

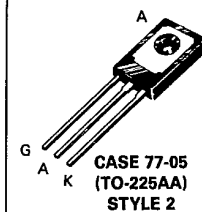
## Silicon Controlled Rectifiers Reverse Blocking Triode Thyristors

... designed for high-volume consumer phase-control applications such as motor speed, temperature, and light controls and for switching applications in ignition and starting systems, voltage regulators, vending machines, and lamp drivers requiring:

- Small, Rugged, Thermopad Construction — for Low Thermal Resistance, High Heat Dissipation, and Durability
- Practical Level Triggering and Holding Characteristics @ 25°C  
 $I_{GT} = 7 \text{ mA (Typ)}$   
 $I_H = 6 \text{ mA (Typ)}$
- Low "On" Voltage —  $V_{TM} = 1 \text{ Volt (Typ) @ 5 Amps @ 25°C}$
- High Surge Current Rating —  $I_{TSM} = 80 \text{ Amps}$

**2N4441  
thru  
2N4444**

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



### MAXIMUM RATINGS ( $T_J = 100^\circ\text{C}$ unless otherwise noted.)

Rating	Symbol	Value	Unit
Peak Repetitive Forward and Reverse Blocking Voltage, Note 1 2N4441 2N4442 2N4443 2N4444	$V_{DRM}$ or $V_{RRM}$	50 200 400 600	Volts
*Non-Repetitive Peak Reverse Blocking Voltage ( $t = 5 \text{ ms (max) duration}$ ) 2N4441 2N4442 2N4443 2N4444	$V_{RSM}$	75 300 500 700	Volts
*RMS On-State Current (All Conduction Angles)	$I_T(\text{RMS})$	8	Amps
Average On-State Current, $T_C = 73^\circ\text{C}$	$I_T(\text{AV})$	5.1	Amps
*Peak Non-Repetitive Surge Current (1/2 cycle, 60 Hz preceded and followed by rated current and voltage)	$I_{TSM}$	80	Amps
Circuit Fusing ( $T_J = -40 \text{ to } +100^\circ\text{C}; t = 1 \text{ to } 8.3 \text{ ms}$ )	$I^2t$	25	$\text{A}^2\text{s}$
*Peak Gate Power	PGM	5	Watts
*Average Gate Power	$P_G(\text{AV})$	0.5	Watt
*Peak Forward Gate Current	$I_{GM}$	2	Amps
*Peak Reverse Gate Voltage	$V_{RGM}$	10	Volts

\*Indicates JEDEC Registered Data.

(cont.)

Note 1. Ratings apply for zero or negative gate voltage but positive gate voltage shall not be applied concurrently with a negative potential on the anode. When checking forward or reverse blocking capability, thyristor devices should not be tested with a constant current source in a manner that the voltage applied exceeds the rated blocking voltage.

## 2N4441 thru 2N4444

MAXIMUM RATINGS — continued ( $T_J = 100^\circ\text{C}$  unless otherwise noted.)

Rating	Symbol	Value	Unit
*Operating Junction Temperature Range	$T_J$	-40 to +100	$^\circ\text{C}$
*Storage Temperature Range	$T_{\text{stg}}$	-40 to +150	$^\circ\text{C}$
Mounting Torque (6-32 screw), Note 1	—	8	in. lb.

## THERMAL CHARACTERISTICS

Characteristic	Symbol	Typ	Max	Unit
*Thermal Resistance, Junction to Case	$R_{\theta\text{JC}}$	—	2.5	$^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient	$R_{\theta\text{JA}}$	40	—	$^\circ\text{C/W}$

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

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Forward or Reverse Blocking Current (Rated $V_{\text{DRM}}$ or $V_{\text{RRM}}$ , gate open) $T_J = 25^\circ\text{C}$ $T_J = 100^\circ\text{C}$	$I_{\text{DRM}}, I_{\text{RRM}}$	— —	— —	10 2	$\mu\text{A}$ $\text{mA}$
Gate Trigger Current (Continuous dc) ( $V_D = 7 \text{ Vdc}$ , $R_L = 100 \text{ Ohms}$ ) $T_C = 25^\circ\text{C}$ $*T_C = -40^\circ\text{C}$	$I_{\text{GT}}$	—	7	30 60	$\text{mA}$
Gate Trigger Voltage (Continuous dc) ( $V_D = 7 \text{ Vdc}$ , $R_L = 100 \text{ Ohms}$ ) ( $V_D = 7 \text{ Vdc}$ , $R_L = 100 \text{ Ohms}$ ) ( $V_D = \text{Rated } V_{\text{DRM}}$ , $R_L = 100 \text{ Ohms}$ ) $T_C = 25^\circ\text{C}$ $T_C = -40^\circ\text{C}$ $T_J = 100^\circ\text{C}$	$V_{\text{GT}}$	— — 0.2	0.75 — —	1.5 2.5 —	Volts
Peak On-State Voltage (Pulse Width = 1 to 2 ms, Duty Cycle $\leq 2\%$ ) ( $I_{\text{TM}} = 5 \text{ A peak}$ ) $*I_{\text{TM}} = 15.7 \text{ A peak}$	$V_{\text{TM}}$	— —	1 —	1.5 2	Volts
Holding Current ( $V_D = 7 \text{ Vdc}$ , gate open) $T_C = 25^\circ\text{C}$ $*T_C = -40^\circ\text{C}$	$I_{\text{H}}$	— —	6 —	40 70	$\text{mA}$
Gate Controlled Turn-On Time ( $I_{\text{TM}} = 5 \text{ A}$ , $I_{\text{GT}} = 20 \text{ mA}$ , $V_D = \text{Rated } V_{\text{DRM}}$ )	$t_{\text{gt}}$	—	1	—	$\mu\text{s}$
Circuit Commutated Turn-Off Time ( $I_{\text{TM}} = 5 \text{ A}$ , $I_{\text{R}} = 5 \text{ A}$ ) ( $I_{\text{TM}} = 5 \text{ A}$ , $I_{\text{R}} = 5 \text{ A}$ , $T_J = 100^\circ\text{C}$ )	$t_{\text{q}}$	— —	15 20	— —	$\mu\text{s}$
Critical Rate of Rise of Off-State Voltage ( $V_D = \text{Rated } V_{\text{DRM}}$ , Exponential Waveform, $T_J = 100^\circ\text{C}$ , Gate Open)	$dv/dt$	—	50	—	$\text{V}/\mu\text{s}$

\*Indicates JEDEC Registered Data.

Note 1. Torque rating applies with use of torque washer (Shakeproof WD19522 #6 or equivalent). Mounting torque in excess of 8 in. lbs. does not appreciably lower case-to-sink thermal resistance. Anode lead and heatsink contact pad are common.

For soldering purposes (either terminal connection or device mounting), soldering temperatures shall not exceed  $+225^\circ\text{C}$ .

FIGURE 1 - ON-STATE CHARACTERISTICS

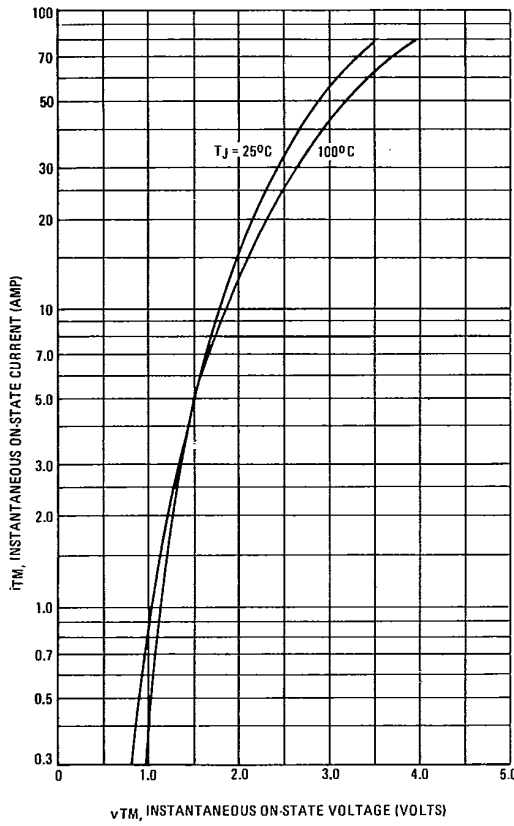


FIGURE 2 - MAXIMUM ON-STATE POWER DISSIPATION

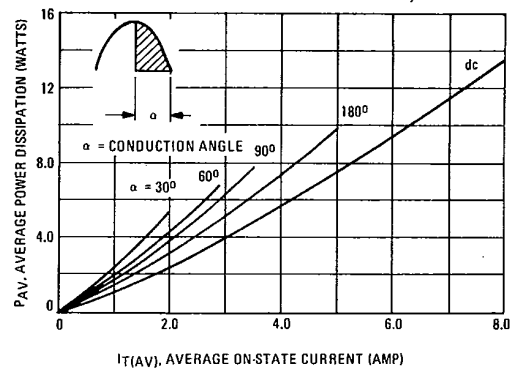


FIGURE 3 - AVERAGE CURRENT DERATING

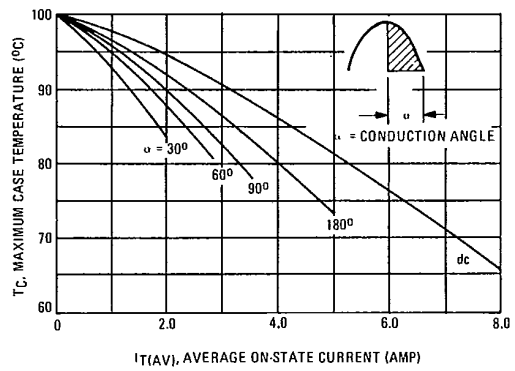
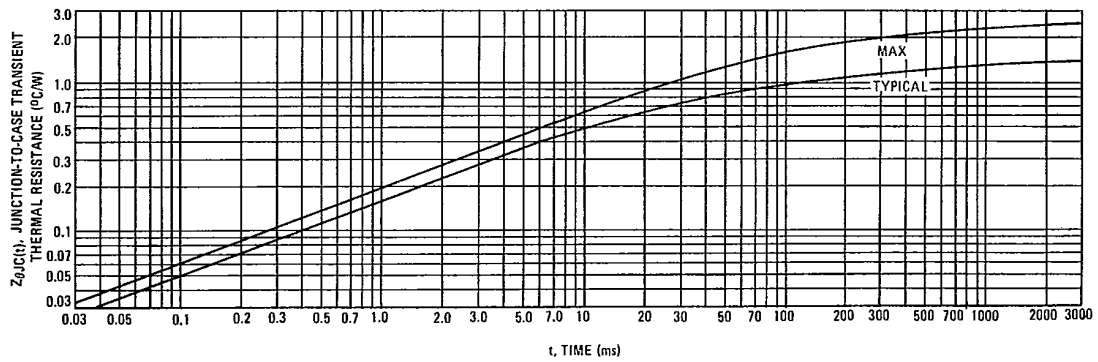


FIGURE 4 - THERMAL RESPONSE



2N4441 thru 2N4444

FIGURE 5 - MAXIMUM NON-REPETITIVE SURGE CURRENT

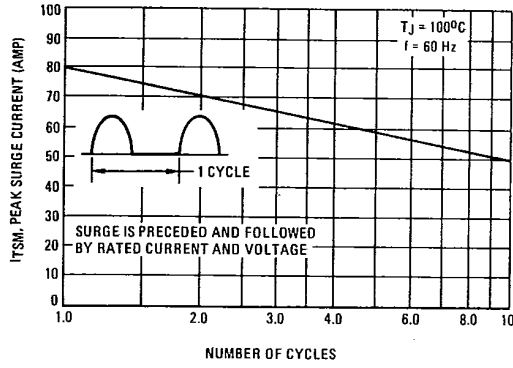


FIGURE 6 - TYPICAL HOLDING CURRENT

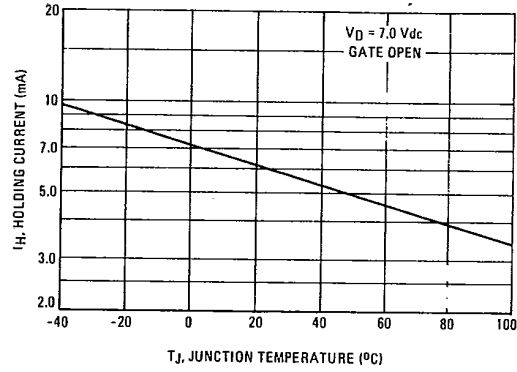


FIGURE 7 - TYPICAL GATE TRIGGER CURRENT

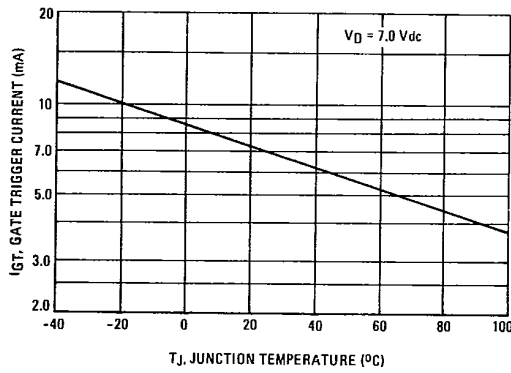
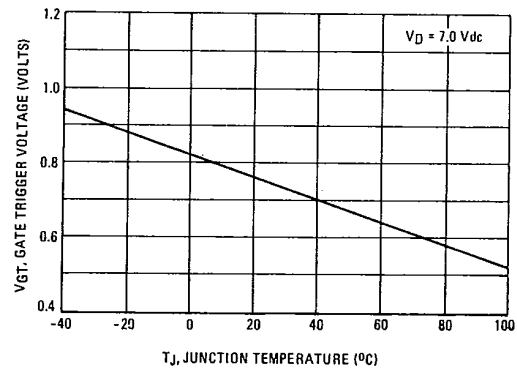


FIGURE 8 - TYPICAL GATE TRIGGER VOLTAGE



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