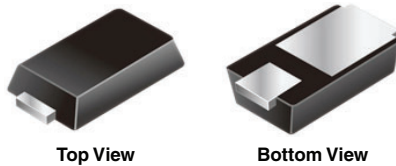


Ultrafast Rectifier, 2 A FRED Pt[®]

eSMP[®] Series



Top View

Bottom View

MicroSMP (DO-219AD)

Anode Cathode

 AUTOMOTIVE
GRADE

RoHS
COMPLIANT
HALOGEN
FREE

FEATURES

- Very low profile - typical height of 0.65 mm
- 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
- For PFC, CRM snubber operation
- AEC-Q101 qualified
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

TYPICAL APPLICATIONS

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

MECHANICAL DATA

Case: MicroSMP (DO-219AD)

Molding compound meets UL 94 V-0 flammability rating

Terminals: matte tin plated leads, solderable per J-STD-002, meets JESD 201 class 2 whisker test

Polarity: color band denotes cathode end

LINKS TO ADDITIONAL RESOURCES



3D Models

| PRIMARY CHARACTERISTICS | |
|-------------------------|---------------------|
| $I_{F(AV)}$ | 2 A |
| V_R | 100 V, 200 V |
| V_F at I_F | 0.82 V |
| t_{rr} (typ.) | 33 ns |
| I_{FSM} | 30 A |
| T_J max. | 175 °C |
| Package | MicroSMP (DO-219AD) |
| Circuit configuration | Single |

| ABSOLUTE MAXIMUM RATINGS | | | | |
|---|----------------|---------------------------------|-------------|-------|
| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
| Peak repetitive reverse voltage | V_{RRM} | VS-2EQH01HM3 | 100 | V |
| | | VS-2EQH02HM3 | 200 | |
| Average rectified forward current | $I_{F(AV)}$ | $T_M = 137$ °C | 2 | A |
| Non-repetitive peak surge current | I_{FSM} | $T_J = 25$ °C, 10 ms sine pulse | 30 | |
| Operating junction and storage temperatures | T_J, T_{Stg} | | -55 to +175 | °C |

| 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 | $I_R = 100$ μ A | 100 | - | - | V | |
| | | | 200 | | | | |
| Forward voltage | V_F | $I_F = 2$ A | - | 0.96 | 1.05 | | |
| | | $I_F = 2$ A, $T_J = 150$ °C | - | 0.82 | 0.84 | | |
| Reverse leakage current | I_R | $V_R = V_R$ rated | - | - | 1 | μ A | |
| | | $T_J = 150$ °C, $V_R = V_R$ rated | - | - | 25 | | |
| Junction capacitance | C_T | $V_R = 200$ V | - | 6 | - | pF | |



| DYNAMIC RECOVERY CHARACTERISTICS ($T_J = 25\text{ }^\circ\text{C}$ unless otherwise specified) | | | | | | |
|---|-----------|--|------|------|------|-------|
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNITS |
| Reverse recovery time | t_{rr} | $I_F = 1.0\text{ A}$, $di_F/dt = 50\text{ A}/\mu\text{s}$, $V_R = 30\text{ V}$ | - | 33 | - | ns |
| | | $I_F = 0.5\text{ A}$, $I_R = 1\text{ A}$, $I_{rr} = 0.25\text{ A}$ | - | - | 23 | |
| | | $T_J = 25\text{ }^\circ\text{C}$ | - | 19 | - | |
| | | $T_J = 125\text{ }^\circ\text{C}$ | - | 33 | - | |
| Peak recovery current | I_{RRM} | $T_J = 25\text{ }^\circ\text{C}$ | - | 1.7 | - | A |
| | | $T_J = 125\text{ }^\circ\text{C}$ | - | 2.5 | - | |
| Reverse recovery charge | Q_{rr} | $T_J = 25\text{ }^\circ\text{C}$ | - | 15 | - | nC |
| | | $T_J = 125\text{ }^\circ\text{C}$ | - | 34 | - | |

| THERMAL - MECHANICAL SPECIFICATIONS | | | | | | |
|--|------------------|---|-------|------|------|---------------------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNITS |
| Maximum junction and storage temperature range | T_J, T_{Stg} | | -55 | - | 175 | $^\circ\text{C}$ |
| Thermal resistance, junction to mount | $R_{thJM}^{(1)}$ | | - | 16 | 20 | $^\circ\text{C}/\text{W}$ |
| Thermal resistance, junction to ambient | R_{thJA} | Device mounted on FR4 PCB, 2 oz. standard footprint | - | 160 | - | |
| Approximate weight | | | 0.006 | | | g |
| Marking device | VS-2EQH01HM3 | Case style MicroSMP (DO-219AD) | 2H1 | | | |
| | VS-2EQH02HM3 | | 2H2 | | | |

Note

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

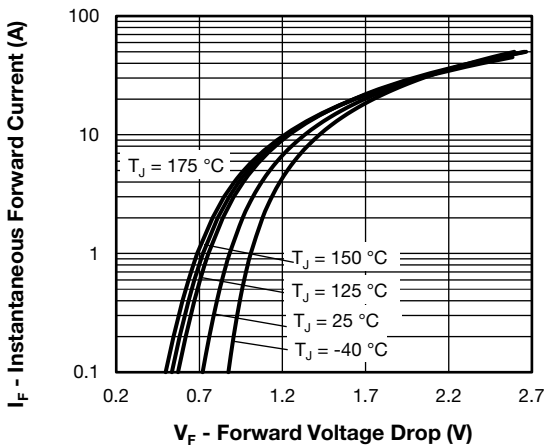


Fig. 1 - Typical Forward Voltage Drop Characteristics

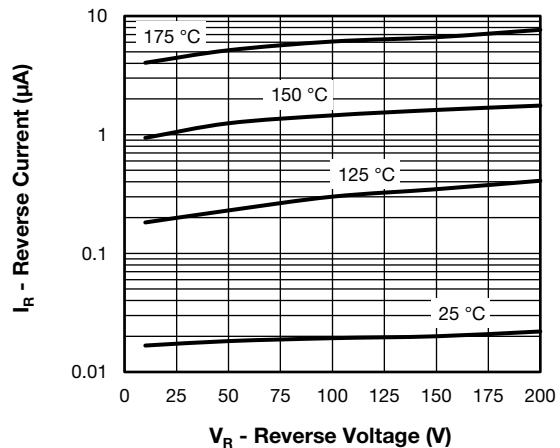


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

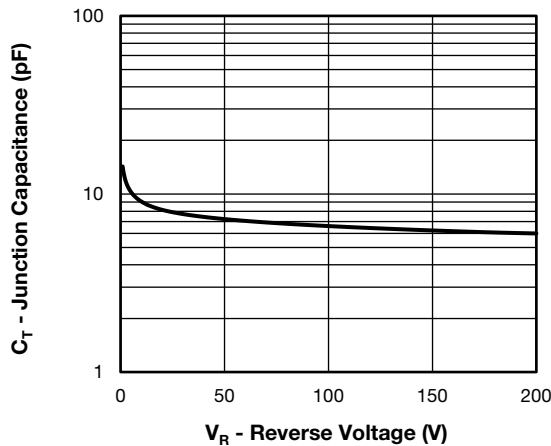


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

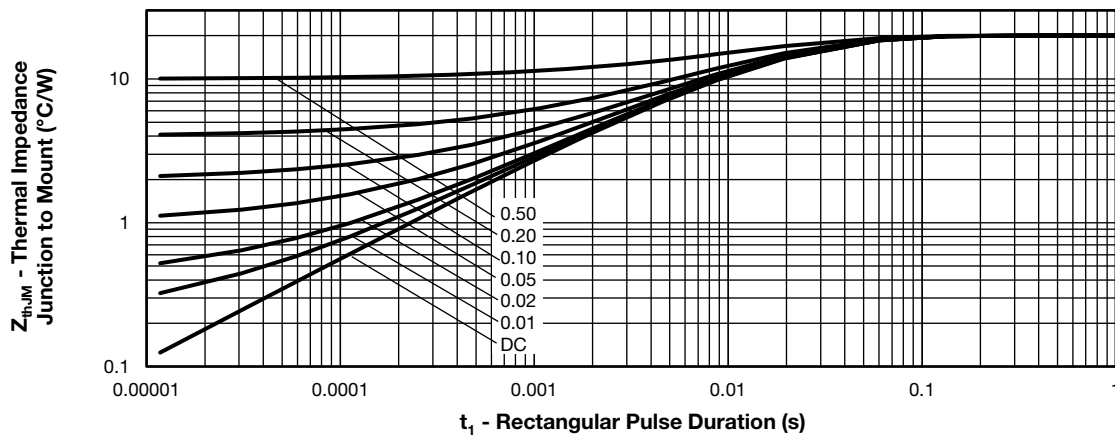


Fig. 4 - Maximum Transient Thermal Impedance, Junction to Mount

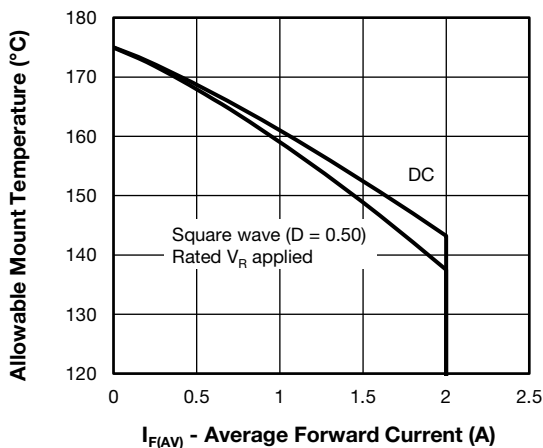


Fig. 5 - Maximum Allowable Mount Temperature vs. Average Forward Current

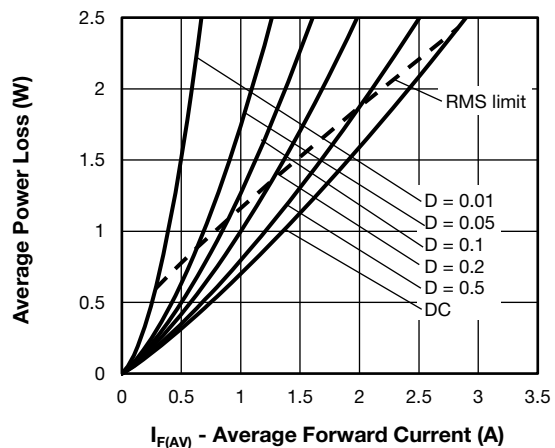


Fig. 6 - Forward Power Loss Characteristics

Note

Formula used: $T_M = T_J - (P_d + P_{dREV}) \times R_{thJM}$;
 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

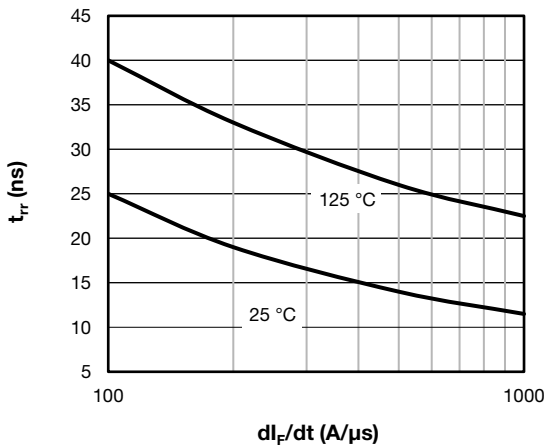


Fig. 7 - Typical Reverse Recovery Time vs. di_F/dt

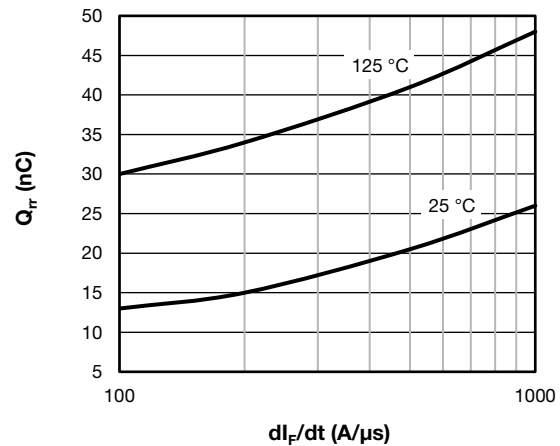
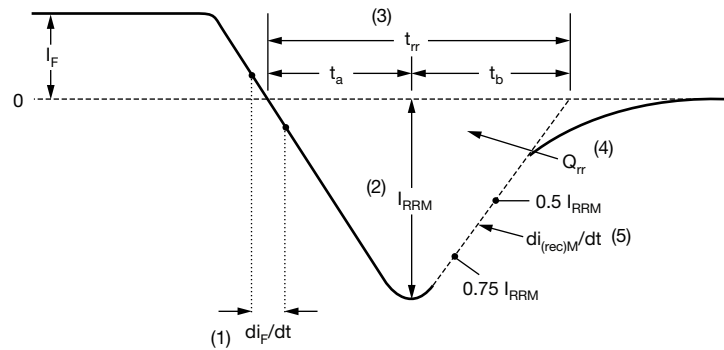


Fig. 8 - Typical Stored Charge vs. di_F/dt



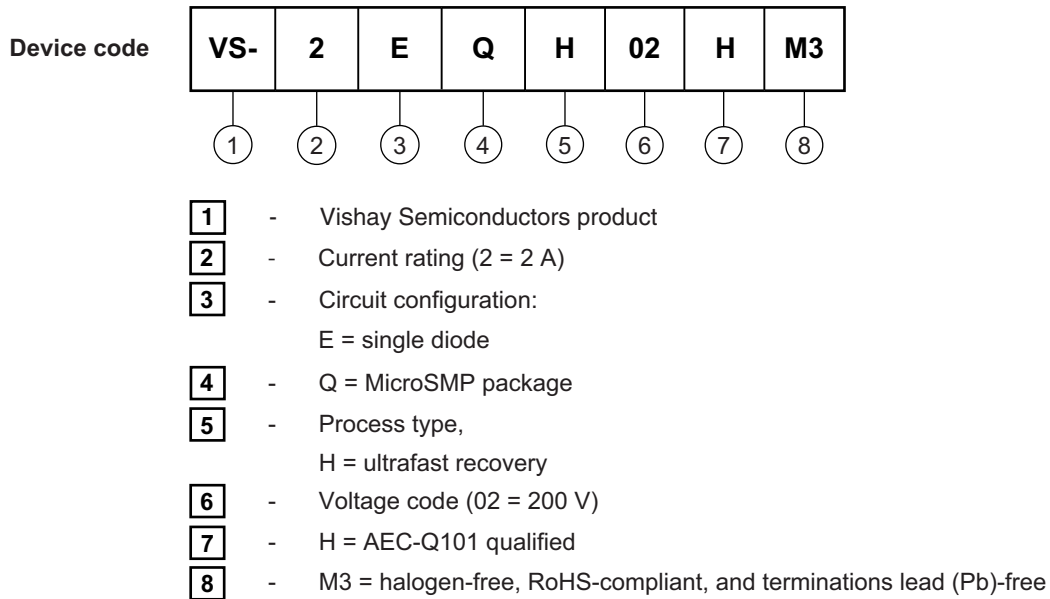
- (1) di_F/dt - rate of change of current through zero crossing
- (2) I_{RRM} - peak reverse recovery current
- (3) t_{rr} - reverse recovery time measured from zero crossing point of negative going I_F to point where a line passing through $0.75 I_{RRM}$ and $0.50 I_{RRM}$ extrapolated to zero current.
- (4) Q_{rr} - area under curve defined by t_{rr} and I_{RRM}
- (5) $di_{(rec)M}/dt$ - peak rate of change of current during t_b portion of t_{rr}

$$Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$$

Fig. 9 - Reverse Recovery Waveform and Definitions



ORDERING INFORMATION TABLE



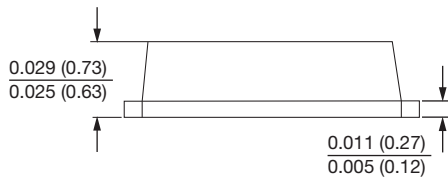
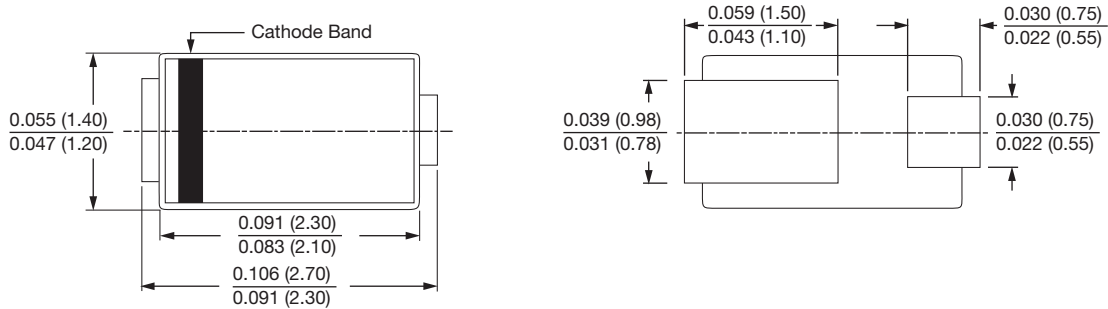
| ORDERING INFORMATION (Example) | | | |
|--------------------------------|------------------------|------------------------|-----------------------------------|
| PREFERRED P/N | PREFERRED PACKAGE CODE | MINIMUM ORDER QUANTITY | PACKAGING DESCRIPTION |
| VS-2EQH01HM3/H | H | 4500 | 7" diameter plastic tape and reel |
| VS-2EQH02HM3/H | H | 4500 | 7" diameter plastic tape and reel |

| LINKS TO RELATED DOCUMENTS | |
|----------------------------|--|
| Dimensions | www.vishay.com/doc?96591 |
| Part marking information | www.vishay.com/doc?96590 |
| Packaging information | www.vishay.com/doc?88869 |
| SPIICE model | www.vishay.com/doc?96595 |

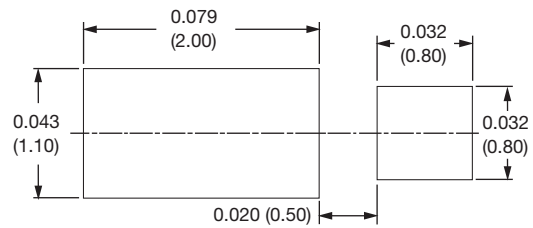


MicroSMP (DO-219AD), FRED Pt®

DIMENSIONS in inches (millimeters)



Mounting Pad Layout





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