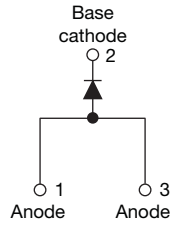


# High Voltage Surface Mount Input Rectifier Diode, 20 A



### FEATURES

- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Designed and qualified according to JEDEC-JESD47
- Material categorization:  
For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**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	
Package	TO-263AB (D <sup>2</sup> PAK)
$I_{F(AV)}$	20 A
$V_R$	800 V, 1200 V
$V_F$ at $I_F$	1.1 V
$I_{FSM}$	300 A
$T_J$ max.	150 °C
Diode variation	Single die

OUTPUT CURRENT IN TYPICAL APPLICATIONS			
APPLICATIONS	SINGLE-PHASE BRIDGE	THREE-PHASE BRIDGE	UNITS
Capacitive input filter $T_A = 55$ °C, $T_J = 125$ °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, $T_J = 25$ °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	$I_{F(AV)}$	$T_C = 105$ °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	$I^2\sqrt{t}$	$t = 0.1$ ms to 10 ms, no voltage reapplied	4420	A <sup>2</sup> √s



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 μm) copper 40 °C/W  
For recommended footprint and soldering techniques refer to application note #AN-994

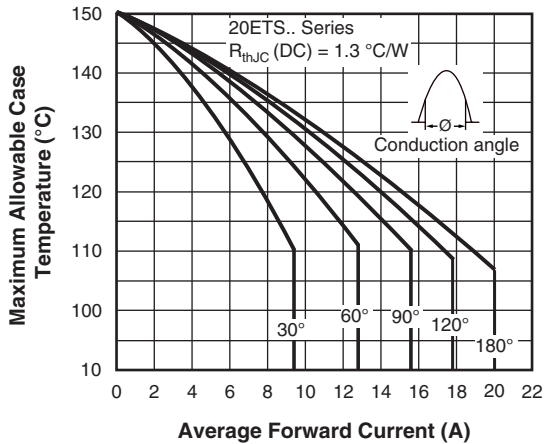


Fig. 1 - Current Rating Characteristics

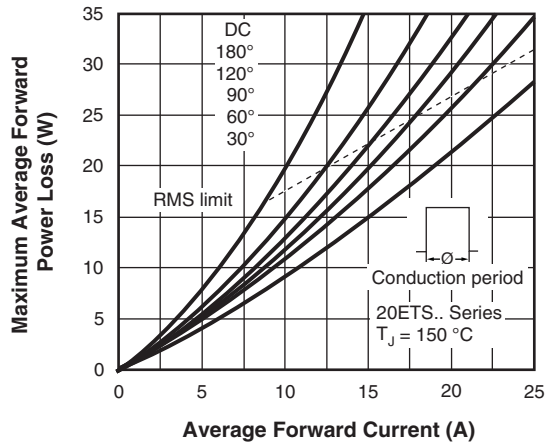


Fig. 4 - Forward Power Loss Characteristics

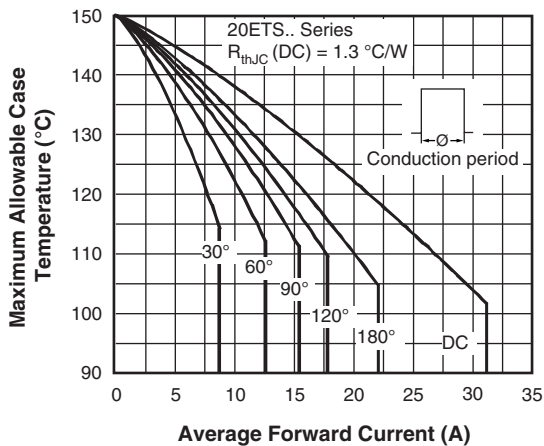


Fig. 2 - Current Rating Characteristics

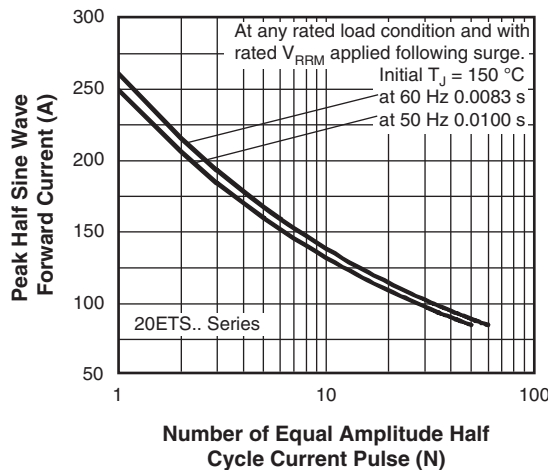


Fig. 5 - Maximum Non-Repetitive Surge Current

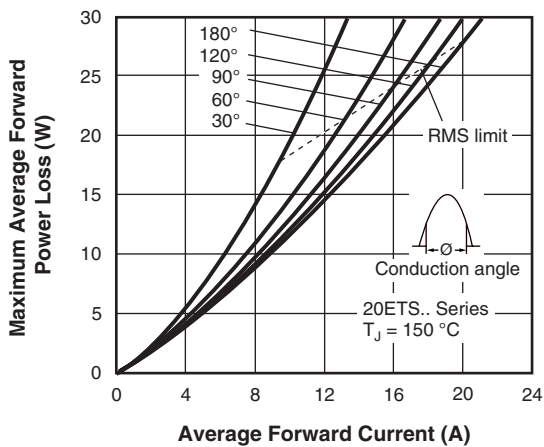


Fig. 3 - Forward Power Loss Characteristics

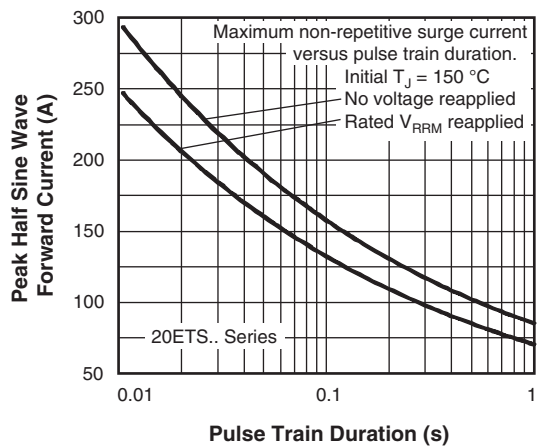


Fig. 6 - Maximum Non-Repetitive Surge Current

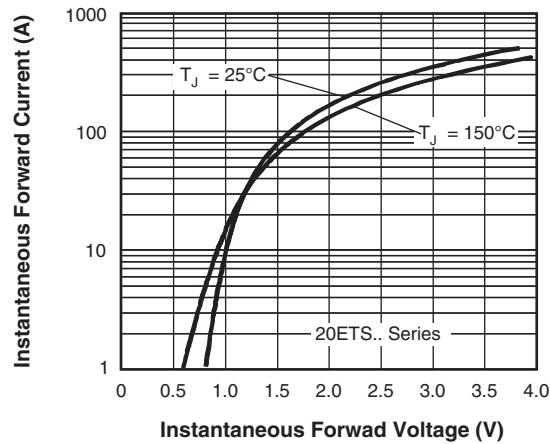


Fig. 7 - Forward Voltage Drop Characteristics

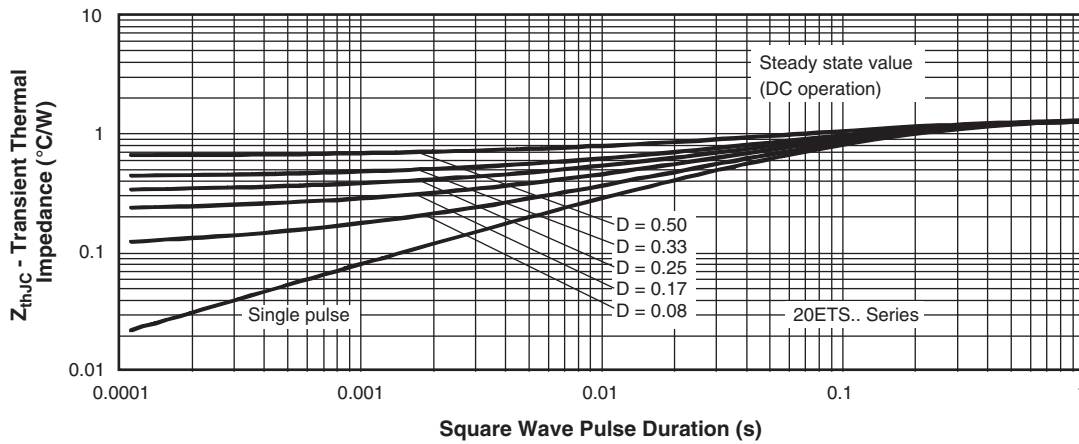
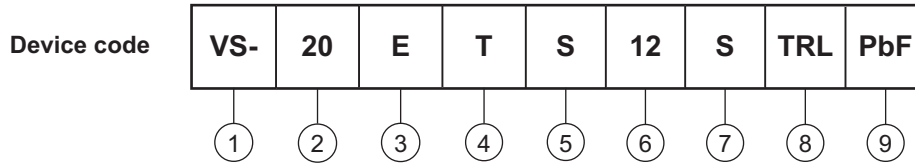


Fig. 8 - Thermal Impedance  $Z_{thJC}$  Characteristics



## ORDERING INFORMATION TABLE



- 1** - Vishay Semiconductors product
- 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 x 100 =  $V_{RRM}$  08 = 800 V  
12 = 1200 V
- 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

ORDERING INFORMATION (Example)			
PREFERRED P/N	QUANTITY PER TUBE	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-20ETS08SPbF	50	1000	Antistatic plastic tube
VS-20ETS08STRRPbF	800	800	13" diameter reel
VS-20ETS08STRLPbF	800	800	13" diameter reel
VS-20ETS12SPbF	50	1000	Antistatic plastic tube
VS-20ETS12STRRPbF	800	800	13" diameter reel
VS-20ETS12STRLPbF	800	800	13" diameter reel

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>
SPIICE model	<a href="http://www.vishay.com/doc?95409">www.vishay.com/doc?95409</a>





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