

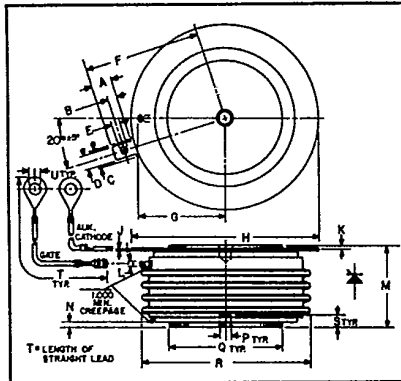
POWEREX

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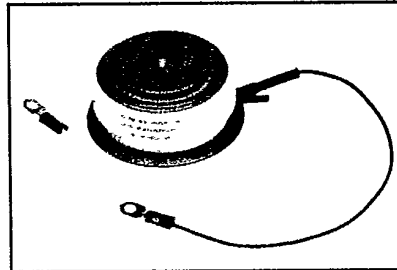
C390

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**450 Amperes Avg****500-1300 Volts****C390****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



C390
Phase Control SCR
 450 Amperes/500-1300 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 I²t Ratings

Applications:

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

Ordering Information

Example: Select the complete five or six digit part number you desire from the table – i.e. C390P is a 1000 Volt, 450 Ampere Phase Control SCR.

Type	Voltage		Current
	V _{ORM} V _{RRM}	Code	
C390	500	E	450
	600	M	
	700	S	
	800	N	
	900	T	
	1000	P	
	1100	PA	
	1200	PB	
	1300	PC	



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Absolute Maximum Ratings

	Symbol	C390	Units
RMS On-State Current	$I_{T(RMS)}$	700	Amperes
Average On-State Current	$I_{T(av)}$	450	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}	7600	Amperes
Critical Rate-of-Rise of On-State Current (Non-Repetitive)	di/dt	800	Amperes/ μs
Critical Rate-of-Rise of On-State Current (Repetitive)	di/dt	500	Amperes/ μs
I^2t (for Fusing), 8.3 milliseconds	I^2t	265,000	A ² sec
Peak Gate Power Dissipation, 40 μ sec Pulse	P_{GM}	200	Watts
Average Gate Power Dissipation	$P_{G(av)}$	5	Watts
Storage Temperature	T_{STG}	-40 to 150	°C
Operating Temperature	T_J	-40 to 125	°C
Mounting Force ^①		2000 to 2500	lb.
Mounting Force ^①		8.9 to 11.1	kN

① Consult recommended mounting procedures.



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C390**Phase Control SCR**

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Electrical and Thermal Characteristics

Characteristics	Symbol	Test Conditions	C390	Units
Voltage—Blocking State Maximums				
Forward Leakage, Peak	I_{DRM}	$T_J = 125^\circ\text{C}, V = V_{DRM}$	45	mA
Reverse Leakage, Peak	I_{RRM}	$T_J = 125^\circ\text{C}, V = V_{RRM}$	45	mA
Current—Conducting State Maximums				
Peak On-State Voltage	V_{TM}	$T_C = 25^\circ\text{C}, I_{TM} = 3000 \text{ A Peak, Duty Cycle } \leq 0.01\%$	2.4	Volts
Switching				
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 = $20\text{V}/\mu\text{sec}$ (linear); Commutation $di/dt = 25 \text{ Amps}/\mu\text{sec}$; Repetition Rate = 1 pps; Gate Bias During Turn-Off Interval = 0 Volts, 100Ω	125	μsec
Typical Delay Time	t_d	$T_J = 25^\circ\text{C}, I_{TM} = 50 \text{ Adc}, V_{DRM}$ Rated. Gate Supply: 20 Volts, 20Ω , $0.1 \mu\text{sec}$ Max. Rise Time	0.4	μsec
Min. Critical dv/dt exponential to V_{DRM}	dv/dt	$T_J = 125^\circ\text{C}, \text{Gate Open}$	200	$\text{V}/\mu\text{sec}$
Thermal				
Maximum Thermal Resistance, [Ⓢ] double sided cooling				
Junction to Case	$R_{\theta JC}$		.06	$^\circ\text{C}/\text{Watt}$
Case to Sink, Lubricated	$R_{\theta CS}$		.020	$^\circ\text{C}/\text{Watt}$
Gate—Maximum Parameters				
Gate Current to Trigger	I_{GT}	$T_J = 25^\circ\text{C}, V_D = 6\text{Vdc}, R_L = 3\Omega$	150	mA
Gate Voltage to Trigger	V_{GT}	$T_J = -40^\circ\text{C to } 125^\circ\text{C}, V_D = 6\text{Vdc}, R_L = 3\Omega$	5	Volts
Non-Triggering Gate Voltage	V_{GDM}	$T_C = 125^\circ\text{C}, V_D = \text{Rated}, R_L = 1000\Omega$	.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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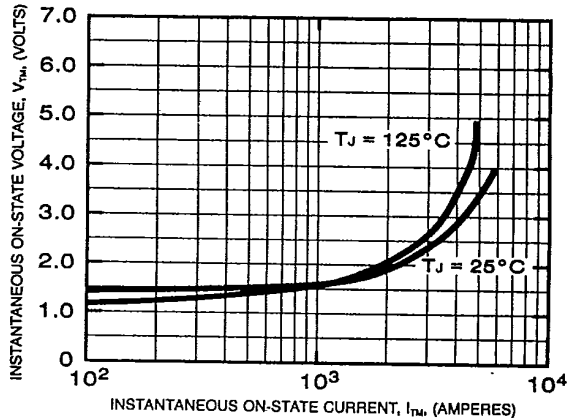
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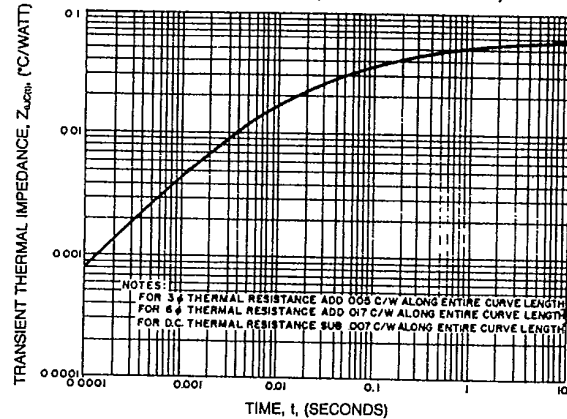
Phase Control SCR

450 Amperes Avg/500-1300 Volts

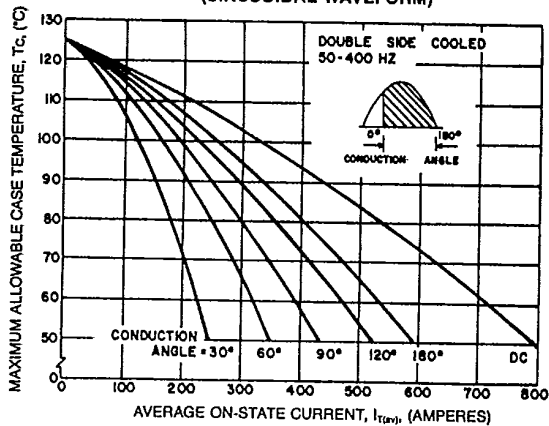
MAXIMUM ON-STATE CHARACTERISTICS



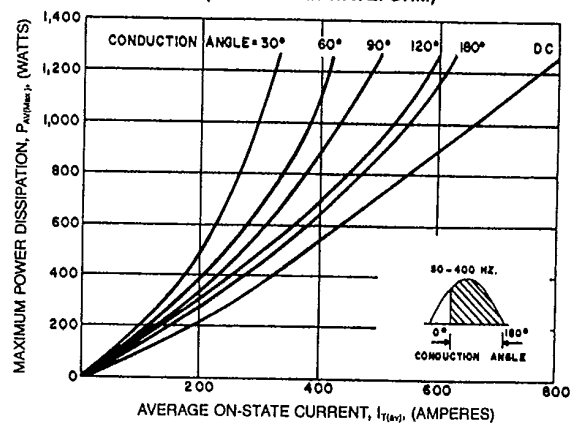
TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)



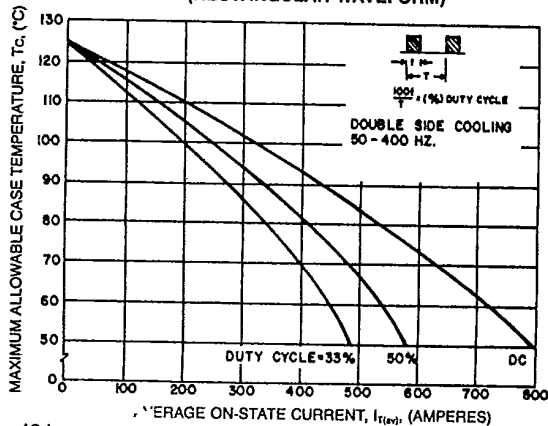
MAXIMUM ALLOWABLE CASE TEMPERATURE (SINUSOIDAL WAVEFORM)



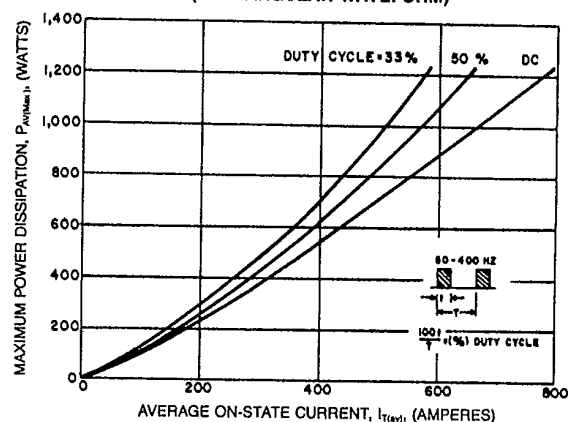
MAXIMUM ON-STATE POWER DISSIPATION (SINUSOIDAL WAVEFORM)



MAXIMUM ALLOWABLE CASE TEMPERATURE (RECTANGULAR WAVEFORM)



MAXIMUM ON-STATE POWER DISSIPATION (RECTANGULAR WAVEFORM)





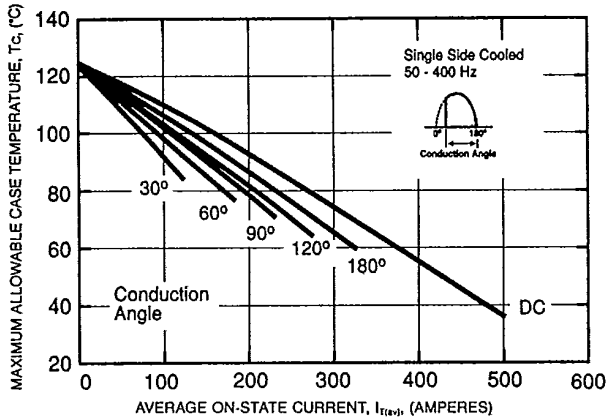
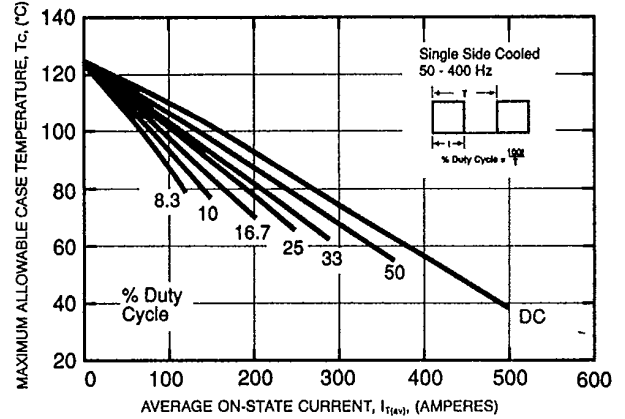
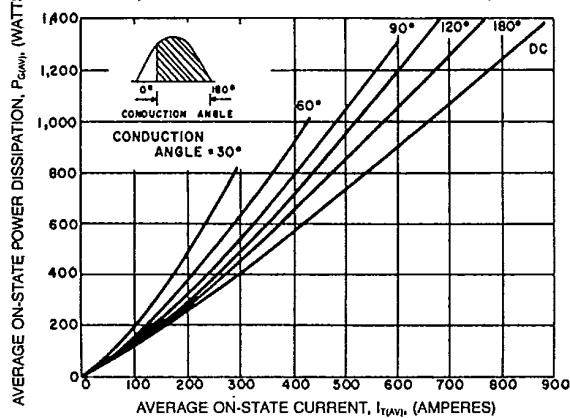
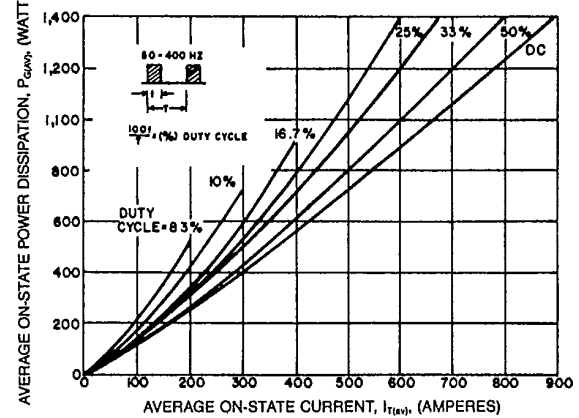
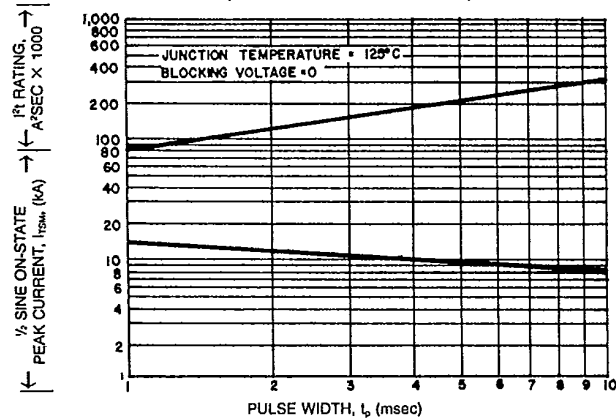
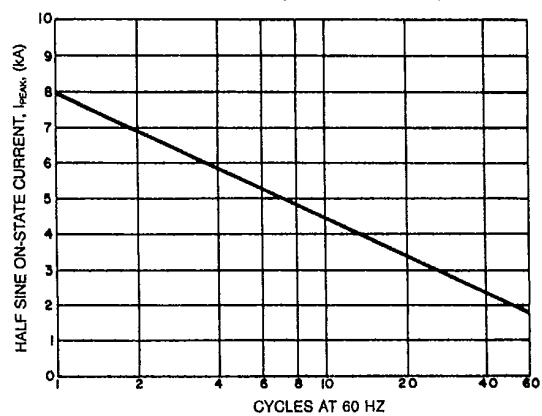
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**MAXIMUM ALLOWABLE CASE TEMPERATURE
(SINUSOIDAL WAVEFORM)****MAXIMUM ALLOWABLE CASE TEMPERATURE
(RECTANGULAR WAVEFORM)****MAXIMUM ON-STATE POWER DISSIPATION
(SINUSOIDAL WAVEFORM — EXTENDED)****MAXIMUM ON-STATE POWER DISSIPATION
(RECTANGULAR WAVEFORM — EXTENDED)****SUB-CYCLE SURGE AND I^2t RATINGS
(RATED LOAD CONDITIONS)****MAXIMUM ALLOWABLE SURGE ON-STATE
CURRENT (NON-REPETITIVE)**



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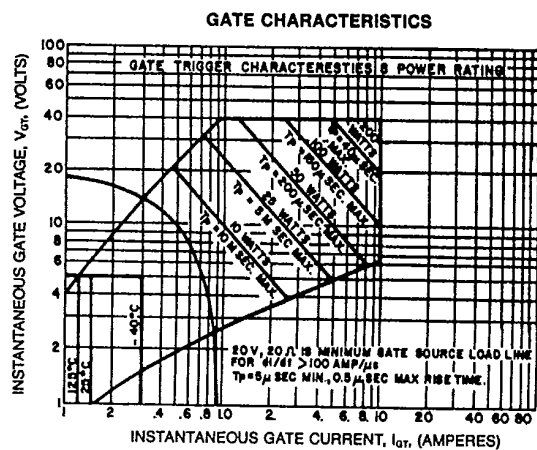
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NOTES:

1. Maximum allowable gate power dissipation = 5 watts.
2. The locus of possible DC trigger points lie outside the boundaries shown at various case temperatures.
3. T_p = Rectangular Gate Current Pulse Width.