AUTOMOTIVE

RoHS

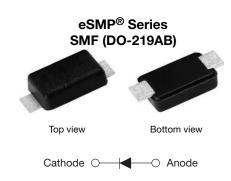
COMPLIANT HALOGEN

FREE



Vishay Semiconductors

Hyperfast Rectifier, 1 A FRED Pt®



LINKS TO ADDITIONAL RESOURCES





PRIMARY CHARACTERISTICS				
I _{F(AV)}	1 A			
V _R	1200 V			
V _F at I _F	1.45 V			
t _{rr}	50 ns			
T _J max.	175 °C			
Package	SMF (DO-219AB)			
Circuit configuration	Single			

FEATURES

- \bullet Hyperfast recovery time, reduced $\mathbf{Q}_{\text{rr}},$ and soft recovery
- 175 °C maximum operating junction temperature
- Specified for output and snubber operation
- Low forward voltage drop
- · Low leakage current
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified, meets JESD 201 class 2 whisker test
- Material categorization: for definitions of compliance please see <u>www.vishav.com/doc?99912</u>

DESCRIPTION / APPLICATIONS

State of the art hyperfast recovery rectifiers specifically designed with optimized performance of forward voltage drop and hyperfast recovery time.

The planar structure and the platinum doped life time control guarantee the best overall performance, ruggedness, and reliability characteristics.

These devices are intended for use as clamp, snubber and freewheeling diode in a flyback aux power supplies, bootstrap and desaturate for HV MOSFET and IGBT driver, high frequency rectifiers in a cuk and sepic circuit for LED lighting.

Their extremely optimized stored charge and low recovery current minimize the switching losses and reduce power dissipation in the switching element.

MECHANICAL DATA

Case: SMF (DO-219AB)

Molding compound meets UL 94 V-0 flammability rating **Terminals:** matte tin plated leads, solderable per

J-STD-002

Polarity: color band denotes cathode end

ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS	
Peak repetitive reverse voltage	V_{RRM}		1200	V	
Average rectified forward current	I _{F(AV)}	T _{Sp} = 135 °C, DC conduction	1	۸	
Non-repetitive peak surge current	I _{FSM}	T _J = 25 °C, 8.3 ms sine pulse	14	^	
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	1200	-	-	
		I _F = 1 A	-	1.85	2.30	v
Forward voltage, per diode V _F	V_{F}	I _F = 1 A, T _J = 125 °C	-	1.55	1.75	, v
		I _F = 1 A, T _J = 150 °C	-	1.45	1.65	
Reverse leakage current, per diode	I _R	$V_R = V_R$ rated	-	-	2	μA
		$T_J = 125$ °C, $V_R = V_R$ rated	-	ı	20	μΑ
Junction capacitance	C _T	V _R = 1200 V	-	3.0	-	pF



DYNAMIC RECOVERY CHARACTERISTICS (T _J = 25 °C unless otherwise specified)							
PARAMETER	SYMBOL	TEST CO	NDITIONS	MIN.	TYP.	MAX.	UNITS
		$I_F = 0.5 \text{ A}, I_R = 1 \text{ A}$	A, I _{rr} = 0.25 A	1	40	50	
Reverse recovery time	t _{rr}	T _J = 25 °C		-	91	-	ns
		T _J = 125 °C		-	120	-	
Deel, we are well as a support	1		$I_F = 1 \text{ A},$	-	3.0	-	Α
Peak recovery current	$T_{J} = 125 ^{\circ}\text{C}$	$dI_F/dt = 200 A/\mu s, V_R = 800 V$	-	4.0	-		
Deviates resource shows	O	T _J = 25 °C	••	-	105	-	nC
Reverse recovery charge		T _J = 125 °C		-	200	-	IIC

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⁾	Device mounted on PCB with 2 x 3.5 mm soldering lands	-	23	26	°C/W
Thermal resistance, junction to ambient	R _{thJA}	Device mounted on PCB with recommended pad size	-	125	-	°C/W
Approximate weight				0.015		g
Marking device		Case style SMF (DO-219AB)		М	RX	

Note

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

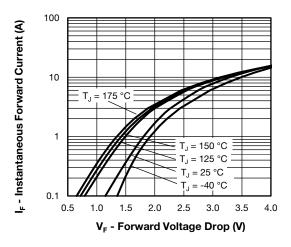


Fig. 1 - Typical Forward Voltage Drop Characteristics

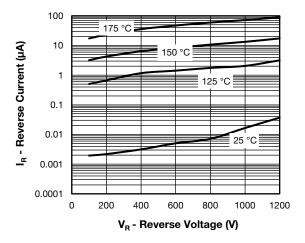


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

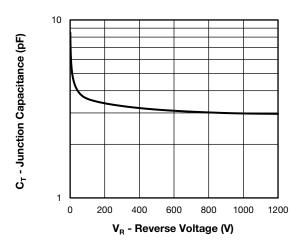


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

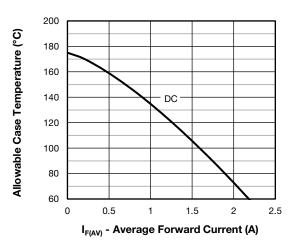


Fig. 4 - Maximum Allowable Case Temperature vs. Average Forward Current

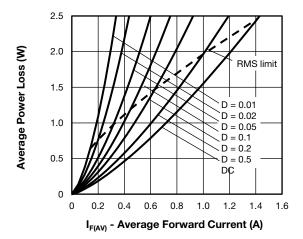
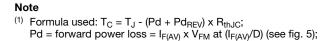


Fig. 5 - Forward Power Loss Characteristics



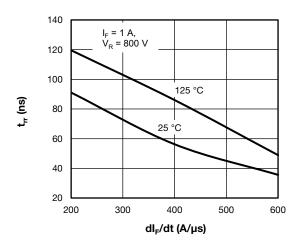


Fig. 6 - Typical Reverse Recovery Time vs. dl_F/dt

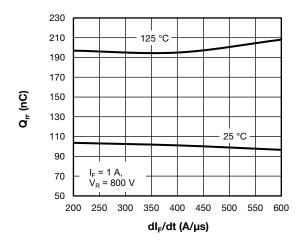


Fig. 7 - Typical Stored Charge vs. dl_F/dt

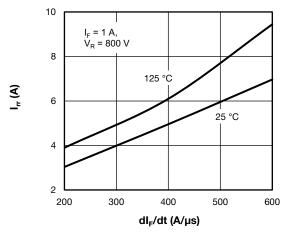


Fig. 8 - I_{rr} (A) vs. dI_F/dt

 Pd_{REV} = inverse power loss = $V_{R1} \times I_{R} (1 - D)$; I_{R} at V_{R1} = rated V_{R}

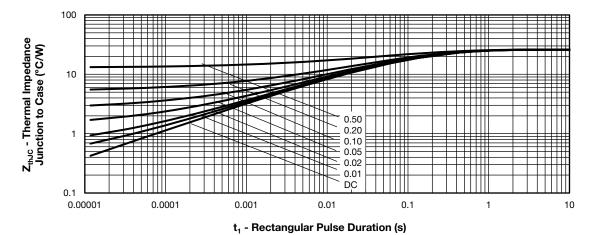


Fig. 9 - Transient Thermal Impedance, Junction to Case

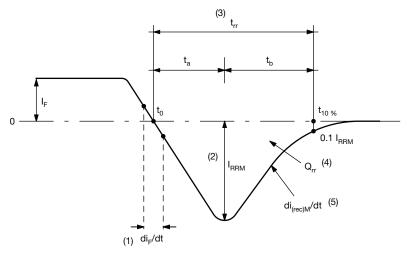


Fig. 10 - Reverse Recovery Waveform and Definitions

Notes

- (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 t_0 , crossing point of negative going I_F , to point $t_{10\%}$, 0.1 I_{RRM}
- $^{(4)}~$ Q_{rr} area under curve defined by t_0 and $t_{10}~\%$

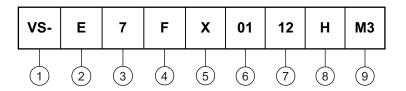
$$Q_{rr} = \int_{t_0}^{t_{10}\%} I(t)dt$$

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



ORDERING INFORMATION TABLE

Device code



1 - Vishay Semiconductors product

2 - Circuit configuration:

E = single diode

3 - 7 = FRED generation 7

F = SMF package

5 - Process type,

X = hyperfast recovery

6 - Current rating (01 = 1 A)

7 - Voltage code (12 = 1200 V)

8 - H = AEC-Q101 qualified

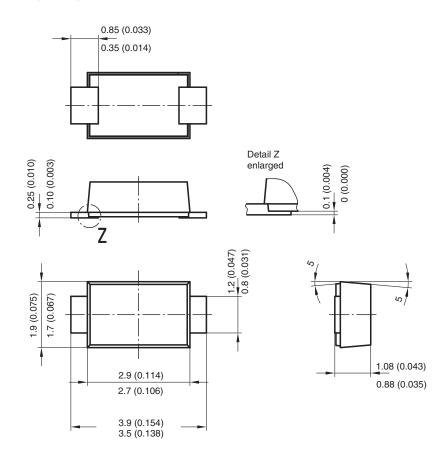
9 - M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free

ORDERING INFORMATION (Example)					
PREFERRED P/N	QUANTITY PER REEL	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION		
VS-E7FX0112HM3/I	10 000	10 000	13"diameter plastic tape and reel		

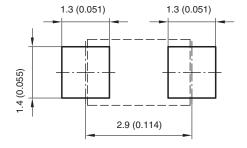
LINKS TO RELATED DOCUMENTS			
Dimensions	www.vishay.com/doc?95572		
Part marking information	www.vishay.com/doc?95618		
Packaging information	www.vishay.com/doc?95577		
SPICE model	www.vishay.com/doc?97264		

SMF (DO-219AB)

DIMENSIONS in millimeters (inches)



Foot print recommendation:



Created - Date: 15. February 2005 Rev. 3 - Date: 13. March 2007 Document no.:S8-V-3915.01-001 (4) 17247



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Vishay

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