

**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. The 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 ten digit module part number from the table below.  
Example: RA201820XX is a 1800V 2000 A General Purpose Rectifier

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



**RA20  
2000A**

Powerex, Inc., 173 Pavilion Lane, Youngwood, Pennsylvania 15697 (724) 925-7272  
www.pwr.com

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

### Absolute Maximum Ratings

Characteristics	Symbol		Units
Non-Repetitive Transient Peak Reverse Blocking 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) 60 Hz	$I_{FSM}$	24000	Amperes
Peak One Cycle Surge Forward Current (Non-Repetitive) 50 Hz	$I_{FSM}$	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, 60 Hz	$I^2t$	$2.40 \times 10^6$	$A^2 \text{ sec}$
Maximum $I^2t$ of Package ( $t = 8.3 \text{ msec}$ )	$I^2t$	$125 \times 10^6$	$A^2 \text{ sec}$
Operating Temperature	$T_J$	-40 to +150	$^\circ C$
Storage Temperature	$T_{stg}$	-40 to +200	$^\circ C$
Approximate Weight		2.1	lb.
		950	G
Mounting Force		9000 to 11000	lb.
		4100 to 5000	kg.

Information presented is based upon manufacturers testing and projected capabilities.  
This information is subject to change without notice.  
The manufacturer makes no claim as to the suitability of use, reliability, capability,  
or future availability of this product.

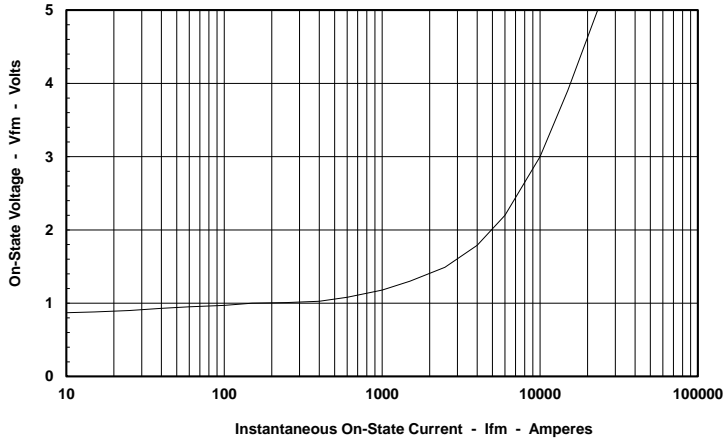
**Electrical Characteristics, T<sub>J</sub>=25°C unless otherwise specified**

Characteristics	Symbol	Test Conditions	Min.	Max.	Units
Repetitive Peak Reverse Leakage Current	I <sub>R</sub> RM	T <sub>J</sub> =150°C, V <sub>R</sub> = V <sub>R</sub> RM		150	mA
Peak On-State Voltage	V <sub>FM</sub>	I <sub>FM</sub> =3000A, Duty Cycle < 0.1 %		1.45	V
Threshold Voltage, Low-level	V <sub>(TO)1</sub>	T <sub>J</sub> = 150°C, I = 15%I <sub>F(AV)</sub> to πI <sub>F(AV)</sub>		0.96347	V
Slope Resistance, Low-level	r <sub>T1</sub>			0.20721	mΩ
Threshold Voltage, High-level	V <sub>(TO)2</sub>	T <sub>J</sub> = 150°C, I = πI <sub>F(AV)</sub> to I <sub>FSM</sub>		1.76654	V
Slope Resistance, High-level	r <sub>T2</sub>			0.12481	mΩ
V <sub>TM</sub> Coefficients, Low-level		T <sub>J</sub> = 150°C, I = 15%I <sub>F(AV)</sub> to πI <sub>F(AV)</sub>	A <sub>1</sub> = B <sub>1</sub> =	0.87099 0.01029	
		V <sub>FM</sub> = A + B Ln I + C I + D Sqrt I	C <sub>1</sub> = D <sub>1</sub> =	1.852E-04 1.589E-03	
V <sub>TM</sub> Coefficients, High-level		T <sub>J</sub> = 150°C, I = πI <sub>F(AV)</sub> to I <sub>FSM</sub>	A <sub>2</sub> = B <sub>2</sub> =	10.9312 -1.82561	
		V <sub>FM</sub> = A + B Ln I + C I + D Sqrt I	C <sub>2</sub> = D <sub>2</sub> =	-1.435E-04 0.10336	
Diode Reverse Recovery Time (Typical)	t <sub>rr</sub>	T <sub>C</sub> = 25°C, I <sub>FM</sub> = 1500A, di <sub>R</sub> /dt = -25A/μs, T <sub>p</sub> = 190 μs		25 (Typical)	μs

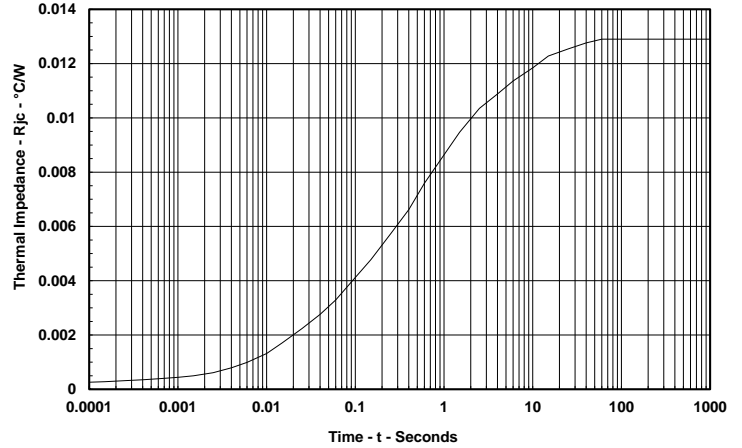
**Thermal Characteristics**

Characteristics	Symbol	Max.	Units
Maximum Thermal Resistance, Double Sided Cooling			
Junction-to-Case	R <sub>Θ(J-C)</sub>	0.013	°C/W
Case-to-Sink	R <sub>Θ(C-S)</sub>	0.007	°C/W

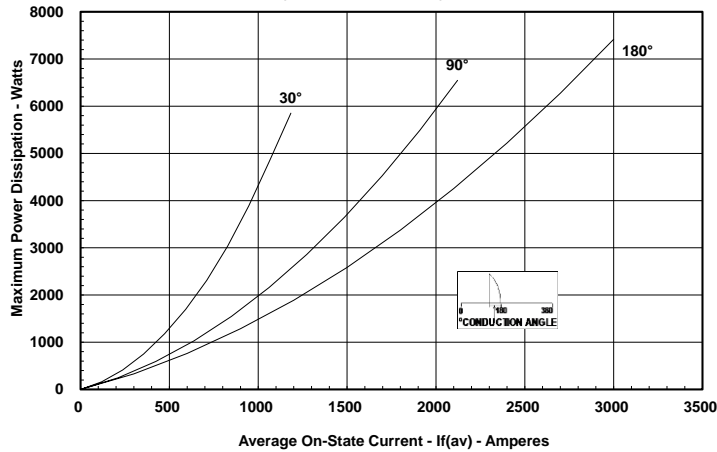
**Maximum On-State Forward Voltage Drop**  
( $T_j = 150^\circ\text{C}$ )



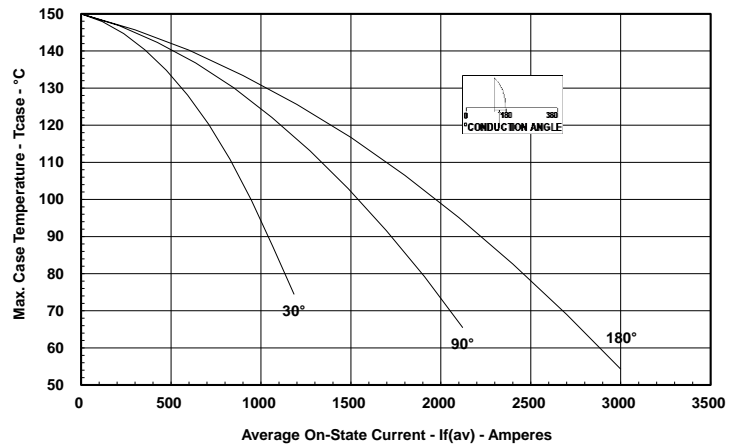
**Maximum Transient Thermal Impedance**  
(Junction to Case)



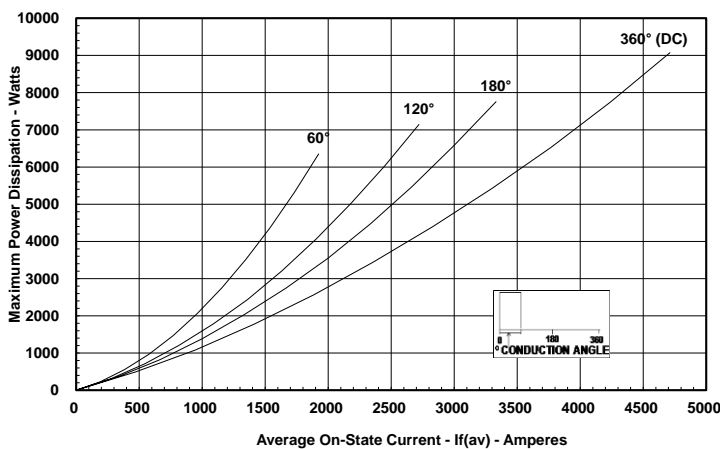
**Maximum On-State Power Dissipation**  
(Sinusoidal Waveform)



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



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



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

