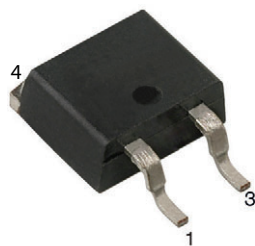
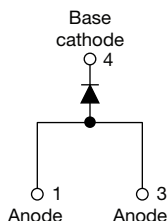


# High Voltage Surface-Mount Input Rectifier Diode, 30 A


**D<sup>2</sup>PAK 2L (TO-263AB 2L)**

**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

## 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
- Designed and qualified according to JEDEC® - JESD 47
- 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](http://www.vishay.com/doc?99912)

## LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	30 A
$V_R$	1200 V
$V_F$ at $I_F$	1.20 V
$I_{FSM}$	255 A
$T_J$ max.	175 °C
Package	D <sup>2</sup> PAK 2L (TO-263AB 2L)
Circuit configuration	Single

## APPLICATIONS

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

## DESCRIPTION

The VS-30ETS12S2L-M3 rectifier High Voltage Series has been optimized for very low forward voltage drop, with moderate leakage.

## MECHANICAL DATA

**Case:** D<sup>2</sup>PAK 2L (TO-263AB 2L)

Molding compound meets UL 94 V-0 flammability rating

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

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	30	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-30ETS12S2L-M3	1200	1300	3

**ABSOLUTE MAXIMUM RATINGS**

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	$T_C = 109\text{ }^{\circ}\text{C}$ , 180° conduction half sine wave	30	A
Maximum peak one cycle non-repetitive surge current	$I_{FSM}$	10 ms sine pulse, rated $V_{RRM}$ applied, at $T_J = 175\text{ }^{\circ}\text{C}$	215	
		10 ms sine pulse, no voltage reapplied, at $T_J = 175\text{ }^{\circ}\text{C}$	255	
Maximum $I^2t$ for fusing	$I^2t$	10 ms sine pulse, rated $V_{RRM}$ applied, at $T_J = 175\text{ }^{\circ}\text{C}$	231	$\text{A}^2\text{s}$
		10 ms sine pulse, no voltage reapplied, at $T_J = 175\text{ }^{\circ}\text{C}$	326	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	$t = 0.1\text{ ms to } 10\text{ ms}$ , no voltage reapplied, at $T_J = 175\text{ }^{\circ}\text{C}$	3260	$\text{A}^2\sqrt{\text{s}}$

**ELECTRICAL SPECIFICATIONS**

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum forward voltage drop	$V_{FM}$	30 A, $T_J = 25\text{ }^{\circ}\text{C}$	1.20	V
Forward slope resistance	$r_t$	$T_J = 175\text{ }^{\circ}\text{C}$	12	$\text{m}\Omega$
Threshold voltage	$V_{F(TO)}$		0.83	V
Maximum reverse leakage current	$I_{RM}$	$T_J = 25\text{ }^{\circ}\text{C}$	0.1	mA
		$T_J = 150\text{ }^{\circ}\text{C}$	1.0	
		$T_J = 175\text{ }^{\circ}\text{C}$	3.0	

**THERMAL - MECHANICAL SPECIFICATIONS**

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction and storage temperature range	$T_J, T_{Stg}$		-40 to +175	$^{\circ}\text{C}$
Maximum thermal resistance, junction to case	$R_{thJC}$	DC operation	0.9	$^{\circ}\text{C/W}$
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
Marking device		Case style: D <sup>2</sup> PAK 2L (TO-263AB 3L)	30ETS12S	

**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  $^{\circ}\text{C/W}$

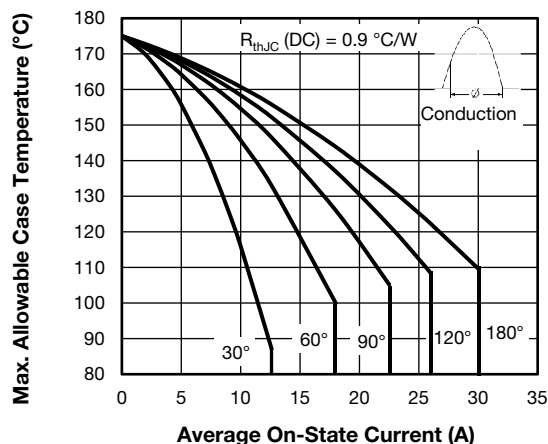


Fig. 1 - Current Rating Characteristics

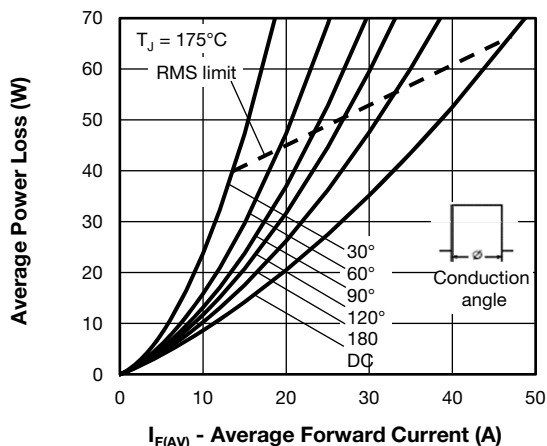


Fig. 4 - Forward Power Loss Characteristics

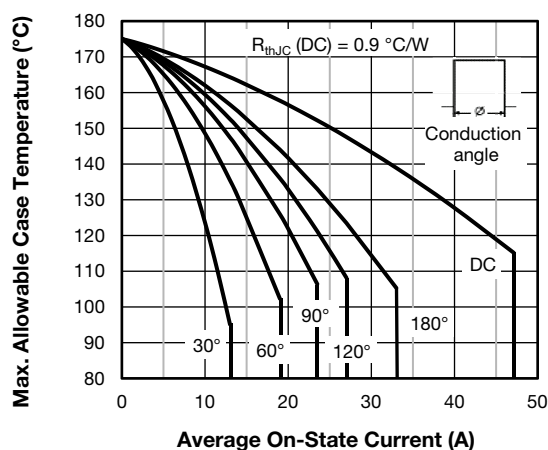


Fig. 2 - Current Rating Characteristics

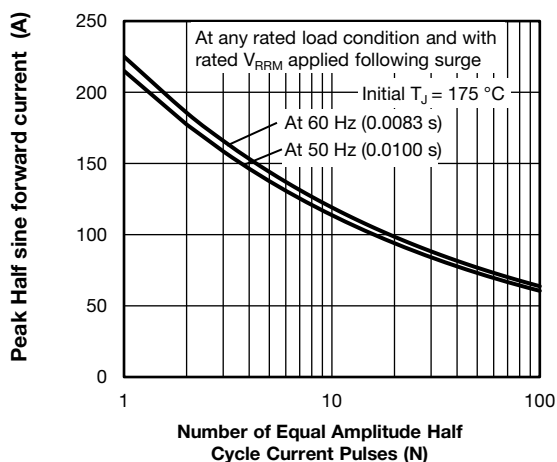


Fig. 5 - Maximum Non-Repetitive Surge Current

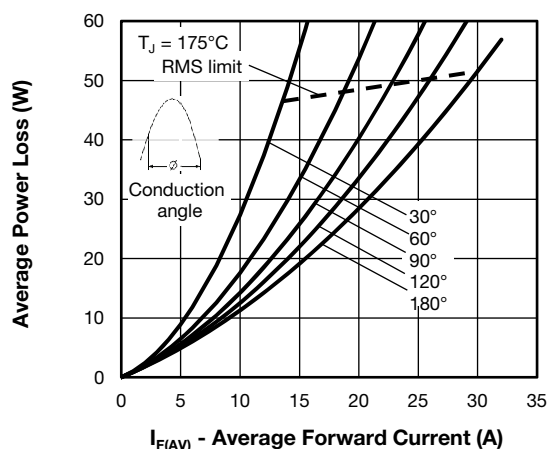


Fig. 3 - Forward Power Loss Characteristics

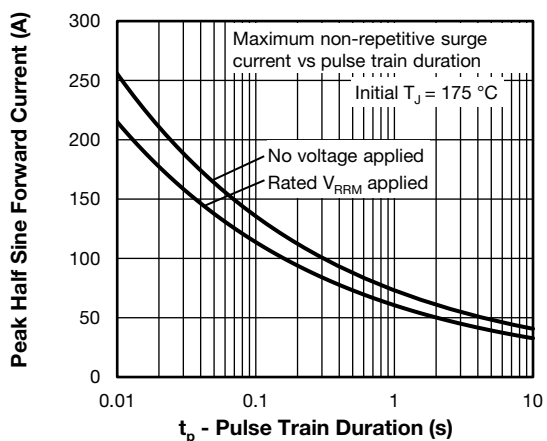


Fig. 6 - Maximum Non-Repetitive Surge Current

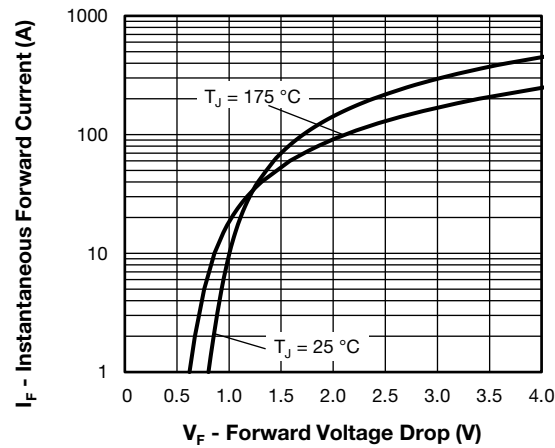
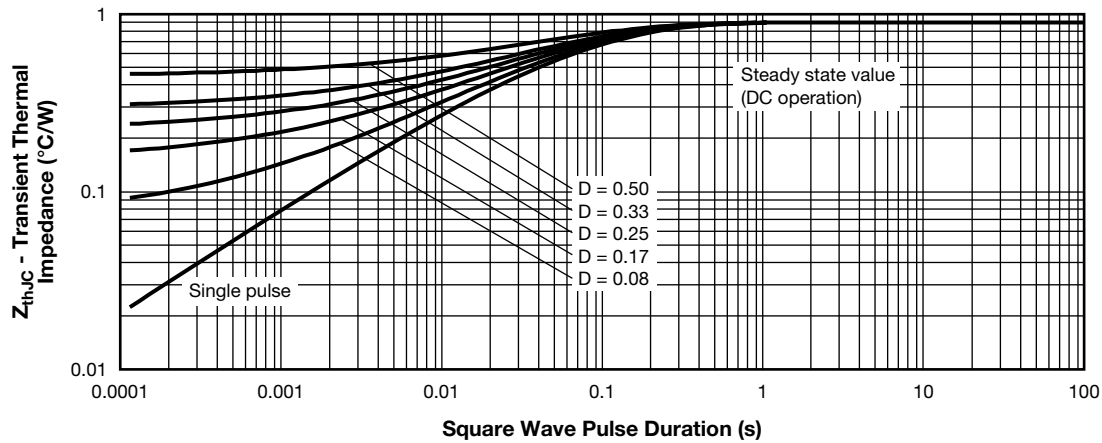


Fig. 7 - Forward Voltage Drop Characteristics


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



## ORDERING INFORMATION TABLE

Device code	VS-	30	E	T	S	12	S	2	L	-M3
	1	2	3	4	5	6	7	8	9	10

- 1** - Vishay Semiconductors product
- 2** - Current rating (30 = 30 A)
- 3** - Circuit configuration  
E = single diode
- 4** - Package:  
T = D<sup>2</sup>PAK
- 5** - Type of silicon:  
S = standard recovery rectifier
- 6** - Voltage code x 100 = V<sub>RRM</sub> ———— **12 = 1200 V**
- 7** - S = surface mountable
- 8** - 2 = true 2 pin D<sup>2</sup>PAK
- 9** - L = tape and reel (left oriented), for different orientation, contact factory
- 10** - Environmental digit:  
-M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free

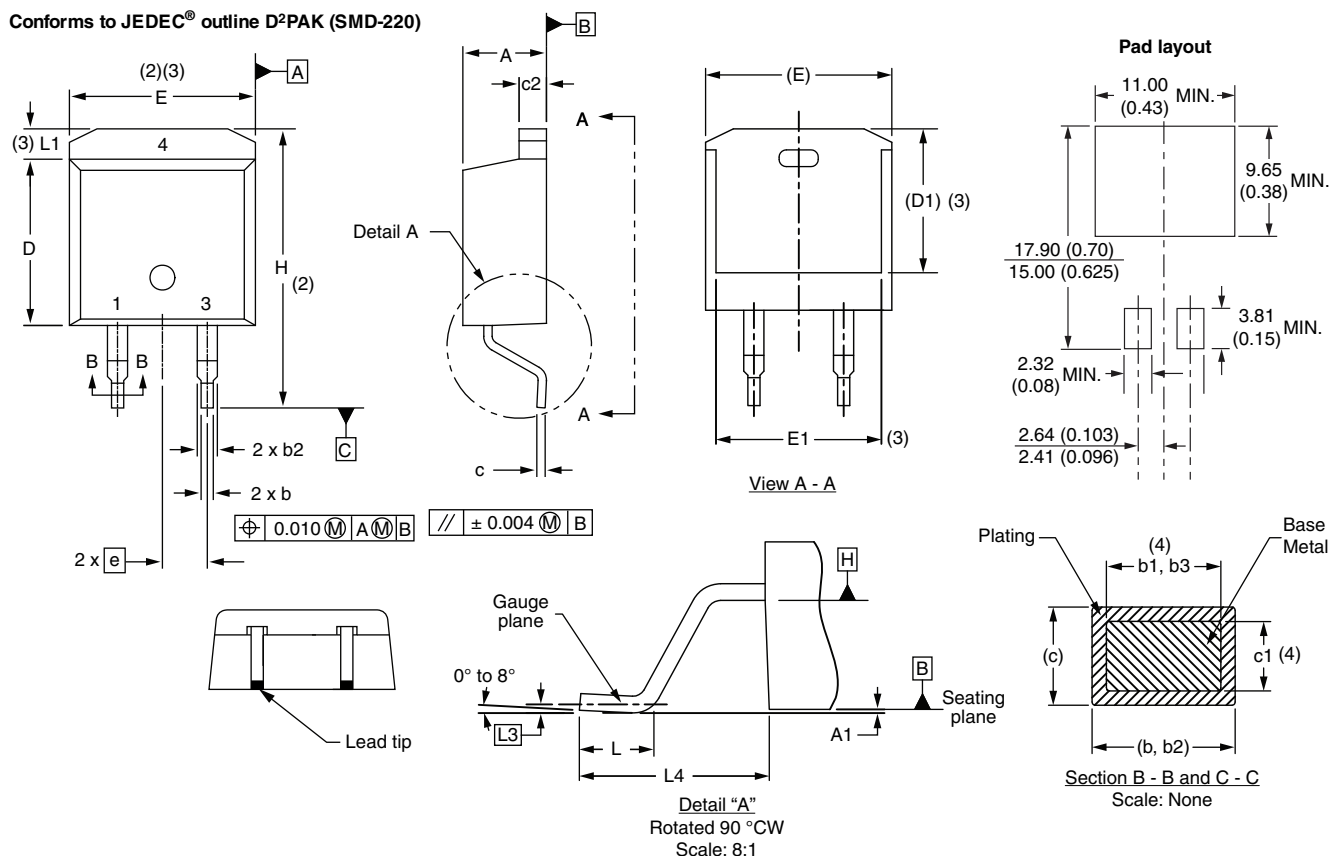
ORDERING INFORMATION (Example)			
PREFERRED P/N	QUANTITY PER REEL	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-30ETS12S2L-M3	800	800	13" diameter reel

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?96683">www.vishay.com/doc?96683</a>
Part marking information	<a href="http://www.vishay.com/doc?96693">www.vishay.com/doc?96693</a>
Packaging information	<a href="http://www.vishay.com/doc?95032">www.vishay.com/doc?95032</a>

## D<sup>2</sup>PAK 2L (TO-263AB 2L)

**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	L3	0.25 BSC		0.010 BSC		
c2	1.14	1.65	0.045	0.065		L4	4.78	5.28	0.188	0.208	
D	8.51	9.65	0.335	0.380	2						

## 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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