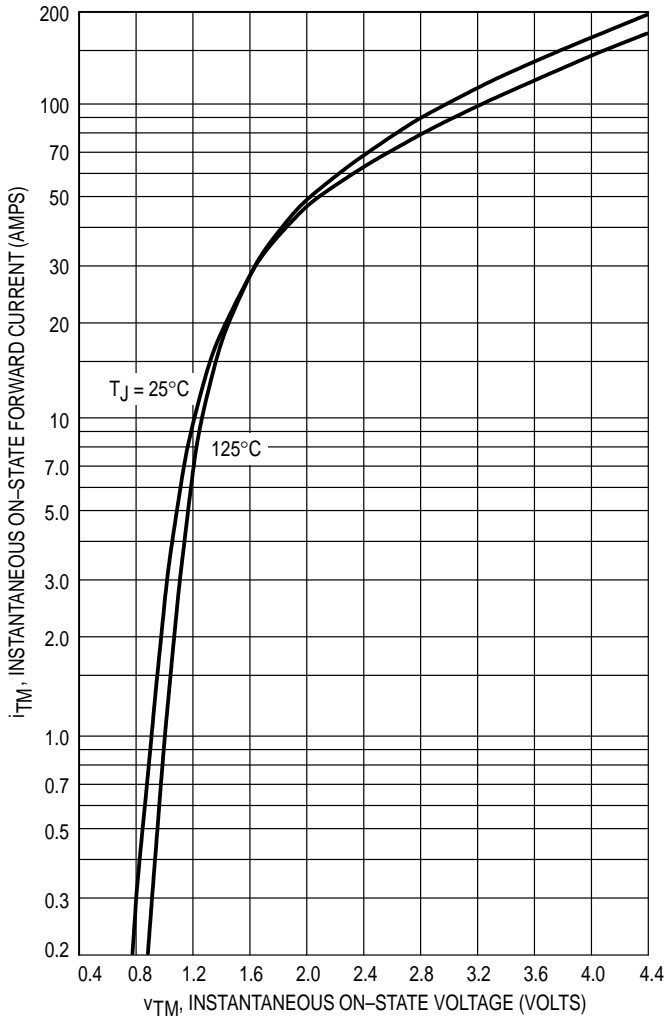


FIGURE 4 — MAXIMUM NON-REPETITIVE SURGE CURRENT

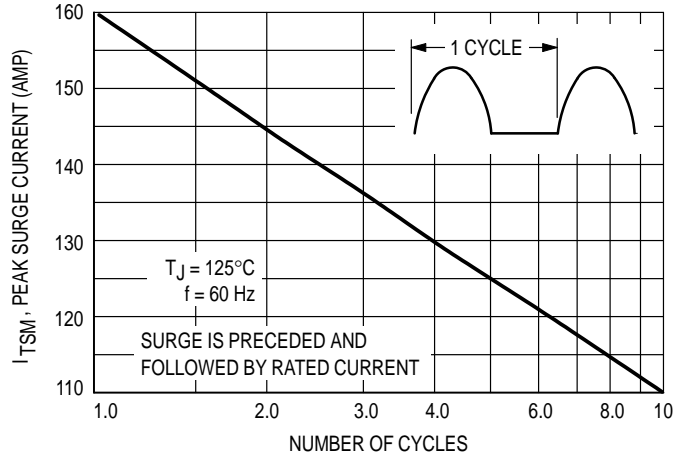
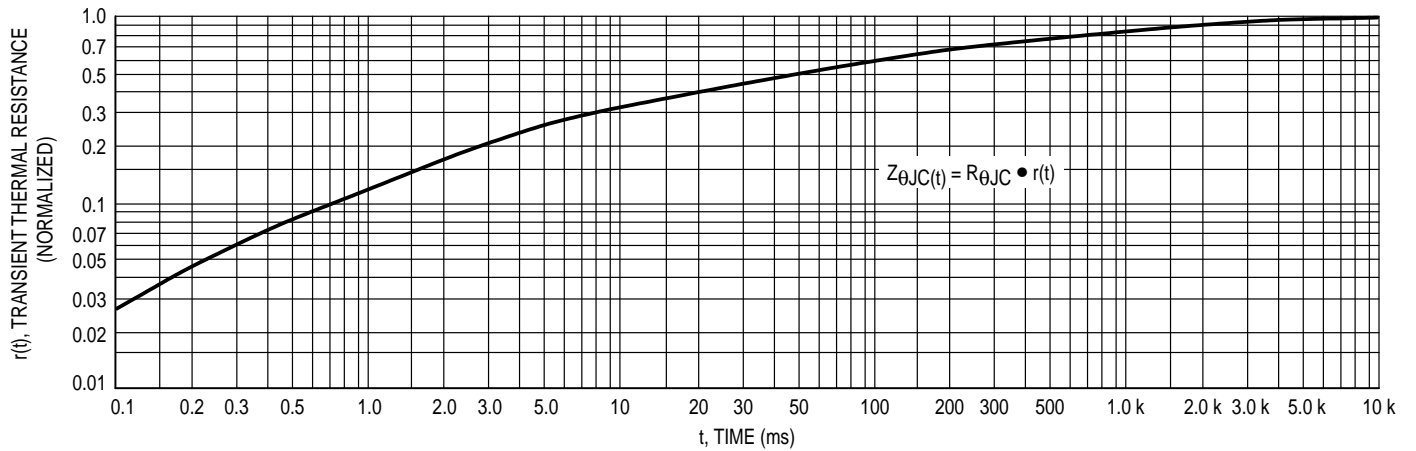


FIGURE 5 — THERMAL RESPONSE



TYPICAL CHARACTERISTICS

FIGURE 6 — PULSE TRIGGER CURRENT

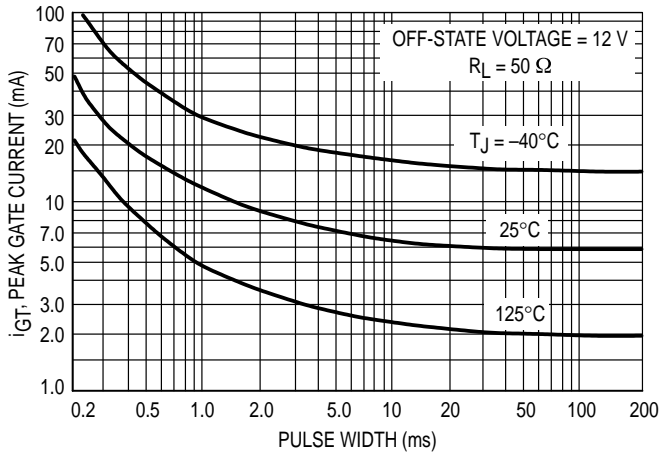


FIGURE 7 — GATE TRIGGER CURRENT

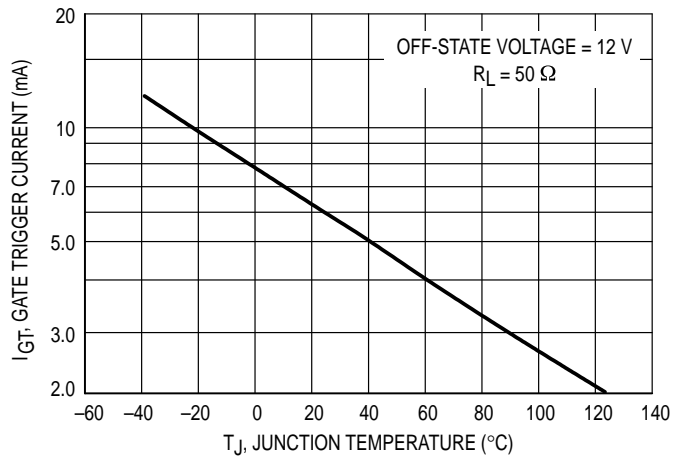


FIGURE 8 — GATE TRIGGER VOLTAGE

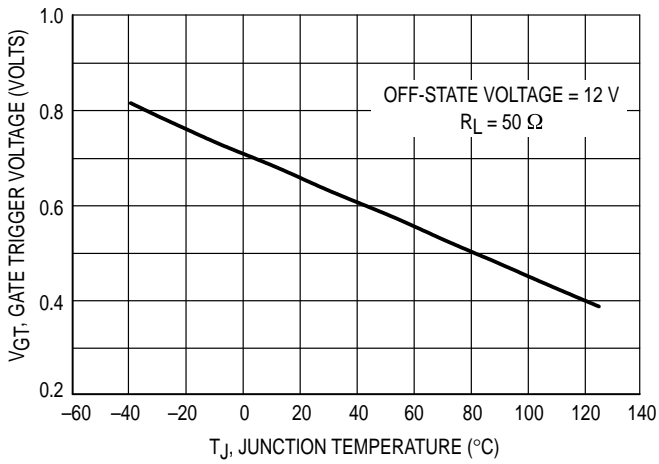
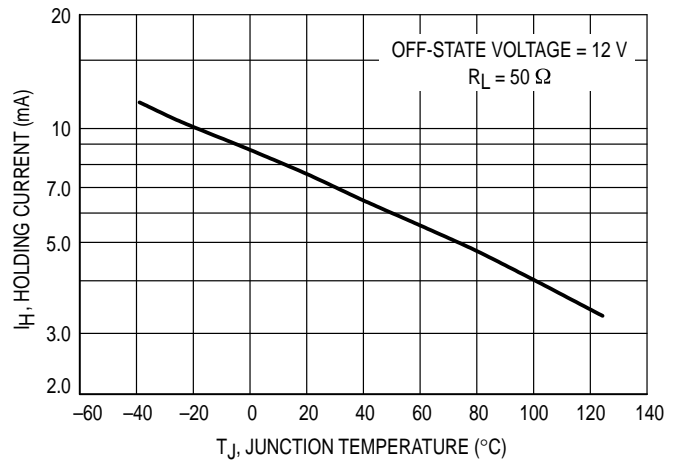
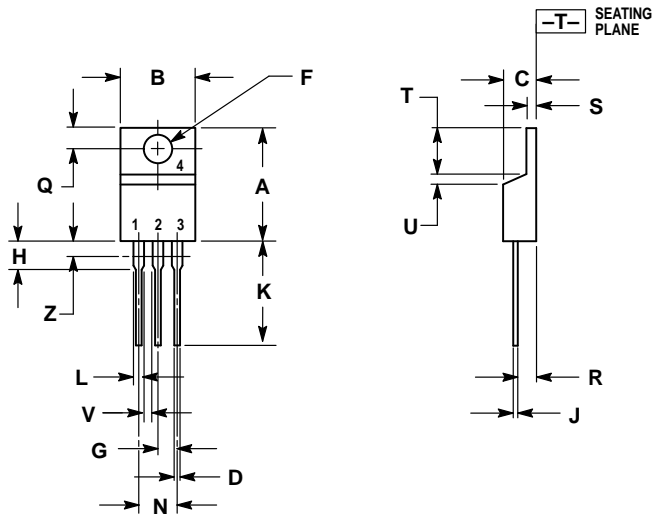


FIGURE 9 — HOLDING CURRENT



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  
 2. ANODE  
 3. GATE  
 4. ANODE

CASE 221A-07  
 ISSUE Z

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