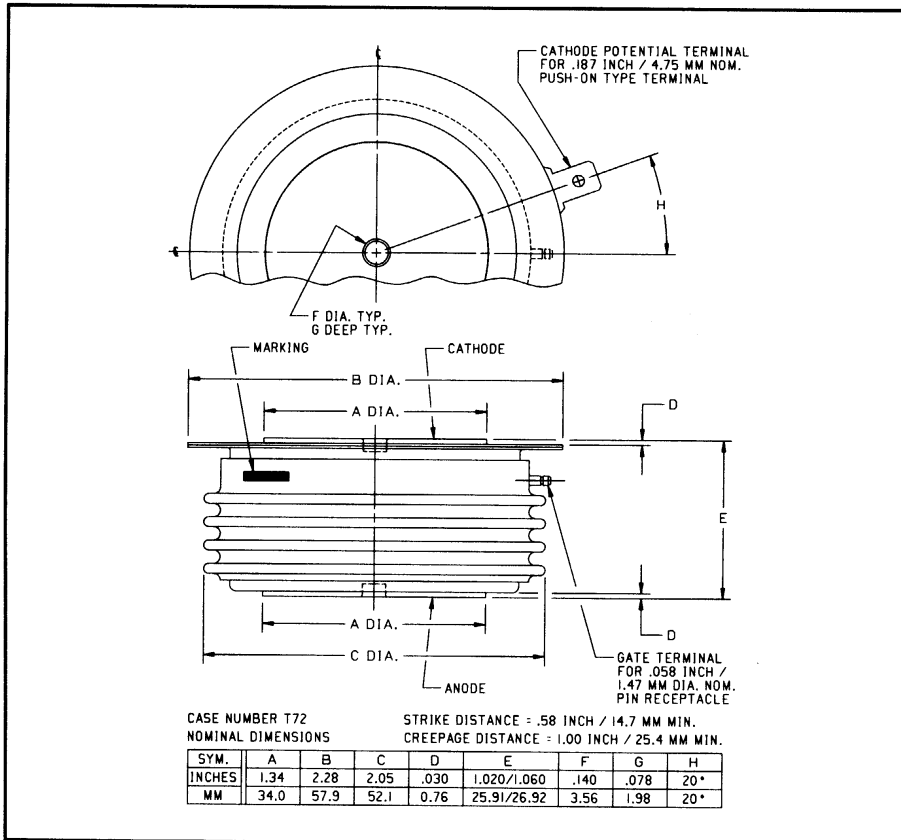
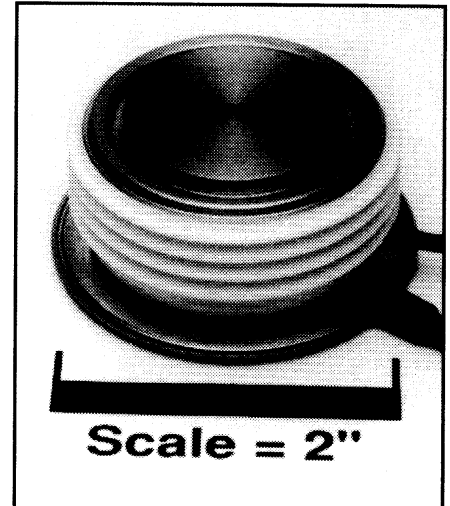


Powerex, Inc., 200 Hillis Street, Youngwood, Pennsylvania 15697-1800 (412) 925-7272  
 Powerex, Europe, S.A. 428 Avenue G. Durand, BP107, 72003 Le Mans, France (43) 41.14.14

**Phase Control SCR**  
 450 Amperes Average  
 2400 Volts



C390 (Outline Drawing)



C390 Phase Control SCR  
 450 Amperes Average, 2400 Volts

### Ordering Information:

Select the complete five or six digit part number you desire from the table, i.e. C390LD is a 2400 Volt, 450 Ampere Phase Control SCR.

Type	Voltage		Current
	V <sub>DRM</sub> V <sub>RRM</sub>	Code	I <sub>T(av)</sub>
C390	600	M	450
	800	N	
	1000	P	
	1200	PB	
	1400	PD	
	1600	PM	
	1800	PN	
	2000	L	
	2200	LB	
2400	LD		

### 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

## C390

### Phase Control SCR

450 Amperes Average, 2400 Volts

### Absolute Maximum Ratings

	Symbol	C390	Units
RMS On-State Current @ $T_C = 73^\circ\text{C}$	$I_{T(\text{RMS})}$	700	Amperes
Average On-State Current @ $T_C = 73^\circ\text{C}$	$I_{T(\text{av})}$	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/ $\mu\text{s}$
Critical Rate-of-Rise of On-State Current (Repetitive)	di/dt	500	Amperes/ $\mu\text{s}$
$I^2t$ (for Fusing), 8.3 milliseconds	$I^2t$	265,000	$\text{A}^2\text{sec}$
Peak Gate Power Dissipation, 40 $\mu\text{sec}$ Pulse	$P_{GM}$	200	Watts
Average Gate Power Dissipation	$P_{G(\text{av})}$	5	Watts
Storage Temperature	$T_{STG}$	-40 to 150	$^\circ\text{C}$
Operating Temperature	$T_J$	-40 to 125	$^\circ\text{C}$
Mounting Force		2000 to 2500	lb.
Mounting Force		8.9 to 11.1	kN

**C390**

**Phase Control SCR**

450 Amperes Average, 2400 Volts

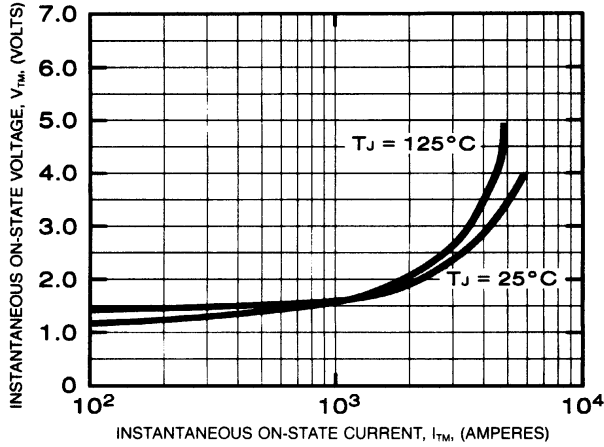
**Electrical and Thermal Characteristics**

Characteristics	Symbol	Test Conditions	C390	Units
<b>Voltage—Blocking State Maximums</b>				
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
<b>Current—Conducting State Maximums</b>				
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
<b>Switching</b>				
Typical Turn-Off Time	$t_q$	$T_J = 125^\circ\text{C}; I_{TM} = 500 \text{ Amps}; V_R = 50 \text{ Volts Min.}; V_{DRM} \text{ (Reapplied); Rate-of-Rise of Reapplied Off-State Voltage} = 20\text{V}/\mu\text{sec (linear); Commutation } di/dt = 25 \text{ Amps}/\mu\text{sec; Repetition Rate} = 1 \text{ pps; Gate Bias During Turn-Off Interval} = 0 \text{ Volts, } 100\Omega$	125	$\mu\text{sec}$
Typical Delay Time	$t_d$	$T_J = 25^\circ\text{C}, I_{TM} = 50 \text{ Adc, } V_{DRM} \text{ Rated. Gate Supply: } 20 \text{ Volts, } 20\Omega, 0.1 \mu\text{sec Max. Rise Time}$	0.4	$\mu\text{sec}$
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	$R_{\theta CS}$		0.020	$^\circ\text{C}/\text{Watt}$
<b>Gate—Maximum Parameters</b>				
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	$V_{GDM}$	$T_C = 125^\circ\text{C}, V_D = \text{Rated}, R_L = 1000\Omega$	0.15	Volts
Peak Forward Gate Current	$I_{GTM}$		10	Amperes
Peak Reverse Gate Voltage	$V_{GRM}$		5	Volts

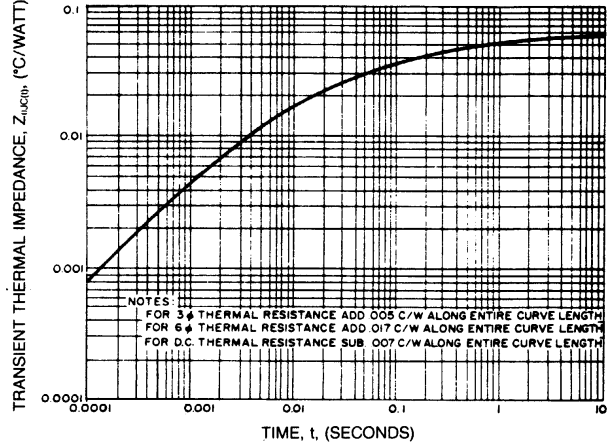
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**C390**  
**Phase Control SCR**  
 450 Amperes Average, 2400 Volts

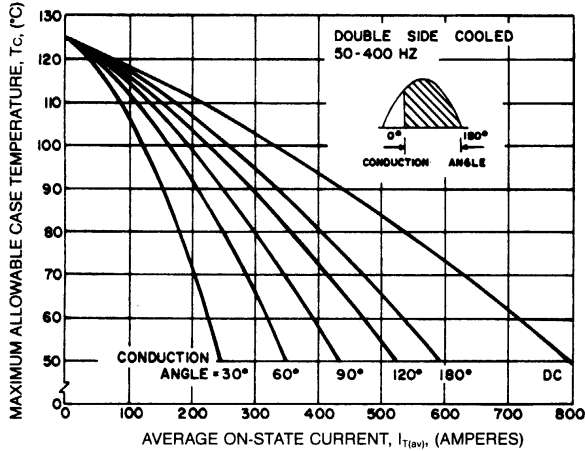
**MAXIMUM ON-STATE CHARACTERISTICS**



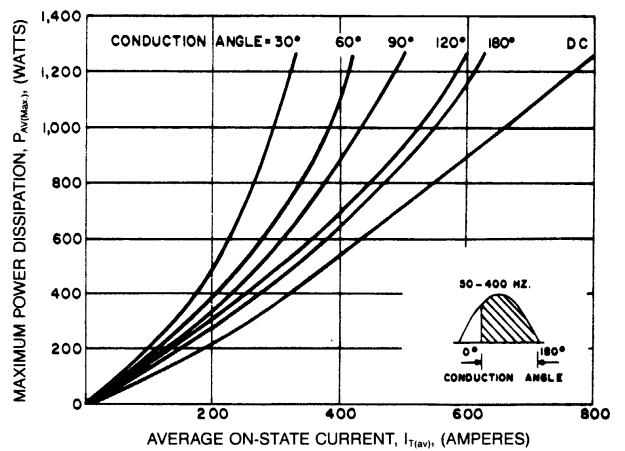
**TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)**



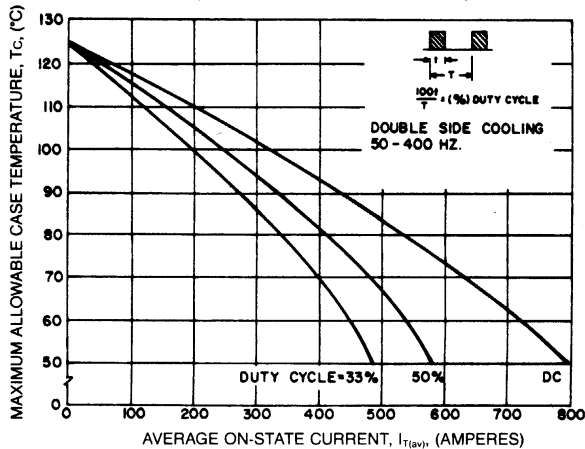
**MAXIMUM ALLOWABLE CASE TEMPERATURE (SINUSOIDAL WAVEFORM)**



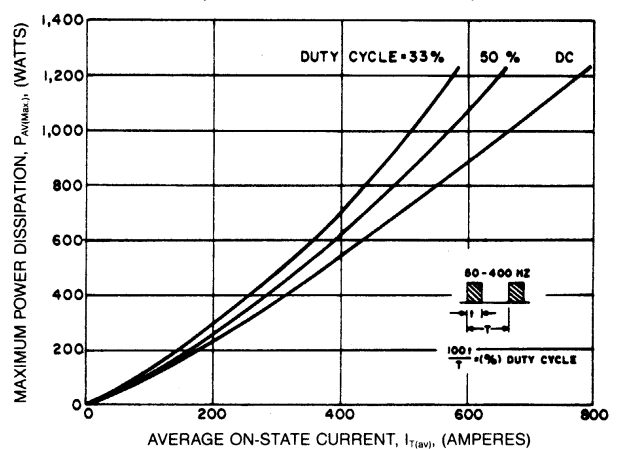
**MAXIMUM ON-STATE POWER DISSIPATION (SINUSOIDAL WAVEFORM)**



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

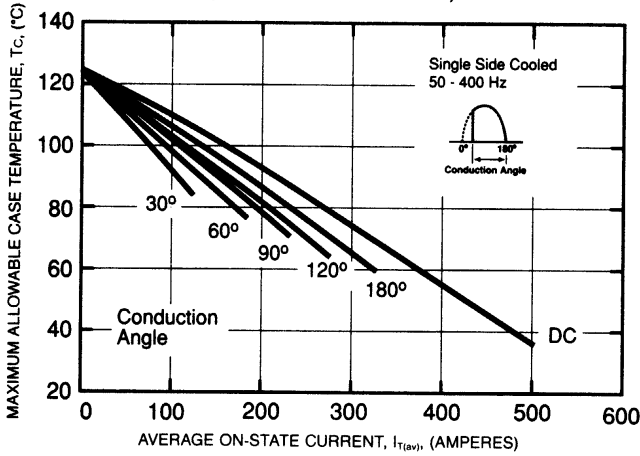


**MAXIMUM ON-STATE POWER DISSIPATION (RECTANGULAR WAVEFORM)**

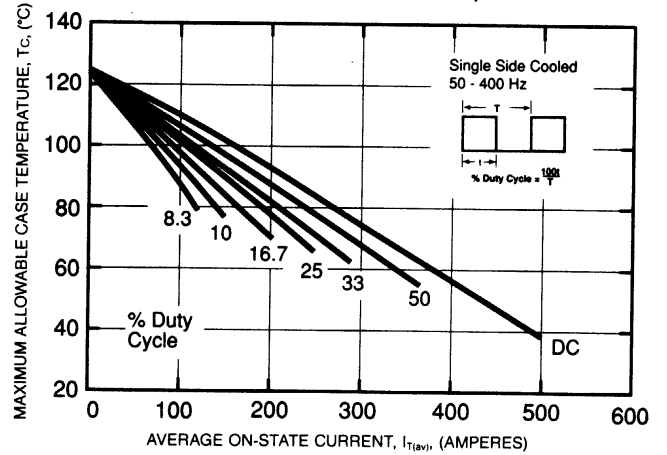


**C390**  
**Phase Control SCR**  
 450 Amperes Average, 2400 Volts

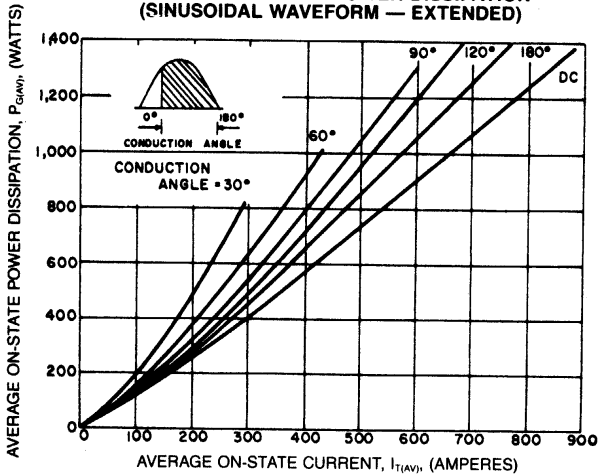
**MAXIMUM ALLOWABLE CASE TEMPERATURE (SINUSOIDAL WAVEFORM)**



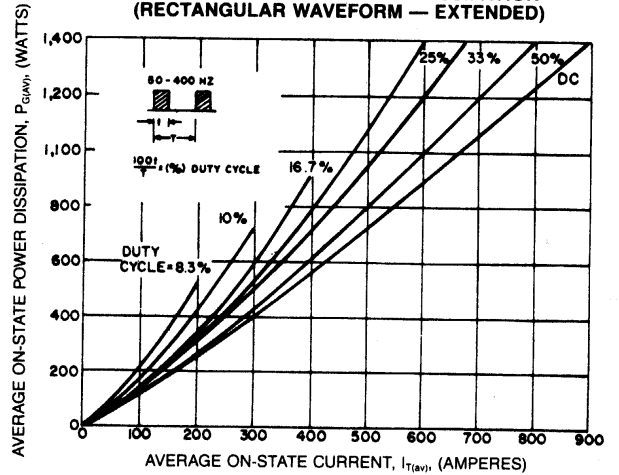
**MAXIMUM ALLOWABLE CASE TEMPERATURE (RECTANGULAR WAVEFORM)**



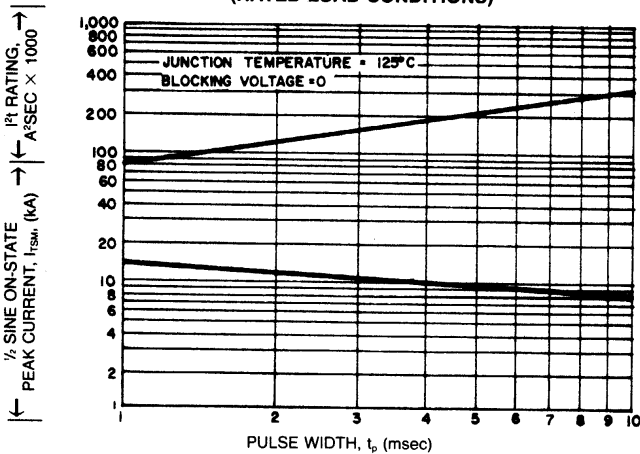
**MAXIMUM ON-STATE POWER DISSIPATION (SINUSOIDAL WAVEFORM — EXTENDED)**



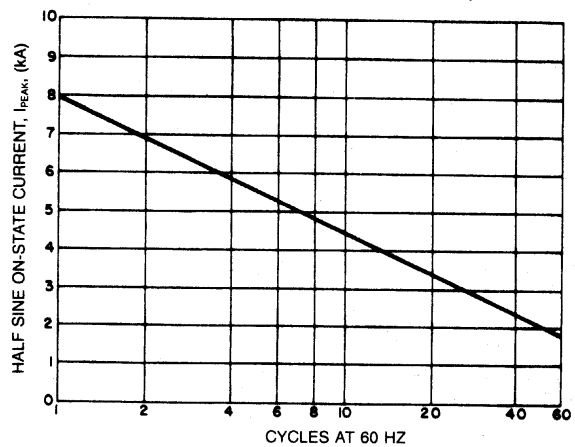
**MAXIMUM ON-STATE POWER DISSIPATION (RECTANGULAR WAVEFORM — EXTENDED)**



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



**MAXIMUM ALLOWABLE SURGE ON-STATE CURRENT (NON-REPETITIVE)**



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C390  
Phase Control SCR  
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### GATE CHARACTERISTICS

