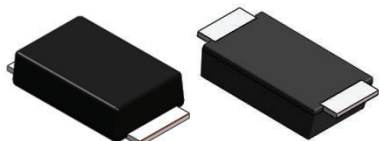


# Hyperfast Rectifier, 2 A FRED Pt®

## eSMP® Series



Top View

Bottom View

## SlimSAW (DO-221AD)



## LINKS TO ADDITIONAL RESOURCES



| PRIMARY CHARACTERISTICS |                    |
|-------------------------|--------------------|
| $I_{F(AV)}$             | 2 A                |
| $V_R$                   | 100 V, 200 V       |
| $V_F$ at $I_F$          | 0.69 V             |
| $I_{FSM}$               | 60 A               |
| $t_{rr}$ (typ.)         | 15 ns              |
| $T_J$ max.              | 175 °C             |
| Package                 | SlimSAW (DO-221AD) |
| Circuit configuration   | Single             |

## FEATURES

- Low profile package
- Ideal for automated placement
- Low forward voltage drop, low power losses
- Low leakage current
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified, class 2 whisker test
- Compatible to SOD-128 package case outline
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
FREE

## DESCRIPTION / APPLICATIONS

For use in high frequency, freewheeling, DC/DC converters, PFC, and in snubber industrial, and automotive applications.

## MECHANICAL DATA

**Case:** SlimSAW (DO-221AD)

Molding compound meets UL 94 V-0 flammability rating  
Halogen-free, RoHS-compliant

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

**Polarity:** color band denotes cathode end

## ABSOLUTE MAXIMUM RATINGS

| PARAMETER                                   | SYMBOL            | TEST CONDITIONS                              | VALUES      | UNITS |
|---------------------------------------------|-------------------|----------------------------------------------|-------------|-------|
| Peak repetitive reverse voltage             | $V_{RRM}$         | $T_C = 151\text{ °C}$                        | 100         | V     |
|                                             |                   |                                              | 200         |       |
| Average rectified forward current           | $I_{F(AV)}^{(1)}$ | $T_J = 25\text{ °C}$ , 10 ms sine pulse wave | 2           | A     |
| Non-repetitive peak surge current           | $I_{FSM}$         |                                              | 60          |       |
| Operating junction and storage temperatures | $T_J, T_{Stg}$    |                                              | -55 to +175 | °C    |

### Note

(1) Mounted on infinite heatsink

## ELECTRICAL SPECIFICATIONS ( $T_J = 25\text{ °C}$ unless otherwise specified)

| PARAMETER                           | SYMBOL        | TEST CONDITIONS                         | MIN. | TYP. | MAX. | UNITS         |
|-------------------------------------|---------------|-----------------------------------------|------|------|------|---------------|
| Breakdown voltage, blocking voltage | $V_{BR}, V_R$ | $I_R = 100\text{ }\mu\text{A}$          | 100  | -    | -    | V             |
|                                     |               |                                         | 200  | -    | -    |               |
| Forward voltage, per diode          | $V_F$         | $I_F = 2\text{ A}$                      | -    | 0.86 | 0.93 |               |
|                                     |               | $I_F = 2\text{ A}, T_J = 150\text{ °C}$ | -    | 0.69 | 0.75 |               |
| Reverse leakage current, per diode  | $I_R$         | $V_R = V_R$ rated                       | -    | -    | 2    | $\mu\text{A}$ |
|                                     |               | $T_J = 150\text{ °C}, V_R = V_R$ rated  | -    | -    | 20   |               |
| Junction capacitance                | $C_T$         | $V_R = 200\text{ V}$                    | -    | 12   | -    | pF            |

**DYNAMIC RECOVERY CHARACTERISTICS** ( $T_J = 25^\circ\text{C}$  unless otherwise specified)

| PARAMETER               | SYMBOL    | TEST CONDITIONS                                                                   | MIN. | TYP. | MAX. | UNITS |
|-------------------------|-----------|-----------------------------------------------------------------------------------|------|------|------|-------|
| Reverse recovery time   | $t_{rr}$  | $I_F = 1.0\text{ A}$ , $dI_F/dt = 50\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$  | -    | 22   | -    | ns    |
|                         |           | $I_F = 1.0\text{ A}$ , $dI_F/dt = 100\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$ | -    | 15   | -    |       |
|                         |           | $I_F = 0.5\text{ A}$ , $I_R = 1\text{ A}$ , $I_{rr} = 0.25\text{ A}$              | -    | -    | 28   |       |
|                         |           | $T_J = 25^\circ\text{C}$                                                          | -    | 16   | -    |       |
|                         |           | $T_J = 125^\circ\text{C}$                                                         | -    | 26   | -    |       |
| Peak recovery current   | $I_{RRM}$ | $T_J = 25^\circ\text{C}$                                                          | -    | 2.7  | -    | A     |
|                         |           | $T_J = 125^\circ\text{C}$                                                         | -    | 3.4  | -    |       |
| Reverse recovery charge | $Q_{rr}$  | $T_J = 25^\circ\text{C}$                                                          | -    | 20   | -    | nC    |
|                         |           | $T_J = 125^\circ\text{C}$                                                         | -    | 43   | -    |       |

**THERMAL - MECHANICAL SPECIFICATIONS**

| PARAMETER                                      | SYMBOL                            | TEST CONDITIONS                                        | MIN. | TYP. | MAX. | UNITS |
|------------------------------------------------|-----------------------------------|--------------------------------------------------------|------|------|------|-------|
| Maximum junction and storage temperature range | T <sub>J</sub> , T <sub>Stg</sub> |                                                        | -55  | -    | 175  | °C    |
| Thermal resistance, junction to mount          | R <sub>thJM</sub> <sup>(1)</sup>  | Infinite heatsink                                      | -    | 12   | 15   | °C/W  |
| Thermal resistance, junction to ambient        | R <sub>thJA</sub>                 | Device mounted on FR4 PCB,<br>2 oz. standard footprint | -    | 120  | 150  |       |
| Marking device                                 | VS-2EYH01HM3                      | Case style SlimSMAW (DO-221AD)                         | 2H1  |      |      |       |
|                                                | VS-2EYH02HM3                      |                                                        | 2H2  |      |      |       |

**Note**

(1) Thermal resistance junction to mount follows JEDEC® 51-14 transient dual interface test method (TDIM)

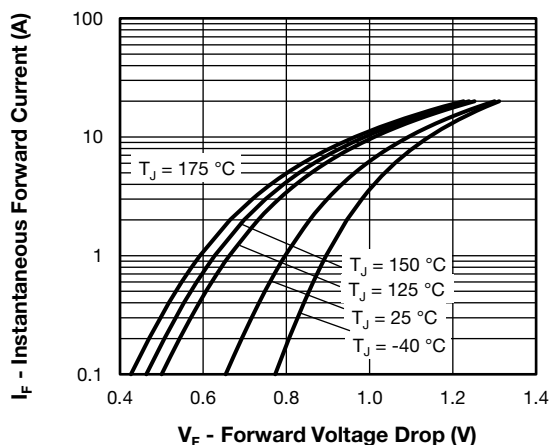


Fig. 1 - Typical Forward Voltage Drop Characteristics

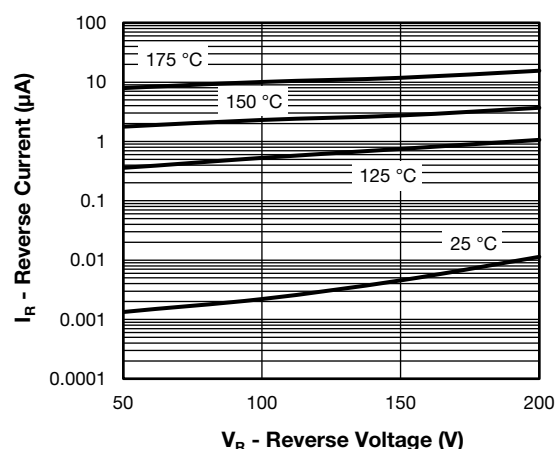


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

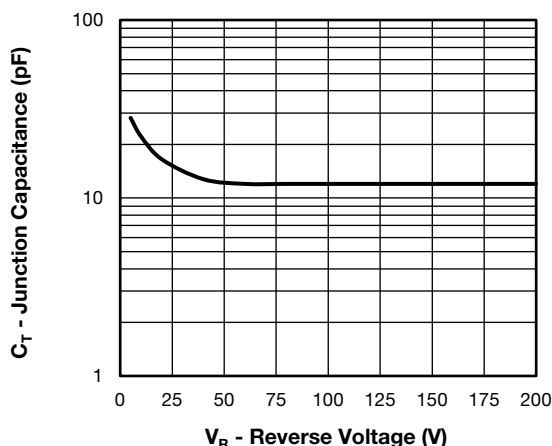


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

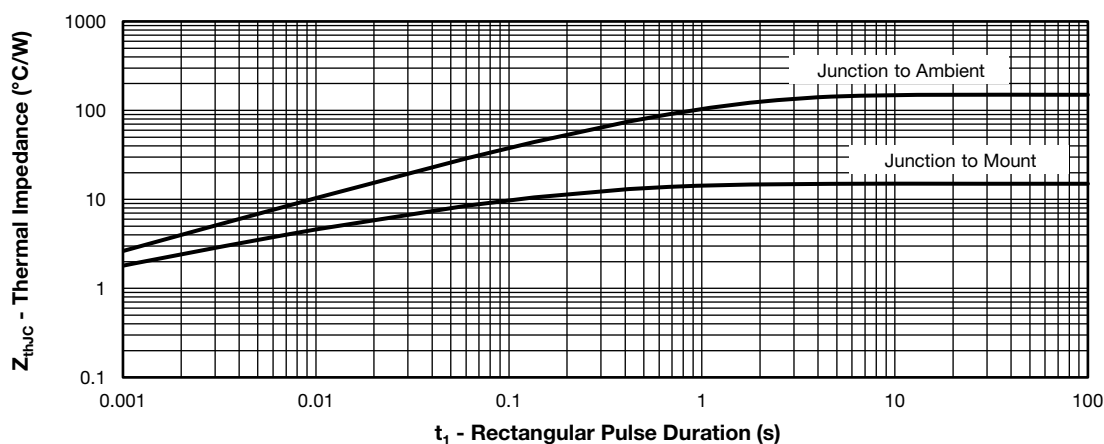
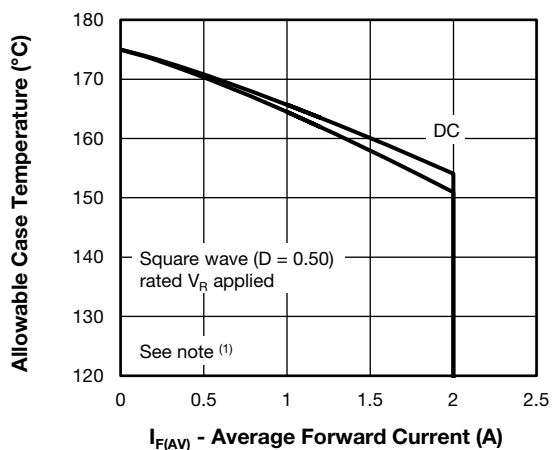

Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

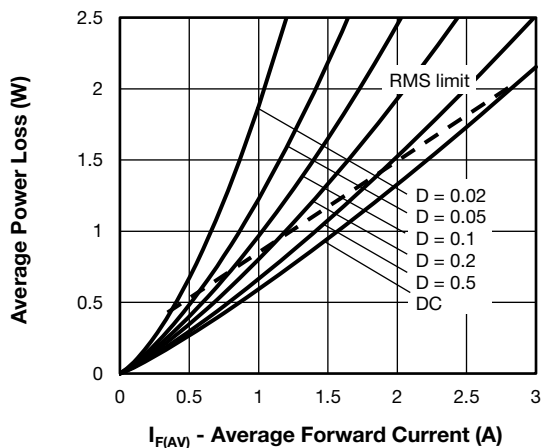


Fig. 6 - Forward Power Loss Characteristics

#### Note

- (1) Formula used:  $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$ ;  
 $P_d$  = forward power loss =  $I_{F(AV)} \times V_{FM}$  at  $(I_{F(AV)}/D)$  (see fig. 5);  
 $P_{dREV}$  = inverse power loss =  $V_{R1} \times I_R (1 - D)$ ;  $I_R$  at  $V_{R1}$  = rated  $V_R$

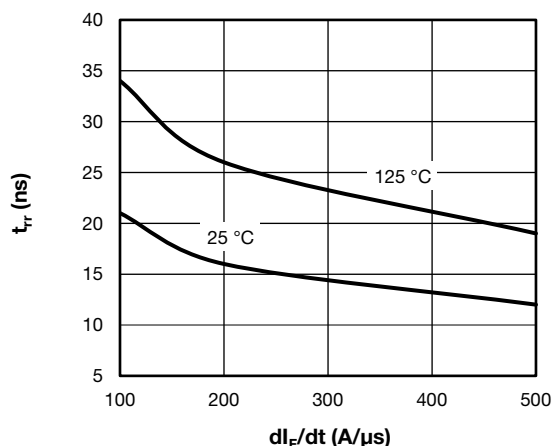


Fig. 7 - Typical Reverse Recovery Time vs.  $di_F/dt$

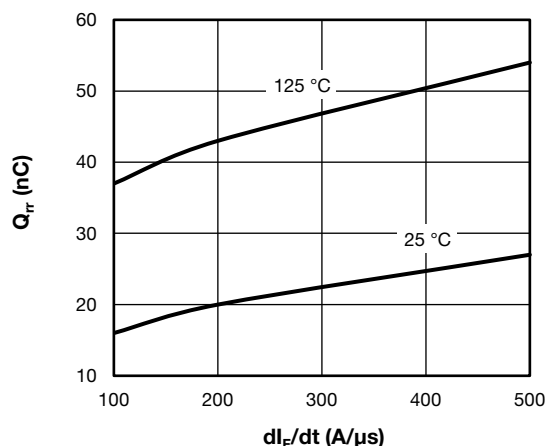


Fig. 8 - Typical Stored Charge vs.  $dl_F/dt$

## ORDERING INFORMATION TABLE

**Device code**

|            |          |          |          |          |           |          |           |
|------------|----------|----------|----------|----------|-----------|----------|-----------|
| <b>VS-</b> | <b>2</b> | <b>E</b> | <b>Y</b> | <b>H</b> | <b>02</b> | <b>H</b> | <b>M3</b> |
|------------|----------|----------|----------|----------|-----------|----------|-----------|

Diagram illustrating the device code structure for the VS-2EYH02HM3:

- 1: Vishay Semiconductors product
- 2: Current rating (2 = 2 A)
- 3: Circuit configuration:  
E = single diode
- 4: Y = SlimSMAW (DO-221AD)
- 5: Process type,  
H = hyperfast recovery
- 6: Voltage code (02 = 200 V)
- 7: H = AEC-Q101 qualified
- 8: M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free

| ORDERING INFORMATION (Example) |                 |                        |               |                                   |
|--------------------------------|-----------------|------------------------|---------------|-----------------------------------|
| PREFERRED P/N                  | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | PACKAGING DESCRIPTION             |
| VS-2EYH01HM3/H                 | 0.033           | H                      | 3500          | 7"diameter plastic tape and reel  |
| VS-2EYH01HM3/I                 | 0.033           | I                      | 14 000        | 13"diameter plastic tape and reel |
| VS-2EYH02HM3/H                 | 0.033           | H                      | 3500          | 7"diameter plastic tape and reel  |
| VS-2EYH02HM3/I                 | 0.033           | I                      | 14 000        | 13"diameter plastic tape and reel |

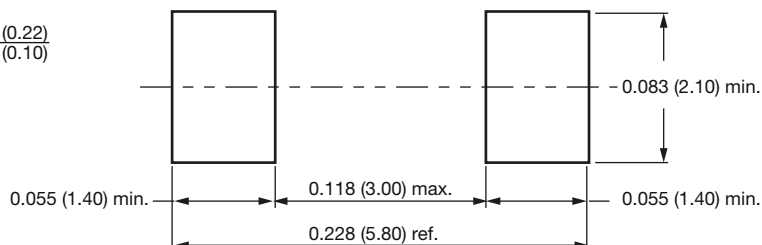
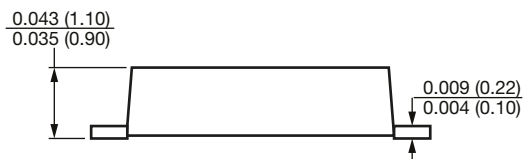
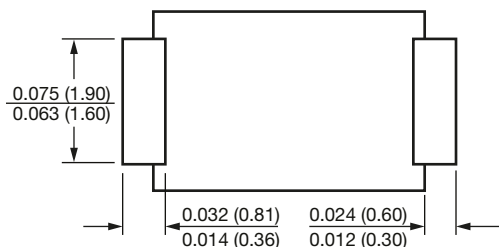
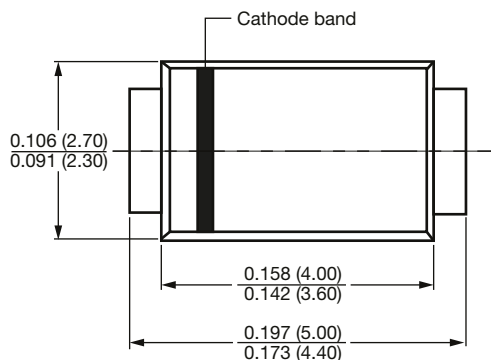
| LINKS TO RELATED DOCUMENTS |                                                                        |
|----------------------------|------------------------------------------------------------------------|
| Dimensions                 | <a href="http://www.vishay.com/doc?96582">www.vishay.com/doc?96582</a> |
| Part marking information   | <a href="http://www.vishay.com/doc?95562">www.vishay.com/doc?95562</a> |
| Packaging information      | <a href="http://www.vishay.com/doc?88869">www.vishay.com/doc?88869</a> |
| SPICE model                | <a href="http://www.vishay.com/doc?96585">www.vishay.com/doc?96585</a> |



## SlimSMAW (DO-221AD)

**DIMENSIONS** in inches (millimeters)

### SlimSMAW (DO-221AD)



Mounting pad layout



## Disclaimer

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