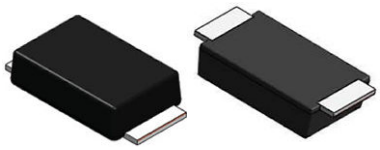
# Hyperfast Rectifier, 3 A FRED Pt®

**eSMP® Series**



Top View Bottom View

**SlimSMAW (DO-221AD)**

## 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

AUTOMOTIVE GRADE

RoHS COMPLIANT

HALOGEN FREE

## DESIGN SUPPORT TOOLS

click logo to get started

3D Models Available

## DESCRIPTION / APPLICATIONS

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

## MECHANICAL DATA

**Case:** SlimSMAW (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 and JESD 22-B1022

**Polarity:** color band denotes the cathode end

| 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 |

## ABSOLUTE MAXIMUM RATINGS

| PARAMETER | | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
|---|---|---|---|---|---|
| Peak repetitive reverse voltage | VS-3EYH01HM3 | $V_{RRM}$ | | 100 | V |
| | VS-3EYH02HM3 | | | 200 | |
| Average rectified forward current | | $I_{F(AV)}$ (1) | $T_C$ = 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**

(1) 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 | VS-3EYH01HM3 | $V_{BR}$, $V_R$ | $I_R$ = 100 µA | 100 | - | - | V |
| | VS-3EYH02HM3 | | | 200 | - | - | |
| Forward voltage, per diode | | $V_F$ | $I_F$ = 3 A | - | 0.86 | 0.95 | |
| | | | $I_F$ = 3 A, $T_J$ = 150 °C | - | 0.71 | 0.79 | |
| Reverse leakage current, per diode | | $I_R$ | $V_R$ = $V_R$ rated | - | - | 2 | µA |
| | | | $T_J$ = 150 °C, $V_R$ = $V_R$ rated | - | - | 20 | |
| Junction capacitance | | $C_T$ | $V_R$ = 200 V | - | 16 | - | pF |



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| DYNAMIC RECOVERY CHARACTERISTICS ($T_J$ = 25 °C unless otherwise specified) | | | | | | | |
|---|---|---|---|---|---|---|---|
| PARAMETER | SYMBOL | TEST CONDITIONS | | MIN. | TYP. | MAX. | UNITS |
| Reverse recovery time | $t_{rr}$ | $I_F$ = 1.0 A, $dI_F/dt$ = 100 A/µs, $V_R$ = 30 V | | - | 16 | - | ns |
| | | $I_F$ = 0.5 A, $I_R$ = 1A, $I_{rr}$ = 0.25 A | | - | - | 30 | |
| | | $T_J$ = 25 °C | $I_F$ = 3 A, $dI_F/dt$ = 200 A/µs, $V_R$ = 100 V | - | 18 | - | |
| | | $T_J$ = 125 °C | | - | 30 | - | |
| Peak recovery current | $I_{RRM}$ | $T_J$ = 25 °C | | - | 2.5 | - | A |
| | | $T_J$ = 125 °C | | - | 4 | - | |
| Reverse recovery charge | $Q_{rr}$ | $T_J$ = 25 °C | | - | 23 | - | nC |
| | | $T_J$ = 125 °C | | - | 60 | - | |

| THERMAL - MECHANICAL SPECIFICATIONS | | | | | | | |
|---|---|---|---|---|---|---|---|
| PARAMETER | | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNITS |
| Maximum junction and storage temperature range | | $T_J$, $T_{Stg}$ | | -55 | - | 175 | °C |
| Thermal resistance, junction to mount | | $R_{thJM}$ (1) | Infinite heatsink | - | 12 | 15 | °C/W |
| Thermal resistance, junction to ambient | | $R_{thJA}$ | Device mounted on FR4 PCB, 2 oz. standard footprint | - | 120 | 150 | |
| Marking device | VS-3EYH01HM3 | | Case style SlimSMAW (DO-221AD) | 3H1 | | | |
| | VS-3EYH02HM3 | | | 3H2 | | | |

**Note**

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


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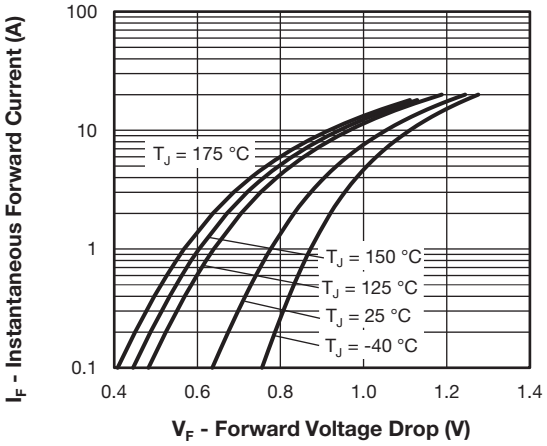


Fig. 1 - Typical Forward Voltage Drop Characteristics

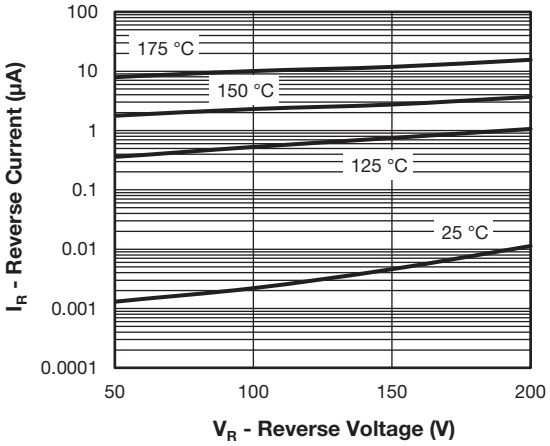


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

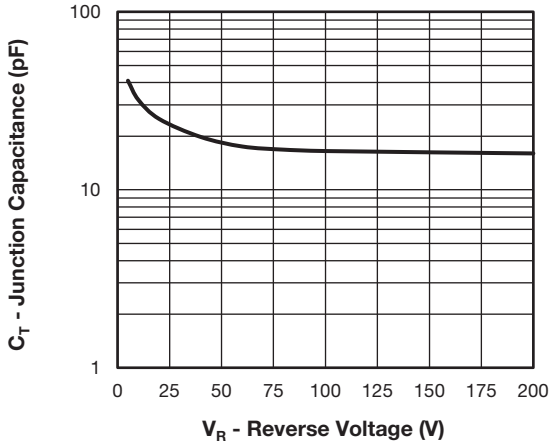


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

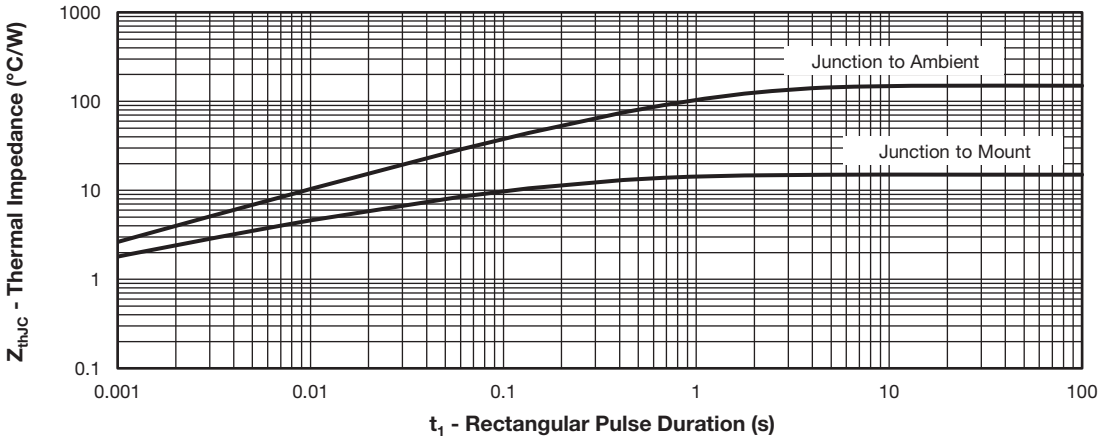


Fig. 4 - Maximum Thermal Impedance $Z_{thJC}$ Characteristics


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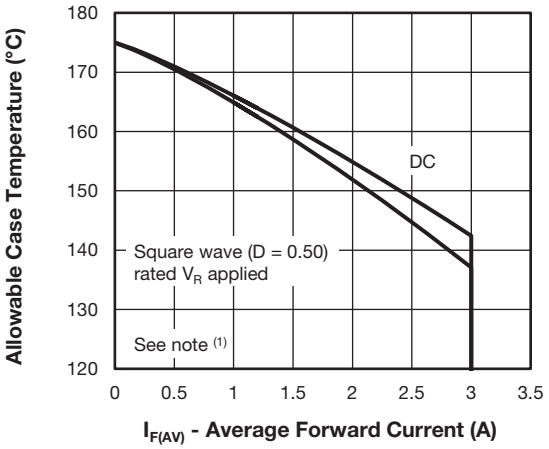


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

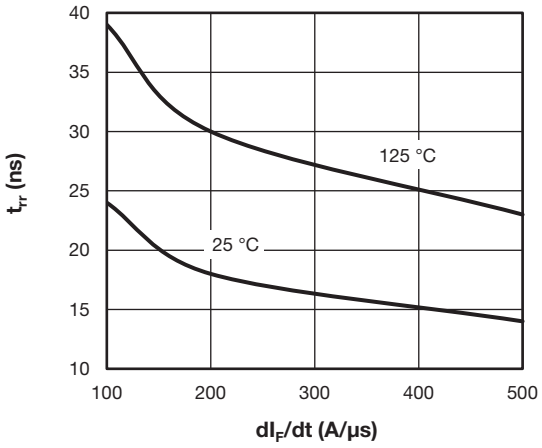


Fig. 7 - Typical Reverse Recovery Time vs. $dI_F/dt$

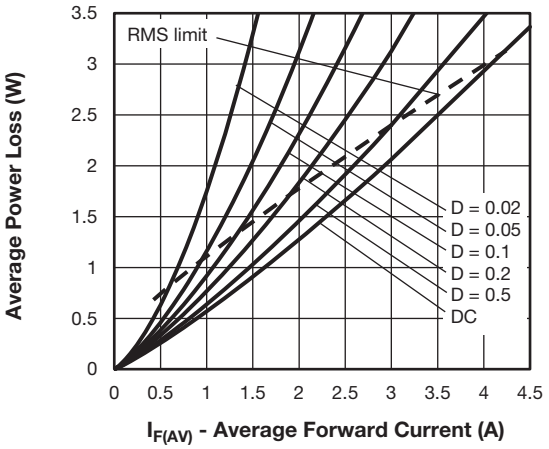


Fig. 6 - Forward Power Loss Characteristics

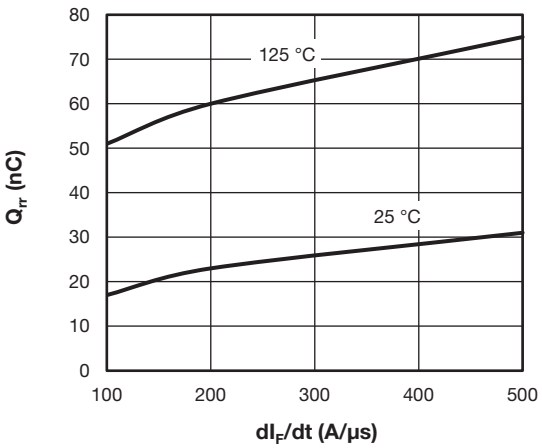


Fig. 8 - Typical Stored Charge vs. $dI_F/dt$

**Note**

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


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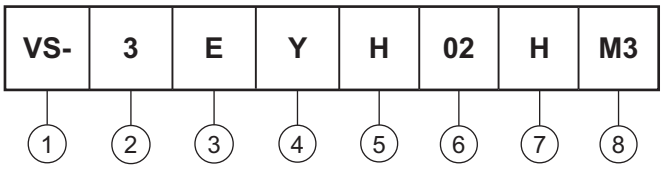
## ORDERING INFORMATION TABLE

Device code




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 - 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-3EYH01HM3/H | 0.033 | H | 3500 | 7"diameter plastic tape and reel |
| VS-3EYH01HM3/I | 0.033 | I | 14 000 | 13"diameter plastic tape and reel |
| VS-3EYH02HM3/H | 0.033 | H | 3500 | 7"diameter plastic tape and reel |
| VS-3EYH02HM3/I | 0.033 | I | 14 000 | 13"diameter plastic tape and reel |

| LINKS TO RELATED DOCUMENTS | |
|---|---|
| Dimensions | www.vishay.com/doc?96582 |
| Part marking information | www.vishay.com/doc?95562 |
| Packaging information | www.vishay.com/doc?88869 |
| SPICE model | www.vishay.com/doc?96586 |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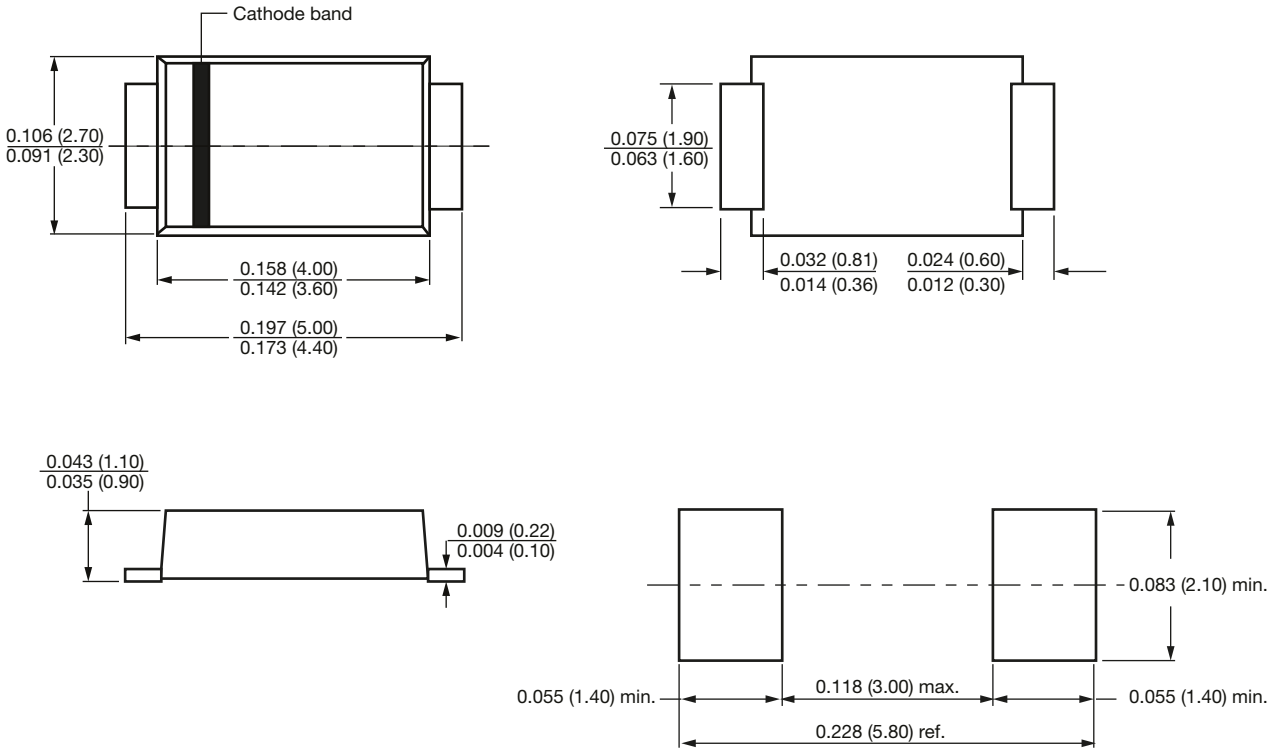
# SlimSMAW (DO-221AD)

**DIMENSIONS** in inches (millimeters)

**SlimSMAW (DO-221AD)**




**Mounting pad layout**



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