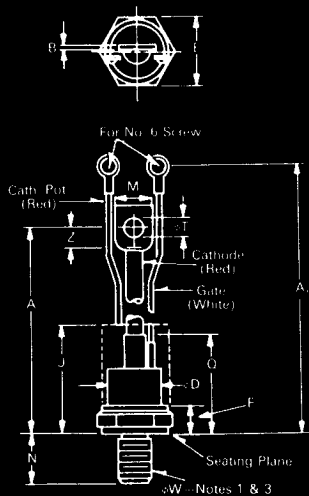


# Fast Switching SCR T507\_80

80A Avg.  
(125 RMS)  
Up to 1400 Volts  
10-50  $\mu$ s



Conforms to TO-94 Outline

| Symbol         | Inches                   |       | Millimeters |        |
|----------------|--------------------------|-------|-------------|--------|
|                | Min.                     | Max.  | Min.        | Max.   |
| A              | 5.775                    | 6.265 | 146.69      | 159.13 |
| A <sub>1</sub> | 6.850                    | 7.500 | 173.99      | 190.50 |
| B              | .055                     | .075  | 1.40        | 1.91   |
| $\phi$ D       | .860                     | 1.000 | 21.84       | 25.40  |
| E              | 1.031                    | 1.063 | 26.19       | 27.00  |
| F              | .255                     | .400  | 6.48        | 10.16  |
| J              | 2.50                     |       | 63.50       |        |
| M              | .437                     | .650  | 11.10       | 16.51  |
| N              | .796                     | .827  | 20.24       | 21.01  |
| Q              |                          | 1.675 |             | 42.55  |
| $\phi$ T       | .260                     | .291  | 6.60        | 7.39   |
| Z              | .250                     |       | 6.35        |        |
| $\phi$ W       | $\frac{1}{2}$ -20 UNF-2A |       |             |        |

Creep & Strike Distance.

T500—50 in. min. (12.85 mm).  
(In accordance with NEMA standards.)

Finish—Nickel Plate.

Approx. Weight—5 oz. (142 g).

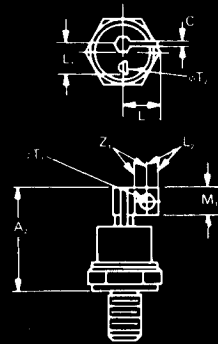
1. Complete threads to extend to within  
2½ threads of seating plane.

2. Angular orientation of terminals is  
undefined.

3. Pitch diameter of  $\frac{1}{2}$ -20 UNF-2A  
(coated) threads (ASA B1.1-1960).

4. Dimension "J" denotes seated height  
with leads bent at right angles.

\*for 10  $\mu$ sec turn-off,  
consult factory

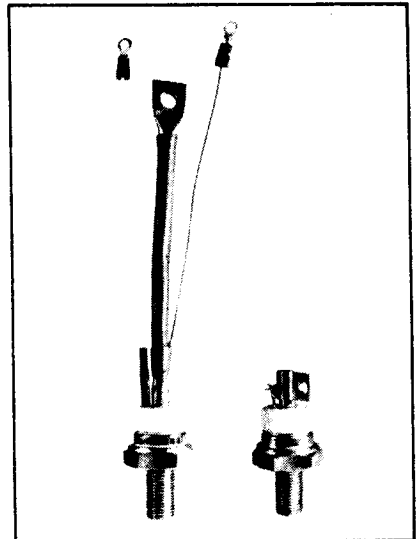


Conforms to TO-83 Outline

| Symbol                | Inches                   |       | Millimeters |       |
|-----------------------|--------------------------|-------|-------------|-------|
|                       | Min.                     | Max.  | Min.        | Max.  |
| A <sub>2</sub>        |                          | 1.810 |             | 45.97 |
| C                     | .070                     | .110  | 1.78        | 2.79  |
| L                     |                          | .650  |             | 16.51 |
| L <sub>1</sub>        | .420                     | .520  | 10.67       | 13.21 |
| L <sub>2</sub>        | .180                     |       | 4.57        |       |
| M <sub>1</sub>        | .360                     | .470  | 9.14        | 11.94 |
| $\phi$ T <sub>1</sub> | .190                     | .235  | 4.83        | 5.97  |
| $\phi$ T <sub>2</sub> | .060                     | .080  | 1.52        | 2.03  |
| Z <sub>1</sub>        | .180                     |       | 4.57        |       |
| $\phi$ W              | $\frac{1}{2}$ -20 UNF-2A |       |             |       |

Approx. Weight—4 oz. (114 g).

1. Basic dimensions of TO-94 and TO-83  
are same except as noted.



## Features:

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

## Applications:

- Inverters for UPS
- Induction Heating
- AC Motor Control
- Switching power supplies
- Cycloconverters
- Choppers
- Crowbars

## Ordering Information

| Type | Voltage                                   |      | Current                |      | Turn-off              |      | Gate-current         |      | Leads |      |  |
|------|-------------------------------------------|------|------------------------|------|-----------------------|------|----------------------|------|-------|------|--|
| Case | V <sub>DRM</sub> and V <sub>RRM</sub> (V) | Code | I <sub>T(av)</sub> (A) | Code | t <sub>q</sub> (μsec) | Code | I <sub>GT</sub> (ma) | Code | Case  | Code |  |
| T507 | 100                                       | 01   | 80                     | 80   | 10                    | 8    | 150                  | 4    | TO-94 | AQ   |  |
|      | 200                                       | 02   |                        |      | 15                    | 7    |                      |      |       |      |  |
|      | 300                                       | 03   |                        |      | 20                    | 6    |                      |      |       |      |  |
|      | 400                                       | 04   |                        |      | 25                    | 5    |                      |      |       |      |  |
|      | 500                                       | 05   |                        |      | 30                    | 5    |                      |      |       |      |  |
|      | 600                                       | 06   |                        |      | 40                    | 4    |                      |      |       |      |  |
|      | 700                                       | 07   |                        |      | 50                    | 3    |                      |      |       |      |  |
|      | 800                                       | 08   |                        |      | 10                    | C    |                      |      | TO-83 | AB   |  |
|      | 900                                       | 09   |                        |      |                       |      |                      |      |       |      |  |
|      | 1000                                      | 10   |                        |      |                       |      |                      |      |       |      |  |
|      | 1100                                      | 11   |                        |      |                       |      |                      |      |       |      |  |
|      | 1200                                      | 12   |                        |      |                       |      |                      |      |       |      |  |
|      | 1400                                      | 14   |                        |      |                       |      |                      |      |       |      |  |

## Example

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

Type T 507 rated at 80 A average with V<sub>DRM</sub> = 1000V,  
I<sub>GT</sub> = 150 ma, t<sub>q</sub> = 30  $\mu$ sec max. and flex leads—order as:

| Type    | Voltage | Current | Turn Off | Gate Current | Leads |
|---------|---------|---------|----------|--------------|-------|
| T 5 0 7 | 1 0     | 8 0     | 5        | 4            | A Q   |

**80A Avg.  
(125 RMS)  
Up to 1400 Volts  
10-50  $\mu$ s**

**Fast Switching  
SCR  
T507\_80**

## Voltage

**Blocking State Maximums**  $\textcircled{2}$  ( $T_J = 125^\circ\text{C}$ )

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

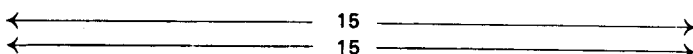
Symbol

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

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

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

$I_{DRM}$   
 $I_{RRM}$



## Current

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

RMS forward current, A ...  
Ave. forward current, A ...  
One-half cycle surge current $\textcircled{3}$ , A ...  
 $I_2 t$  for fusing (for times  $\geq 8.3$  ms)  
A<sup>2</sup> sec. ...  
Forward voltage drop at  $I_{TM} = 500$ A  
and  $T_J = 25^\circ\text{C}$ , V ...  
Min. repetitive di/dt $\textcircled{1}$  $\textcircled{4}$  $\textcircled{5}$ , A/ $\mu$ sec ...

Symbol

**T507\_80**

$I_{T(rms)}$   
 $I_{T(av)}$   
 $I_{TSM}$   
 $I_2 t$   
 $V_{TM}$   
di/dt

125  
80  
1400  
8150  
3.2  
150

## Switching

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

Max. turn-off time,  $I_T = 50$ A,  
 $T_J = 125^\circ\text{C}$ , di/dt = 5  
A/ $\mu$ sec, reapplied dv/dt =  
20V/ $\mu$ sec linear to 0.8  $V_{DRM}$ ,  $\mu$ sec $\textcircled{1}$  $\textcircled{2}$  ...  
Typ. turn-on time,  $I_T = 100$ A,  
 $V_D = 100$ V $\textcircled{2}$ ,  $\mu$ sec ...  
Min. critical dv/dt, exponential to  $V_{DRM}$ ,  
 $T_J = 125^\circ\text{C}$ , V/ $\mu$ sec $\textcircled{3}$  $\textcircled{4}$  ...  
Min. di/dt non-repetitive,  
A/ $\mu$ sec $\textcircled{1}$  $\textcircled{2}$  $\textcircled{5}$  ...

Symbol

$t_q$

10 to 50

$t_{on}$

3.5

dv/dt

200

di/dt

800

## Gate

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

Gate current to trigger at  $V_D = 12$ V, mA ...  
Gate voltage to trigger at  $V_D = 12$ V, V ...  
Non-triggering gate voltage,  $T_J = 125^\circ\text{C}$ ,  
and rated  $V_{DRM}$ , V ...  
Peak forward gate current, A ...  
Peak reverse gate voltage, V ...  
Peak gate power, Watts ...  
Average gate power, Watts ...

Symbol

$I_{GT}$   
 $V_{GT}$   
 $V_{GDM}$   
 $I_{GTM}$   
 $V_{GRM}$   
 $P_{GM}$   
 $P_{G(av)}$

150  
3  
0.15  
4  
5  
16  
3

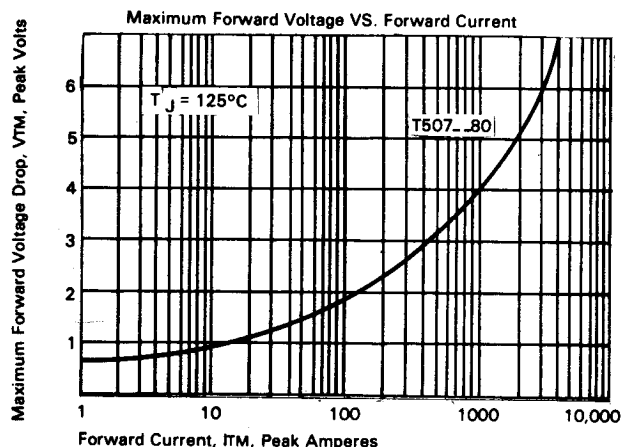
## Thermal and Mechanical

Min., Max. oper. junction temp.,  $^\circ\text{C}$  ...  
Min., Max. storage temp.,  $^\circ\text{C}$  ...  
Max. mounting torque, in lb.  $\textcircled{1}$  ...  
Max. Thermal resistance  $\textcircled{1}$   
Junction to case,  $^\circ\text{C}/\text{Watt}$  ...  
Case to sink, lubricated,  $^\circ\text{C}/\text{Watt}$  ...

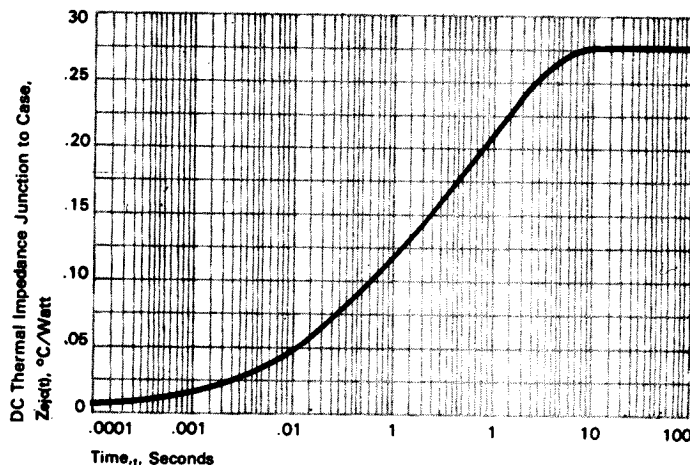
Symbol

$T_J$   
 $T_{stg}$   
 $R_{\theta JC}$   
 $R_{\theta CS}$

-40 to +125  
-40 to +150  
130  
.28  
.12



## Transient Thermal Impedance VS. Time

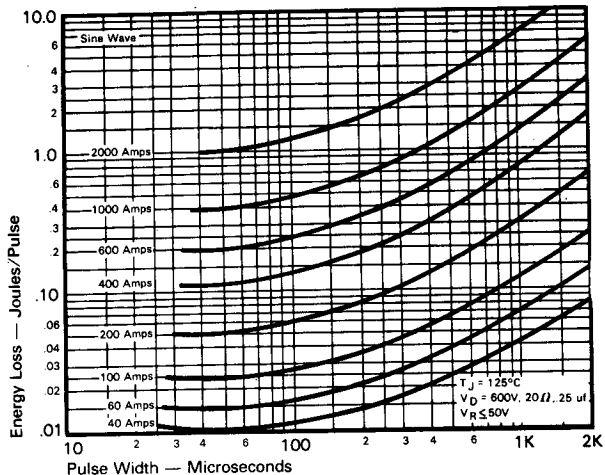


- $\textcircled{1}$  Consult recommended mounting procedures.
- $\textcircled{2}$  Applies for zero or negative gate bias.
- $\textcircled{3}$  Per JEDEC RS-397, 5.2.2.1.
- $\textcircled{4}$  With recommended gate drive.
- $\textcircled{5}$  Higher dv/dt ratings available, consult factory.
- $\textcircled{6}$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

# Fast Switching SCR T507\_80

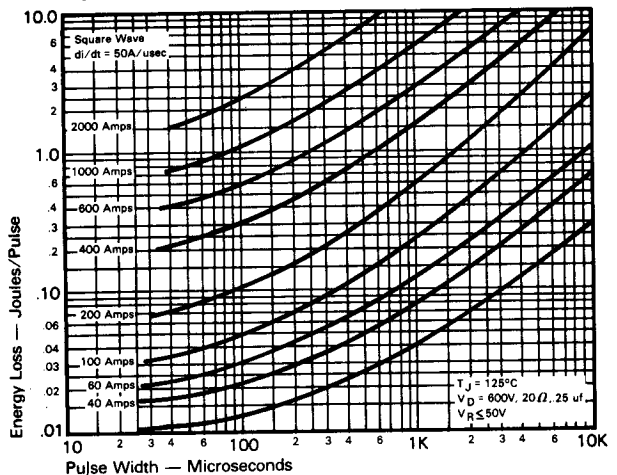
80A Avg.  
(125 RMS)  
Up to 1400 Volts  
10-50  $\mu$ s

## Sinusoidal Current Data

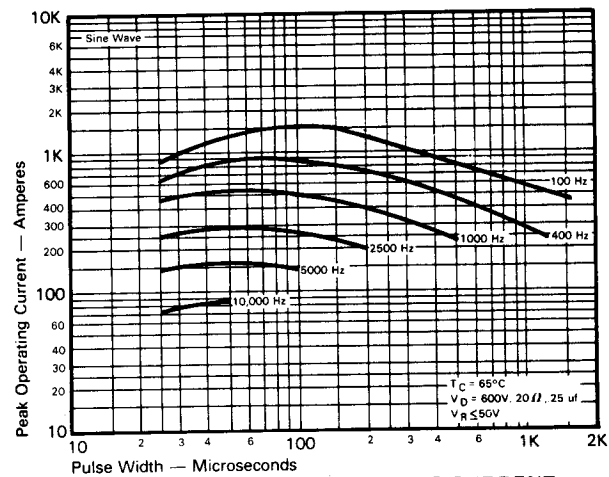


ENERGY PER PULSE FOR SINUSOIDAL PULSES

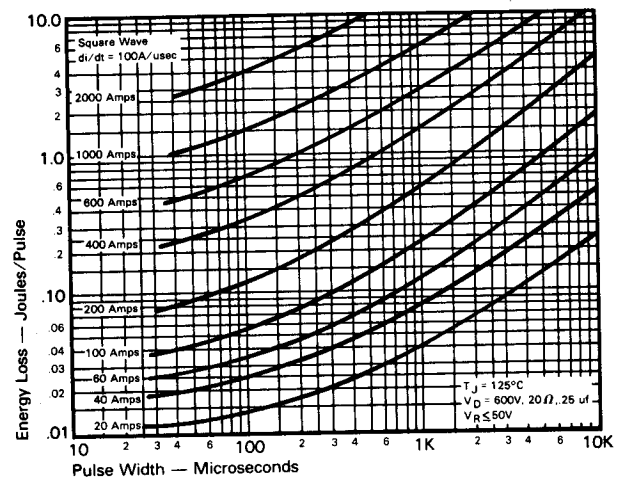
## Trapezoidal Wave Current Data



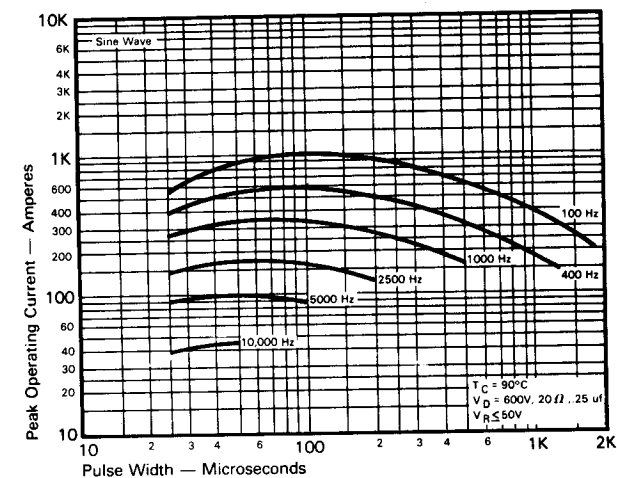
ENERGY PER PULSE FOR TRAPEZOIDAL PULSES  
( $di/dt = 50\text{A/usec}$ )



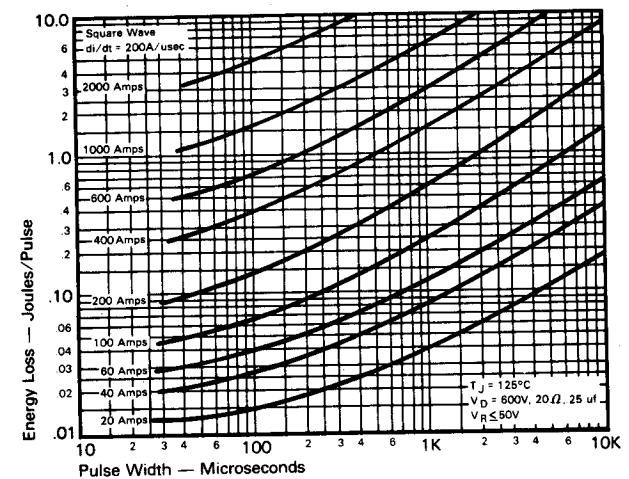
MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT  
vs. PULSE WIDTH ( $T_C = 65^\circ\text{C}$ )



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



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

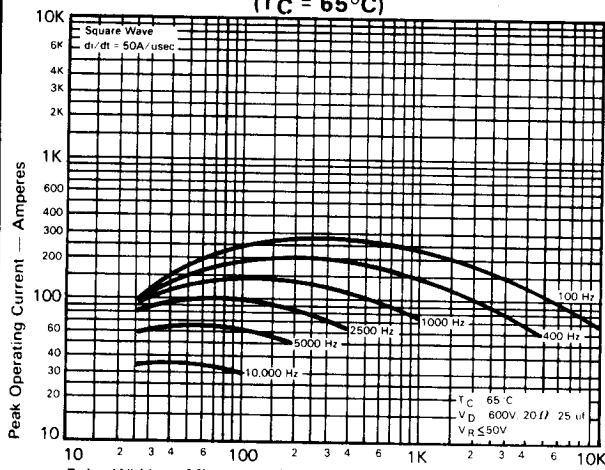


ENERGY PER PULSE FOR TRAPEZOIDAL PULSES  
( $di/dt = 200\text{A/usec}$ )

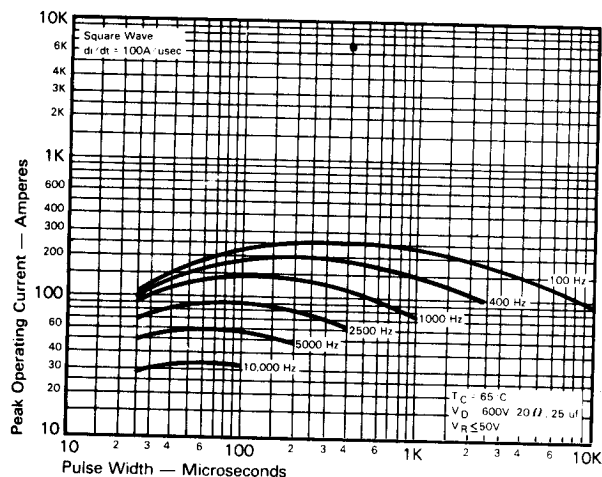
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Fast Switching  
SCR  
T507\_80

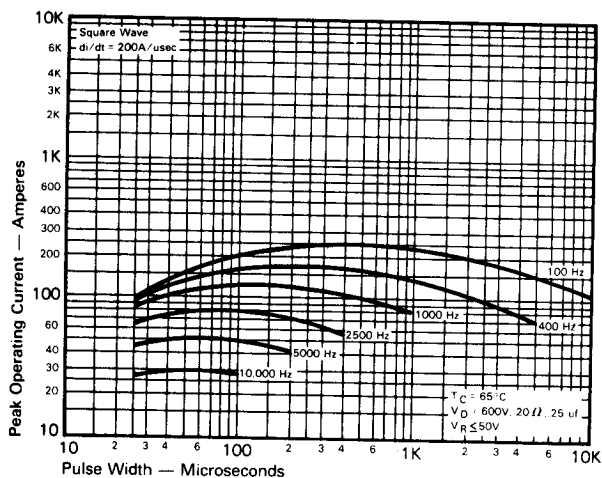
### Trapezoidal Wave Current Data ( $T_C = 65^\circ\text{C}$ )



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

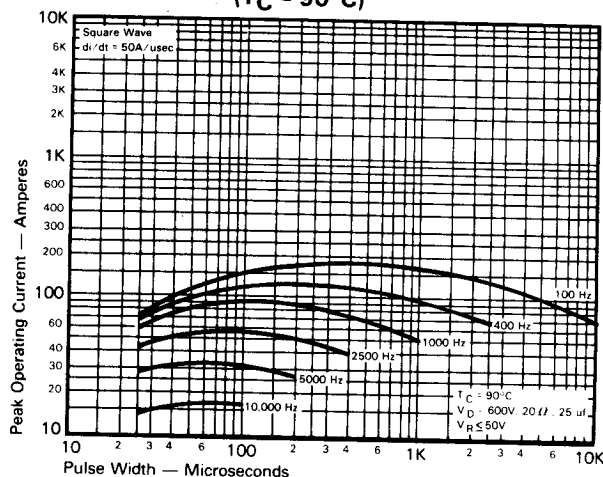


**MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT vs. PULSE WIDTH ( $dI/dt = 100\text{A}/\mu\text{sec}$ )**

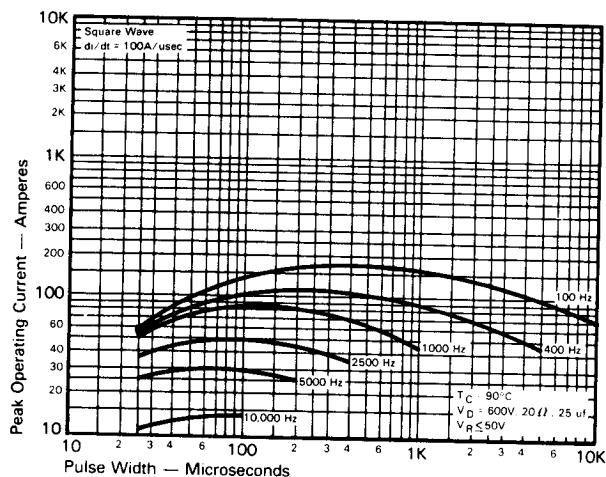


**MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT vs. PULSE WIDTH ( $dI/dt = 200\text{A}/\mu\text{sec}$ )**

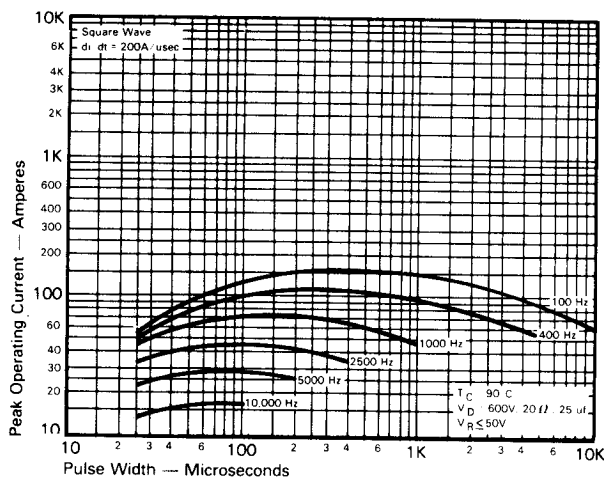
### Trapezoidal Wave Current Data ( $T_C = 90^\circ\text{C}$ )



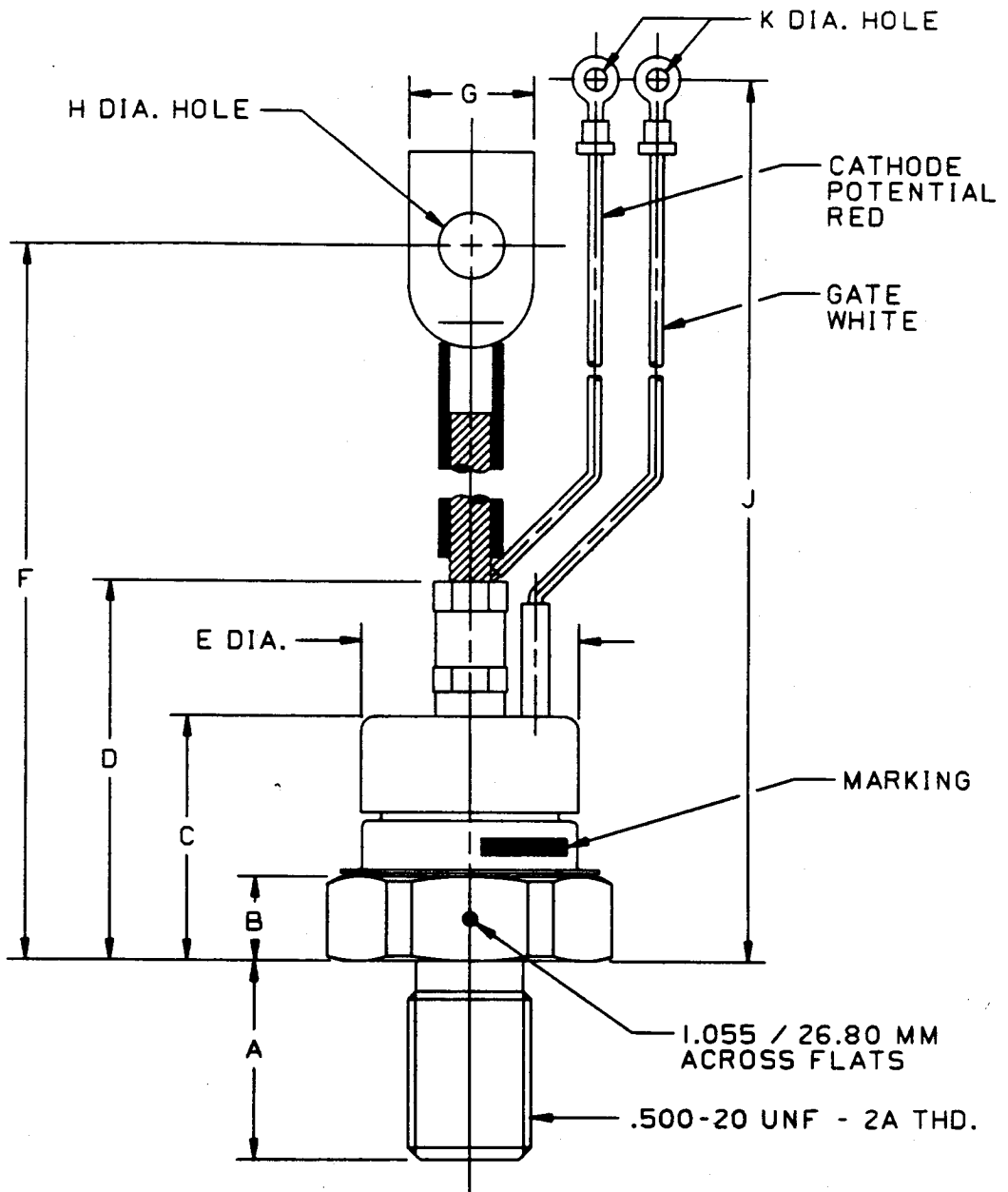
**MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT vs. PULSE WIDTH ( $dI/dt = 50\text{A}/\mu\text{sec}$ )**



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



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



CASE NUMBER T50  
NOMINAL DIMENSIONS

STRIKE DISTANCE = .44 INCH / 11.2 MM MIN.  
CREEPAGE DISTANCE = .44 INCH / 11.2 MM MIN.

| SYM.   | A    | B   | C    | D    | E    | F     | G    | H    | J     | K    |
|--------|------|-----|------|------|------|-------|------|------|-------|------|
| INCHES | .81  | .34 | .98  | 1.58 | .89  | 6.12  | .48  | .266 | 7.44  | .146 |
| MM     | 20.6 | 8.6 | 24.9 | 40.1 | 22.6 | 155.4 | 12.2 | 6.76 | 189.0 | 3.71 |

ALL DIMENSIONS ARE REFERENCE