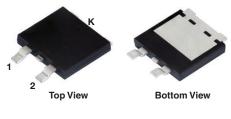


Hyperfast Rectifier, 2 x 10 A FRED Pt®

eSMP[®] Series SMPD (TO-263AC)





LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS				
I _{F(AV)}	2 x 10 A			
V_{R}	200 V			
V _F at I _F	0.77 V			
t _{rr}	25 ns			
T _J max.	175 °C			
Package	SMPD (TO-263AC)			
Circuit configuration	Common cathode			

FEATURES

Hyperfast recovery time, reduced Q_{rr}, and soft recovery



175 °C maximum operating junction temperature

Specified for output and snubber operation

COMPLIANT 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 <u>www.vishay.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 in the output rectification stage of SMPS, telecom, DC/DC converters as well as freewheeling diode in low voltage inverters and chopper motor drives.

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

MECHANICAL DATA

Case: SMPD (TO-263AC)

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}		200	V
Average rectified forward current	per device	I _{F(AV)}	T _{solder pad} = 152 °C	20	
	per diode			10	_
Non vanatitiva paak aurran per device		T 05 °C 6 ma aguara nulas	210] A	
Non-repetitive peak surge current	per diode	IFSM	T _J = 25 °C, 6 ms square pulse	110	

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	200	-	-	
Forward voltage, per diade	V	I _F = 10 A	-	0.94	1.05	V
Forward voltage, per diode	V_{F}	I _F = 10 A, T _J = 150 °C	-	0.77	0.87	
Reverse leakage current, per diode I _R		V _R = V _R rated	-	-	2	
		T _J = 150 °C, V _R = V _R rated	-	10	150	μA
Junction capacitance, per diode	C _T	V _R = 200 V	-	30	-	pF



DYNAMIC RECOVERY CHARACTERISTICS (T _J = 25 °C unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
		$I_F = 1 A, dI_F/dt = 50 A$	= 50 A/μs, V _R = 30 V		25	-	
Payaraa raaayan tima	t _{rr}	$I_F = 0.5 \text{ A}, I_R = 1 \text{ A}, I_{rr} = 0.25 \text{ A}$		-	-	25	
Reverse recovery time		T _J = 25 °C	I _F = 10 A, dI _F /dt = 200 A/μs, V _B = 160 V	-	22	-	ns
		T _J = 125 °C		-	35	-	
Dools were stand of twent	recovery current I _{RRM}	T _J = 25 °C		-	2.5	-	Α
Peak recovery current		T _J = 125 °C		-	5	-	
Deviates received above	0	T _J = 25 °C		-	25	-	nC
Reverse recovery charge	Q _{rr}	T _J = 125 °C		-	85	-	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, per diode junction to mount	R _{thJM}		-	1.8	2.4	°C/W
Approximate weight				0.55		g
Approximate weight				0.02		oz.
Marking device		Case style SMPD (TO-263AC)		20CI	DH02	

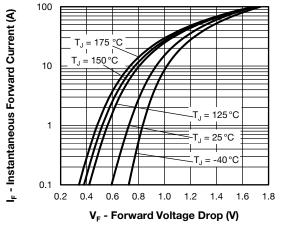


Fig. 1 - Typical Forward Voltage Drop Characteristics

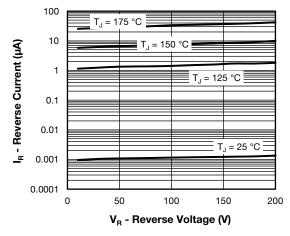


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

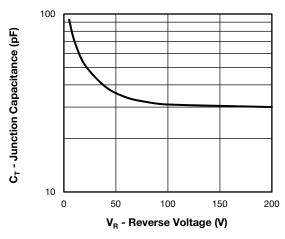


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

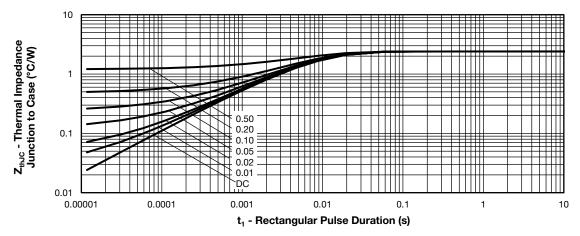


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

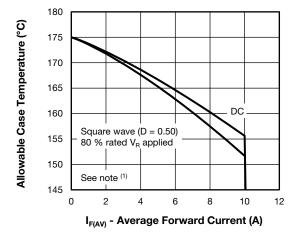


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

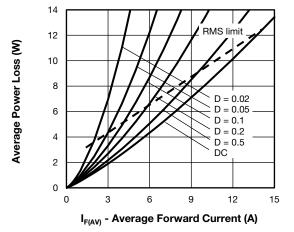


Fig. 6 - Forward Power Loss Characteristics

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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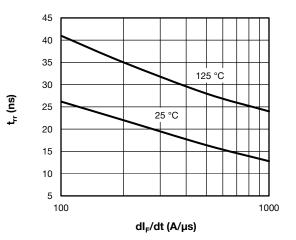


Fig. 7 - Typical Reverse Recovery Time vs. dl_F/dt

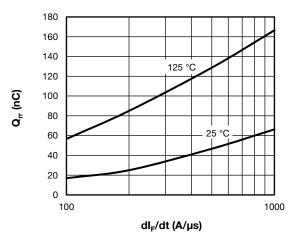
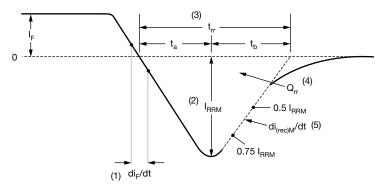


Fig. 8 - Typical Stored Charge vs. dl_F/dt



- (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 $\rm l_{r}$ 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}_{rr} area under curve defined by \mathbf{t}_{rr} and \mathbf{I}_{RRM}

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

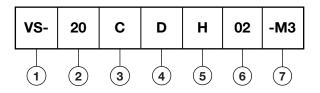
(5) di_{(rec)M}/dt - peak rate of change of current during t_b portion of t_{rr}

Fig. 9 - Reverse Recovery Waveform and Definitions



ORDERING INFORMATION TABLE

Device code



Vishay Semiconductors product

Current rating (20 A)

3 - Circuit configuration:

C = common cathode

- D = SMPD package

5 - Process type,

H = hyperfast recovery

6 - Voltage code (02 = 200 V)

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

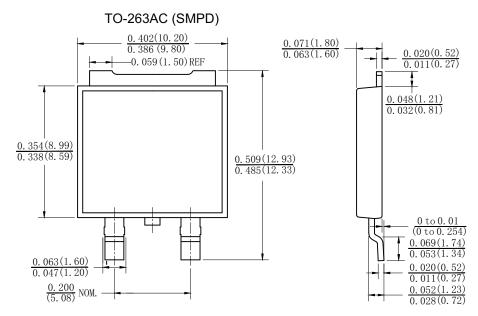
ORDERING INFORMATION (Example)						
PREFERRED P/N	QUANTITY PER REEL MINIMUM ORDER QUANTITY PACKAGING DESCRIPTION					
VS-20CDH02-M3/I	2000	2000	13" diameter plastic tape and reel			

LINKS TO RELATED DOCUMENTS				
Dimensions <u>www.vishay.com/doc?95604</u>				
Part marking information	www.vishay.com/doc?95566			
Packaging information	www.vishay.com/doc?88869			
SPICE model	www.vishay.com/doc?96572			

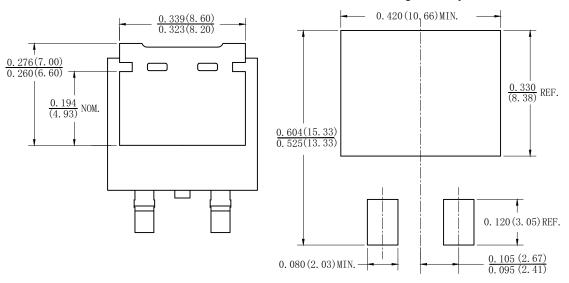


TO-263AC (SMPD)

DIMENSIONS in inches (millimeters)



Mounting Pad Layout





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