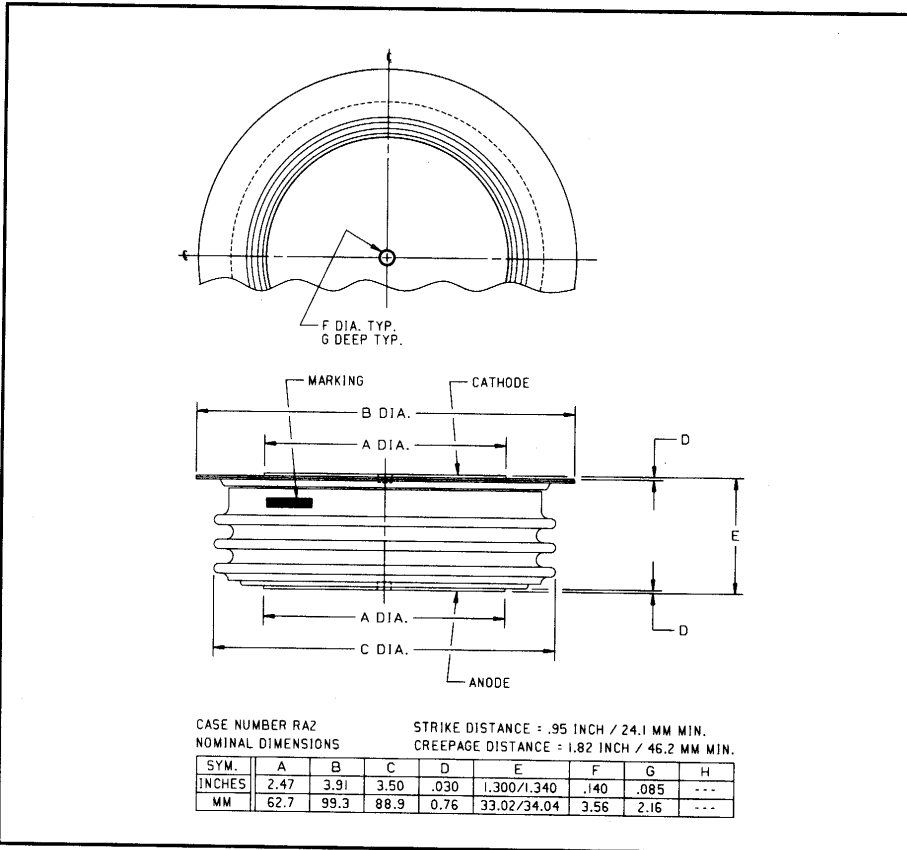


Powerex, Inc., 200 Hillis Street, Youngwood, Pennsylvania 15697-1800 (412) 925-7272  
 Powerex, Europe, S.A. 428 Avenue G. Durand, BP107, 72003 Le Mans, France (43) 41.14.14

**General Purpose  
Rectifier**  
 2000 Amperes Average  
 5400 Volts



RA20 2000A (Outline Drawing)



RA20 2000A General Purpose Rectifier  
 2000 Amperes Average, 5400 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 Diode
- Battery Chargers
- Resistance Welding

### Ordering Information:

Select the complete 8 digit part number you desire from the table below.

Type	Voltage	Current	Typical Recovery Time
	$V_{RRM}$ (Volts)	$I_{T(av)}$ (A)	$t_{rr}$ ( $\mu$ sec)
RA20	10 through 54	20	XX
	1000V through 5400V	2000A	25 $\mu$ sec



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**RA20 2000A**  
**General Purpose Rectifier**  
 2000 Amperes Average, 5400 Volts

### Absolute Maximum Ratings

Characteristics	Symbol	RA20 2000A	Units
Non-repetitive Transient Peak Reverse Voltage	$V_{RSM}$	$V_{RRM} + 200V$	Volts
RMS Forward Current, $T_C = 99^\circ C$	$I_{F(rms)}$	3140	Amperes
Average Current 180° Sine Wave, $T_C = 99^\circ C$	$I_{F(av)}$	2000	Amperes
RMS Forward Current, $T_C = 55^\circ C$	$I_{F(rms)}$	4710	Amperes
Average Current 180° Sine Wave, $T_C = 55^\circ C$	$I_{F(av)}$	3000	Amperes
Peak One Cycle Surge Forward Current (Non-repetitive) 60Hz	$I_{fsm}$	24000	Amperes
Peak One Cycle Surge Forward Current (Non-repetitive) 50Hz	$I_{fsm}$	21800	Amperes
3 Cycle Surge Current	$I_{fsm}$	19000	Amperes
10 Cycle Surge Current	$I_{fsm}$	15000	Amperes
$I^2t$ (for Fusing) for One Cycle, 60Hz	$I^2t$	$2.40 \times 10^6$	$A^2sec$
Maximum $I^2t$ of Package ( $t = 8.3$ msec)	$I^2t$	$125 \times 10^6$	$A^2sec$
Operating Temperature	$T_j$	-40 to +150°C	°C
Storage Temperature	$T_{stg}$	-40 to +200°C	°C
Approximate Weight		2.1	lb.
		950	g
Mounting Force		9000 to 11000	lb.
		4100 to 5000	kg.



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**RA20 2000A**  
**General Purpose Rectifier**  
 2000 Amperes Average, 5400 Volts

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Peak Reverse Leakage Current	$I_{RRM}$	$T_j = 125^\circ\text{C}, V_R = V_{RRM}$			200	mA
Forward Voltage Drop	$V_{FM}$	$I_{FM} = 3000\text{A}, \text{Duty Cycle} < 0.1\%$			1.45	Volts
Threshold Voltage, Low-level	$V_{(TO)1}$	$T_j = 150^\circ\text{C}, I = 15\%, I_{T(av)}$ to $\pi I_{T(av)}$			0.96347	Volts
Slope Resistance, Low-level	$r_{T1}$				0.20721	m $\Omega$
Threshold Voltage, High-level	$V_{(TO)2}$	$T_j = 150^\circ\text{C}, I = \pi I_{T(av)}$ to $I_{TSM}$			1.76654	Volts
Slope Resistance, High-level	$r_{T2}$				0.12481	m $\Omega$
$V_{TM}$ Coefficients, Low-level		$T_j = 150^\circ\text{C}, I = 15\% I_{T(av)}$ to $\pi I_{T(av)}$				
					$A_1 = 0.87099$	
					$B_1 = 0.01029$	
					$C_1 = 1.852\text{E-}04$	
					$D_1 = 1.589\text{E-}03$	
$V_{TM}$ Coefficients, High-level		$T_j = 150^\circ\text{C}, I = \pi I_{T(av)}$ to $I_{TSM}$				
					$A_2 = 10.9312$	
					$B_2 = -1.82561$	
					$C_2 = -1.435\text{E-}04$	
					$D_2 = 0.10336$	
Typical Reverse Recovery Time	$t_{rr}$	$T_C = 25^\circ\text{C}, I_{FM} = 1500\text{A},$ $di_F/dt = 25\text{A}/\mu\text{sec}, t_p = 190\mu\text{sec}$		25		$\mu\text{sec}$

**Thermal Characteristics**

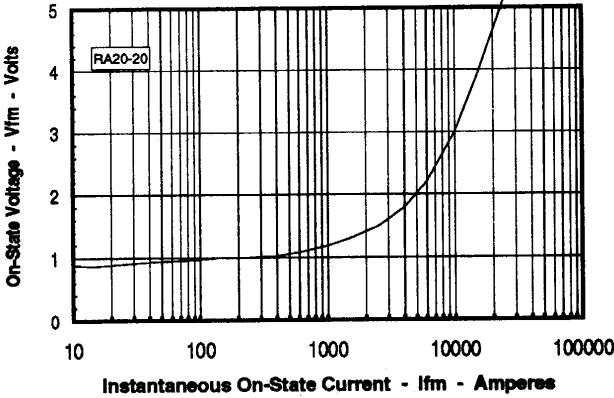
Maximum Thermal Resistance, Double Sided Cooling						
Junction-to-Case	$R_{\theta(j-c)}$				0.013	$^\circ\text{C}/\text{W}$
Case-to-Sink	$R_{\theta(c-s)}$				0.007	$^\circ\text{C}/\text{W}$



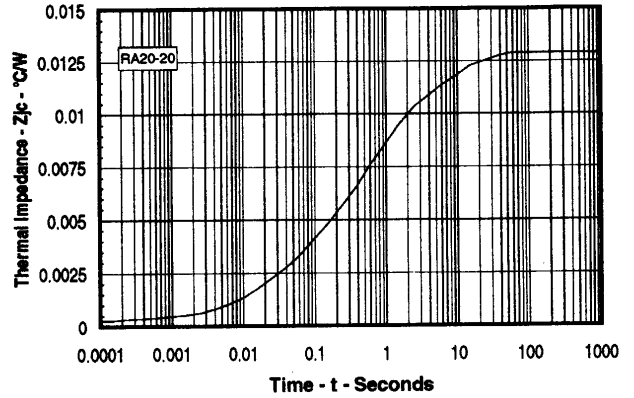
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**RA20 2000A**  
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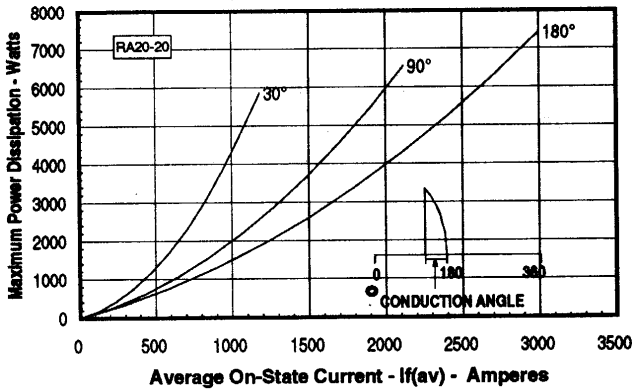
**Maximum On-State Forward Voltage Drop**  
 ( $T_j = 150^\circ\text{C}$ )



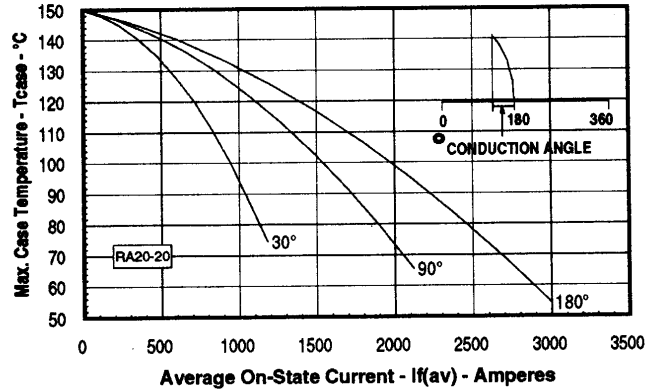
**Maximum Transient Thermal Impedance**  
 (Junction to Case)



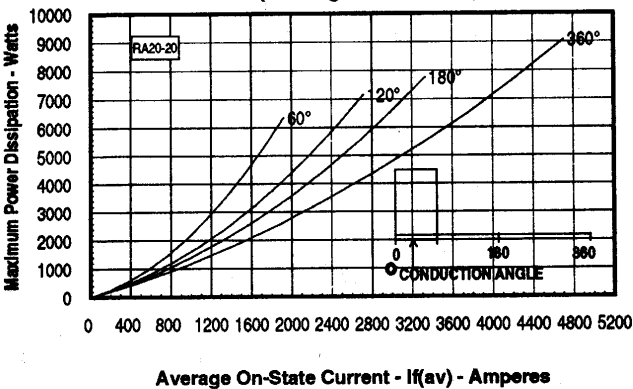
**Maximum On-State Power Dissipation**  
 (Sinusoidal Waveform)



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



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



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

