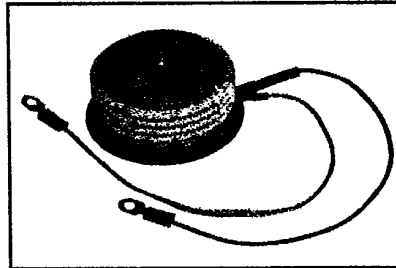
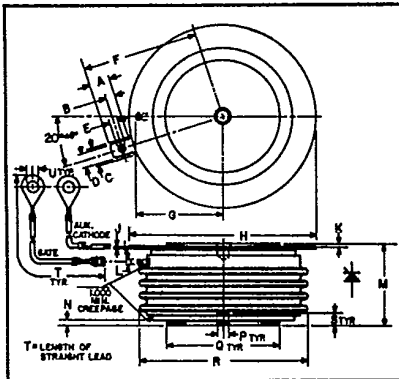




C391

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
490 Amperes Avg
1300-1800 Volts



C391
Phase Control SCR
490 Amperes/1300-1800 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 I²t Ratings

Applications:

- ☐ Power Supplies
- ☐ Battery Chargers
- ☐ Motor Control
- ☐ Light Dimmers
- ☐ VAR Generators

Ordering Information

Example: Select the complete six digit part number you desire from the table - i.e. C391PE is a 1500 Volt, 490 Ampere Phase Control SCR.

C391
Outline Drawing

| Dimensions | Inches | | Millimeters | |
|------------|--------|--------|-------------|--------|
| | Min. | Max. | Min. | Max. |
| A | .240 | .260 | 6.096 | 6.604 |
| B | .110 | .130 | 2.794 | 3.302 |
| C | .245 | | 6.223 | |
| D | .186 | .191 | 4.724 | 4.851 |
| E | .060 | .075 | 1.524 | 1.905 |
| F | — | 1.430 | — | 36.32 |
| G | — | 1.065 | — | 27.051 |
| H | 2.200 | 2.500 | 55.88 | 63.50 |
| J | .011 | .019 | 2.794 | 3.483 |
| K | .030 | .130 | .762 | 3.302 |
| L | .056 | .060 | 1.422 | 1.524 |
| M | 1.000 | 1.065 | 25.40 | 27.05 |
| N | .030 | .096 | .762 | 2.438 |
| P | .130 | .150 | 3.302 | 3.810 |
| Q | 1.300 | 1.345 | 33.02 | 34.16 |
| R | — | 2.150 | — | 54.61 |
| S | .067 | .803 | 1.702 | 2.110 |
| T | 12.200 | 12.360 | 309.9 | 313.9 |
| U | .137 | .153 | 3.480 | 3.886 |

| Type | Voltage | | Current |
|------|--------------------------------------|------|---------|
| | V _{DRM} V _{RRM} | Code | |
| C391 | 1300 | PC | 490 |
| | 1400 | PD | |
| | 1500 | PE | |
| | 1600 | PM | |
| | 1700 | PS | |
| | 1800 | PN | |



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Absolute Maximum Ratings

| | Symbol | C391 | Units |
|---|--------------|--------------|------------------|
| RMS On-State Current | $I_{T(RMS)}$ | 770 | Amperes |
| Average On-State Current | $I_{T(av)}$ | 490 | Amperes |
| Peak One-Cycle Surge (Non-Repetitive) On-State Current (60Hz) | I_{TSM} | 8000 | Amperes |
| Peak One-Cycle Surge (Non-Repetitive) On-State Current (50Hz) | I_{TSM} | 7000 | Amperes |
| Critical Rate-of-Rise of On-State Current (Non-Repetitive) | di/dt | 150 | Amperes/ μ s |
| Critical Rate-of-Rise of On-State Current (Repetitive) | di/dt | 75 | Amperes/ μ s |
| I^2t (for Fusing), One Cycle at 60Hz | I^2t | 265,000 | A^2sec |
| Peak Gate Power Dissipation | P_{GM} | 200 | Watts |
| Average Gate Power Dissipation | $P_{G(av)}$ | 5 | Watts |
| Storage Temperature | T_{STG} | -40 to +150 | $^{\circ}C$ |
| Operating Temperature | T_J | -40 to +125 | $^{\circ}C$ |
| Mounting Force [Ⓢ] | | 2000 to 2500 | lb. |
| Mounting Force [Ⓢ] | | 8.9 to 11.1 | kN |

Electrical and Thermal Characteristics

| Characteristics | Symbol | Test Conditions | C391 | Units |
|--|-----------------|---|------|------------------|
| Voltage—Blocking State Maximums | | | | |
| Forward Leakage, Peak | I_{DRM} | $T_J = 125^{\circ}C$, Rated V_{DRM} | 45 | mA |
| Reverse Leakage, Peak | I_{RRM} | $T_J = 125^{\circ}C$, Rated V_{RRM} | 45 | mA |
| Current—Conducting State Maximums | | | | |
| Peak On-State Voltage | V_{TM} | $I_{TM} = 3000A$ Peak, Duty Cycle $\leq 0.01\%$, $T_C = 25^{\circ}C$ | 2.65 | Volts |
| Switching | | | | |
| Typical Turn-Off Time | t_q | $T_J = 125^{\circ}C$; $I_{TM} = 500$ Amps; $V_R = 50$ Volts Min.; .8 $\times V_{DRM}$ (Reapplied); Rate-of-Rise of Reapplied Off-State Voltage = 20V/ μ sec (linear); Commutation $di/dt = 25$ Amps/ μ sec; Repetition Rate = 1 pps; Gate Bias During Turn-Off Interval = 0 Volts, 100 Ω | 200 | μ sec |
| Typical Delay Time | t_d | $T_J = 25^{\circ}C$, $I_{TM} = 50$ Adc, V_{DRM} Rated. Gate Supply: 20 Volts, 20 Ω , 0.1 μ sec Max. Rise Time | 1 | μ sec |
| Min. Critical dv/dt exponential to V_{DRM} | dv/dt | 0.8 V_{DRM} Rated, $T_J = 125^{\circ}C$ | 200 | V/ μ sec |
| Thermal | | | | |
| Maximum Thermal Resistance, [Ⓢ] double sided cooling Junction to Case | $R_{\theta JC}$ | | .06 | $^{\circ}C/Watt$ |
| Case to Sink, Lubricated | $R_{\theta CS}$ | | .02 | $^{\circ}C/Watt$ |
| Gate—Maximum Parameters | | | | |
| Gate Current to Trigger | I_{GT} | $V_D = 6Vdc$, $T_C = 25^{\circ}C$, $R_L = 3\Omega$ | 150 | mA |
| Gate Voltage to Trigger | V_{GT} | $T_C = -40$ to $+125^{\circ}C$, $V_D = 6Vdc$, $R_L = 3\Omega$ | 5 | Volts |
| Non-Triggering Gate Voltage | V_{GDM} | $V = \text{rated } V_{DRM}$, $T_C = 125^{\circ}C$, $R_L = 1000\Omega$ | .15 | Volts |
| Peak Forward Gate Current | I_{GTM} | | 10 | Amperes |
| Peak Reverse Gate Voltage | V_{GRM} | | 5 | Volts |

[Ⓢ] Consult recommended mounting procedures.



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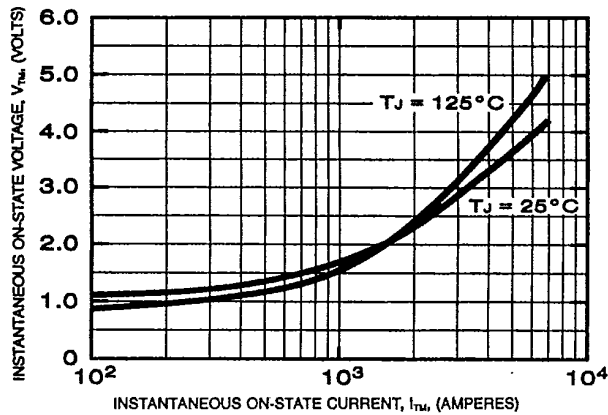
Powerex Europe, S.A., 428 Ave. G. Durand, BP107, 72003 LeMans, France (43) 72.75.15

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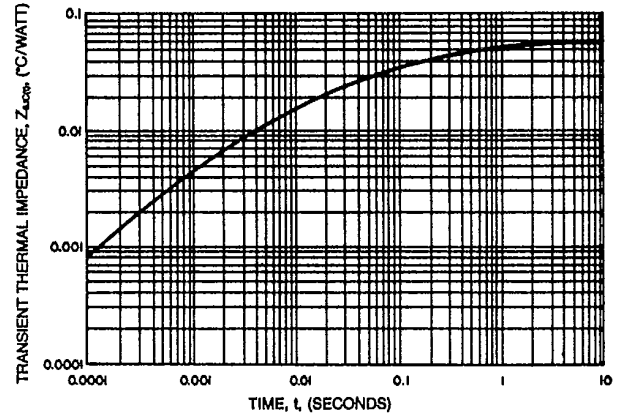
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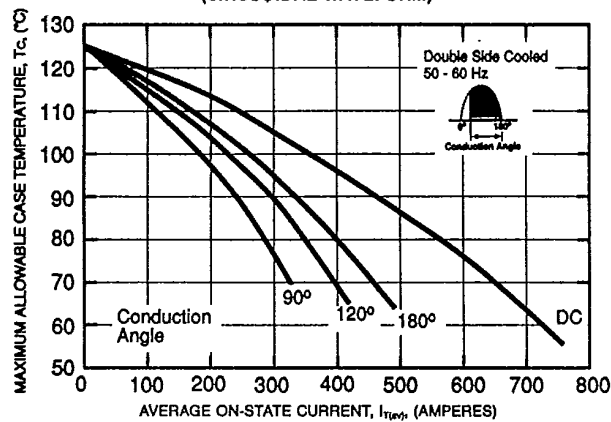
MAXIMUM ON-STATE CHARACTERISTICS



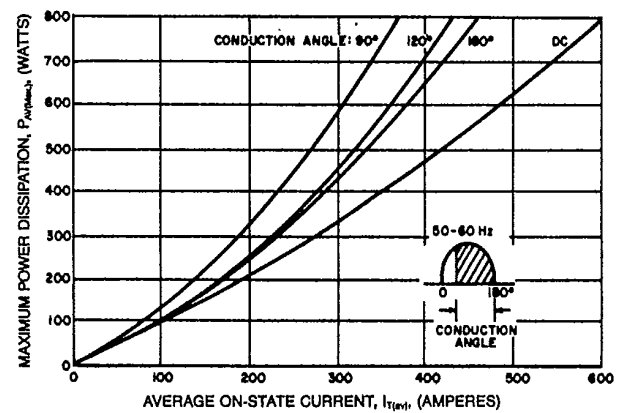
TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)



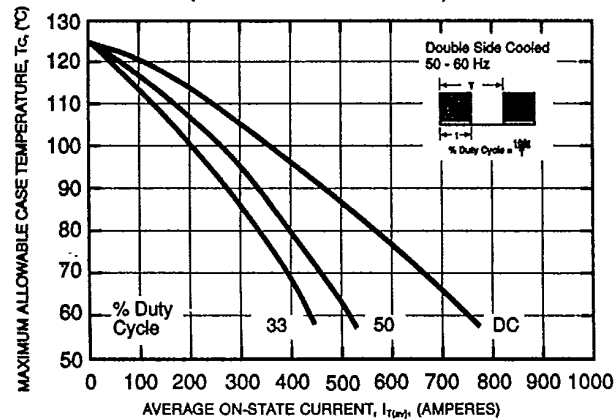
MAXIMUM ALLOWABLE CASE TEMPERATURE (SINUSOIDAL WAVEFORM)



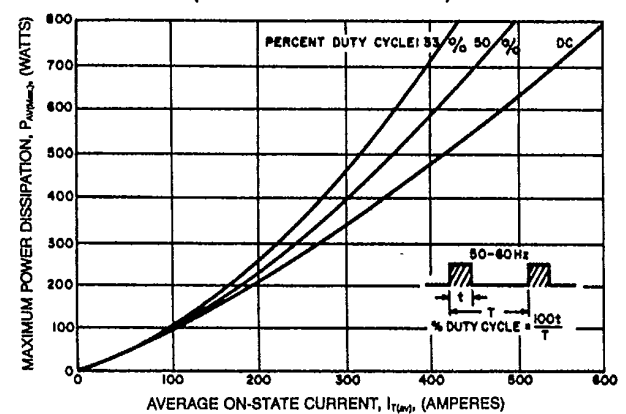
MAXIMUM ON-STATE POWER DISSIPATION (SINUSOIDAL WAVEFORM)



MAXIMUM ALLOWABLE CASE TEMPERATURE (RECTANGULAR WAVEFORM)



MAXIMUM ON-STATE POWER DISSIPATION (RECTANGULAR WAVEFORM)





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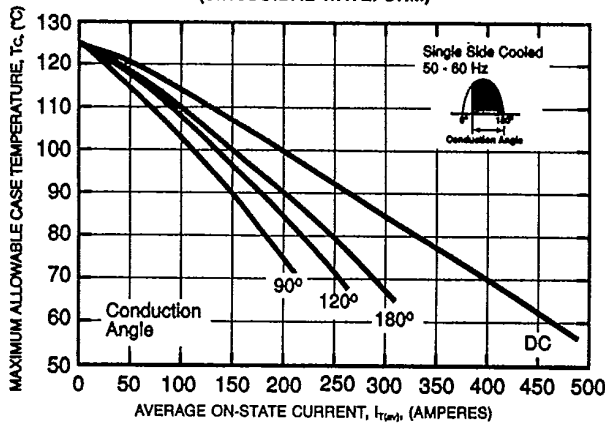
Powerex Europe, S.A., 428 Ave. G. Durand, BP107, 72003 LeMans, France (43) 72.75.15

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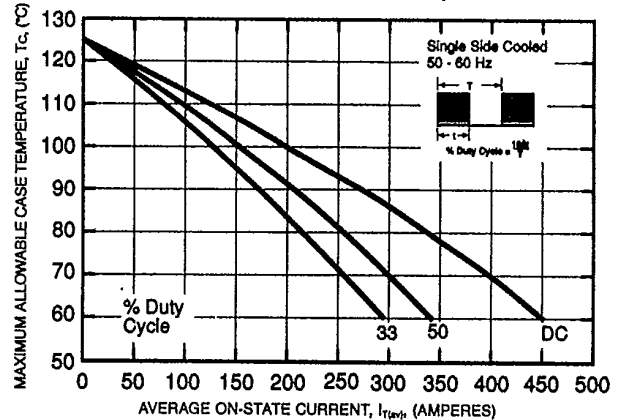
Phase Control SCR

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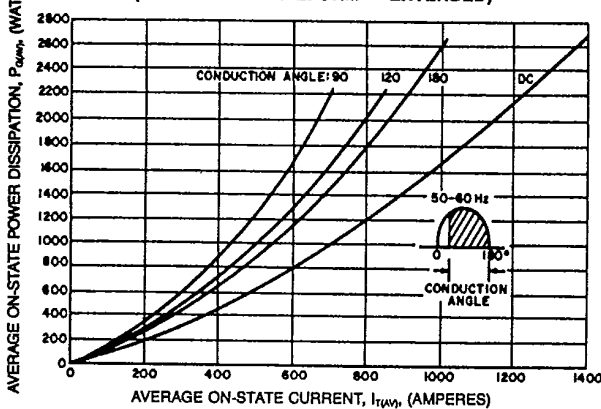
MAXIMUM ALLOWABLE CASE TEMPERATURE
(SINUSOIDAL WAVEFORM)



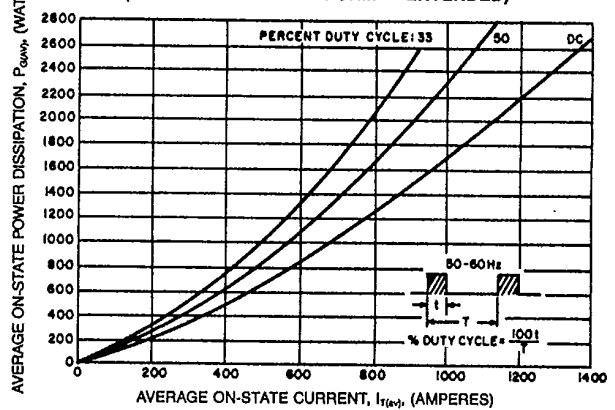
MAXIMUM ALLOWABLE CASE TEMPERATURE
(RECTANGULAR WAVEFORM)



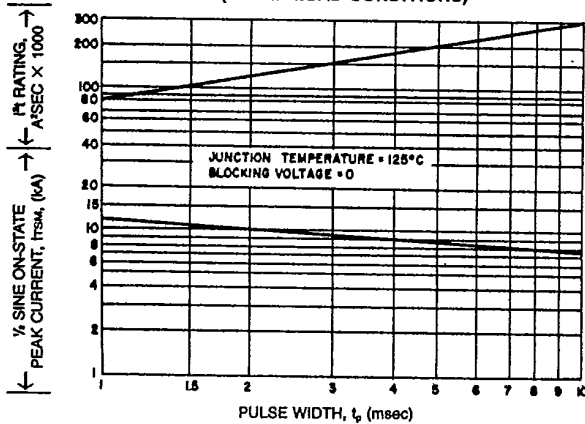
MAXIMUM ON-STATE POWER DISSIPATION
(SINUSOIDAL WAVEFORM — EXTENDED)



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



SUB-CYCLE SURGE AND I²t RATINGS
(RATED LOAD CONDITIONS)



GATE CHARACTERISTICS

