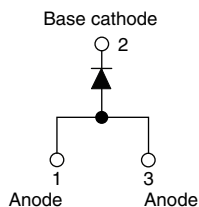


## Input Rectifier Diode, 20 A



D<sup>2</sup>PAK



### 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.

### PRODUCT SUMMARY

$V_F$ at 10 A	< 1 V
$I_{FSM}$	300 A
$V_{RRM}$	800 V/1200 V

### OUTPUT CURRENT IN TYPICAL APPLICATIONS

APPLICATIONS	SINGLE-PHASE BRIDGE	THREE-PHASE BRIDGE	UNITS
Capacitive input filter $T_A = 55\text{ °C}$ , $T_J = 125\text{ °C}$ common heatsink of 1 °C/W	16.3	21	A

### MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Sinusoidal waveform	20	A
$V_{RRM}$		800/1200	V
$I_{FSM}$		300	A
$V_F$	20 A, $T_J = 25\text{ °C}$	1.1	V
$T_J$		- 40 to 150	°C

### VOLTAGE RATINGS

PART NUMBER	$V_{RRM}$ , MAXIMUM PEAK REVERSE VOLTAGE V	$V_{RSM}$ , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	$I_{RRM}$ AT 150 °C mA
VS-20ETS08SPbF	800	900	1
VS-20ETS12SPbF	1200	1300	

### ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	$T_C = 105\text{ °C}$ , 180° conduction half sine wave	20	A
Maximum peak one cycle non-repetitive surge current	$I_{FSM}$	10 ms sine pulse, rated $V_{RRM}$ applied	250	
		10 ms sine pulse, no voltage reapplied	300	
Maximum $I^2t$ for fusing	$I^2t$	10 ms sine pulse, rated $V_{RRM}$ applied	316	A <sup>2</sup> s
		10 ms sine pulse, no voltage reapplied	442	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	$t = 0.1\text{ ms}$ to 10 ms, no voltage reapplied	4420	A <sup>2</sup> √s

# VS-20ETS08SPbF, VS-20ETS12SPbF High Voltage Series

Vishay Semiconductors

Input Rectifier Diode, 20 A



ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	V <sub>FM</sub>	20 A, T <sub>J</sub> = 25 °C		1.1	V
Forward slope resistance	r <sub>t</sub>	T <sub>J</sub> = 150 °C		10.4	mΩ
Threshold voltage	V <sub>F(TO)</sub>			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
		T <sub>J</sub> = 150 °C		1.0	

THERMAL - MECHANICAL SPECIFICATIONS					
PARAMETER		SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction and storage temperature range		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	°C/W
Maximum thermal resistance, junction to ambient		R <sub>thJA</sub> <sup>(1)</sup>	For D <sup>2</sup> PAK version	62	
Typical thermal resistance, case to heatsink		R <sub>thCS</sub>	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



# VS-20ETS08SPbF, VS-20ETS12SPbF High Voltage Series

Input Rectifier Diode, 20 A

Vishay Semiconductors

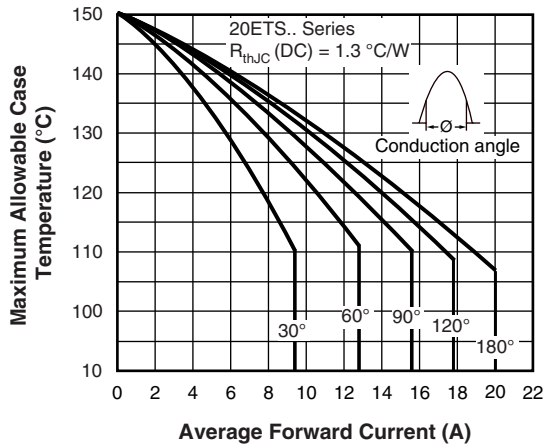


Fig. 1 - Current Rating Characteristics

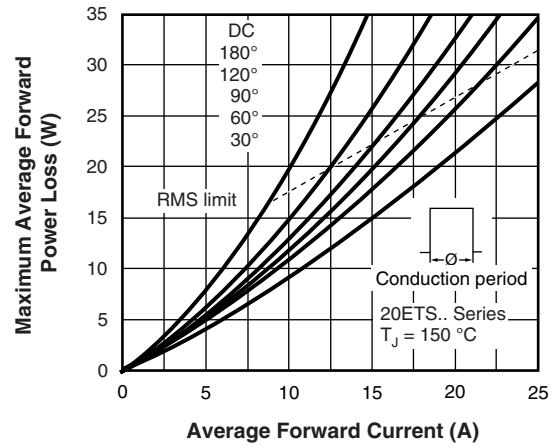


Fig. 4 - Forward Power Loss Characteristics

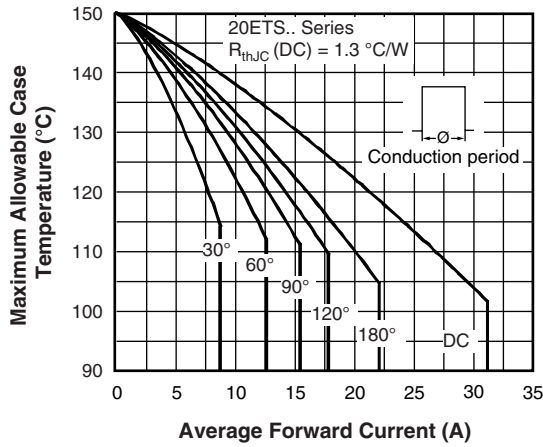


Fig. 2 - Current Rating Characteristics

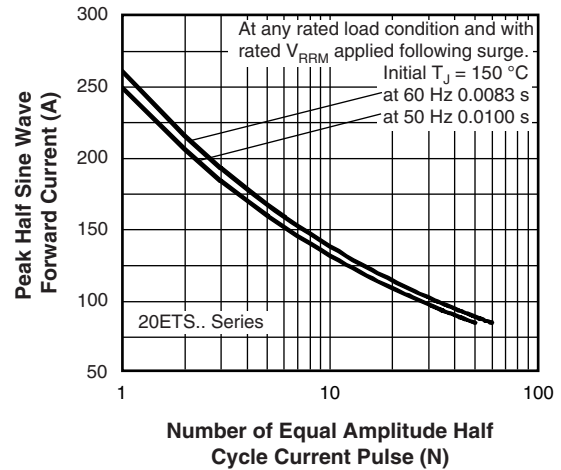


Fig. 5 - Maximum Non-Repetitive Surge Current

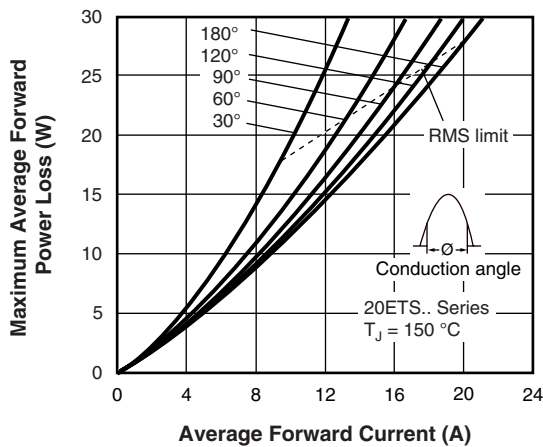


Fig. 3 - Forward Power Loss Characteristics

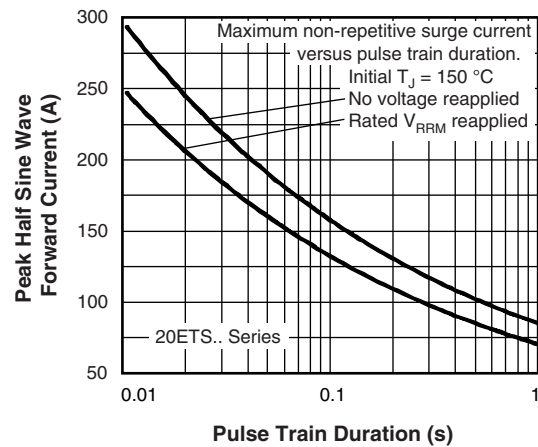


Fig. 6 - Maximum Non-Repetitive Surge Current

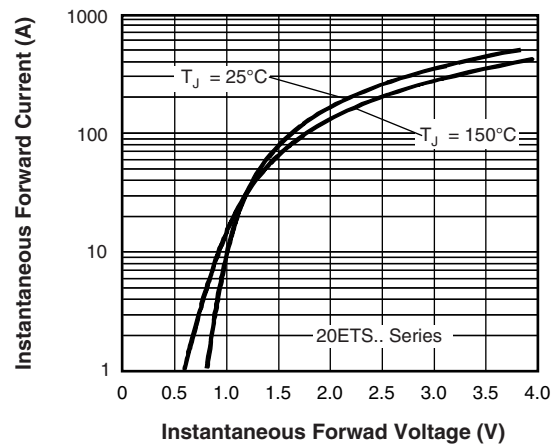


Fig. 7 - Forward Voltage Drop Characteristics

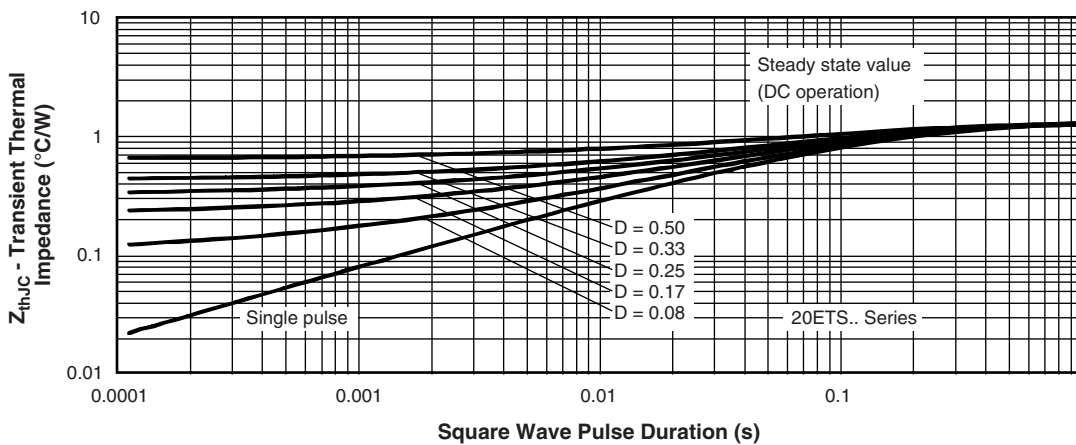


Fig. 8 - Thermal Impedance  $Z_{thJC}$  Characteristics

## ORDERING INFORMATION TABLE

<b>Device code</b>	<b>VS-</b>	<b>20</b>	<b>E</b>	<b>T</b>	<b>S</b>	<b>12</b>	<b>S</b>	<b>TRL</b>	<b>PbF</b>
	1	2	3	4	5	6	7	8	9

- 1 - HPP product suffix
  - 2 - Current rating (20 = 20 A)
  - 3 - Circuit configuration  
E = Single diode
  - 4 - Package:  
T = TO-220AC
  - 5 - Type of silicon:  
S = Standard recovery rectifier
  - 6 - Voltage code  $\times 100 = V_{RRM}$
  - 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
- 08 = 800 V  
12 = 1200 V

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95046">www.vishay.com/doc?95046</a>
Part marking information	<a href="http://www.vishay.com/doc?95054">www.vishay.com/doc?95054</a>
Packaging information	<a href="http://www.vishay.com/doc?95032">www.vishay.com/doc?95032</a>
SPICE model	<a href="http://www.vishay.com/doc?95409">www.vishay.com/doc?95409</a>



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