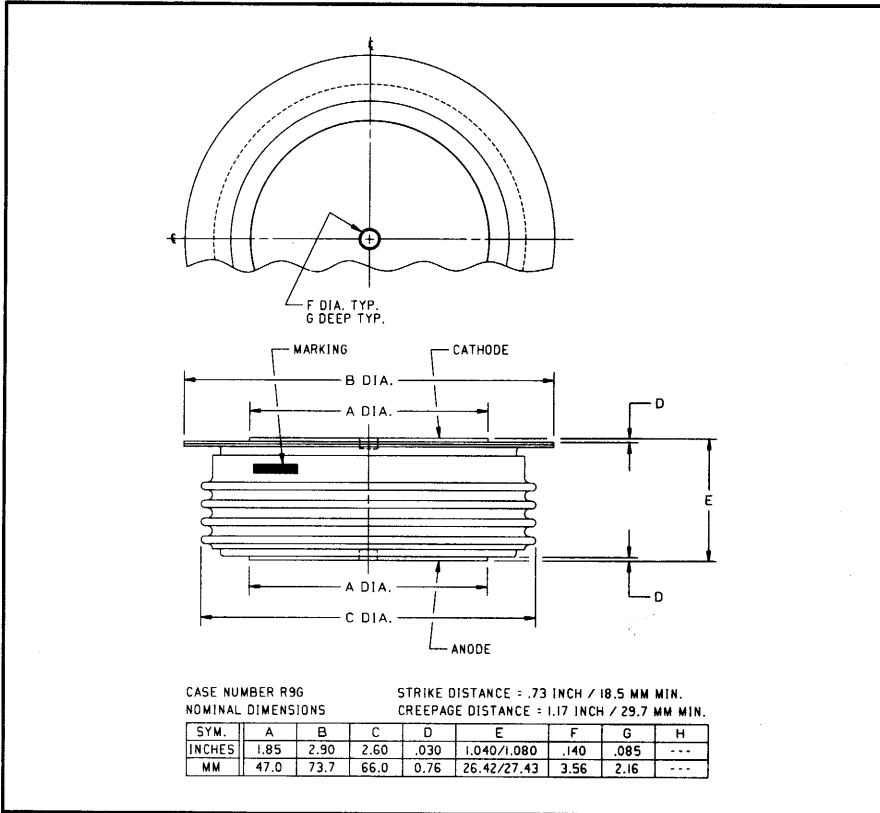
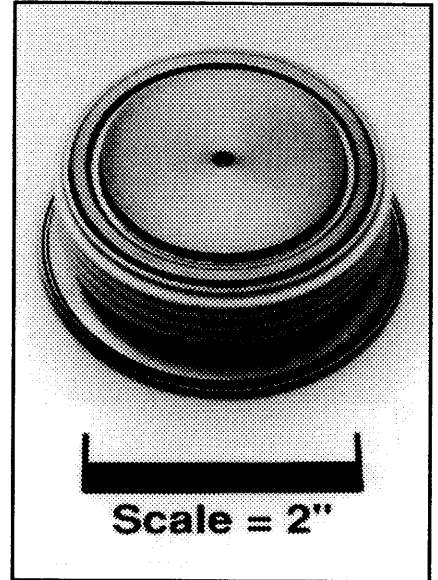


Powerex, Inc., 200 Hillis Street, Youngwood, Pennsylvania 15697-1800 (412) 925-7272  
 Powerex, Europe, S.A. 428 Avenue G. Durand, BP107, 72003 Le Mans, France (43) 41.14.14

**General Purpose Rectifier**  
 2500 Amperes Average  
 2200 Volts



A451 (Outline Drawing)



A451 General Purpose Rectifier  
 2500 Amperes Average, 2200 Volts

### Description:

Powerex General Purpose Rectifiers are designed for high blocking voltage capability with low forward voltage to minimize conduction losses. These hermetic Pow-R-Disc devices can be mounted using commercially available clamps and heatsinks.

### Features:

- Low Forward Voltage
- Low Thermal Impedance
- Hermetic Packaging
- Excellent Surge and  $I^2t$  Ratings

### Applications:

- Power Supplies
- Motor Control
- Free Wheeling Diodes
- Battery Chargers
- Resistance Welding

### Ordering Information:

Select the complete five or six digit part number you desire from the table, i.e. A451LB is a 2200 Volt, 2500 Ampere General Purpose Rectifier.

Type	Voltage		Current $I_T(av)$
	$V_{RRM}$	Code	
A451	1400	PD	2500
	1600	PM	
	1800	PN	
	2000	L	
	2200	LB	



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A451  
General Purpose Rectifier  
2500 Amperes Average, 2200 Volts

### Absolute Maximum Ratings

Characteristics	Symbol	A451	Units
Non-repetitive Transient Peak Reverse Voltage	$V_{RSM}$	$V_{RRM} + 100V$	Volts
RMS Forward Current, $T_C = 88^\circ C$	$I_F(rms)$	3925	Amperes
Average Current 180° Sine Wave, $T_C = 88^\circ C$	$I_F(av)$	2500	Amperes
RMS Forward Current, $T_C = 55^\circ C$	$I_F(rms)$	4830	Amperes
Average Current 180° Sine Wave, $T_C = 55^\circ C$	$I_F(av)$	3075	Amperes
Peak One Cycle Surge Forward Current (Non-repetitive) 60Hz	$I_{fsm}$	30000	Amperes
Peak One Cycle Surge Forward Current (Non-repetitive) 50Hz	$I_{fsm}$	27300	Amperes
$I^2t$ (for Fusing) for One Cycle, 60Hz	$I^2t$	1,892,250	$A^2sec$
Operating Temperature	$T_j$	-40 to +175°C	°C
Storage Temperature	$T_{stg}$	-40 to +200°C	°C
Approximate Weight		1	lb.
		454	g
Mounting Force		5000 to 5500	lb.
		22.2 to 24.5	kN



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A451  
 General Purpose Rectifier  
 2500 Amperes Average, 2200 Volts

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Repetitive Reverse Leakage Current	$I_{RRM}$	$T_j = 175^\circ\text{C}$ , $V_R = V_{RRM}$			50	mA
Forward Voltage Drop	$V_{FM}$	$T_j = 25^\circ$ , $I_{FM} = 5000\text{A Peak}$ Duty Cycle < 0.1%			1.4	Volts
Threshold Voltage, Low-level	$V_{(TO)1}$	$T_j = 175^\circ\text{C}$ , $I = 15\%$ , $I_{T(av)}$ to $\pi I_{T(av)}$			0.66127	Volts
Slope Resistance, Low-level	$r_{T1}$				0.1281	m $\Omega$
Threshold Voltage, High-level	$V_{(TO)2}$	$T_j = 175^\circ\text{C}$ , $I = \pi I_{T(av)}$ to $I_{TSM}$			0.90714	Volts
Slope Resistance, High-level	$r_{T2}$				0.08478	m $\Omega$
$V_{TM}$ Coefficients, Low-level		$T_j = 175^\circ\text{C}$ , $I = 15\% I_{T(av)}$ to $\pi I_{T(av)}$				
					$A_1 = 0.42150$	
					$B_1 = 0.01339$	
					$C_1 = 4.598\text{E-}05$	
					$D_1 = 0.007539$	
$V_{TM}$ Coefficients, High-level		$T_j = 175^\circ\text{C}$ , $I = \pi I_{T(av)}$ to $I_{TSM}$				
					$A_2 = -1.3173$	
					$B_2 = 0.30858$	
					$C_2 = 8.988\text{E-}05$	
					$D_2 = -0.006564$	
Maximum Reverse Recovery Charge	$Q_{rr}$	$T_j = 175^\circ\text{C}$ , $I_{FM} = 1000\text{A}$ , $di_F/dt = 25\text{A}/\mu\text{sec}$ , $t_p = 1000\mu\text{sec}$			4000	$\mu\text{C}$

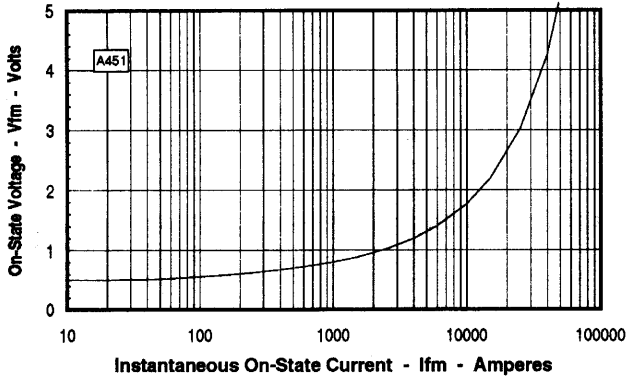
**Thermal Characteristics**

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

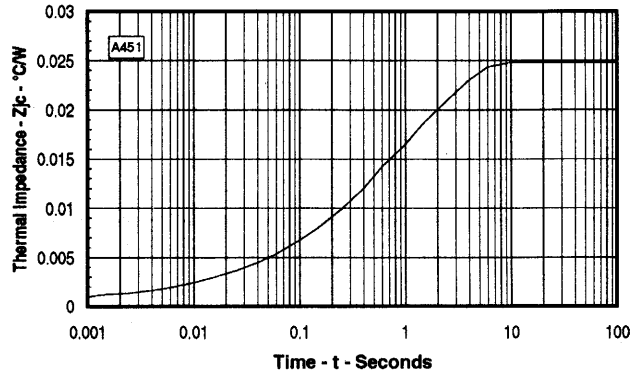
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**A451**  
**General Purpose Rectifier**  
 2500 Amperes Average, 2200 Volts

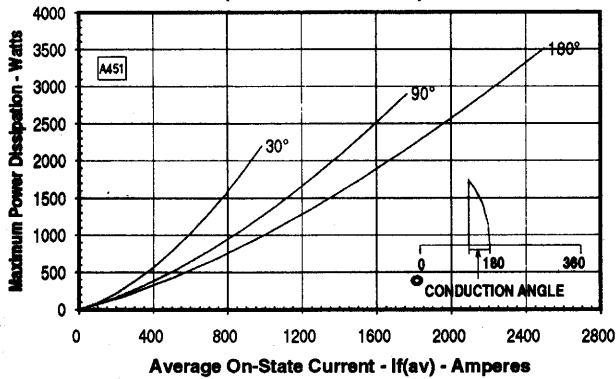
**Maximum On-State Forward Voltage Drop**  
 ( $T_J = 175^\circ\text{C}$ )



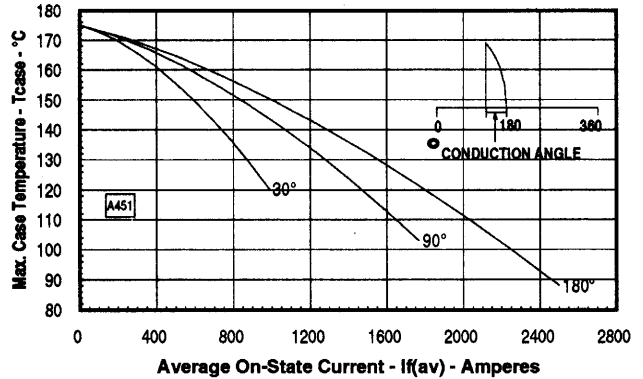
**Maximum Transient Thermal Impedance**  
 (Junction to Case)



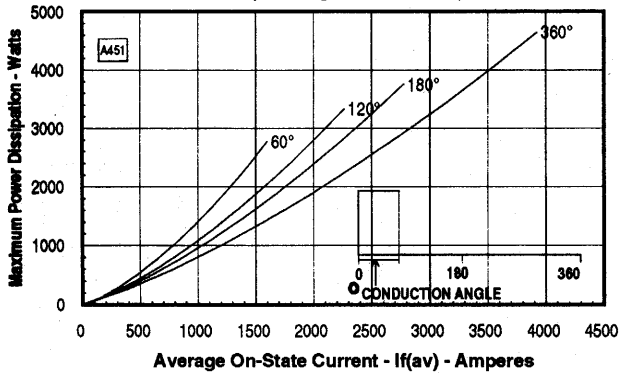
**Maximum On-State Power Dissipation**  
 (Sinusoidal Waveform)



**Maximum Allowable Case Temperature**  
 (Sinusoidal Waveform)



**Maximum On-State Power Dissipation**  
 (Rectangular Waveform)



**Maximum Allowable Case Temperature**  
 (Rectangular Waveform)

