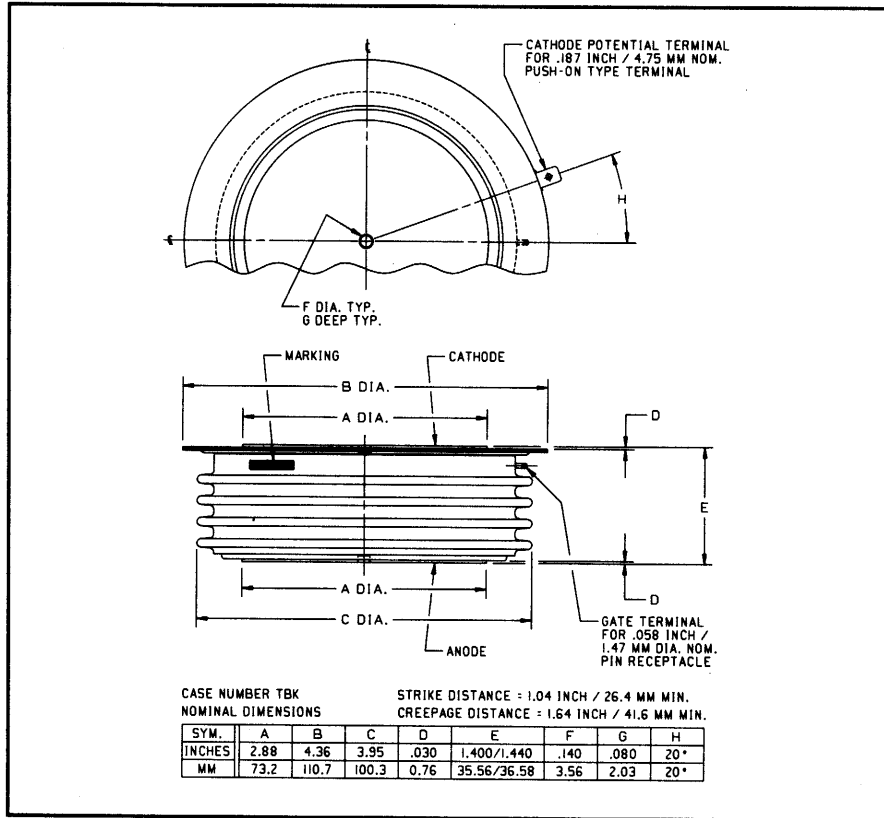
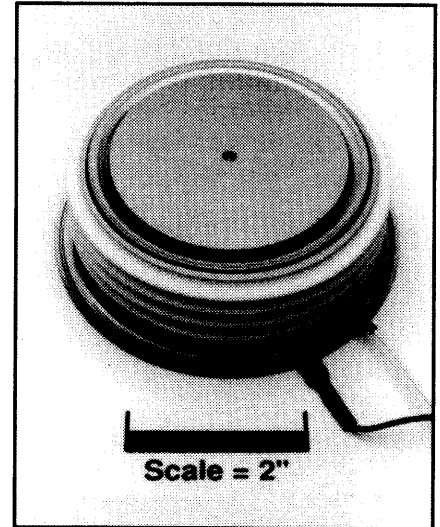


Powerex, Inc., 200 Hillis Street, Youngwood, Pennsylvania 15697-1800 (412) 925-7272
Powerex, Europe, S.A. 428 Avenue G. Durand, BP107, 72003 Le Mans, France (43) 41.14.14

Phase Control SCR 2500 Amperes Average 2100 Volts



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, $T_C = 72^\circ C$	$I_{T(rms)}$	3925	Amperes
Average Current 180° Sine Wave, $T_C = 72^\circ C$	$I_{T(av)}$	2500	Amperes
RMS On-state Current, $T_C = 55^\circ C$	$I_{T(rms)}$	4820	Amperes
Average Current 180° Sine Wave, $T_C = 55^\circ C$	$I_{T(av)}$	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/ μ sec
Critical Rate-of-rise of On-state Current (Repetitive)	di/dt	100	A/ μ sec
I^2t (for Fusing) for One Cycle, 60Hz	I^2t	8.5×10^6	A ² sec
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

C781
Phase Control SCR
2500 Amperes Average, 2100 Volts

Electrical Characteristics, $T_j = 25^\circ\text{C}$ Unless Otherwise Specified

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

Thermal Characteristics

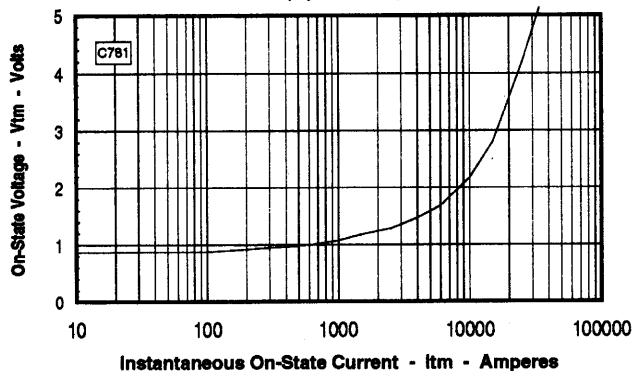
Maximum Thermal Resistance, Double Sided Cooling

Junction-to-Case	$R_{\theta(j-c)}$	0.012	$^\circ\text{C}/\text{W}$
Case-to-Sink	$R_{\theta(c-s)}$	0.002	$^\circ\text{C}/\text{W}$

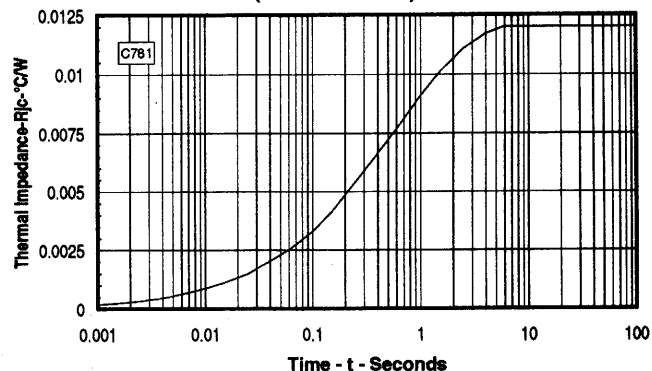
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C781
Phase Control SCR
1500 Amperes Average, 2400 Volts

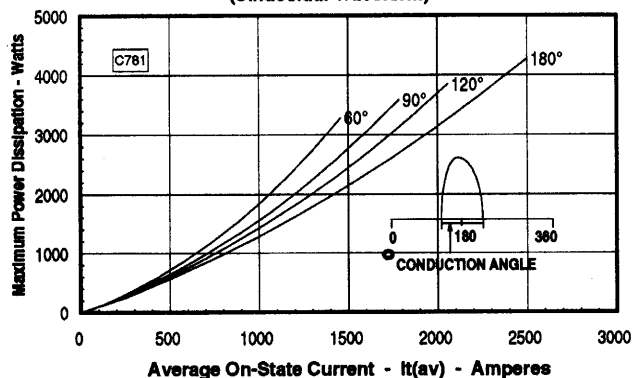
Maximum On-State Forward Voltage Drop
($T_J = 125^\circ\text{C}$)



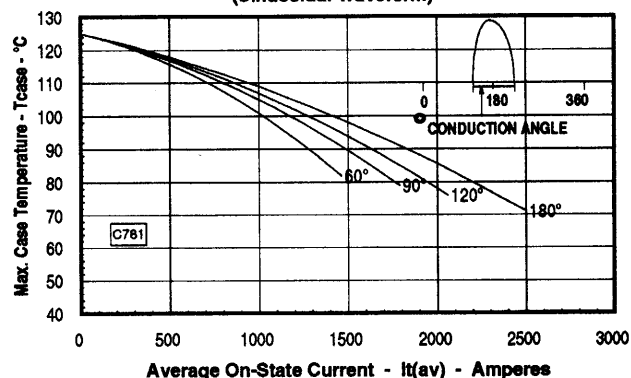
Maximum Transient Thermal Impedance
(Junction to Case)



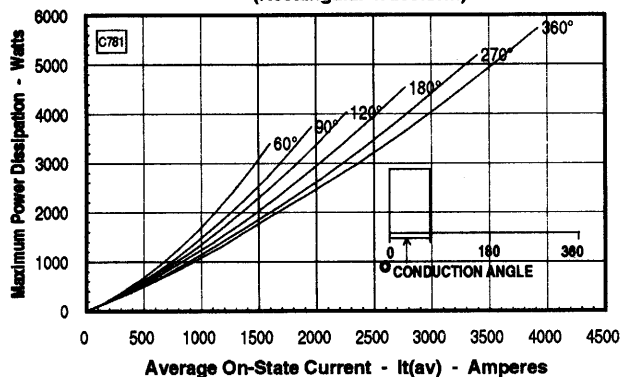
Maximum On-State Power Dissipation
(Sinusoidal Waveform)



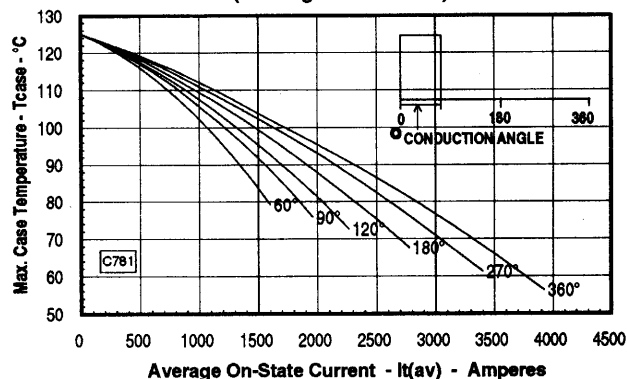
Maximum Allowable Case Temperature
(Sinusoidal Waveform)



Maximum On-State Power Dissipation
(Rectangular Waveform)



Maximum Allowable Case Temperature
(Rectangular Waveform)



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