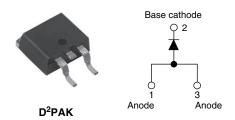


Vishay Semiconductors

## Input Rectifier Diode, 20 A



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

#### **FEATURES**

- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Compliant to RoHS directive 2002/95/EC
- Halogen-free according to IEC 61249-2-21 definition
- Designed and qualified for industrial level





ROHS COMPLIANT HALOGEN FREE

### **APPLICATIONS**

- Input rectification
- Vishay Semiconductors switches and output rectifiers which are available in identical package outlines

### **DESCRIPTION**

The VS-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.

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	А					

MAJOR RATINGS AND CHARACTERISTICS									
SYMBOL	CHARACTERISTICS	VALUES	UNITS  A  V  A						
I <sub>F(AV)</sub>	Sinusoidal waveform	20	Α						
V <sub>RRM</sub>		800/1200	V						
I <sub>FSM</sub>		300	Α						
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					
VS-20ETS08SPbF	800	900	1					
VS-20ETS12SPbF	1200	1300	ı					

ABSOLUTE MAXIMUM RATINGS								
PARAMETER	PARAMETER SYMBOL TEST CONDITIONS							
Maximum average forward current	I <sub>F(AV)</sub>	T <sub>C</sub> = 105 °C, 180° conduction half sine wave	20					
Maximum peak one cycle	1	10 ms sine pulse, rated V <sub>RRM</sub> applied 250						
non-repetitive surge current	I <sub>FSM</sub>	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						
Maximum i-t for fusing	1-1	10 ms sine pulse, no voltage reapplied	442	A <sup>2</sup> s				
Maximum I <sup>2</sup> √t for fusing	I <sup>2</sup> √t	t = 0.1 ms to 10 ms, no voltage reapplied	4420	A²√s				

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ELECTRICAL SPECIFICATIONS								
PARAMETER	SYMBOL	TEST (	VALUES	UNITS				
Maximum forward voltage drop	$V_{FM}$	20 A, T <sub>J</sub> = 25 °C		1.1	V			
Forward slope resistance	r <sub>t</sub>	T <sub>.1</sub> = 150 °C	10.4	mΩ				
Threshold voltage	V <sub>F(TO)</sub>	1 1 = 150 C		0.85	V			
Maximum reverse leakage current	I <sub>RM</sub>	T <sub>J</sub> = 25 °C	V <sub>R</sub> = Rated V <sub>RRM</sub>	0.1	mA			
Maximum reverse leakage current		T <sub>J</sub> = 150 °C	v <sub>R</sub> = nateu v <sub>RRM</sub>	1.0				

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

### Note

 $<sup>^{(1)}</sup>$  When mounted on 1" square (650 mm²) PCB of FR-4 or G-10 material 4 oz. (140 µm) copper 40 °C/W For recommended footprint and soldering techniques refer to application note #AN-994



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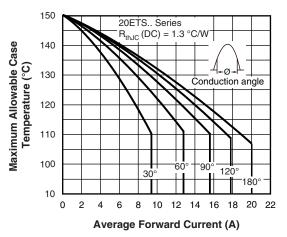


Fig. 1 - Current Rating Characteristics

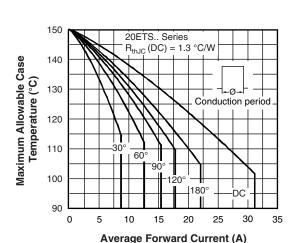


Fig. 2 - Current Rating Characteristics

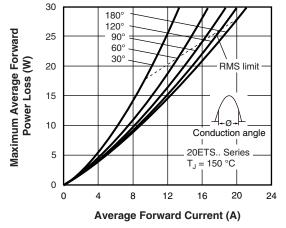


Fig. 3 - Forward Power Loss Characteristics

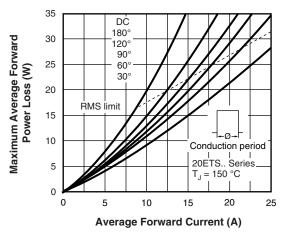
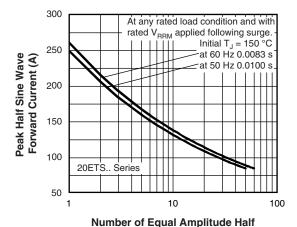


Fig. 4 - Forward Power Loss Characteristics



Cycle Current Pulse (N)
Fig. 5 - Maximum Non-Repetitive Surge Current

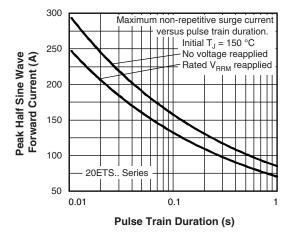


Fig. 6 - Maximum Non-Repetitive Surge Current

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Input Rectifier Diode, 20 A



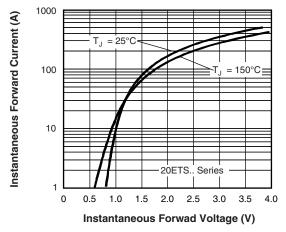


Fig. 7 - Forward Voltage Drop Characteristics

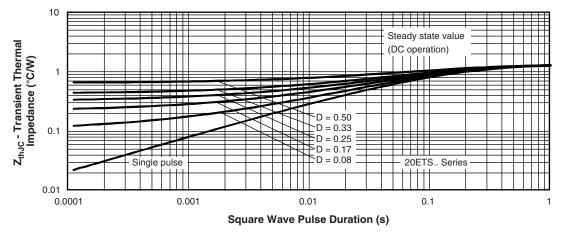


Fig. 8 - Thermal Impedance  $Z_{\text{thJC}}$  Characteristics

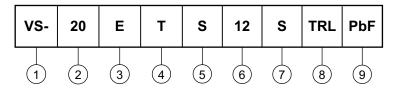


Input Rectifier Diode, 20 A

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### **ORDERING INFORMATION TABLE**

Device code



1 - HPP product suffix

2 - Current rating (20 = 20 A)

Circuit configuration

E = Single diode

4 - Package:

T = TO-220AC

5 - Type of silicon:

S = Standard recovery rectifier

7 - S = TO-220 D<sup>2</sup>PAK (SMD-220) version

8 - • None = Tube

• TRL = Tape and reel (left oriented)

• TRR = Tape and reel (right oriented)

9 - PbF = Lead (Pb)-free

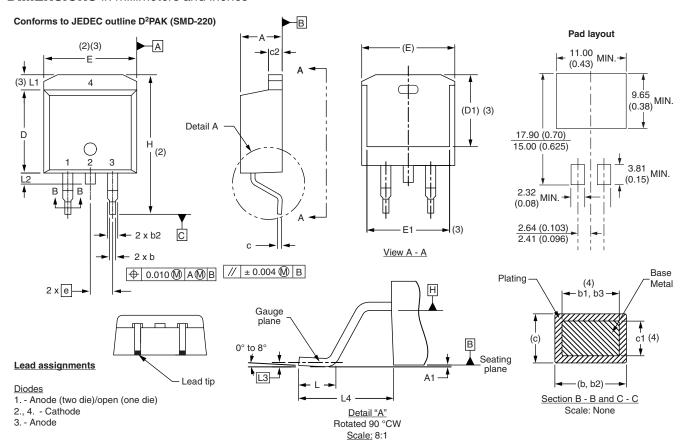
LINKS TO RELATED DOCUMENTS						
Dimensions	www.vishay.com/doc?95046					
Part marking information	www.vishay.com/doc?95054					
Packaging information	www.vishay.com/doc?95032					
SPICE model	www.vishay.com/doc?95409					



## Vishay Semiconductors

### D<sup>2</sup>PAK

### **DIMENSIONS** in millimeters and inches



SYMBOL	MILLIMETERS		INCHES		NOTES	NOTES	SYMBOL	MILLIM	ETERS	INC	HES
STWBOL	MIN.	MAX.	MIN.	MAX.	NOTES		STINIBUL	MIN.	MAX.	MIN.	MAX.
Α	4.06	4.83	0.160	0.190			D1	6.86	8.00	0.270	0.315
A1	0.00	0.254	0.000	0.010			E	9.65	10.67	0.380	0.420
b	0.51	0.99	0.020	0.039			E1	7.90	8.80	0.311	0.346
b1	0.51	0.89	0.020	0.035	4		е	2.54	BSC	0.100	BSC
b2	1.14	1.78	0.045	0.070			Н	14.61	15.88	0.575	0.625
b3	1.14	1.73	0.045	0.068	4		L	1.78	2.79	0.070	0.110
С	0.38	0.74	0.015	0.029			L1	-	1.65	-	0.066
c1	0.38	0.58	0.015	0.023	4		L2	1.27	1.78	0.050	0.070
c2	1.14	1.65	0.045	0.065			L3	0.25	BSC	0.010	BSC
D	8.51	9.65	0.335	0.380	2		L4	4.78	5.28	0.188	0.208

### Notes

- $^{(1)}$  Dimensioning and tolerancing per ASME Y14.5 M-1994
- (2) Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outmost extremes of the plastic body
- (3) Thermal pad contour optional within dimension E, L1, D1 and E1
- (4) Dimension b1 and c1 apply to base metal only
- (5) Datum A and B to be determined at datum plane H
- (6) Controlling dimension: inch
- (7) Outline conforms to JEDEC outline TO-263AB

**NOTES** 

3

2, 3

3

3



### **Legal Disclaimer Notice**

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