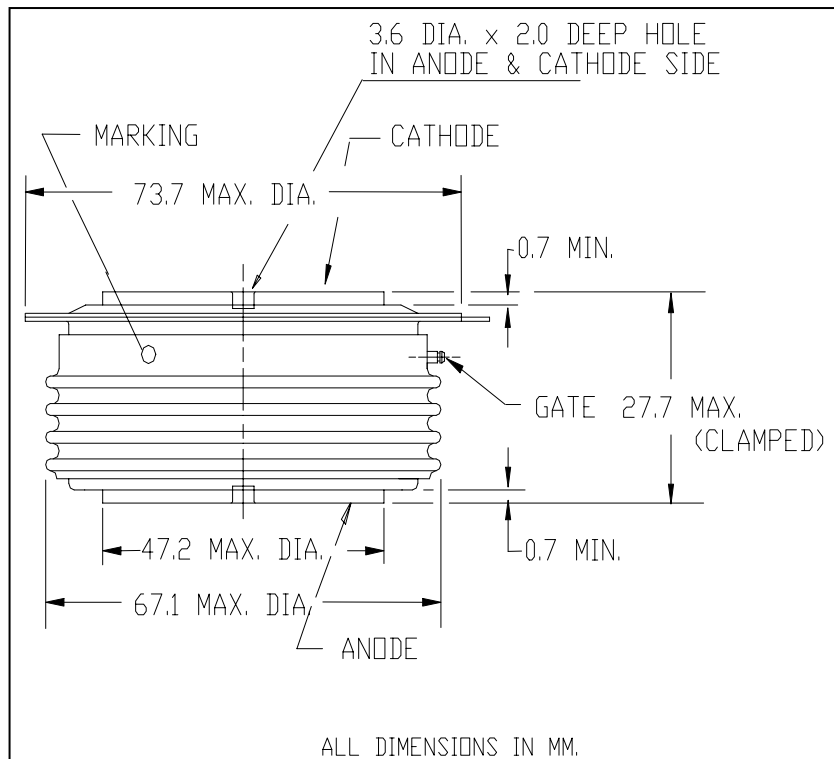




The C702 is a medium voltage, high current disc pack SCR employing a Bar gate, amplifying gate structure. This amplifying gate design allows the SCR to be reliably operated at high di/dt and high dv/dt conditions in phase control applications.

#### FEATURES:

- Low On-State Voltage
- High di/dt Capability
- High dv/dt Capability
- Hermetic Ceramic Package
- Excellent Surge and  $I^2t$  Ratings

#### APPLICATIONS:

- DC Power Supplies
- Motor Controls
- AC Soft-Starters

#### ORDERING INFORMATION

Select the complete Part Number using the table below.  
EXAMPLE: C702CB is a 3200V-1000A SCR with 200ma IGT and 12 inch gate and cathode potential leads.

| PART        | Voltage Rating<br>$V_{DRM}-V_{RRM}$ | Voltage Code | Current Rating<br>$I_{tavg}$ |
|-------------|-------------------------------------|--------------|------------------------------|
| <b>C702</b> | 2400V                               | <b>LD</b>    | 1000A                        |
|             | 2600V                               | <b>LM</b>    |                              |
|             | 2800V                               | <b>LN</b>    |                              |
|             | 3000V                               | <b>CP</b>    |                              |
|             | 3200V                               | <b>CB</b>    |                              |
|             |                                     |              |                              |
|             |                                     |              |                              |

**Absolute Maximum Ratings**

| Characteristic                                      | Symbol                          | Rating                 | Units                |
|-----------------------------------------------------|---------------------------------|------------------------|----------------------|
| Repetitive Peak Voltage                             | $V_{\text{DRM}}-V_{\text{RRM}}$ | 3200                   | Volts                |
| Non-repetitive Transient Peak Reverse Voltage       | $V_{\text{RSM}}$                | $V_{\text{RRM}} + 100$ | Volts                |
| Average On-State Current, $T_C=74^\circ\text{C}$    | $I_{\text{T(Avg.)}}$            | 1000                   | A                    |
| RMS On-State Current, $T_C=74^\circ\text{C}$        | $I_{\text{T(RMS)}}$             | 1571                   | A                    |
| Average On-State Current, $T_C=55^\circ\text{C}$    | $I_{\text{T(Avg.)}}$            | 1220                   | A                    |
| RMS On-State Current, $T_C=55^\circ\text{C}$        | $I_{\text{T(RMS)}}$             | 1916                   | A                    |
| Peak One Cycle Surge Current, 60Hz, $V_R=0\text{V}$ | $I_{\text{TSM}}$                | 21,500                 | A                    |
| Peak One Cycle Surge Current, 50Hz, $V_R=0\text{V}$ | $I_{\text{TSM}}$                | 20,500                 | A                    |
| Fuse Coordination $I^2t$ , 60Hz                     | $I^2t$                          | 1.93E+06               | $\text{A}^2\text{s}$ |
| Fuse Coordination $I^2t$ , 50Hz                     | $I^2t$                          | 2.10E+06               | $\text{A}^2\text{s}$ |
| Critical Rate-of-Rise of On-State Current           | $di/dt$                         | 100                    | A/us                 |
| Repetitive                                          |                                 |                        |                      |
| Critical Rate-of-Rise of On-State Current           | $di/dt$                         | 300                    | A/us                 |
| Non-Repetitive                                      |                                 |                        |                      |
| Peak Gate Power, 100us                              | $P_{\text{GM}}$                 | 16                     | Watts                |
| Average Gate Power                                  | $P_{\text{G(avg)}}$             | 5                      | Watts                |
| Operating Temperature                               | $T_j$                           | -40 to +125            | $^\circ\text{C}$     |
| Storage Temperature                                 | $T_{\text{Stg.}}$               | -50 to +150            | $^\circ\text{C}$     |
| Approximate Weight                                  |                                 | 1                      | lb                   |
|                                                     |                                 | 0.45                   | Kg                   |
| Mounting Force                                      |                                 | 5500-6000              | lbs                  |
|                                                     |                                 | 24.5 - 26.7            | Knewtons             |

**Electrical Characteristics, Tj=25°C unless otherwise specified**

| Characteristic                              | Symbol    | Test Conditions                                            | Rating |     |           | Units    |
|---------------------------------------------|-----------|------------------------------------------------------------|--------|-----|-----------|----------|
|                                             |           |                                                            | min    | typ | max       |          |
| Repetitive Peak Forward Leakage Current     | $I_{DRM}$ | Tj=125°C, $V_{DRM}$ =Rated                                 |        |     | 150       | ma       |
| Repetitive Peak Reverse Leakage Current     | $I_{RRM}$ | Tj=125°C, $V_{RRM}$ =Rated                                 |        |     | 150       | ma       |
| Peak On-State Voltage                       | $V_{TM}$  | Tj=125°C, $I_{TM}$ =2000A                                  |        |     | 1.85      | V        |
| $V_{TM}$ Model, Low Level                   | $V_0$     | Tj=125°C                                                   |        |     | 0.944     | V        |
| $V_{TM} = V_0 + r \cdot I_{TM}$             | r         | 15% $I_{TM} - \pi \cdot I_{TM}$                            |        |     | 4.25E-04  | $\Omega$ |
| $V_{TM}$ Model, High Level                  | $V_0$     | Tj=125°C                                                   |        |     | 1.18      | V        |
| $V_{TM} = V_0 + r \cdot I_{TM}$             | r         | $\pi \cdot I_{TM} - I_{TSM}$                               |        |     | 3.49E-04  | $\Omega$ |
| $V_{TM}$ Model, 4-Term                      | A         | Tj=125°C                                                   |        |     | 0.363     |          |
| $V_{TM} = A + B \cdot \ln(I_{TM}) +$        | B         | 15% $I_{TM} - I_{TSM}$                                     |        |     | 0.108     |          |
| $C \cdot (I_{TM}) + D \cdot (I_{TM})^{1/2}$ | C         |                                                            |        |     | 3.42E-04  |          |
|                                             | D         |                                                            |        |     | -8.33E-04 |          |
| Turn-On Delay Time                          | $t_d$     | $V_D = 0.5 \cdot V_{DRM}$<br>Gate Drive: 40V - 20 $\Omega$ |        | 2.5 |           | us       |
| Turn-Off Time                               | tq        | Tj=125°C<br>dv/dt = 20V/us to 80% $V_{DRM}$                |        | 400 |           | us       |
| dv/dt <sub>(Crit)</sub>                     | dv/dt     | Tj=125°C Exp. Waveform<br>$V_D$ =80% Rated                 | 400    |     |           | V/us     |
| Gate Trigger Current                        | $I_{GT}$  | Tj=25°C $V_D = 12V$                                        | 30     | 100 | 200       | ma       |
| Gate Trigger Voltage                        | $V_{GT}$  |                                                            | 0.8    | 2.0 | 4.5       | V        |
| Peak Reverse Gate Voltage                   | $V_{GRM}$ |                                                            |        |     | 5         | V        |

**Thermal Characteristics**

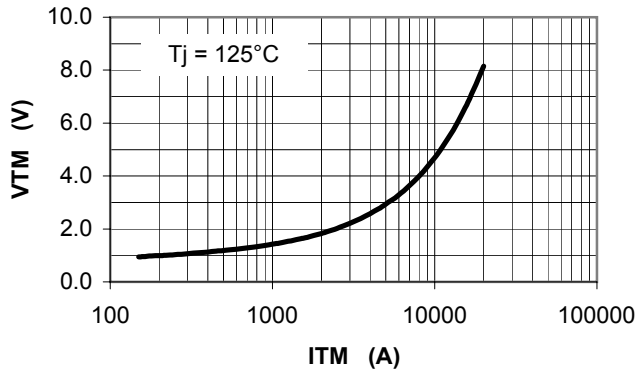
| Characteristic     | Symbol         | Test Conditions    | min | Rating |       | Units   |
|--------------------|----------------|--------------------|-----|--------|-------|---------|
|                    |                |                    |     | typ    | max   |         |
| Thermal Resistance |                |                    |     |        |       |         |
| Junction to Case   | $R\theta_{jc}$ | Double side cooled |     | 0.021  | 0.023 | °C/Watt |
| Case to Sink       | $R\theta_{cs}$ | Double side cooled |     | 0.004  | 0.006 | °C/Watt |

Thermal Impedance Model  $Z\theta_{jc}$  Double side cooled

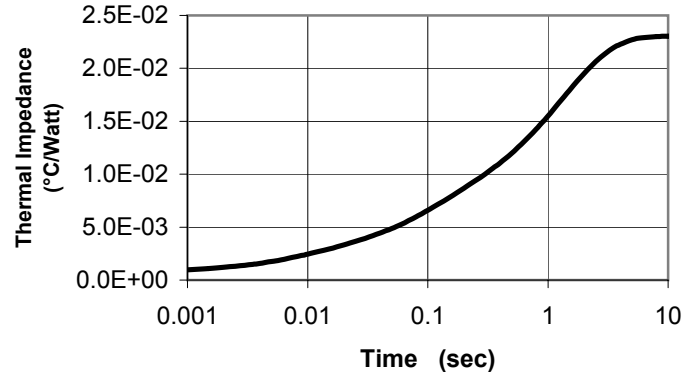
$$Z\theta_{jc}(t) = \sum(A(N) \cdot (1 - \exp(-t/\text{Tau}(N)))) \quad \text{where:} \quad N = \begin{matrix} 1 & 2 & 3 & 4 \end{matrix}$$

|                   |          |          |          |          |
|-------------------|----------|----------|----------|----------|
| $A(N) =$          | 7.26E-04 | 1.58E-03 | 4.55E-03 | 1.62E-02 |
| $\text{Tau}(N) =$ | 4.49E-05 | 8.21E-03 | 8.84E-02 | 1.31E+00 |

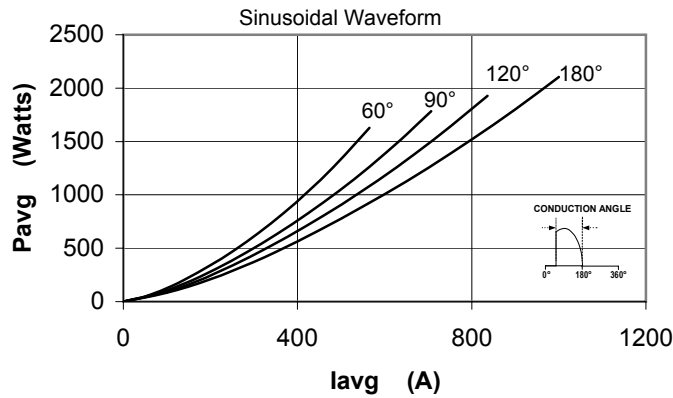
**Maximum On-State Voltage Drop**



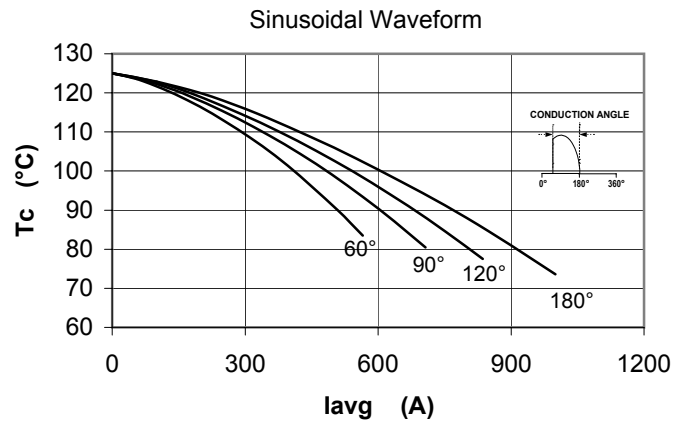
**MAXIMUM TRANSIENT THERMAL IMPEDANCE**



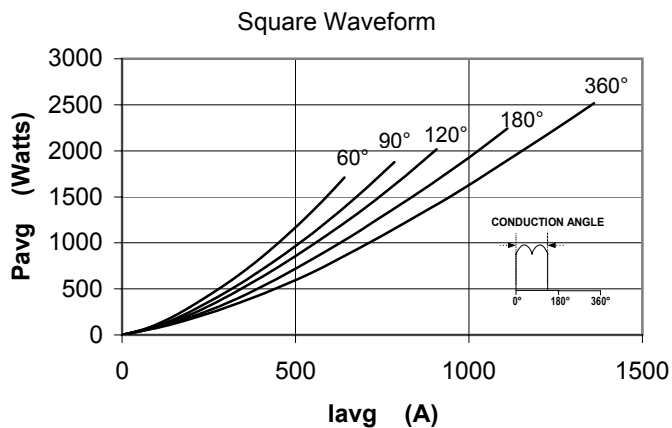
**Maximum On-State Power Dissipation**



**Maximum Allowable Case Temperature**



**Maximum On-State Power Dissipation**



**Maximum Allowable Case Temperature**

