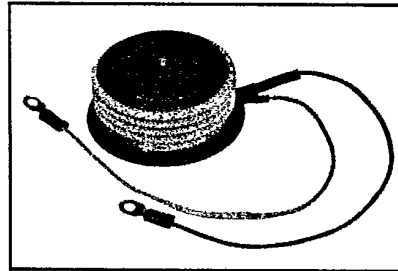
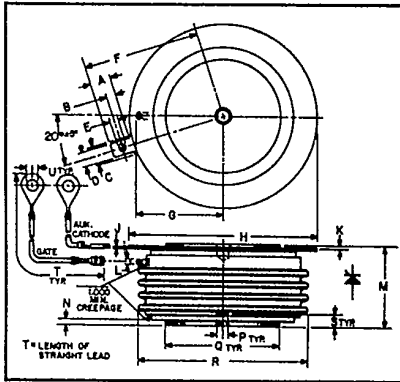




**C390\_X500**

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**  
**620 Amperes Avg**  
**100-600 Volts**



**C390\_X500**  
**Phase Control SCR**  
 620 Amperes/100-600 Volts

**C390\_X500**  
**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

**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<sup>2</sup>t Ratings

**Applications:**

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

**Ordering Information**

Example: Select the complete nine digit part number you desire from the table - i.e. C390DX500 is a 400 Volt, 620 Ampere Phase Control SCR.

Type	Voltage		Current
	V <sub>ORM</sub> V <sub>RRM</sub>	Code	
C390_X500	100	A	620
	200	B	
	300	C	
	400	D	
	500	E	
	600	M	



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C390\_X500  
 Phase Control SCR  
 620 Amperes Avg/100-600 Volts

### Absolute Maximum Ratings

	Symbol	C390_X500	Units
RMS On-State Current	$I_{T(RMS)}$	975	Amperes
Average On-State Current	$I_{T(av)}$	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/ $\mu$ s
Critical Rate-of-Rise of On-State Current (Repetitive)	di/dt	150	Amperes/ $\mu$ s
$I^2t$ (for Fusing), One Cycle at 60Hz	$I^2t$	416,500	A <sup>2</sup> sec
Peak Gate Power Dissipation, 40 $\mu$ sec Pulse	$P_{GM}$	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 <sup>Ⓞ</sup>		1800 to 2200	lb.
Mounting Force <sup>Ⓞ</sup>		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	$t_q$	$T_J = 125^{\circ}\text{C}, I_{TM} = 500\text{Amps}; V_R = 50\text{Volts Min.}; V_{DRM}$ (Reapplied); Rate-of-Rise of Reapplied Off-State Voltage = 20V/ $\mu$ sec (linear); Commutation di/dt = 25A/ $\mu$ sec; Repetition Rate = 1 pps; Gate Bias During Turn-Off Interval = 0 Volts, 100 $\Omega$	125	$\mu$ sec
Typical Delay Time	$t_d$	$T_J = 25^{\circ}\text{C}, I_{TM} = 50\text{A dc}, V_{DRM}$ Rated. Gate Supply: 20 Volts, 20 $\Omega$ , 0.1 $\mu$ sec Max. Rise Time	0.7	$\mu$ sec
Min. Critical dv/dt exponential to $V_{DRM}$	dv/dt	$T_J = 125^{\circ}\text{C}, \text{Gate Open}$	200	V/ $\mu$ sec
<b>Thermal</b>				
Maximum Thermal Resistance, <sup>Ⓞ</sup> double sided cooling				
Junction to Case	$R_{\theta JC}$		.06	$^{\circ}\text{C}/\text{Watt}$
Case to Sink, Lubricated	$R_{\theta CS}$		.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-Trigging Gate Voltage	$V_{GDM}$	$T_J = 125^{\circ}\text{C}, \text{rated } V_{DRM}, R_L = 1000\Omega$	.15	Volts
Peak Forward Gate Current	$I_{GTM}$		10	Amperes
Peak Reverse Gate Voltage	$V_{GRM}$		5	Volts

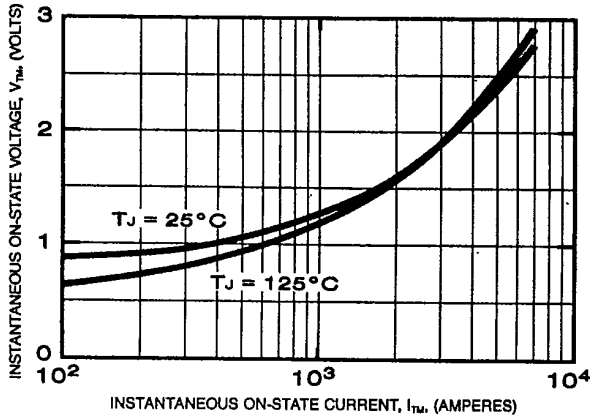
<sup>Ⓞ</sup> Consult recommended mounting procedures.



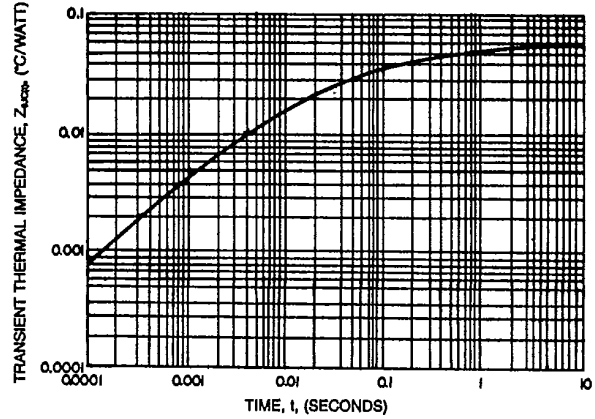
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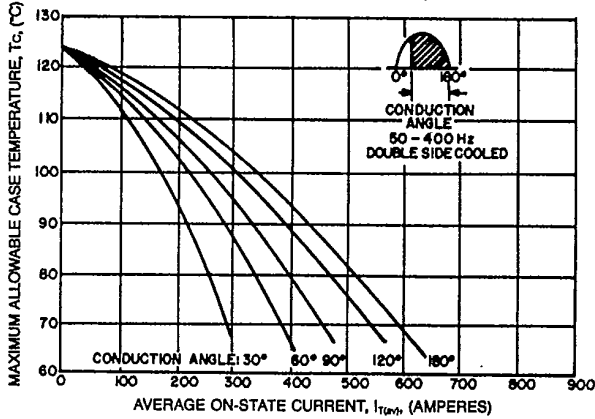
MAXIMUM ON-STATE CHARACTERISTICS



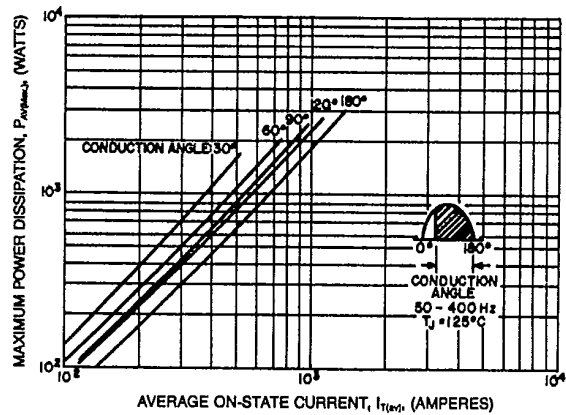
TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)



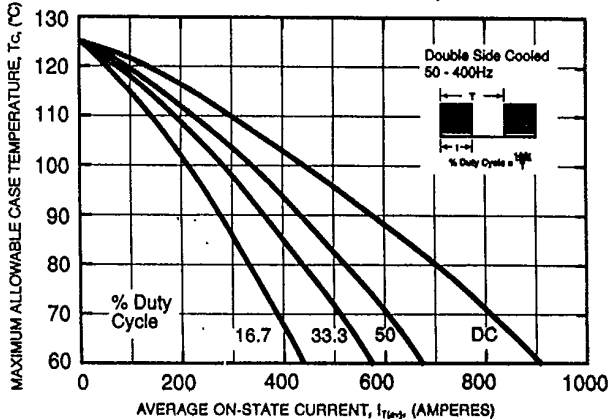
MAXIMUM ALLOWABLE CASE TEMPERATURE (SINUSOIDAL WAVEFORM)



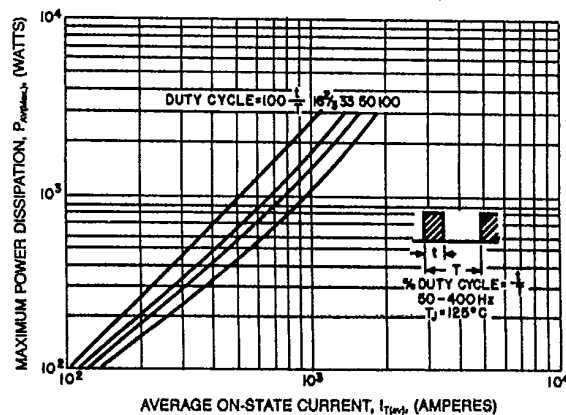
MAXIMUM ON-STATE POWER DISSIPATION (SINUSOIDAL WAVEFORM)



MAXIMUM ALLOWABLE CASE TEMPERATURE (RECTANGULAR WAVEFORM)



MAXIMUM ON-STATE POWER DISSIPATION (RECTANGULAR WAVEFORM)



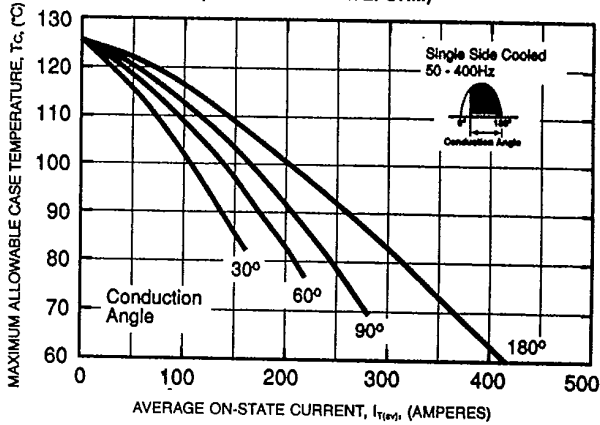


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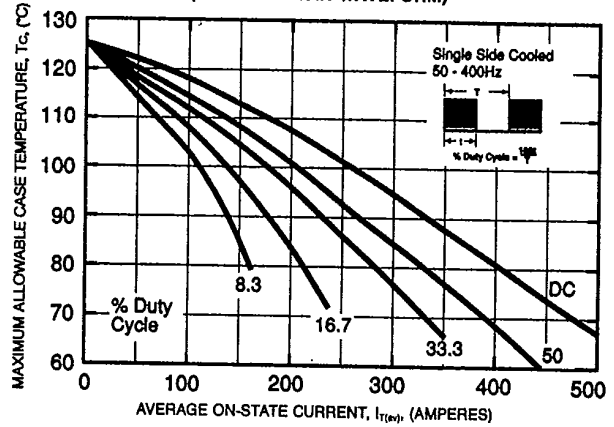
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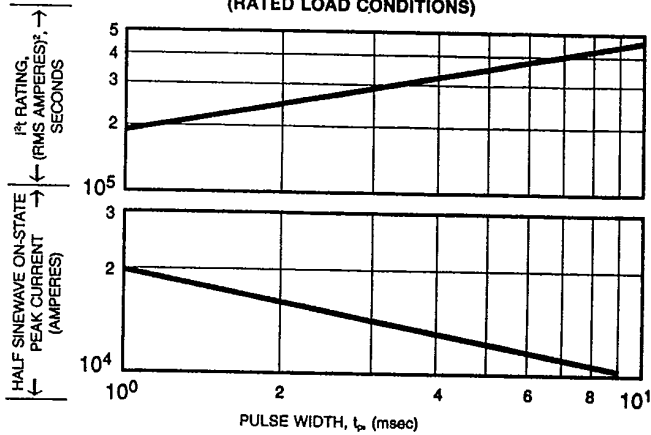
MAXIMUM ALLOWABLE CASE TEMPERATURE (SINUSOIDAL WAVEFORM)



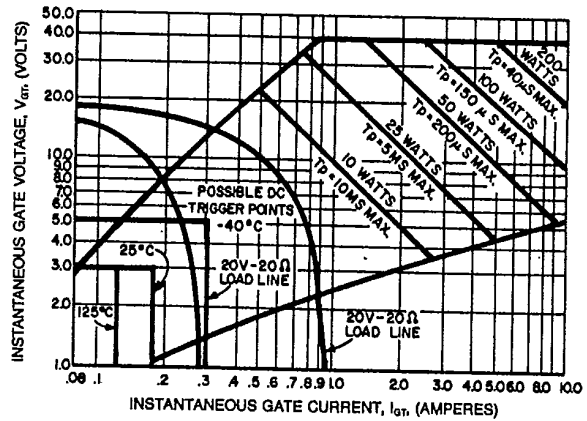
MAXIMUM ALLOWABLE CASE TEMPERATURE (RECTANGULAR WAVEFORM)



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



GATE CHARACTERISTICS



NOTES:

- Maximum allowable average gate dissipation = 5 watts.
  - The locus of possible dc trigger points lie outside the boundaries shown at various case temperatures.
  - $T_p$  = Rectangular gate current pulse width (5μs min. duration; 1.0 μs max. rise time for 20V, 65 Ω source).
  - 20 V - 20 Ω is the minimum gate source load line when rate of circuit current rise > 100 Amp/μs or anode rate of current rise > 200 Amps/μs ( $T_p$  = 5 μs min., 0.5μs max. rise time).
- Maximum long-term repetitive anode di/dt = 500 Amps/μs with 20V - 20 Ω gate source.