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Vishay Semiconductors

Hyperfast Rectifier, 2 x 4 A FRED Pt®



LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS							
I _{F(AV)} 2 x 4 A							
V _R	200 V						
V _F at I _F	0.7 V						
t _{rr (typ.)}	25 ns						
T _J max.	175 °C						
Package	FlatPAK 5 x 6						
Circuit configuration	Separated cathode						

FEATURES

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



COMPLIANT HALOGEN

FREE

- 175 °C maximum operating junction temperature
- Specific 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
- Material categorization: for definitions of compliance please see www.vishav.com/doc?99912

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 snubber, boost, piezo-injection, as high frequency rectifiers, and freewheeling diodes.

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

MECHANICAL DATA

Case: FlatPAK 5 x 6

Molding compound meets UL 94 V-0 flammability rating

Halogen-free, RoHS-compliant

Terminals: matte tin plated leads, solderable per

J-STD-002, meets JESD 201 class 2 whisker test

ABSOLUTE MAXIMUM RATINGS								
PARAMETER		SYMBOL	TEST CONDITIONS	VALUES	UNITS			
Peak repetitive reverse voltage		V_{RRM}		200	V			
Average rectified forward current per	per device	I	T _{Solderpad} = 170 °C, DC	- 8	Α			
	per device	I _{F(AV)}	T _{Solderpad} = 169 °C, D = 0.5	0				
Non-repetitive peak surge current ——	per device		T _{.I} = 25 °C, 10 ms sinusoidal pulse	173				
	per diode	I _{FSM}	T _J = 25 °C, To this sinusoidal pulse	87				
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	200	-	-			
Forward voltage, per diode	V _F	I _F = 4 A	-	0.87	0.96	V		
		I _F = 4 A, T _J = 150 °C	-	0.7	0.78			
Payerna lagkaga aurrent, per diade	I _R	V _R = V _R rated	-	-	2			
Reverse leakage current, per diode		$T_J = 150 ^{\circ}\text{C}, V_R = V_R \text{rated}$	-	7	80	μA		
Junction capacitance	C _T	V _R = 200 V	-	19	-	pF		



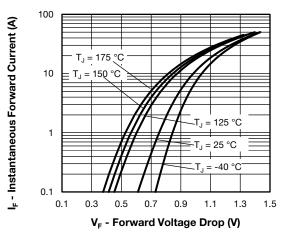
DYNAMIC RECOVERY CHARACTERISTICS (T _J = 25 °C unless otherwise specified)									
PARAMETER	SYMBOL	TEST CC	MIN.	TYP.	MAX.	UNITS			
		$I_F = 1.0 \text{ A}, dI_F/dt =$	= 50 A/ μ s, V _R = 30 V	1	20	-			
Reverse recovery time		$I_F = 0.5 \text{ A}, I_R = 1 \text{ A}, I_{rr} = 0.25 \text{ A}$		-	-	25			
	t _{rr}	T _J = 25 °C		-	17	-	ns		
		T _J = 125 °C		-	29	-			
Dook roopyony gurrant	1	T _J = 25 °C	I _F = 4 A	-	2.1	-	Α		
Peak recovery current	I _{RRM}	T _J = 125 °C	dl _F /dt = 200 A/μs V _R = 160 V	-	4	-	A		
Reverse recovery charge	0	T _J = 25 °C]	-	18	-	nC		
	Q _{rr}	T _J = 125 °C		-	60	-	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 ambient, per diode	R _{thJA} (1)(2)		-	89	103	°C/W			
Thermal resistance, junction to mount, per diode	R _{thJM} (3)		-	1.8	2.1	C/ VV			

Notes

- $^{(1)}$ The heat generated must be less than the thermal conductivity from junction to ambient: $dP_D/dT_J < 1/R_{thJA}$
- $^{(2)}$ Free air, mounted or recommended copper pad area; thermal resistance R_{thJA} junction to ambient
- (3) Mounted on infinite heatsink







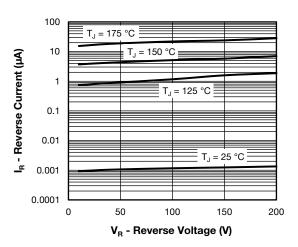


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

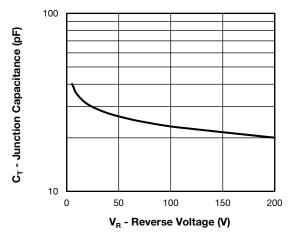


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

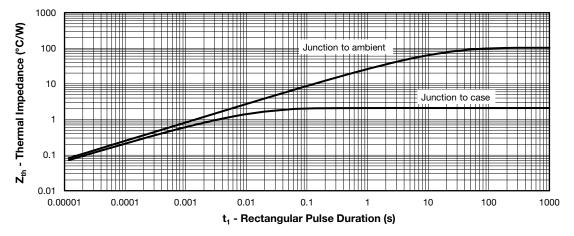


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

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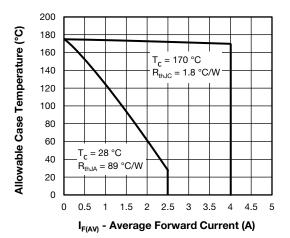


Fig. 5 - Maximum Allowable Case Temperature vs.
Average Forward Current

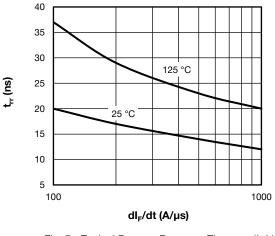


Fig. 7 - Typical Reverse Recovery Time vs. dl_F/dt

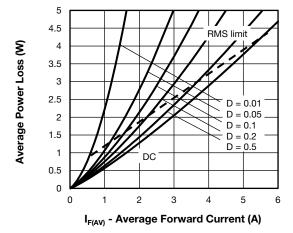


Fig. 6 - Forward Power Loss Characteristics

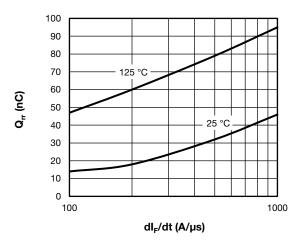
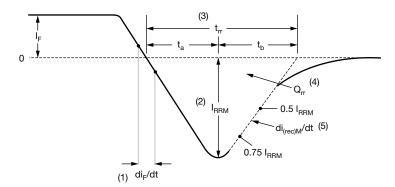


Fig. 8 - Typical Stored Charge vs. dl_F/dt



- (1) di_F/dt rate of change of current through zero crossing
- (2) I_{RRM} peak reverse recovery current
- (3) 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.
- (4) $\mathbf{Q}_{\rm rr}$ area under curve defined by $\mathbf{t}_{\rm rr}$ and $\mathbf{I}_{\rm RRM}$

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

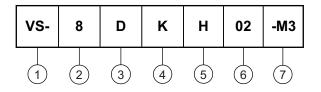
(5) $di_{(rec)M}/dt$ - peak rate of change of current during t_b portion of t_{rr}

Fig. 9 - Reverse Recovery Waveform and Definitions



ORDERING INFORMATION TABLE

Device code



1 - Vishay Semiconductors product

2 - Current rating (8 = 8 A)

Circuit configuration:

D = separated cathode

K = FlatPAK package

5 - Process type,

H = hyper fast recovery

6 - Voltage code (02 = 200 V)

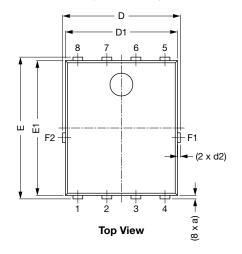
8 - -M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free

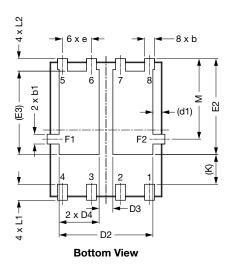
ORDERING INFORMATION (example)								
PREFERRED P/N UNIT WEIGHT PREFERRED PACKAGE CODE BASE QUANTITY PACKAGING DESCRIPTION								
VS-8DKH02-M3/H	0.10	Н	1500	7"diameter plastic tape and reel				
VS-8DKH02-M3/I	0.10	I	6000	13"diameter plastic tape and reel				

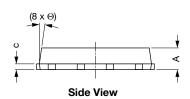
LINKS TO RELATED DOCUMENTS						
Dimensions	www.vishay.com/doc?96056					
Part marking information	www.vishay.com/doc?96059					
Packaging information	www.vishay.com/doc?88869					

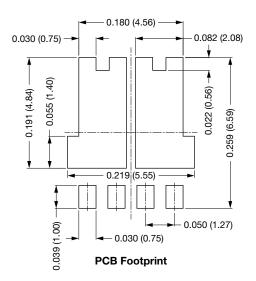
FlatPAK 5 x 6 (Dual)

DIMENSIONS in inches (millimeters)









DIM		INCHES	INCHES		MILLIMETERS	ETERS	
DIM.	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	
Α	0.035	0.039	0.043	0.89	0.99	1.09	
(a)	-	0.006	-	-	0.15	-	
b	0.013	0.017	0.020	0.32	0.43	0.52	
b1	0.013	0.017	0.020	0.32	0.43	0.52	
С	0.008	-	0.014	0.20	-	0.35	
D	0.197	0.203	0.209	5.00	5.15	5.30	
D1	0.189	0.193	0.197	4.80	4.90	5.00	
D2	0.154	0.161	0.169	3.90	4.10	4.30	
D3	0.020	0.024	0.031	0.50	0.60	0.80	
D4	0.063	0.069	0.075	1.60	1.75	1.90	
(d1)	-	0.016	-	=	0.40	=	
(d2)	-	0.005	-	-	0.125	-	
Е	0.238	0.244	0.250	6.05	6.20	6.35	



Outline Dimensions

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DIM.		INCHES			MILLIMETERS			
DIM.	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.		
E1	0.228	0.232	0.236	5.80	5.90	6.00		
E2	0.157	0.165	0.173	4.00	4.20	4.40		
(E3)	-	0.144	=	-	3.65	=		
е		0.050 BSC			1.27 BSC			
(K)	0.039	-	-	1.00	-	-		
L1	0.019	-	0.043	0.48	-	1.10		
L2	0.012	-	0.031	0.30	-	0.80		
M	0.128	0.138	0.148	3.25	3.50	3.75		
Θ	0°	-	10°	0°	-	10°		

Notes

- Dimensioning and tolerancing per ASME Y14.5-2009
- Dimensions D1 and E1 do not include mold flash or gate burrs
- Dimension (XX) means reference only



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