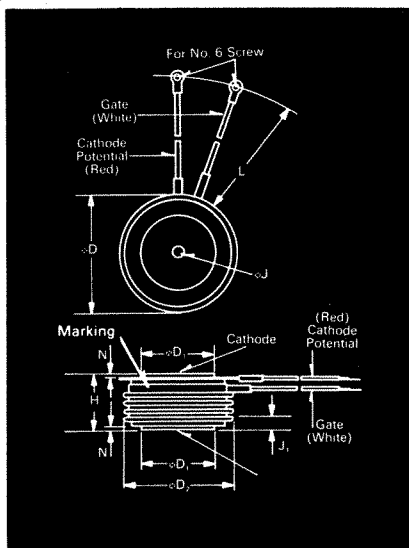


# Fast Switching SCR T72H\_45

450A Avg.  
(700 RMS)  
Up to 1400 Volts  
25-50  $\mu$ s



| Symbol         | Inches |       | Millimeters |        |
|----------------|--------|-------|-------------|--------|
|                | Min.   | Max.  | Min.        | Max.   |
| $\phi D$       | 2.250  | 2.290 | 57.15       | 58.17  |
| $\phi D_1$     | 1.333  | 1.343 | 33.86       | 34.11  |
| $\phi D_2$     | 2.030  | 2.090 | 51.56       | 53.09  |
| H              | 1.020  | 1.060 | 25.91       | 26.92  |
| $\phi J$       | .135   | .145  | 3.43        | 3.68   |
| J <sub>1</sub> | .075   | .090  | 1.91        | 2.29   |
| L              | 7.75   | 8.50  | 196.85      | 215.90 |
| N              | .040   |       | 1.02        |        |

Creep Distance—1.00 in. min. (25.40 mm).

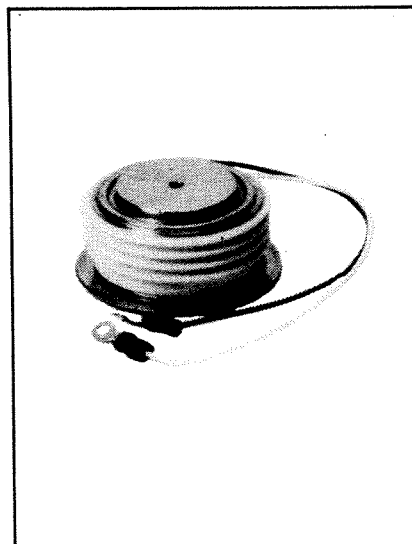
Strike Distance—.69 in. min. (17.53 mm).

(In accordance with NEMA standards.)

Finish—Nickel Plate.

Approx. Weight—8 oz. (227 g).

1. Dimension "H" is a clamped dimension.



## T72 Outline

### Features:

- Interdigitated, di/namic Gate structure
- Hard Commutation Turn-Off
- Forward Blocking 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> $\mu$ sec | Code | I <sub>GT</sub> (ma) | Code | Case  | Code |
| T72H | 100                                       | 01   | 450                    | 45   | 25                       | B    | 150                  | 4    | T72   | DN   |
|      | 200                                       | 02   |                        |      | 30                       | 5    |                      |      |       |      |
|      | 300                                       | 03   |                        |      | 40                       | 4    |                      |      |       |      |
|      | 400                                       | 04   |                        |      | 50                       | 3    |                      |      |       |      |
|      | 500                                       | 05   |                        |      |                          |      |                      |      |       |      |
|      | 600                                       | 06   |                        |      |                          |      |                      |      |       |      |
|      | 700                                       | 07   |                        |      |                          |      |                      |      |       |      |
|      | 800                                       | 08   |                        |      |                          |      |                      |      |       |      |
|      | 900                                       | 09   |                        |      |                          |      |                      |      |       |      |
|      | 1000                                      | 10   |                        |      |                          |      |                      |      |       |      |
|      | 1100                                      | 11   |                        |      |                          |      |                      |      |       |      |
|      | 1200                                      | 12   |                        |      |                          |      |                      |      |       |      |
|      | 1400                                      | 14   |                        |      |                          |      |                      |      |       |      |

## Example

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

Type T72H rated at 450 A average with V<sub>DRM</sub> = 1000V,  
I<sub>GT</sub> = 150 ma, t<sub>q</sub> = 40  $\mu$ sec max. and leads—order as:

| Type    | Voltage | Current | Turn Off | Gate Current | Leads |
|---------|---------|---------|----------|--------------|-------|
| T 7 2 H | 1 0     | 4 5     | 4        | 4            | D N   |

**450A Avg.  
(700 RMS)  
Up to 1400 Volts  
25-50  $\mu$ s**

**Fast Switching  
SCR  
T72H\_45**

## Voltage ①

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

|                                                                                 |           |
|---------------------------------------------------------------------------------|-----------|
| Repetitive peak forward blocking voltage, V                                     | $V_{DRM}$ |
| Repetitive peak reverse voltage, V                                              | $V_{RRM}$ |
| Non-repetitive transient peak reverse voltage,<br>$t \leq 5.0 \text{ msec}$ , V | $V_{RSM}$ |
| Forward leakage current, mA peak                                                | $I_{DRM}$ |
| Reverse leakage current, mA peak                                                | $I_{RRM}$ |

|     |     |     |     |     |     |     |     |      |      |      |      |      |
|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| 100 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900  | 1000 | 1100 | 1200 | 1400 |
| 100 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900  | 1000 | 1100 | 1200 | 1400 |
| 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 | 1300 | 1500 |

## Current

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

|                                                                                     |                   |
|-------------------------------------------------------------------------------------|-------------------|
| RMS forward current, A                                                              | $I_T(\text{rms})$ |
| Ave. forward current, A                                                             | $I_T(\text{av})$  |
| One-half cycle surge current③, A                                                    | $I_{TSM}$         |
| 3 cycle surge current③, A                                                           | $I_{TSM}$         |
| 10 cycle surge current③, A                                                          | $I_{TSM}$         |
| $I^2t$ for fusing (for times $\geq 8.3 \text{ ms}$ )<br>A <sup>2</sup> sec.         | $I^2t$            |
| Forward voltage drop at $I_{TM} = 1500\text{A}$<br>and $T_J = 25^\circ\text{C}$ , V | $V_{TM}$          |
| Min. repetitive $di/dt$ ①①① A/ $\mu\text{sec}$                                      | $di/dt$           |

**T72H\_45**

|         |
|---------|
| 700     |
| 450     |
| 7500    |
| 5300    |
| 4650    |
| 234,000 |
| 2.30    |
| 600     |

## Switching

( $T_J = 25^\circ\text{C}$ )

Max. turn-off time,  $I_T = 1000\text{A}$ ,  $T_J = 125^\circ\text{C}$   
 $t_p = 100 \mu\text{sec}$ ,  $di/dt = 50$   
A/ $\mu\text{sec}$ , reappplied  $dv/dt =$   
200V/ $\mu\text{sec}$ , linear to 0.8  $V_{DRM}$ ,  $\mu\text{sec}$  ③①

Typ. delay time,  $I_{TM} = 1000\text{A}$   
 $t_d = .8 V_{DRM}$  ①,  $\mu\text{sec}$

Min. critical  $dv/dt$  exponential to .8  
 $V_{DRM}$ ,  $T_J = 125^\circ\text{C}$ , V/ $\mu\text{sec}$  ③③

Min.  $di/dt$ , non-repetitive, A/ $\mu\text{sec}$  ①①①

Symbol

|          |
|----------|
| 25 to 50 |
| .5       |
| 300      |
| 1200     |

## Gate

Maximum Parameters  
( $T_J = 25^\circ\text{C}$ )

|                                                                                     |             |
|-------------------------------------------------------------------------------------|-------------|
| 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, $T_J = 125^\circ\text{C}$ ,<br>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   |

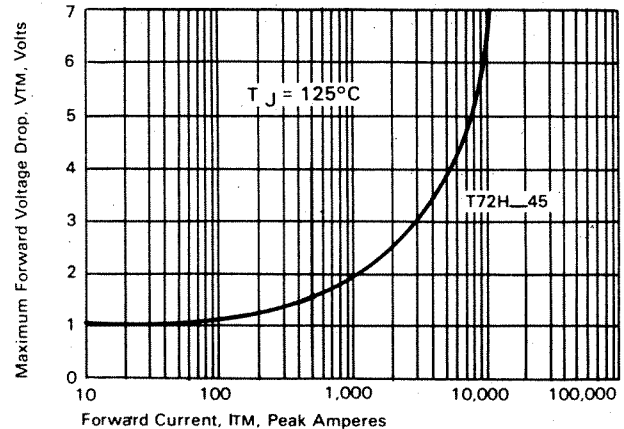
## Thermal and Mechanical

|                                                                                                 |                 |
|-------------------------------------------------------------------------------------------------|-----------------|
| 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 resistance①, double-<br>side cooling, junction to case,<br>$^\circ\text{C}/\text{Watt}$ | $R_{\theta JC}$ |
| Case to sink, lubricated, $^\circ\text{C}/\text{Watt}$                                          | $R_{\theta CS}$ |

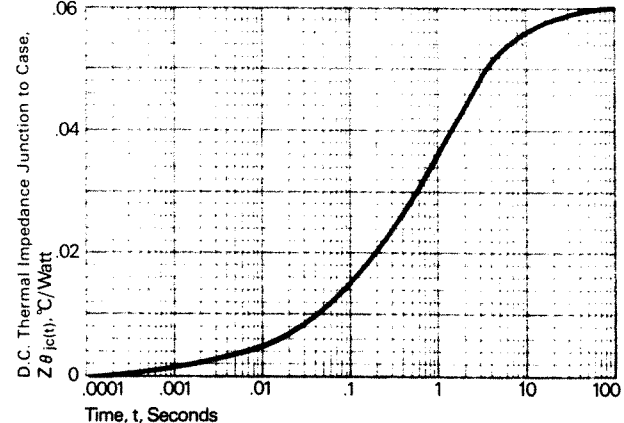
|              |
|--------------|
| -40 to +125  |
| -40 to +150  |
| 2000 to 2400 |
| .06          |
| .02          |

- 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 VS. Forward Current



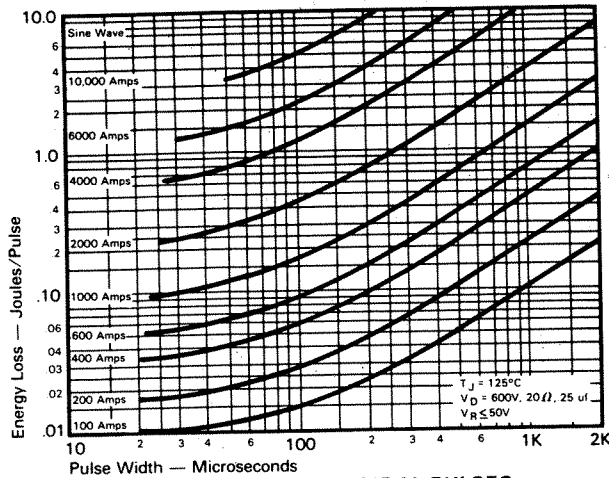
Transient Thermal Impedance VS. Time



# Fast Switching SCR T72H\_45

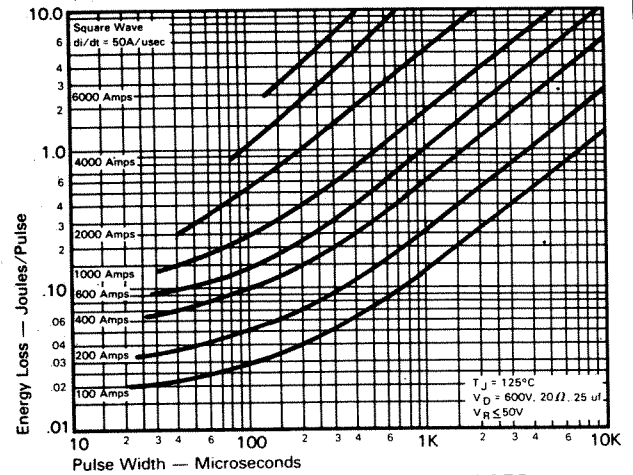
450A Avg.  
(700 RMS)  
Up to 1400 Volts  
25-50  $\mu$ s

## Sinusoidal Current Data

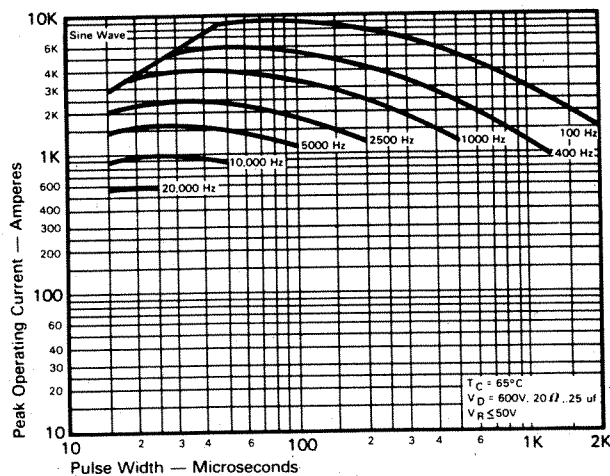


ENERGY PER PULSE FOR SINUSOIDAL PULSES

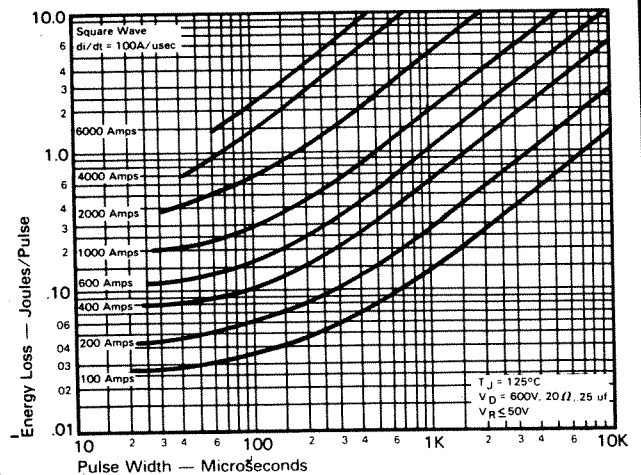
## Trapezoidal Wave Current Data



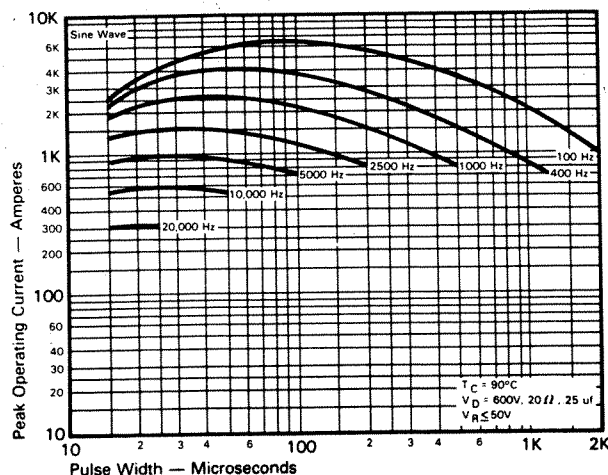
ENERGY PER PULSE FOR TRAPEZOIDAL PULSES  
( $di/dt = 50\text{A/usec}$ )



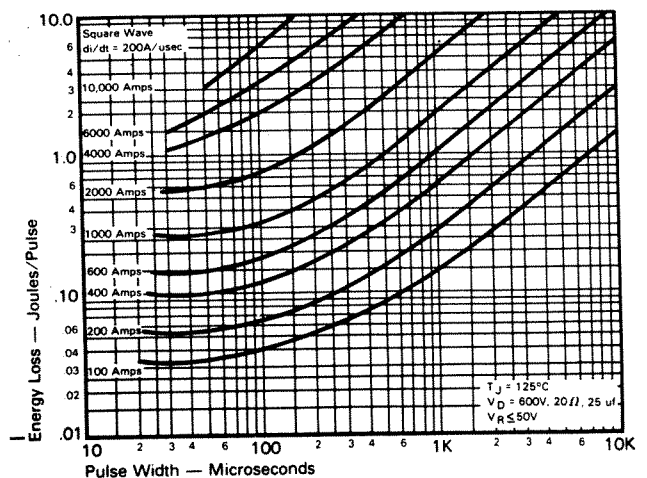
MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT  
vs. PULSE WIDTH ( $T_C = 65^\circ\text{C}$ )



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



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

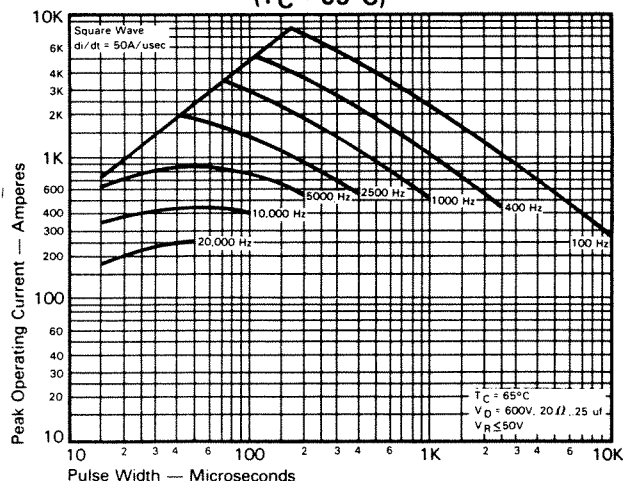


ENERGY PER PULSE FOR TRAPEZOIDAL PULSES  
( $di/dt = 200\text{A/usec}$ )

**450A Avg.  
(700 RMS)  
Up to 1400 Volts  
25-50  $\mu$ s**

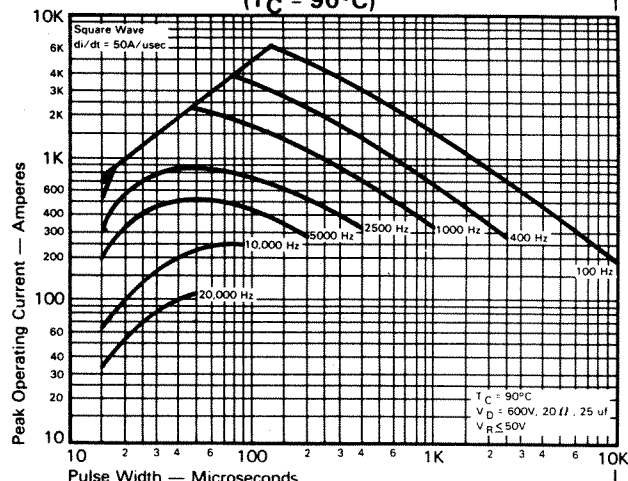
**Fast Switching  
SCR  
T72H\_45**

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

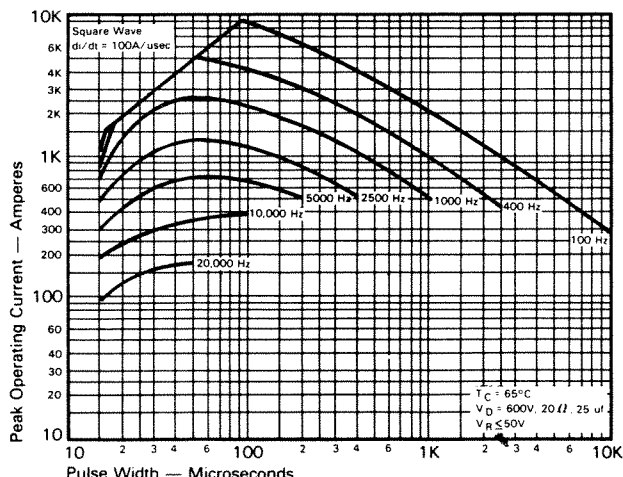


**MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT  
vs. PULSE WIDTH ( $di/dt = 50\text{A/usec}$ )**

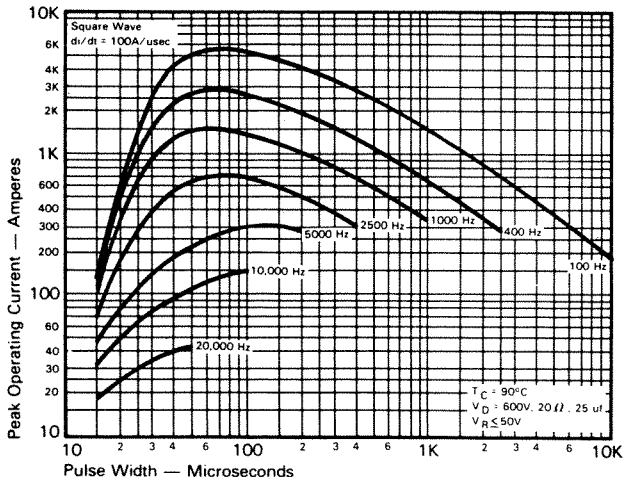
**Trapezoidal Wave Current Data  
( $T_C = 90^\circ\text{C}$ )**



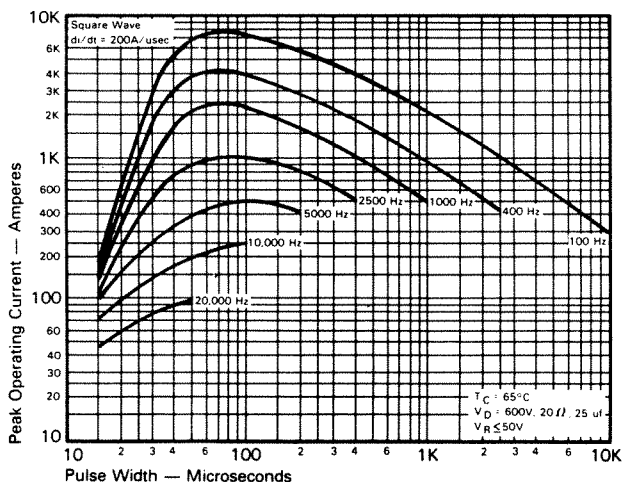
**MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT  
vs. PULSE WIDTH ( $di/dt = 50\text{A/usec}$ )**



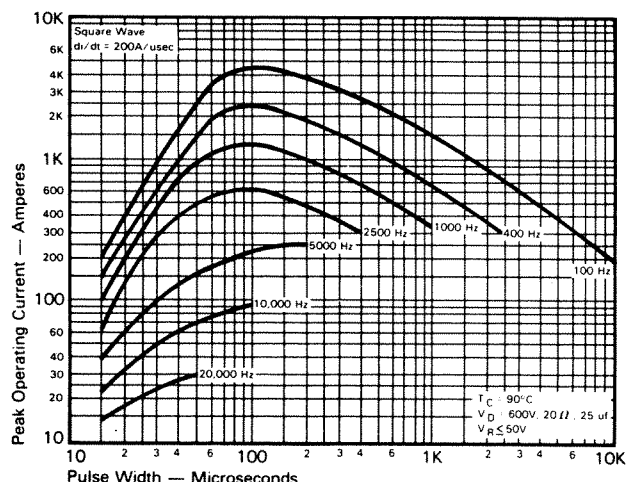
**MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT  
vs. PULSE WIDTH ( $di/dt = 100\text{A/usec}$ )**



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



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



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