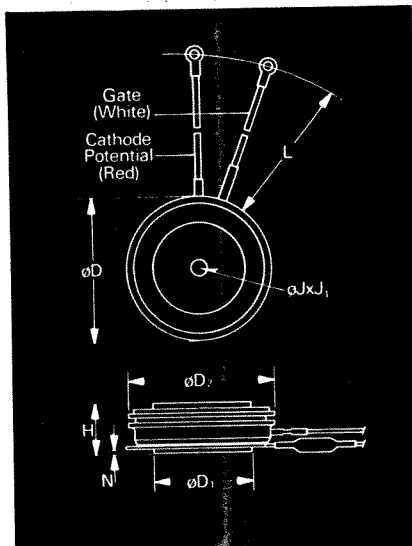


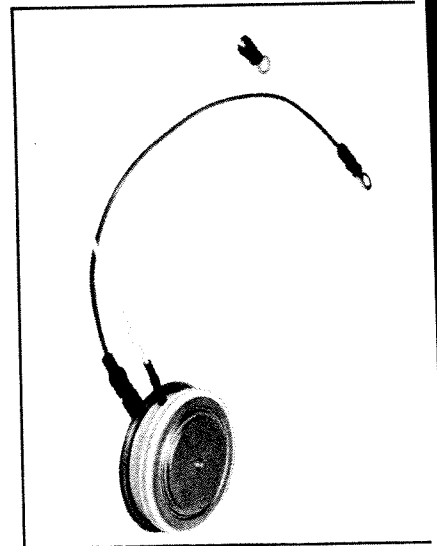
# Fast Switching SCR T7SH\_40

400A Avg.  
(700 RMS)  
Up to 1200 Volts  
10-50  $\mu$ s



| 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.



## T7S Outline

### Features:

- Interdigitated, di/namic Gate structure
- Hard Commutation Turn-Off
- Forward Blocking Voltage Capabilities to 1200 Volts
- Low Switching Losses at High Frequency
- Soft Commutation (Feedback Diode) Testing Available
- High di/dt with softgate control

### Applications:

- Induction Heating
- Transportation
- Inverters
- Crowbars
- Cycloconverters

## Ordering Information

| Type | Voltage                                   |      | Current                |      | Turn-off            |      | Gate current         |      | Leads |      |
|------|-------------------------------------------|------|------------------------|------|---------------------|------|----------------------|------|-------|------|
| Code | V <sub>DRM</sub> and V <sub>RRM</sub> (V) | Code | I <sub>T(av)</sub> (A) | Code | t <sub>q</sub> usec | Code | I <sub>GT</sub> (ma) | Code | Case  | Code |
| T7SH | 100                                       | 01   | 400                    | 40   | 10                  | 8    | ~ 150                | 4    | T7S   | DN   |
|      | 200                                       | 02   |                        |      | 15                  | 7    |                      |      |       |      |
|      | 300                                       | 03   |                        |      | 20                  | 6    |                      |      |       |      |
|      | 400                                       | 04   |                        |      | 25                  | 5    |                      |      |       |      |
|      | 500                                       | 05   |                        |      | 30                  | 4    |                      |      |       |      |
|      | 600                                       | 06   |                        |      | 40                  | 3    |                      |      |       |      |
|      | 700                                       | 07   |                        |      | 50                  |      |                      |      |       |      |
|      | 800                                       | 08   |                        |      |                     |      |                      |      |       |      |
|      | 900                                       | 09   |                        |      |                     |      |                      |      |       |      |
|      | 1000                                      | 10   |                        |      |                     |      |                      |      |       |      |
|      | 1100                                      | 11   |                        |      |                     |      |                      |      |       |      |
|      | 1200                                      | 12   |                        |      |                     |      |                      |      |       |      |

## Example

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

Type T72H rated at 400A average with V<sub>DRM</sub> = 1000V, I<sub>GT</sub> = 150 ma, t<sub>q</sub> = 30  $\mu$ sec max. and leads—order as:

| Type    | Voltage | Current | Turn Off | Gate Current | Leads |
|---------|---------|---------|----------|--------------|-------|
| T 7 S H | 1 0     | 4 0     | 5        | 4            | D N   |

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SCR  
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## Voltage ②

Blocking State Maximums ( $T_J = 125^\circ\text{C}$ )

Repetitive peak forward blocking voltage, V ...  
Repetitive peak reverse voltage, V ...  
Non-repetitive transient peak reverse voltage,  
 $t \leq 5.0$  msec, V ...

Symbol

$V_{DRM}$   
 $V_{RRM}$   
 $V_{RSM}$   
 $I_{DRM}$   
 $I_{RRM}$

|     |     |     |     |     |     |     |     |      |      |      |      |
|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| 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 |

Forward leakage current, mA peak ...  
Reverse leakage current, mA peak ...

## Current

Conducting State Maximums  
( $T_J = 125^\circ\text{C}$ )

Symbol

**T7SH\_40**

RMS forward current, A ...  
Ave. forward current, A ...  
One-half cycle surge current③, A ...  
3 cycle surge current③, A ...  
10 cycle surge current③, A ...  
 $I^2t$  for fusing (for times  $\geq 8.3$  ms)  
A<sup>2</sup> sec. ...  
Forward voltage drop at  $I_{TM} = 1500\text{A}$   
and  $T_J = 125^\circ\text{C}$ , V ...  
Min. repetitive  $di/dt$ ①④⑤ A/ $\mu$ sec ...

$I_T(\text{rms})$   
 $I_T(\text{av})$   
 $I_{TSM}$   
 $I_{TSM}$   
 $I_{TSM}$   
 $I^2t$   
 $V_{TM}$   
 $di/dt$

628  
400  
8000  
5765  
4980  
267,000  
3.15  
500

## Switching

( $T_J = 125^\circ\text{C}$ )

Symbol

Max. turn-off time,  $I_T = 1000\text{A}$ ,  $T_J = 125^\circ\text{C}$   
 $t_p = 100$   $\mu$ sec,  $di/dt = 50$   
A/ $\mu$ sec., reapplied  $dv/dt =$   
200V/ $\mu$ sec. linear to 0.8  $V_{DRM}$ ,  $\mu$ sec. ③④  $t_q$   
Typ. delay time,  $I_{TM} = 1000\text{A}$   
 $T_D = .8$   $V_{DRM}$ ④,  $\mu$ sec  $t_d$   
Min. critical  $dv/dt$  exponential to .8  
 $V_{DRM}$ ,  $T_J = 125^\circ\text{C}$ , V/ $\mu$ sec ②⑤  $dv/dt$   
Min.  $di/dt$ , non-repetitive, A/ $\mu$ sec ①④⑤  $di/dt$

10 to 50  
.5  
300  
1200

## Gate

Maximum Parameters  
( $T_J = 125^\circ\text{C}$ )

Symbol

Gate current to trigger at  $V_D = 12\text{V}$ , mA  $I_{GT}$   
Gate voltage to trigger at  $V_D = 12\text{V}$ , V ...  $V_{GT}$   
Non-triggering gate voltage,  $T_J = 125^\circ\text{C}$ ,  
and rated  $V_{DRM}$ , V ...  $V_{GDM}$   
Peak forward gate current, A ...  $I_{GTM}$   
Peak reverse gate voltage, V ...  $V_{GRM}$   
Peak gate power, Watts ...  $P_{GM}$   
Average gate power, Watts ...  $P_{G(av)}$

150  
3  
.25  
4  
5  
16  
3

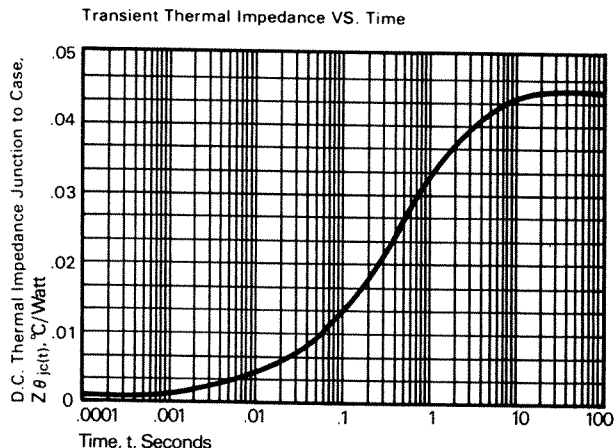
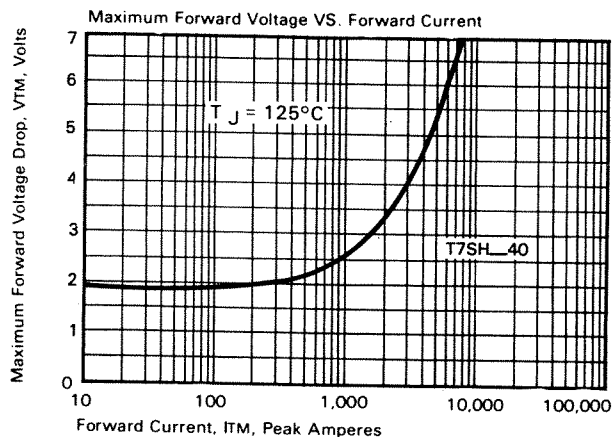
## Thermal and Mechanical

Symbol

Min., Max. oper. junction temp.,  $^\circ\text{C}$  ...  $T_J$   
Min., Max. storage temp.,  $^\circ\text{C}$  ...  $T_{stg}$   
Max. mounting force, lb. ... ①  
Thermal resistance⑦, double-  
side cooling, junction to case,  
 $^\circ\text{C}/\text{Watt}$  ...  $R_{\theta JC}$   
Case to sink, lubricated,  $^\circ\text{C}/\text{Watt}$  ...  $R_{\theta CS}$

-40 to +125  
-40 to +150  
2000 to 2400  
.045  
.02

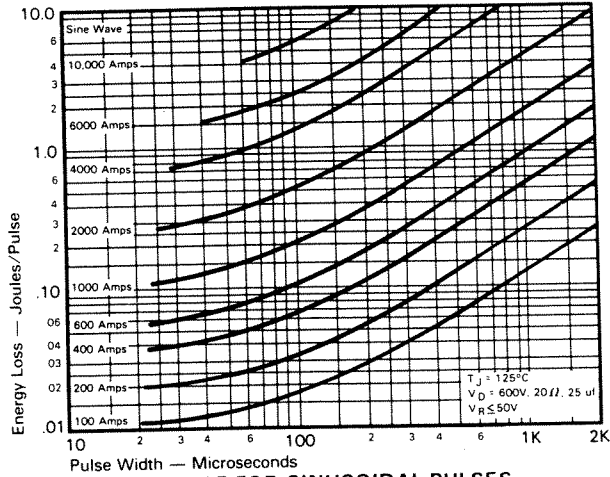
- ① Consult recommended mounting procedures.
- ② Applies for zero or negative gate bias.
- ③ Per JEDEC RS-397, 5.2.2.1.
- ④ With recommended gate drive.
- ⑤ Higher  $dv/dt$  ratings available, consult factory.
- ⑥ Per JEDEC standard RS-397, 5.2.2.6.
- ⑦ For operation with antiparallel diode, consult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



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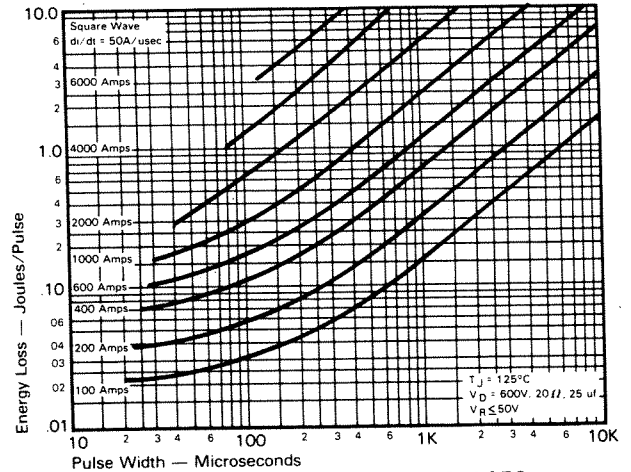
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## Sinusoidal Current Data

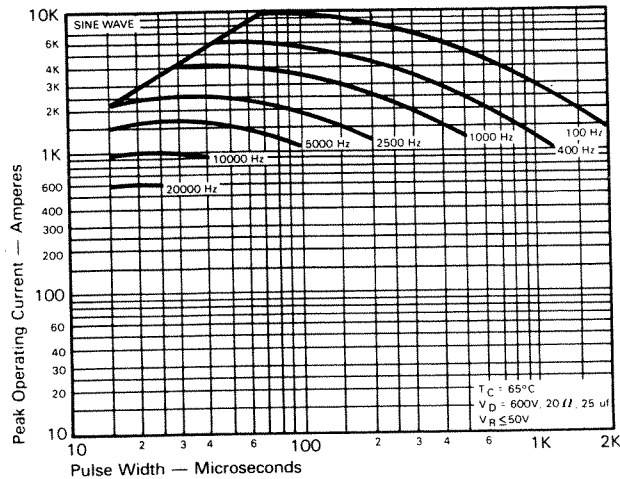


ENERGY PER PULSE FOR SINUSOIDAL PULSES

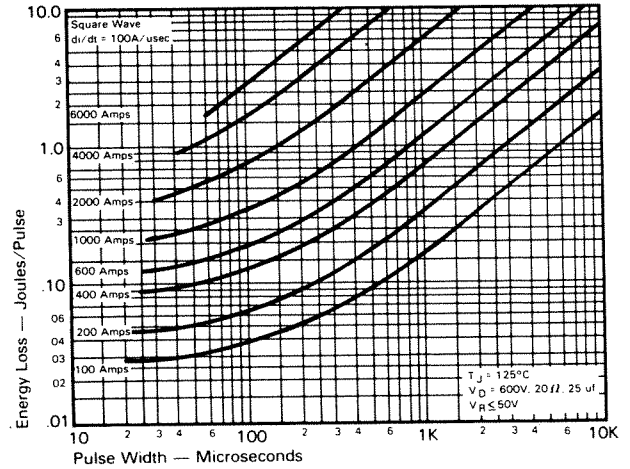
## Trapezoidal Wave Current Data



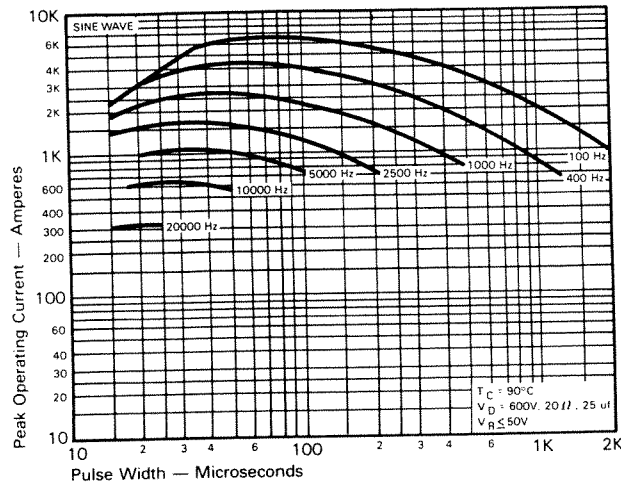
ENERGY PER PULSE FOR TRAPEZOIDAL PULSES  
( $di/dt = 50\text{A/usec}$ )



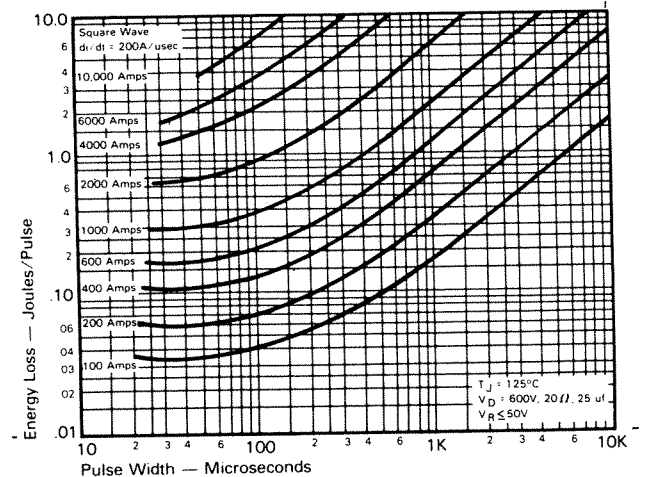
MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT  
vs. PULSE WIDTH ( $T_C = 65^\circ\text{C}$ )



ENERGY PER PULSE FOR TRAPEZOIDAL PULSES  
( $di/dt = 100\text{A/usec}$ )



MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT  
vs. PULSE WIDTH ( $T_C = 90^\circ\text{C}$ )

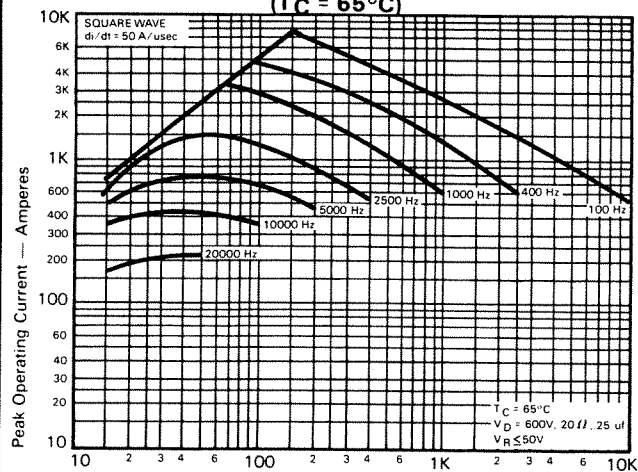


ENERGY PER PULSE FOR TRAPEZOIDAL PULSES  
( $di/dt = 200\text{A/usec}$ )

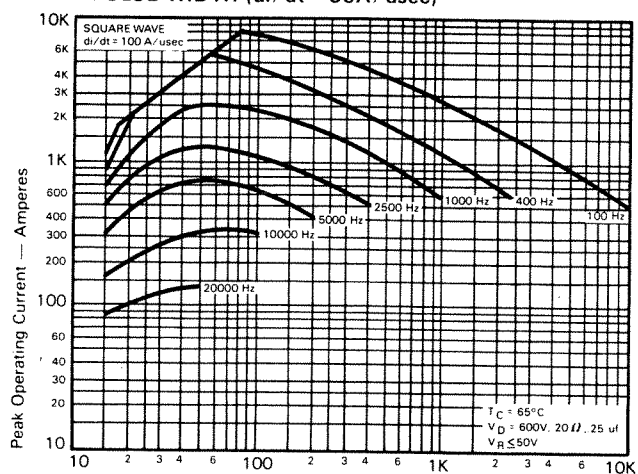
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SCR  
T7SH\_40**

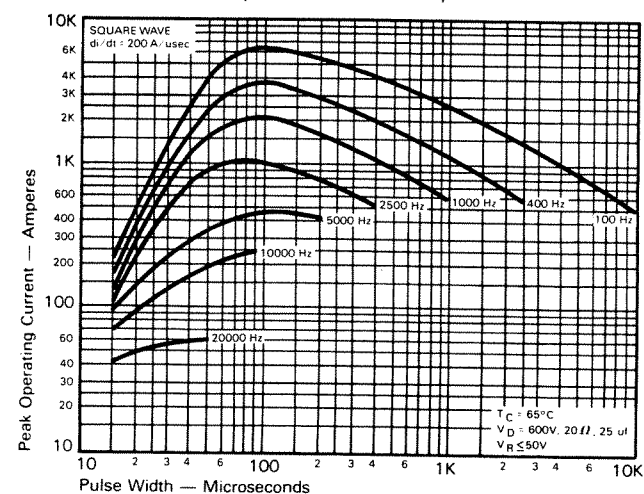
**Trapezoidal Wave Current Data  
( $T_C = 65^\circ\text{C}$ )**



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

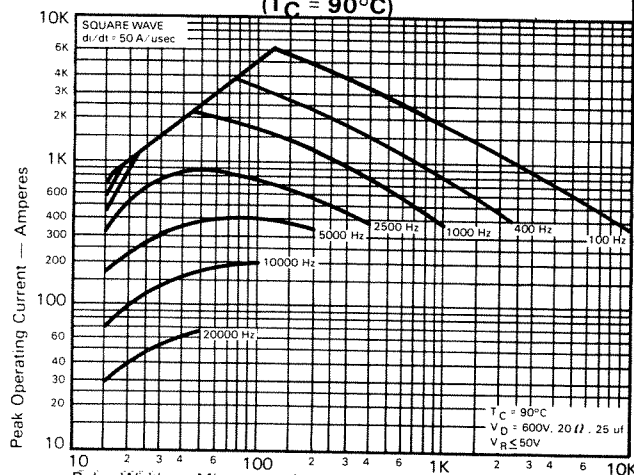


**MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT  
vs. PULSE WIDTH ( $di/dt = 100\text{A/u sec}$ )**

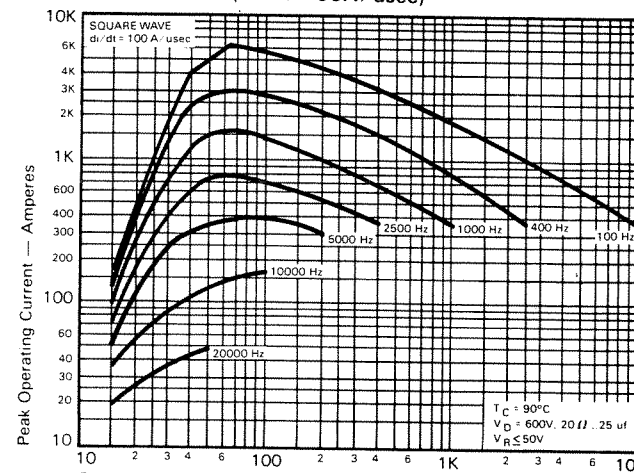


**MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT  
vs. PULSE WIDTH ( $di/dt = 200\text{A/u sec}$ )**

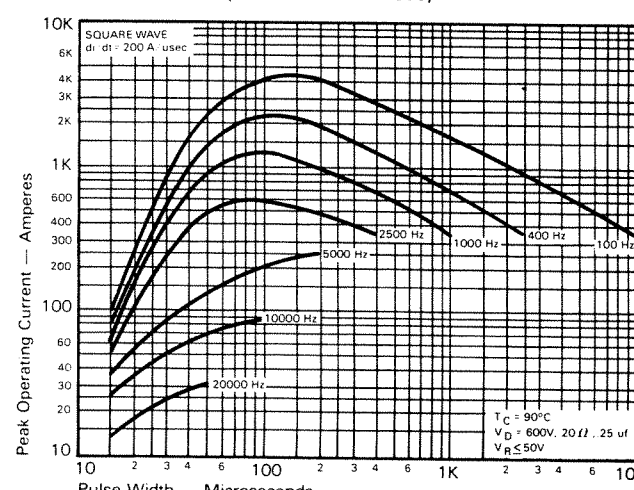
**Trapezoidal Wave Current Data  
( $T_C = 90^\circ\text{C}$ )**



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



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



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