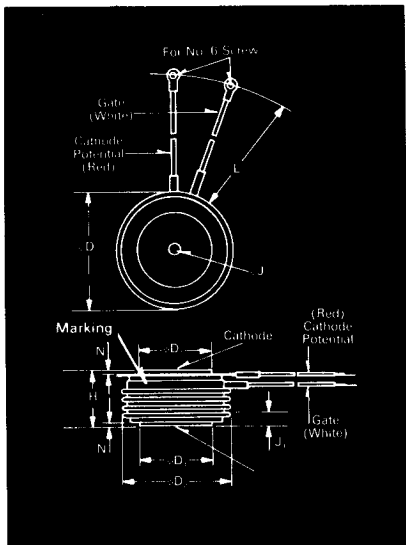


# Fast Switching SCR T727\_45

450A Avg.  
(700 RMS)  
Up to 1200 Volts  
15-60  $\mu$ 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   |
| $J_1$      | .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).

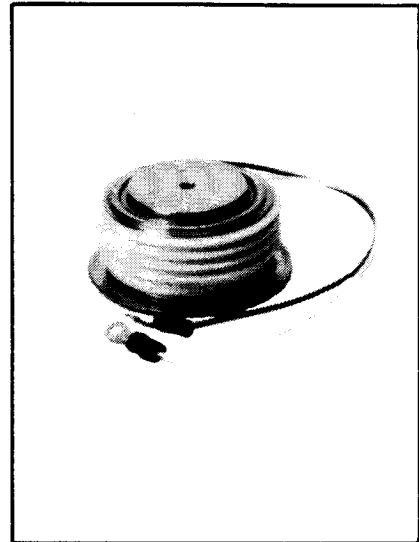
Strike Distance—.69 in. min. (17.53 mm).

(In accordance with NEMA standards.)

Finish—Nickel Plate.

Approx. Weight—8 oz. (227 g).

1. Dimension "H" is a clamped dimension.



## T72 Outline

### Features:

- Center fired di/dynamic 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

### Applications:

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

## Ordering Information

| Type | Voltage                     |      | Current         |      | Turn-off        |      | Gate Current  |      | Leads |      |
|------|-----------------------------|------|-----------------|------|-----------------|------|---------------|------|-------|------|
| Code | $V_{DRM}$ and $V_{RRM}$ (V) | Code | $I_{T(av)}$ (A) | Code | $t_q$ $\mu$ sec | Code | $I_{GT}$ (ma) | Code | Case  | Code |
| T727 | 100                         | 01   | 450             | 45   | 15              | 7    | 150           | 4    | T72   | DN   |
|      | 200                         | 02   |                 |      | 20              | 6    |               |      |       |      |
|      | 300                         | 03   |                 |      | 25              | 8    |               |      |       |      |
|      | 400                         | 04   |                 |      | 30              | 5    |               |      |       |      |
|      | 500                         | 05   |                 |      | 40              | 4    |               |      |       |      |
|      | 600                         | 06   |                 |      | 50              | 3    |               |      |       |      |
|      | 700                         | 07   |                 |      | 60              | 2    |               |      |       |      |
|      | 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 T727 rated at 450 A average with  $V_{DRM} = 1000V$ .

$I_{GT} = 150$  ma,  $t_q = 30$   $\mu$ sec max. and standard control leads—order as:

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

\*for 15 and 20  $\mu$ sec  $V_F$  data, consult factory

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**Fast Switching  
SCR  
T727..45**

## Voltage

**Blocking State Maximums** <sup>②</sup> ( $T_J = 125^\circ\text{C}$ )

| Symbol                                                                       |           |
|------------------------------------------------------------------------------|-----------|
| Repetitive peak forward blocking voltage, V                                  | $V_{DRM}$ |
| Repetitive peak reverse voltage, V                                           | $V_{RRM}$ |
| Non-repetitive transient peak reverse voltage, $t \leq 5.0 \text{ msec}$ , 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 |
| 30  |     |     |     |     |     | 30  |     |      |      |      |      |      |

## Current

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

| Symbol                                                                               | T727—45          |
|--------------------------------------------------------------------------------------|------------------|
| RMS forward current, A                                                               | $I_{T(rms)}$ 700 |
| Ave. forward current, A                                                              | $I_{T(av)}$ 450  |
| One-half cycle surge current <sup>③</sup> , A                                        | $I_{TSM}$ 8000   |
| $I^2t$ for fusing (for times $\geq 8.3 \text{ ms}$ )<br>A <sup>2</sup> sec.          | $I^2t$ 265,000   |
| Forward voltage drop at $I_{TM} = 625 \text{ A}$<br>and $T_J = 25^\circ\text{C}$ , V | $V_{TM}$ 1.45    |
| Min. repetitive $di/dt$ A/ $\mu\text{sec}$ <sup>①④⑤</sup>                            | $di/dt$ 400      |

## Switching

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

| Symbol                                                                                                                                                                                                                  |                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| Max. turn-off time, $I_T = 400 \text{ A}$<br>$T_J = 125^\circ\text{C}$ , $di/dt = 25 \text{ A}/\mu\text{sec}$ , reappplied $dv/dt = 20 \text{ V}/\mu\text{sec}$ linear to $0.8 V_{DRM}$ , $\mu\text{sec}$ <sup>①④</sup> | $t_q$ 15 to 60 |
| Typ. turn-on-time, $I_T = 1000 \text{ A}$<br>$V_D = 300 \text{ V}$ <sup>④</sup> , $\mu\text{sec}$                                                                                                                       | $t_{on}$ 3.0   |
| Min. critical $dv/dt$ , exponential to $V_{DRM}$<br>$T_J = 125^\circ\text{C}$ , V/ $\mu\text{sec}$ <sup>②⑤</sup>                                                                                                        | $dv/dt$ 300    |
| Min. $di/dt$ non-repetitive,<br>A/ $\mu\text{sec}$ <sup>①④⑤</sup>                                                                                                                                                       | $di/dt$ 800    |

## Gate

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

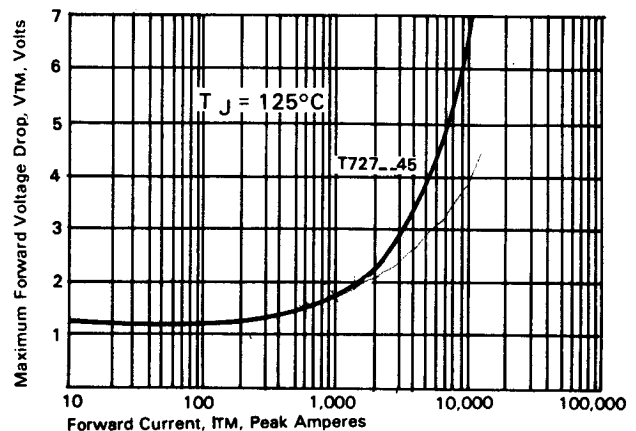
| Symbol                                                                              |                |
|-------------------------------------------------------------------------------------|----------------|
| Gate current to trigger at $V_D = 12 \text{ V}$ , mA                                | $I_{GT}$ 150   |
| Gate voltage to trigger at $V_D = 12 \text{ V}$ , V                                 | $V_{GT}$ 3     |
| Non-triggering gate voltage, $T_J = 125^\circ\text{C}$ ,<br>and rated $V_{DRM}$ , V | $V_{GDM}$ 0.15 |
| Peak forward gate current, A                                                        | $I_{GTM}$ 4    |
| Peak reverse gate voltage, V                                                        | $V_{GRM}$ 5    |
| Peak gate power, Watts                                                              | $P_{GM}$ 16    |
| Average gate power, Watts                                                           | $P_{G(av)}$ 3  |

## Thermal and Mechanical

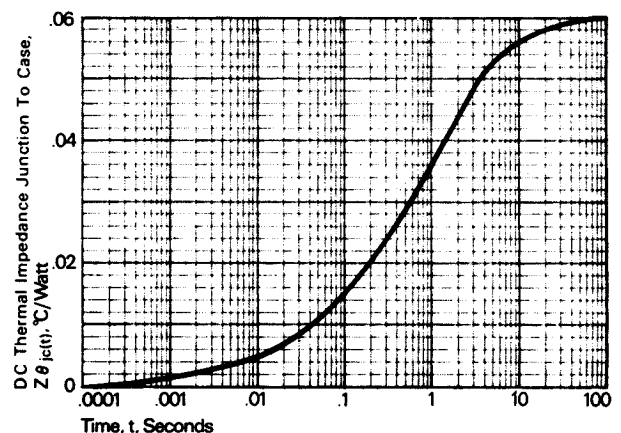
| Symbol                                                                                                    |                       |
|-----------------------------------------------------------------------------------------------------------|-----------------------|
| Min., Max. oper. junction temp., $^\circ\text{C}$                                                         | $T_J$ -40 to +125     |
| Min., Max. storage temp., $^\circ\text{C}$                                                                | $T_{stg}$ -40 to +150 |
| Max. mounting torque, in lb. <sup>①</sup>                                                                 | 2000 to 2400          |
| Max. thermal resistance <sup>①</sup> Double side cooled<br>Junction to case, $^\circ\text{C}/\text{Watt}$ | $R_{\theta JC}$ .06   |
| Case to sink, lubricated, $^\circ\text{C}/\text{Watt}$                                                    | $R_{\theta CS}$ .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



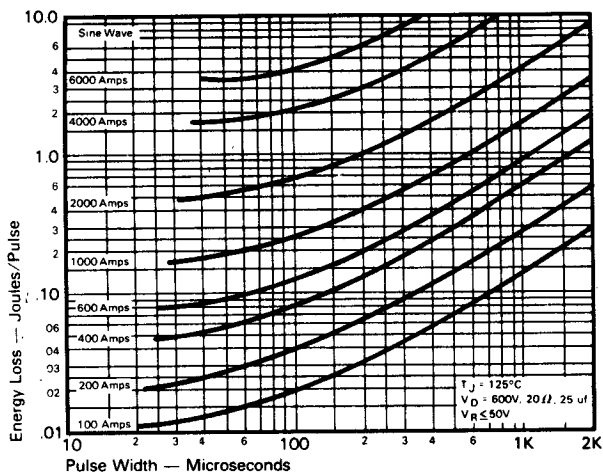
Transient Thermal Impedance VS. Time



# Fast Switching SCR T727\_45

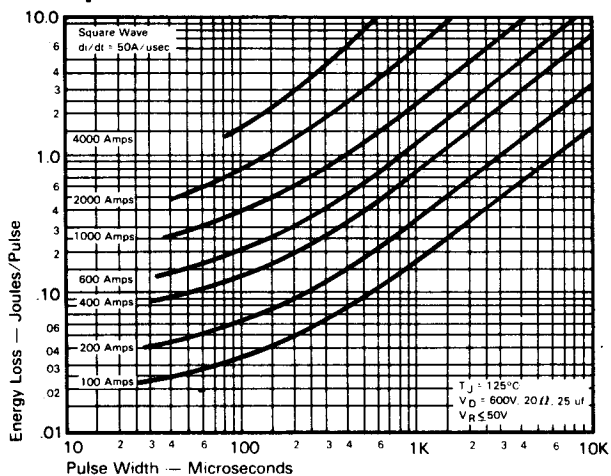
450A Avg.  
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## Sinusoidal Current Data

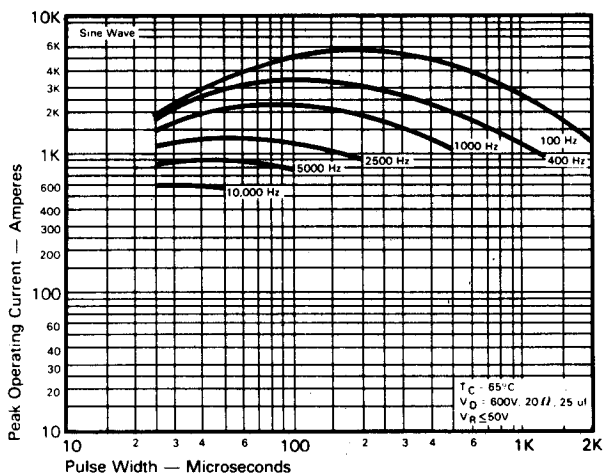


ENERGY PER PULSE FOR SINUSOIDAL PULSES

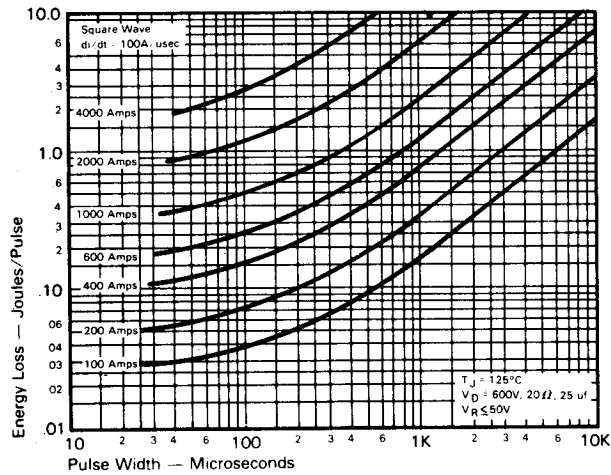
## Trapezoidal Wave Current Data



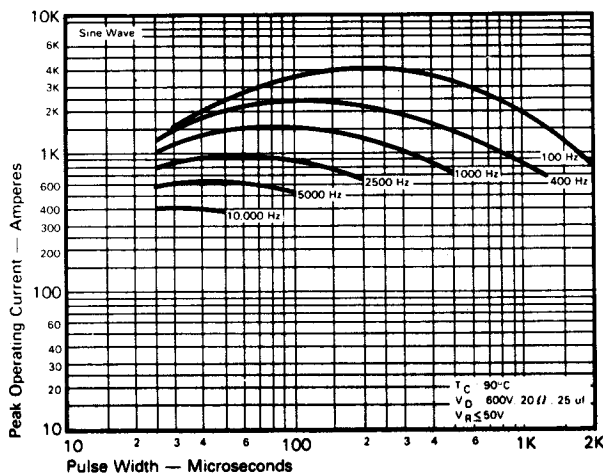
ENERGY PER PULSE FOR TRAPEZOIDAL PULSES  
( $di/dt = 50\text{A}/\mu\text{sec}$ )



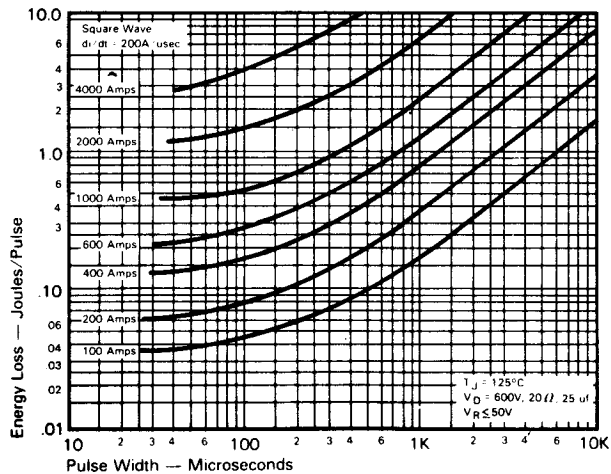
MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT  
vs. PULSE WIDTH ( $T_C = 65^\circ\text{C}$ )



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



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

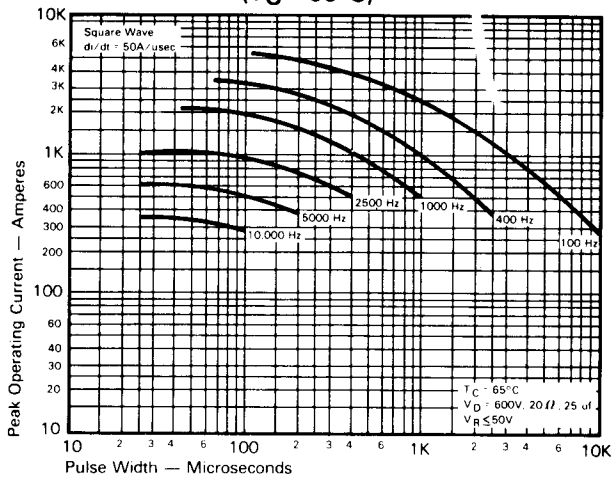


ENERGY PER PULSE FOR TRAPEZOIDAL PULSES  
( $di/dt = 200\text{A}/\mu\text{sec}$ )

**450A Avg.  
(700 RMS)  
Up to 1200 Volts  
15-60  $\mu$ s**

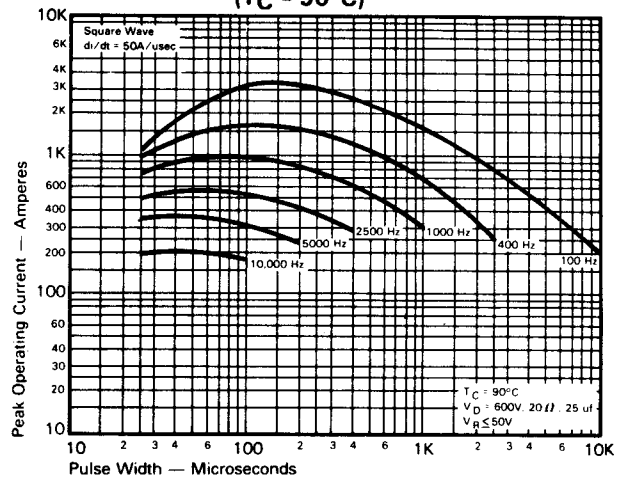
**Fast Switching  
SCR  
T727\_45**

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

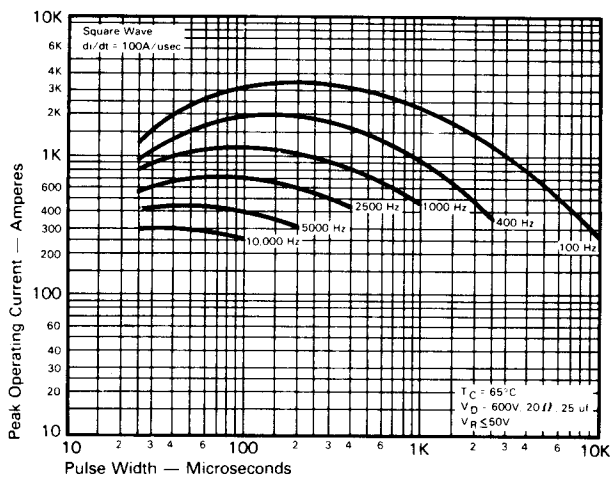


**MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT  
vs. PULSE WIDTH ( $di/dt = 50\text{A}/\mu\text{sec}$ )**

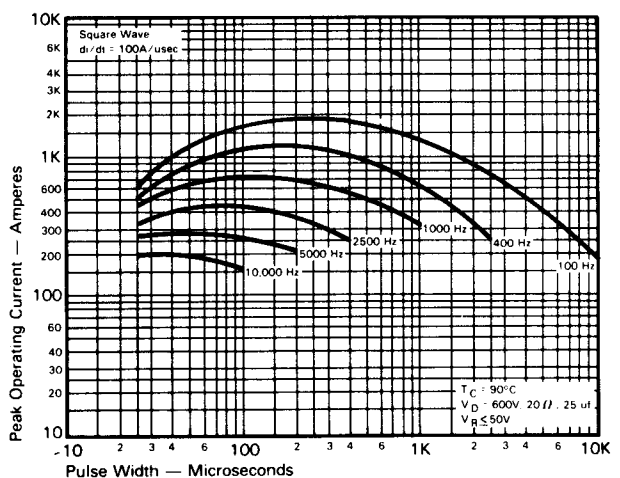
### Trapezoidal Wave Current Data ( $T_C = 90^\circ\text{C}$ )



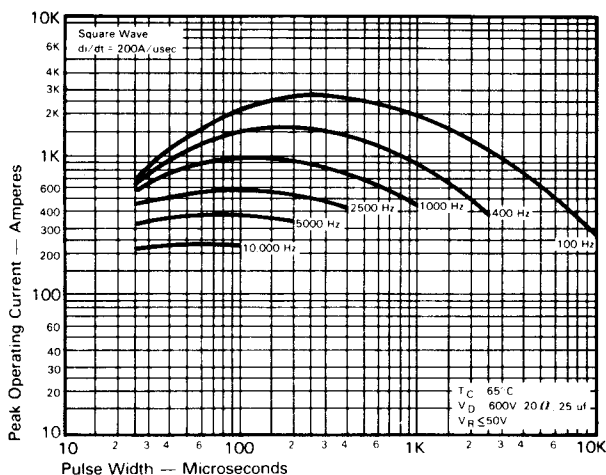
**MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT  
vs. PULSE WIDTH ( $di/dt = 50\text{A}/\mu\text{sec}$ )**



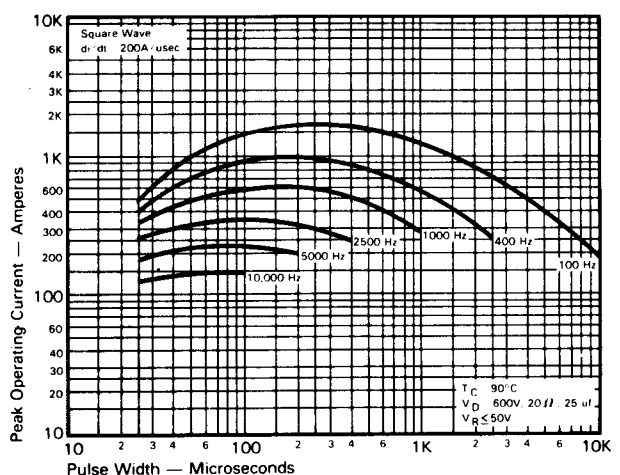
**MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT  
vs. PULSE WIDTH ( $di/dt = 100\text{A}/\mu\text{sec}$ )**



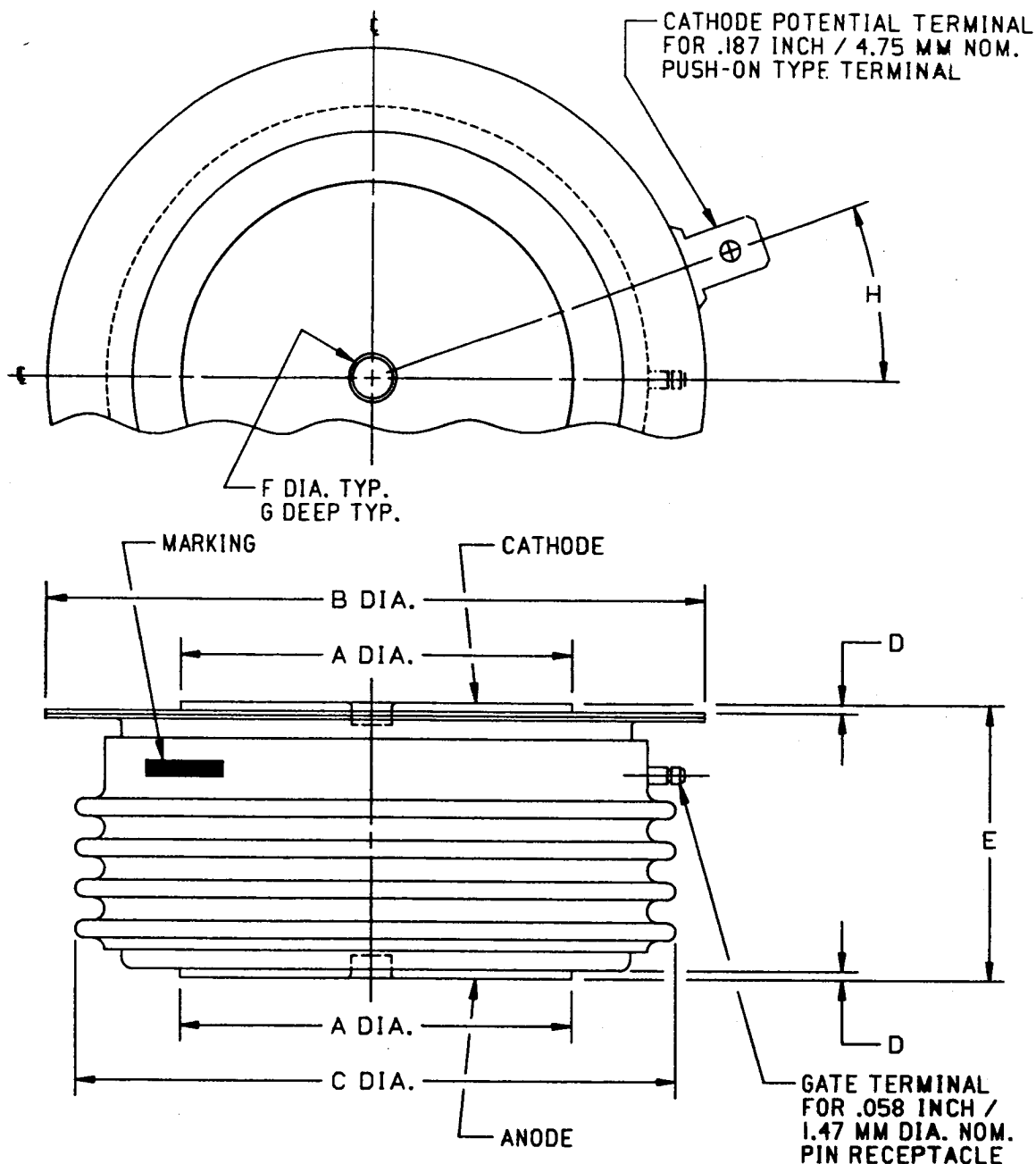
**MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT  
vs. PULSE WIDTH ( $di/dt = 100\text{A}/\mu\text{sec}$ )**



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



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



CASE NUMBER T72  
NOMINAL DIMENSIONS

STRIKE DISTANCE = .58 INCH / 14.7 MM MIN.  
CREEPAGE DISTANCE = 1.00 INCH / 25.4 MM MIN.

| SYM.   | A    | B    | C    | D    | E           | F    | G    | H   |
|--------|------|------|------|------|-------------|------|------|-----|
| INCHES | 1.34 | 2.28 | 2.05 | .030 | 1.020/1.060 | .140 | .080 | 20° |
| MM     | 34.0 | 57.9 | 52.1 | 0.76 | 25.91/26.92 | 3.56 | 2.03 | 20° |

ALL DIMENSIONS ARE REFERENCE