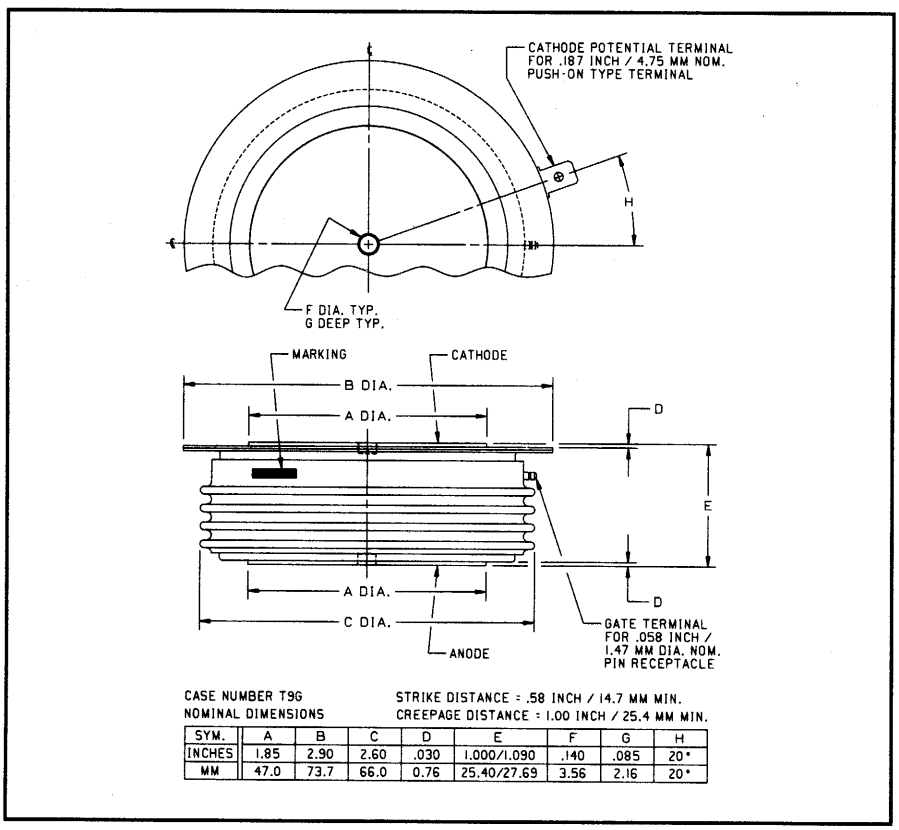
Powerex, Inc., 200 Hillis Street, Youngwood, Pennsylvania 15697-1800 (412) 925-7272
Powerex, Europe, S.A. 428 Avenue G. Durand, BP107, 72003 Le Mans, France (43) 41.14.14

Phase Control SCR
1500 Amperes Average
2400 Volts



CASE NUMBER T9G
NOMINAL DIMENSIONS

STRIKE DISTANCE = .58 INCH / 14.7 MM MIN.
CREEPAGE DISTANCE = 1.00 INCH / 25.4 MM MIN.

SYM.	A	B	C	D	E	F	G	H
INCHES	1.85	2.90	2.60	.030	1.000/1.090	.140	.085	20°
MM	47.0	73.7	66.0	0.76	25.40/27.69	3.56	2.16	20°

C451 (Outline Drawing)



C451 Phase Control SCR
1500 Amperes Average, 2400 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
- ☐ VAR Generators

Ordering Information:
Select the complete five or six digit part number you desire from the table, i.e. C451LD is a 2400 Volt, 1500 Ampere Phase Control SCR.

Type	Voltage		Current
	V_{DRM} V_{RRM}	Code	$I_{T(av)}$
C451	1400	PD	1500
	1600	PM	
	1800	PN	
	2000	L	
	2200	LB	
	2400	LD	

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C451
Phase Control SCR
1500 Amperes Average, 2400 Volts

Absolute Maximum Ratings

Characteristics	Symbol	C451	Units
Non-repetitive Transient Peak Reverse Voltage	V_{RSM}	V_{RRM} + 100V	Volts
RMS On-state Current, T_C = 64°C	$I_{T(rms)}$	2350	Amperes
Average Current 180° Sine Wave, T_C = 64°C	$I_{T(av)}$	1500	Amperes
RMS On-state Current, T_C = 55°C	$I_{T(rms)}$	2590	Amperes
Average Current 180° Sine Wave, T_C = 55°C	$I_{T(av)}$	1650	Amperes
Peak One Cycle Surge On-state Current (Non-repetitive) 60Hz	I_{tsm}	23000	Amperes
Peak One Cycle Surge On-state Current (Non-repetitive) 50Hz	I_{tsm}	20800	Amperes
Critical Rate-of-rise of On-state Current (Non-repetitive)	di/dt	400	A/µsec
Critical Rate-of-rise of On-state Current (Repetitive)	di/dt	75	A/µsec
I^2t (for Fusing) for One Cycle, 60Hz	I^2t	2.2×10^6	A^2sec
Peak Gate Power Dissipation	P_{GM}	200	Watts
Average Gate Power Dissipation	$P_{G(av)}$	5	Watts
Operating Temperature	T_j	-40 to +125°C	°C
Storage Temperature	T_{stg}	-40 to +150°C	°C
Approximate Weight		1	lb.
		454	g
Mounting Force		5500 to 6000	lb.
		2450 to 2670	kg.

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C451
Phase Control SCR
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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, $V_R = V_{RRM}$			45	mA
Repetitive Peak Forward Leakage Current	I_{DRM}	T_j = 125°C, $V_D = V_{DRM}$			45	mA
Peak On-state Voltage	V_{TM}	I_{TM} = 3000A Peak Duty Cycle < 0.1%			1.7	Volts
Threshold Voltage, Low-level	$V_{(TO)1}$	T_j = 125°C, I = 15%, $I_{T(av)}$ to $\pi I_{T(av)}$			0.87956	Volts
Slope Resistance, Low-level	r_{T1}				0.2271	mΩ
Threshold Voltage, High-level	$V_{(TO)2}$	T_j = 125°C, I = $\pi I_{T(av)}$ to I_{TSM}			0.59931	Volts
Slope Resistance, High-level	r_{T2}				0.2781	mΩ
V_{TM} Coefficients, Low-level		T_j = 125°C, I = 15% $I_{T(av)}$ to $\pi I_{T(av)}$			A_1 = 0.83982 B_1 = 4.972E-04 C_1 = 2.032E-04 D_1 = 0.002154	
V_{TM} Coefficients, High-level		T_j = 125°C, I = $\pi I_{T(av)}$ to I_{TSM}			A_2 = 12.127 B_2 = -1.8090 C_2 = 1.429E-04 D_2 = 0.064436	
Typical Delay Time	t_d	I_T = 50A, Gate = 20V, 20Ω, 0.1µsec Rise		0.7		µsec
Typical Turn-off Time	t_q	T_j = 125°C, I_T = 2000A, di_R/dt = 25A/µsec Reapplied dv/dt = 200V/µsec Linear to 80% V_{DRM}, V_R = 50V, Gate = 0V, R_{GK} = 100Ω		150		µsec
Minimum Critical dv/dt - Exponential to V_{DRM}	dv/dt	T_j = 125°C	400			V/µsec
Gate Trigger Current	I_{GT}	T_j = 25°C, V_D = 20V_{DC}, R_L = 3Ω			200	mA
Gate Trigger Voltage	V_{GT}	T_j = -40°C to +125°C, V_D = 20V, R_L = 3Ω			5.0	Volts
Non-Triggering Gate Voltage	V_{GDM}	T_j = 125°C, $V_D = V_{DRM}$, R_L = 1000Ω			0.15	Volts
Peak Forward Gate Current	I_{GTM}				10	A
Peak Reverse Gate Voltage	V_{GRM}				5	Volts

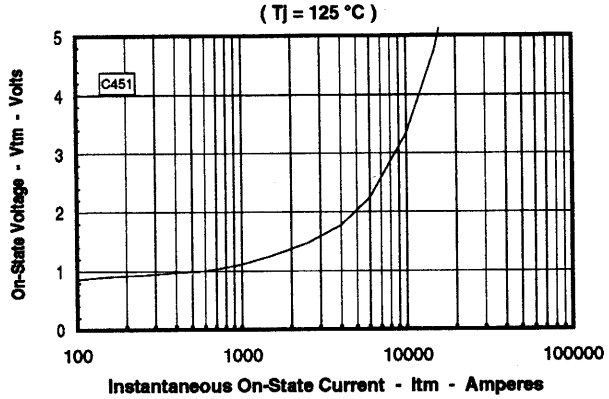
Thermal Characteristics

Maximum Thermal Resistance, Double Sided Cooling						
Junction-to-Case	$R_{\theta(j-c)}$				0.025	°C/W
Case-to-Sink	$R_{\theta(c-s)}$				0.0075	°C/W

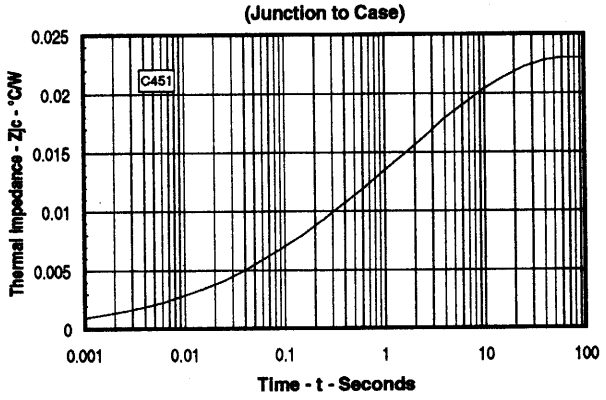
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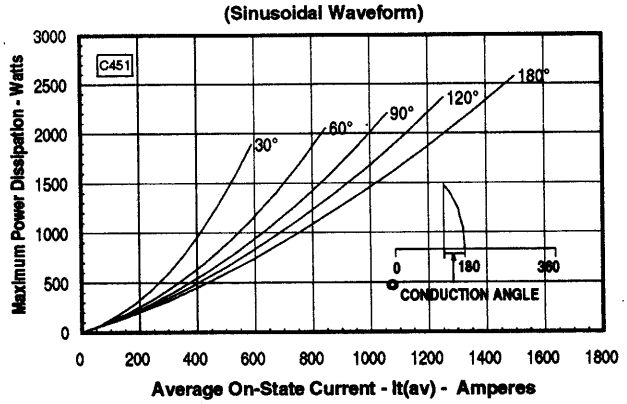
Maximum On-State Forward Voltage Drop
(Tj = 125 °C)



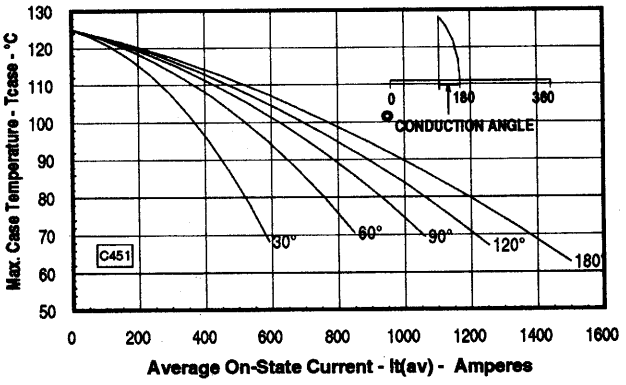
Maximum Transient Thermal Impedance
(Junction to Case)



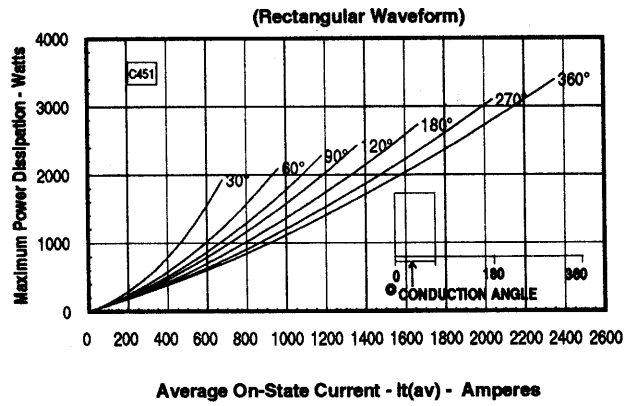
Maximum On-State Power Dissipation
(Sinusoidal Waveform)



Maximum Allowable Case Temperature
(Sinusoidal Waveform)



Maximum On-State Power Dissipation
(Rectangular Waveform)



Maximum Allowable Case Temperature
(Rectangular Waveform)

