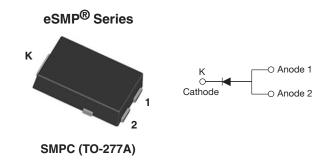


Ultrafast Rectifier, 8 A FRED Pt®



LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS				
I _{F(AV)}	8 A			
V_{R}	600 V			
V _F at I _F	1.01 V			
t _{rr (typ.)}	42 ns			
T _J max.	175 °C			
Package	SMPC (TO-277A)			
Circuit configuration	Single			

FEATURES

• Ultrafast recovery time, reduced Q_{rr}, and soft recovery



COMPLIANT

• 175 °C maximum operating junction temperature

• For PFC, CRM snubber operation

HALOGEN FREE · Low forward voltage drop

Low leakage current

• Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C

Meets JESD 201 class 2 whisker test

• Material categorization: for definitions of compliance please see www.vishav.com/doc?99912

DESCRIPTION / APPLICATIONS

State of the art ultrafast recovery rectifiers specifically designed with optimized performance of forward voltage drop and ultra fast 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 in PFC, boost, lighting, in the AC/DC section of SMPS, freewheeling and clamp diodes.

The 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: SMPC (TO-277A)

Molding compound meets UL 94 V-0 flammability rating

Halogen-free, RoHS-compliant

Terminals: matte tin plated leads, solderable per

J-STD-002

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 _{Sp} = 137 °C	8	۸
Non-repetitive peak surge current	I _{FSM}	T _J = 25 °C	120	A
Operating junction and storage temperatures	T_J , T_{Stg}		-55 to +175	°C

ELECTRICAL SPECIFICATIONS (T _J = 25 °C unless otherwise specified)						
PARAMETER	SYMBOL	SYMBOL TEST CONDITIONS MIN. TYP. M		MAX.	UNITS	
Breakdown voltage, blocking voltage	V_{BR}, V_{R}	I _R = 100 μA	600	-	-	
Forward voltage V _F		I _F = 8 A	-	1.16	1.36	V
	VF	I _F = 8 A, T _J = 150 °C	-	1.01	1.24	
Develope legisles current	I _R	V _R = V _R rated	-	-	5	μA
Reverse leakage current		$T_J = 150 ^{\circ}\text{C}, V_R = V_R \text{rated}$	-	25	150	μA
Junction capacitance	C _T	V _R = 600 V	-	8	-	pF



DYNAMIC RECOVERY CHARACTERISTICS (T _J = 25 °C unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
			$I_F = 1 \text{ A}, dI_F/dt = 50 \text{ A/}\mu\text{s}, V_R = 30 \text{ V}$		42	-	
Poverse receivery time		$I_F = 0.5 \text{ A}, I_R = 1 \text{ A}, I_{rr} = 0.25 \text{ A}$		1	-	60	no
Reverse recovery time	t _{rr}	T _J = 25 °C	I _F = 8 A	-	63	-	ns
		T _J = 125 °C		-	88	-	
Dook recovery ourrent	Bud and a sund	T _J = 25 °C		-	12	-	Α
Peak recovery current I _{RRM}	T _J = 125 °C	dI _F /dt = 500 A/μs V _R = 400 V	-	17	-	Α	
Reverse recovery charge Q _{rr}	0	T _J = 25 °C		-	460	-	nC
	T _J = 125 °C		ı	930	-	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}		-	2.4	3.5	°C/W
Approximate weight				0.1		g
Marking device		Case style SMPC (TO-277A)	QEU6			

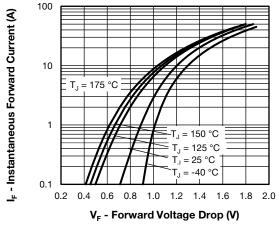


Fig. 1 - Typical Forward Voltage Drop Characteristics

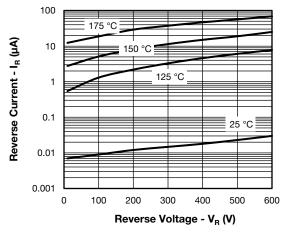


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

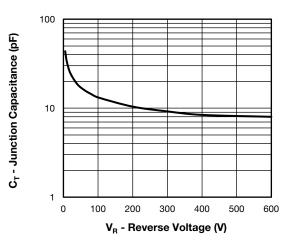


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

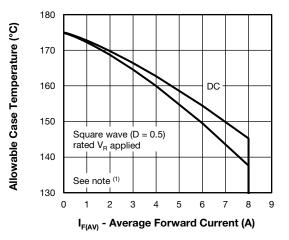


Fig. 4 - Maximum Allowable Case Temperature vs. Average Forward Current



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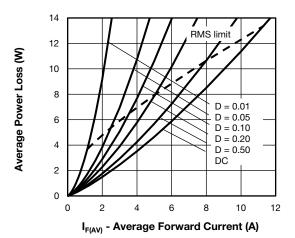


Fig. 5 - Forward Power Loss Characteristics

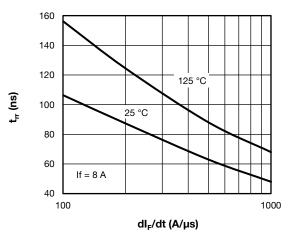


Fig. 6 - Typical Reverse Recovery Time vs. dI_F/dt

Note

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

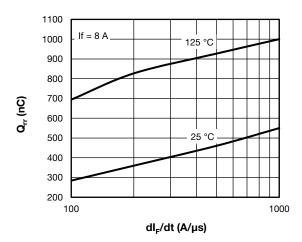


Fig. 7 - Typical Stored Charge vs. dl_F/dt

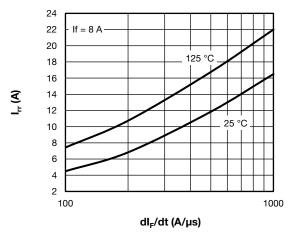
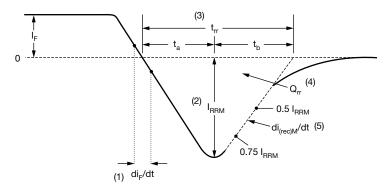


Fig. 8 - Typical Reverse Recovery Current vs. dl_F/dt



- (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 $\rm l_{r}$ to point where a line passing through 0.75 $\rm l_{RRM}$ and 0.50 $\rm l_{RRM}$ extrapolated to zero current.
- (4) $\mathbf{Q}_{\rm rr}$ area under curve defined by $\mathbf{t}_{\rm rr}$ and $\mathbf{I}_{\rm RRM}$

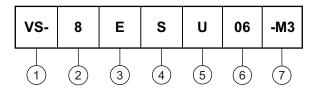
$$Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$$

(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



- Vishay Semiconductors product
- 2 Current rating (8 = 8 A)
- Circuit configuration:

E = single diode

- 4 S = SMPC package
- 5 Process type,

U = ultra fast recovery

- 6 Voltage code (06 = 600 V)
- 7 -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-8ESU06-M3/H	1500	1500	7" diameter plastic tape and reel		
VS-8ESU06-M3/I	6500	6500	13" diameter plastic tape and reel		

LINKS TO RELATED DOCUMENTS				
Dimensions	www.vishay.com/doc?95570			
Part marking information	www.vishay.com/doc?95565			
Packaging information	www.vishay.com/doc?88869			



SMPC (TO-277A)

DIMENSIONS in inches (millimeters)





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