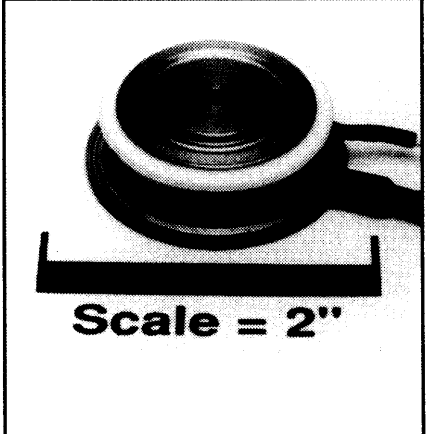
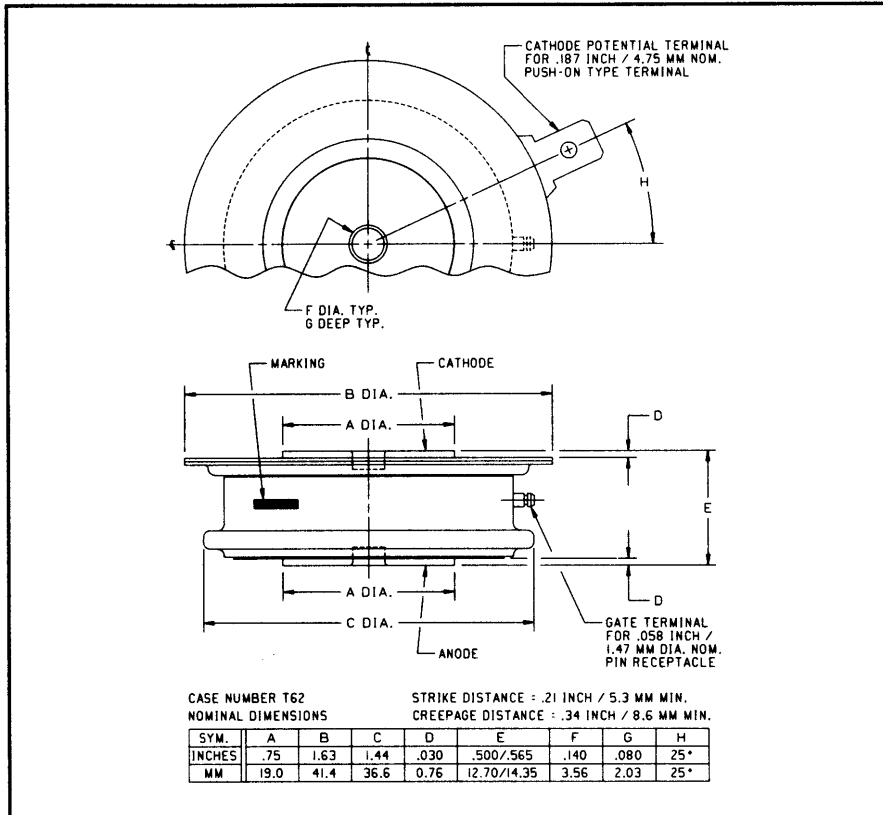


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**Phase Control SCR**  
 250 Amperes Average  
 1600 Volts



**C380 Phase Control SCR**  
 250 Amperes Average, 1600 Volts

C380 (Outline Drawing)

**Description:**

Powerex Silicon Controlled Rectifiers (SCR) are designed for phase control applications. These are all-diffused, Press-Pak (Pow-R-Disc) devices employing the field-proven amplifying (di/namic) gate.

**Features:**

- Low On-State Voltage
- High di/dt
- High dv/dt
- Hermetic Packaging
- Excellent Surge and I<sup>2</sup>t Ratings

**Applications:**

- Power Supplies
- Battery Chargers
- Motor Control

**Ordering Information:**

Select the complete five or six digit part number you desire from the table, i.e. C380PM is a 1600 Volt, 250 Ampere Phase Control SCR.

| Type | Voltage          |                       | Current            |
|------|------------------|-----------------------|--------------------|
|      | V <sub>DRM</sub> | V <sub>RRM</sub> Code | I <sub>T(av)</sub> |
| C380 | 400              | D                     | 250                |
|      | 600              | M                     |                    |
|      | 800              | N                     |                    |
|      | 1000             | P                     |                    |
|      | 1200             | PB                    |                    |
|      | 1400             | PD                    |                    |
|      | 1600             | PM                    |                    |



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C380  
Phase Control SCR  
250 Amperes Average, 1600 Volts

### Absolute Maximum Ratings

|   | Symbol              | C380        | Units                  |
|---|---------------------|-------------|------------------------|
| RMS On-State Current @ $T_C = 74^\circ\text{C}$               | $I_{T(\text{RMS})}$ | 400         | Amperes                |
| Average On-State Current @ $T_C = 74^\circ\text{C}$           | $I_{T(\text{av})}$  | 250         | Amperes                |
| Peak One-Cycle Surge (Non Repetitive) On-State Current (60Hz) | $I_{TSM}$           | 3500        | Amperes                |
| Peak One-Cycle Surge (Non-Repetitive) On-State Current (50Hz) | $I_{TSM}$           | 3200        | Amperes                |
| Critical Rate-of-Rise of On-State Current (Non-Repetitive)    | di/dt               | 800         | Amperes/ $\mu\text{s}$ |
| Critical Rate-of-Rise of On-State Current (Repetitive)        | di/dt               | 500         | Amperes/ $\mu\text{s}$ |
| $I^2t$ (for Fusing), 8.3 milliseconds                         | $I^2t$              | 50,000      | $\text{A}^2\text{sec}$ |
| Peak Gate Power Dissipation                                   | $P_{GM}$            | 10          | Watts                  |
| Average Gate Power Dissipation                                | $P_{G(\text{av})}$  | 2           | Watts                  |
| Storage Temperature   | $T_{STG}$           | -40 to 150  | $^\circ\text{C}$       |
| Operating Temperature   | $T_J$               | -40 to 125  | $^\circ\text{C}$       |
| Mounting Force  |                     | 720 to 880  | lb.                    |
| Mounting Force  |                     | 3.2 to 3.92 | kN                     |

**C380**  
**Phase Control SCR**  
 250 Amperes Average, 1600 Volts

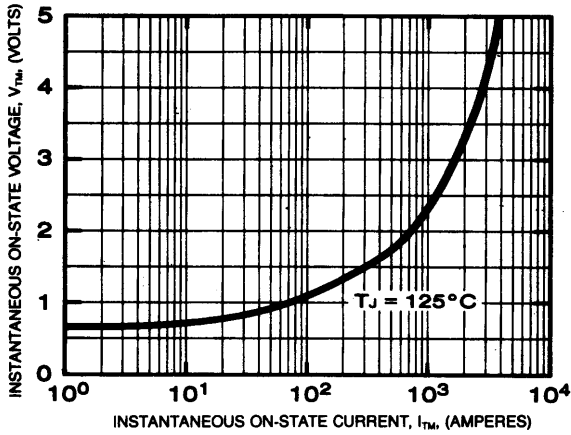
## Electrical and Thermal Characteristics

| Characteristics                                  | Symbol          | Test Conditions   | C380  | Units                 |
|--|-----------------|---|-------|-----------------------|
| <b>Voltage—Blocking State Maximums</b>           |                 |   |       |                       |
| Forward Leakage, Peak                            | $I_{DRM}$       | $T_J = 125^\circ\text{C}, V = V_{DRM}$  | 20    | mA                    |
| Reverse Leakage, Peak                            | $I_{RRM}$       | $T_J = 125^\circ\text{C}, V = V_{RRM}$  | 20    | mA                    |
| <b>Current—Conducting State Maximums</b>         |                 |   |       |                       |
| Peak On-State Voltage                            | $V_{TM}$        | $I_{TM} = 1500\text{A Peak}, T_C = 25^\circ\text{C}, \text{Duty Cycle} \leq 0.01\%$   | 2.85  | Volts                 |
| <b>Switching</b>                                 |                 |   |       |                       |
| Typical Turn-Off Time                            | $t_q$           | $T_J = 120^\circ\text{C}, I_{TM} = 250 \text{ amps};$<br>$V_R = 50 \text{ Volts Min.}; V_{DRM} \text{ (Reapplied);}$<br>Rate-of-Rise of Reapplied Off-State;<br>Voltage = 20 Volts/ $\mu\text{sec}$ (Linear);<br>Gate Bias During Turn-Off Interval = 0 Volts,<br>100 Ohms Duty Cycle $\leq 0.01\%$ | 200   | $\mu\text{sec}$       |
| Typical Delay Time                               | $t_d$           | $T_J = 25^\circ\text{C}, I_T = 100 \text{ Adc}, V_{DRM} = \text{Rated};$<br>Gate Supply: 10 Volt Open Circuit, 25 Ohm,<br>0.1 $\mu\text{sec}$ max. rise time  | 1     | $\mu\text{sec}$       |
| Min. Critical dv/dt exponential to $V_{DRM}$     | dv/dt           | $T_J = 125^\circ\text{C}, \text{Gate Open}$   | 200   | V/ $\mu\text{sec}$    |
| <b>Thermal</b>                                   |                 |   |       |                       |
| Maximum Thermal Resistance, double sided cooling |                 |   |       |                       |
| Junction to Case                                 | $R_{\theta JC}$ |   | 0.095 | $^\circ\text{C/Watt}$ |
| Case to Sink, Lubricated                         | $R_{\theta CS}$ |   | 0.02  | $^\circ\text{C/Watt}$ |
| <b>Gate—Maximum Parameters</b>                   |                 |   |       |                       |
| Gate Current to Trigger                          | $I_{GT}$        | $V_D = 6\text{V}, T_C = 25^\circ\text{C}, R_L = 3\Omega$  | 150   | mA                    |
| Gate Voltage to Trigger                          | $V_{GT}$        | $V_D = 6\text{V}, T_C = -40 \text{ to } 125^\circ\text{C}, R_L = 3\Omega$   | 3     | Volts                 |
| Non-Triggering Gate Voltage                      | $V_{GDM}$       | $T_J = 125^\circ\text{C}, \text{rated } V_{DRM}, R_L = 1000\Omega$  | 0.15  | Volts                 |
| Peak Forward Gate Current                        | $I_{GTM}$       |   | 10    | Amperes               |
| Peak Reverse Gate Voltage                        | $V_{GRM}$       |   | 5     | Volts                 |

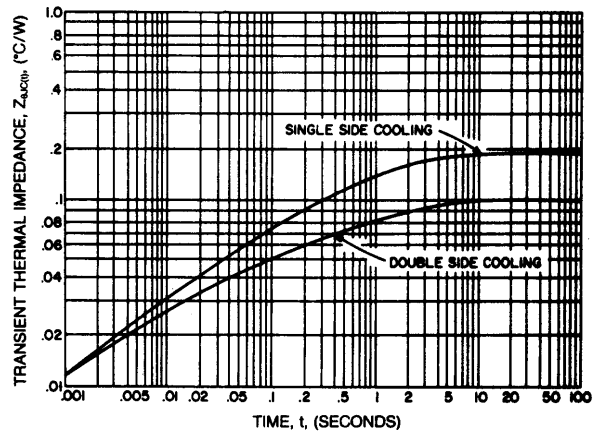
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**C380**  
**Phase Control SCR**  
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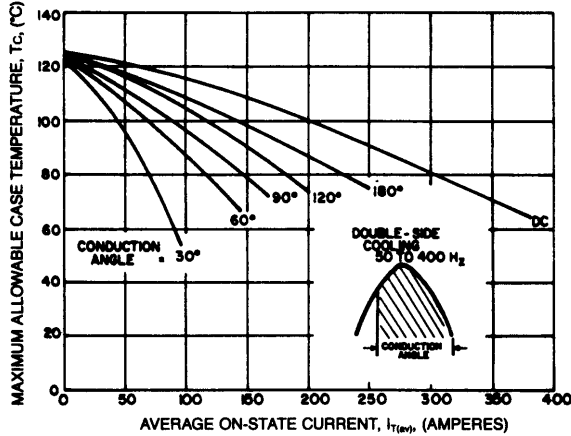
**MAXIMUM ON-STATE CHARACTERISTICS**



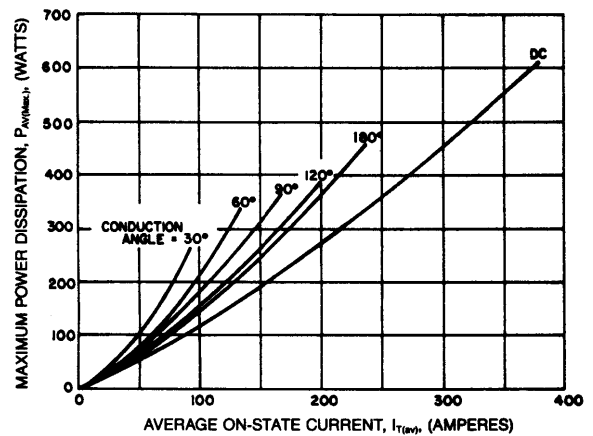
**TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)**



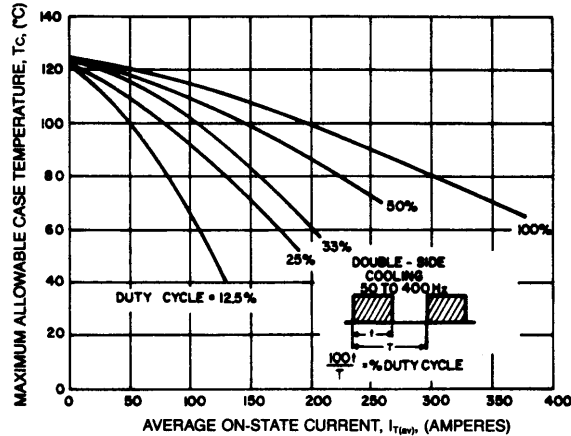
**MAXIMUM ALLOWABLE CASE TEMPERATURE (SINUSOIDAL WAVEFORM)**



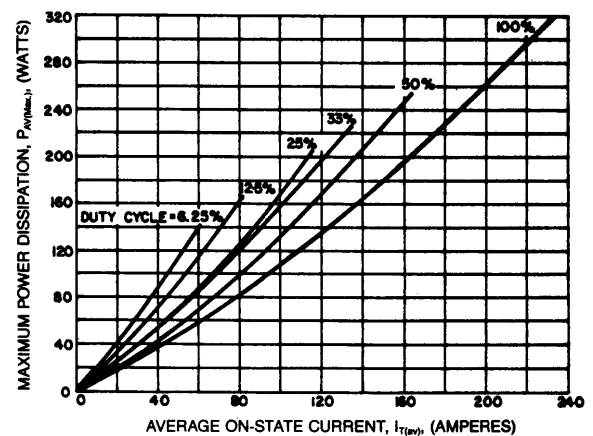
**MAXIMUM ON-STATE POWER DISSIPATION (SINUSOIDAL WAVEFORM)**



**MAXIMUM ALLOWABLE CASE TEMPERATURE (RECTANGULAR WAVEFORM)**



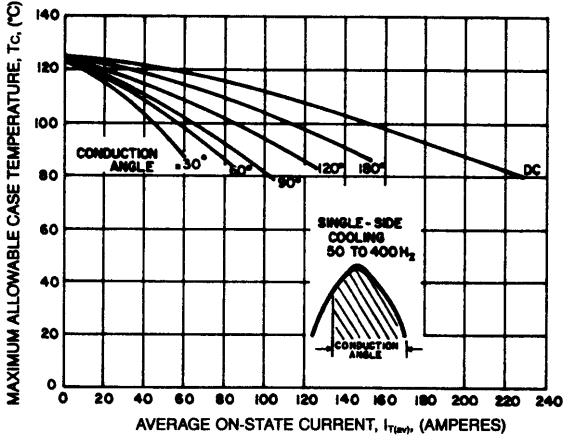
**MAXIMUM ON-STATE POWER DISSIPATION (RECTANGULAR WAVEFORM)**



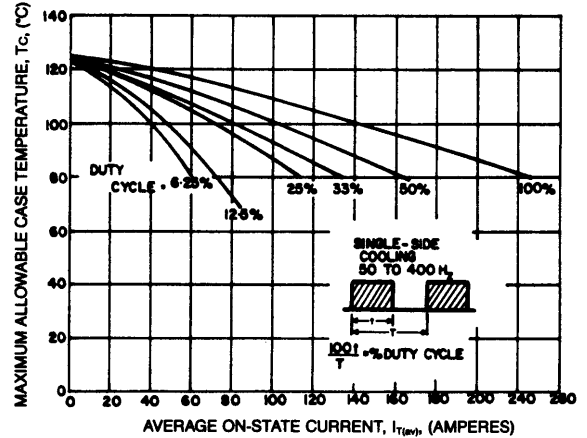
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**C380**  
**Phase Control SCR**  
 250 Amperes Average, 1600 Volts

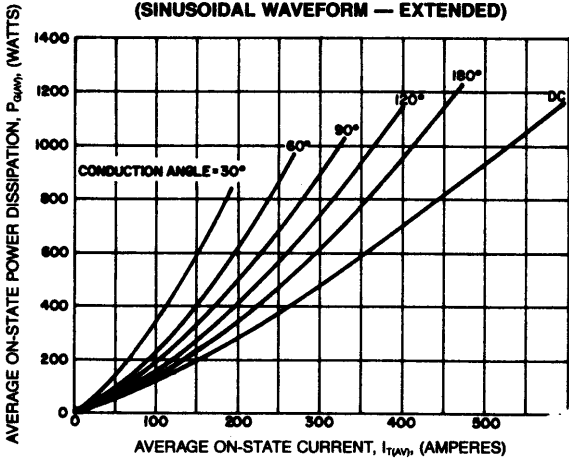
**MAXIMUM ALLOWABLE CASE TEMPERATURE (SINUSOIDAL WAVEFORM)**



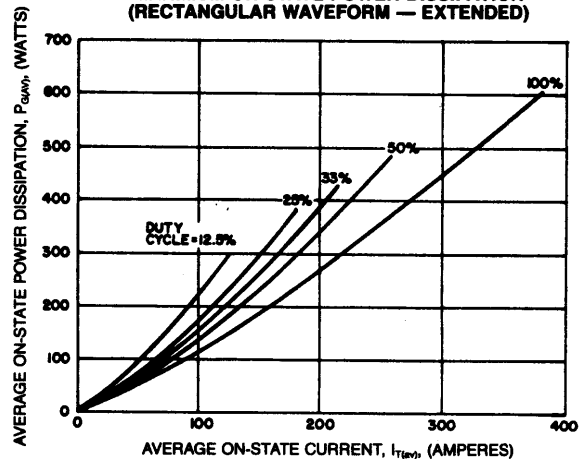
**MAXIMUM ALLOWABLE CASE TEMPERATURE (RECTANGULAR WAVEFORM)**



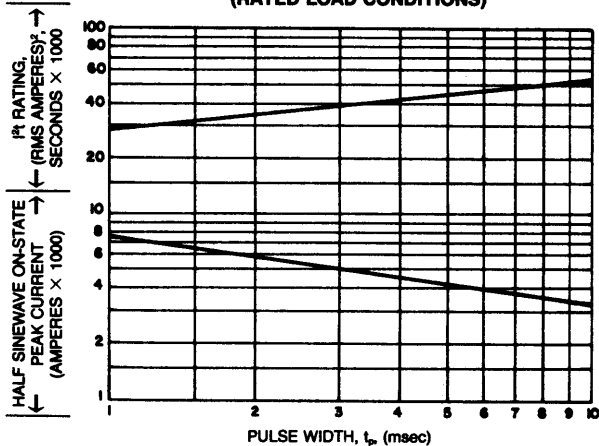
**MAXIMUM ON-STATE POWER DISSIPATION (SINUSOIDAL WAVEFORM — EXTENDED)**



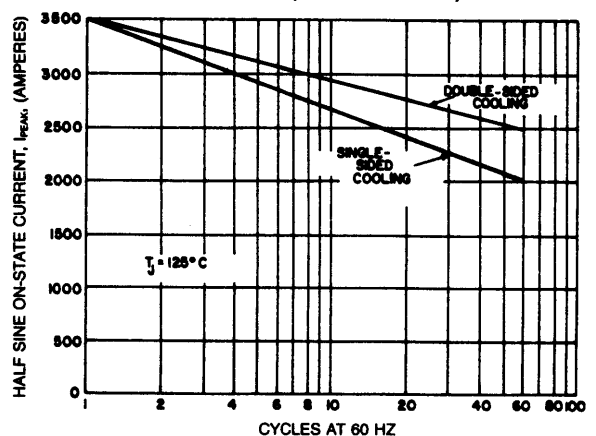
**MAXIMUM ON-STATE POWER DISSIPATION (RECTANGULAR WAVEFORM — EXTENDED)**



**SUB-CYCLE SURGE AND  $I^2t$  RATINGS (RATED LOAD CONDITIONS)**



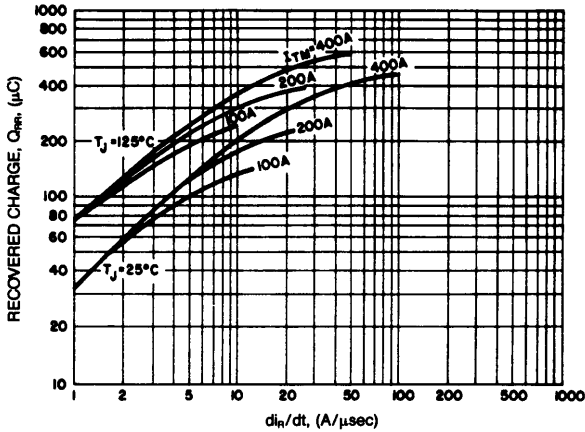
**MAXIMUM ALLOWABLE SURGE ON-STATE CURRENT (NON-REPETITIVE)**



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**C380**  
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**MAXIMUM RECOVERED CHARGE**



**GATE CHARACTERISTICS**

