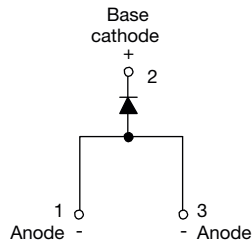




## Surface Mount Fast Soft Recovery Rectifier Diode, 8 A



TO-252AA (D-PAK)



### FEATURES

- Glass passivated pellet chip junction
- Meets MSL level 1, per J-STD-020, LF maximum of 260 °C
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



RoHS COMPLIANT

### APPLICATIONS

- Output rectification and freewheeling diode in inverters, choppers and converters
- Input rectifications where severe restrictions on conducted EMI should be met

### DESCRIPTION

The VS-8EWF..SPbF fast soft recovery rectifier series has been optimized for combined short reverse recovery time, low forward voltage drop and low leakage current. The glass passivation ensures stable reliable operation in the most severe temperature and power cycling conditions. This series is designed and qualified for industrial level.

| PRODUCT SUMMARY |                     |
|-----------------|---------------------|
| Package         | TO-252AA (D-PAK)    |
| $I_{F(AV)}$     | 8 A                 |
| $V_R$           | 200 V, 400 V, 600 V |
| $V_F$ at $I_F$  | 1.2 V               |
| $I_{FSM}$       | 150 A               |
| $t_{rr}$        | 55 ns               |
| $T_J$ max.      | 150 °C              |
| Diode variation | Single die          |
| Snap factor     | 0.5                 |

| MAJOR RATINGS AND CHARACTERISTICS |                           |             |       |
|-----------------------------------|---------------------------|-------------|-------|
| SYMBOL                            | CHARACTERISTICS           | VALUES      | UNITS |
| $I_{F(AV)}$                       | Sinusoidal waveform       | 8           | A     |
| $V_{RRM}$                         |                           | 200 to 600  | V     |
| $I_{FSM}$                         |                           | 150         | A     |
| $V_F$                             | 8 A, $T_J = 25\text{ °C}$ | 1.2         | V     |
| $t_{rr}$                          | 1 A, 100 A/ $\mu$ s       | 55          | ns    |
| $T_J$                             | Range                     | -40 to +150 | °C    |

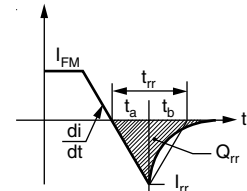
| VOLTAGE RATINGS |   |  |                           |
|-----------------|---|--|---------------------------|
| PART NUMBER     | $V_{RRM}$ , MAXIMUM PEAK REVERSE VOLTAGE<br>V | $V_{RSM}$ , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE<br>V | $I_{RRM}$ AT 150 °C<br>mA |
| VS-8EWF02SPbF   | 200   | 300  | 3                         |
| VS-8EWF04SPbF   | 400   | 500  |                           |
| VS-8EWF06SPbF   | 600   | 700  |                           |

| ABSOLUTE MAXIMUM RATINGS                            |               |  |        |               |
|---|---------------|--|--------|---------------|
| PARAMETER   | SYMBOL        | TEST CONDITIONS  | VALUES | UNITS         |
| Maximum average forward current                     | $I_{F(AV)}$   | $T_C = 96\text{ °C}$ , 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     | $A^2s$        |
|   |               | 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   | $A^2\sqrt{s}$ |



| ELECTRICAL SPECIFICATIONS       |             |                                       |                               |        |                  |
|---------------------------------|-------------|---------------------------------------|-------------------------------|--------|------------------|
| PARAMETER                       | SYMBOL      | TEST CONDITIONS                       |                               | VALUES | UNITS            |
| Maximum forward voltage drop    | $V_{FM}$    | 8 A, $T_J = 25\text{ }^\circ\text{C}$ |                               | 1.2    | V                |
| Forward slope resistance        | $r_t$       | $T_J = 150\text{ }^\circ\text{C}$     |                               | 16     | $\text{m}\Omega$ |
| Threshold voltage               | $V_{F(TO)}$ |                                       |                               | 1.13   | V                |
| Maximum reverse leakage current | $I_{RM}$    | $T_J = 25\text{ }^\circ\text{C}$      | $V_R = \text{Rated } V_{RRM}$ | 0.1    | mA               |
|                                 |             | $T_J = 150\text{ }^\circ\text{C}$     |                               | 3      |                  |

| RECOVERY CHARACTERISTICS |          |   |        |               |
|--------------------------|----------|---|--------|---------------|
| PARAMETER                | SYMBOL   | TEST CONDITIONS   | VALUES | UNITS         |
| Reverse recovery time    | $t_{rr}$ | $I_F$ at 8 A <sub>pk</sub><br>25 A/ $\mu\text{s}$<br>$T_J = 25\text{ }^\circ\text{C}$ | 200    | ns            |
| Reverse recovery current | $I_{rr}$ |   | 2.6    | A             |
| Reverse recovery charge  | $Q_{rr}$ |   | 0.25   | $\mu\text{C}$ |
| Snap factor              | S        |   | 0.5    |               |



| 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                | 2.5         | $^\circ\text{C}/\text{W}$ |
| Typical thermal resistance, junction to ambient (PCB mount) | $R_{thJA}^{(1)}$ |                             | 50          |                           |
| Approximate weight  |                  |                             | 1           | g                         |
|   |                  |                             | 0.03        | oz.                       |
| Marking device  |                  | Case style TO-252AA (D-PAK) | 8EWF06S     |                           |

**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

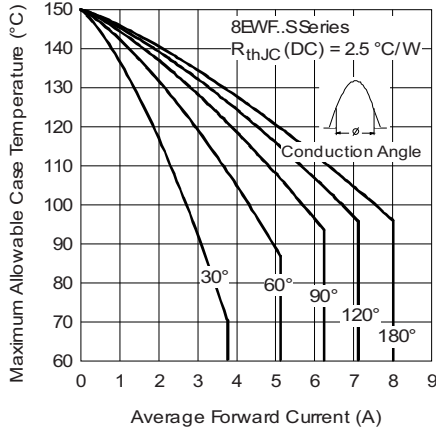


Fig. 1 - Current Rating Characteristics

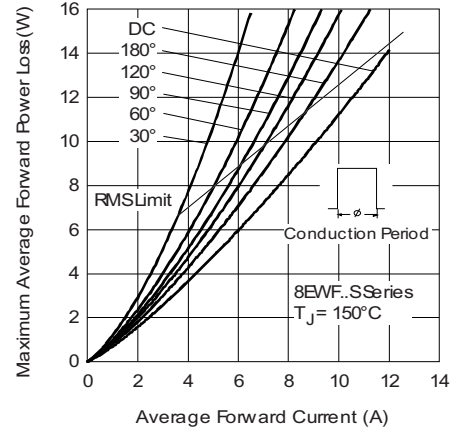


Fig. 4 - Forward Power Loss Characteristics

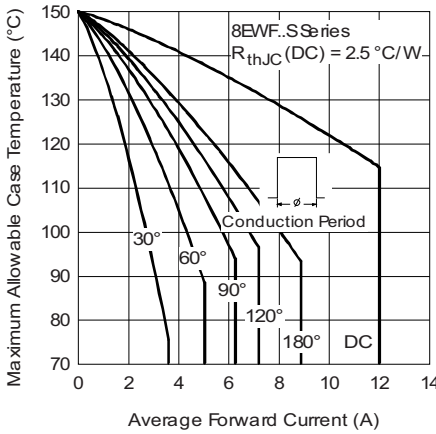


Fig. 2 - Current Rating Characteristics

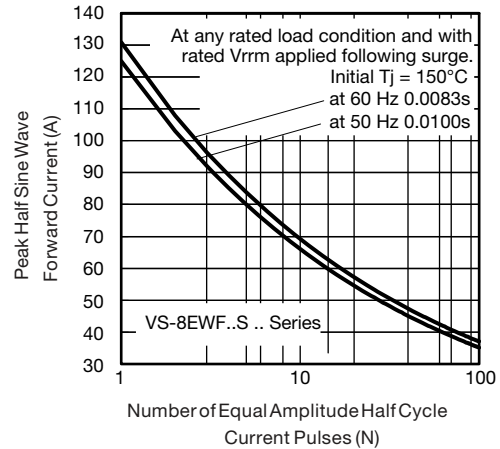


Fig. 5 - Maximum Non-Repetitive Surge Current

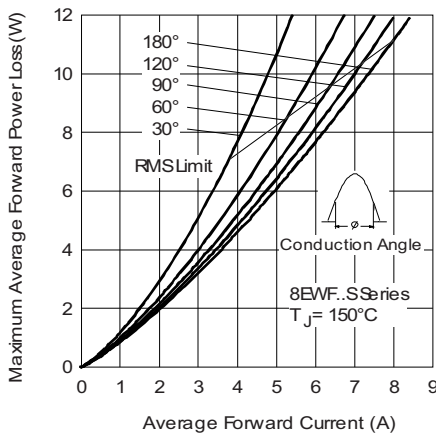


Fig. 3 - Forward Power Loss Characteristics

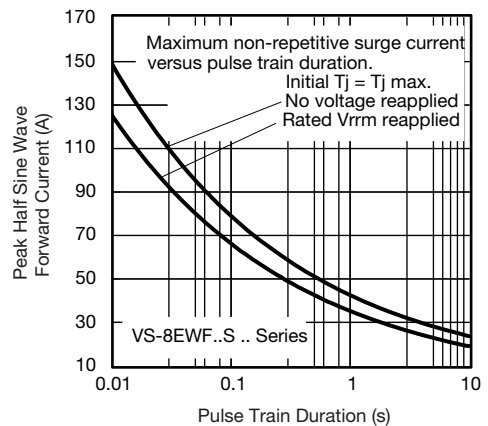


Fig. 6 - Maximum Non-Repetitive Surge Current

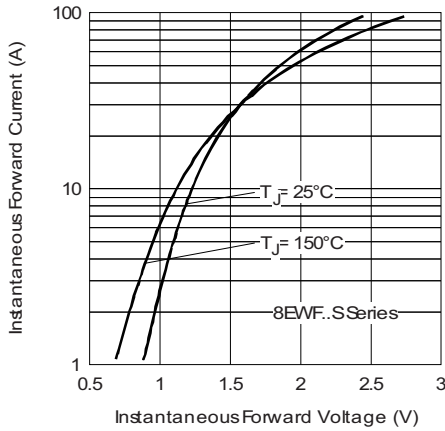


Fig. 7 - Forward Voltage Drop Characteristics

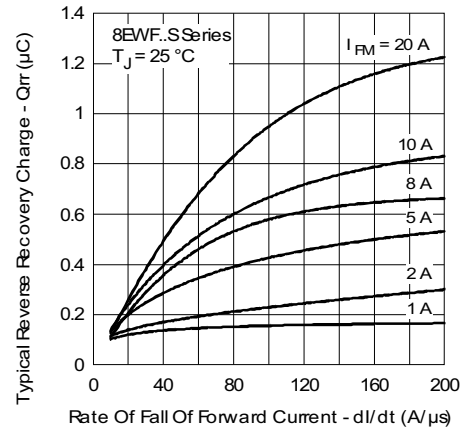


Fig. 10 - Recovery Charge Characteristics,  $T_J = 25\text{ }^\circ\text{C}$

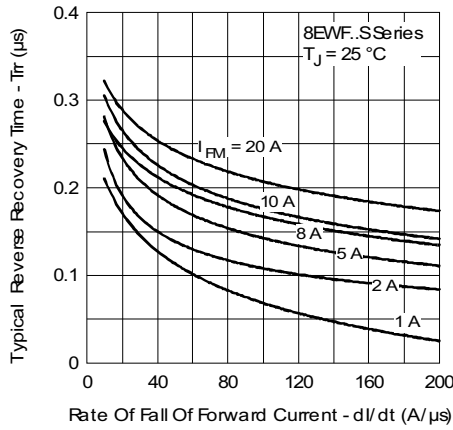


Fig. 8 - Recovery Time Characteristics,  $T_J = 25\text{ }^\circ\text{C}$

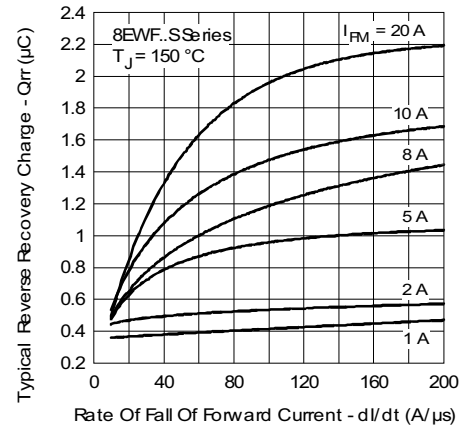


Fig. 11 - Recovery Charge Characteristics,  $T_J = 150\text{ }^\circ\text{C}$

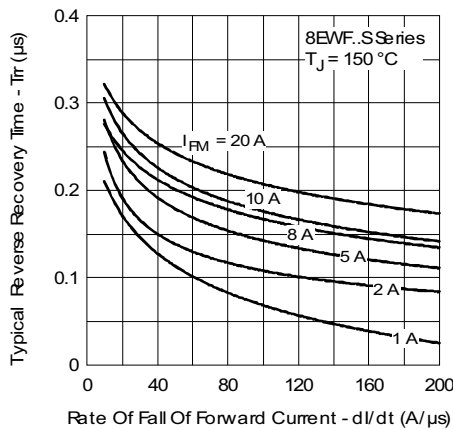


Fig. 9 - Recovery Time Characteristics,  $T_J = 150\text{ }^\circ\text{C}$

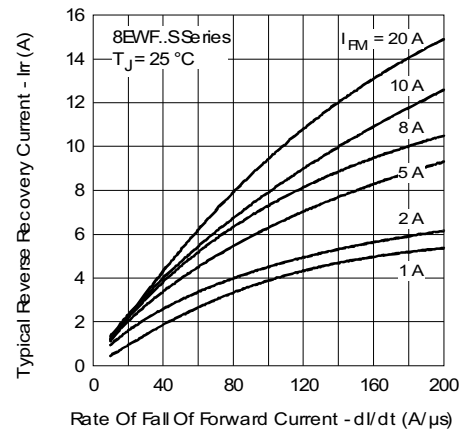


Fig. 12 - Recovery Current Characteristics,  $T_J = 25\text{ }^\circ\text{C}$

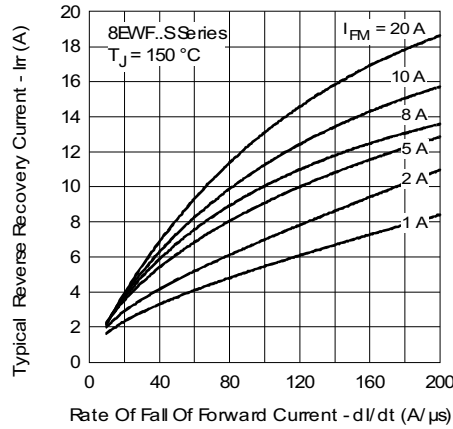


Fig. 13 - Recovery Current Characteristics,  $T_J = 150^\circ C$

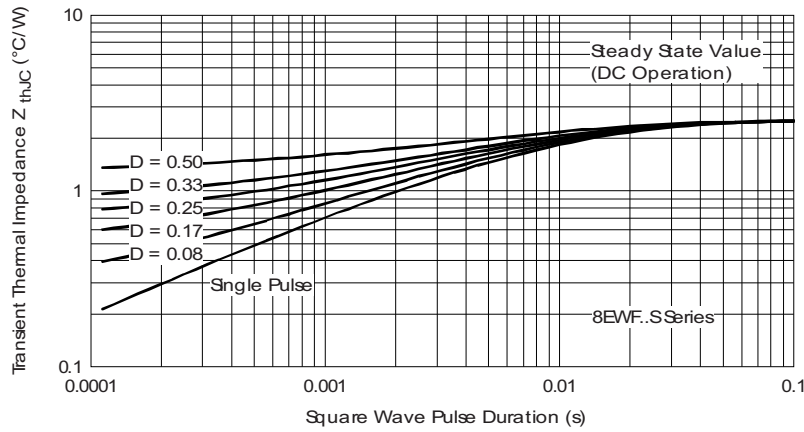
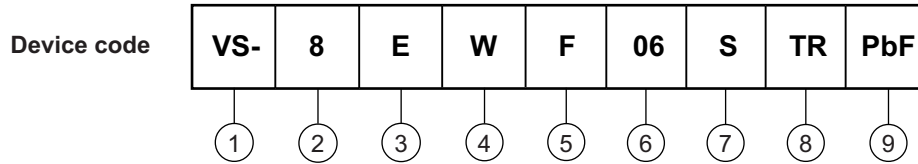


Fig. 14 - Thermal Impedance  $Z_{thJC}$  Characteristics



## ORDERING INFORMATION TABLE



- 1** - Vishay Semiconductors product
- 2** - Current rating (8 = 8 A)
- 3** - Circuit configuration:  
E = single diode
- 4** - Package:  
W = D-PAK
- 5** - Type of silicon:  
F = fast soft recovery rectifier
- 6** - Voltage code x 100 =  $V_{RRM}$ 

|            |
|------------|
| 02 = 200 V |
| 04 = 400 V |
| 06 = 600 V |
- 7** - S = surface mountable
- 8** -
  - TR = tape and reel
  - TRR = tape and reel (right oriented)
  - TRL = tape and reel (left oriented)
- 9** - PbF = lead (Pb)-free

| LINKS TO RELATED DOCUMENTS |  |
|----------------------------|--|
| Dimensions                 | <a href="http://www.vishay.com/doc?95016">www.vishay.com/doc?95016</a> |
| Part marking information   | <a href="http://www.vishay.com/doc?95059">www.vishay.com/doc?95059</a> |
| Packaging information      | <a href="http://www.vishay.com/doc?95033">www.vishay.com/doc?95033</a> |
| SPIICE model               | <a href="http://www.vishay.com/doc?95551">www.vishay.com/doc?95551</a> |

### D-PAK (TO-252AA)

**DIMENSIONS** in millimeters and inches



| SYMBOL | MILLIMETERS |      | INCHES |       | NOTES | SYMBOL | MILLIMETERS |       | INCHES     |       | NOTES |
|--------|-------------|------|--------|-------|-------|--------|-------------|-------|------------|-------|-------|
|        | MIN.        | MAX. | MIN.   | MAX.  |       |        | MIN.        | MAX.  | MIN.       | MAX.  |       |
| A      | 2.18        | 2.39 | 0.086  | 0.094 |       | e      | 2.29 BSC    |       | 0.090 BSC  |       |       |
| A1     | -           | 0.13 | -      | 0.005 |       | H      | 9.40        | 10.41 | 0.370      | 0.410 |       |
| b      | 0.64        | 0.89 | 0.025  | 0.035 |       | L      | 1.40        | 1.78  | 0.055      | 0.070 |       |
| b2     | 0.76        | 1.14 | 0.030  | 0.045 |       | L1     | 2.74 BSC    |       | 0.108 REF. |       |       |
| b3     | 4.95        | 5.46 | 0.195  | 0.215 | 3     | L2     | 0.51 BSC    |       | 0.020 BSC  |       |       |
| c      | 0.46        | 0.61 | 0.018  | 0.024 |       | L3     | 0.89        | 1.27  | 0.035      | 0.050 | 3     |
| c2     | 0.46        | 0.89 | 0.018  | 0.035 |       | L4     | -           | 1.02  | -          | 0.040 |       |
| D      | 5.97        | 6.22 | 0.235  | 0.245 | 5     | L5     | 1.14        | 1.52  | 0.045      | 0.060 | 2     |
| D1     | 5.21        | -    | 0.205  | -     | 3     | Ø      | 0°          | 10°   | 0°         | 10°   |       |
| E      | 6.35        | 6.73 | 0.250  | 0.265 | 5     | Ø1     | 0°          | 15°   | 0°         | 15°   |       |
| E1     | 4.32        | -    | 0.170  | -     | 3     | Ø2     | 25°         | 35°   | 25°        | 35°   |       |

**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) Section C - C dimension apply to the flat section of the lead between 0.13 and 0.25 mm (0.005 and 0.10") from the lead tip
- (5) 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 outermost extremes of the plastic body
- (6) Dimension b1 and c1 applied to base metal only
- (7) Datum A and B to be determined at datum plane H
- (8) Outline conforms to JEDEC outline TO-252AA



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