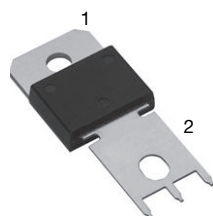


Ultrafast Soft Recovery Diode, 150 A FRED Pt®


PowerTab®


FEATURES

- Ultrafast recovery time
- 175 °C max. operating junction temperature
- Screw mounting only
- Designed and qualified according to JEDEC®-JESD 47
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT
HALOGEN
FREE

BENEFITS

- Reduced RFI and EMI
- Higher frequency operation
- Reduced snubbing
- Reduced parts count

DESCRIPTION / APPLICATIONS

These diodes are optimized to reduce losses and EMI/RFI in high frequency power conditioning systems. The softness of the recovery eliminates the need for a snubber in most applications. These devices are ideally suited for HF welding, power converters and other applications where switching losses are not significant portion of the total losses.

MECHANICAL DATA

Case: PowerTab®

Molding compound meets UL 94 V-0 flammability rating

Terminal: nickel plated, screwable

LINKS TO ADDITIONAL RESOURCES



| PRIMARY CHARACTERISTICS | |
|-------------------------|--------------------|
| $I_{F(AV)}$ | 150 A |
| V_R | 400 V |
| V_F at I_F | 0.9 V |
| t_{rr} (typ.) | See recovery table |
| T_J max. | 175 °C |
| Package | PowerTab® |
| Circuit configuration | Single |

| ABSOLUTE MAXIMUM RATINGS | | | | |
|---|----------------|-----------------------|-------------|-------|
| PARAMETER | SYMBOL | TEST CONDITIONS | MAX. | UNITS |
| Cathode to anode voltage | V_R | | 400 | V |
| Continuous forward current | $I_{F(AV)}$ | $T_C = 104\text{ °C}$ | 150 | A |
| Single pulse forward current | I_{FSM} | $T_C = 25\text{ °C}$ | 1500 | |
| Maximum repetitive forward current | I_{FRM} | Square wave, 20 kHz | 300 | |
| 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 | $I_R = 200\text{ }\mu\text{A}$ | 400 | - | - | V |
| Forward voltage | V_F | $I_F = 150\text{ A}$ | - | 1.07 | 1.3 | |
| | | $I_F = 150\text{ A}, T_J = 175\text{ °C}$ | - | 0.9 | 1.1 | |
| | | $I_F = 150\text{ A}, T_J = 125\text{ °C}$ | - | 0.96 | 1.17 | |
| Reverse leakage current | I_R | $V_R = V_R$ rated | - | - | 50 | μA |
| | | $T_J = 150\text{ °C}, V_R = V_R$ rated | - | - | 4 | mA |
| Junction capacitance | C_T | $V_R = 400\text{ V}$ | - | 100 | - | pF |
| Series inductance | L_S | Measured lead to lead 5 mm from package body | - | 3.5 | - | nH |

| 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} | $I_F = 1.0\text{ A}$, $di_F/dt = 200\text{ A}/\mu\text{s}$, $V_R = 30\text{ V}$ | - | - | 60 | ns |
| | | $T_J = 25\text{ }^{\circ}\text{C}$ | - | 93 | - | |
| | | $T_J = 125\text{ }^{\circ}\text{C}$ | - | 172 | - | |
| Peak recovery current | I_{RRM} | $T_J = 25\text{ }^{\circ}\text{C}$ | - | 11 | - | A |
| | | $T_J = 125\text{ }^{\circ}\text{C}$ | - | 20 | - | |
| Reverse recovery charge | Q_{rr} | $T_J = 25\text{ }^{\circ}\text{C}$ | - | 490 | - | nC |
| | | $T_J = 125\text{ }^{\circ}\text{C}$ | - | 1740 | - | |

| THERMAL - MECHANICAL SPECIFICATIONS | | | | | | |
|--|------------|---|-------------|------|-------------|---------------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNITS |
| Thermal resistance, junction to case | R_{thJC} | | - | 0.22 | 0.29 | K/W |
| Thermal resistance, junction to heatsink | R_{thCS} | Mounting surface, flat, smooth, and greased | - | 0.2 | - | |
| Weight | | | - | - | 5.02 | g |
| Mounting torque | | | 1.2 (10) | - | 2.4 (20) | N · m (lbf · in) |
| Marking device | | Case style PowerTab® | 150EBU04 | | | |

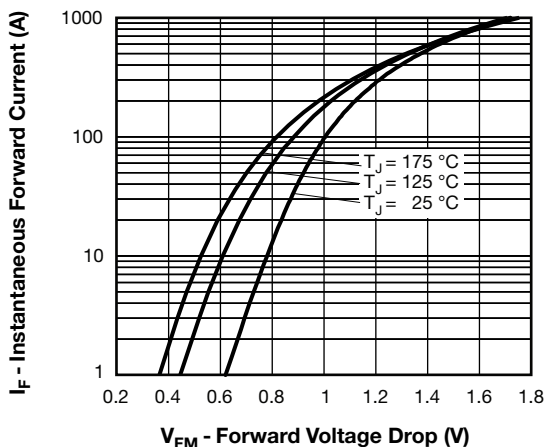


Fig. 1 - Maximum Forward Voltage Drop Characteristics

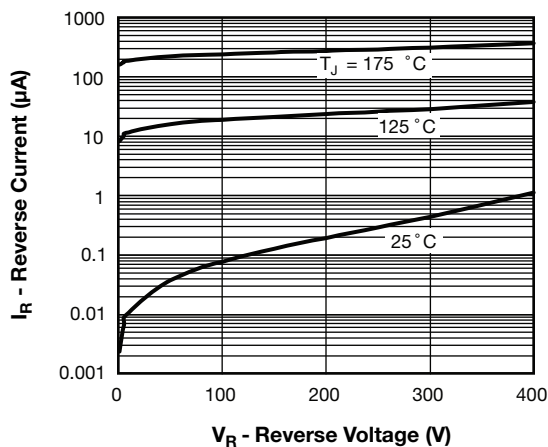


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

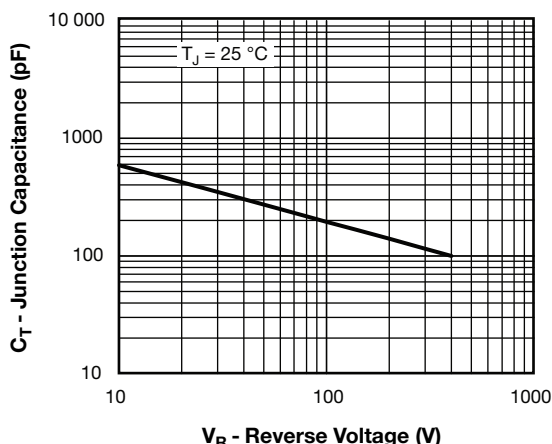


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

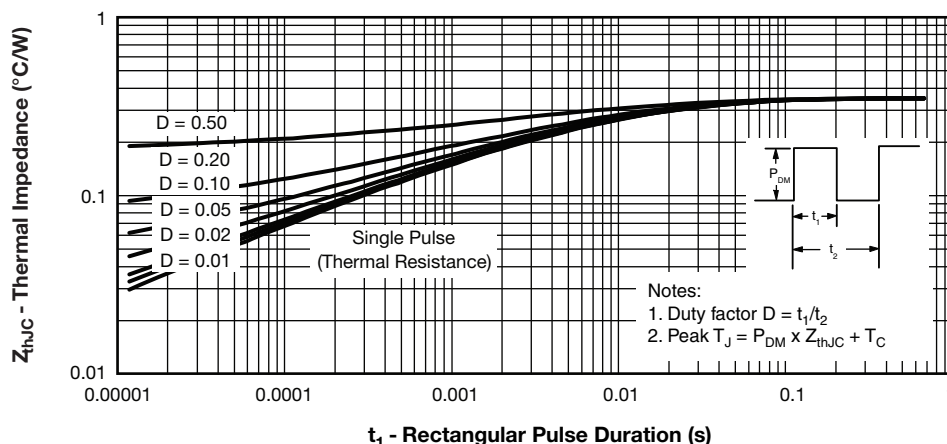


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

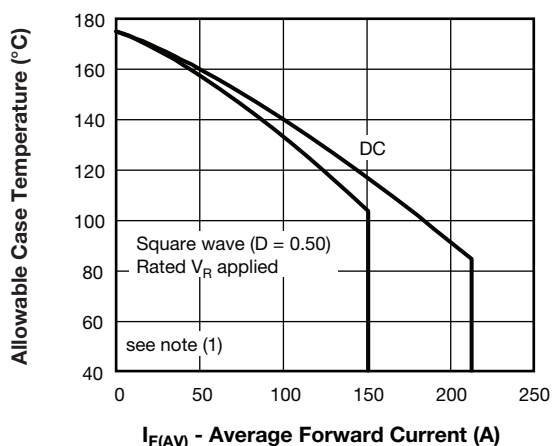


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

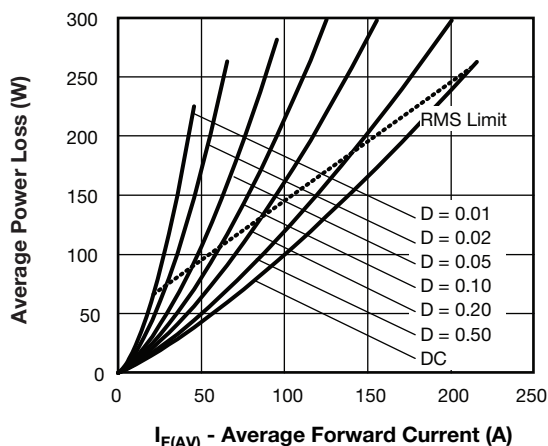


Fig. 6 - Forward Power Loss Characteristics

Note

- (1) Formula used: $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$;
 P_d = forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig. 6);
 P_{dREV} = inverse power loss = $V_{R1} \times I_R (1 - D)$; I_R at V_{R1} = Rated V_R

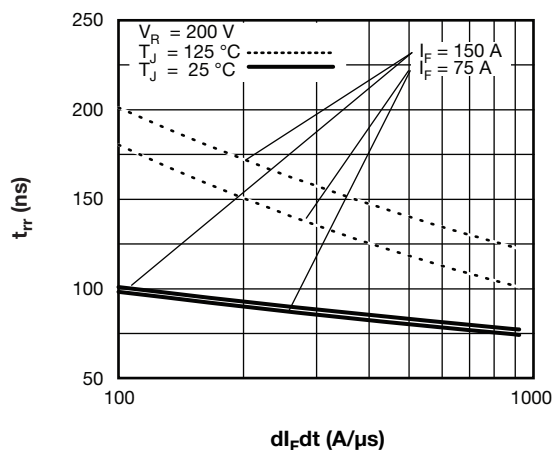
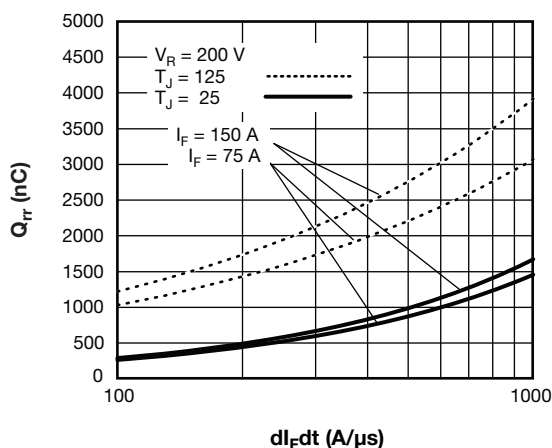
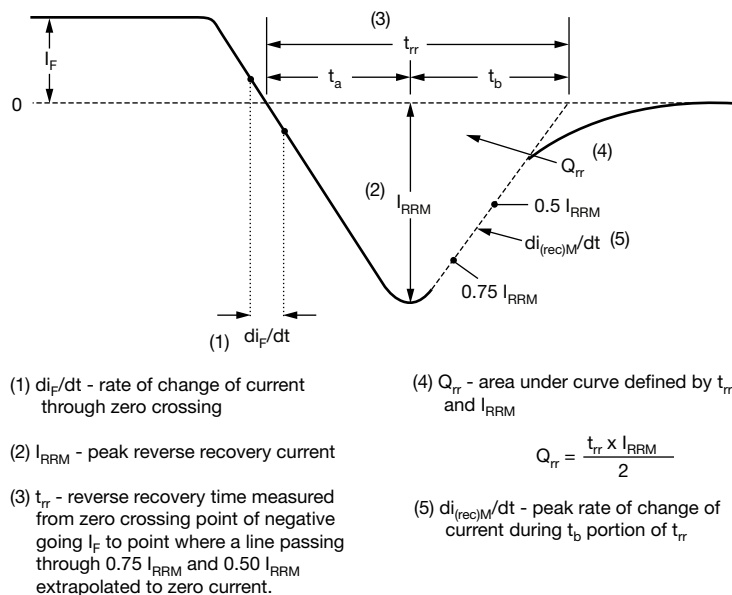

Fig. 7 - Typical Reverse Recovery Time vs. di_F/dt

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


Fig. 9 - Reverse Recovery Waveform and Definitions

ORDERING INFORMATION TABLE

Device code

| | | | | | | |
|------------|------------|----------|----------|----------|-----------|------------|
| VS- | 150 | E | B | U | 04 | -N4 |
|------------|------------|----------|----------|----------|-----------|------------|

Diagram illustrating the device code structure (VS-150-E-B-U-04-N4) with corresponding digit positions (1-7) and their meanings:

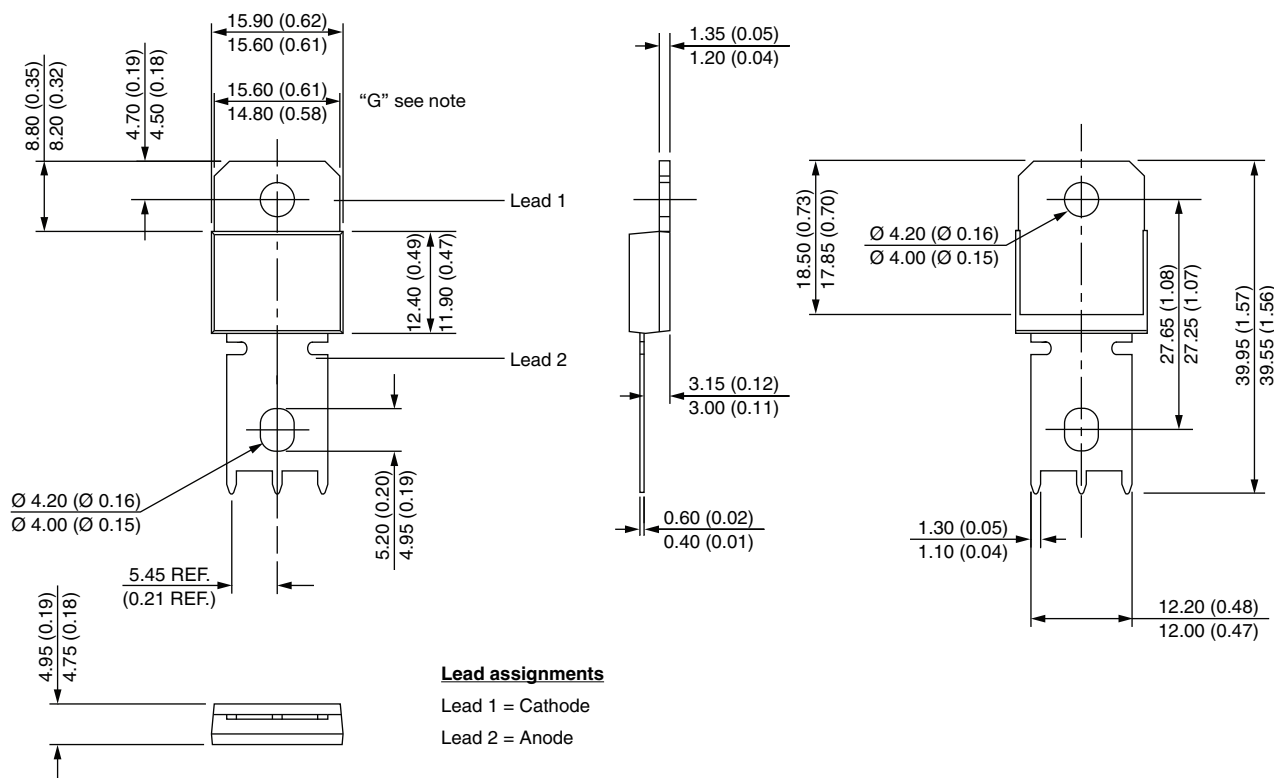
- 1** - Vishay Semiconductors product
- 2** - Current rating (150 = 150 A)
- 3** - Single diode
- 4** - PowerTab® (ultrafast / hyperfast only)
- 5** - Ultrafast recovery
- 6** - Voltage rating (04 = 400 V)
- 7** - Environmental digit:
-N4 = Halogen-free, RoHS-compliant, and totally lead(Pb)-free

| ORDERING INFORMATION | | |
|----------------------|---------------|-------------------------|
| PREFERRED P/N | BASE QUANTITY | PACKAGING DESCRIPTION |
| VS-150EBU04-N4 | 25/tube | Antistatic plastic tube |

| LINKS TO RELATED DOCUMENTS | |
|----------------------------|--|
| Dimensions | www.vishay.com/doc?95240 |
| Part marking information | www.vishay.com/doc?95467 |
| Application note | www.vishay.com/doc?95179 |

PowerTab®

DIMENSIONS in millimeters (inches)



Note:

Outline conform to JEDEC® TO-275, except for dimension "G" only



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