

Ultrafast Rectifier, 1 A FRED Pt®

eSMP® Series


SMP (DO-220AA)

Cathode  Anode

DESIGN SUPPORT TOOLS

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PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	1 A
V_R	100 V, 200 V
V_F at I_F	0.69 V
I_{FSM}	40 A
t_{rr} (typ.)	23 ns
T_J max.	175 °C
Package	SMP (DO-220AA)
Circuit configuration	Single

FEATURES

- Very low profile - typical height of 1.0 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

TYPICAL APPLICATION

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

MECHANICAL DATA

Case: SMP (DO-220AA)

Molding compound meets UL 94 V-0 flammability rating

Terminals: matte tin plated leads, solderable per J-STD-002 and JESD 33-N102

Polarity: color band denotes cathode end

ABSOLUTE MAXIMUM RATINGS					
PARAMETER		SYMBOL	TEST CONDITIONS	VALUES	UNITS
Peak repetitive reverse voltage	VS-1ENH01-M3	V_{RRM}		100	V
	VS-1ENH02-M3			200	
Average rectified forward current		$I_{F(AV)}$	$T_C = 168\text{ }^{\circ}\text{C}$	1	A
Non-repetitive peak surge current		I_{FSM}	$T_J = 25\text{ }^{\circ}\text{C}$, 10 ms sine pulse	40	
Operating junction and storage temperatures		T_J, T_{Stg}		-55 to +175	$^{\circ}\text{C}$

ELECTRICAL SPECIFICATIONS (T _J = 25 °C unless otherwise specified)							
PARAMETER		SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Breakdown voltage, blocking voltage	VS-1ENH01-M3	V _{BR} , V _R	I _R = 100 μA	100	-	-	V
	VS-1ENH02-M3			200	-	-	
Forward voltage		V _F	I _F = 1 A	-	0.86	0.92	
			I _F = 1 A, T _J = 150 °C	-	0.69	0.74	
Reverse leakage current		I _R	V _R = V _R rated	-	-	2	μA
			T _J = 150 °C, V _R = V _R rated	-	-	20	
Junction capacitance		C _T	V _R = 200 V	-	8	-	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}	$I_F = 1.0\text{ A}$, $dI_F/dt = 100\text{ A}/\mu\text{s}$, $V_R = 30\text{ V}$	-	23	-	ns
		$I_F = 0.5\text{ A}$, $I_R = 1\text{ A}$, $I_{rr} = 0.25\text{ A}$	-	-	28	
		$T_J = 25\text{ }^{\circ}\text{C}$	-	14	-	
		$T_J = 125\text{ }^{\circ}\text{C}$	-	22	-	
Peak recovery current	I_{RRM}	$T_J = 25\text{ }^{\circ}\text{C}$	-	1.7	-	A
		$T_J = 125\text{ }^{\circ}\text{C}$	-	2.7	-	
Reverse recovery charge	Q_{rr}	$T_J = 25\text{ }^{\circ}\text{C}$	-	10	-	nC
		$T_J = 125\text{ }^{\circ}\text{C}$	-	29	-	

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 mount		R _{thJM} ⁽¹⁾	Infinite heatsink	-	7	9	°C/W
Thermal resistance, junction to ambient		R _{thJA}	PCB footprint 4.8 mm x 4.8 mm	-	107	-	
Marking device	VS-1ENH01-M3		Case style SMP (DO-220AA)	1H1			
	VS-1ENH02-M3			1H2			

Note

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

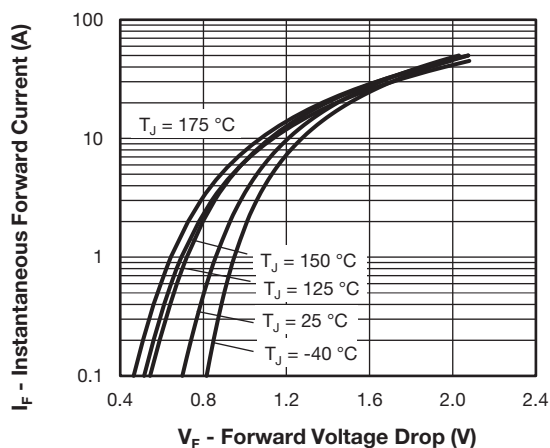


Fig. 1 - Typical Forward Voltage Drop Characteristics

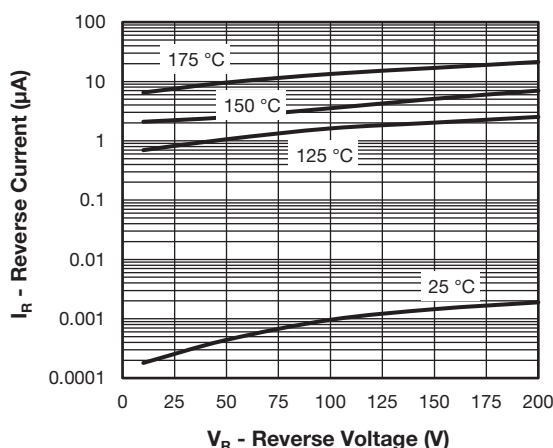


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

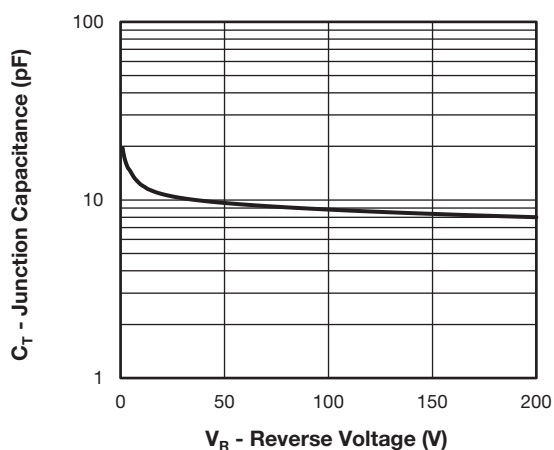


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

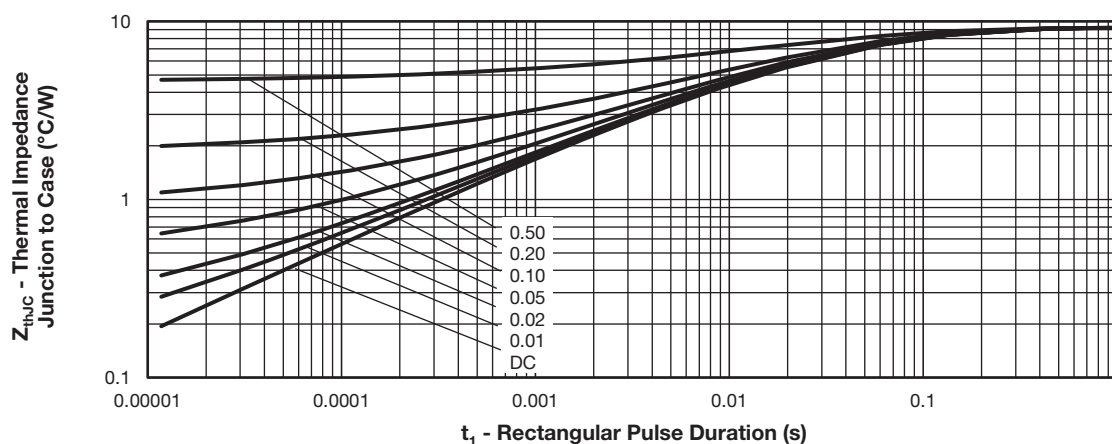


Fig. 4 - Transient Thermal Impedance, Junction to Case

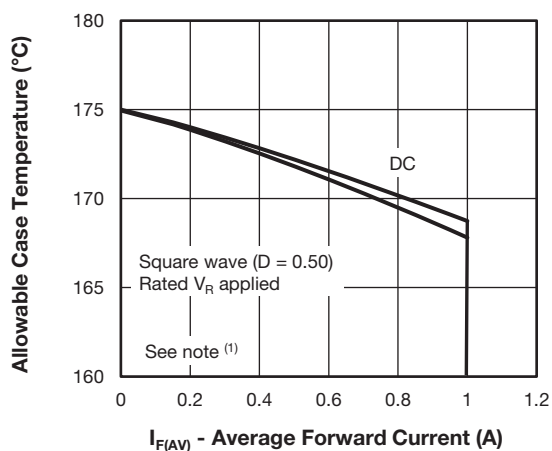


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

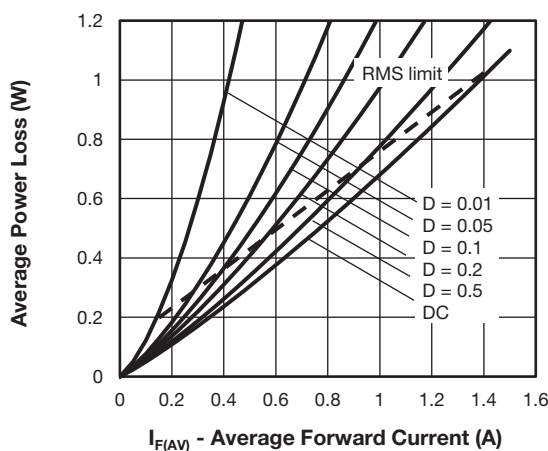


Fig. 6 - Forward Power Loss Characteristics

Note

- (1) Formula used: $T_C = T_J - (P_d + P_{dREV}) \times R_{\theta JC}$;
 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

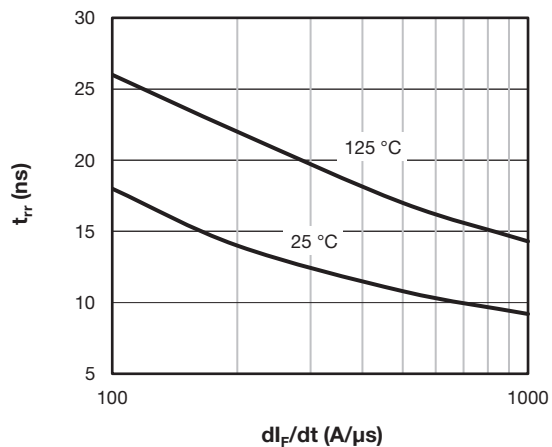
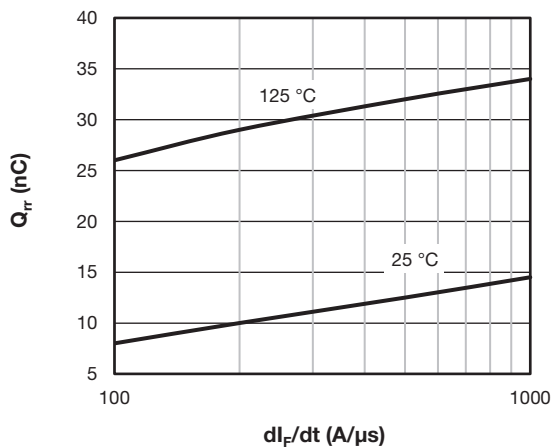
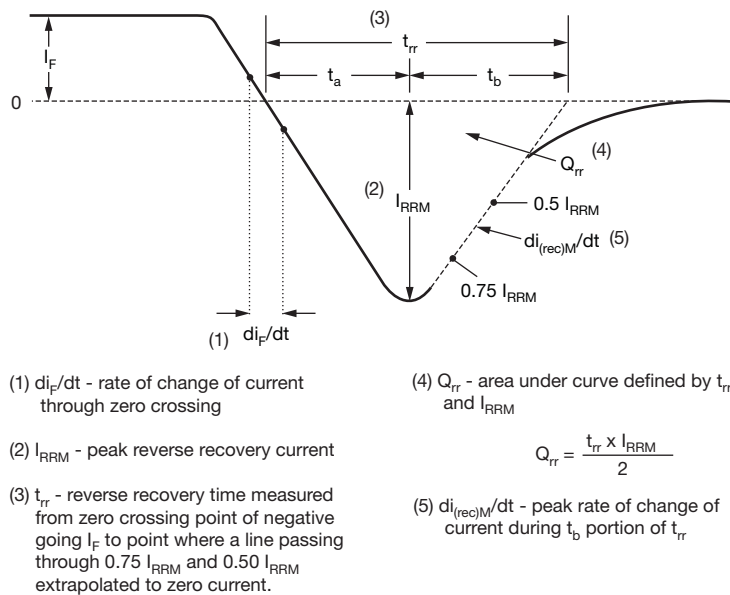

Fig. 7 - Typical Reverse Recovery Time vs. dI_F/dt

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


Fig. 9 - Reverse Recovery Waveform and Definitions

**ORDERING INFORMATION TABLE**

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

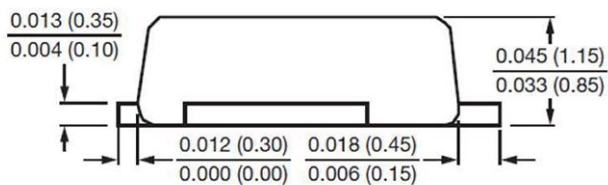
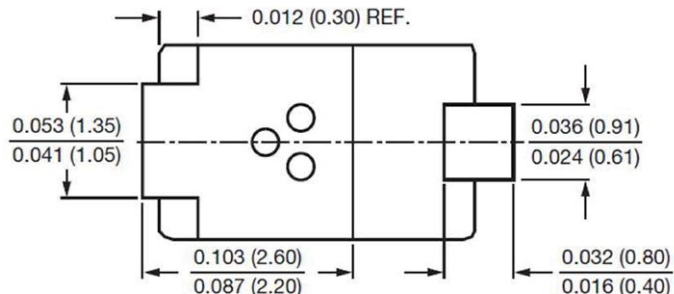
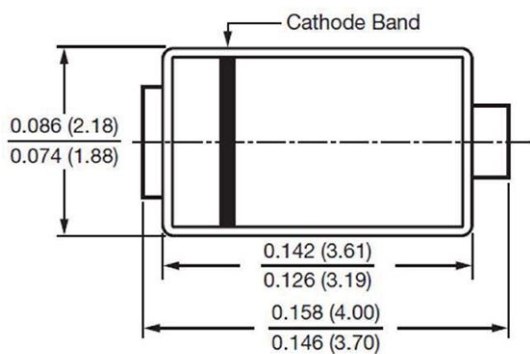
ORDERING INFORMATION (Example)			
PREFERRED P/N	PREFERRED PACKAGE CODE	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-1ENH01-M3/84A	84A	3000	7" diameter plastic tape and reel
VS-1ENH01-M3/85A	85A	10 000	13" diameter plastic tape and reel
VS-1ENH02-M3/84A	84A	3000	7" diameter plastic tape and reel
VS-1ENH02-M3/85A	85A	10 000	13" diameter plastic tape and reel

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?96547
Part marking information	www.vishay.com/doc?96574
Packaging information	www.vishay.com/doc?88869
SPICE model	www.vishay.com/doc?96550

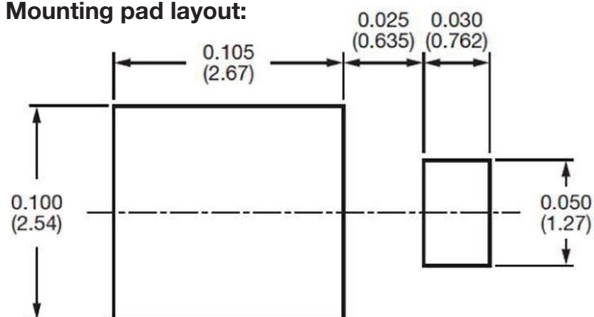


SMP (DO-220AA)

DIMENSIONS in inches (millimeters)



Mounting pad layout:





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