



150EBU04

Ultrafast Soft Recovery Diode

Features

- Ultrafast Recovery
- 175°C Operating Junction Temperature

Benefits

- Reduced RFI and EMI
- Higher Frequency Operation
- Reduced Snubbing
- Reduced Parts Count

$t_{rr} = 60\text{ns}$  $I_{F(AV)} = 150\text{Amp}$  $V_R = 400\text{V}$

Description/ Applications

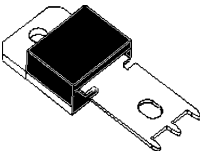
These diodes are optimized to reduce losses and EMI/ RFI in high frequency power conditioning systems. The softness of the recovery eliminates the need for a snubber in most applications. These devices are ideally suited for HF welding, power converters and other applications where switching losses are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

Absolute Maximum Ratings

| Parameters          |                                                          | Max         | Units              |
|---------------------|----------------------------------------------------------|-------------|--------------------|
| $V_R$               | Cathode to Anode Voltage                                 | 400         | V                  |
| $I_{F(AV)}$         | Continuous Forward Current, $T_C = 104^{\circ}\text{C}$  | 150         | A                  |
| $I_{FSM}$           | Single Pulse Forward Current, $T_C = 25^{\circ}\text{C}$ | 1500        |                    |
| $I_{FRM} \text{ ①}$ | Maximum Repetitive Forward Current                       | 300         |                    |
| $T_J, T_{STG}$      | Operating Junction and Storage Temperatures              | - 55 to 175 | $^{\circ}\text{C}$ |

① Square Wave, 20kHz

Case Styles



PowIRtab

**Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise specified)**

| Parameters                                                           | Min | Typ  | Max  | Units | Test Conditions                                               |
|----------------------------------------------------------------------|-----|------|------|-------|---------------------------------------------------------------|
| V <sub>BR</sub> , V <sub>r</sub> Breakdown Voltage, Blocking Voltage | 400 | -    | -    | V     | I <sub>R</sub> = 200μA                                        |
| V <sub>F</sub> Forward Voltage                                       | -   | 1.07 | 1.3  | V     | I <sub>F</sub> = 150A                                         |
|                                                                      | -   | 0.9  | 1.1  | V     | I <sub>F</sub> = 150A, T <sub>J</sub> = 175°C                 |
|                                                                      | -   | 0.96 | 1.17 | V     | I <sub>F</sub> = 150A, T <sub>J</sub> = 125°C                 |
| I <sub>R</sub> Reverse Leakage Current                               | -   | -    | 50   | μA    | V <sub>R</sub> = V <sub>R</sub> Rated                         |
|                                                                      | -   | -    | 4    | mA    | T <sub>J</sub> = 150°C, V <sub>R</sub> = V <sub>R</sub> Rated |
| C <sub>T</sub> Junction Capacitance                                  | -   | 100  | -    | pF    | V <sub>R</sub> = 400V                                         |
| L <sub>S</sub> Series Inductance                                     | -   | 3.5  | -    | nH    | Measured lead to lead 5mm from package body                   |

**Dynamic Recovery Characteristics @ T<sub>J</sub> = 25°C (unless otherwise specified)**

| Parameters                              | Min | Typ  | Max | Units | Test Conditions                                                            |
|-----------------------------------------|-----|------|-----|-------|----------------------------------------------------------------------------|
| t <sub>rr</sub> Reverse Recovery Time   | -   | -    | 60  | ns    | I <sub>F</sub> = 1.0A, di <sub>F</sub> /dt = 200A/μs, V <sub>R</sub> = 30V |
|                                         | -   | 93   | -   |       | T <sub>J</sub> = 25°C                                                      |
|                                         | -   | 172  | -   |       | T <sub>J</sub> = 125°C                                                     |
| I <sub>RRM</sub> Peak Recovery Current  | -   | 11   | -   | A     | T <sub>J</sub> = 25°C                                                      |
|                                         | -   | 20   | -   |       | T <sub>J</sub> = 125°C                                                     |
| Q <sub>rr</sub> Reverse Recovery Charge | -   | 490  | -   | nC    | T <sub>J</sub> = 25°C                                                      |
|                                         | -   | 1740 | -   |       | T <sub>J</sub> = 125°C                                                     |

**Thermal - Mechanical Characteristics**

| Parameters                                               | Min | Typ  | Max  | Units  |
|----------------------------------------------------------|-----|------|------|--------|
| R <sub>thJC</sub> Thermal Resistance, Junction to Case   |     |      | 0.35 | K/W    |
| R <sub>thCS</sub> ② Thermal Resistance, Case to Heatsink |     | 0.2  |      |        |
| Wt Weight                                                |     |      | 5.02 | g      |
|                                                          |     | 0.18 |      | (oz)   |
| T Mounting Torque                                        | 1.2 |      | 2.4  | N * m  |
|                                                          | 10  |      | 20   | lbf.in |

② Mounting Surface, Flat, Smooth and Greased

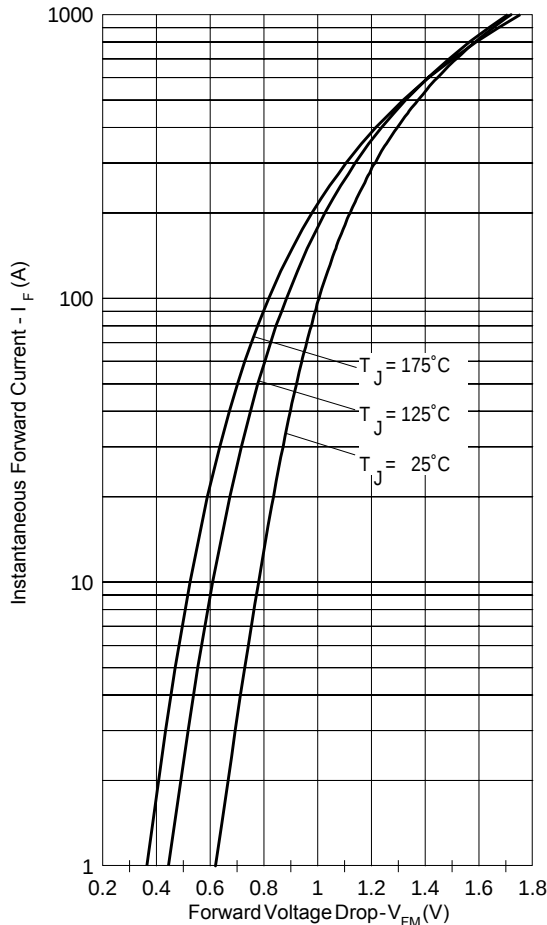


Fig. 1 - Typical Forward Voltage Drop Characteristics

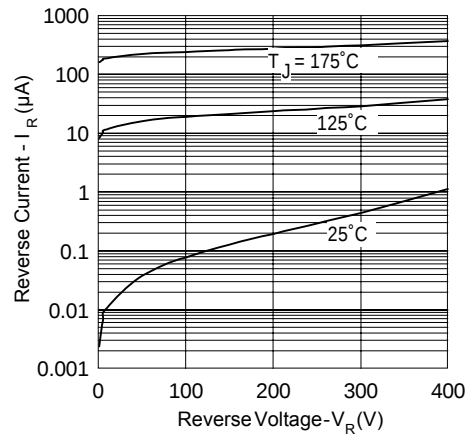


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage

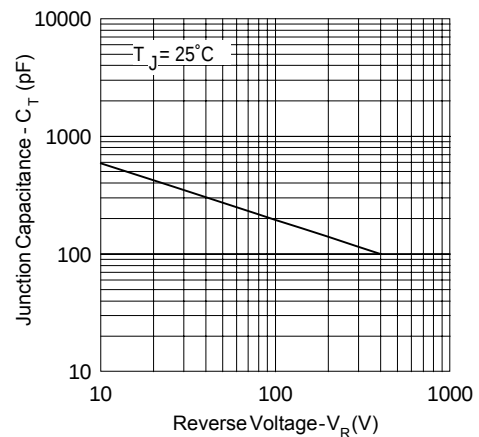


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

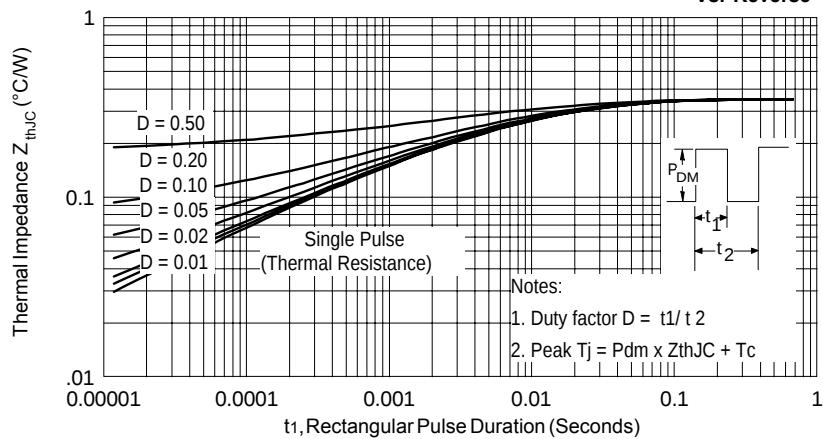
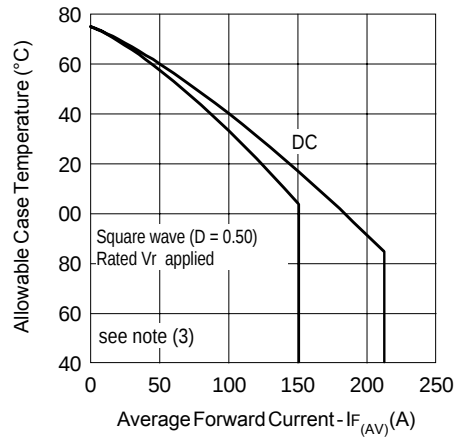
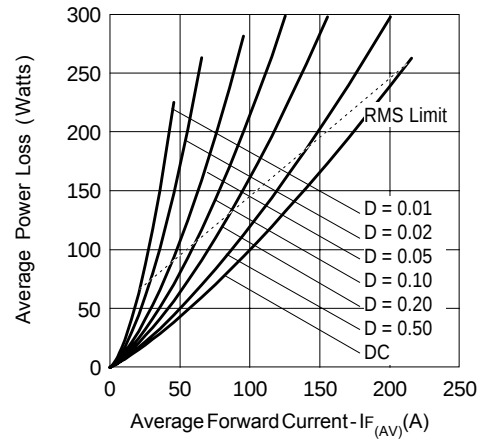


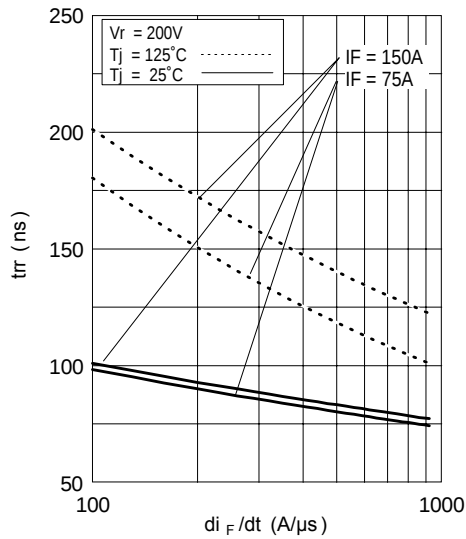
Fig. 4 - Max. Thermal Impedance  $Z_{thJC}$  Characteristics



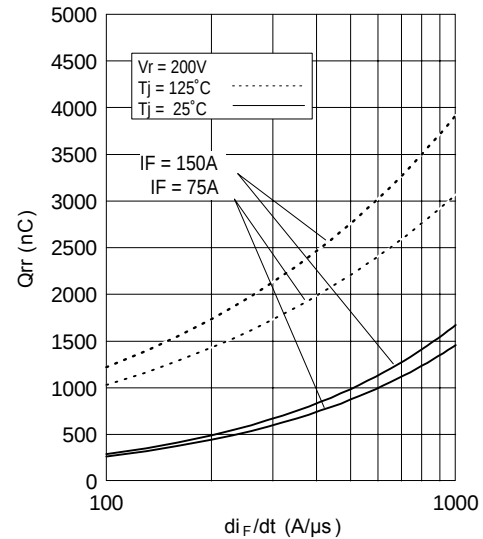
**Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current**



**Fig. 6 - Forward Power Loss Characteristics**



**Fig. 7 - Typical Reverse Recovery time vs.  $di_F/dt$**

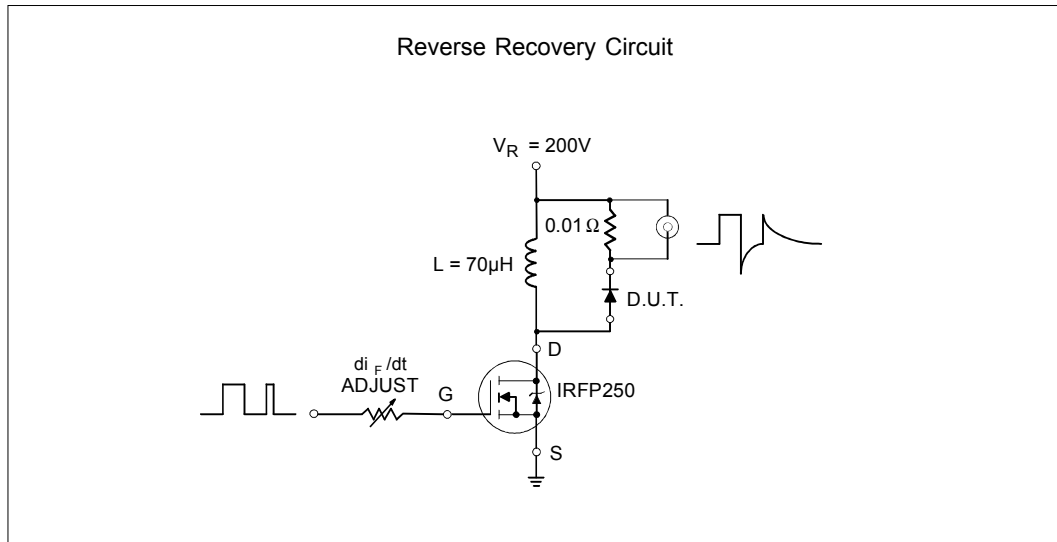


**Fig. 8 - Typical Stored Charge vs.  $di_F/dt$**

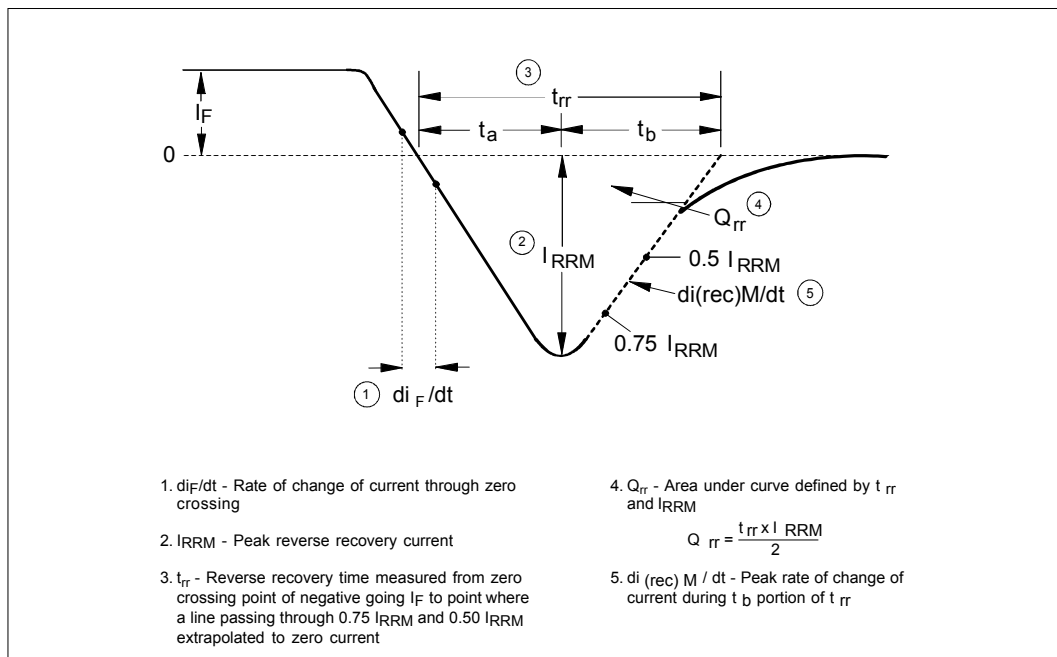
(3) Formula used:  $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$ ;

$P_d$  = Forward Power Loss =  $I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$  (see Fig. 6);

$P_{d_{REV}}$  = Inverse Power Loss =  $V_{R1} \times I_R (1 - D)$ ;  $I_R @ V_{R1}$  = rated  $V_R$



**Fig. 9- Reverse Recovery Parameter Test Circuit**



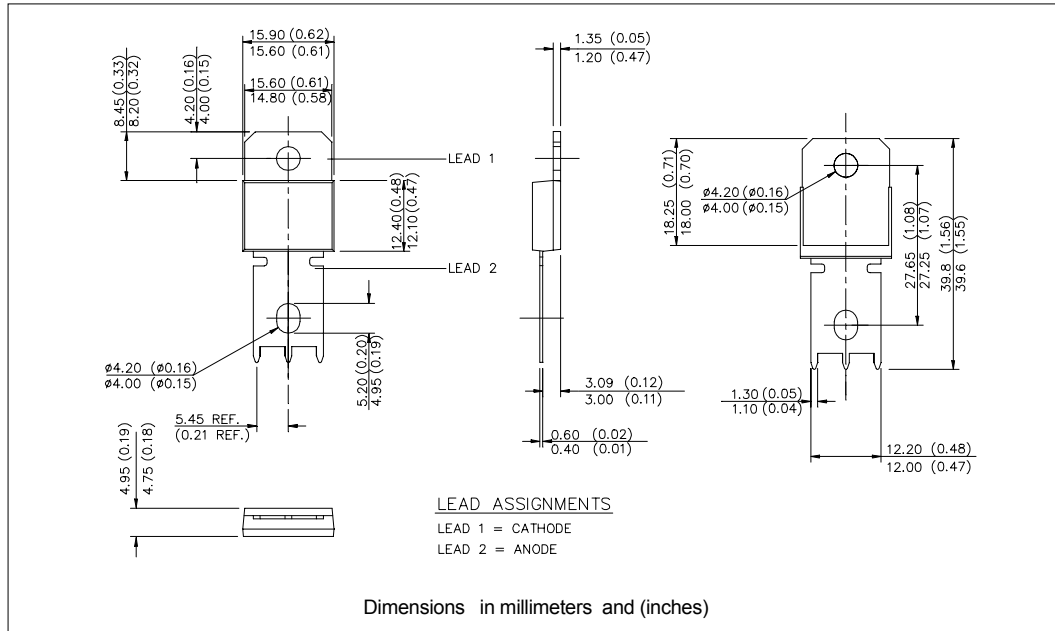
**Fig. 10 - Reverse Recovery Waveform and Definitions**

# 150EBU04

Preliminary Data Sheet PD-20744 06/00

International  
**IOR** Rectifier

## Outline Table



## Ordering Information Table

| Device Code |   |                    |                             |    |
|-------------|---|--------------------|-----------------------------|----|
| 150         | E | B                  | U                           | 04 |
| ①           | ② | ③                  | ④                           | ⑤  |
| 1           | - | Current Rating     | (150 = 150A)                |    |
| 2           | - | Single Diode       |                             |    |
| 3           | - | Pow/rtab           | (Ultrafast/ Hyperfast only) |    |
| 4           | - | Ultrafast Recovery |                             |    |
| 5           | - | Voltage Rating     | (04 = 400V)                 |    |

International  
**IOR** Rectifier

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