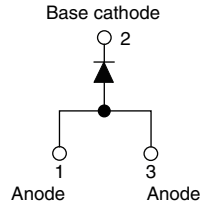




### Input Rectifier Diode, 20 A



D<sup>2</sup>PAK



#### DESCRIPTION/FEATURES

The 20ETS...SPbF rectifier High Voltage Series has been optimized for very low forward voltage drop, with moderate leakage. The glass passivation technology used has reliable operation up to 150 °C junction temperature.



RoHS\* COMPLIANT

Typical applications are in input rectification and these products are designed to be used with Vishay HPP switches and output rectifiers which are available in identical package outlines.

This product has been designed and qualified for industrial level and lead (Pb)-free.

PRODUCT SUMMARY	
V <sub>F</sub> at 10 A	1 V
I <sub>FSM</sub>	300 A
V <sub>RRM</sub>	800/1200 V

OUTPUT CURRENT IN TYPICAL APPLICATIONS			
APPLICATIONS	SINGLE-PHASE BRIDGE	THREE-PHASE BRIDGE	UNITS
Capacitive input filter T <sub>A</sub> = 55 °C, T <sub>J</sub> = 125 °C common heatsink of 1 °C/W	16.3	21	A

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
I <sub>F(AV)</sub>	Sinusoidal waveform	20	A
V <sub>RRM</sub>		800/1200	V
I <sub>FSM</sub>		300	A
V <sub>F</sub>	20 A, T <sub>J</sub> = 25 °C	1.1	V
T <sub>J</sub>		- 40 to 150	°C

VOLTAGE RATINGS			
PART NUMBER	V <sub>RRM</sub> , MAXIMUM PEAK REVERSE VOLTAGE V	V <sub>RSM</sub> , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	I <sub>RRM</sub> AT 150 °C mA
20ETS08SPbF	800	900	1
20ETS12SPbF	1200	1300	

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	I <sub>F(AV)</sub>	T <sub>C</sub> = 105 °C, 180° conduction half sine wave	20	A
Maximum peak one cycle non-repetitive surge current	I <sub>FSM</sub>	10 ms sine pulse, rated V <sub>RRM</sub> applied	250	
		10 ms sine pulse, no voltage reapplied	300	
Maximum I <sup>2</sup> t for fusing	I <sup>2</sup> t	10 ms sine pulse, rated V <sub>RRM</sub> applied	316	A <sup>2</sup> s
		10 ms sine pulse, no voltage reapplied	442	
Maximum I <sup>2</sup> √t for fusing	I <sup>2</sup> √t	t = 0.1 to 10 ms, no voltage reapplied	4420	A <sup>2</sup> √s

\* Pb containing terminations are not RoHS compliant, exemptions may apply

# 20ETS...SPbF High Voltage Series



Vishay High Power Products Input Rectifier Diode, 20 A

ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	$V_{FM}$	20 A, $T_J = 25\text{ }^\circ\text{C}$		1.1	V
Forward slope resistance	$r_t$	$T_J = 150\text{ }^\circ\text{C}$		10.4	$\text{m}\Omega$
Threshold voltage	$V_{F(TO)}$			0.85	V
Maximum reverse leakage current	$I_{RM}$	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_{RRM}$	0.1	mA
		$T_J = 150\text{ }^\circ\text{C}$		1.0	

THERMAL - MECHANICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum junction and storage temperature range	$T_J, T_{Stg}$			- 40 to 150	$^\circ\text{C}$
Maximum thermal resistance, junction to case	$R_{thJC}$	DC operation		1.3	$^\circ\text{C}/\text{W}$
Maximum thermal resistance, junction to ambient	$R_{thJA}^{(1)}$	For D <sup>2</sup> PAK version		62	
Typical thermal resistance, case to heatsink	$R_{thCS}$	Mounting surface, smooth and greased		0.5	
Approximate weight				2	g
				0.07	oz.
Mounting torque	minimum			6.0 (5.0)	kgf · cm (lbf · in)
	maximum			12 (10)	
Marking device		Case style D <sup>2</sup> PAK (SMD-220)		20ETS08S	
				20ETS12S	

**Note**

<sup>(1)</sup> When mounted on 1" square (650 mm<sup>2</sup>) PCB of FR-4 or G-10 material 4 oz. (140  $\mu\text{m}$ ) copper 40  $^\circ\text{C}/\text{W}$   
For recommended footprint and soldering techniques refer to application note #AN-994



# 20ETS...SPbF High Voltage Series

Input Rectifier Diode, 20 A Vishay High Power Products

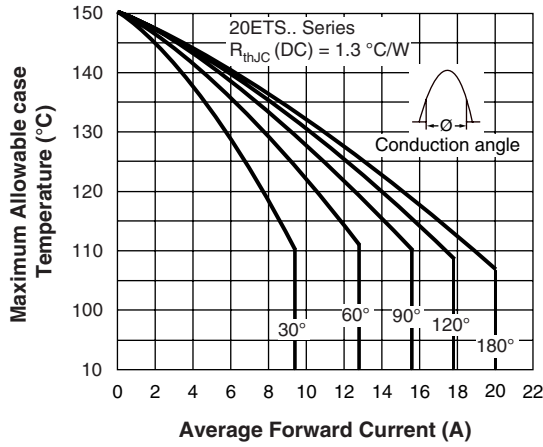


Fig. 1 - Current Rating Characteristics

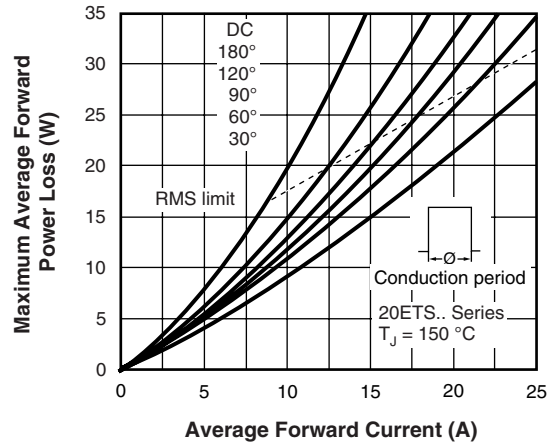


Fig. 4 - Forward Power Loss Characteristics

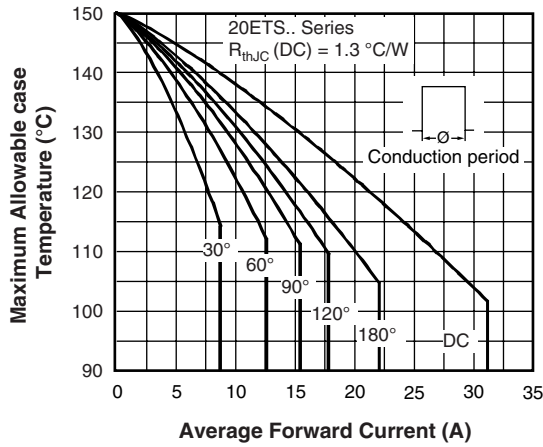


Fig. 2 - Current Rating Characteristics

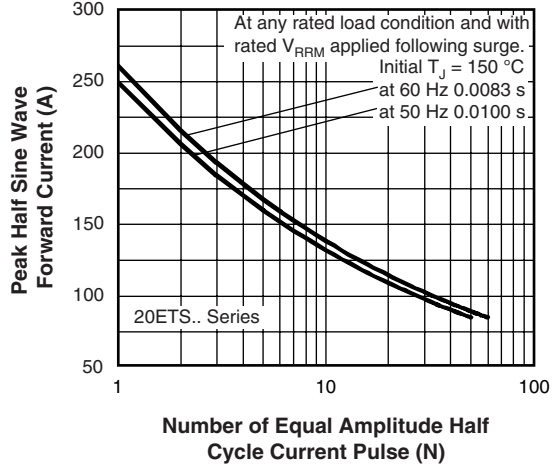


Fig. 5 - Maximum Non-Repetitive Surge Current

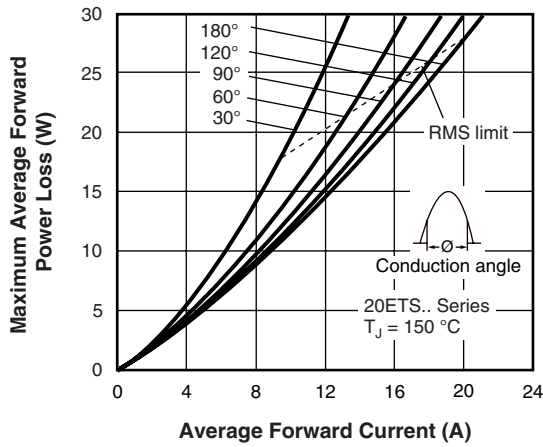


Fig. 3 - Forward Power Loss Characteristics

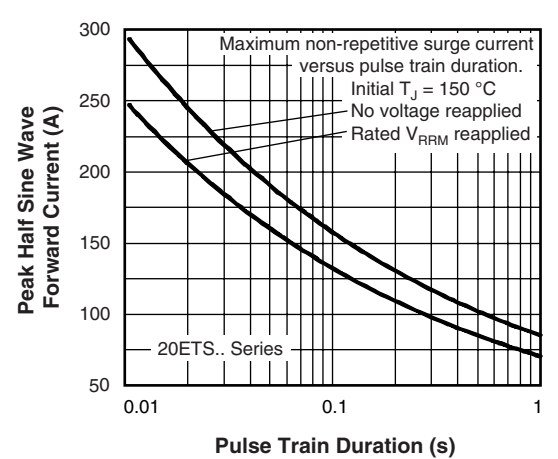


Fig. 6 - Maximum Non-Repetitive Surge Current

# 20ETS...SPbF High Voltage Series

Vishay High Power Products Input Rectifier Diode, 20 A

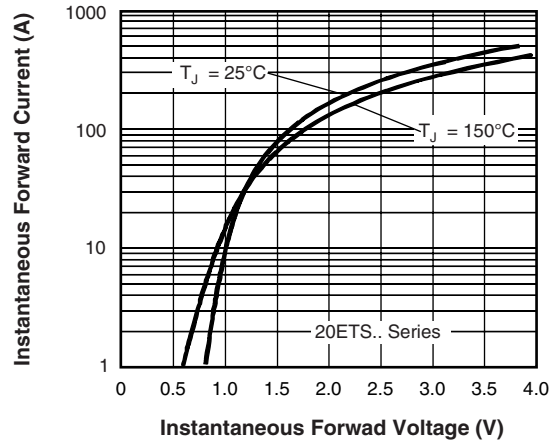


Fig. 7 - Forward Voltage Drop Characteristics

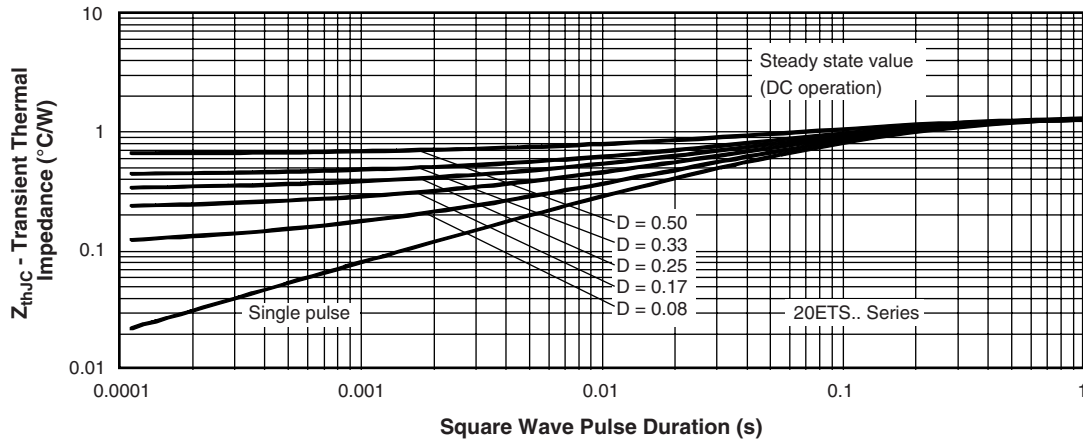


Fig. 8 - Thermal Impedance  $Z_{thJC}$  Characteristics



# 20ETS...SPbF High Voltage Series

Input Rectifier Diode, 20 A Vishay High Power Products

## ORDERING INFORMATION TABLE

Device code	20	E	T	S	12	S	TRL	PbF
	①	②	③	④	⑤	⑥	⑦	⑧
	<b>1</b>	-	Current rating (20 = 20 A)					
	<b>2</b>	-	Circuit configuration					
			E = Single diode					
	<b>3</b>	-	Package:					
			T = TO-220AC					
	<b>4</b>	-	Type of silicon:					
			S = Standard recovery rectifier					
	<b>5</b>	-	Voltage code x 100 = $V_{RRM}$					
								08 = 800 V 12 = 1200 V
	<b>6</b>	-	S = TO-220 D <sup>2</sup> PAK (SMD-220) version					
	<b>7</b>	-	• None = Tube					
			• TRL = Tape and reel (left oriented)					
			• TRR = Tape and reel (right oriented)					
	<b>8</b>	-	• None = Standard production					
			• PbF = Lead (Pb)-free					

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95046">http://www.vishay.com/doc?95046</a>
Part marking information	<a href="http://www.vishay.com/doc?95054">http://www.vishay.com/doc?95054</a>
Packaging information	<a href="http://www.vishay.com/doc?95032">http://www.vishay.com/doc?95032</a>



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