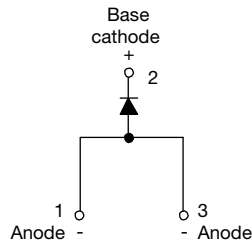


# High Voltage Surface Mountable Input Rectifier Diode, 8 A



DPAK (TO-252AA)



## FEATURES

- Glass passivated pellet chip junction
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- 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](http://www.vishay.com/doc?99912)



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

## APPLICATIONS

- On-board and off-board EV / HEV battery chargers
- Renewable energy inverters

## DESCRIPTION

The VS-8EWS12SLHM3 rectifier high voltage series has been optimized for very low forward voltage drop, with moderate leakage.

The **high reverse voltage** range available allows design of input stage primary rectification with **outstanding voltage surge** capability.

## PRIMARY CHARACTERISTICS

|                       |                 |
|-----------------------|-----------------|
| $I_{F(AV)}$           | 8 A             |
| $V_R$                 | 1200 V          |
| $V_F$ at $I_F$        | 1.1 V           |
| $I_{FSM}$             | 150 A           |
| $T_J$ max.            | 150 °C          |
| Package               | DPAK (TO-252AA) |
| Circuit configuration | Single          |

## OUTPUT CURRENT IN TYPICAL APPLICATIONS

| APPLICATIONS                                                              | SINGLE-PHASE BRIDGE | THREE-PHASE BRIDGE | UNITS |
|---------------------------------------------------------------------------|---------------------|--------------------|-------|
| NEMA FR-4 or G10 glass fabric-based epoxy with 4 oz. (140 $\mu$ m) copper | 1.2                 | 1.6                | A     |
| Aluminum IMS, $R_{thCA} = 15$ °C/W                                        | 2.5                 | 2.8                |       |
| Aluminum IMS with heatsink, $R_{thCA} = 5$ °C/W                           | 5.5                 | 6.5                |       |

### Note

- $T_A = 55$  °C,  $T_J = 125$  °C, footprint 300 mm<sup>2</sup>

## MAJOR RATINGS AND CHARACTERISTICS

| SYMBOL      | CHARACTERISTICS     | VALUES      | UNITS |
|-------------|---------------------|-------------|-------|
| $I_{F(AV)}$ | Sinusoidal waveform | 8           | A     |
| $V_{RRM}$   |                     | 1200        | V     |
| $I_{FSM}$   |                     | 150         | A     |
| $V_F$       | 8 A, $T_J = 25$ °C  | 1.10        | V     |
| $T_J$       |                     | -55 to +150 | °C    |

## VOLTAGE RATINGS

| PART NUMBER    | $V_{RRM}$ , MAXIMUM<br>PEAK REVERSE VOLTAGE<br>V | $V_{RSM}$ , MAXIMUM<br>NON-REPETITIVE PEAK<br>REVERSE VOLTAGE<br>V | $I_{RRM}$<br>AT 150 °C<br>mA |
|----------------|--------------------------------------------------|--------------------------------------------------------------------|------------------------------|
| VS-8EWS12SLHM3 | 1200                                             | 1300                                                               | 0.50                         |

**ABSOLUTE MAXIMUM RATINGS**

| PARAMETER                                           | SYMBOL        | TEST CONDITIONS                                                      | VALUES | UNITS                       |
|-----------------------------------------------------|---------------|----------------------------------------------------------------------|--------|-----------------------------|
| Maximum average forward current                     | $I_{F(AV)}$   | $T_C = 105\text{ }^{\circ}\text{C}$ , 180° conduction half sine wave | 8      | A                           |
| Maximum peak one cycle non-repetitive surge current | $I_{FSM}$     | 10 ms sine pulse, rated $V_{RRM}$ applied                            | 125    |                             |
|                                                     |               | 10 ms sine pulse, no voltage reapplied                               | 150    |                             |
| Maximum $I^2t$ for fusing                           | $I^2t$        | 10 ms sine pulse, rated $V_{RRM}$ applied                            | 78     | $\text{A}^2\text{s}$        |
|                                                     |               | 10 ms sine pulse, no voltage reapplied                               | 110    |                             |
| Maximum $I^2\sqrt{t}$ for fusing                    | $I^2\sqrt{t}$ | $t = 0.1\text{ ms to }10\text{ ms}$ , no voltage reapplied           | 1100   | $\text{A}^2\sqrt{\text{s}}$ |

**ELECTRICAL SPECIFICATIONS**

| PARAMETER                       | SYMBOL      | TEST CONDITIONS                         | VALUES | UNITS            |
|---------------------------------|-------------|-----------------------------------------|--------|------------------|
| Maximum forward voltage drop    | $V_{FM}$    | 8 A, $T_J = 25\text{ }^{\circ}\text{C}$ | 1.1    | V                |
| Forward slope resistance        | $r_t$       | $T_J = 150\text{ }^{\circ}\text{C}$     | 20     | $\text{m}\Omega$ |
| Threshold voltage               | $V_{F(TO)}$ |                                         | 0.82   | V                |
| Maximum reverse leakage current | $I_{RM}$    | $T_J = 25\text{ }^{\circ}\text{C}$      | 0.05   | mA               |
|                                 |             | $T_J = 150\text{ }^{\circ}\text{C}$     | 0.50   |                  |

**THERMAL - MECHANICAL SPECIFICATIONS**

| PARAMETER                                                   | SYMBOL           | TEST CONDITIONS            | VALUES      | UNITS                |
|-------------------------------------------------------------|------------------|----------------------------|-------------|----------------------|
| Maximum junction and storage temperature range              | $T_J, T_{Stg}$   |                            | -55 to +150 | $^{\circ}\text{C}$   |
| Maximum thermal resistance, junction to case                | $R_{thJC}$       | DC operation               | 2.5         | $^{\circ}\text{C/W}$ |
| Typical thermal resistance, junction to ambient (PCB mount) | $R_{thJA}^{(1)}$ |                            | 62          |                      |
| Approximate weight                                          |                  |                            | 1           | g                    |
|                                                             |                  |                            | 0.03        | oz.                  |
| Marking device                                              |                  | Case style DPAK (TO-252AA) | 8EWS12SH    |                      |

**Note**

(1) 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  $^{\circ}\text{C/W}$

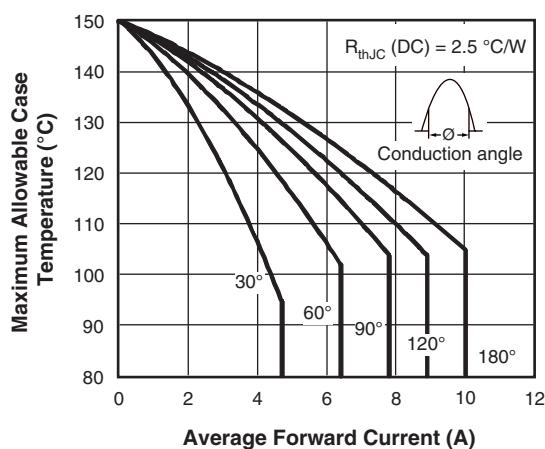


Fig. 1 - Current Rating Characteristics

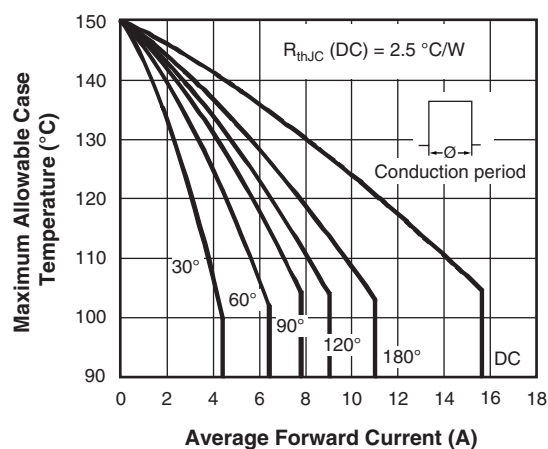


Fig. 2 - Current Rating Characteristics

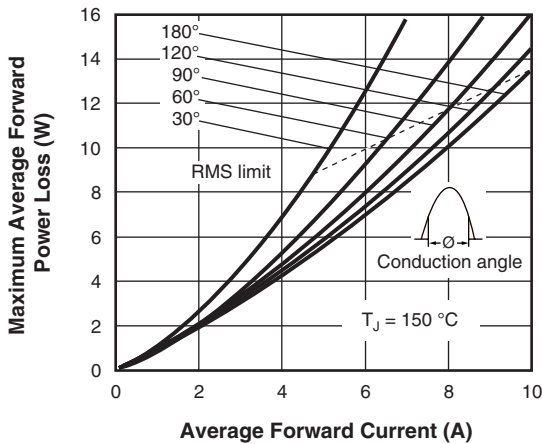


Fig. 3 - Forward Power Loss Characteristics

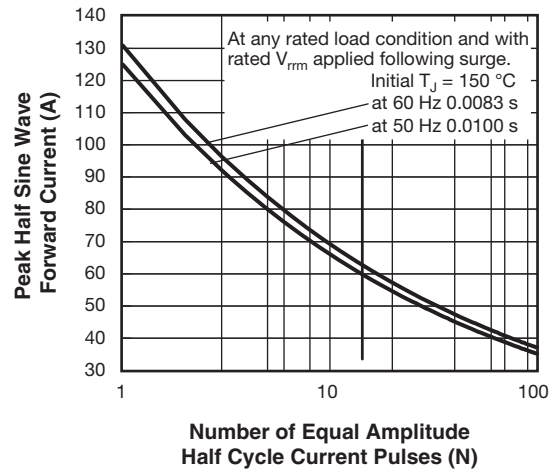


Fig. 5 - Maximum Non-Repetitive Surge Current

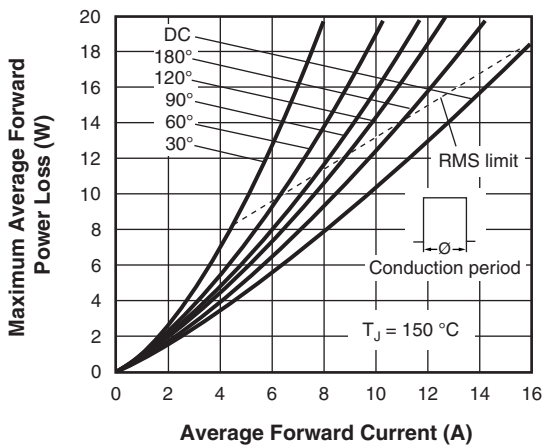


Fig. 4 - Forward Power Loss Characteristics

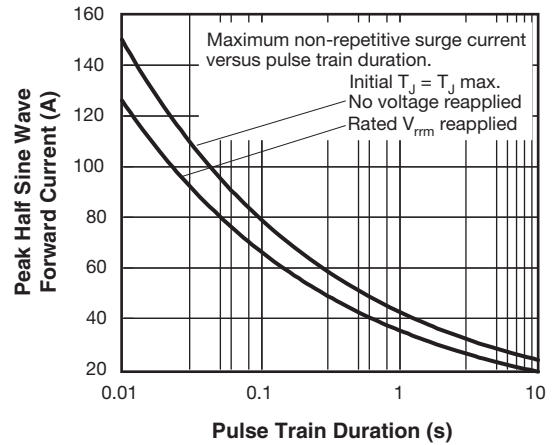


Fig. 6 - Maximum Non-Repetitive Surge Current

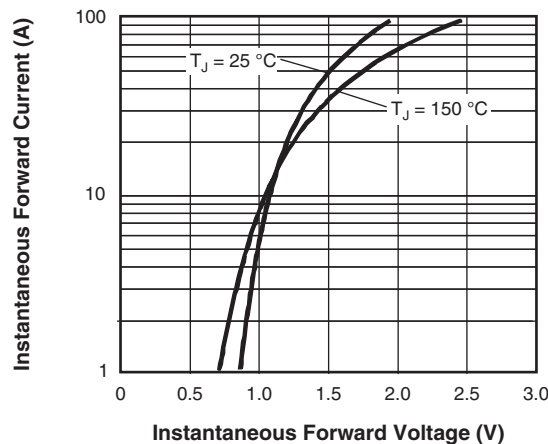
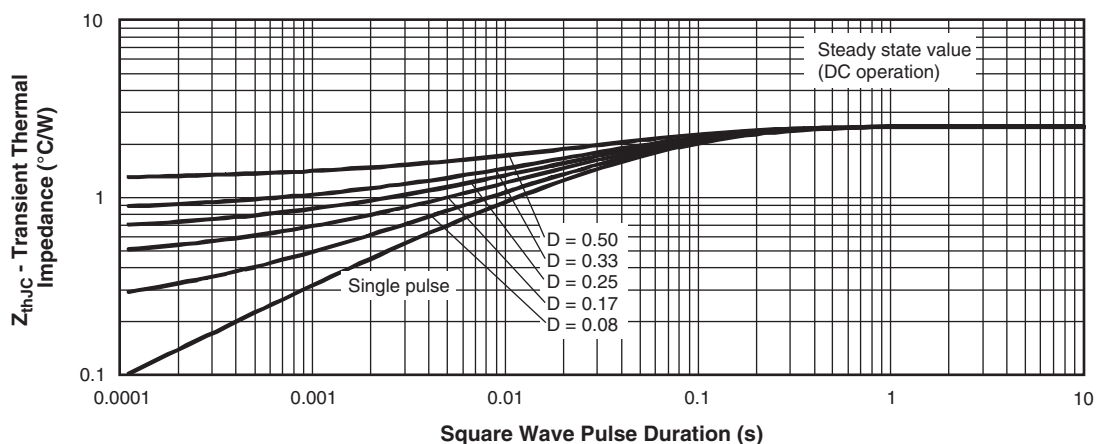


Fig. 7 - Forward Voltage Drop Characteristics


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

### ORDERING INFORMATION TABLE

| Device code | VS-                                                                                        | 8 | E | W | S | 12 | S | L | H | M3 |
|-------------|--------------------------------------------------------------------------------------------|---|---|---|---|----|---|---|---|----|
|             | 1                                                                                          | 2 | 3 | 4 | 5 | 6  | 7 | 8 | 9 | 10 |
| 1           | Vishay Semiconductors product                                                              |   |   |   |   |    |   |   |   |    |
| 2           | Current rating (8 = 8 A)                                                                   |   |   |   |   |    |   |   |   |    |
| 3           | Circuit configuration:<br>E = single                                                       |   |   |   |   |    |   |   |   |    |
| 4           | Package:<br>W = DPAK (TO-252AA)                                                            |   |   |   |   |    |   |   |   |    |
| 5           | Type of silicon:<br>S = standard recovery rectifier                                        |   |   |   |   |    |   |   |   |    |
| 6           | Voltage code x 100 = $V_{RRM}$ — 12 = 1200 V                                               |   |   |   |   |    |   |   |   |    |
| 7           | S = surface mountable                                                                      |   |   |   |   |    |   |   |   |    |
| 8           | L = tape and reel (left oriented), for different orientation contact factory               |   |   |   |   |    |   |   |   |    |
| 9           | H = AEC-Q101 qualified                                                                     |   |   |   |   |    |   |   |   |    |
| 10          | Environmental digit:<br>M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free |   |   |   |   |    |   |   |   |    |

### ORDERING INFORMATION (Example)

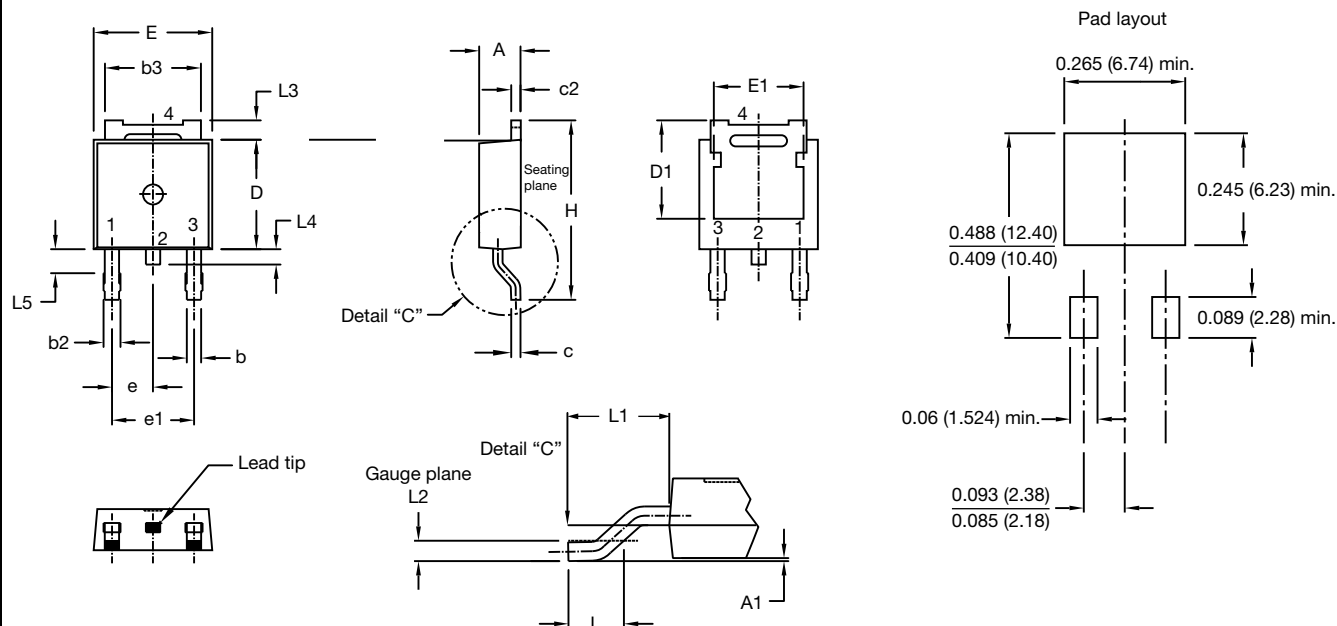
| PREFERRED P/N  | QUANTITY PER T/R | MINIMUM ORDER QUANTITY | PACKAGING DESCRIPTION |
|----------------|------------------|------------------------|-----------------------|
| VS-8EWS12SLHM3 | 3000             | 3000                   | 13" diameter reel     |

### LINKS TO RELATED DOCUMENTS

|                          |                                                                        |
|--------------------------|------------------------------------------------------------------------|
| Dimensions               | <a href="http://www.vishay.com/doc?95519">www.vishay.com/doc?95519</a> |
| Part marking information | <a href="http://www.vishay.com/doc?95518">www.vishay.com/doc?95518</a> |
| Packaging information    | <a href="http://www.vishay.com/doc?96495">www.vishay.com/doc?96495</a> |
| SPIICE model             | <a href="http://www.vishay.com/doc?96668">www.vishay.com/doc?96668</a> |

### DPAK (TO-252AA)

#### DIMENSIONS in millimeters and inches



| SYMBOL | MILLIMETERS |      | INCHES |       | NOTES |
|--------|-------------|------|--------|-------|-------|
|        | MIN.        | MAX. | MIN.   | MAX.  |       |
| A      | 2.18        | 2.39 | 0.086  | 0.094 |       |
| A1     | -           | 0.13 | -      | 0.005 |       |
| b      | 0.64        | 0.89 | 0.025  | 0.035 |       |
| b2     | 0.76        | 1.14 | 0.030  | 0.045 |       |
| b3     | 4.95        | 5.46 | 0.195  | 0.215 | 3     |
| c      | 0.46        | 0.61 | 0.018  | 0.024 |       |
| c2     | 0.46        | 0.89 | 0.018  | 0.035 |       |
| D      | 5.97        | 6.22 | 0.235  | 0.245 | 5     |
| D1     | 5.21        | -    | 0.205  | -     | 3     |
| E      | 6.35        | 6.73 | 0.250  | 0.265 | 5     |
| E1     | 4.32        | -    | 0.170  | -     | 3     |

| SYMBOL | MILLIMETERS |       | INCHES     |       | NOTES |
|--------|-------------|-------|------------|-------|-------|
|        | MIN.        | MAX.  | MIN.       | MAX.  |       |
| e      | 2.29 BSC    |       | 0.090 BSC  |       |       |
| H      | 9.40        | 10.41 | 0.370      | 0.410 |       |
| L      | 1.40        | 1.78  | 0.055      | 0.070 |       |
| L1     | 2.74 BSC    |       | 0.108 REF. |       |       |
| L2     | 0.51 BSC    |       | 0.020 BSC  |       |       |
| L3     | 0.89        | 1.27  | 0.035      | 0.050 | 3     |
| L4     | -           | 1.02  | -          | 0.040 |       |
| L5     | 1.14        | 1.52  | 0.045      | 0.060 | 2     |

#### Notes

- (1) Dimensioning and tolerancing as per ASME Y14.5M-1994
- (2) Lead dimension uncontrolled in L5
- (3) Dimension D1, E1, L3 and b3 establish a minimum mounting surface for thermal pad
- (4) Dimensions 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 outermost extremes of the plastic body
- (5) Outline conforms to JEDEC® outline TO-252AA



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