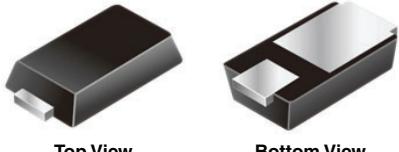


Ultrafast Rectifier, 1 A FRED Pt®

eSMP® Series



Top View

Bottom View

MicroSMP (DO-219AD)

Anode  Cathode

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
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	1 A
V_R	100 V, 200 V
V_F at I_F	0.72 V
t_{rr} (typ.)	33 ns
I_{FSM}	30 A
T_J max.	175 °C
Package	MicroSMP (DO-219AD)
Circuit configuration	Single

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

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Peak repetitive reverse voltage	V_{RRM}	$T_M = 159$ °C	100	V
VS-1EQH01-M3	VS-1EQH02-M3		200	
Average rectified forward current	$I_{F(AV)}$		1	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	$I_R = 100$ µA	100	-	-	V
VS-1EQH01-M3	VS-1EQH02-M3		200			
Forward voltage	V_F	$I_F = 1$ A	-	0.88	0.97	
VS-1EQH02-M3		$I_F = 1$ A, $T_J = 150$ °C	-	0.72	0.75	
Reverse leakage current	I_R	$V_R = V_R$ rated	-	-	1	µA
VS-1EQH01-M3		$T_J = 150$ °C, $V_R = V_R$ rated	-	-	25	
Junction capacitance	C_T	$V_R = 200$ V	-	6	-	pF

DYNAMIC RECOVERY CHARACTERISTICS ($T_J = 25^\circ\text{C}$ 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	
		$T_J = 25^\circ\text{C}$	-	13	-	
		$T_J = 125^\circ\text{C}$	-	18	-	
Peak recovery current	I_{RRM}	$T_J = 25^\circ\text{C}$	-	1.8	-	A
		$T_J = 125^\circ\text{C}$	-	2.7	-	
Reverse recovery charge	Q_{rr}	$T_J = 25^\circ\text{C}$	-	11	-	nC
		$T_J = 125^\circ\text{C}$	-	23	-	

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	$R_{thJM}^{(1)}$		-	16	20	°C/W	
Thermal resistance, junction to ambient	R_{thJA}	Device mounted on FR4 PCB, 2 oz. standard footprint	-	160	-		
Marking device	VS-1EQH01-M3	Case style MicroSMP (DO-219AD)	1H1				
	VS-1EQH02-M3		1H2				

Note

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

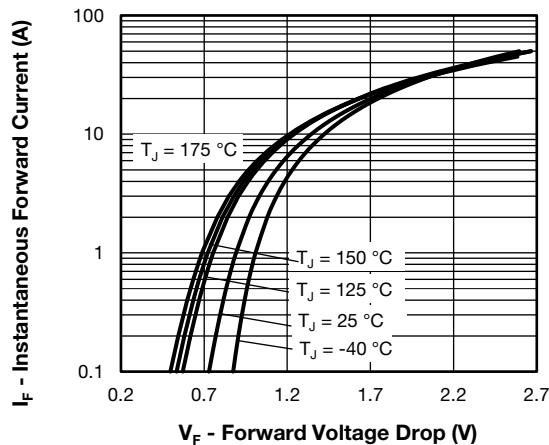


Fig. 1 - Typical Forward Voltage Drop Characteristics

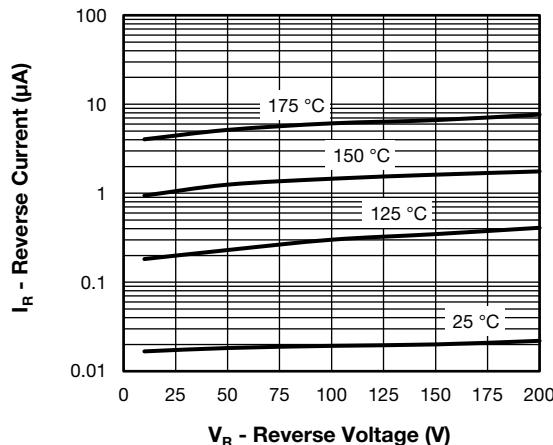


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

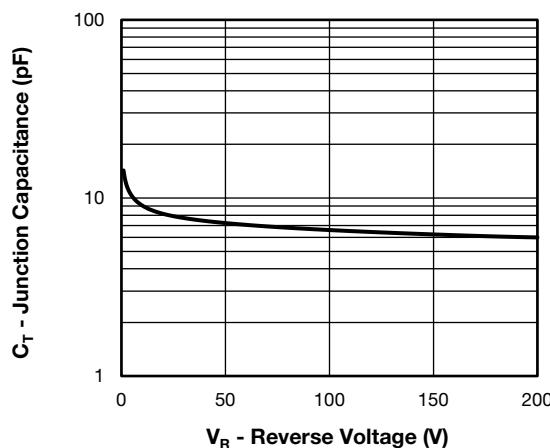


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

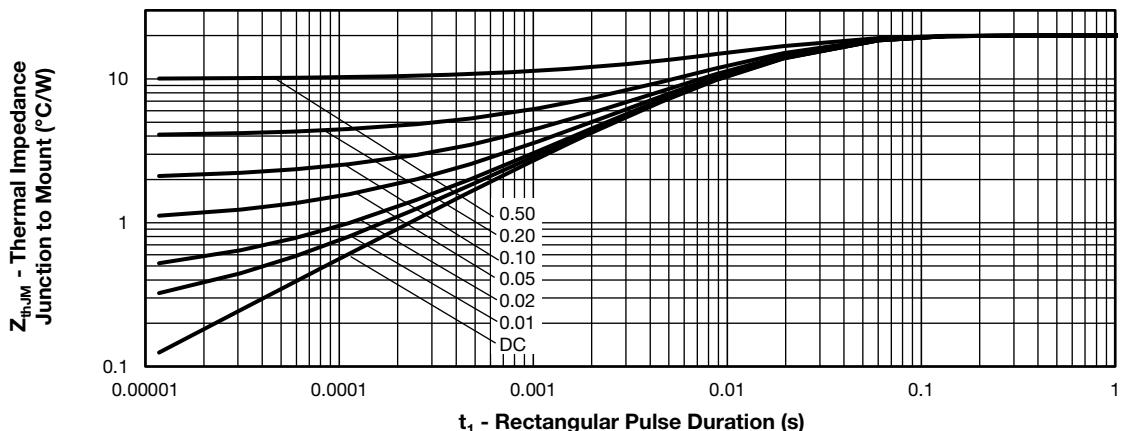


Fig. 4 - Maximum Transient Thermal Impedance, Junction to Mount

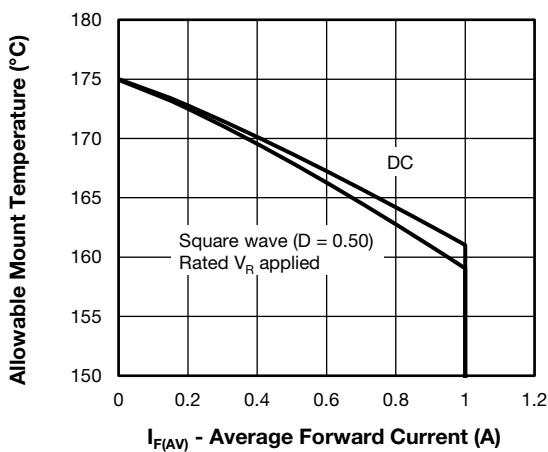


Fig. 5 - Maximum Allowable Mount Temperature vs. Average Forward Current

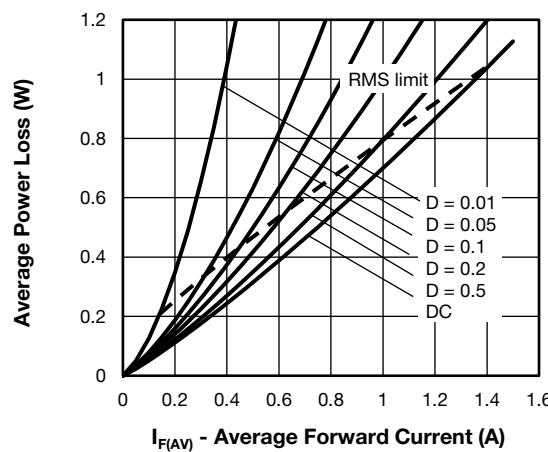


Fig. 6 - Forward Power Loss Characteristics

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

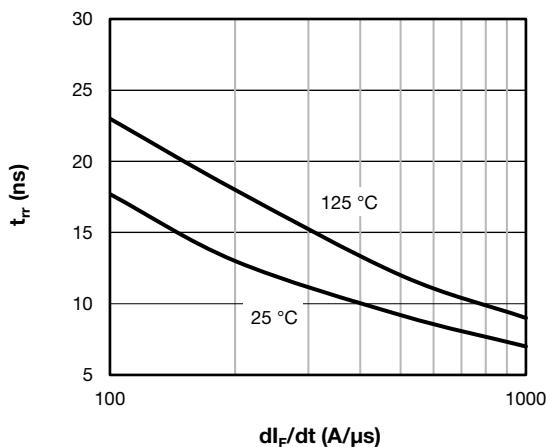


Fig. 7 - Typical Reverse Recovery Time vs. di_F/dt

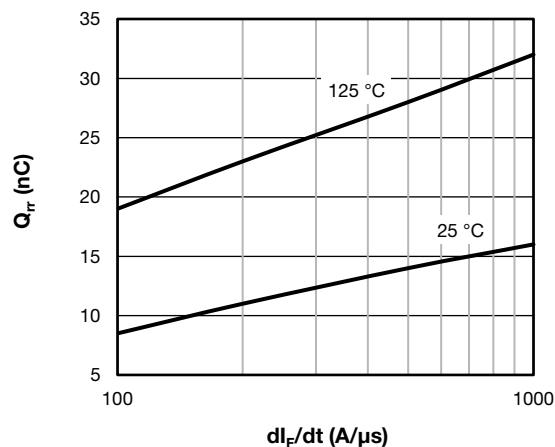
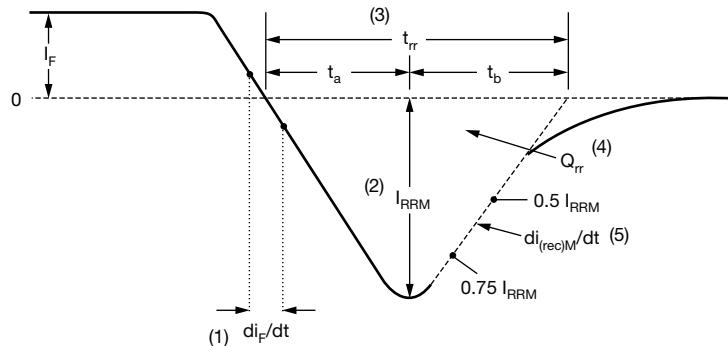


Fig. 8 - Typical Stored Charge vs. di_F/dt



(1) di_F/dt - rate of change of current through zero crossing

(4) Q_{rr} - area under curve defined by t_{rr} and I_{RRM}

(2) I_{RRM} - peak reverse recovery current

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

(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.

(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

Device code	VS-	1	E	Q	H	02	H	M3
	1	2	3	4	5	6	7	8

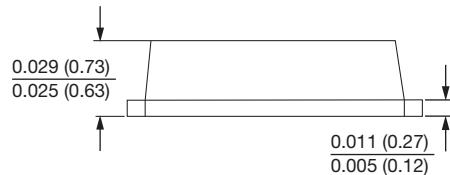
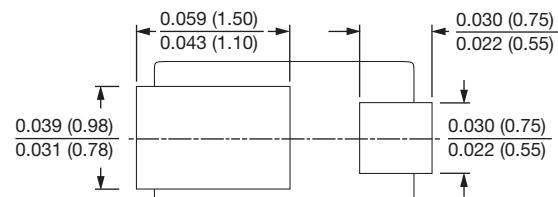
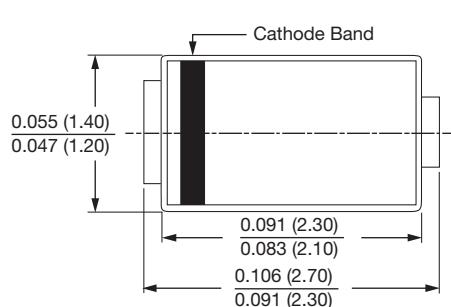
- 1** - Vishay Semiconductors product
- 2** - Current rating (1 = 1 A)
- 3** - Circuit configuration:
E = single diode
- 4** - Q = MicroSMP package
- 5** - Process type,
H = ultrafast recovery
- 6** - Voltage code (02 = 200 V)
- 7** - H = AEC-Q101 qualified
- 8** - M3 = halogen-free, RoHS-compliant,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

ORDERING INFORMATION (Example)			
PREFERRED P/N	PREFERRED PACKAGE CODE	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-1EQH01-M3/H	H	4500	7" diameter plastic tape and reel
VS-1EQH02-M3/H	H	4500	7" diameter plastic tape and reel

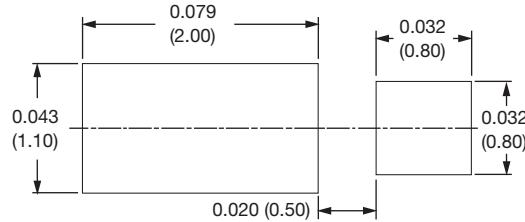
LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?96591
Part marking information	www.vishay.com/doc?96590
Packaging information	www.vishay.com/doc?88869
SPICE model	www.vishay.com/doc?96594

MicroSMP (DO-219AD), FRED Pt®

DIMENSIONS in inches (millimeters)



Mounting Pad Layout



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