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Vishay Semiconductors

ROHS

HALOGEN

FREE

Ultrafast Rectifier, 2 A FRED Pt®

eSMP® Series





Top View

Bottom View

MicroSMP (DO-219AD)

Anode O Cathode

LINKS TO ADDITIONAL RESOURCES



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			

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 <u>www.vishay.com/doc?99912</u>

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	VS-2EQH01-M3	- V _{RRM}		100	V		
	VS-2EQH02-M3			200			
Average rectified forward current		I _{F(AV)}	T _M = 137 °C	2	Α		
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,	VS-2EQH01-M3	V _{BR} ,	I _R = 100 μA	100	-	-	V
blocking voltage	VS-2EQH02-M3	V_R		200			
Forward voltage		V _F	I _F = 2 A	-	0.96	1.05	
	v _F	I _F = 2 A, T _J = 150 °C	-	0.82	0.84	1	
Reverse leakage current		I_	V _R = V _R rated	-	-	1	
		I _R	$T_J = 150 ^{\circ}\text{C}, V_R = V_R \text{rated}$	-	-	25	μA
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
		$I_F = 1.0 \text{ A}, dI_F/dt = 50 \text{ A/}\mu\text{s}, V_R = 30 \text{ V}$		-	33	-	
Reverse recovery time	t _{rr}	$I_F = 0.5 \text{ A}, I_R = 1 \text{ A}, I_{rr} = 0.25 \text{ A}$		-	-	23	
		T _J = 25 °C	I _F = 2 A dI _F /dt = 200 A/μs V _R = 100 V	-	19	-	ns A nC
		T _J = 125 °C		-	33	-	
Peak recovery current	I _{RRM}	T _J = 25 °C		-	1.7	-	
		T _J = 125 °C		-	2.5	-	
Reverse recovery charge Q _{rr}	0	T _J = 25 °C		-	15	-	
	T _J = 125 °C		-	34	-	110	

THERMAL - MECHANICAL SPECIFICATIONS							
PARAMETER		SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Maximum junction a temperature range	and storage	T _J , T _{Stg}		-55	-	175	°C
Thermal resistance,	, junction to mount	R _{thJM} ⁽¹⁾		-	16	20	
Thermal resistance,	, junction to ambient	R _{thJA}	Device mounted on FR4 PCB, 2 oz. standard footprint	-	160	-	°C/W
Approximate weight					0.006		g
Marking davisa	VS-1EQH01-M3		Consist de Mierre CMD (DO 210AD)	2H1			
Marking device	VS-2EQH02-M3		Case style MicroSMP (DO-219AD)	2H2			

Note

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

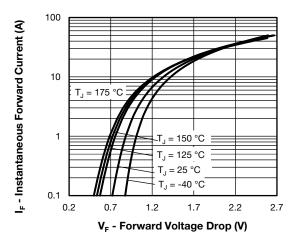


Fig. 1 - Typical Forward Voltage Drop Characteristics

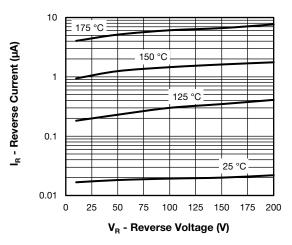


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

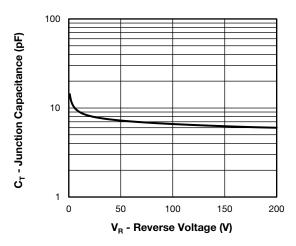


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

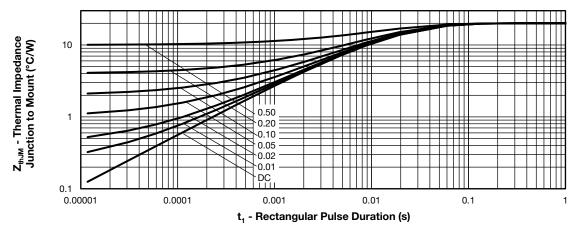


Fig. 4 - Maximum Transient Thermal Impedance, Junction to Mount

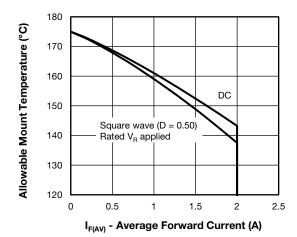


Fig. 5 - Maximum Allowable Mount Temperature vs. Average Forward Current

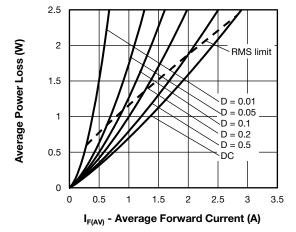


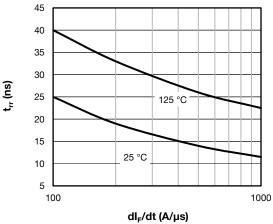
Fig. 6 - Forward Power Loss Characteristics

Note

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

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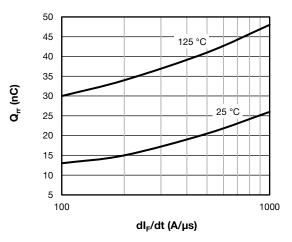
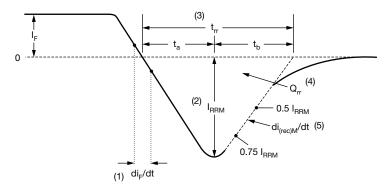


Fig. 8 - Typical Stored Charge vs. dl_F/dt



- (1) di_F/dt rate of change of current through zero crossing
- (2) I_{RRM} peak reverse recovery current
- (3) $\rm t_{rr}$ reverse recovery time measured from zero crossing point of negative going $\rm I_{r}$ to point where a line passing through 0.75 $\rm I_{RRM}$ and 0.50 $\rm I_{RRM}$ extrapolated to zero current.
- (4) \mathbf{Q}_{rr} area under curve defined by \mathbf{t}_{rr} and \mathbf{I}_{RRM}

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

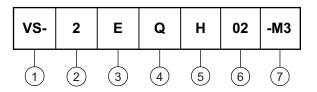
(5) di_{(rec)M}/dt - peak rate of change of current during t_b portion of t_{rr}

Fig. 9 - Reverse Recovery Waveform and Definitions



ORDERING INFORMATION TABLE

Device code



1 - Vishay Semiconductors product

- Current rating (2 = 2 A)

Circuit configuration:

E = single diode

4 - Q = MicroSMP package

5 - Process type,

H = ultrafast recovery

6 - Voltage code (02 = 200 V)

- -M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free

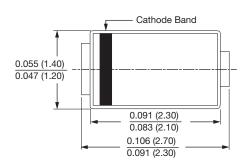
ORDERING INFORMATION (Example)						
PREFERRED P/N	PREFERRED PACKAGE CODE MINIMUM ORDER QUANTITY PACKAGING DESCRIPTION					
VS-2EQH01-M3/H	Н	4500	7" diameter plastic tape and reel			
VS-2EQH02-M3/H	Н	4500	7" diameter plastic tape and reel			

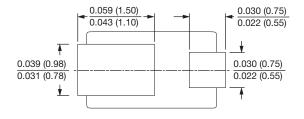
LINKS TO RELATED DOCUMENTS					
Dimensions <u>www.vishay.com/doc?96591</u>					
Part marking information	www.vishay.com/doc?96590				
Packaging information	www.vishay.com/doc?88869				
SPICE model	www.vishay.com/doc?96595				

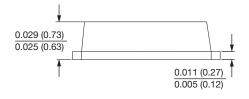


MicroSMP (DO-219AD), FRED Pt®

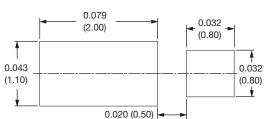
DIMENSIONS in inches (millimeters)







Mounting Pad Layout





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