POWEREX

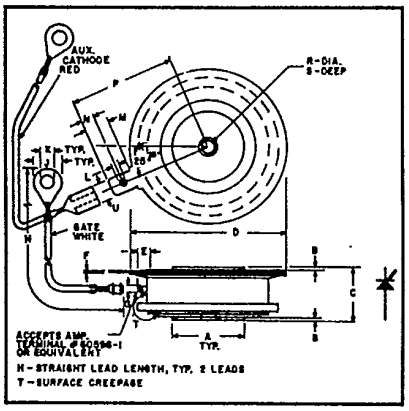
T-25-19

# C380__X555

*Powerex, Inc. Hillis Street, Youngwood, Pennsylvania 15697 (412) 925-7272*
*Powerex Europe, S.A., 428 Ave. G. Durand, BP107, 72003 LeMans, France (43) 72.75.15*

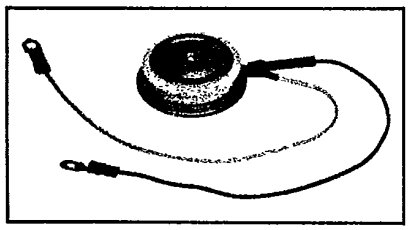
## Phase Control SCR

***300 Amperes Avg***
***100-1300 Volts***




**TO-200**
**Outline Drawing**

| Dimensions | Inches | | Millimeters | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | .744 | .752 | 18.897 | 19.101 |
| B | .030 | .060 | .762 | 1.524 |
| C | .515 | .565 | 13.081 | 14.351 |
| D | 1.600 | 1.656 | 40.64 | 42.06 |
| E | .110 | — | 2.794 | — |
| F | .013 | .017 | .330 | .432 |
| G | .057 | .059 | 1.447 | 1.449 |
| H | 7.980 | 8.115 | 202.70 | 206.11 |
| J | — | .300 | — | 7.620 |
| K | .137 | .153 | 3.479 | 3.886 |
| L | .065 | .070 | 1.651 | 1.778 |
| M | .245 | .260 | 6.223 | 6.604 |
| N | .120 | .140 | 3.048 | 3.556 |
| P | 1.090 | 1.125 | 27.69 | 28.55 |
| R | .135 | .145 | 3.429 | 3.683 |
| S | .067 | .083 | 1.701 | 2.108 |
| T | .340 | — | 8.636 | — |
| U | .186 | .189 | 4.724 | 4.801 |



**C380__X555**
**Phase Control SCR**
300 Amperes/100-1300 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
- ☐ Light Dimmers
- ☐ VAR Generators

**Ordering Information**
Example: Select the complete nine or ten digit part number you desire from the table – i.e. C380NX555 is an 800 Volt, 300 Ampere Phase Control SCR.

| Type | Voltage | | Current |
|---|---|---|---|
| | $V_{DRM}$ $V_{RRM}$ | Code | $I_T$ (avg) |
| C380__X555 | 100 | A | 300 |
| | 200 | B | |
| | 300 | C | |
| | 400 | D | |
| | 500 | E | |
| | 600 | M | |
| | 700 | S | |
| | 800 | N | |
| | 900 | T | |
| | 1000 | P | |
| | 1100 | PA | |
| | 1200 | PB | |
| | 1300 | PC | |

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***C380__X555***
***Phase Control SCR***
*300 Amperes Avg/100-1300 Volts*

## Absolute Maximum Ratings

| | Symbol | C380__X555 | Units |
|---|---|---|---|
| RMS On-State Current | $I_{T(RMS)}$ | 450 | Amperes |
| Average On-State Current | $I_{T(av)}$ | 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/μs |
| Critical Rate-of-Rise of On-State Current (Repetitive) | di/dt | 300 | Amperes/μs |
| $I^2t$ (for Fusing), 8.3 milliseconds | $I^2t$ | 42,000 | $A^2$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 | °C |
| Operating Temperature | $T_J$ | −40 to 150 | °C |
| Mounting Force① | | 720 to 880 | lb. |
| Mounting Force① | | 3.2 to 3.92 | kN |

## Electrical and Thermal Characteristics

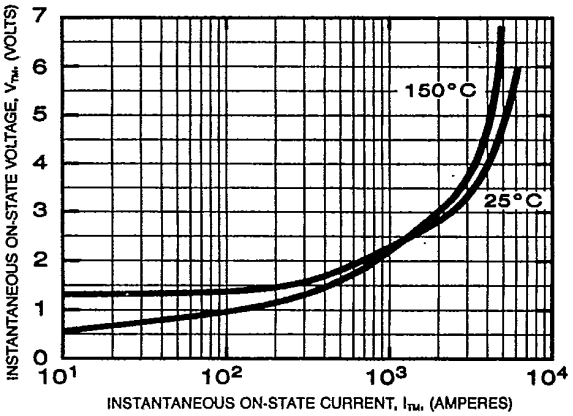
| Characteristics | Symbol | Test Conditions | C380__X555 | Units |
|---|---|---|---|---|
| **Voltage—Blocking State Maximums** | | | | |
| Forward Leakage, Peak | $I_{DRM}$ | $T_J$ = 150°C, V = $V_{DRM}$ | 45 | mA |
| Reverse Leakage, Peak | $I_{RRM}$ | $T_J$ = 150°C, V = $V_{RRM}$ | 45 | mA |
| **Current—Conducting State Maximums** | | | | |
| Peak On-State Voltage | $V_{TM}$ | $I_{TM}$ = 1500A Peak, $T_C$ = 25°C | 2.85 | Volts |
| **Switching** | | | | |
| Typical Turn-Off Time | $t_q$ | $T_J$ = +150°C, $I_{TM}$ = 250 Amperes, $V_R$ = 50 Volts Minimum, $V_{DRM}$ (Reapplied), Rate-of-Rise of Reapplied Off-State voltage = 20 Volts/μsec (Linear) Gate Bias During Turn-off Interval = 0 Volts, 100Ω. Duty Cycle ≤0.01% | 75 | μsec |
| Typical Delay Time | $t_d$ | $T_C$ = +25°C, $I_T$ = 100 Adc, $V_{DRM}$ = Rated Gate Supply: 10 Volt Open Circuit, 25 ohm, 0.1 μsec maximum rise time | 1.0 | μsec |
| Min. Critical dv/dt exponential to $V_{DRM}$ | dv/dt | $T_J$ = 150°C, Gate Open | 200 | V/μsec |
| **Thermal** | | | | |
| Maximum Thermal Resistance,① double sided cooling | | | | |
| Junction to Case | $R_{\theta JC}$ | | .095 | °C/Watt |
| Case to Sink, Lubricated | $R_{\theta CS}$ | | .02 | °C/Watt |
| **Gate—Maximum Parameters** | | | | |
| Gate Current to Trigger | $I_{GT}$ | $T_C$ = 25°C, $V_D$ = 6Vdc; $R_L$ = 3Ω | 150 | mA |
| Gate Voltage to Trigger | $V_{GT}$ | $T_C$ = −40°C to 150°C, $V_D$ = 6 Vdc, $R_L$ = 3Ω | 3 | Volts |
| Non-Triggering Gate Voltage | $V_{GDM}$ | $T_J$ = 150°C, $R_L$ = 1000Ω, Rated $V_{DRM}$ | .15 | Volts |
| Peak Forward Gate Current | $I_{GTM}$ | | 10 | Amperes |
| Peak Reverse Gate Voltage | $V_{GRM}$ | | 5 | Volts |

① Consult recommended mounting procedures.

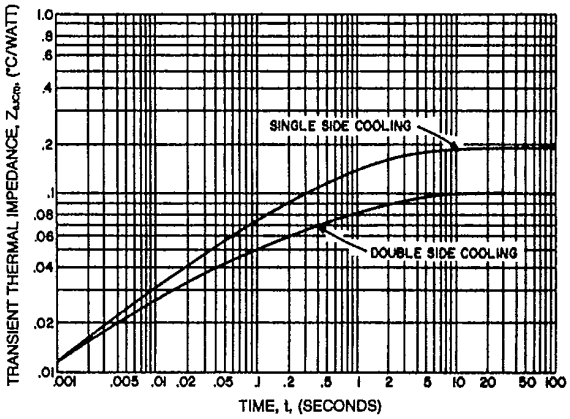
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***Phase Control SCR***
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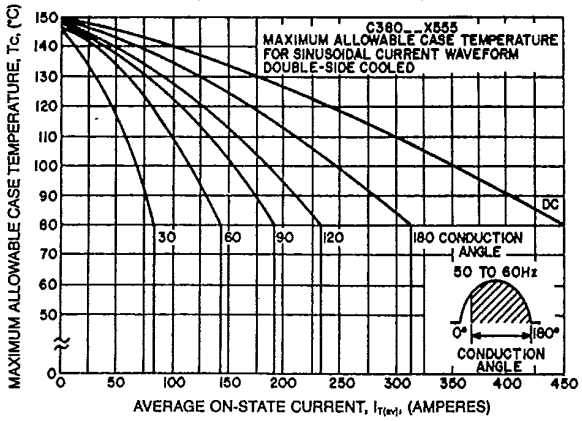
**MAXIMUM ON-STATE CHARACTERISTICS**



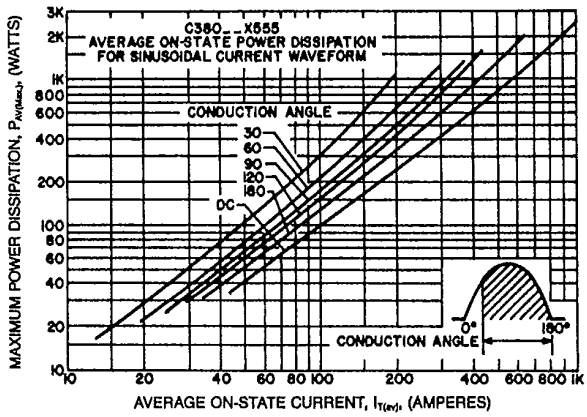

**TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)**



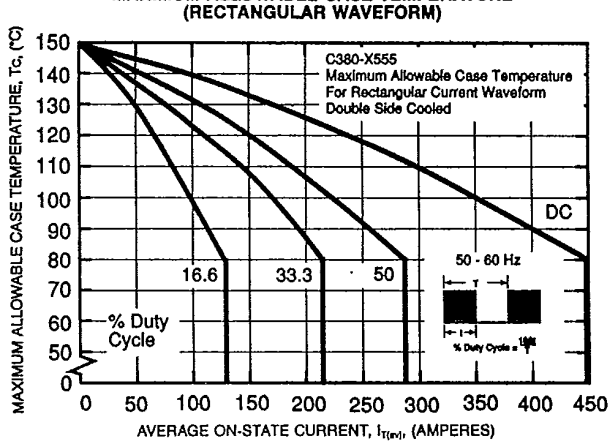

**MAXIMUM ALLOWABLE CASE TEMPERATURE (SINUSOIDAL WAVEFORM)**



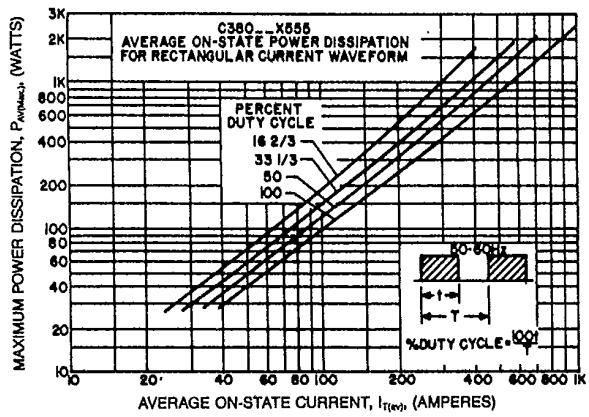

**MAXIMUM ON-STATE POWER DISSIPATION (SINUSOIDAL WAVEFORM)**




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



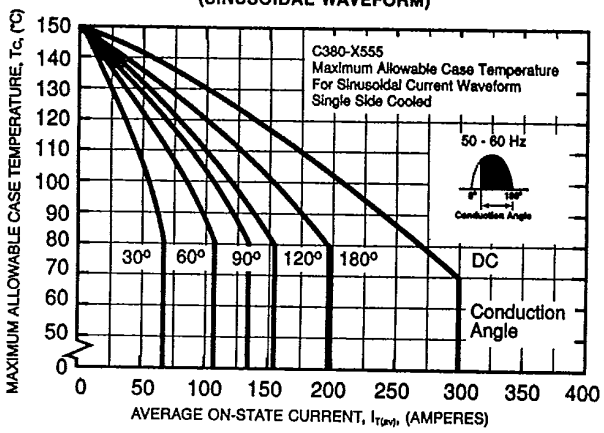

**MAXIMUM ON-STATE POWER DISSIPATION (RECTANGULAR WAVEFORM)**



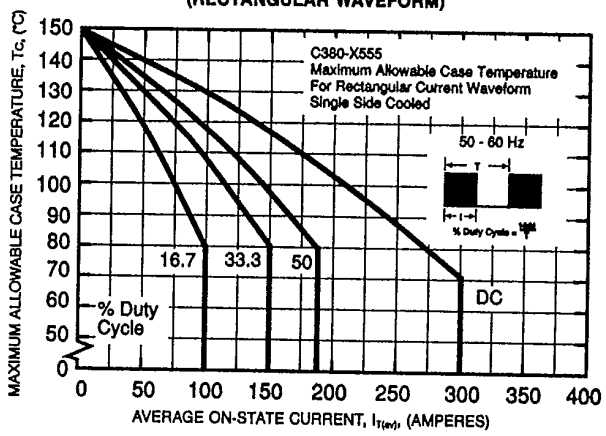
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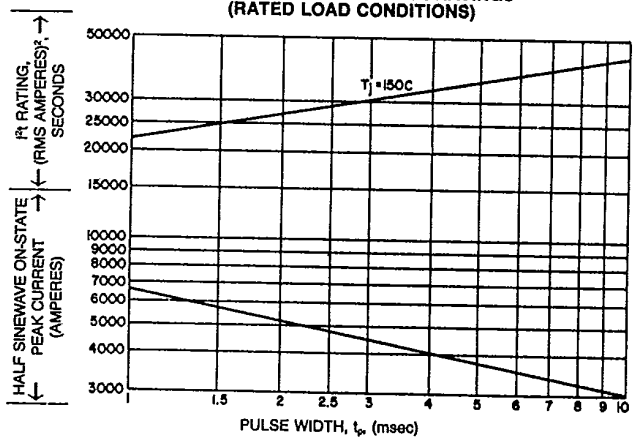
**MAXIMUM ALLOWABLE CASE TEMPERATURE (SINUSOIDAL WAVEFORM)**



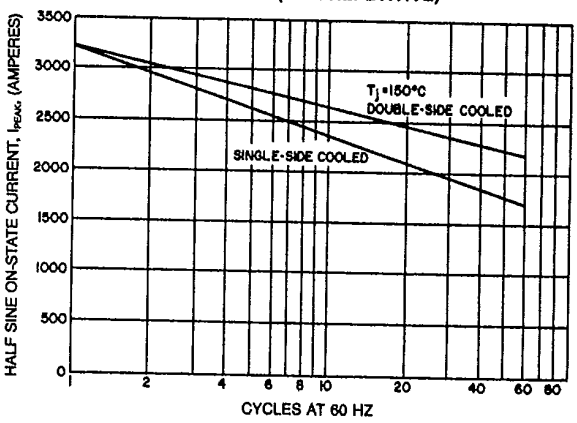

**MAXIMUM ALLOWABLE CASE TEMPERATURE (RECTANGULAR WAVEFORM)**



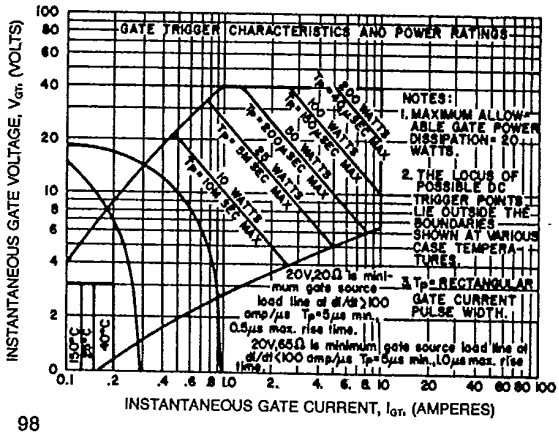

**SUB-CYCLE SURGE AND $I^2t$ RATINGS (RATED LOAD CONDITIONS)**




**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. Tp = Rectangular Gate Current Pulse Width.