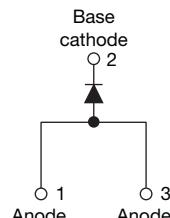


## High Voltage Surface Mount Input Rectifier Diode, 10 A



**RoHS**  
COMPLIANT  
HALOGEN  
FREE

### 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)

### APPLICATIONS

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

### DESCRIPTION

The VS-10ETS..SPbF rectifier 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 <sub>F(AV)</sub>	10 A
V <sub>R</sub>	800 V, 1000 V, 1200 V
V <sub>F</sub> at I <sub>F</sub>	1.1 V
I <sub>FSM</sub>	160 A
T <sub>J</sub> max.	150 °C
Diode variation	Single die

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	12.0	16.0	A

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
I <sub>F(AV)</sub>	Sinusoidal waveform	10	A
V <sub>RRM</sub>		800/1200	V
I <sub>FSM</sub>		160	A
V <sub>F</sub>	10 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-10ETS08SPbF	800	900	0.5
VS-10ETS10SPbF	1000	1100	
VS-10ETS12SPbF	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	10	A
Maximum peak one cycle non-repetitive surge current	I <sub>FSM</sub>	10 ms sine pulse, rated V <sub>RRM</sub> applied	135	
		10 ms sine pulse, no voltage reapplied	160	
Maximum I <sup>2</sup> t for fusing	I <sup>2</sup> t	10 ms sine pulse, rated V <sub>RRM</sub> applied	91	A <sup>2</sup> s
		10 ms sine pulse, no voltage reapplied	130	
Maximum I <sup>2</sup> /t for fusing	I <sup>2</sup> /t	t = 0.1 ms to 10 ms, no voltage reapplied	1290	A <sup>2</sup> /s

<b>ELECTRICAL SPECIFICATIONS</b>					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	$V_{FM}$	$10 \text{ A}, T_J = 25 \text{ }^\circ\text{C}$		1.1	V
Forward slope resistance	$r_f$	$T_J = 150 \text{ }^\circ\text{C}$		20	$\text{m}\Omega$
Threshold voltage	$V_{F(TO)}$			0.82	V
Maximum reverse leakage current	$I_{RM}$	$T_J = 25 \text{ }^\circ\text{C}$	$V_R = \text{Rated } V_{RRM}$	0.05	mA
		$T_J = 150 \text{ }^\circ\text{C}$		0.50	

<b>THERMAL - MECHANICAL SPECIFICATIONS</b>					
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		2.5	$^\circ\text{C}/\text{W}$
Maximum thermal resistance, junction to ambient (PCB mount)	$R_{thJA}^{(1)}$			62	
Soldering temperature	$T_s$			260	$^\circ\text{C}$
Approximate weight				2	g
				0.07	oz.
Marking device		Case style D <sup>2</sup> PAK (SMD-220)		10ETS08S	
				10ETS10S	
				10ETS12S	

**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

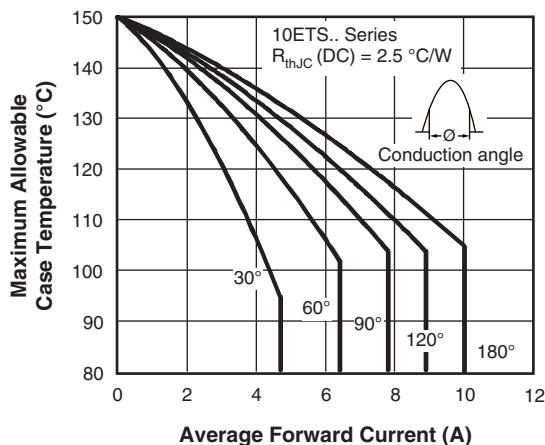


Fig. 1 - Current Rating Characteristics

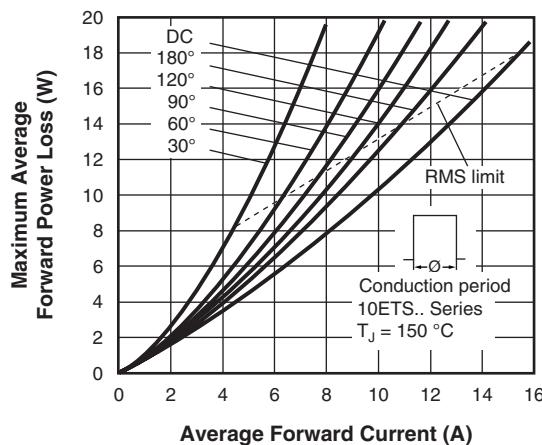


Fig. 4 - Forward Power Loss Characteristics

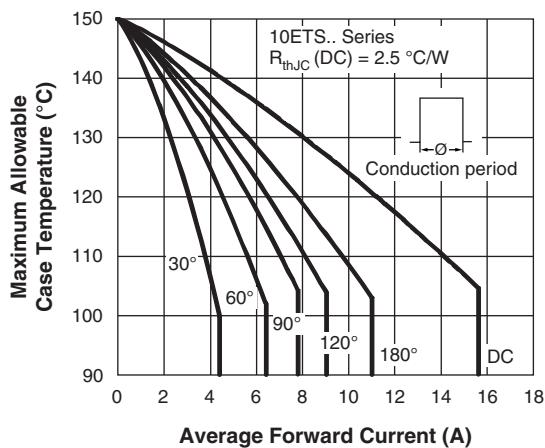


Fig. 2 - Current Rating Characteristics

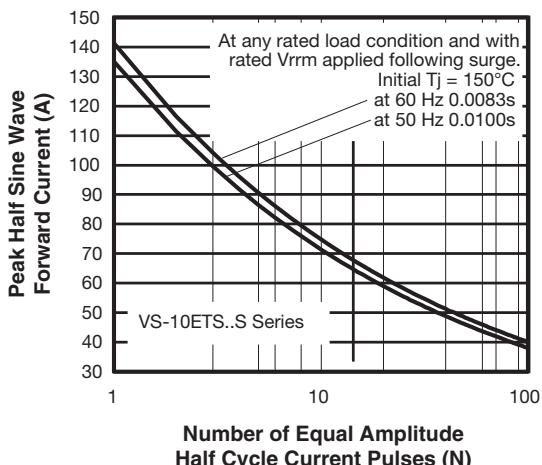


Fig. 5 - Maximum Non-Repetitive Surge Current

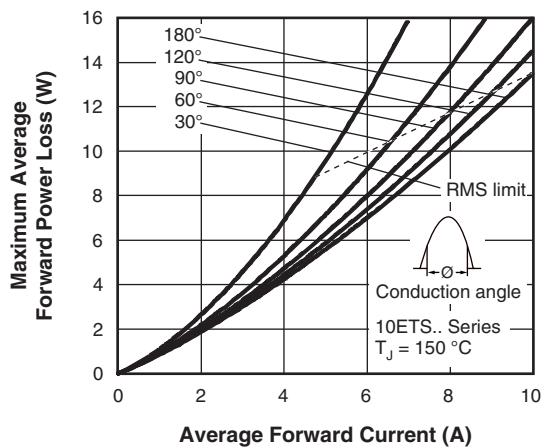


Fig. 3 - Forward Power Loss Characteristics

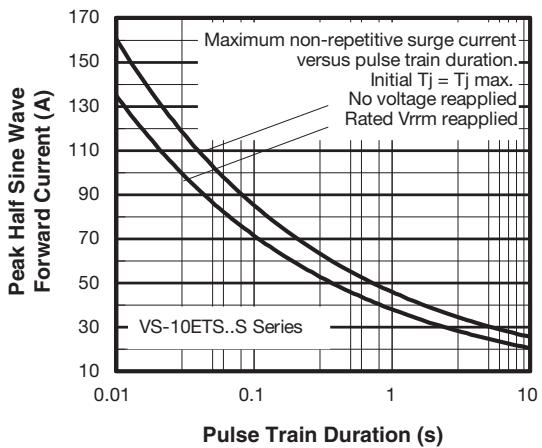


Fig. 6 - Maximum Non-Repetitive Surge Current

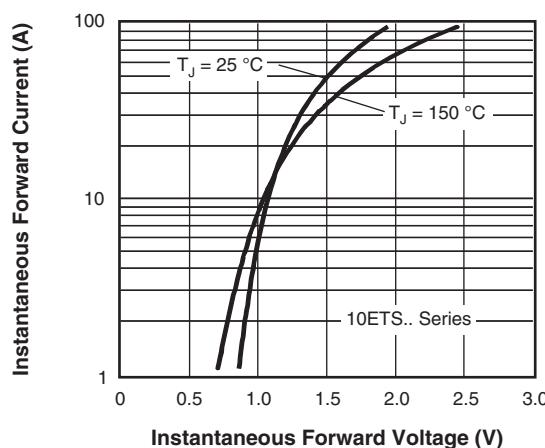


Fig. 7 - Forward Voltage Drop Characteristics

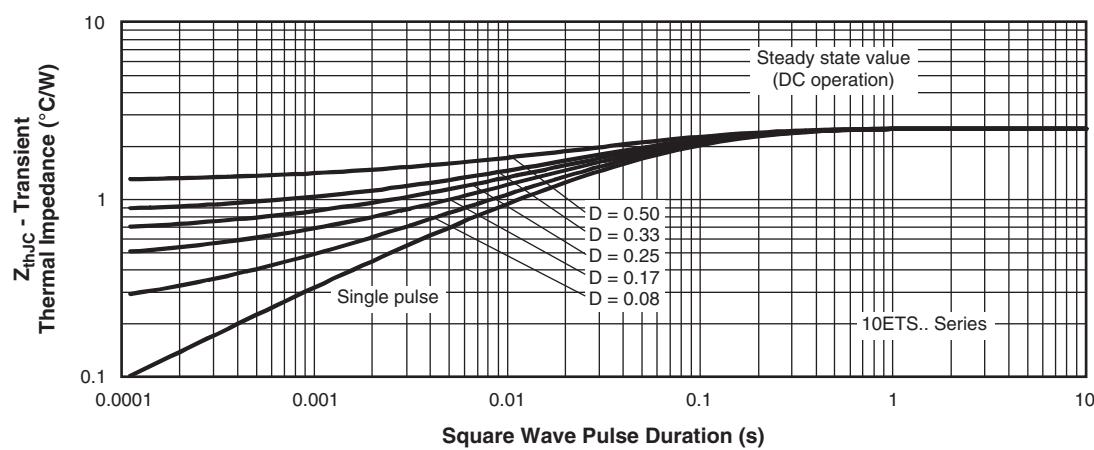


Fig. 8 - Thermal Impedance  $Z_{thJC}$  Characteristics

**ORDERING INFORMATION TABLE**

Device code	VS-	10	E	T	S	12	S	TRL	PbF
	1	2	3	4	5	6	7	8	9

- 1** - Vishay Semiconductors product
- 2** - Current rating (10 = 10 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
10 = 1000 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

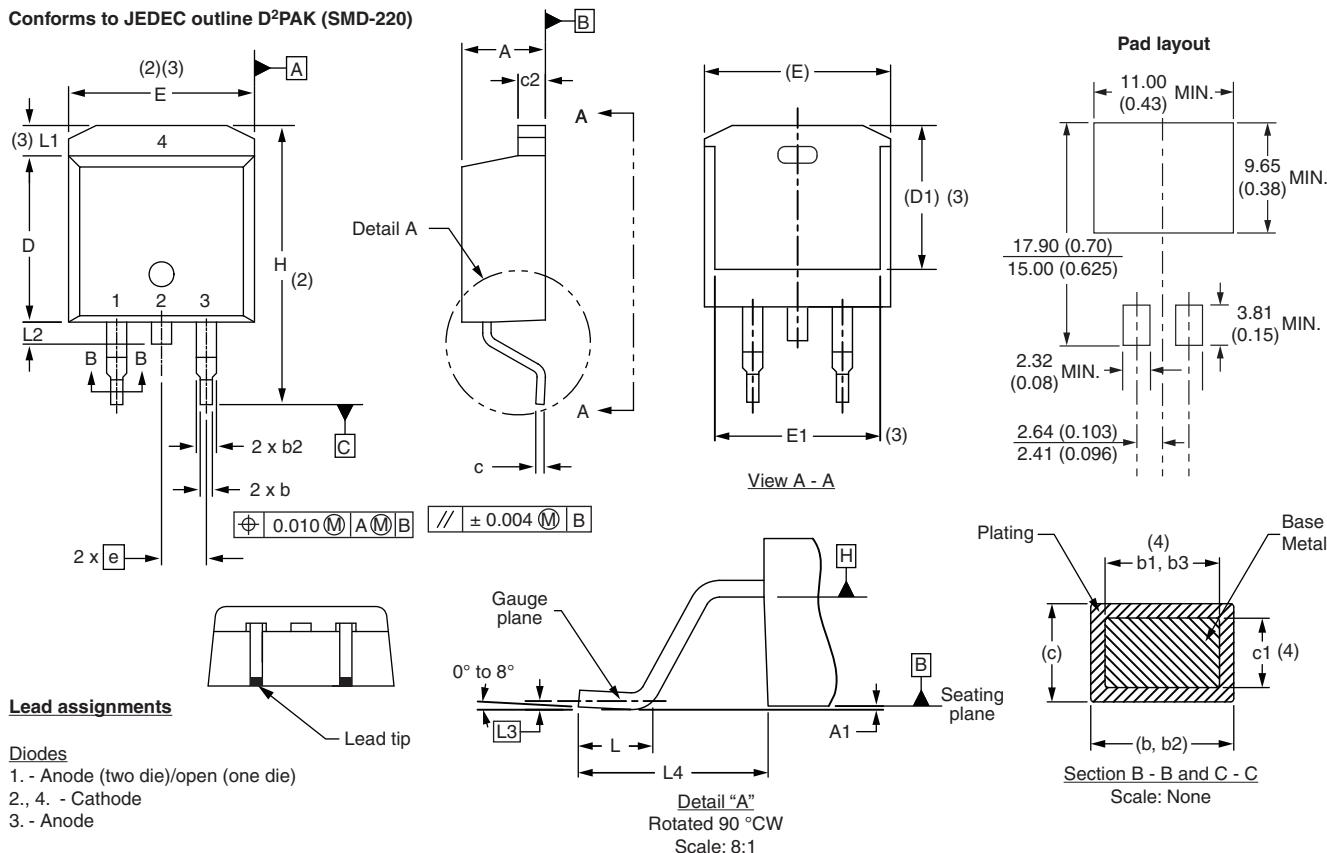
<b>ORDERING INFORMATION</b> (Example)				
PREFERRED P/N	QUANTITY PER TUBE	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION	
VS-10ETS08SPbF	50	1000	Antistatic plastic tube	
VS-10ETS08STRRPbF	800	800	13" diameter reel	
VS-10ETS08STRLPbF	800	800	13" diameter reel	
VS-10ETS10SPbF	50	1000	Antistatic plastic tube	
VS-10ETS10STRRPbF	800	800	13" diameter reel	
VS-10ETS10STRLPbF	800	800	13" diameter reel	
VS-10ETS12SPbF	50	1000	Antistatic plastic tube	
VS-10ETS12STRRPbF	800	800	13" diameter reel	
VS-10ETS12STRLPbF	800	800	13" diameter reel	
VS-10ETS08SPbF	50	1000	Antistatic plastic tube	

<b>LINKS TO RELATED DOCUMENTS</b>	
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>

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

#### DIMENSIONS in millimeters and inches

Conforms to JEDEC outline D<sup>2</sup>PAK (SMD-220)



SYMBOL	MILLIMETERS		INCHES		NOTES		SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.				MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	0.160	0.190			D1	6.86	8.00	0.270	0.315	3
A1	0.00	0.254	0.000	0.010			E	9.65	10.67	0.380	0.420	2, 3
b	0.51	0.99	0.020	0.039			E1	7.90	8.80	0.311	0.346	3
b1	0.51	0.89	0.020	0.035	4		e	2.54 BSC		0.100 BSC		
b2	1.14	1.78	0.045	0.070			H	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	
c	0.38	0.74	0.015	0.029			L1	-	1.65	-	0.066	3
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

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