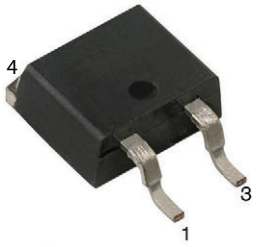
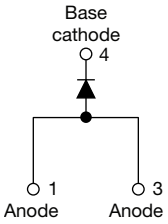
High Voltage Surface-Mount Input Rectifier Diode, 25 A





D^2PAK 2L (TO-263AB 2L)

LINKS TO ADDITIONAL RESOURCES

3D Models

FEATURES

- Meets MSL level 1, per J-STD-020, LF maximum peak of 245 °C
- 175 °C maximum operating junction temperature
- Glass passivated pellet chip junction
- AEC-Q101 qualified
- Meets JESD 201 class 2 whisker test
- Flexible solution for reliable AC power rectification
- High surge, low V_F rugged blocking diode for DC charging stations
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT
HALOGEN FREE

APPLICATIONS

- Input rectification
- On-board and off-board EV / HEV battery chargers

DESCRIPTION

The VS-25ETS12SLHM3 rectifier High Voltage Series has been optimized for very low forward voltage drop, with moderate leakage.

MECHANICAL DATA

Case: D^2PAK 2L (TO-263AB 2L)
Molding compound meets UL 94 V-0 flammability rating

Terminals: matte tin plated leads, solderable per J-STD-002

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	25 A
V_R	1200 V
V_F at I_F	1.14 V
I_{FSM}	255 A
T_J max.	175 °C
Package	D^2PAK 2L (TO-263AB 2L)
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	20	23	A

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Sinusoidal waveform	25	A
V_{RRM}		1200	V
I_{FSM}		255	A
V_F	10 A, T_J = 25 °C	1.0	V
T_J		-40 to +175	°C

VOLTAGE RATINGS			
PART NUMBER	V_{RRM}, MAXIMUM PEAK REVERSE VOLTAGE V	V_{RSM}, MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	I_{RRM} AT 175 °C mA
VS-25ETS12S2LHM3	1200	1300	3

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	T_C = 125 °C, 180° conduction half sine wave	25	A
Maximum peak one cycle non-repetitive surge current	I_{FSM}	10 ms sine pulse, rated V_{RRM} applied, at T_J = 175 °C	215	A
		10 ms sine pulse, no voltage reapplied, at T_J = 175 °C	255	A
Maximum I^2t for fusing	I^2t	10 ms sine pulse, rated V_{RRM} applied, at T_J = 175 °C	231	A^2s
		10 ms sine pulse, no voltage reapplied, at T_J = 175 °C	326	A^2s
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reapplied, at T_J = 175 °C	3260	$A^2\sqrt{s}$

ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	V_{FM}	25 A, T_J = 25 °C		1.14	V
Forward slope resistance	r_t	T_J = 175 °C		12	mΩ
Threshold voltage	$V_{F(TO)}$			0.83	V
Maximum reverse leakage current	I_{RM}	T_J = 25 °C	V_R = rated V_{RRM}	0.1	mA
		T_J = 150 °C		1.0	
		T_J = 175 °C		3.0	

THERMAL - MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction and storage temperature range	T_J, T_{Stg}		-40 to +175	°C
Maximum thermal resistance, junction to case	R_{thJC}	DC operation	0.9	°C/W
Maximum thermal resistance, junction to ambient	R_{thJA} (1)	For D^2PAK version	62	
Typical thermal resistance, case to heatsink	R_{thCS}	Mounting surface, smooth, and greased	0.5	
Approximate weight			2	g
			0.07	oz.
Marking device		Case style: D^2PAK 2L (TO-263AB 2L)	25ETS12SH	

Note

(1) When mounted on 1" square (650 mm^2) PCB of FR-4 or G-10 material 4 oz. (140 µm) copper 40 °C/W

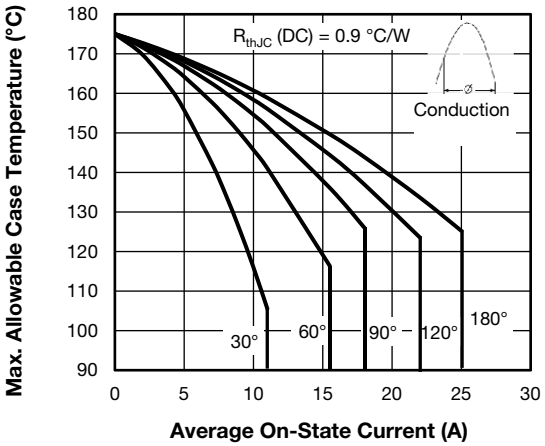


Fig. 1 - Current Rating Characteristics

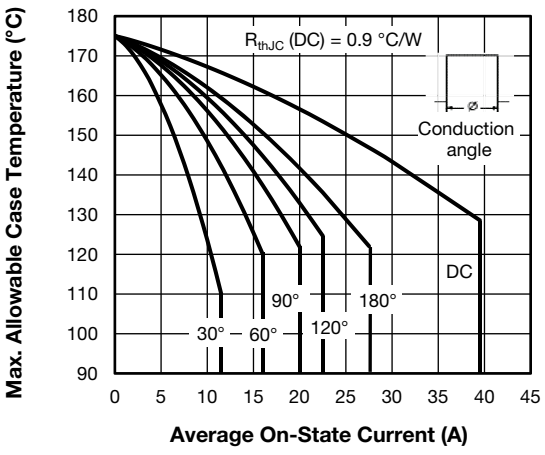


Fig. 2 - Current Rating Characteristics

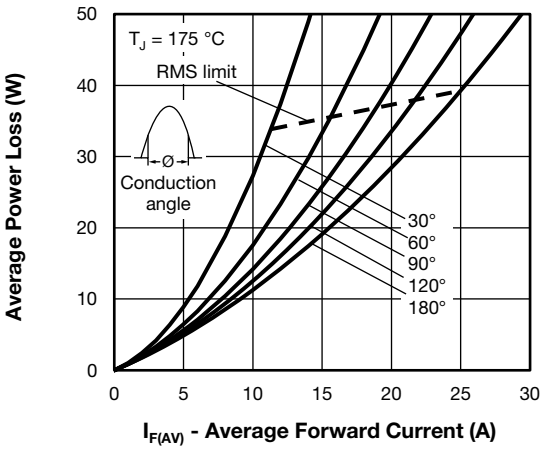


Fig. 3 - Forward Power Loss Characteristics

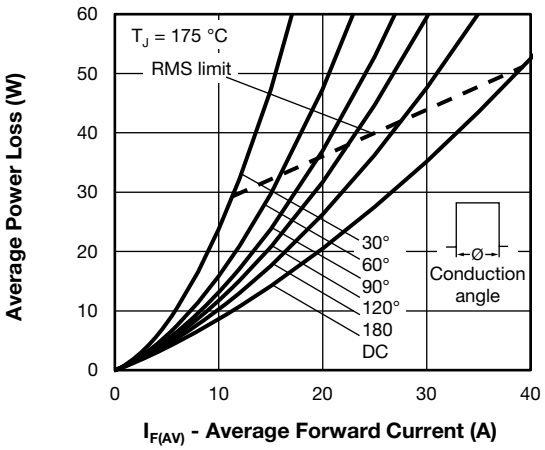


Fig. 4 - Forward Power Loss Characteristics

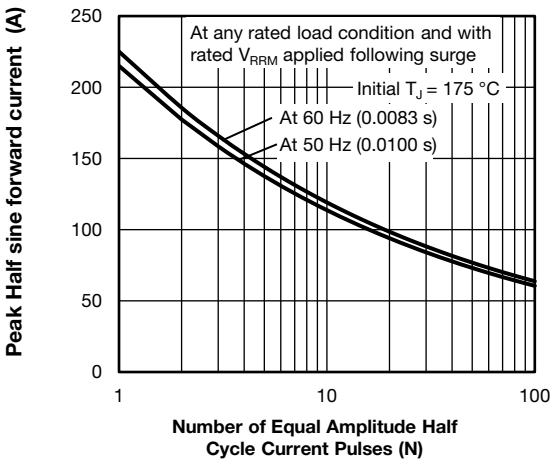


Fig. 5 - Maximum Non-Repetitive Surge Current

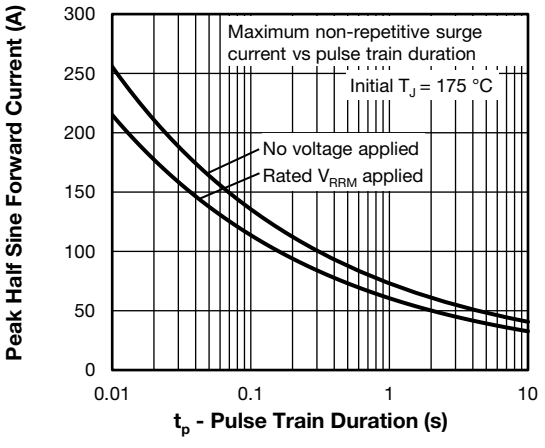


Fig. 6 - Maximum Non-Repetitive Surge Current

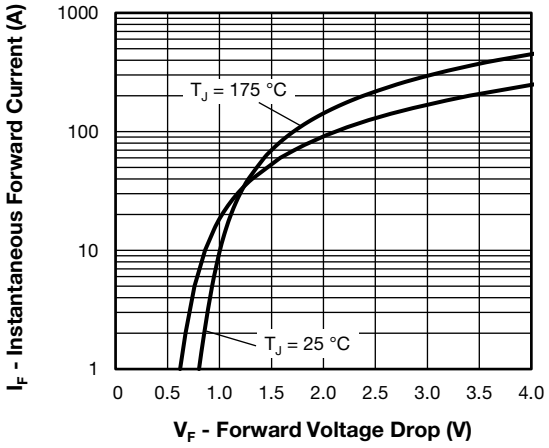


Fig. 7 - Forward Voltage Drop Characteristics

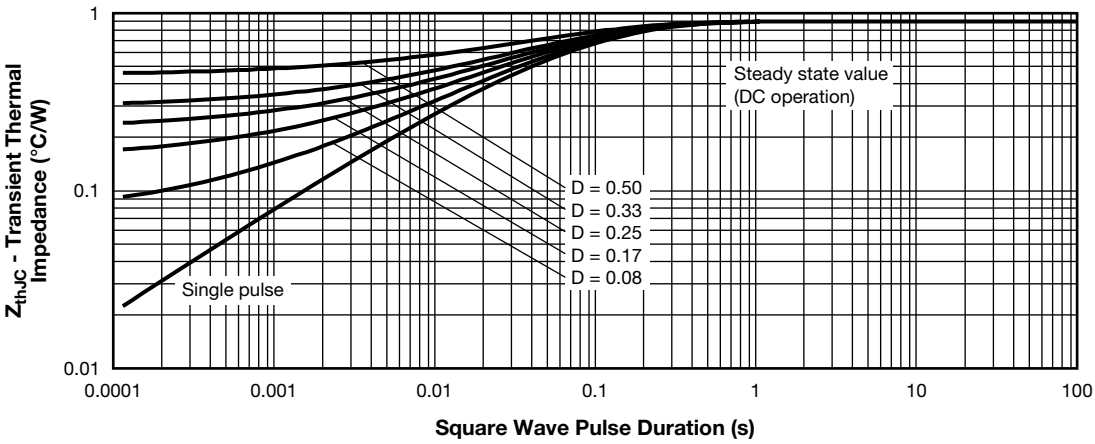


Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

ORDERING INFORMATION TABLE

Device code

VS-	25	E	T	S	12	S	2	L	H	M3
1	2	3	4	5	6	7	8	9	10	11

1 - Vishay Semiconductors product

2 - Current rating (25 = 25 A)

3 - Circuit configuration
E = single diode

4 - Package:
T = D^2PAK

5 - Type of silicon:
S = standard recovery rectifier

6 - Voltage code x 100 = V_{RRM} — 12 = 1200 V

7 - S = surface mountable

8 - 2 = true 2 pin D^2PAK

9 - L = tape and reel (left oriented), for different orientation, contact factory

10 - H = AEC-Q101 qualified

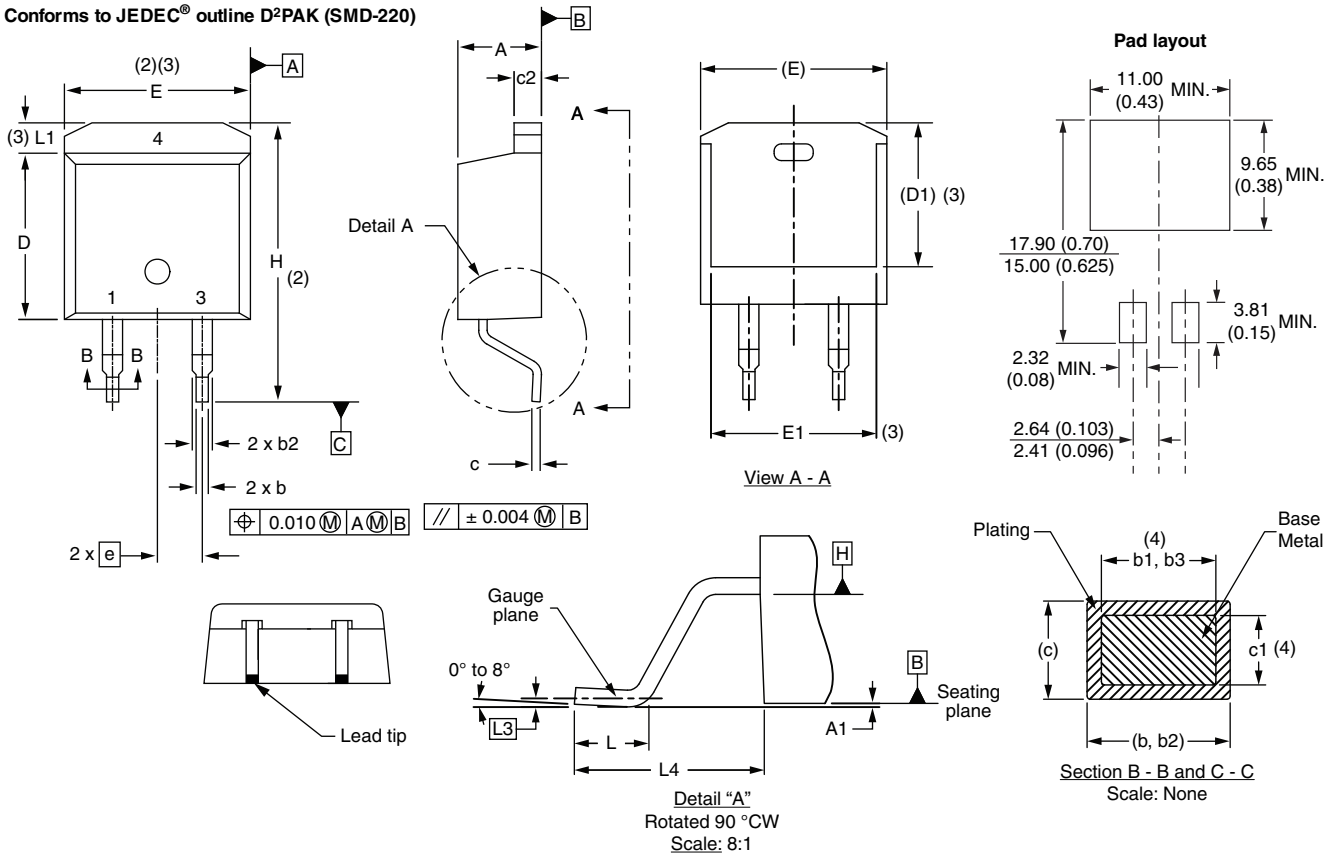
11 - Environmental digit:
M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free

ORDERING INFORMATION (Example)			
PREFERRED P/N	**QUANTITY PER REEL**	**MINIMUM ORDER QUANTITY**	**PACKAGING DESCRIPTION**
VS-25ETS12S2LHM3	800	800	13" diameter reel

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?96683
Part marking information	www.vishay.com/doc?96693
Packaging information	www.vishay.com/doc?95032

D²PAK 2L (TO-263AB 2L)

DIMENSIONS in millimeters and inches



SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	0.160	0.190	
A1	0.00	0.254	0.000	0.010	
b	0.51	0.99	0.020	0.039	
b1	0.51	0.89	0.020	0.035	4
b2	1.14	1.78	0.045	0.070	
b3	1.14	1.73	0.045	0.068	4
c	0.38	0.74	0.015	0.029	
c1	0.38	0.58	0.015	0.023	4
c2	1.14	1.65	0.045	0.065	
D	8.51	9.65	0.335	0.380	2

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
D1	6.86	8.00	0.270	0.315	3
E	9.65	10.67	0.380	0.420	2, 3
E1	7.90	8.80	0.311	0.346	3
e	2.54 BSC		0.100 BSC		
H	14.61	15.88	0.575	0.625	
L	1.78	2.79	0.070	0.110	
L1	-	1.65	-	0.066	3
L3	0.25 BSC		0.010 BSC		
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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