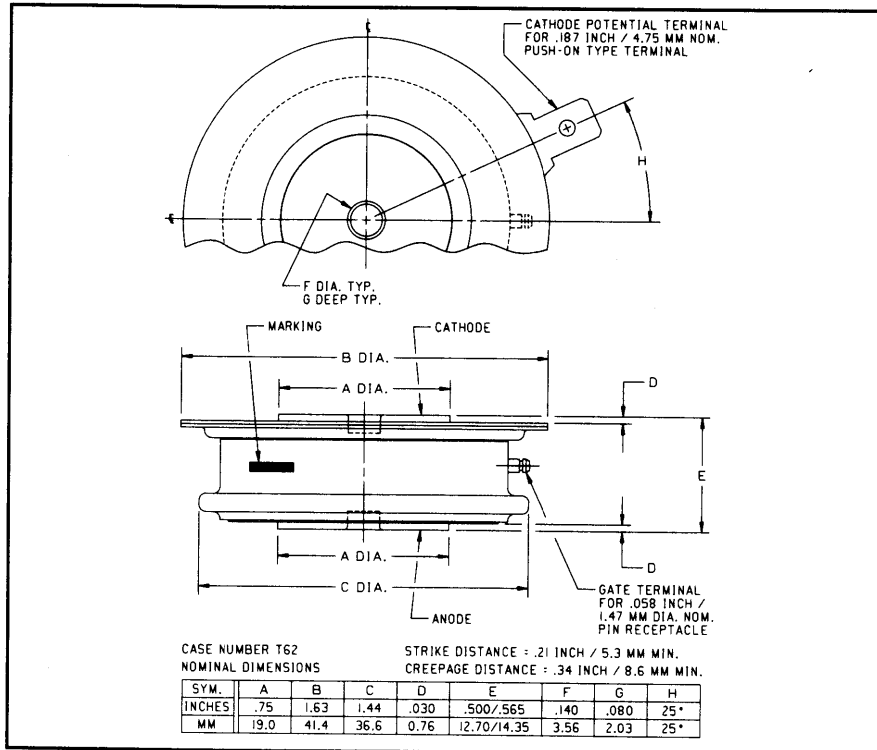
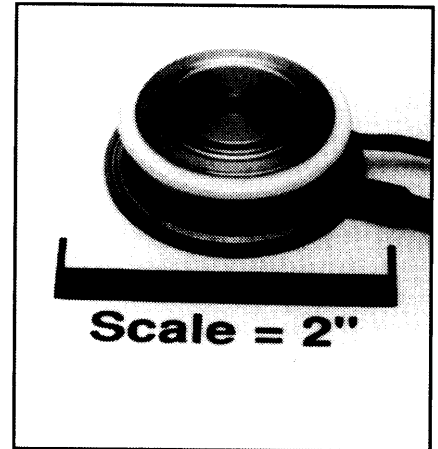


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Powerex, Europe, S.A. 428 Avenue G. Durand, BP107, 72003 Le Mans, France (43) 41.14.14

### Phase Control SCR 300 Amperes Average 1300 Volts



C380\_\_X555 (Outline Drawing)



C380\_\_X555 Phase Control SCR  
300 Amperes Average, 1300 Volts

#### 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  $I^2t$  Ratings
- ☐ High Temperature Operation

#### Applications:

- ☐ Power Supplies
- ☐ Battery Chargers
- ☐ Motor Control

#### Ordering Information:

Select the complete nine or ten digit part number you desire from the table, i.e. C380PCX555 is a 1300 Volt, 300 Ampere Phase Control SCR.

| Type       | Voltage                |      | Current |
|------------|------------------------|------|---------|
|            | $V_{DRM}$<br>$V_{RRM}$ | Code |         |
| C380__X555 | 400                    | D    | 300     |
|            | 600                    | M    |         |
|            | 800                    | N    |         |
|            | 1000                   | P    |         |
|            | 1200                   | PB   |         |
|            | 1300                   | PC   |         |

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C380\_X555  
 Phase Control SCR  
 300 Amperes Average, 1300 Volts

## Absolute Maximum Ratings

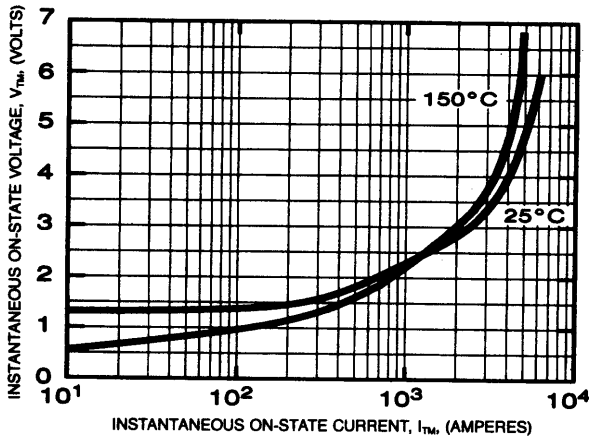
|                                                               | Symbol       | C380_X555   | Units                  |
|---------------------------------------------------------------|--------------|-------------|------------------------|
| RMS On-State Current @ $T_C = 85^\circ\text{C}$               | $I_{T(RMS)}$ | 450         | Amperes                |
| Average On-State Current @ $T_C = 85^\circ\text{C}$           | $I_{T(av)}$  | 300         | Amperes                |
| Peak One-Cycle Surge (Non-Repetitive) On-State Current (60Hz) | $I_{TSM}$    | 3200        | Amperes                |
| Peak One-Cycle Surge (Non-Repetitive) On-State Current (50Hz) | $I_{TSM}$    | 2900        | Amperes                |
| Critical Rate-of-Rise of On-State Current (Non-Repetitive)    | $di/dt$      | 600         | Amperes/ $\mu\text{s}$ |
| Critical Rate-of-Rise of On-State Current (Repetitive)        | $di/dt$      | 300         | Amperes/ $\mu\text{s}$ |
| $I^2t$ (for Fusing), 8.3 milliseconds                         | $I^2t$       | 42,000      | $\text{A}^2\text{sec}$ |
| Peak Gate Power Dissipation                                   | $P_{GM}$     | 10          | Watts                  |
| Average Gate Power Dissipation                                | $P_{G(av)}$  | 2           | Watts                  |
| Storage Temperature                                           | $T_{STG}$    | -40 to 150  | $^\circ\text{C}$       |
| Operating Temperature                                         | $T_J$        | -40 to 150  | $^\circ\text{C}$       |
| Mounting Force                                                |              | 720 to 880  | lb.                    |
| Mounting Force                                                |              | 3.2 to 3.92 | kN                     |

## Electrical and Thermal Characteristics

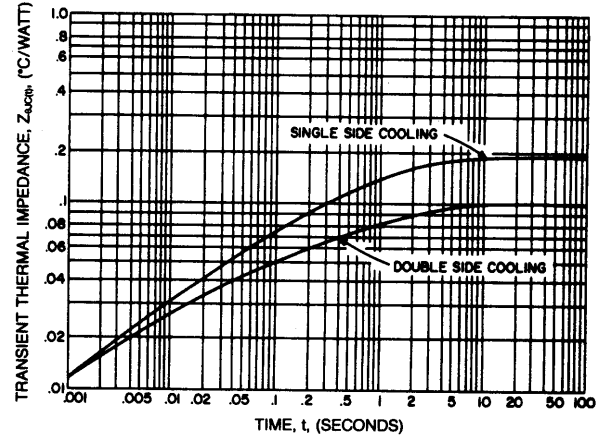
| Characteristics                                                         | Symbol          | Test Conditions                                                                                                                                                                                                                                                                                      | C380_X555 | Units                        |
|-------------------------------------------------------------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------|
| <b>Voltage—Blocking State Maximums</b>                                  |                 |                                                                                                                                                                                                                                                                                                      |           |                              |
| Forward Leakage, Peak                                                   | $I_{DRM}$       | $T_J = 150^\circ\text{C}, V = V_{DRM}$                                                                                                                                                                                                                                                               | 45        | mA                           |
| Reverse Leakage, Peak                                                   | $I_{RRM}$       | $T_J = 150^\circ\text{C}, V = V_{RRM}$                                                                                                                                                                                                                                                               | 45        | mA                           |
| <b>Current—Conducting State Maximums</b>                                |                 |                                                                                                                                                                                                                                                                                                      |           |                              |
| Peak On-State Voltage                                                   | $V_{TM}$        | $I_{TM} = 1500\text{A Peak}, T_C = 25^\circ\text{C}$                                                                                                                                                                                                                                                 | 2.85      | Volts                        |
| <b>Switching</b>                                                        |                 |                                                                                                                                                                                                                                                                                                      |           |                              |
| Typical Turn-Off Time                                                   | $t_q$           | $T_J = +150^\circ\text{C}, I_{TM} = 250\text{ Amperes},$<br>$V_R = 50\text{ Volts Minimum}, V_{DRM}$ (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<br>Volts, 100 $\Omega$ . Duty Cycle $\leq 0.01\%$ | 75        | $\mu\text{sec}$              |
| Typical Delay Time                                                      | $t_d$           | $T_C = +25^\circ\text{C}, I_T = 100\text{ Adc}, V_{DRM} = \text{Rated}$<br>Gate Supply: 10 Volt Open Circuit,<br>25 ohm, 0.1 $\mu\text{sec}$ maximum rise time                                                                                                                                       | 1.0       | $\mu\text{sec}$              |
| Min. Critical $dv/dt$ exponential to $V_{DRM}$                          | $dv/dt$         | $T_J = 150^\circ\text{C}, \text{Gate Open}$                                                                                                                                                                                                                                                          | 200       | $\text{V}/\mu\text{sec}$     |
| <b>Thermal</b>                                                          |                 |                                                                                                                                                                                                                                                                                                      |           |                              |
| Maximum Thermal Resistance,<br>double sided cooling<br>Junction to Case | $R_{\theta JC}$ |                                                                                                                                                                                                                                                                                                      | 0.095     | $^\circ\text{C}/\text{Watt}$ |
| Case to Sink, Lubricated                                                | $R_{\theta CS}$ |                                                                                                                                                                                                                                                                                                      | 0.02      | $^\circ\text{C}/\text{Watt}$ |
| <b>Gate—Maximum Parameters</b>                                          |                 |                                                                                                                                                                                                                                                                                                      |           |                              |
| Gate Current to Trigger                                                 | $I_{GT}$        | $T_C = 25^\circ\text{C}, V_D = 6\text{Vdc}; R_L = 3\Omega$                                                                                                                                                                                                                                           | 150       | mA                           |
| Gate Voltage to Trigger                                                 | $V_{GT}$        | $T_C = -40^\circ\text{C to } 150^\circ\text{C}, V_D = 6\text{Vdc}, R_L = 3\Omega$                                                                                                                                                                                                                    | 3         | Volts                        |
| Non-Triggering Gate Voltage                                             | $V_{GDM}$       | $T_J = 150^\circ\text{C}, R_L = 1000\Omega, \text{Rated } V_{DRM}$                                                                                                                                                                                                                                   | 0.15      | Volts                        |
| Peak Forward Gate Current                                               | $I_{GTM}$       |                                                                                                                                                                                                                                                                                                      | 10        | Amperes                      |
| Peak Reverse Gate Voltage                                               | $V_{GRM}$       |                                                                                                                                                                                                                                                                                                      | 5         | Volts                        |

**C380 X555**  
**Phase Control SCR**  
300 Amperes Average, 1300 Volts

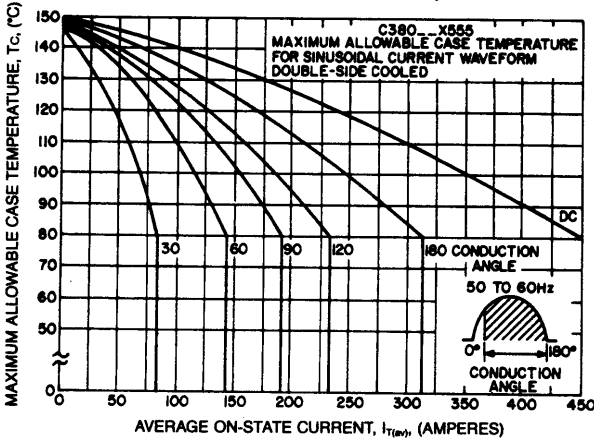
**MAXIMUM ON-STATE CHARACTERISTICS**



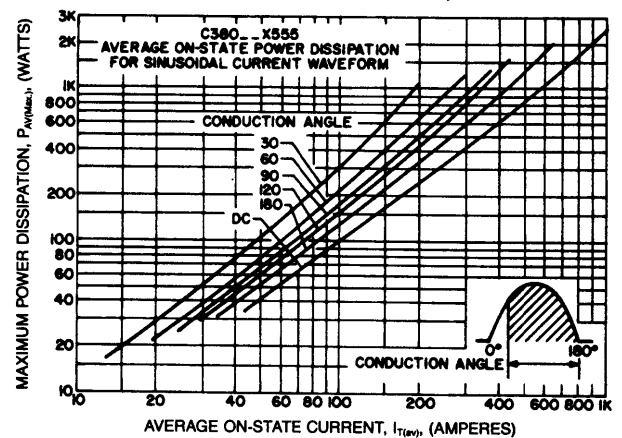
**TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)**



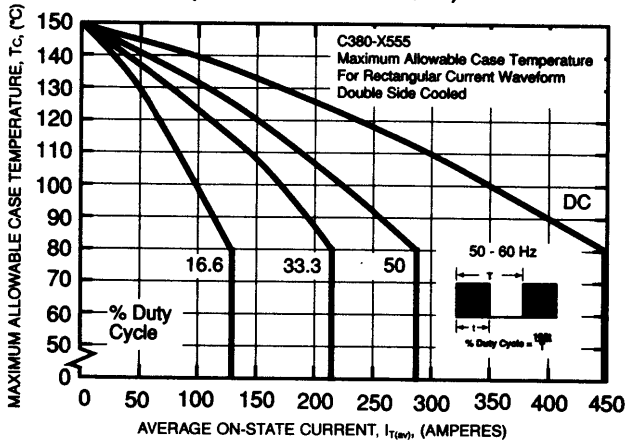
**MAXIMUM ALLOWABLE CASE TEMPERATURE (SINUSOIDAL WAVEFORM)**



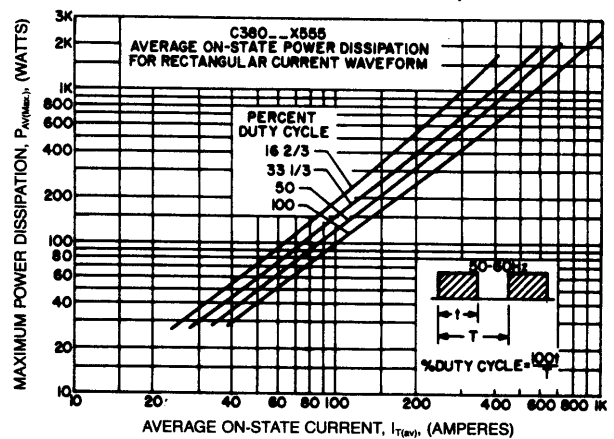
**MAXIMUM ON-STATE POWER DISSIPATION (SINUSOIDAL WAVEFORM)**



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



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



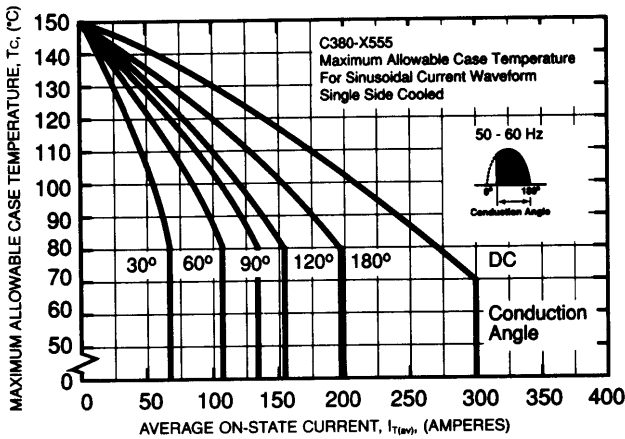
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C380-X555

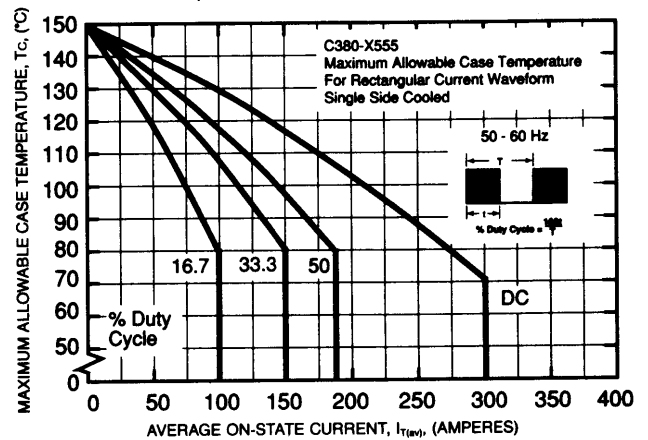
Phase Control SCR

300 Amperes Average, 1300 Volts

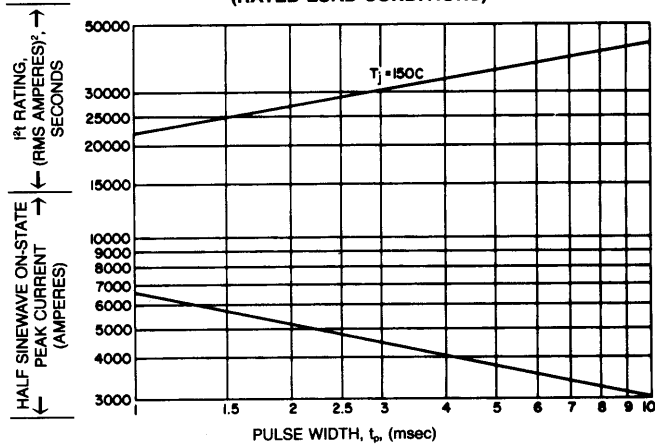
MAXIMUM ALLOWABLE CASE TEMPERATURE  
(SINUSOIDAL WAVEFORM)



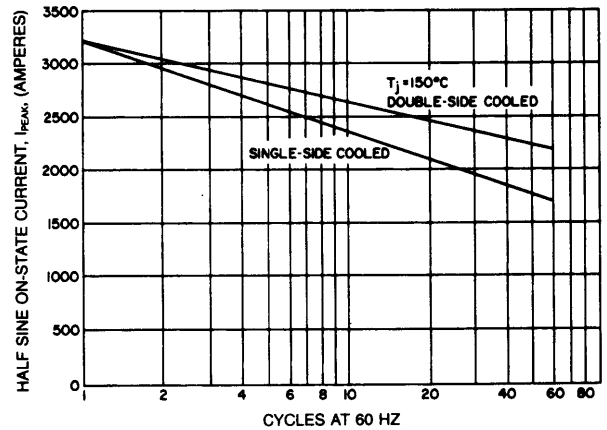
MAXIMUM ALLOWABLE CASE TEMPERATURE  
(RECTANGULAR WAVEFORM)



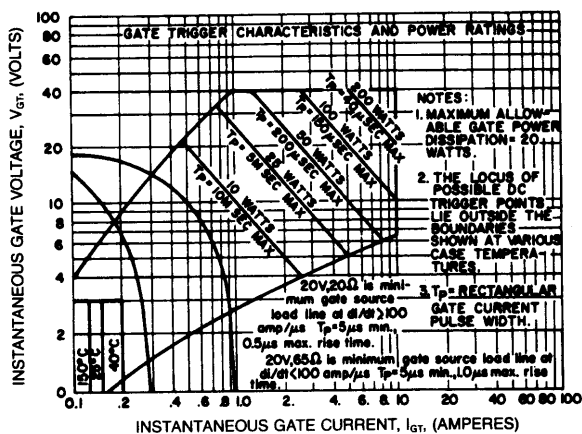
SUB-CYCLE SURGE AND  $I^2t$  RATINGS  
(RATED LOAD CONDITIONS)



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



GATE CHARACTERISTICS



#### NOTES:

1. Maximum allowable gate power dissipation = 2 watts.
2. The locus of possible DC trigger points lie outside the boundaries shown at various case temperatures.
3.  $T_p$  = Rectangular Gate Current Pulse Width.



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