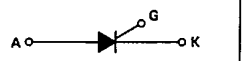
2N4441 thru 2N4444

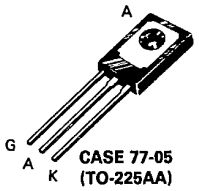
Silicon Controlled Rectifiers
Reverse Blocking Triode Thyristors

SCRs
8 AMPERES RMS
50 thru 600 VOLTS

... 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 mA (Typ)
  I_H = 6 mA (Typ)
- Low "On" Voltage — V_{TM} = 1 Volt (Typ) @ 5 Amps @ 25°C
- High Surge Current Rating — I_{TSM} = 80 Amps





CASE 77-05
(TO-225AA)
STYLE 2

MAXIMUM RATINGS (T_J = 100°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 ms (max) duration) 2N4441 2N4442 2N4443 2N4444	V_{RSM}	 75 300 500 700	Volts
*RMS On-State Current (All Conduction Angles)	$I_{T(RMS)}$	8	Amps
Average On-State Current, T_C = 73°C	$I_{T(AV)}$	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 to +100°C; t = 1 to 8.3 ms)	I^2t	25	A^2s
*Peak Gate Power	P_{GM}	5	Watts
*Average Gate Power	$P_{G(AV)}$	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.

MAXIMUM RATINGS — continued (T_J = 100°C unless otherwise noted.)

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

THERMAL CHARACTERISITCS

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

ELECTRICAL CHARACTERISTICS (T_C = 25°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_J = 25°C	I_{DRM}, I_{RRM}	—	—	10	μA
	T_J = 100°C		—	—	2	mA
Gate Trigger Current (Continuous dc) (V_D = 7 Vdc, R_L = 100 Ohms)	T_C = 25°C	I_{GT}	—	7	30	mA
	*T_C = −40°C				60	
Gate Trigger Voltage (Continuous dc)		V_{GT}				Volts
(V_D = 7 Vdc, R_L = 100 Ohms)	T_C = 25°C		—	0.75	1.5	
(V_D = 7 Vdc, R_L = 100 Ohms)	T_C = −40°C		—	—	2.5	
(V_D = Rated V_{DRM}, R_L = 100 Ohms)	T_J = 100°C		0.2	—	—	
Peak On-State Voltage (Pulse Width = 1 to 2 ms, Duty Cycle ≤ 2%)		V_{TM}				Volts
	(I_{TM} = 5 A peak)		—	1	1.5	
	*(I_{TM} = 15.7 A peak)		—	—	2	
Holding Current (V_D = 7 Vdc, gate open)		I_H				mA
	T_C = 25°C		—	6	40	
	*T_C = −40°C		—	—	70	
Gate Controlled Turn-On Time (I_{TM} = 5 A, I_{GT} = 20 mA, V_D = Rated V_{DRM})		t_{gt}	—	1	—	μs
Circuit Commutated Turn-Off Time		t_q				μs
(I_{TM} = 5 A, I_R = 5 A)			—	15	—	
(I_{TM} = 5 A, I_R = 5 A, T_J = 100°C)			—	20	—	
Critical Rate of Rise of Off-State Voltage (V_D = Rated V_{DRM}, Exponential Waveform, T_J = 100°C, Gate Open)		dv/dt	—	50	—	V/μs

*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°C.

FIGURE 1 – ON-STATE CHARACTERISTICS

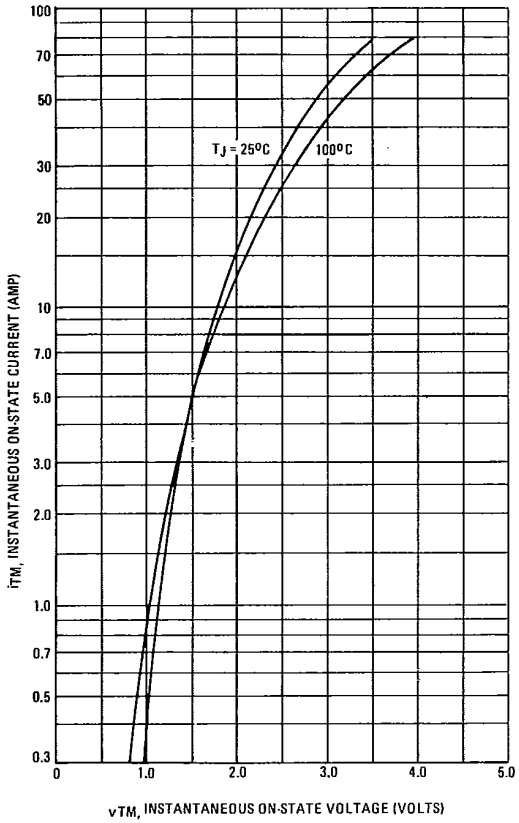


FIGURE 2 – MAXIMUM ON-STATE POWER DISSIPATION

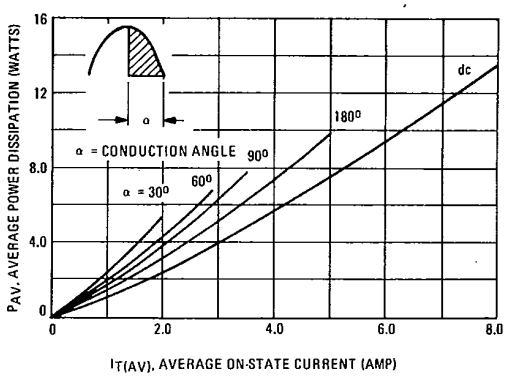


FIGURE 3 – AVERAGE CURRENT DERATING

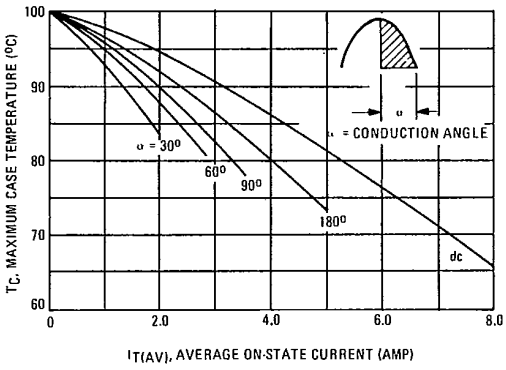


FIGURE 4 – THERMAL RESPONSE

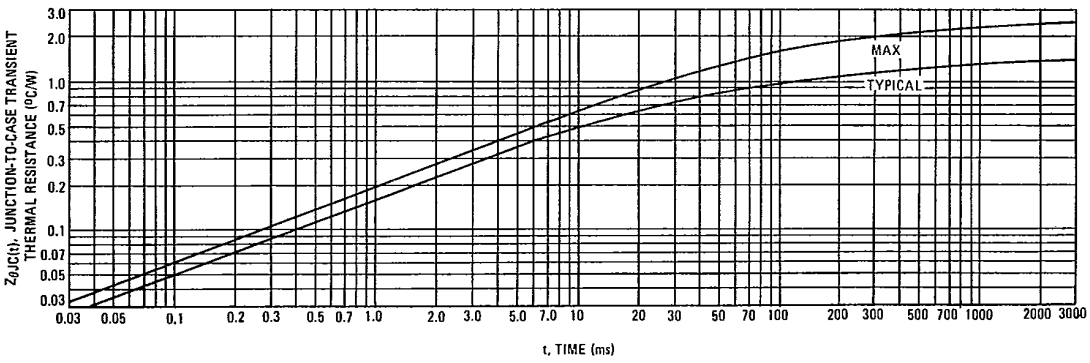


FIGURE 5 – MAXIMUM NON-REPETITIVE SURGE CURRENT

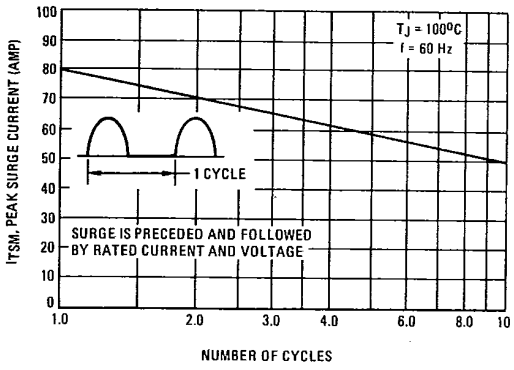


FIGURE 6 – TYPICAL HOLDING CURRENT

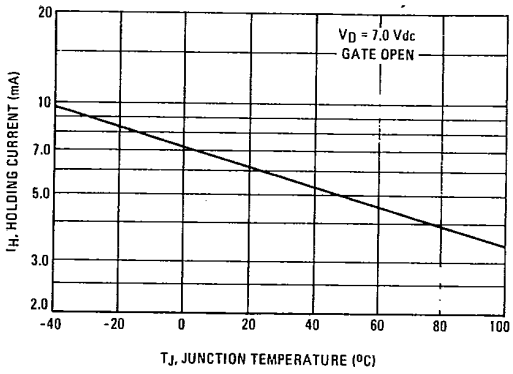


FIGURE 7 – TYPICAL GATE TRIGGER CURRENT

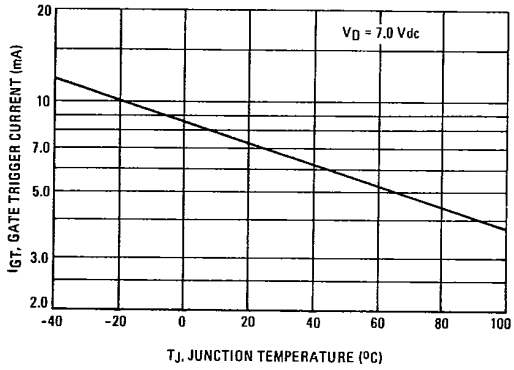
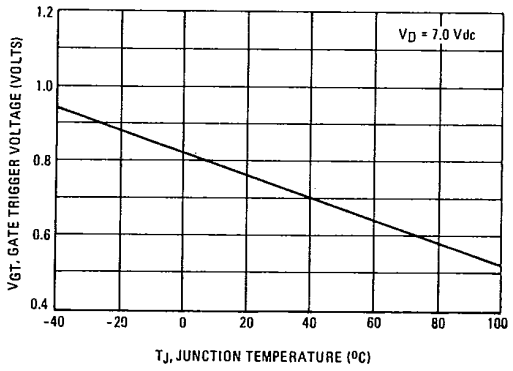


FIGURE 8 – TYPICAL GATE TRIGGER VOLTAGE



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