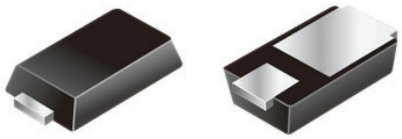
Ultrafast Rectifier, 1 A FRED Pt®

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

3D Models

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

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

ABSOLUTE MAXIMUM RATINGS					
PARAMETER		SYMBOL	TEST CONDITIONS	VALUES	UNITS
Peak repetitive reverse voltage	VS-1EQH01-M3	V_{RRM}		100	V
	VS-1EQH02-M3			200	
Average rectified forward current		$I_{F(AV)}$	T_M = 159 °C	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	VS-1EQH01-M3	V_{BR}, V_R	I_R = 100 µA	100	-	-	V
	VS-1EQH02-M3			200			
Forward voltage		V_F	I_F = 1 A	-	0.88	0.97	
			I_F = 1 A, T_J = 150 °C	-	0.72	0.75	
Reverse leakage current		I_R	V_R = V_R rated	-	-	1	µA
			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 °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 = 50 A/µs, V_R = 30 V		-	33	-	ns
		I_F = 0.5 A, I_R = 1 A, I_{rr} = 0.25 A		-	-	23	
		T_J = 25 °C	I_F = 1 A dI_F/dt = 200 A/µs V_R = 100 V	-	13	-	
		T_J = 125 °C		-	18	-	
Peak recovery current	I_{RRM}	T_J = 25 °C		-	1.8	-	A
		T_J = 125 °C		-	2.7	-	
Reverse recovery charge	Q_{rr}	T_J = 25 °C		-	11	-	nC
		T_J = 125 °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			
Marking device VS-1EQH02-M3			1H2			

Note

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

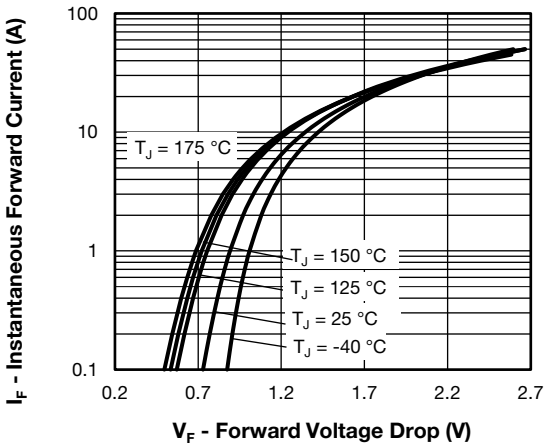


Fig. 1 - Typical Forward Voltage Drop Characteristics

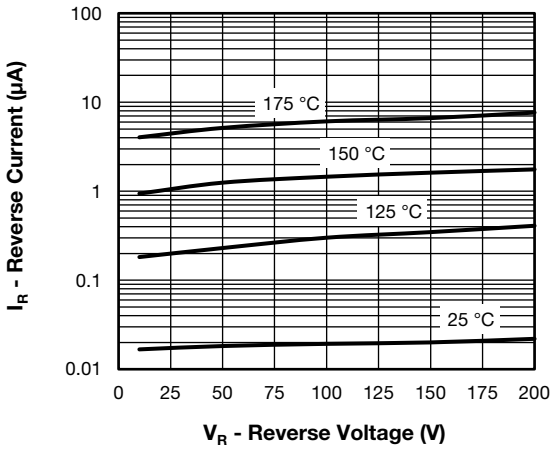


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

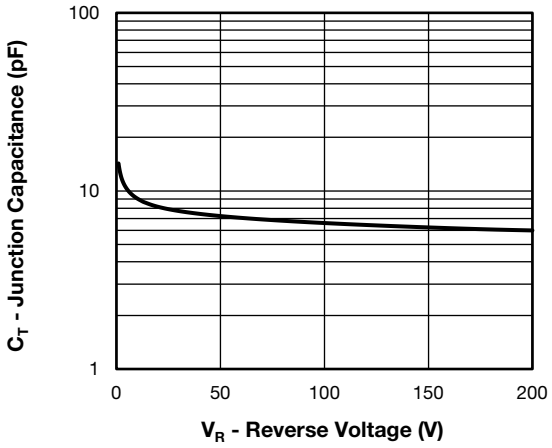


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

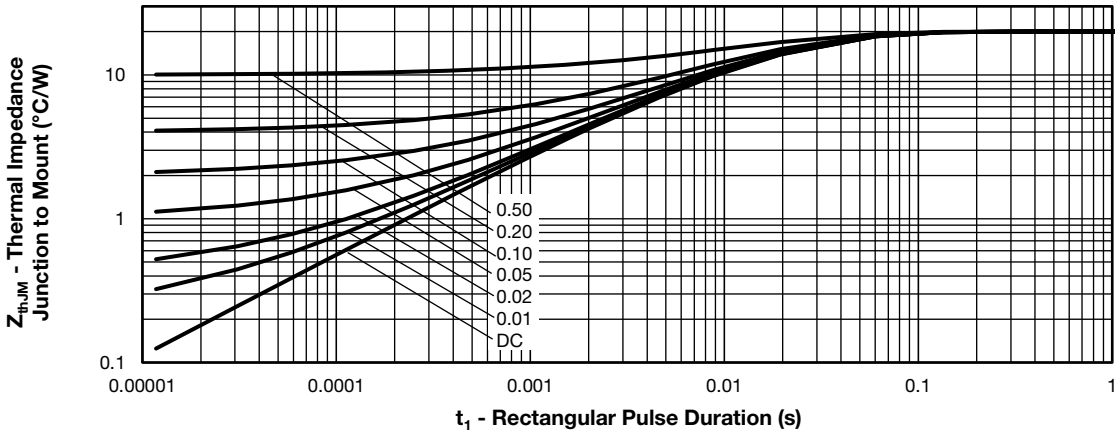


Fig. 4 - Maximum Transient Thermal Impedance, Junction to Mount

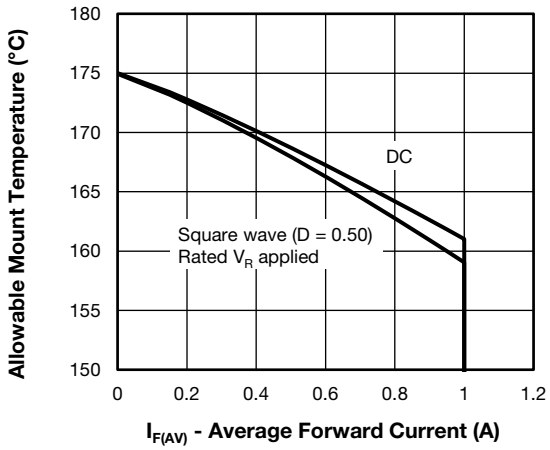


Fig. 5 - Maximum Allowable Mount Temperature vs. Average Forward Current

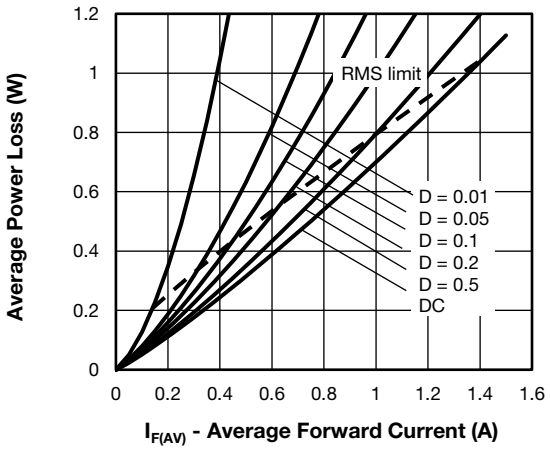


Fig. 6 - Forward Power Loss Characteristics

Note

Formula used: $T_M = T_J - (Pd + Pd_{REV}) \times R_{thJM}$;
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

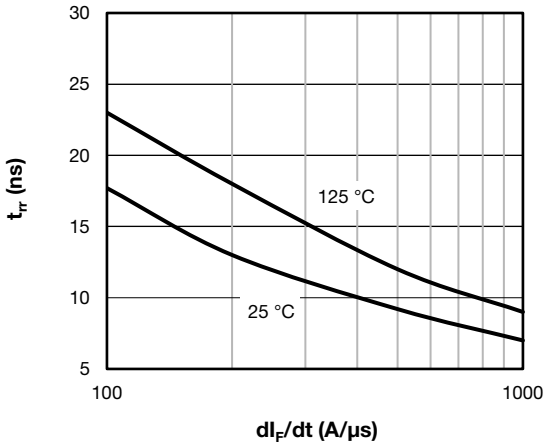


Fig. 7 - Typical Reverse Recovery Time vs. dI_F/dt

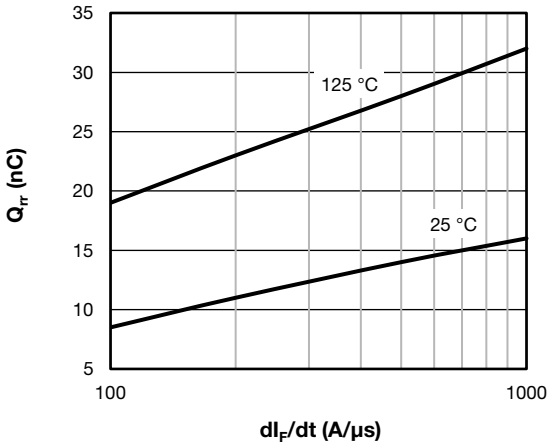
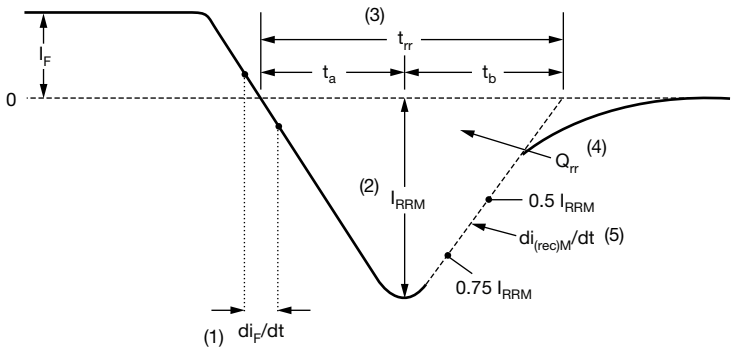


Fig. 8 - Typical Stored Charge vs. dI_F/dt



(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}

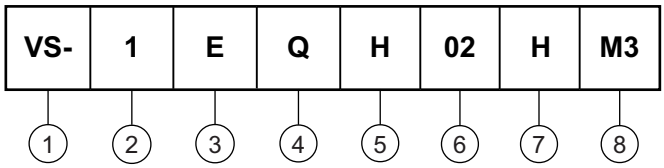
$$Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$$

(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

Device code



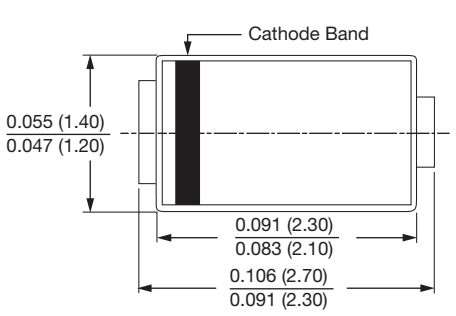
1 - Vishay Semiconductors product
2 - Current rating (1 = 1 A)
3 - Circuit configuration:
E = single diode
4 - Q = MicroSMP package
5 - Process type,
H = ultrafast recovery
6 - Voltage code (02 = 200 V)
7 - H = AEC-Q101 qualified
8 - M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free

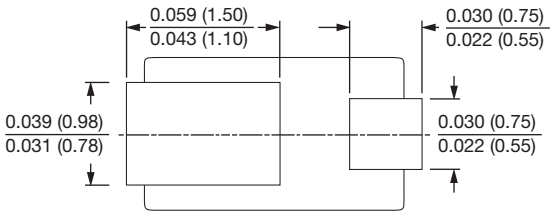
ORDERING INFORMATION (Example)			
PREFERRED P/N	**PREFERRED PACKAGE CODE**	**MINIMUM ORDER QUANTITY**	**PACKAGING DESCRIPTION**
VS-1EQH01-M3/H	H	4500	7" diameter plastic tape and reel
VS-1EQH02-M3/H	H	4500	7" diameter plastic tape and reel

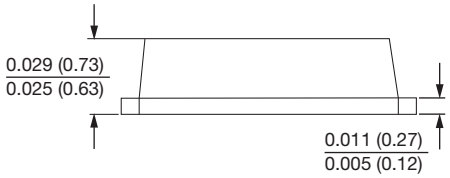
LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?96591
Part marking information	www.vishay.com/doc?96590
Packaging information	www.vishay.com/doc?88869
SPICE model	www.vishay.com/doc?96594

MicroSMP (DO-219AD), FRED Pt®

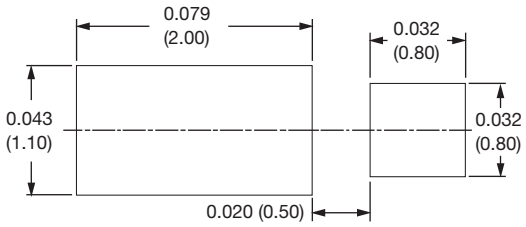
DIMENSIONS in inches (millimeters)







Mounting Pad Layout



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