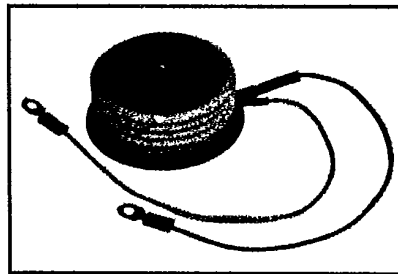
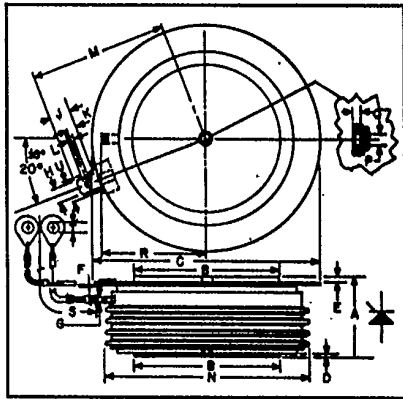




C450

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
 1460-1640 Amperes Avg
 500-1400 Volts



C450
 Phase Control SCR
 1460-1640 Amperes/500-1400 Volts

C450
 Outline Drawing

| Dimensions | Inches | | Millimeters | |
|------------|--------|--------|-------------|--------|
| | Min. | Max. | Min. | Max. |
| A | 1.020 | 1.065 | 25.90 | 27.05 |
| B | 1.845 | 1.855 | 46.86 | 47.12 |
| C | — | 2.940 | — | 74.68 |
| D | .030 | — | .76 | — |
| E | .050 | — | 1.27 | — |
| F | .017 | .023 | .43 | .58 |
| G | .057 | .059 | 1.44 | 1.50 |
| H | .186 | .191 | 4.72 | 4.85 |
| J | .245 | .255 | 6.22 | 6.48 |
| K | .115 | .130 | 2.92 | 3.30 |
| L | .064 | .070 | 1.62 | 1.78 |
| M | — | 1.800 | — | 45.72 |
| N | — | 2.650 | — | 67.31 |
| P | .135 | .145 | 3.42 | 3.68 |
| Q | .070 | .100 | 1.77 | 2.54 |
| R | — | 1.355 | — | 34.42 |
| S | 12.219 | 12.343 | 310.36 | 313.51 |
| T | .137 | .153 | 3.47 | 3.89 |

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 or seven digit part number you desire from the table - i.e. C450P1 is a 1000 Volt, 1640 Ampere Phase Control SCR.

| Type | Voltage | | Current | |
|------|------------------|------------------|----------------------|------|
| | V _{ORM} | V _{RRM} | I _T (avg) | Code |
| C450 | 500 | E | 1460 | 2 |
| | 600 | M | | |
| | 700 | S | 1640 | 1 |
| | 800 | N | | |
| | 900 | T | | |
| | 1000 | P | | |
| | 1100 | PA | | |
| | 1200 | PB | | |
| | 1300 | PC | | |
| | 1400 | PD | | |



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C450

Phase Control SCR

1460-1640 Amperes Avg/500-1400 Volts

Absolute Maximum Ratings

| | Symbol | C450-1 | C450-2 | Units |
|---|--------------|-------------------|-------------------|------------------|
| RMS On-State Current | $I_{T(RMS)}$ | 2575 | 2300 | Amperes |
| Average On-State Current | $I_{T(av)}$ | 1640 | 1460 | Amperes |
| Peak One-Cycle Surge (Non Repetitive) On-State Current (60Hz) | I_{TSM} | 28500 | 25,000 | Amperes |
| Peak One-Cycle Surge (Non-Repetitive) On-State Current (50Hz) | I_{TSM} | 26,000 | 22,800 | Amperes |
| Critical Rate-of-Rise of On-State Current (Non-Repetitive) | di/dt | 800 | 800 | Amperes/ μ s |
| Critical Rate-of-Rise of On-State Current (Repetitive) | di/dt | 400 | 400 | Amperes/ μ s |
| I^2t (for Fusing), One Cycle at 60Hz | I^2t | 3.4×10^6 | 2.6×10^6 | A^2 sec |
| Peak Gate Power Dissipation | P_{GM} | 200 | 200 | Watts |
| Average Gate Power Dissipation | $P_{G(av)}$ | 5 | 5 | Watts |
| Storage Temperature | T_{STG} | -40 to 150 | -40 to 150 | $^{\circ}$ C |
| Operating Temperature | T_J | -40 to 125 | -40 to 125 | $^{\circ}$ C |
| Mounting Force [ⓐ] | | 5500 to 6000 | 5500 to 6000 | lb. |
| Mounting Force [ⓐ] | | 24.5 to 26.7 | 24.5 to 26.7 | kN |

Electrical and Thermal Characteristics

| Characteristics | Symbol | Test Conditions | C450-1 | C450-2 | Units |
|---|-----------------|--|--------|--------|------------------|
| Current—Conducting State Maximums | | | | | |
| Peak On-State Voltage | V_{TM} | $I_{TM} = 3000A$ Peak, $T_J = 25^{\circ}C$ | 1.4 | 1.65 | Volts |
| C450 | | | | | |
| Voltage—Blocking State Maximums | | | | | |
| Forward Leakage, Peak | I_{DRM} | $T_J = 125^{\circ}C$, $V = V_{DRM}$ | 45 | | mA |
| Reverse Leakage, Peak | I_{RRM} | $T_J = 125^{\circ}C$, $V = V_{RRM}$ | 45 | | mA |
| Switching | | | | | |
| Typical Turn-Off Time | t_q | $T_J = 125^{\circ}C$, $I_T = 2000A$, Pulse Width = 1000 μ sec; $V_R = 50V$; $dv/dt = 200V/\mu$ sec; Linear to V_{DRM} ; $di_R/dt = 25A/\mu$ sec; $VG = 0$, $R_L = 100\Omega$ | 150 | | μ sec |
| Typical Delay Time | t_d | $T_J = 25^{\circ}C$; $I_T = 50A$; Gate supply 20V; $R_L = 20\Omega$; 0.1 μ sec Rise Time | | .7 | μ sec |
| Min. Critical dv/dt exponential to V_{DRM} | dv/dt | $T_J = 125^{\circ}C$ | 400 | | V/ μ sec |
| Thermal | | | | | |
| Maximum Thermal Resistance, [ⓐ] double sided cooling | | | | | |
| Junction to Case | $R_{\theta JC}$ | | | .025 | $^{\circ}C/Watt$ |
| Case to Sink, Lubricated | $R_{\theta CS}$ | | | .0075 | $^{\circ}C/Watt$ |
| Gate—Maximum Parameters | | | | | |
| Gate Current to Trigger | I_{GT} | $T_J = 25^{\circ}C$, $V_D = 20V$, $R_L = 3\Omega$ | 200 | | mA |
| Gate Voltage to Trigger | V_{GT} | $T_J = -40^{\circ}$ to $125^{\circ}C$, $V_D = 20V$, $R_L = 3\Omega$ | 5 | | Volts |
| Non-Trigging Gate Voltage | V_{GDM} | $T_J = 125^{\circ}C$, $V_D = \text{rated } V_{DRM}$, $R_L = 1000\Omega$ | .15 | | Volts |
| Peak Forward Gate Current | I_{GTM} | | 10 | | Amperes |
| Peak Reverse Gate Voltage | V_{GRM} | | 5 | | Volts |

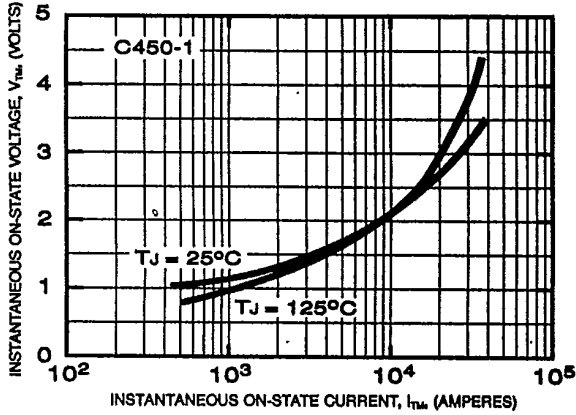
[ⓐ] Consult recommended mounting procedures.



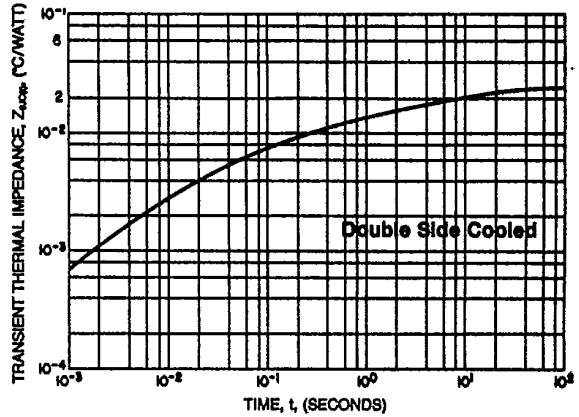
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C450
 Phase Control SCR
 1460-1640 Amperes Avg/500-1400 Volts

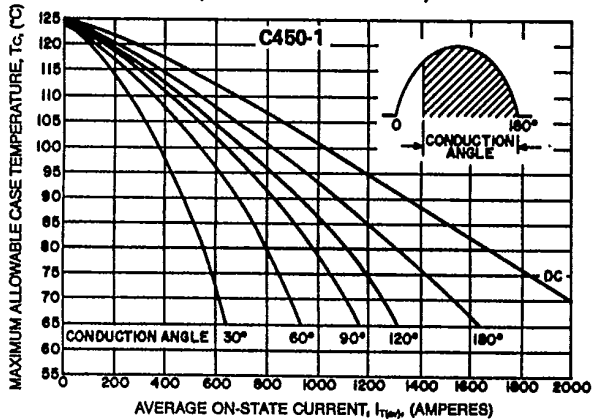
MAXIMUM ON-STATE CHARACTERISTICS



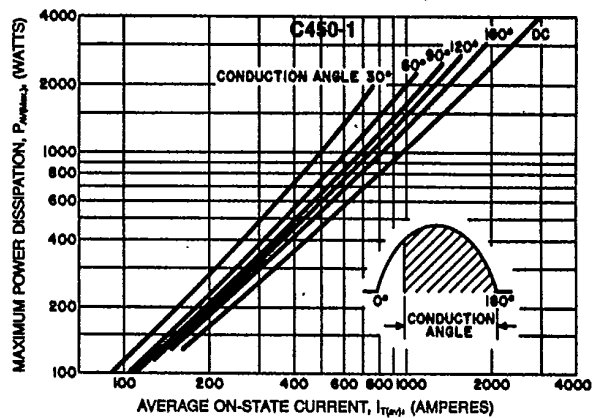
TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)



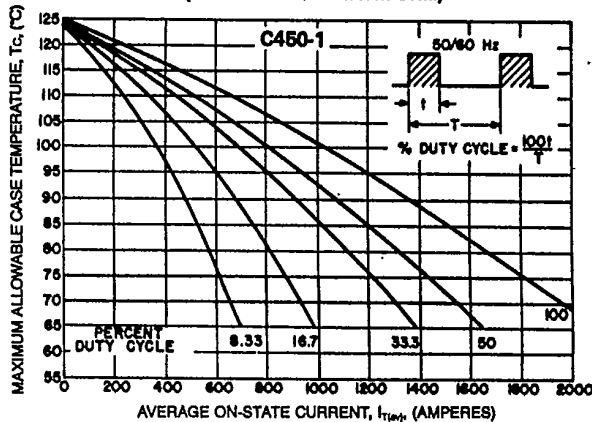
MAXIMUM ALLOWABLE CASE TEMPERATURE (SINUSOIDAL WAVEFORM)



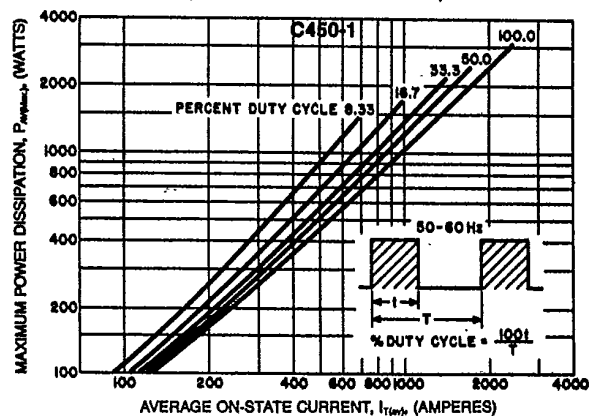
MAXIMUM ON-STATE POWER DISSIPATION (SINUSOIDAL WAVEFORM)



MAXIMUM ALLOWABLE CASE TEMPERATURE (RECTANGULAR WAVEFORM)



MAXIMUM ON-STATE POWER DISSIPATION (RECTANGULAR WAVEFORM)

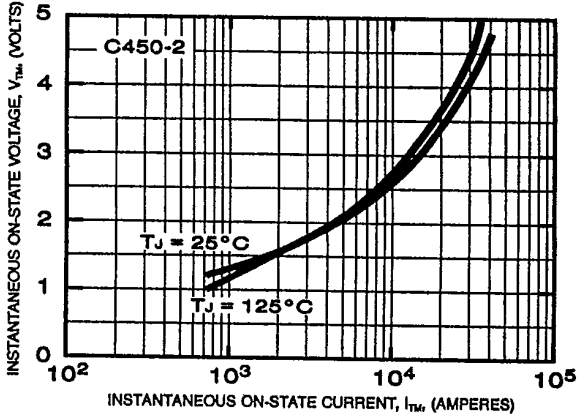




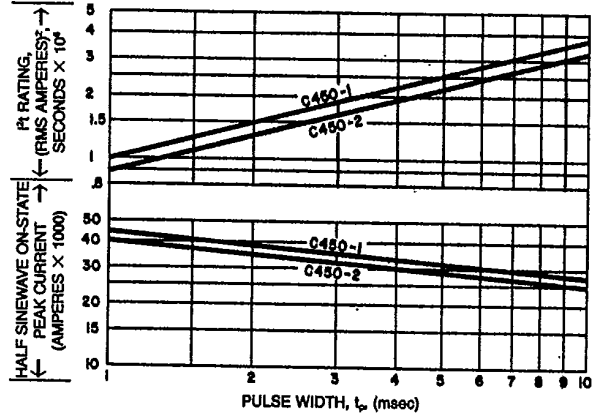
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C450
 Phase Control SCR
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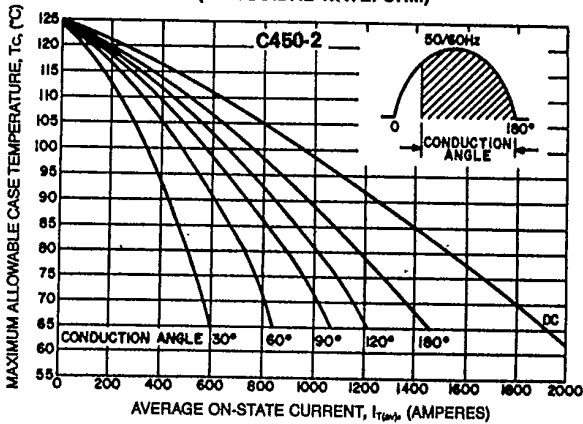
MAXIMUM ON-STATE CHARACTERISTICS



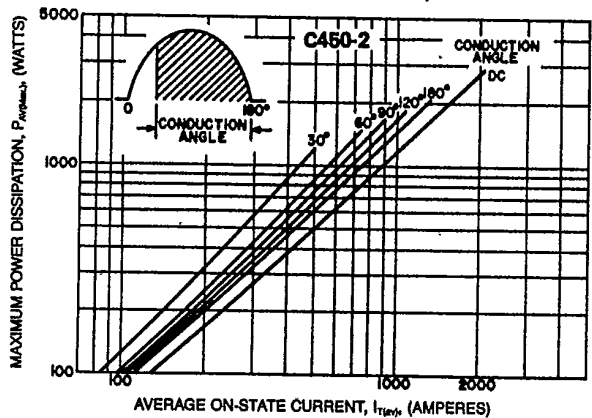
SUB-CYCLE SURGE AND I^2t RATINGS (RATED LOAD CONDITIONS)



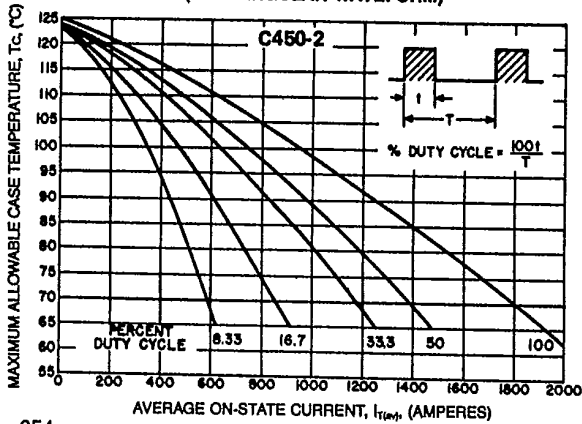
MAXIMUM ALLOWABLE CASE TEMPERATURE (SINUSOIDAL WAVEFORM)



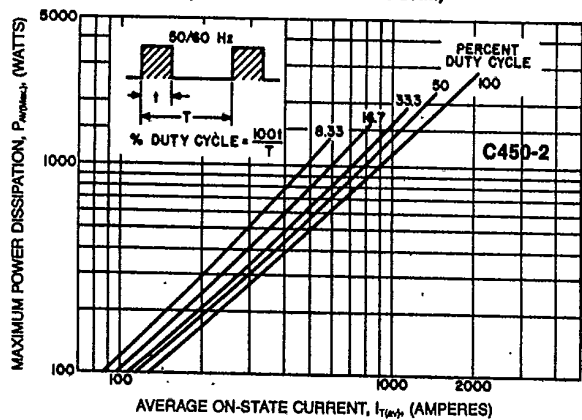
MAXIMUM ON-STATE POWER DISSIPATION (SINUSOIDAL WAVEFORM)



MAXIMUM ALLOWABLE CASE TEMPERATURE (RECTANGULAR WAVEFORM)



MAXIMUM ON-STATE POWER DISSIPATION (RECTANGULAR WAVEFORM)

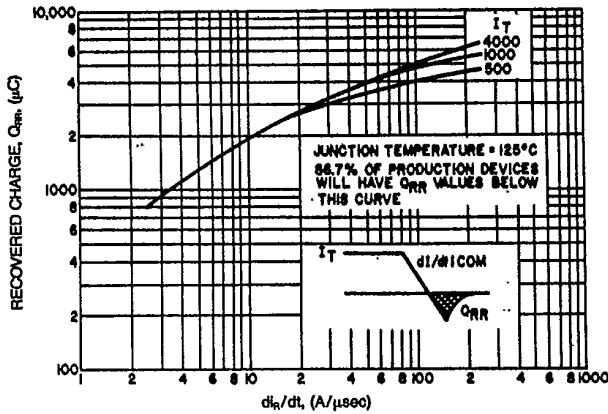




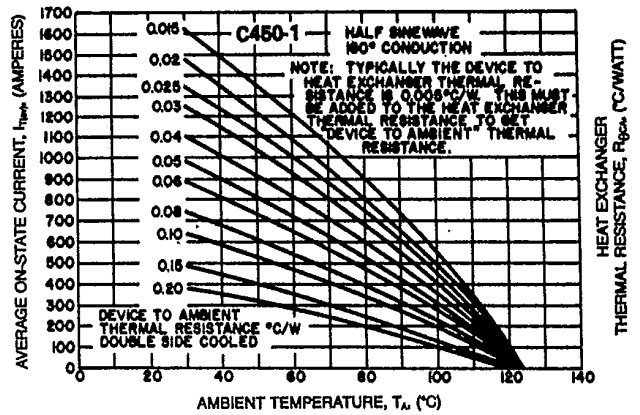
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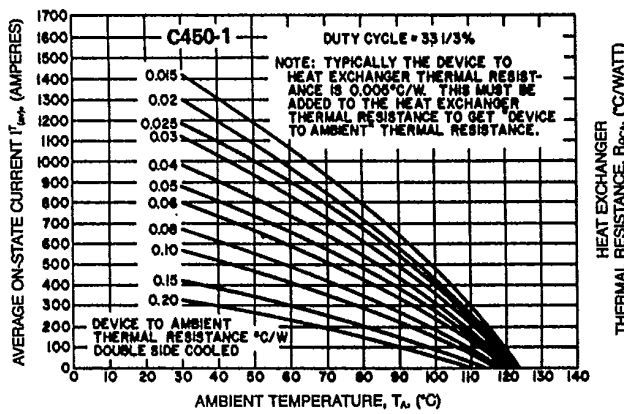
TYPICAL RECOVERED CHARGE



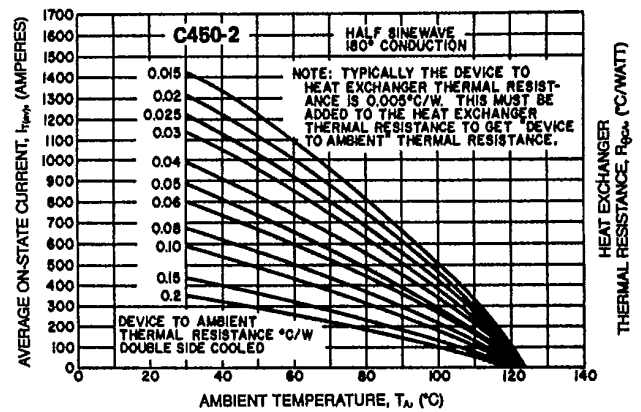
$I_{T(av)}$ vs. T_A (VARIOUS HEAT EXCHANGERS)



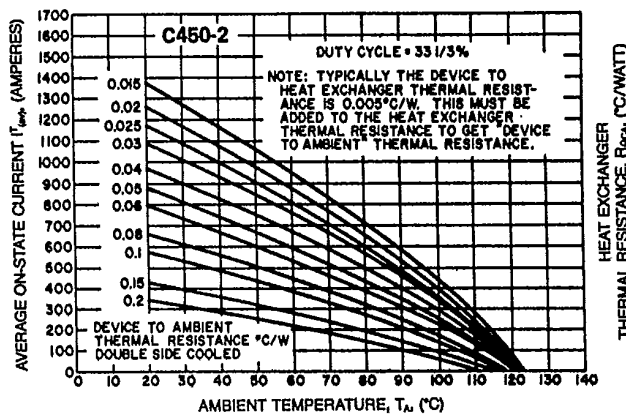
$I_{T(av)}$ vs. T_A (VARIOUS HEAT EXCHANGERS)



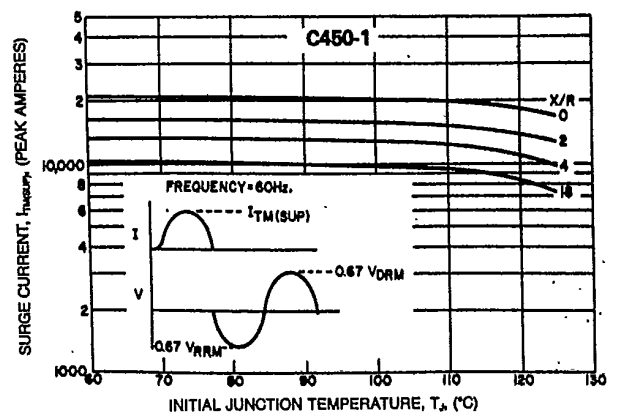
$I_{T(av)}$ vs. T_A (VARIOUS HEAT EXCHANGERS)



$I_{T(av)}$ vs. T_A (VARIOUS HEAT EXCHANGERS)



SURGE SUPPRESSION RATING





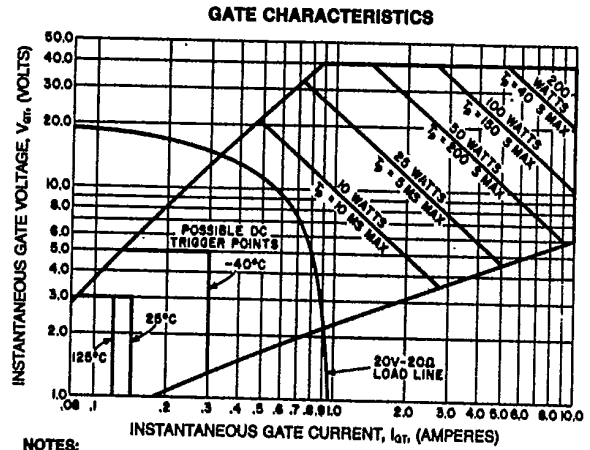
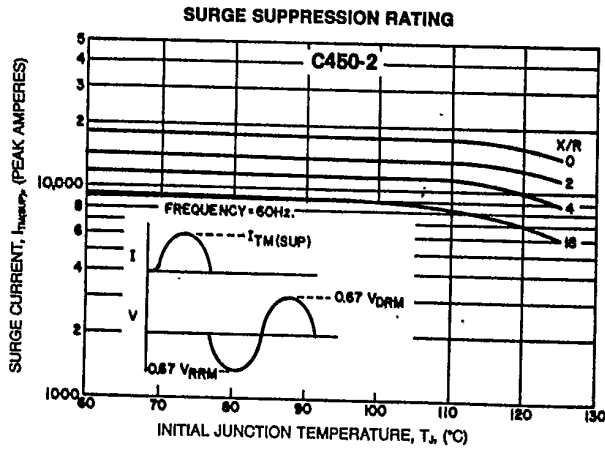
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C450

Phase Control SCR

1460-1840 Amperes Avg/500-1400 Volts



NOTES:

1. Maximum allowable average gate dissipation = 5 watts.
2. The locus of possible DC trigger points lies outside the boundaries shown at various case temperatures.
3. T_p = rectangular gate current pulse width (5 μ s min. duration, 1.0 μ s max. rise time).
4. Maximum long-term, repetitive anode di/dt = 400 Amps/ μ s with 20V - 20 Ω gate source.