AUTOMOTIVE

RoHS

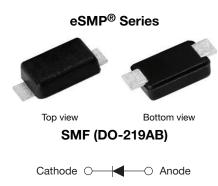
COMPLIANT

HALOGEN FREE



Vishay Semiconductors

Ultrafast Rectifier, 2 A FRED Pt®



LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS				
I _{F(AV)}	2 A			
V_R	600 V			
V _F at I _F	0.95 V			
t _{rr}	55 ns			
T _J max.	175 °C			
Package	SMF (DO-219AB)			
Circuit configuration	Single			

FEATURES

- Ultrafast recovery time, reduced Q_{rr}, and soft recovery
- 175 °C maximum operating junction temperature
- For PFC CRM, snubber operation
- Low forward voltage drop
- · Low leakage current
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Wave and reflow solderable
- Compatible to SOD-123W package case outline
- AEC-Q101 qualified, meets JESD 201 class 2 whisker test
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>

DESCRIPTION / APPLICATIONS

State of the art ultrafast recovery rectifiers designed with optimized performance of forward voltage drop, ultrafast recovery time, and soft recovery.

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 in PFC, boost, lighting, in the AC/DC section of SMPS, freewheeling and clamp diodes.

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

MECHANICAL DATA

Case: SMF (DO-219AB)

Molding compound meets UL 94 V-0 flammability rating

Halogen-free, RoHS-compliant

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}		600	V	
Average rectified forward current	I _{F(AV)}	T _C = 135 °C ⁽¹⁾	2	۸	
Non-repetitive peak surge current	I _{FSM}	T _J = 25 °C, 6 ms square pulse	30	А	
Operating junction and storage temperature range	T _J , T _{Stg}		-55 to +175	°C	

Note

⁽¹⁾ Device on PCB with 8 mm x 16 mm soldering lands



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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	600	-	-	
Forward voltage	W	I _F = 2 A	-	1.10	1.35	V
Forward voltage	V_{F}	I _F = 2 A, T _J = 150 °C	-	0.95	1.15	
Reverse leakage current I _R	V _R = V _R rated	-	-	3		
	ЧR	$T_J = 150 ^{\circ}\text{C}$, $V_R = V_R$ rated	-	20	100	μA
Junction capacitance	C _T	V _R = 600 V	-	5	-	pF

DYNAMIC RECOVERY CHARACTERISTICS (T _J = 25 °C unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
		$I_F = 1 \text{ A}, dI_F/dt = 50 \text{ A}$	-/dt = 50 A/μs, V _R = 30 V		42	-	
Reverse recovery time	+	$I_F = 0.5 \text{ A}, I_R = 1 \text{ A}, I_{rr} = 0.25 \text{ A}$		-	-	55]
neverse recovery time	t _{rr}	T _J = 25 °C	I _F = 2 A	-	40	-	ns
		T _J = 125 °C		-	63	-	
Peak recovery current I _{RRM}		T _J = 25 °C		-	7.0	-	^
	T _J = 125 °C	dI _F /dt = 500 A/μs V _R = 400 V	-	8.1	-	A	
Doverso vocavani abavas	Reverse recovery charge Q _{rr}	T _J = 25 °C	•••	-	140	-	nC
neverse recovery charge		T _J = 125 °C		-	255	-	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}	Device mounted on PCB with 8 mm x 16 mm soldering lands	-	-	15	°C/W
Thermal resistance, junction to ambient	R _{thJA}	Device mounted on PCB with 2 mm x 3.5 mm soldering lands	-	-	130	°C/W
Approximate weight				0.015		g
Approximate weight				0.0005		OZ.
Marking device		Case style SMF (DO-219AB)		М	PU	•

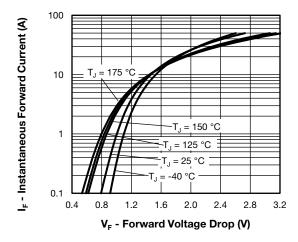


Fig. 1 - Typical Forward Voltage Drop Characteristics

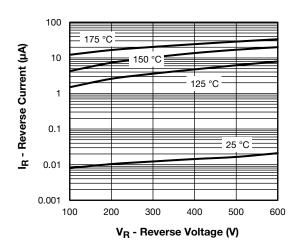
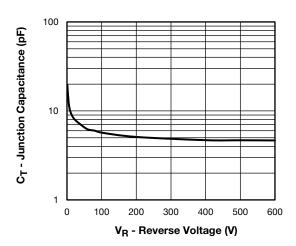


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

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Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

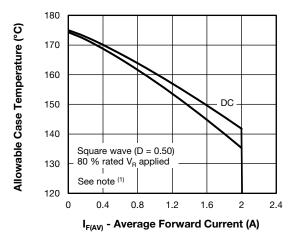
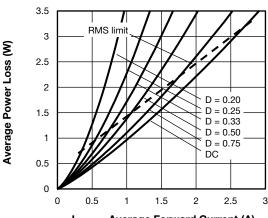


Fig. 4 - Maximum Allowable Case Temperature vs. Average Forward Current



I_{F(AV)} - Average Forward Current (A)

Fig. 5 - Forward Power Loss Characteristics

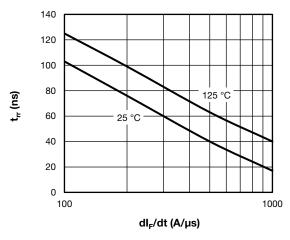


Fig. 6 - Typical Reverse Recovery Time vs. dl_F/dt

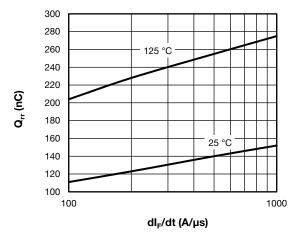
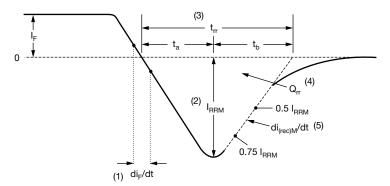


Fig. 7 - Typical Stored Charge vs. dl_F/dt

Note

 $[\]begin{array}{ll} \text{(1)} & \text{Formula used: } T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}; \\ Pd = \text{forward power loss} = I_{F(AV)} \times V_{FM} \text{ at } (I_{F(AV)}/D) \text{ (see fig. 5)}; \\ Pd_{REV} = \text{inverse power loss} = V_{R1} \times I_R \text{ (1 - D); } I_R \text{ at } V_{R1} = \text{rated } V_R \\ \end{array}$

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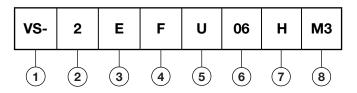
- (1) di_F/dt rate of change of current through zero crossing
- and I_{RRM}
- (2) I_{RRM} peak reverse recovery current
- $Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$
- (3) t_{rr} reverse recovery time measured from zero crossing point of negative going I_F to point where a line passing through 0.75 I_{RRM} 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}

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

Fig. 8 - Reverse Recovery Waveform and Definitions

ORDERING INFORMATION TABLE

Device code



- 1 Vishay Semiconductors product
- Current rating (2 = 2 A)
- **3** Circuit configuration:

E = single diode

- 4 F = SMF package
- 5 Process type,

U = ultrafast recovery

- 6 Voltage code (06 = 600 V)
- 7 H = AEC-Q101 qualified
- 8 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-2EFU06HM3/I	10 000	10 000	13" diameter plastic tape and reel		

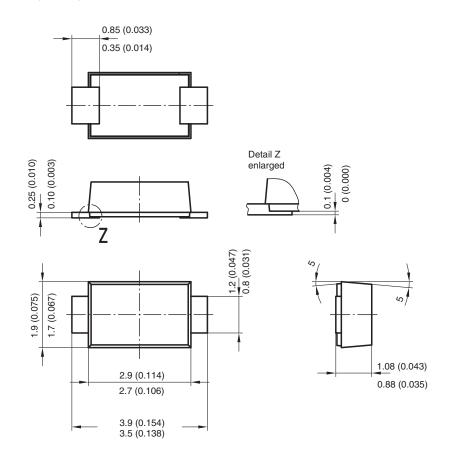
LINKS TO RELATED DOCUMENTS				
Dimensions	www.vishay.com/doc?95572			
Part marking information	www.vishay.com/doc?95618			
Packaging information	www.vishay.com/doc?95577			
SPICE model	www.vishay.com/doc?96867			



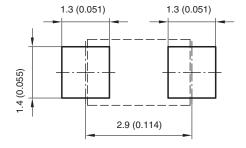
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SMF (DO-219AB)

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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