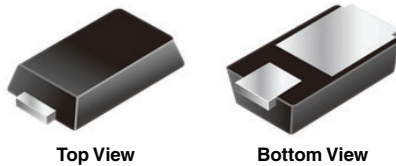


## Ultrafast Rectifier, 2 A FRED Pt<sup>®</sup>

### eSMP<sup>®</sup> 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](http://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	$V_{BR}, V_R$	$I_R = 100$ $\mu$ A	100	-	-	V
			200			
Forward voltage	$V_F$	$I_F = 2$ A	-	0.96	1.05	V
		$I_F = 2$ A, $T_J = 150$ °C	-	0.82	0.84	
Reverse leakage current	$I_R$	$V_R = V_R$ rated	-	-	1	$\mu$ 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)

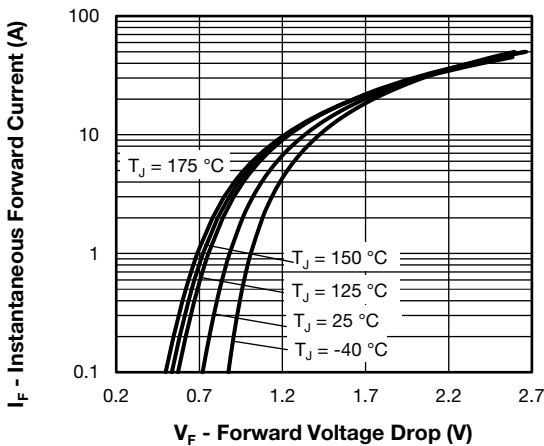


Fig. 1 - Typical Forward Voltage Drop Characteristics

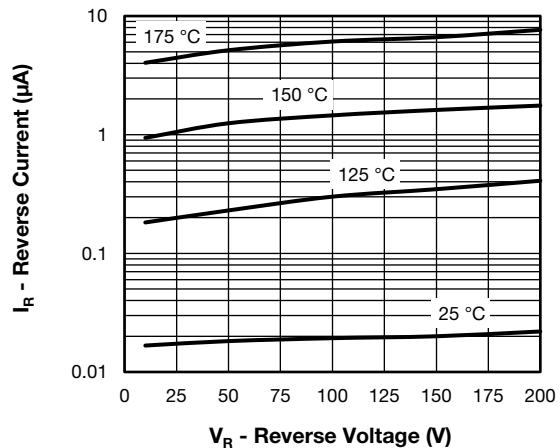


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

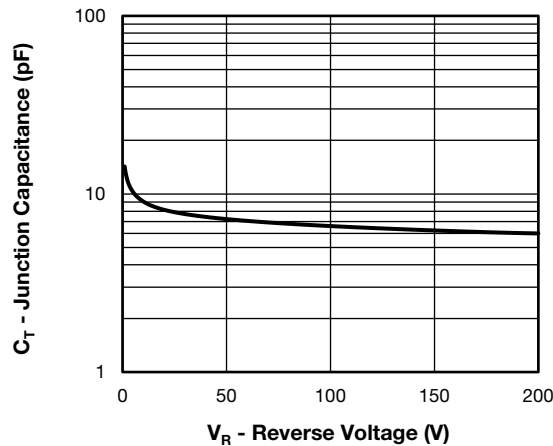


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

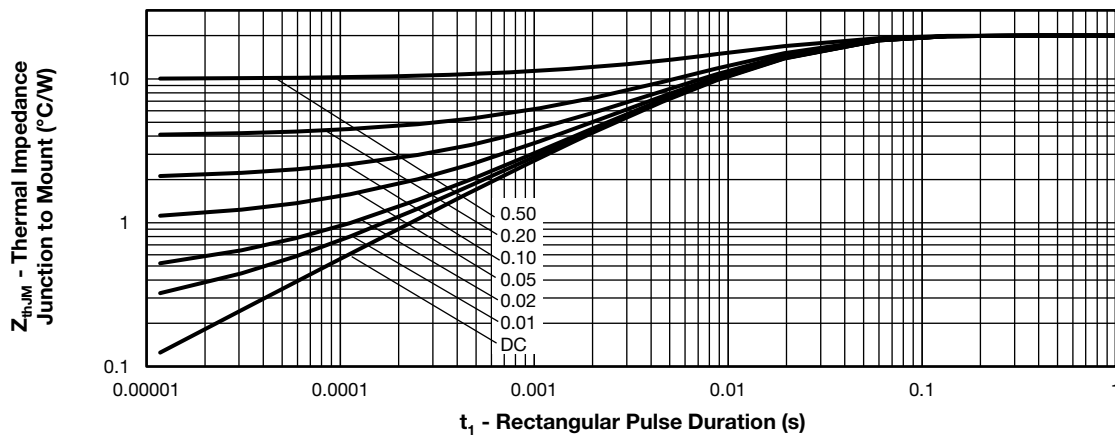


Fig. 4 - Maximum Transient Thermal Impedance, Junction to Mount

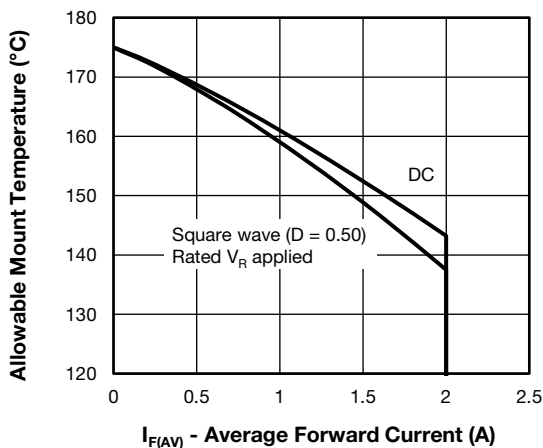


Fig. 5 - Maximum Allowable Mount Temperature vs. Average Forward Current

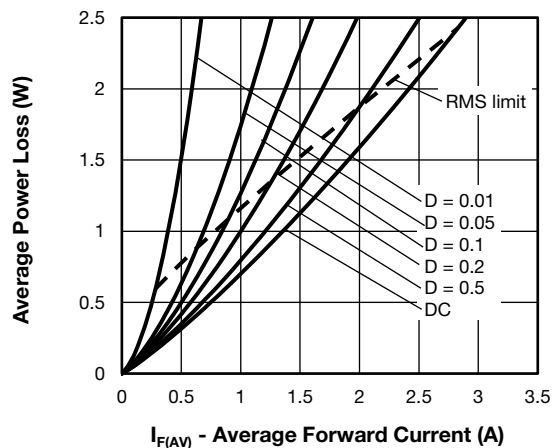
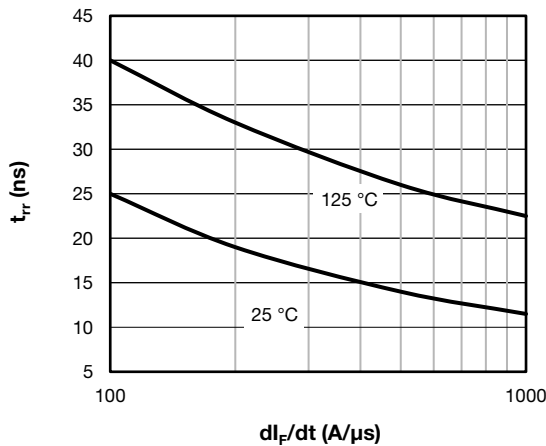
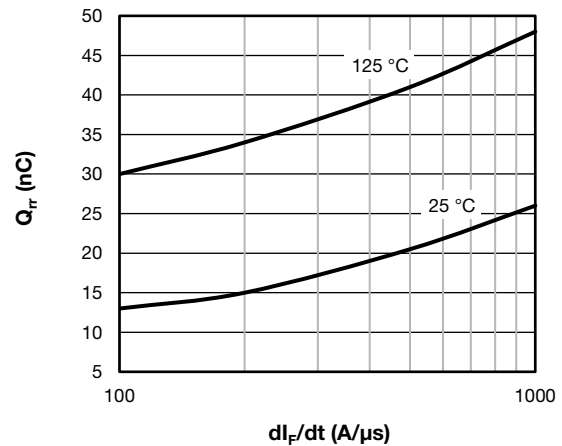
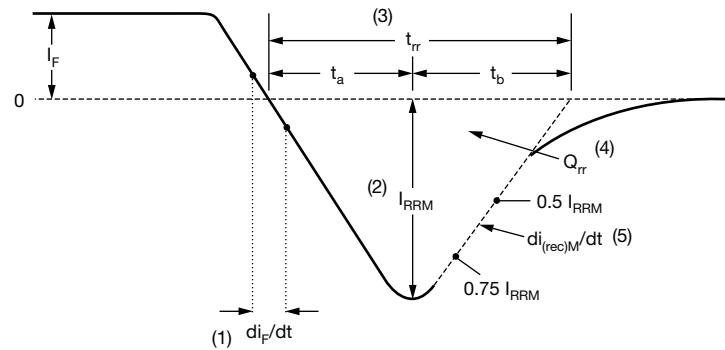


Fig. 6 - Forward Power Loss Characteristics

**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  $I_{RRM}$

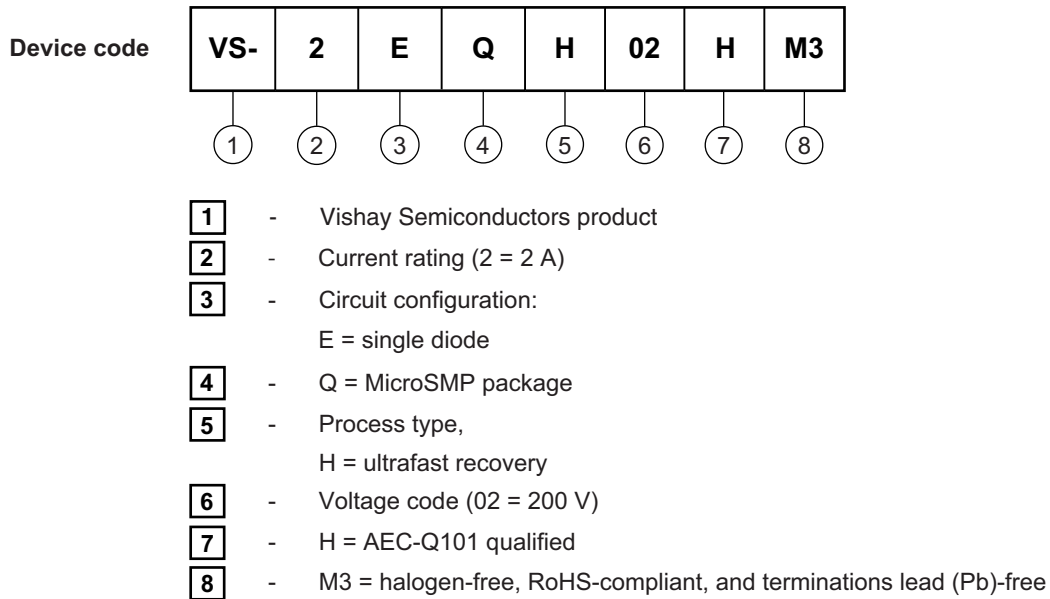
$$Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$$

- (5)  $di_{(rec)M}/dt$  - peak rate of change of current during  $t_b$  portion of  $t_{rr}$

Fig. 9 - Reverse Recovery Waveform and Definitions



## ORDERING INFORMATION TABLE



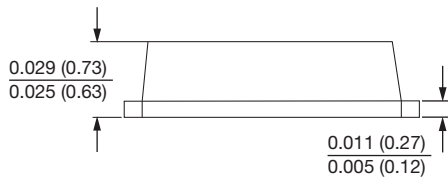
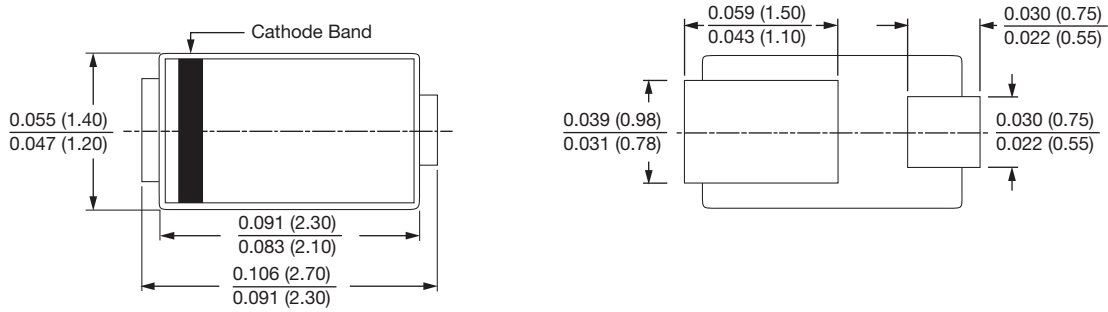
ORDERING INFORMATION (Example)			
PREFERRED P/N	PREFERRED PACKAGE CODE	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-2EQH01HM3/H	H	4500	7" diameter plastic tape and reel
VS-2EQH02HM3/H	H	4500	7" diameter plastic tape and reel

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?96591">www.vishay.com/doc?96591</a>
Part marking information	<a href="http://www.vishay.com/doc?96590">www.vishay.com/doc?96590</a>
Packaging information	<a href="http://www.vishay.com/doc?88869">www.vishay.com/doc?88869</a>
SPIICE model	<a href="http://www.vishay.com/doc?96595">www.vishay.com/doc?96595</a>

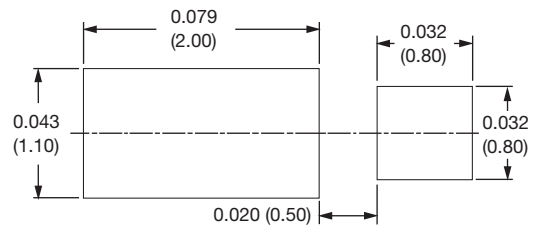


## MicroSMP (DO-219AD), FRED Pt®

**DIMENSIONS** in inches (millimeters)



**Mounting Pad Layout**





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