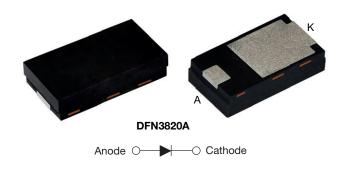


Ultrafast Rectifier, 5 A FRED Pt®



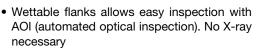
LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS				
I _{F(AV)}	5 A			
V_R	200 V			
V _F at I _F	0.72 V			
t _{rr} (typ.)	15 ns			
I _{FSM}	102 A			
T _J max.	175 °C			
Package	DFN3820A			
Circuit configuration	Single			

FEATURES

- Very low profile typical height of 0.88 mm
- · Ideal for automated placement





- Low forward voltage drop, low power losses
- Low leakage current
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- For PFC, CRM snubber operation
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>

TYPICAL APPLICATIONS

For use in high frequency inverters, DC/DC converters, freewheeling diodes, clamping and snubber, polarity protection, and LED lighting

MECHANICAL DATA

Case: DFN3820A

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

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

Polarity: color band denotes cathode end

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Peak repetitive reverse voltage	V_{RRM}		200	V
Average rectified forward current	I _{F(AV)}	T _M = 154 °C	5	۸
Non-repetitive peak surge current	I _{FSM}	T _J = 25 °C, 10 ms sine pulse	102	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	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS	
Breakdown voltage, blocking voltage	V_{BR}, V_{R}	I _R = 100 μA	200	-	-		
Forward voltage	V	I _F = 5 A	-	0.88	0.97	V	
	V _F	I _F = 5 A, T _J = 150 °C	-	0.72	0.79		
Reverse leakage current	1	V _R = V _R rated	-	-	4		
	IR	T _J = 150 °C, V _R = V _R rated	-	-	50	μA	
Junction capacitance	Ст	V _B = 200 V	-	19	-	pF	



DYNAMIC RECOVERY CHARACTERISTICS (T _J = 25 °C unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
		$I_F = 0.5 \text{ A}, I_R = 1 \text{ A}$	A, $I_{rr} = 0.25 A$	-	15	25	
Reverse recovery time	t _{rr}	T _J = 25 °C	I _F = 5 A dI _F /dt = 500 A/μs V _R = 200 V	-	12	-	ns
		T _J = 125 °C		-	19	-	
Peak recovery current I _F		T _J = 25 °C		-	4.1	-	Α
	IRRM	T _J = 125 °C		-	6.8	-] ^
Reverse recovery charge	Q _{rr}	T _J = 25 °C		-	27	-	nC
		T _J = 125 °C		-	69	-	110

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⁾		-	3.5	4.5	
Thermal resistance, junction to ambient	R _{thJA}	Device mounted on FR4 PCB, 2 oz. standard footprint	-	140	-	°C/W
Weight			-	0.023	-	9
Marking device		Case style DFN3820A		5l	1 2	

Note

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

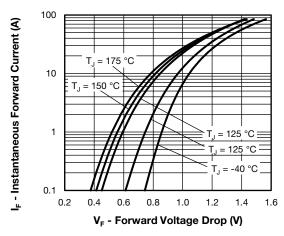


Fig. 1 - Typical Forward Voltage Drop Characteristics

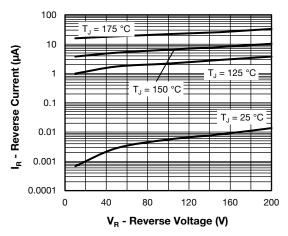


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage



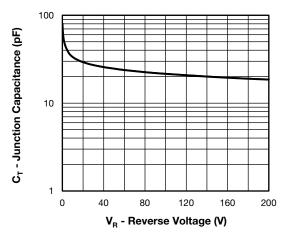


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

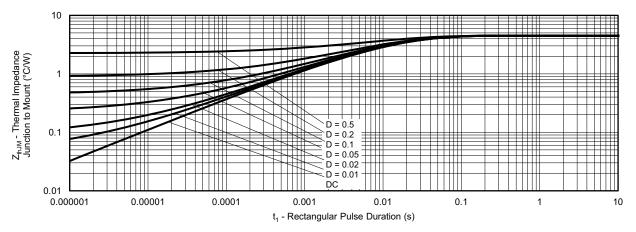


Fig. 4 - Maximum Transient Thermal Impedance, Junction to Mount

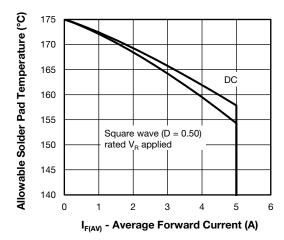


Fig. 5 - Maximum Allowable Mount Temperature vs. Average Forward Current

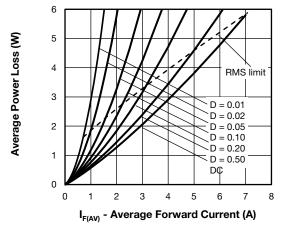
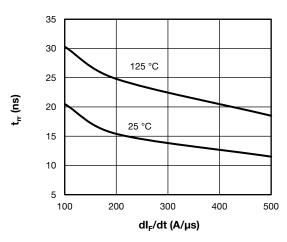


Fig. 6 - Forward Power Loss Characteristics

Note

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







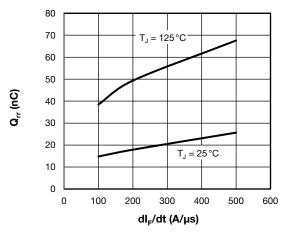


Fig. 8 - Typical Stored Charge vs. dl_F/dt

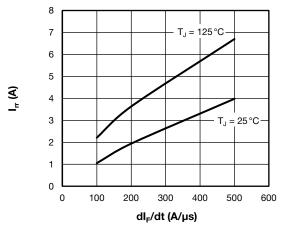
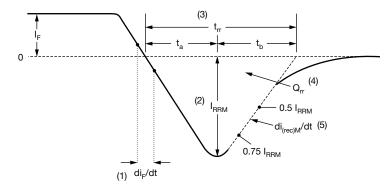


Fig. 9 - I_{rr} vs. dl/dt



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

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

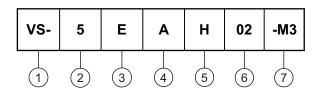
(5) di_{(rec)M}/dt - peak rate of change of current during t_b portion of t_{rr}

Fig. 10 - Reverse Recovery Waveform and Definitions



ORDERING INFORMATION TABLE

Device code



1 - Vishay Semiconductors product

2 - Current rating (5 = 5 A)

Circuit configuration:

E = single diode

4 - A = DFN3820A package

5 - Process type,

H = ultrafast recovery

6 - Voltage code (02 = 200 V)

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

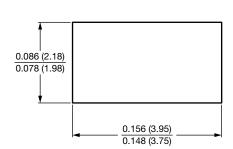
ORDERING INFORMATION (Example)						
PREFERRED P/N	PREFERRED PACKAGE CODE	BASE QUANTITY	PACKAGING DESCRIPTION			
VS-5EAH02-M3/H	Н	3500	7" diameter plastic tape and reel			
VS-5EAH02-M3/I	I	14 000	13" diameter plastic tape and reel			

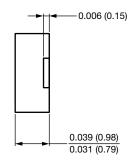
LINKS TO RELATED DOCUMENTS				
Dimensions	www.vishay.com/doc?97066			
Part marking information	www.vishay.com/doc?97065			
Packaging information	www.vishay.com/doc?98488			
SPICE model	www.vishay.com/doc?97098			

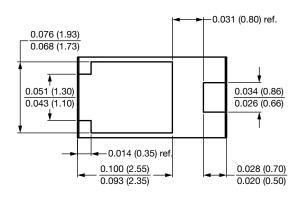


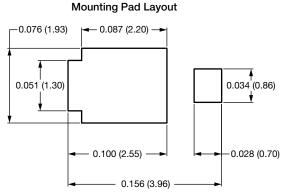
DFN3820A, FRED Pt®

DIMENSIONS in inches (millimeters)











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Vishay

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