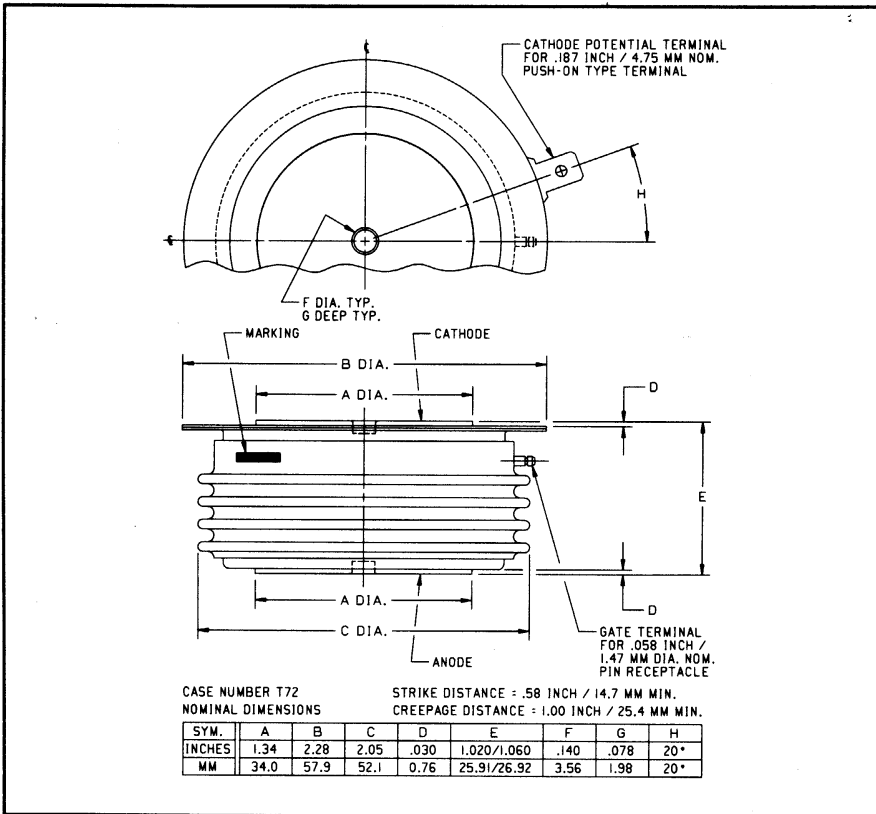
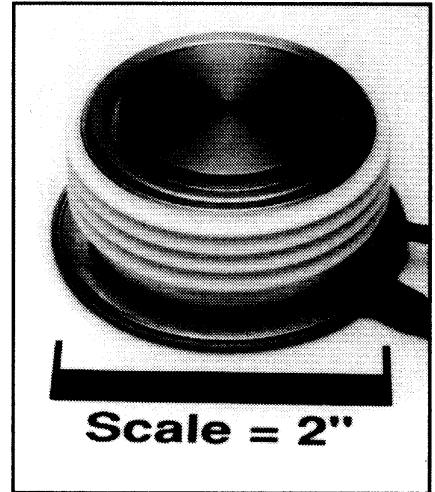


Powerex, Inc., 200 Hillis Street, Youngwood, Pennsylvania 15697-1800 (412) 925-7272  
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**Phase Control SCR**  
 490 Amperes Average  
 2400 Volts



C391 (Outline Drawing)



C391 Phase Control SCR  
 490 Amperes Average, 2400 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
- VAR Generators

### Ordering Information:

Select the complete six digit part number you desire from the table, i.e. C391LD is a 2400 Volt, 490 Ampere Phase Control SCR.

Type	Voltage		Current
	$V_{DRM}$	$V_{RRM}$ Code	$I_{T(av)}$
C391	1400	PD	490
	1600	PM	
	1800	PN	
	2000	L	
	2200	LB	
	2400	LD	



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C391

Phase Control SCR

490 Amperes Average, 2400 Volts

### Absolute Maximum Ratings

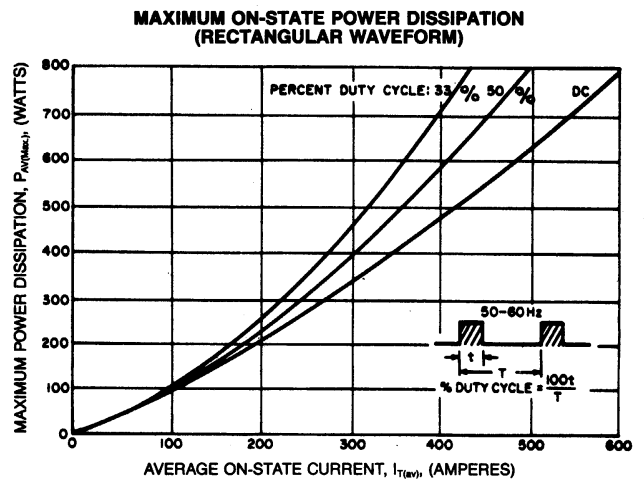
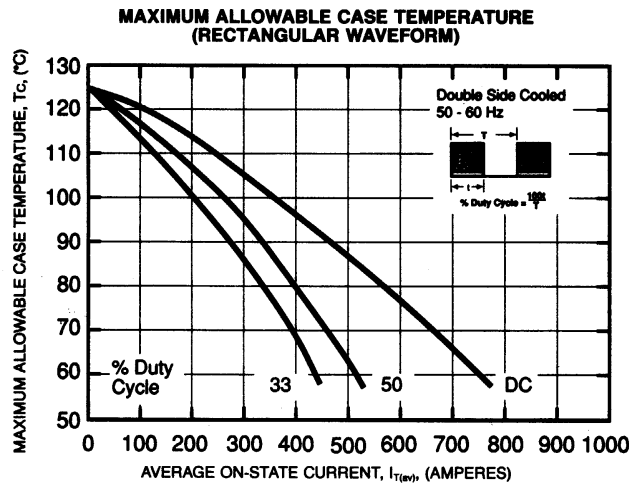
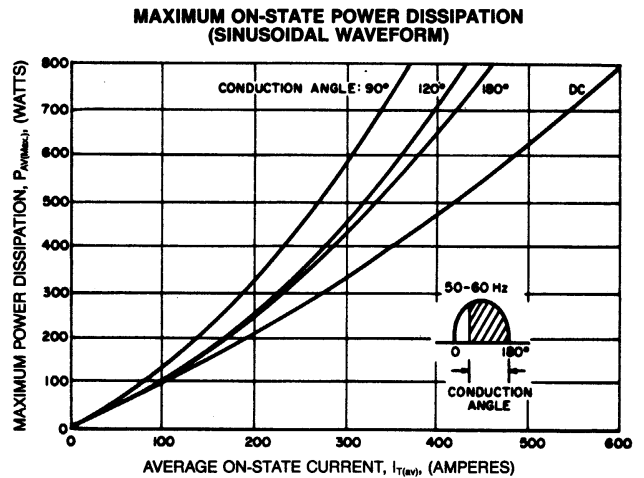
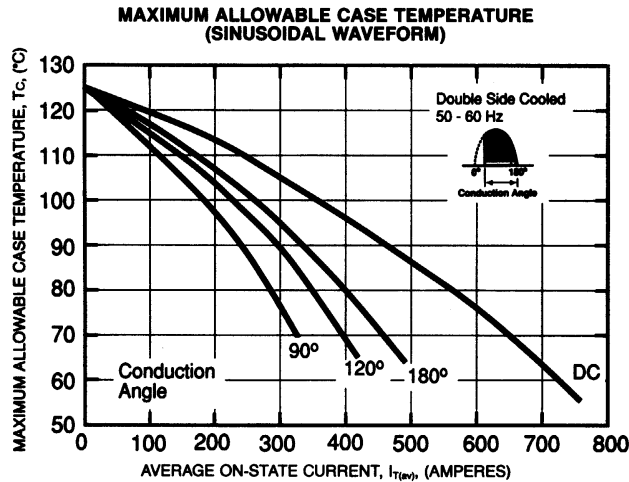
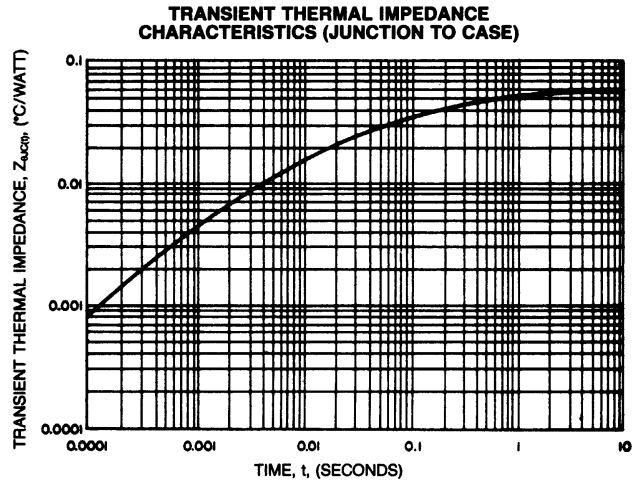
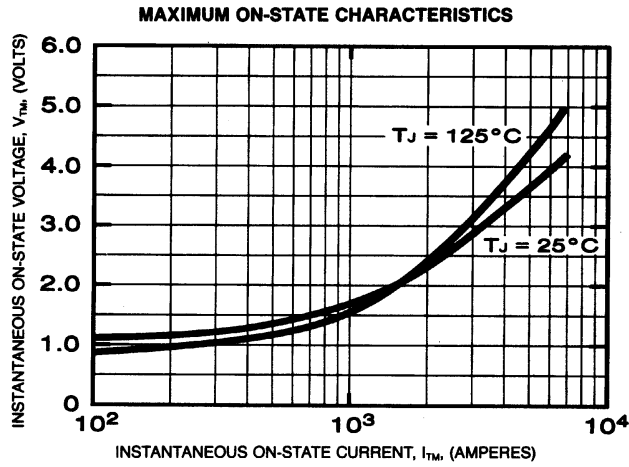
	Symbol	C391	Units
RMS On-State Current @ $T_C = 64^\circ\text{C}$	$I_{T(RMS)}$	770	Amperes
Average On-State Current @ $T_C = 64^\circ\text{C}$	$I_{T(av)}$	490	Amperes
Peak One-Cycle Surge (Non-Repetitive) On-State Current (60Hz)	$I_{TSM}$	8000	Amperes
Peak One-Cycle Surge (Non-Repetitive) On-State Current (50Hz)	$I_{TSM}$	7000	Amperes
Critical Rate-of-Rise of On-State Current (Non-Repetitive)	$di/dt$	150	Amperes/ $\mu\text{s}$
Critical Rate-of-Rise of On-State Current (Repetitive)	$di/dt$	75	Amperes/ $\mu\text{s}$
$I^2t$ (for Fusing), One Cycle at 60Hz	$I^2t$	265,000	$\text{A}^2\text{sec}$
Peak Gate Power Dissipation	$P_{GM}$	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		2000 to 2500	lb.
Mounting Force		8.9 to 11.1	kN

### Electrical and Thermal Characteristics

Characteristics	Symbol	Test Conditions	C391	Units
<b>Voltage—Blocking State Maximums</b>				
Forward Leakage, Peak	$I_{DRM}$	$T_J = 125^\circ\text{C}$ , Rated $V_{DRM}$	45	mA
Reverse Leakage, Peak	$I_{RRM}$	$T_J = 125^\circ\text{C}$ , Rated $V_{RRM}$	45	mA
<b>Current—Conducting State Maximums</b>				
Peak On-State Voltage	$V_{TM}$	$I_{TM} = 3000\text{A}$ Peak, Duty Cycle $\leq 0.01\%$ , $T_C = 25^\circ\text{C}$	2.65	Volts
<b>Switching</b>				
Typical Turn-Off Time	$t_q$	$T_J = 125^\circ\text{C}$ ; $I_{TM} = 500$ Amps; $V_R = 50$ Volts Min.; .8 $\times V_{DRM}$ (Reapplied); Rate-of-Rise of Reapplied Off-State Voltage = $20\text{V}/\mu\text{sec}$ (linear); Commutation $di/dt = 25$ Amps/ $\mu\text{sec}$ ; Repetition Rate = 1 pps; Gate Bias During Turn-Off Interval = 0 Volts, $100\Omega$	200	$\mu\text{sec}$
Typical Delay Time	$t_d$	$T_J = 25^\circ\text{C}$ , $I_{TM} = 50$ Adc, $V_{DRM}$ Rated. Gate Supply: 20 Volts, $20\Omega$ , $0.1 \mu\text{sec}$ Max. Rise Time	1	$\mu\text{sec}$
Min. Critical $dv/dt$ exponential to $V_{DRM}$	$dv/dt$	$0.8V_{DRM}$ Rated, $T_J = 125^\circ\text{C}$	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	$I_{GT}$	$V_D = 6\text{Vdc}$ , $T_C = 25^\circ\text{C}$ , $R_L = 3\Omega$	150	mA
Gate Voltage to Trigger	$V_{GT}$	$T_C = -40$ to $+125^\circ\text{C}$ , $V_D = 6\text{Vdc}$ , $R_L = 3\Omega$	5	Volts
Non-Triggering Gate Voltage	$V_{GDM}$	$V = \text{rated } V_{DRM}$ , $T_C = 125^\circ\text{C}$ , $R_L = 1000\Omega$	0.15	Volts
Peak Forward Gate Current	$I_{GTM}$		10	Amperes
Peak Reverse Gate Voltage	$V_{GRM}$		5	Volts

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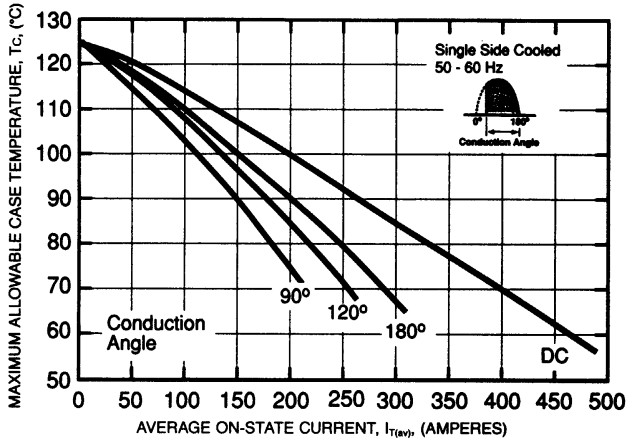
C391  
 Phase Control SCR  
 490 Amperes Average, 2400 Volts



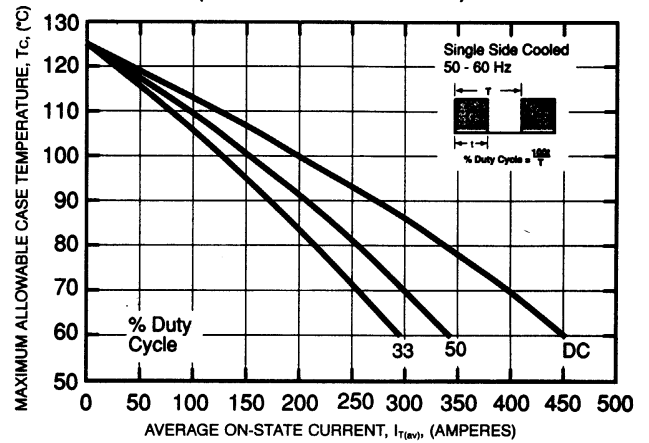
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**C391**  
**Phase Control SCR**  
 490 Amperes Average, 2400 Volts

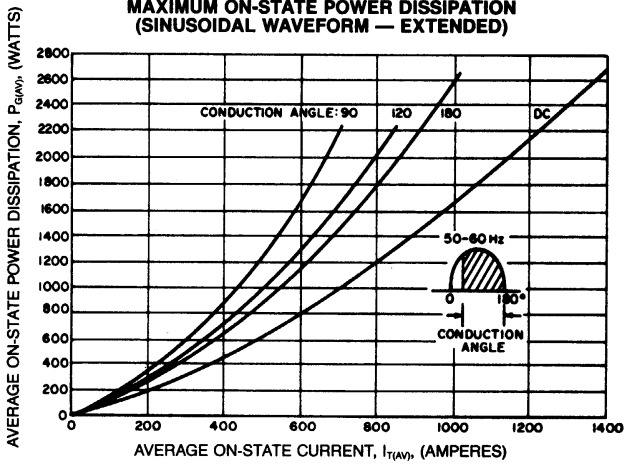
**MAXIMUM ALLOWABLE CASE TEMPERATURE (SINUSOIDAL WAVEFORM)**



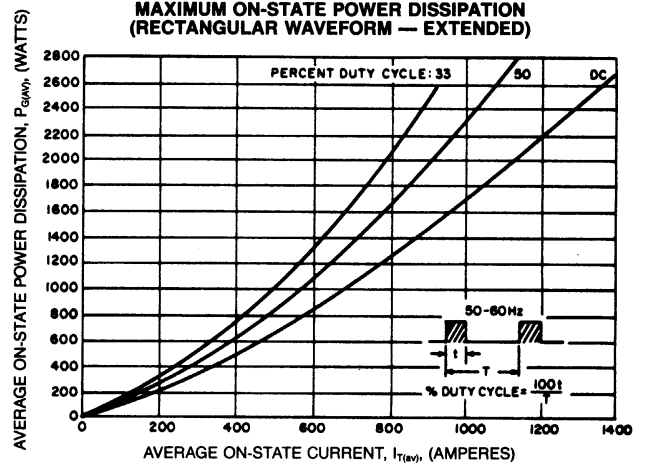
**MAXIMUM ALLOWABLE CASE TEMPERATURE (RECTANGULAR WAVEFORM)**



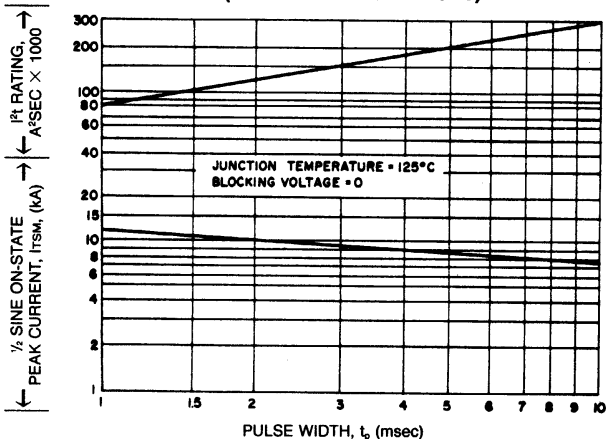
**MAXIMUM ON-STATE POWER DISSIPATION (SINUSOIDAL WAVEFORM — EXTENDED)**



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



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



**GATE CHARACTERISTICS**

