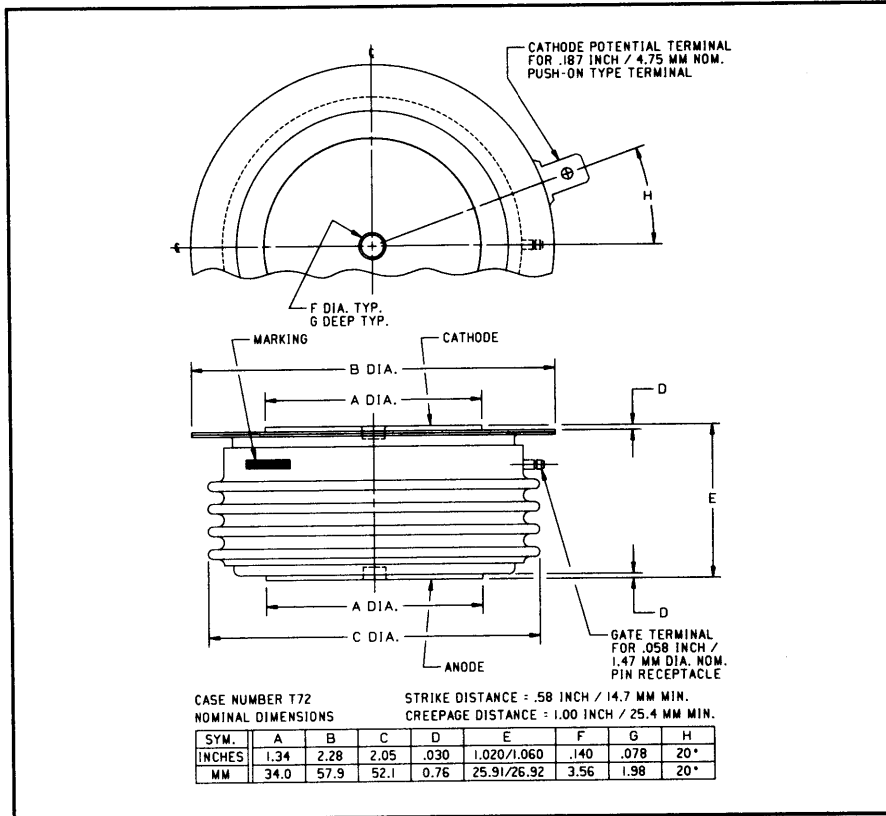
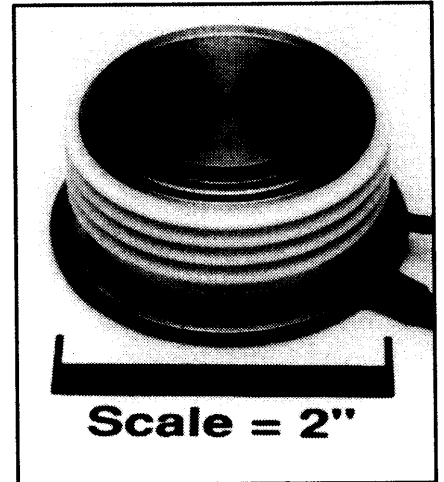


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 Powerex, Europe, S.A. 428 Avenue G. Durand, BP107, 72003 Le Mans, France (43) 41.14.14

**Phase Control SCR**  
 620 Amperes Average  
 600 Volts



C390\_\_X500 (Outline Drawing)



C390\_\_X500 Phase Control SCR  
 620 Amperes Average, 600 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

### Applications:

- Power Supplies
- Battery Chargers
- Motor Control

### Ordering Information:

Select the complete nine digit part number you desire from the table, i.e. C390MX500 is a 600 Volt, 620 Ampere Phase Control SCR.

Type	Voltage		Current
	$V_{DRM}$ $V_{RRM}$	Code	$I_T(av)$
C390__X500	200	B	620
	400	D	
	600	M	



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C390\_X500  
 Phase Control SCR  
 620 Amperes Average, 600 Volts

### Absolute Maximum Ratings

	Symbol	C390_X500	Units
RMS On-State Current @ $T_C = 65^\circ\text{C}$	$I_{T(RMS)}$	975	Amperes
Average On-State Current @ $T_C = 65^\circ\text{C}$	$I_{T(av)}$	620	Amperes
Peak One-Cycle Surge (Non-Repetitive) On-State Current (60Hz)	$I_{TSM}$	10,000	Amperes
Peak One-Cycle Surge (Non-Repetitive) On-State Current (50Hz)	$I_{TSM}$	9500	Amperes
Critical Rate-of-Rise of On-State Current (Non-Repetitive)	$di/dt$	400	Amperes/ $\mu\text{s}$
Critical Rate-of-Rise of On-State Current (Repetitive)	$di/dt$	150	Amperes/ $\mu\text{s}$
$I^2t$ (for Fusing), One Cycle at 60Hz	$I^2t$	416,500	$\text{A}^2\text{sec}$
Peak Gate Power Dissipation, 40 $\mu\text{sec}$ Pulse	$P_{GM}$	200	Watts
Average Gate Power Dissipation	$P_{G(av)}$	5	Watts
Storage Temperature	$T_{STG}$	-40 to 150	$^\circ\text{C}$
Operating Temperature	$T_J$	-40 to 125	$^\circ\text{C}$
Mounting Force		1800 to 2200	lb.
Mounting Force		8 to 9.8	kN

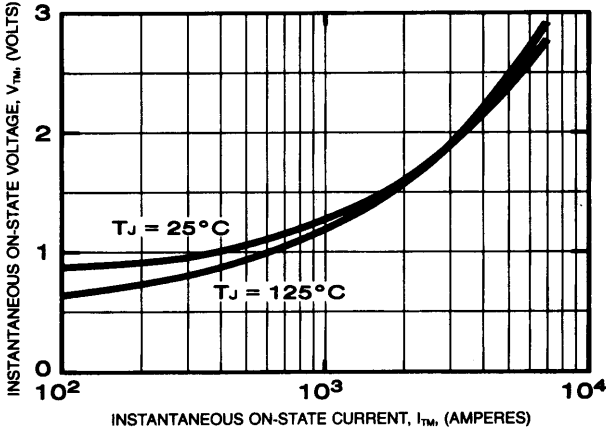
### Electrical and Thermal Characteristics

Characteristics	Symbol	Test Conditions	C390_X500	Units
<b>Voltage—Blocking State Maximums</b>				
Forward Leakage, Peak	$I_{DRM}$	$T_J = 125^\circ\text{C}, V = V_{DRM}$	50	mA
Reverse Leakage, Peak	$I_{RRM}$	$T_J = 125^\circ\text{C}, V = V_{RRM}$	50	mA
<b>Current—Conducting State Maximums</b>				
Peak On-State Voltage	$V_{TM}$	$I_{TM} = 3000\text{A}; T_J = 25^\circ\text{C}$	1.9	Volts
<b>Switching</b>				
Typical Turn-Off Time	$t_t$	$T_J = 125^\circ\text{C}, I_{TM} = 500\text{Amps}; V_R = 50\text{Volts Min.}; V_{DRM}$ (Reapplied); Rate-of-Rise of Reapplied Off-State Voltage = $20\text{V}/\mu\text{sec}$ (linear); Commutation $di/dt = 25\text{A}/\mu\text{sec}$ ; Repetition Rate = 1 pps; Gate Bias During Turn-Off Interval = 0 Volts, $100\Omega$	125	$\mu\text{sec}$
Typical Delay Time	$t_d$	$T_J = 25^\circ\text{C}, I_{TM} = 50\text{Adc}, V_{DRM}$ Rated. Gate Supply: 20 Volts, $20\Omega, 0.1\ \mu\text{sec}$ Max. Rise Time	0.7	$\mu\text{sec}$
Min. Critical $dv/dt$ exponential to $V_{DRM}$	$dv/dt$	$T_J = 125^\circ\text{C}, \text{Gate Open}$	200	$\text{V}/\mu\text{sec}$
<b>Thermal</b>				
Maximum Thermal Resistance, double sided cooling				
Junction to Case	$R_{\theta JC}$		0.06	$^\circ\text{C}/\text{Watt}$
Case to Sink, Lubricated	$R_{\theta CS}$		0.02	$^\circ\text{C}/\text{Watt}$
<b>Gate—Maximum Parameters</b>				
Gate Current to Trigger	$I_{GT}$	$V_D = 6\text{Vdc}, T_J = 25^\circ\text{C}, R_L = 3\Omega$	200	mA
Gate Voltage to Trigger	$V_{GT}$	$T_J = -40^\circ\text{C to } 125^\circ\text{C}, V_D = \text{Vdc}, R_L = 3\Omega$	5	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

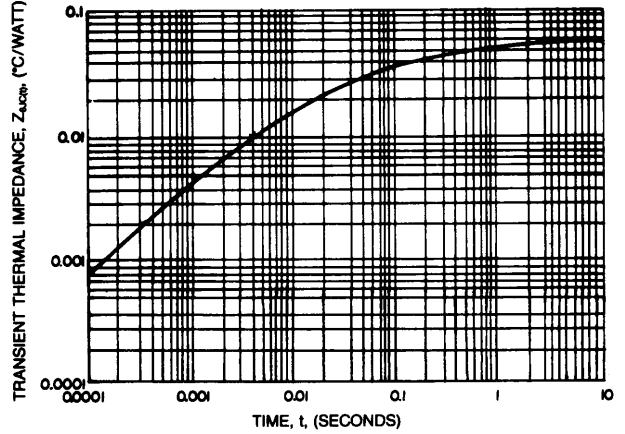
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**C390\_X500**  
**Phase Control SCR**  
 620 Amperes Average, 600 Volts

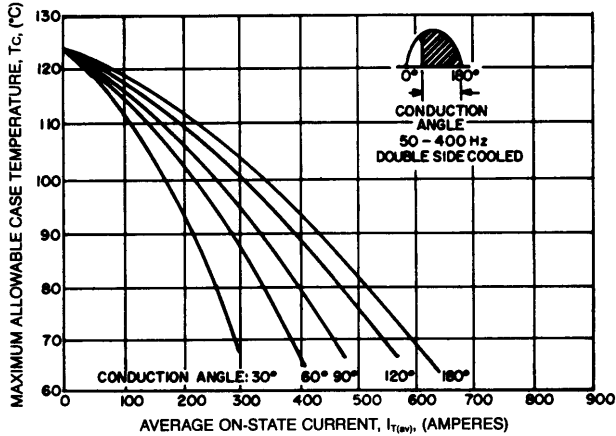
**MAXIMUM ON-STATE CHARACTERISTICS**



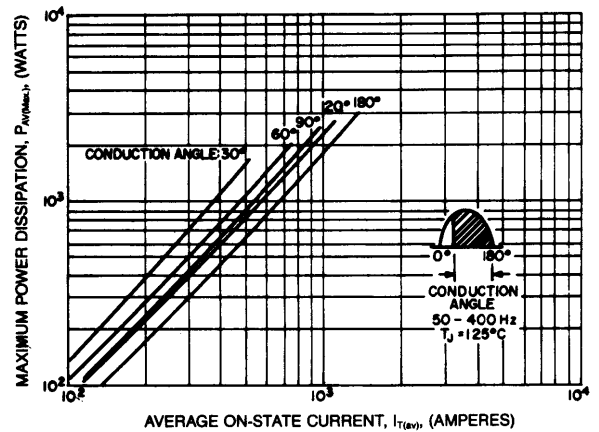
**TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)**



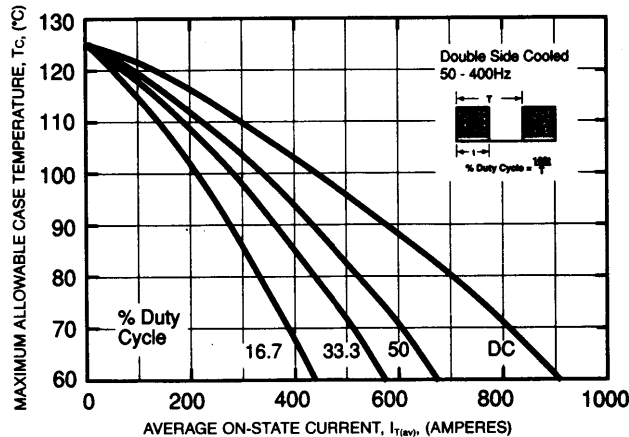
**MAXIMUM ALLOWABLE CASE TEMPERATURE (SINUSOIDAL WAVEFORM)**



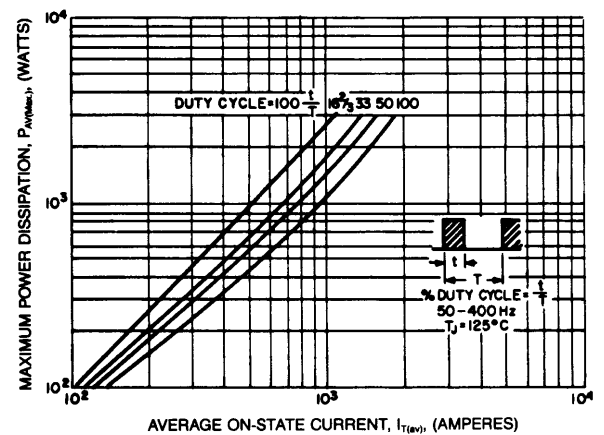
**MAXIMUM ON-STATE POWER DISSIPATION (SINUSOIDAL WAVEFORM)**



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



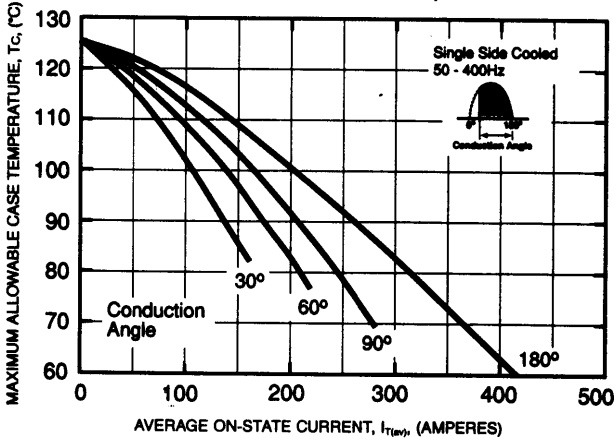
**MAXIMUM ON-STATE POWER DISSIPATION (RECTANGULAR WAVEFORM)**



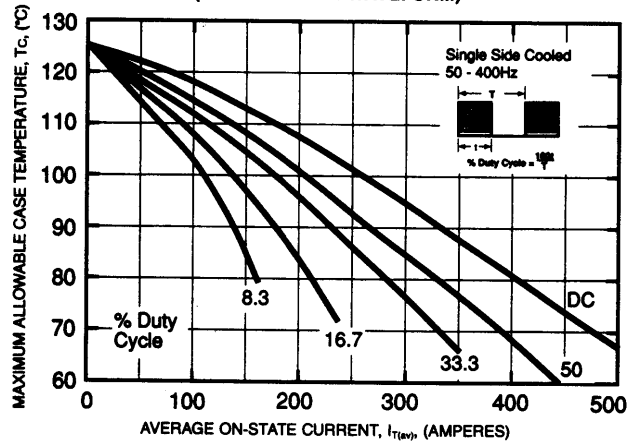
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C390\_X500  
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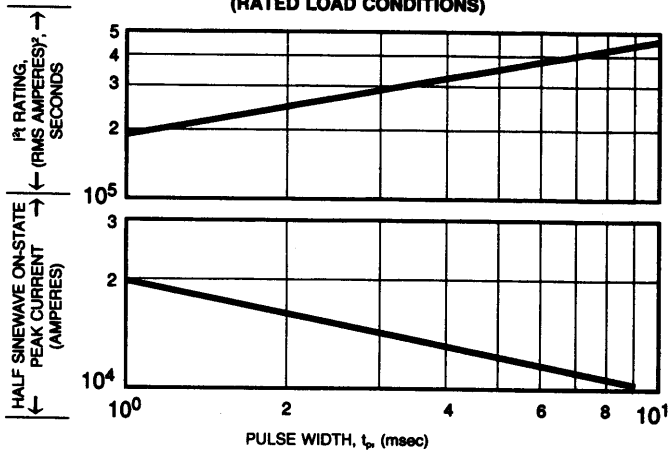
**MAXIMUM ALLOWABLE CASE TEMPERATURE (SINUSOIDAL WAVEFORM)**



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



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



**GATE CHARACTERISTICS**

