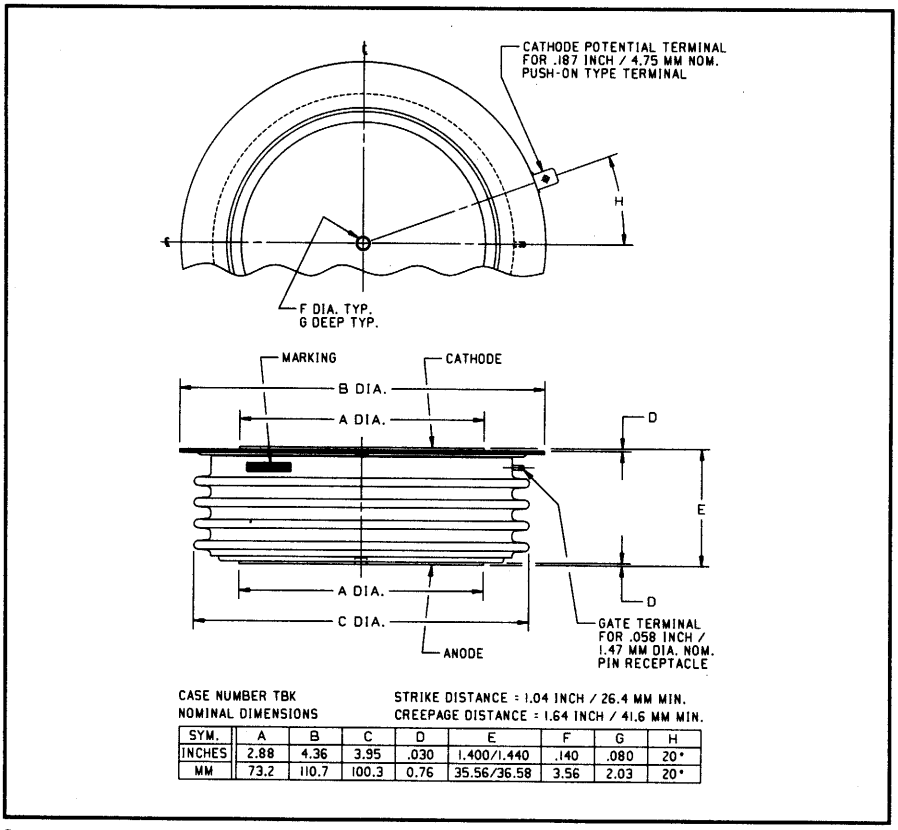
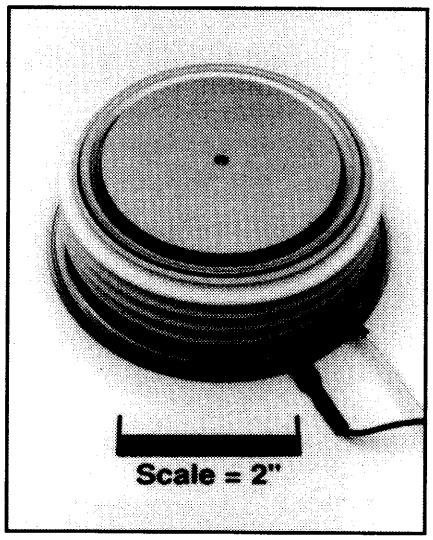
Powerex, Inc., 200 Hillis Street, Youngwood, Pennsylvania 15697-1800 (412) 925-7272
Powerex, Europe, S.A. 428 Avenue G. Durand, BP107, 72003 Le Mans, France (43) 41.14.14

Phase Control SCR
2500 Amperes Average
2100 Volts



SYM.	A	B	C	D	E	F	G	H
INCHES	2.88	4.36	3.95	.030	1.400/1.440	.140	.080	20°
MM	73.2	110.7	100.3	0.76	35.56/36.58	3.56	2.03	20°

C781 (Outline Drawing)



C781 Phase Control SCR
2500 Amperes Average, 2100 Volts

Description:
Powerex Silicon Controlled Rectifiers (SCR) are designed for phase control applications. These are all-diffused, Press-Pak, hermetic Pow-R-Disc devices employing the field proven amplifying gate.

Features:
- ☐ Low On-State Voltage
- ☐ High di/dt Capability
- ☐ High dv/dt Capability
- ☐ Hermetic Packaging
- ☐ Excellent Surge and I^2t Ratings

Applications:
- ☐ Power Supplies
- ☐ Motor Control

Ordering Information:
Select the complete five or six digit part number you desire from the table, i.e. C781LA is a 2100 Volt, 2500 Ampere Phase Control SCR.

Type	Voltage		Current
	V_{DRM} V_{RRM}	Code	$I_{T(av)}$
C781	1200	PB	2500
	1400	PD	
	1600	PM	
	1800	PN	
	2000	L	
	2100	LA	

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C781
Phase Control SCR
2500 Amperes Average, 2100 Volts

Absolute Maximum Ratings

Characteristics	Symbol	C781	Units
Non-repetitive Transient Peak Reverse Voltage	V_{RSM}	V_{RRM} + 100V	Volts
RMS On-state Current, T_C = 72°C	$I_{T(rms)}$	3925	Amperes
Average Current 180° Sine Wave, T_C = 72°C	$I_{T(av)}$	2500	Amperes
RMS On-state Current, T_C = 55°C	$I_{T(rms)}$	4820	Amperes
Average Current 180° Sine Wave, T_C = 55°C	$I_{T(av)}$	3070	Amperes
Peak One Cycle Surge On-state Current (Non-repetitive) 60Hz	I_{tsm}	45000	Amperes
Peak One Cycle Surge On-state Current (Non-repetitive) 50Hz	I_{tsm}	41500	Amperes
Critical Rate-of-rise of On-state Current (Non-repetitive)	di/dt	600	A/µsec
Critical Rate-of-rise of On-state Current (Repetitive)	di/dt	100	A/µsec
I^2t (for Fusing) for One Cycle, 60Hz	I^2t	8.5×10^6	A^2sec
Peak Gate Power Dissipation	P_{GM}	250	Watts
Average Gate Power Dissipation	$P_{G(av)}$	35	Watts
Operating Temperature	T_j	-40 to +125°C	°C
Storage Temperature	T_{stg}	-40 to +150°C	°C
Approximate Weight		3.5	lb.
		1.60	kg
Mounting Force		9000 to 10000	lb.
		40 to 44.5	kN

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C781
Phase Control SCR
2500 Amperes Average, 2100 Volts

Electrical Characteristics, T_j = 25°C Unless Otherwise Specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Repetitive Peak Reverse Leakage Current	I_{RRM}	T_j = 125°C, $V_R = V_{RRM}$			150	mA
Repetitive Peak Forward Leakage Current	I_{DRM}	T_j = 125°C, $V_D = V_{DRM}$			150	mA
Peak On-state Voltage	V_{TM}	T_j = 125°C, I_T = 2000A Peak Duty Cycle < 0.1%			1.20	Volts
Threshold Voltage, Low-level	$V_{(TO)1}$	T_j = 125°C, I = 15%, $I_{T(av)}$ to $\pi I_{T(av)}$			0.94963	Volts
Slope Resistance, Low-level	r_{T1}				0.1234	mΩ
Threshold Voltage, High-level	$V_{(TO)2}$	T_j = 125°C, I = $\pi I_{T(av)}$ to I_{TSM}			1.1007	Volts
Slope Resistance, High-level	r_{T2}				0.1149	mΩ
V_{TM} Coefficients, Low-level		T_j = 125°C, I = 15% $I_{T(av)}$ to $\pi I_{T(av)}$			A_1 = -0.007132 B_1 = 0.18721 C_1 = 1.589E-04 D_1 = -0.011393	
V_{TM} Coefficients, High-level		T_j = 125°C, I = $\pi I_{T(av)}$ to I_{TSM}			A_2 = 30.510 B_2 = -4.6029 C_2 = -2.083E-04 D_2 = 0.1610	
Typical Delay Time	t_d	T_j = 125°C, V_D = 1500V		3		µsec
Typical Turn-off Time	t_q	T_j = 125°C, I_T = 2000A, tp > 3msec,di_R/dt = 5A/µsec, V Reapplied = 1000V, dv/dt = 1000V/µsec, V_R = 100V		250		µsec
Minimum Critical dv/dt - Exponential to V_{DRM}	dv/dt	T_j = 125°C, V_D = 0.8 V_{DRM}	500			V/µsec
Gate Trigger Current	I_{GT}	T_j = 25°C, V_D = 12V_{DC}			250	mA
Gate Trigger Voltage	V_{GT}	T_j = 25°C, V_D = 12V_{DC}			4.2	Volts
Non-Triggering Gate Voltage	V_{GDM}	T_j = 125°C, V_D = 1000V			0.5	Volts
Peak Forward Gate Current	I_{GTM}				20	A
Peak Reverse Gate Voltage	V_{GRM}				20	Volts

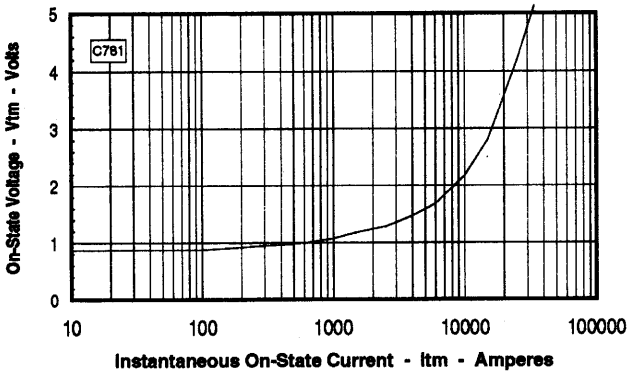
Thermal Characteristics

Maximum Thermal Resistance, Double Sided Cooling						
Junction-to-Case	$R_{\theta(j-c)}$				0.012	°C/W
Case-to-Sink	$R_{\theta(c-s)}$				0.002	°C/W

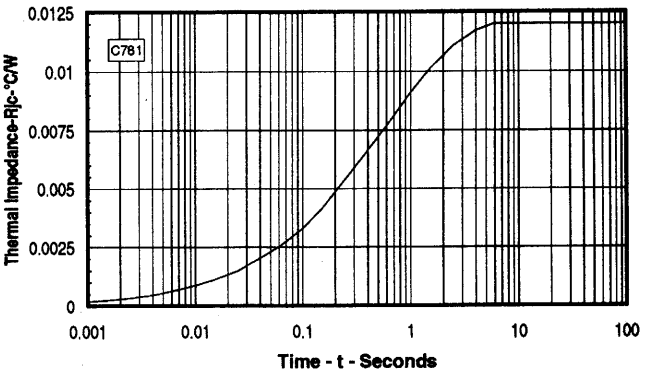
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C781
Phase Control SCR
1500 Amperes Average, 2400 Volts

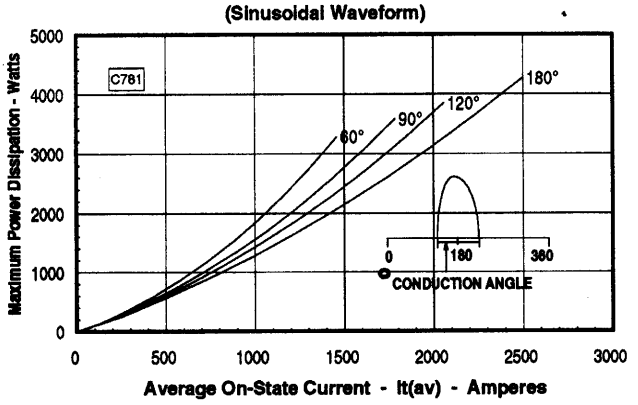
Maximum On-State Forward Voltage Drop
(Tj = 125 °C)



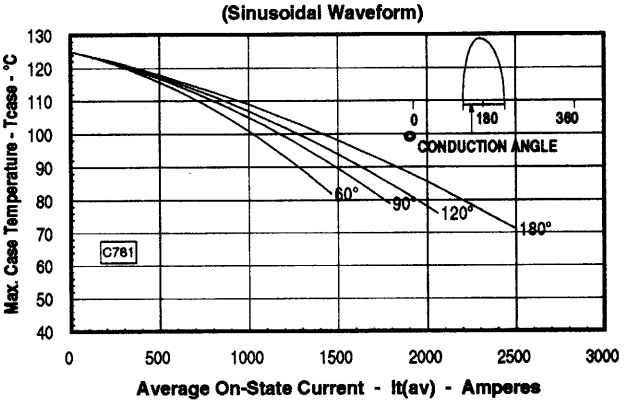
Maximum Transient Thermal Impedance
(Junction to Case)



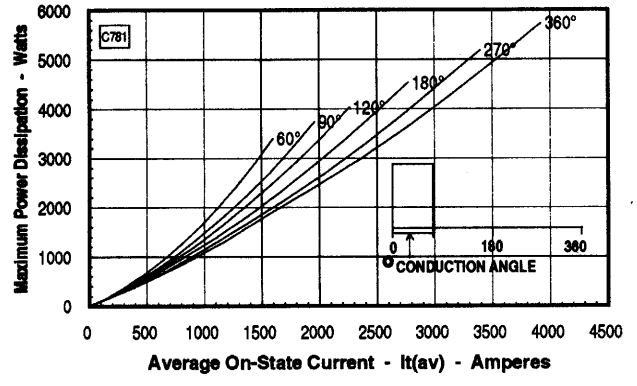
Maximum On-State Power Dissipation
(Sinusoidal Waveform)



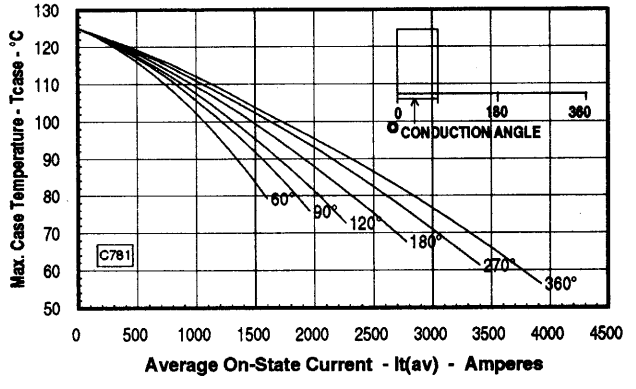
Maximum Allowable Case Temperature
(Sinusoidal Waveform)



Maximum On-State Power Dissipation
(Rectangular Waveform)



Maximum Allowable Case Temperature
(Rectangular Waveform)



Note: Spreading losses included. Curves are for an inductive load.