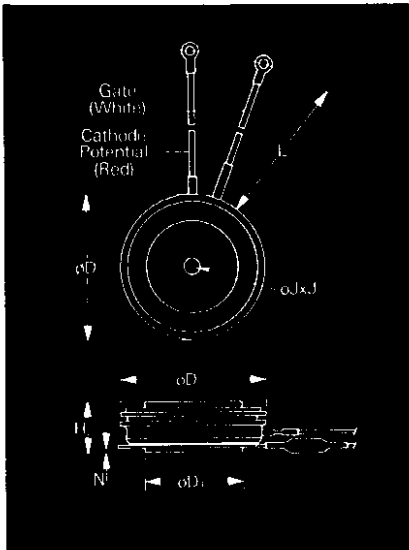


# Fast Switching SCR T7S7\_50

500A Avg.  
(786 RMS)  
Up to 1200 Volts  
25-60  $\mu$ s



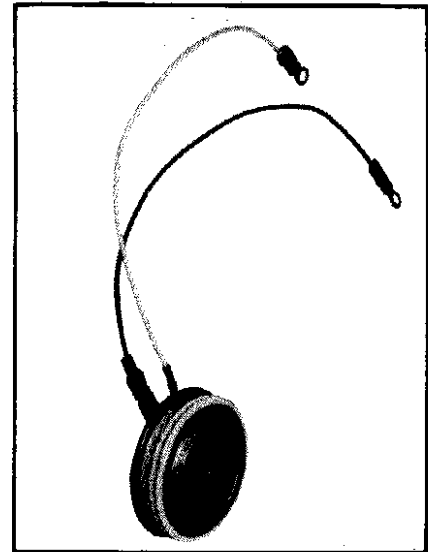
T7S Outline

**Features:**

- Center fired di/namic gate
- High di/dt with soft gate control
- High frequency operation
- Sinusoidal waveform operation to 20KHz
- Rectangular waveform operation to 20KHz
- Low dynamic forward voltage drop
- Low switching losses at high frequency
- Lifetime Guarantee

Symbol	Inches		Millimeters	
	Min.	Max.	Min.	Max.
$\phi D$	1.850	1.900	45.72	48.26
$\phi D_1$	1.140	1.180	28.96	29.97
$\phi D_2$	1.760	1.850	44.70	46.99
H	.545	.605	13.84	15.37
$\phi J$	.135	.145	3.43	3.68
$J_1$	.072	.082	1.83	2.08
L	7.75	8.50	196.85	215.90
N	.025		.64	

Creep Distance—.41 in. min. (10.41 mm).  
Strike Distance—.35 in. min. (8.89 mm).  
Finish-Nickel Plate.  
Approx. Weight—4 oz. (113 g.)  
1. Dimension "H" is a clamped dimension.



**Applications:**

- Inverters
- UPS
- Induction heating
- AC motor drives
- Cycloconverters
- Choppers
- Crowbars

**Ordering Information**

Type	Voltage		Current		Turn-off		Gate current		Leads	
	V <sub>DRM</sub> and V <sub>RRM</sub> (V)	V <sub>DRM</sub> (V)	I <sub>T(av)</sub> (A)	I <sub>TRM</sub> (A)	t <sub>q</sub> (u sec)	t <sub>TR</sub> (u sec)	I <sub>GT</sub> (ma)	Code	Case	Code
T7S7	100	90	500	90	25	2	150	4	T7S	DN
	200	82			30	3				
	300	73			40	4				
	400	64			50	5				
	500	56			60	6				
	600	48								
	700	40								
	800	32								
	900	24								
	1000	16								
	1100	8								
	1200	0								

**Example**

Obtain optimum device performance for your application by selecting proper Order Code.

Type T7S7 rated at 500 A Average with V<sub>DRM</sub> = 900V. I<sub>GT</sub> = 150 ma, t<sub>q</sub> = 30  $\mu$ sec max. and standard control leads—order as:

Type	Voltage	Current	Turn Off	Gate Current	Leads
T 7 S 7 0 9 5 0			5	4	D N

FAST SWITCHING THYRISTORS

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**Voltage**

**Blocking State Maximums** (T<sub>J</sub> = 125°C)

Symbol	Value
Repetitive peak forward blocking voltage, V	V <sub>DRM</sub>
Repetitive peak reverse voltage, V	V <sub>RRM</sub>
Non-repetitive transient peak reverse voltage, V t ≤ 5.0 msec.	V <sub>RSM</sub>
Forward leakage current, mA peak	I <sub>DRM</sub>
Reverse leakage current, mA peak	I <sub>RRM</sub>

100	200	300	400	500	600	700	800	900	1000	1100	1200
100	200	300	400	500	600	700	800	900	1000	1100	1200
200	300	400	500	600	700	800	900	1000	1100	1200	1300
						30					
						30					

**Current**

**Conducting State Maximums**  
(T<sub>J</sub> = 125°C)

Symbol	T7S7_50
RMS forward current, A	I <sub>T(rms)</sub> 786
Ave. forward current, A	I <sub>T(av)</sub> 500
One-half cycle surge current <sup>①</sup> , A	I <sub>TSM</sub> 8000
I <sup>2</sup> t for fusing (for times ≥ 8.3 ms) A <sup>2</sup> sec.	I <sup>2</sup> t 267,000
Forward voltage drop at I <sub>TM</sub> = 625 A and T <sub>J</sub> = 25°C, V	V <sub>TM</sub> 1.65
Min. repetitive di/dt A/ $\mu$ sec <sup>①②③</sup>	di/dt 300

**Switching**

(T<sub>J</sub> = 25°C)

Symbol	Value
Max. turn-off time, I <sub>T</sub> = 400A T <sub>J</sub> = 125°C, di/dt = 25 A/ $\mu$ sec, reapplied dv/dt = 20V/ $\mu$ sec linear to 0.8 V <sub>DRM</sub> , $\mu$ sec <sup>①②</sup>	t <sub>q</sub> 25 to 60
Typ. turn-on-time, I <sub>T</sub> = 1000A V <sub>D</sub> = 300V <sup>③</sup> , $\mu$ sec	t <sub>on</sub> 3.0
Min. critical dv/dt, exponential to V <sub>DRM</sub> T <sub>J</sub> = 125°C, V/ $\mu$ sec <sup>④</sup>	dv/dt 300
Min. di/dt non-repetitive, A/ $\mu$ sec <sup>①②③</sup>	di/dt 800

**Gate**

**Maximum Parameters**  
(T<sub>J</sub> = 25°C)

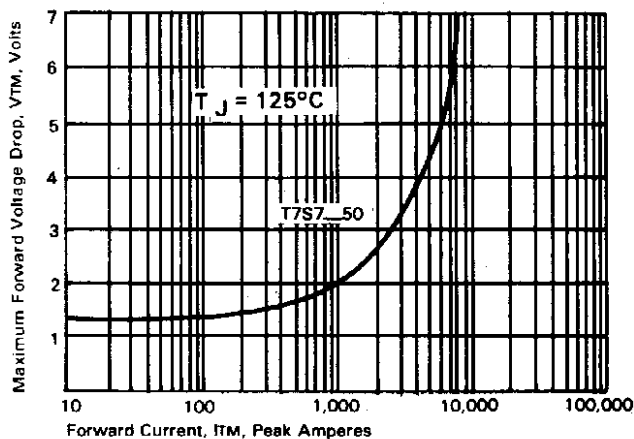
Symbol	Value
Gate current to trigger at V <sub>D</sub> = 12V, mA	I <sub>GT</sub> 150
Gate voltage to trigger at V <sub>D</sub> = 12V, V	V <sub>GT</sub> 3
Non-triggering gate voltage, T <sub>J</sub> = 125°C, and rated V <sub>DRM</sub> , V	V <sub>GDM</sub> 0.15
Peak forward gate current, A	I <sub>GTM</sub> 4
Peak reverse gate voltage, V	V <sub>GRM</sub> 5
Peak gate power, Watts	P <sub>GM</sub> 16
Average gate power, Watts	P <sub>G(av)</sub> 3

**Thermal and Mechanical**

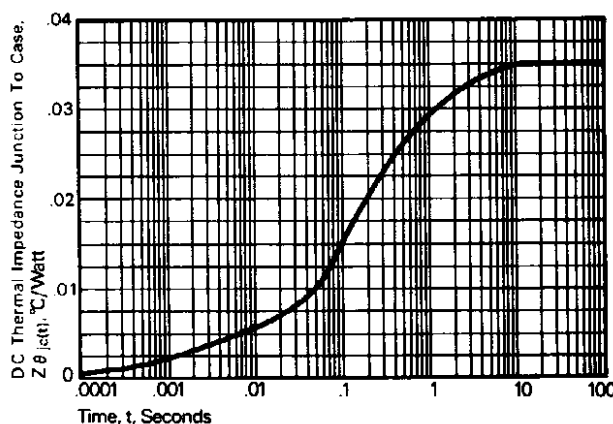
Symbol	Value
Min., Max. oper. junction temp., °C	T <sub>J</sub> -40 to +125
Min., Max. storage temp., °C	T <sub>stg</sub> -40 to +150
Max. mounting force lb. <sup>①</sup>	2000 to 2400
Max. Thermal resistance <sup>②</sup> Double side cooled Junction to case, °C/Watt	R <sub>θJC</sub> .035
Case to sink, lubricated, °C/Watt	R <sub>θCS</sub> .02

- ① Consult recommended mounting procedures.
- ② Applies for zero or negative gate bias.
- ③ Per JEDEC RS-397, 5.2.2.1.
- ④ With recommended gate drive.
- ⑤ Higher dv/dt ratings available, consult factory.
- ⑥ Per JEDEC standard RS-397, 5.2.2.6.
- ⑦ For operation with antiparallel diode, consult factory.

Maximum Forward Voltage Drop VS Forward Current



Transient Thermal Impedance VS. Time

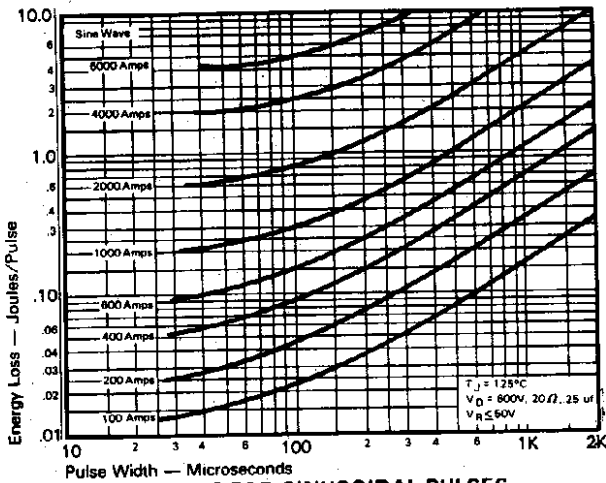


FAST SWITCHING THYRISTORS

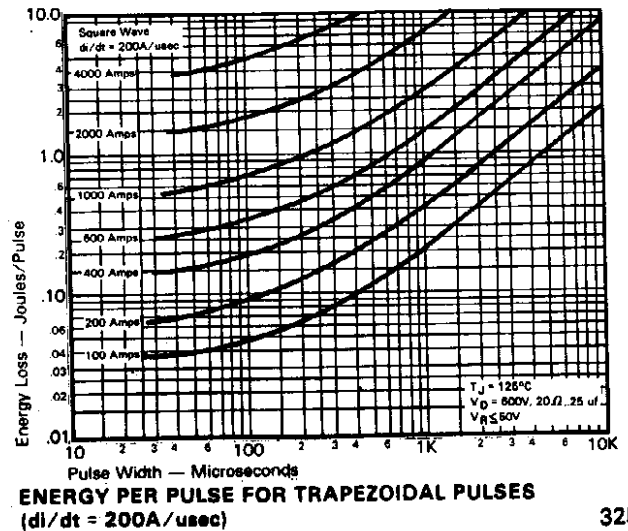
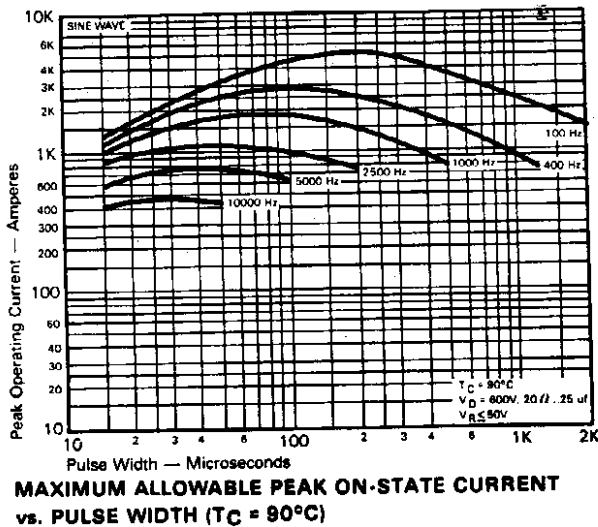
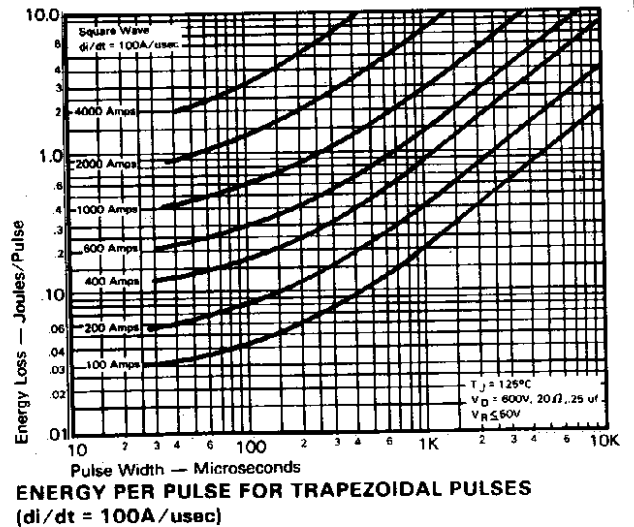
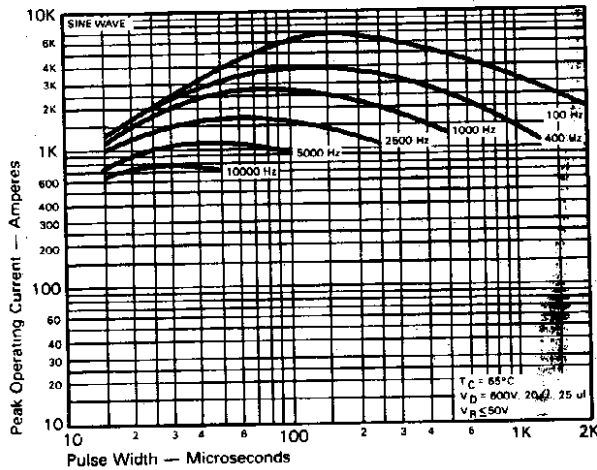
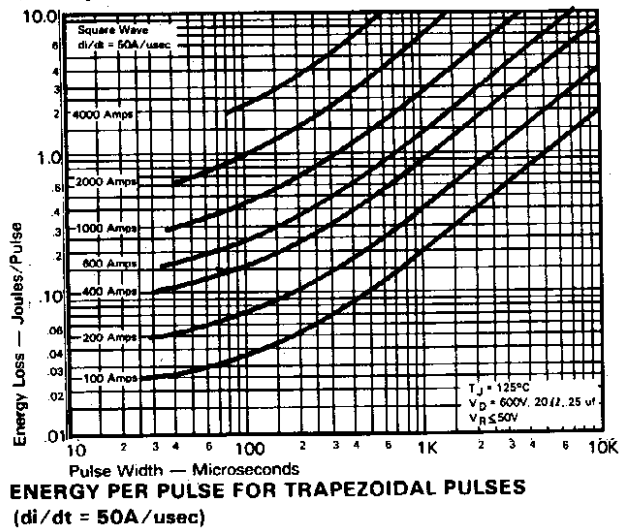
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## Sinusoidal Current Data



## Trapezoidal Wave Current Data

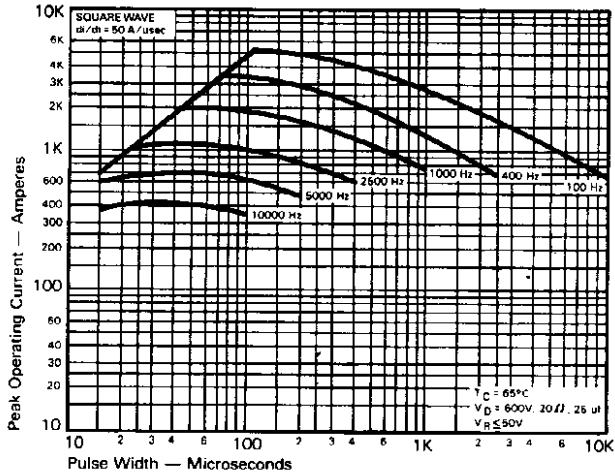


FAST SWITCHING  
THYRISTORS

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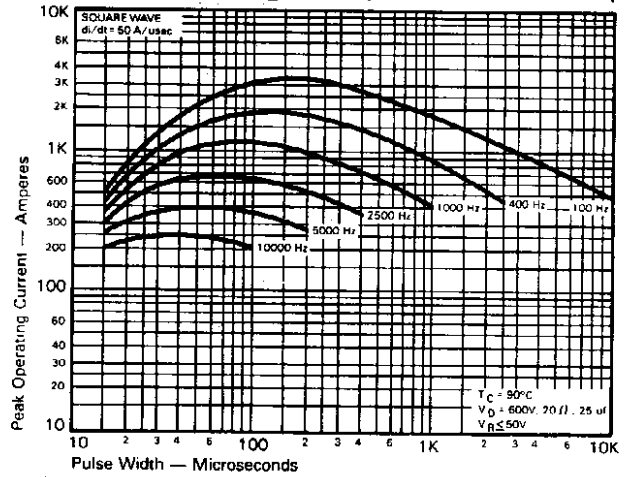
Fast Switching  
SCR  
T7S7\_50

**Trapezoidal Wave Current Data**  
( $T_C = 65^\circ\text{C}$ )

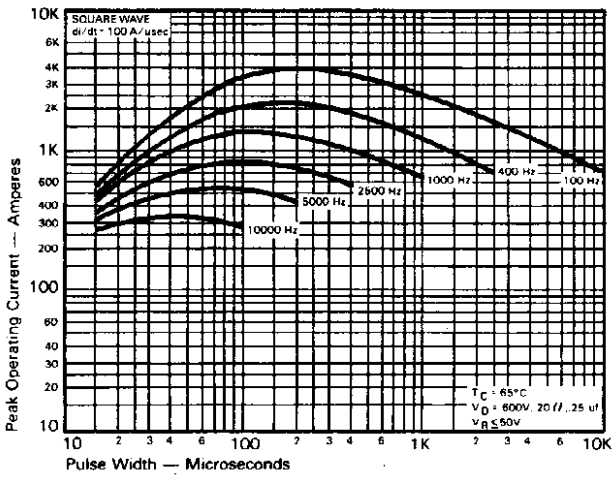


**MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT vs. PULSE WIDTH ( $di/dt = 50\text{A/us}$ )**

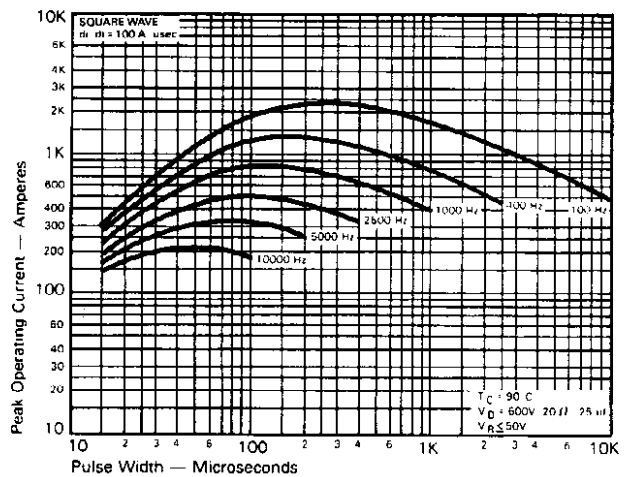
**Trapezoidal Wave Current Data**  
( $T_C = 90^\circ\text{C}$ )



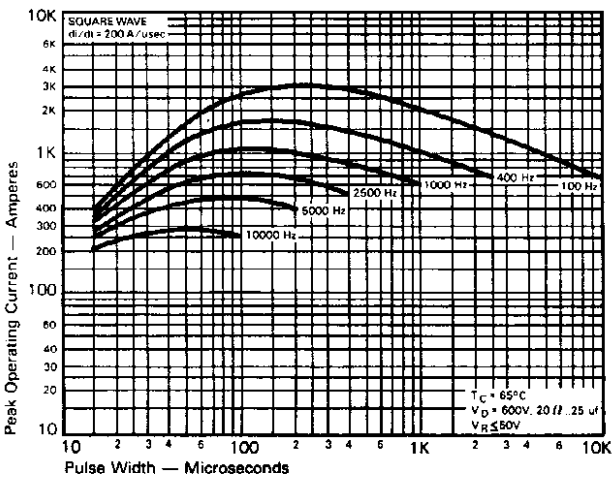
**MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT vs. PULSE WIDTH ( $di/dt = 50\text{A/us}$ )**



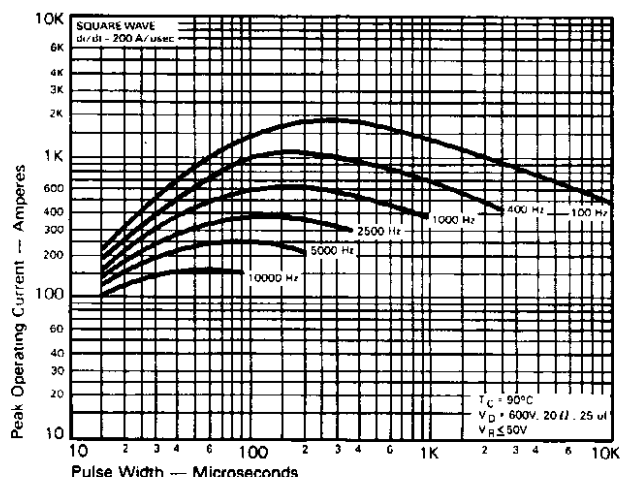
**MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT vs. PULSE WIDTH ( $di/dt = 100\text{A/us}$ )**



**MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT vs. PULSE WIDTH ( $di/dt = 100\text{A/us}$ )**



**MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT vs. PULSE WIDTH ( $di/dt = 200\text{A/us}$ )**



**MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT vs. PULSE WIDTH ( $di/dt = 200\text{A/us}$ )**

FAST SWITCHING  
THYRISTORS