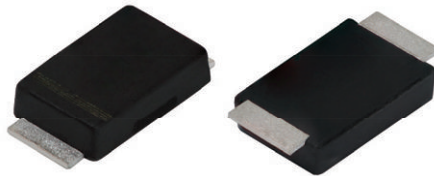


## Hyperfast Rectifier, 3 A FRED Pt<sup>®</sup>

**eSMP<sup>®</sup> Series**


Top View

Bottom View

**SlimSMAW (DO-221AD)**
**LINKS TO ADDITIONAL RESOURCES**


3D Models

| PRIMARY CHARACTERISTICS |                     |
|-------------------------|---------------------|
| $I_{F(AV)}$             | 3 A                 |
| $V_R$                   | 100 V, 200 V        |
| $V_F$ at $I_F$          | 0.71 V              |
| $I_{FSM}$               | 70 A                |
| $t_{rr}$ (typ.)         | 16 ns               |
| $T_J$ max.              | 175 °C              |
| Package                 | SlimSMAW (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
- 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:** SlimSMAW

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             | $V_{RRM}$                  |                                      | 100         | V     |  |
|   |                            |                                      | 200         |       |  |
| Average rectified forward current           | $I_{F(AV)}$ <sup>(1)</sup> | $T_C = 137$ °C                       | 3           | A     |  |
| Non-repetitive peak surge current           | $I_{FSM}$                  | $T_J = 25$ °C, 10 ms sine pulse wave | 70          |       |  |
| Operating junction and storage temperatures | $T_J, T_{Stg}$             |                                      | -55 to +175 | °C    |  |

**Note**

<sup>(1)</sup> Mounted on infinite heatsink

| ELECTRICAL SPECIFICATIONS ( $T_J = 25$ °C unless otherwise specified) |               |                                   |      |      |      |         |  |         |  |
|---|---------------|-----------------------------------|------|------|------|---------|--|---------|--|
| PARAMETER   | SYMBOL        | TEST CONDITIONS                   | MIN. | TYP. | MAX. | UNITS   |  |         |  |
| Breakdown voltage, blocking voltage                                   | $V_{BR}, V_R$ | $I_R = 100$ $\mu$ A               | 100  | -    | -    | V       |  |         |  |
|   |               |                                   | 200  | -    | -    |         |  |         |  |
| Forward voltage, per diode  | $V_F$         | $I_F = 3$ A                       | -    | 0.86 | 0.95 |         |  | $\mu$ A |  |
|   |               | $I_F = 3$ A, $T_J = 150$ °C       | -    | 0.71 | 0.79 |         |  |         |  |
| Reverse leakage current, per diode                                    | $I_R$         | $V_R = V_R$ rated                 | -    | -    | 2    | $\mu$ A |  |         |  |
|   |               | $T_J = 150$ °C, $V_R = V_R$ rated | -    | -    | 20   |         |  |         |  |
| Junction capacitance  | $C_T$         | $V_R = 200$ V                     | -    | 16   | -    | pF      |  |         |  |



| DYNAMIC RECOVERY CHARACTERISTICS (T <sub>J</sub> = 25 °C unless otherwise specified) |                  |   |      |      |      |       |
|--|------------------|---|------|------|------|-------|
| PARAMETER  | SYMBOL           | TEST CONDITIONS   | MIN. | TYP. | MAX. | UNITS |
| Reverse recovery time  | t <sub>rr</sub>  | I <sub>F</sub> = 1.0 A, di <sub>F</sub> /dt = 50 A/μs, V <sub>R</sub> = 30 V  | -    | 22   | -    | ns    |
|  |                  | I <sub>F</sub> = 1.0 A, di <sub>F</sub> /dt = 100 A/μs, V <sub>R</sub> = 30 V | -    | 16   | -    |       |
|  |                  | I <sub>F</sub> = 0.5 A, I <sub>R</sub> = 1A, I <sub>rr</sub> = 0.25 A         | -    | -    | 30   |       |
|  |                  | T <sub>J</sub> = 25 °C  | -    | 18   | -    |       |
|  |                  | T <sub>J</sub> = 125 °C   | -    | 30   | -    |       |
| Peak recovery current  | I <sub>RRM</sub> | T <sub>J</sub> = 25 °C  | -    | 2.5  | -    | A     |
|  |                  | T <sub>J</sub> = 125 °C   | -    | 4    | -    |       |
| Reverse recovery charge  | Q <sub>rr</sub>  | T <sub>J</sub> = 25 °C  | -    | 23   | -    | nC    |
|  |                  | T <sub>J</sub> = 125 °C   | -    | 60   | -    |       |

| 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, 2 oz. standard footprint | -    | 120  | 150  |       |
| Marking device                                 | VS-3EYH01-M3                      | Case style SlimSMAW (DO-221AD)                      | 3H1  |      |      |       |
|  | VS-3EYH02-M3                      |   | 3H2  |      |      |       |

**Note**

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

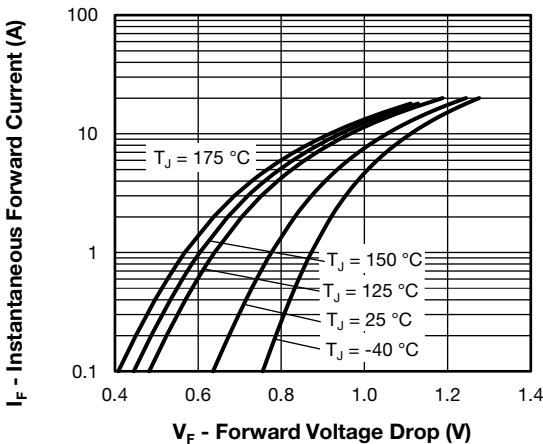


Fig. 1 - Typical Forward Voltage Drop Characteristics

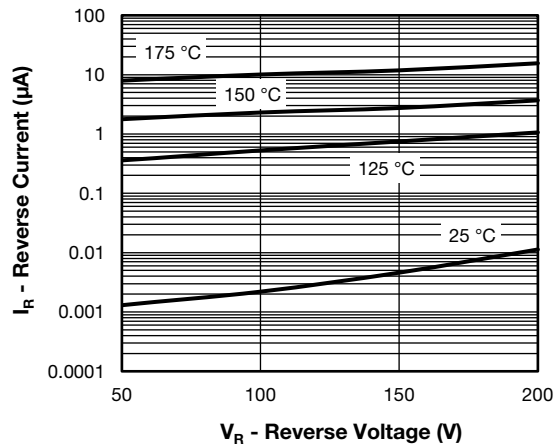


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

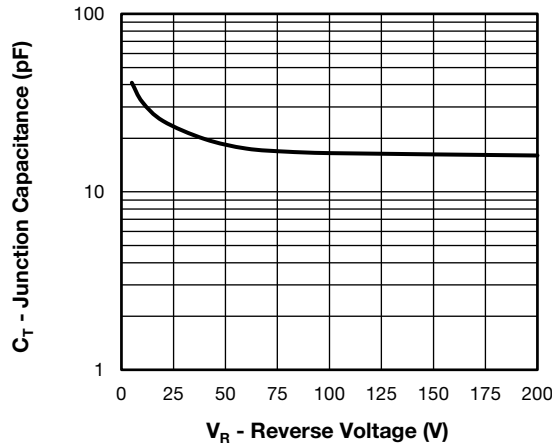


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

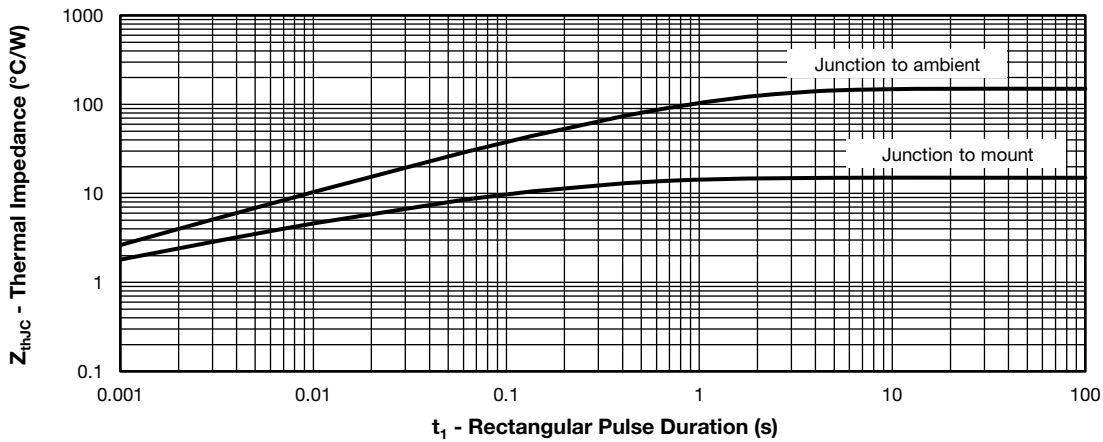


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

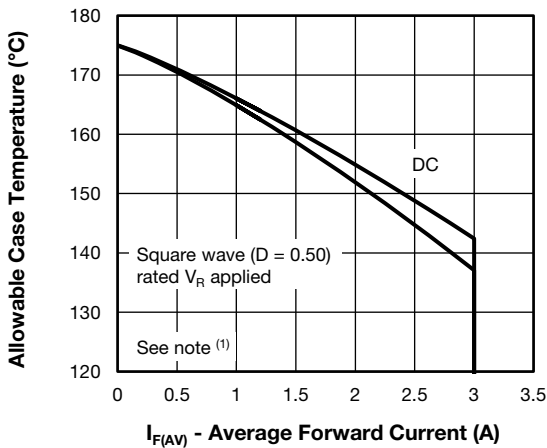


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

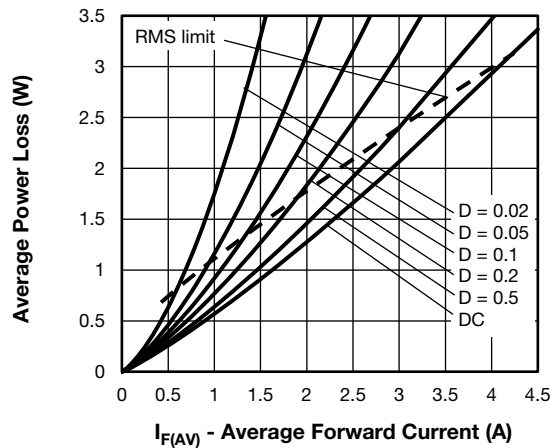


Fig. 6 - Forward Power Loss Characteristics

**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  $V_R$

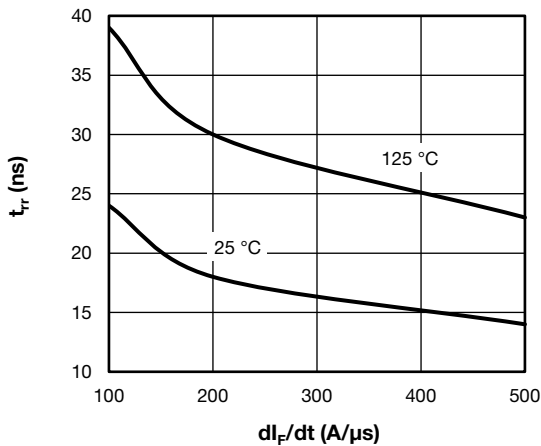


Fig. 7 - Typical Reverse Recovery Time vs. di/dt

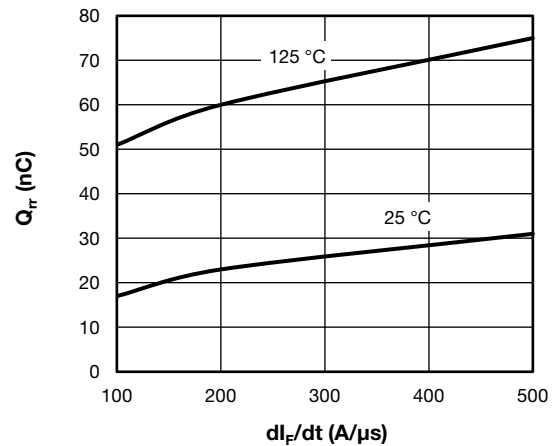


Fig. 8 - Typical Stored Charge vs. di/dt

**ORDERING INFORMATION TABLE**

|             |            |          |          |          |          |           |          |           |
|-------------|------------|----------|----------|----------|----------|-----------|----------|-----------|
| Device code | <b>VS-</b> | <b>3</b> | <b>E</b> | <b>Y</b> | <b>H</b> | <b>02</b> | <b>-</b> | <b>M3</b> |
|             | ①          | ②        | ③        | ④        | ⑤        | ⑥         |          | ⑦         |

- 1** - Vishay Semiconductors product
- 2** - Current rating (3 = 3 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** - 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-3EYH01-M3/H                 | 0.033           | H                      | 3500          | 7" diameter plastic tape and reel  |
| VS-3EYH01-M3/I                 | 0.033           | I                      | 14 000        | 13" diameter plastic tape and reel |
| VS-3EYH02-M3/H                 | 0.033           | H                      | 3500          | 7" diameter plastic tape and reel  |
| VS-3EYH02-M3/I                 | 0.033           | I                      | 14 000        | 13" diameter plastic tape and reel |

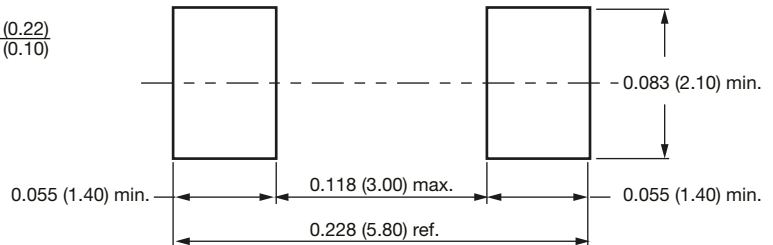
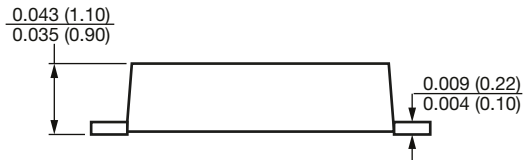
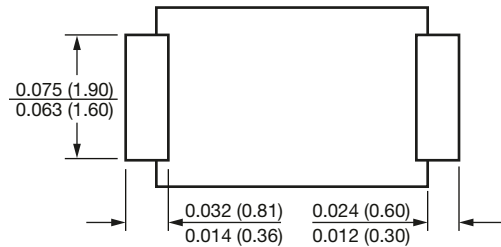
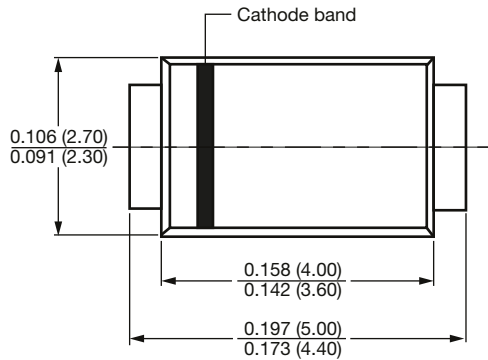
| LINKS TO RELATED DOCUMENTS |  |
|----------------------------|--|
| Dimensions                 | <a href="http://www.vishay.com/doc?96582">www.vishay.com/doc?96582</a> |
| Part marking information   | <a href="http://www.vishay.com/doc?95562">www.vishay.com/doc?95562</a> |
| Packaging information      | <a href="http://www.vishay.com/doc?88869">www.vishay.com/doc?88869</a> |
| SPICE model                | <a href="http://www.vishay.com/doc?96586">www.vishay.com/doc?96586</a> |



## SlimSMAW (DO-221AD)

**DIMENSIONS** in inches (millimeters)

### SlimSMAW (DO-221AD)



**Mounting pad layout**



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