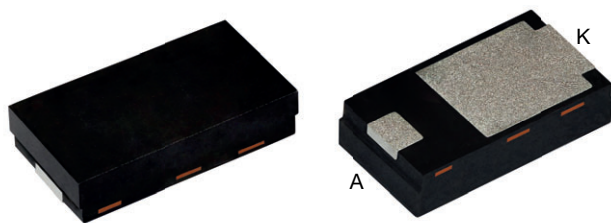


Ultrafast Rectifier, 2 A FRED Pt®


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

LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS

| | |
|-----------------------|----------|
| $I_{F(AV)}$ | 2 A |
| V_R | 200 V |
| V_F at I_F | 0.71 V |
| t_{rr} (typ.) | 15 ns |
| I_{FSM} | 54 A |
| T_J max. | 175 °C |
| Package | DFN3820A |
| Circuit configuration | Single |

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

ABSOLUTE MAXIMUM RATINGS

| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
|---|----------------|---|-------------|-------|
| Peak repetitive reverse voltage | V_{RRM} | | 200 | V |
| Average rectified forward current | $I_{F(AV)}$ | $T_M = 165\text{ °C}$ | 2 | A |
| Non-repetitive peak surge current | I_{FSM} | $T_J = 25\text{ °C}$, 10 ms sine pulse | 54 | |
| Operating junction and storage temperatures | T_J, T_{Stg} | | -55 to +175 | °C |

ELECTRICAL SPECIFICATIONS ($T_J = 25\text{ °C}$ unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNITS |
|-------------------------------------|---------------|--|------|------|------|---------------|
| Breakdown voltage, blocking voltage | V_{BR}, V_R | $I_R = 100\text{ }\mu\text{A}$ | 200 | - | - | V |
| Forward voltage | V_F | $I_F = 2\text{ A}$ | - | 0.88 | 0.95 | |
| | | $I_F = 2\text{ A}$, $T_J = 150\text{ °C}$ | - | 0.71 | 0.76 | |
| Reverse leakage current | I_R | $V_R = V_R$ rated | - | - | 2 | μA |
| | | $T_J = 150\text{ °C}$, $V_R = V_R$ rated | - | - | 50 | |
| Junction capacitance | C_T | $V_R = 200\text{ V}$ | - | 10 | - | 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 |
| | | $T_J = 25\text{ }^{\circ}\text{C}$ | - | 10 | - | |
| | | $T_J = 125\text{ }^{\circ}\text{C}$ | - | 15 | - | |
| Peak recovery current | I_{RRM} | $T_J = 25\text{ }^{\circ}\text{C}$ | - | 3.1 | - | A |
| | | $T_J = 125\text{ }^{\circ}\text{C}$ | - | 4.7 | - | |
| Reverse recovery charge | Q_{rr} | $T_J = 25\text{ }^{\circ}\text{C}$ | - | 18 | - | nC |
| | | $T_J = 125\text{ }^{\circ}\text{C}$ | - | 39 | - | |

| 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 | $R_{thJM}^{(1)}$ | | - | 5 | 6.3 | $^{\circ}\text{C/W}$ |
| 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 | 2H2 | | | |

Note

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

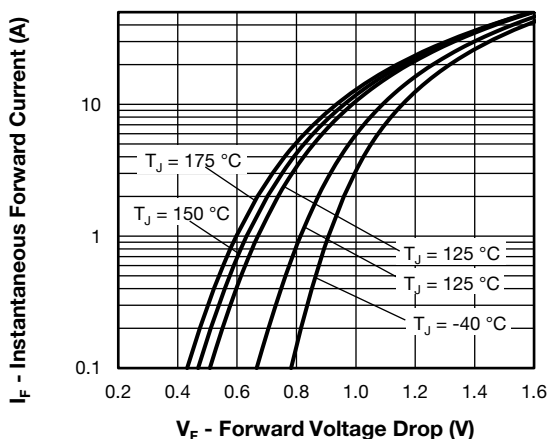


Fig. 1 - Typical Forward Voltage Drop Characteristics

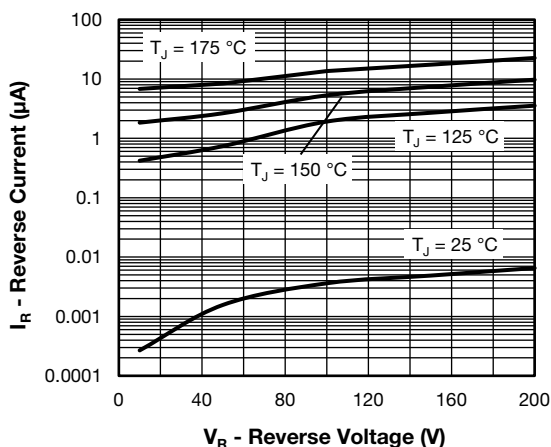


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

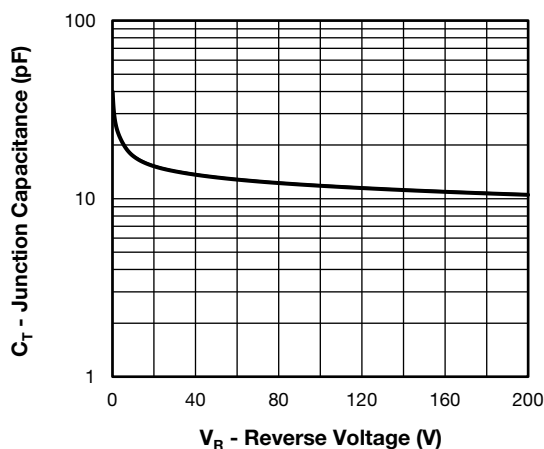


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

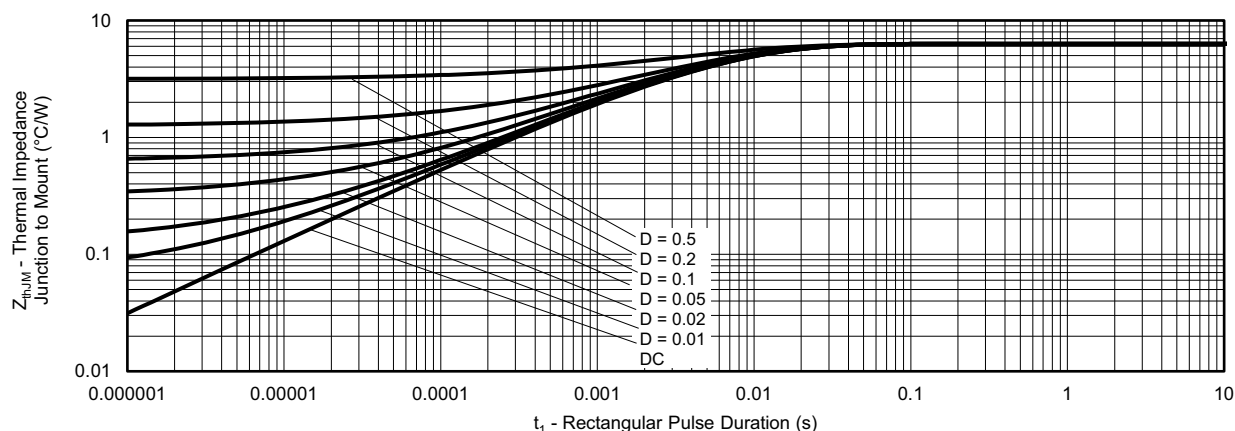


Fig. 4 - Maximum Transient Thermal Impedance, Junction to Mount

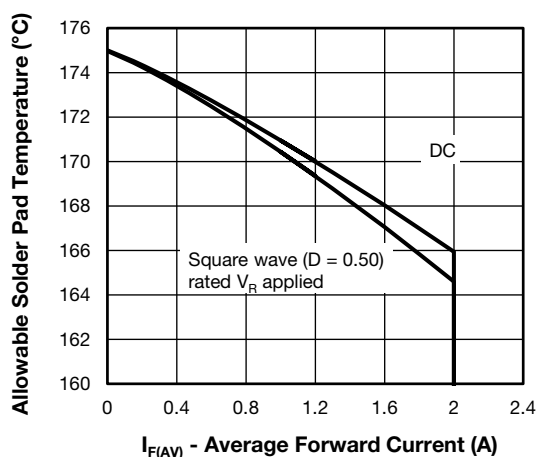


Fig. 5 - Maximum Allowable Mount Temperature vs. Average Forward Current

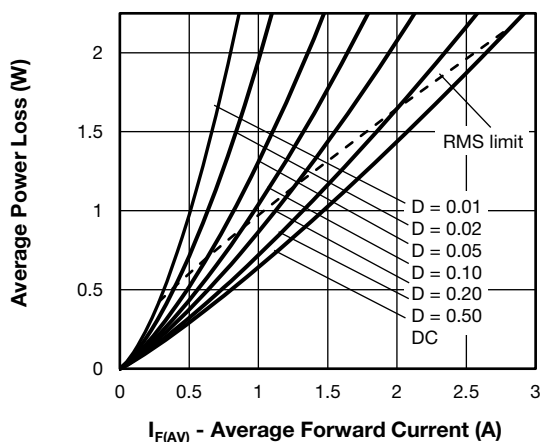


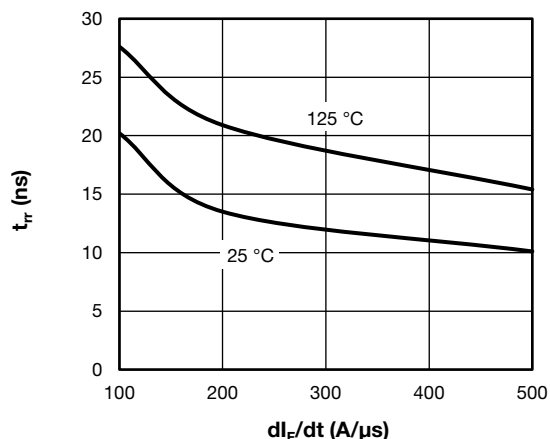
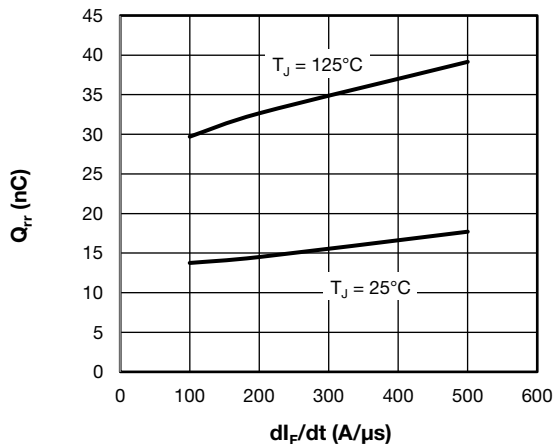
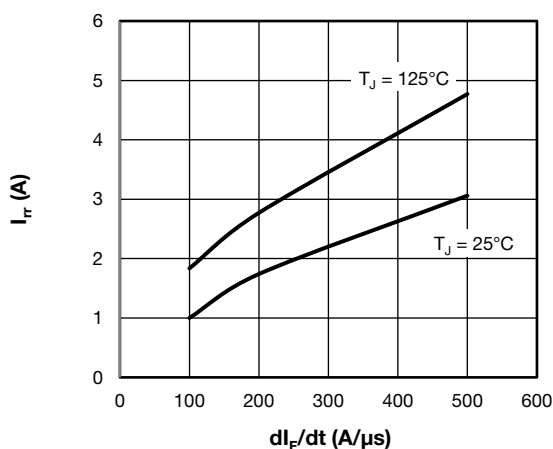
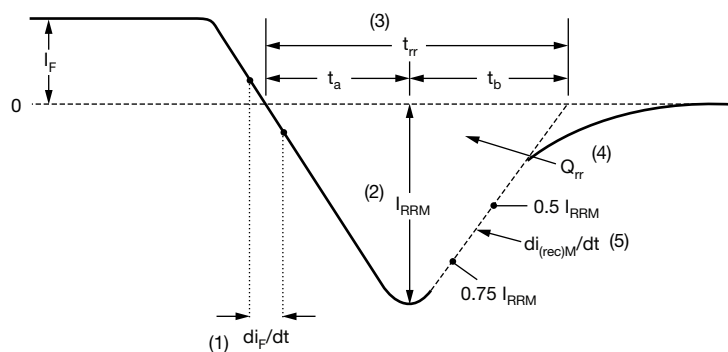
Fig. 6 - Forward Power Loss Characteristics

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- | 2 | E | A | H | 02 | H | M3 |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1 | - Vishay Semiconductors product | | | | | | | |
| 2 | - Current rating (2 = 2 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-2EAH02HM3/H | H | 3500 | 7" diameter plastic tape and reel |
| VS-2EAH02HM3/I | I | 14 000 | 13" diameter plastic tape and reel |

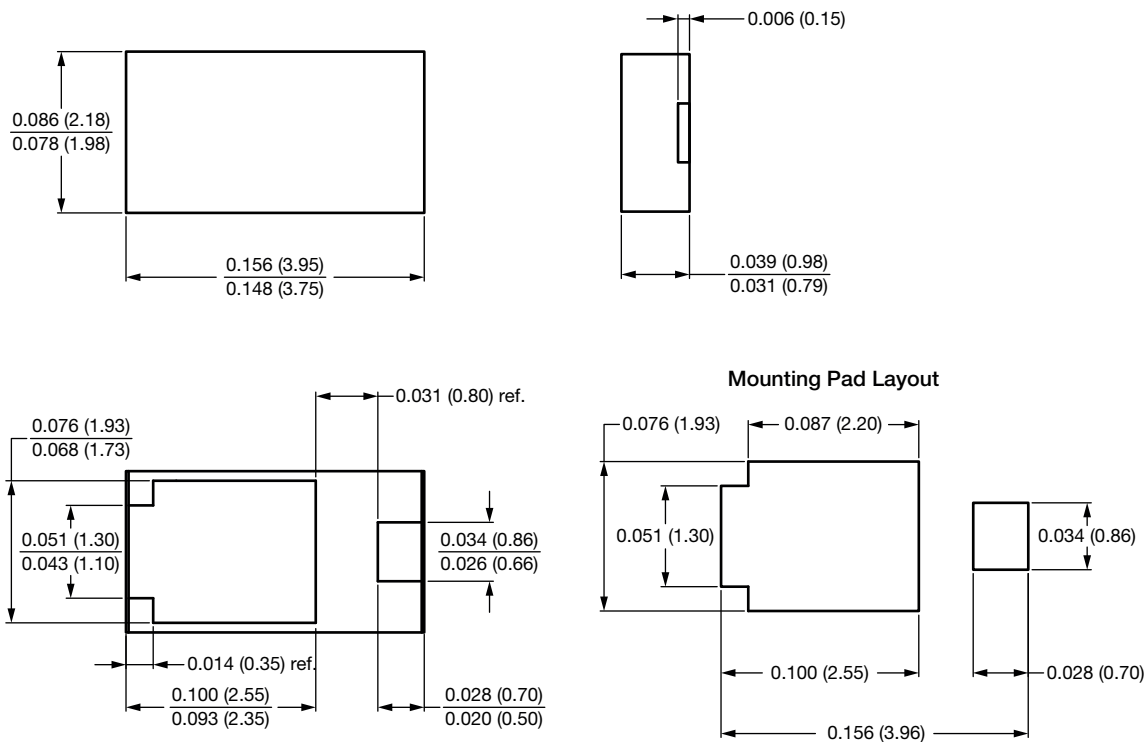
LINKS TO RELATED DOCUMENTS

| | |
|--------------------------|--|
| 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?97096 |



DFN3820A, FRED Pt®

DIMENSIONS in inches (millimeters)





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