

Ultrafast Rectifier, 3 A FRED Pt®


DFN3820A

Anode  Cathode

RoHS
COMPLIANT
HALOGEN
FREE

FEATURES

- Very low profile - typical height of 0.88 mm
- Ideal for automated placement
- Wettable flanks allows easy inspection with AOI (automated optical inspection). No X-ray necessary
- 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
- AEC-Q101 qualified
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

TYPICAL APPLICATIONS

For use in high frequency inverters, DC/DC converters, freewheeling diodes, clamping and snubber, polarity protection, dual voltage injector drivers, piezo drivers, ECU, Antilock Braking Systems (ABS), HID 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

LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	3 A
V_R	200 V
V_F at I_F	0.73 V
t_{rr} (typ.)	15 ns
I_{FSM}	61 A
T_J max.	175 °C
Package	DFN3820A
Circuit configuration	Single

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Peak repetitive reverse voltage	V_{RRM}		200	V
Average rectified forward current	$I_{F(AV)}$	$T_M = 160$ °C	3	A
Non-repetitive peak surge current	I_{FSM}	$T_J = 25$ °C, 10 ms sine pulse	61	
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	$I_R = 100$ μ A	200	-	-	V
Forward voltage	V_F	$I_F = 3$ A	-	0.90	0.96	
		$I_F = 3$ A, $T_J = 150$ °C	-	0.73	0.79	
Reverse leakage current	I_R	$V_R = V_R$ rated	-	-	2	μ A
		$T_J = 150$ °C, $V_R = V_R$ rated	-	-	50	
Junction capacitance	C_T	$V_R = 200$ V	-	11	-	pF

DYNAMIC RECOVERY CHARACTERISTICS ($T_J = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Reverse recovery time	t_{rr}	$I_F = 0.5\text{ A}$, $I_R = 1\text{ A}$, $I_{rr} = 0.25\text{ A}$	-	15	25	ns
		$T_J = 25\text{ }^{\circ}\text{C}$	-	11	-	
		$T_J = 125\text{ }^{\circ}\text{C}$	-	17	-	
Peak recovery current	I_{RRM}	$T_J = 25\text{ }^{\circ}\text{C}$	-	3.8	-	A
		$T_J = 125\text{ }^{\circ}\text{C}$	-	5.8	-	
Reverse recovery charge	Q_{rr}	$T_J = 25\text{ }^{\circ}\text{C}$	-	23	-	nC
		$T_J = 125\text{ }^{\circ}\text{C}$	-	53	-	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Maximum junction and storage temperature range	T_J, T_{Stg}		-55	-	175	$^{\circ}\text{C}$
Thermal resistance, junction to mount	$R_{thJM}^{(1)}$		-	4.5	6	$^{\circ}\text{C/W}$
Thermal resistance, junction to ambient	R_{thJA}	Device mounted on FR4 PCB, 2 oz. standard footprint	-	140	-	
Weight			-	0.023	-	g
Marking device		Case style DFN3820A	3H2			

Note

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

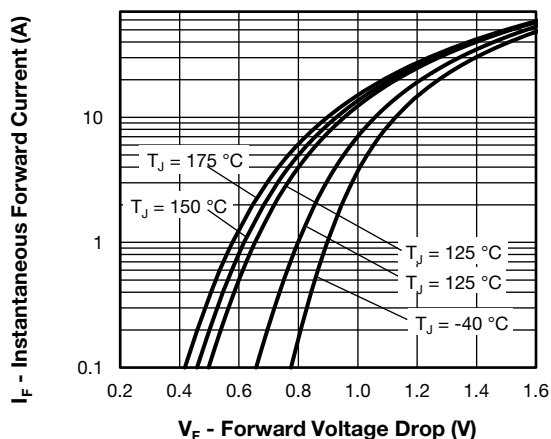


Fig. 1 - Typical Forward Voltage Drop Characteristics

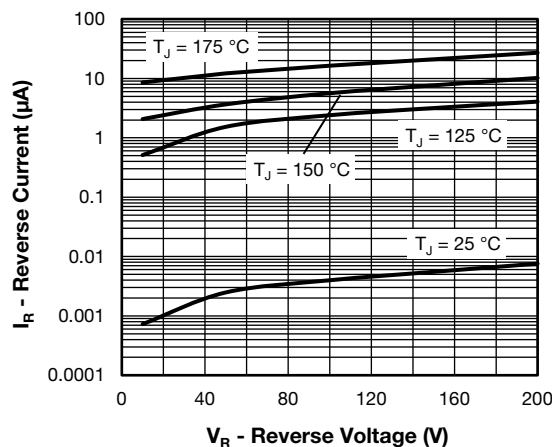


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

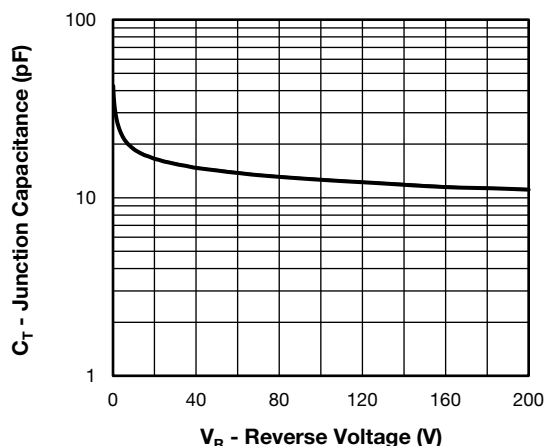


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

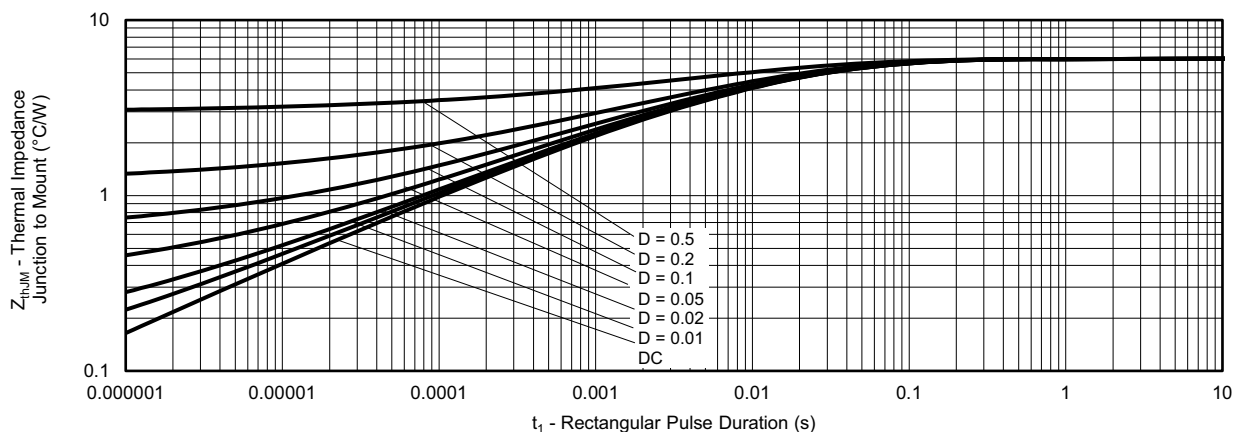


Fig. 4 - Maximum Transient Thermal Impedance, Junction to Mount

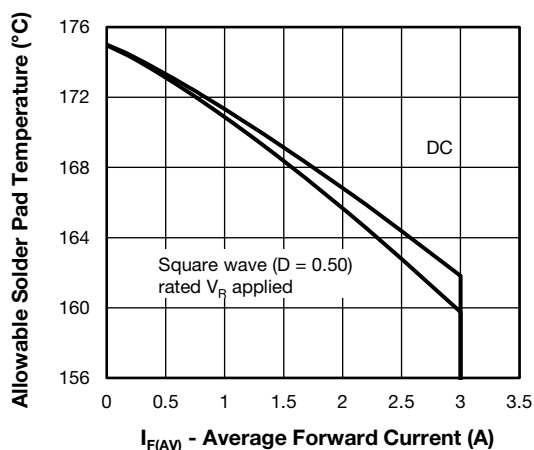


Fig. 5 - Maximum Allowable Mount Temperature vs. Average Forward Current

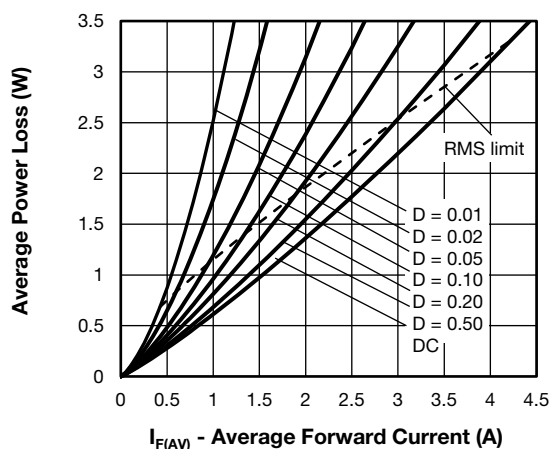


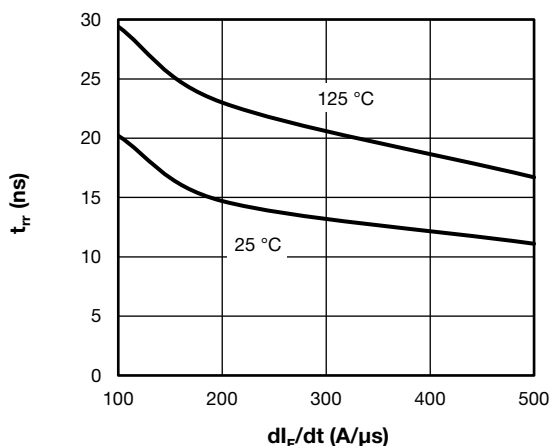
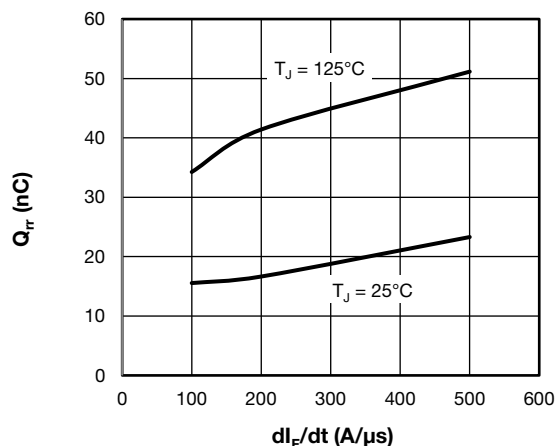
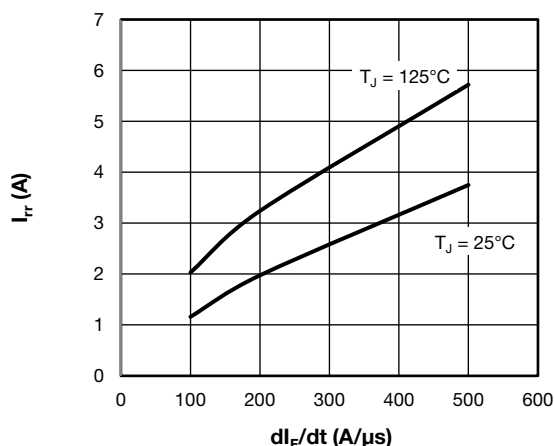
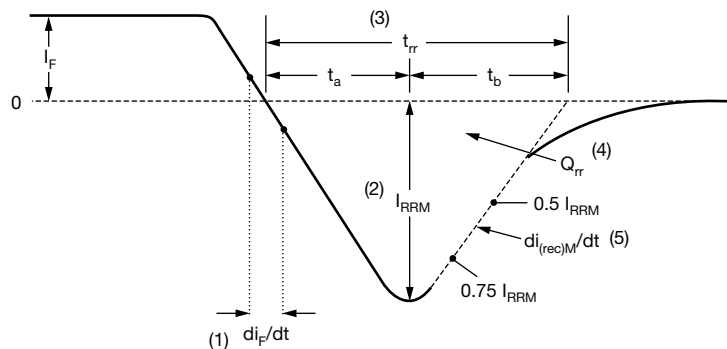
Fig. 6 - Forward Power Loss Characteristics

Note

Formula used: $T_M = T_J - (P_d + P_{d_{REV}}) \times R_{thJM}$;

P_d = forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig. 5);

$P_{d_{REV}}$ = inverse power loss = $V_{R1} \times I_R (1 - D)$; I_R at V_{R1} = rated V_R


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

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

Fig. 9 - I_{rr} vs. dI/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) Q_{rr} - area under curve defined by t_{rr} and 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	VS-	3	E	A	H	02	H	M3
	1	2	3	4	5	6	7	8
1	- Vishay Semiconductors product							
2	- Current rating (3 = 3 A)							
3	- Circuit configuration: E = single diode							
4	- A = DFN3820A package							
5	- Process type, H = ultrafast recovery							
6	- Voltage code (02 = 200 V)							
7	- H = AEC-Q101 qualified							
8	- M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free							

ORDERING INFORMATION (Example)

PREFERRED P/N	PREFERRED PACKAGE CODE	BASE QUANTITY	PACKAGING DESCRIPTION
VS-3EAH02HM3/H	H	3500	7" diameter plastic tape and reel
VS-3EAH02HM3/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
SPIICE model	www.vishay.com/doc?97097



DFN3820A, FRED Pt®

DIMENSIONS in inches (millimeters)





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