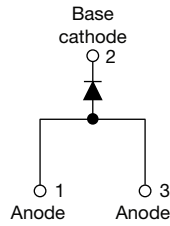


High Voltage Surface Mount Input Rectifier Diode, 20 A


D²PAK (TO-263AB)

FEATURES

- Glass passivated pellet chip junction
- Meets MSL level 1, per J-STD-020, LF maximum peak of 245 °C
- Designed and qualified according to JEDEC®-JESD 47
- Material categorization: for definitions of compliance please see 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...S-M3 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.

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	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
Package	D ² PAK (TO-263AB)
Circuit configuration	Single

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-20ETS08S-M3	800	900	1
VS-20ETS12S-M3	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 ² 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 ² √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 ² 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 ² PAK (TO-263AB)	20ETS08S	
				20ETS12S	

Note

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

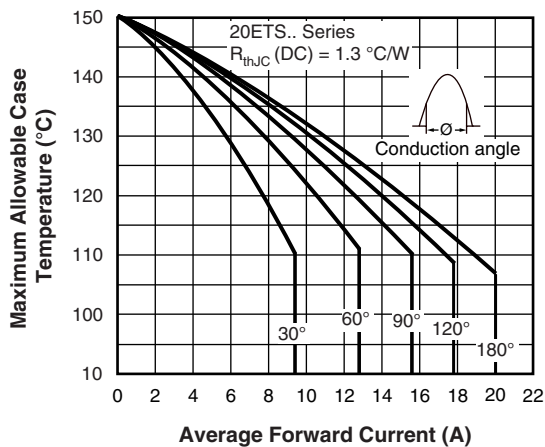


Fig. 1 - Current Rating Characteristics

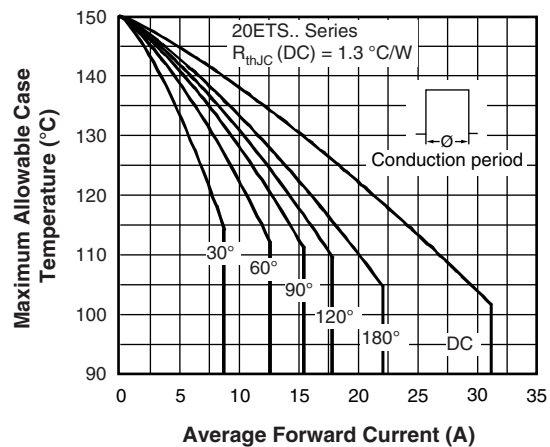


Fig. 2 - Current Rating Characteristics

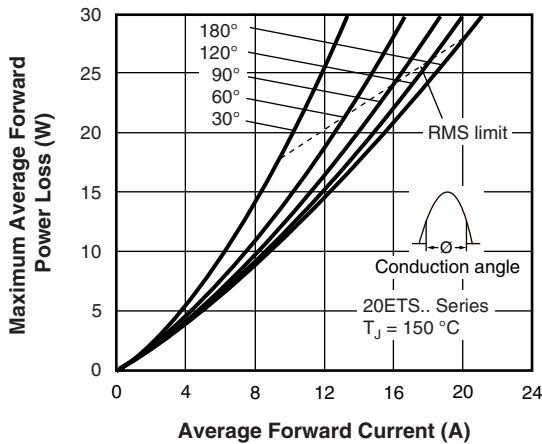


Fig. 3 - Forward Power Loss Characteristics

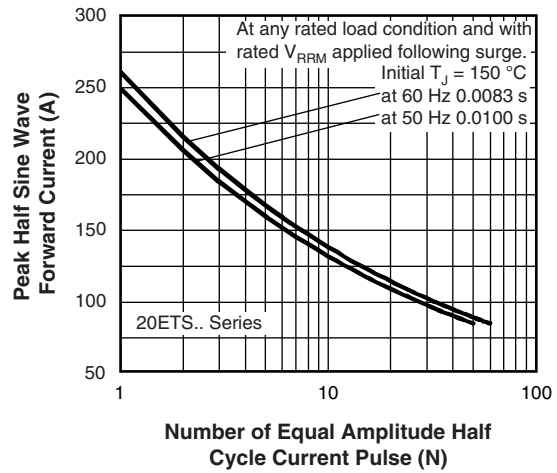


Fig. 5 - Maximum Non-Repetitive Surge Current

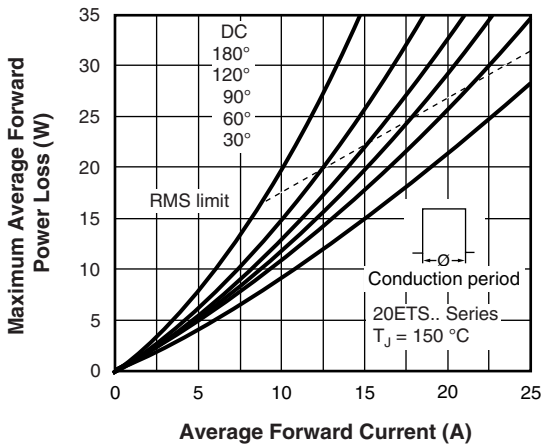


Fig. 4 - Forward Power Loss Characteristics

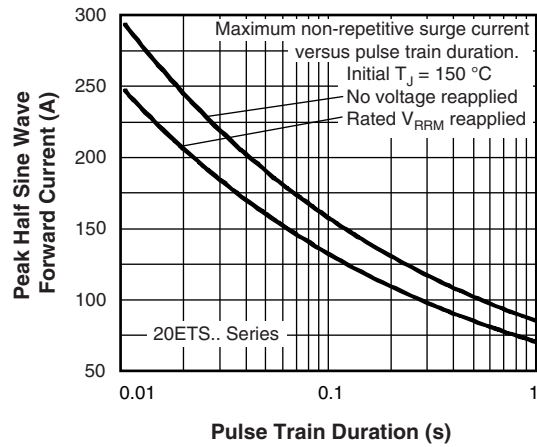


Fig. 6 - Maximum Non-Repetitive Surge Current

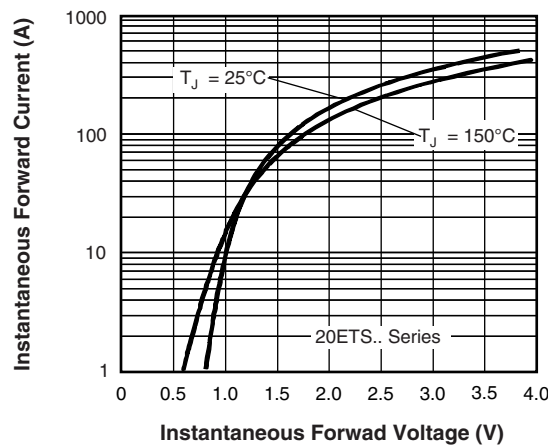


Fig. 7 - Forward Voltage Drop Characteristics

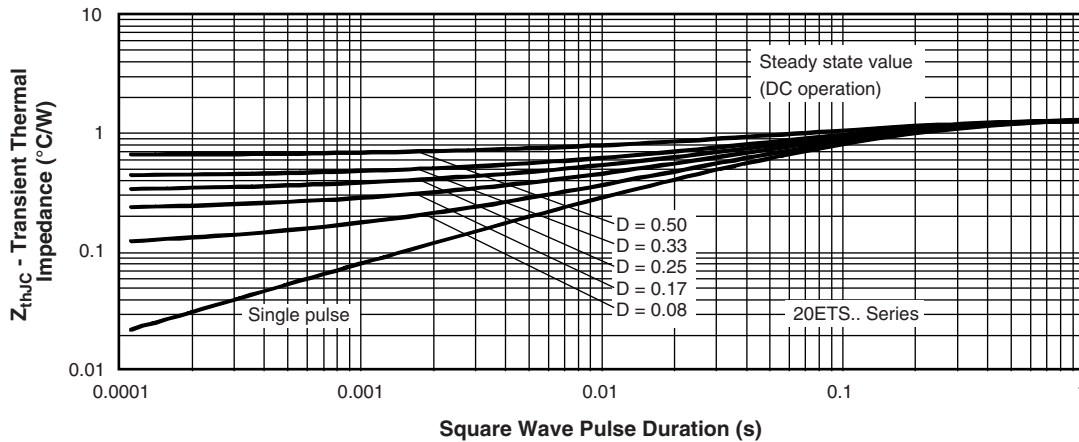


Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

ORDERING INFORMATION TABLE

Device code	VS-	20	E	T	S	12	S	TRL	-M3
	①	②	③	④	⑤	⑥	⑦	⑧	⑨

- 1** - Vishay Semiconductors product
- 2** - Current rating (20 = 20 A)
- 3** - Circuit configuration
E = single
- 4** - Package:
T = D²PAK (TO-263AB)
- 5** - Type of silicon:
S = standard recovery rectifier
- 6** - Voltage code x 100 = V_{RRM} 08 = 800 V
12 = 1200 V
- 7** - S = surface mountable
- 8** -
 - None = tube
 - TRL = tape and reel (left oriented)
 - TRR = tape and reel (right oriented)
- 9** - -M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free



ORDERING INFORMATION (Example)			
PREFERRED P/N	QUANTITY PER TUBE	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-20ETS08S-M3	50	1000	Antistatic plastic tube
VS-20ETS08STRR-M3	800	800	13" diameter reel
VS-20ETS08STRL-M3	800	800	13" diameter reel
VS-20ETS12S-M3	50	1000	Antistatic plastic tube
VS-20ETS12STRR-M3	800	800	13" diameter reel
VS-20ETS12STRL-M3	800	800	13" diameter reel

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?96164
Part marking information	www.vishay.com/doc?95444
Packaging information	www.vishay.com/doc?96424
SPICE model	www.vishay.com/doc?95409

D²PAK

DIMENSIONS in millimeters and inches

Conforms to JEDEC® outline D²PAK (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: inches
- (7) Outline conforms to JEDEC® outline TO-263AB



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