

### Features

- Glass Passivated Die Construction
- Ultra-Fast Recovery Time for High Efficiency
- High Maximum Junction Temperature
- High Forward Surge Current Capability
- For Use in Low Voltage, High Frequency Inverters, Free Wheeling, and Polarity Protection Applications
- **Lead Free Finish, RoHS Compliant (Note 1)**
- **"Green" Molding Compound (No Br, Sb)**
- **Qualified to AEC-Q101 Standards for High Reliability**

### Mechanical Data

- Case: PowerDI™ 5
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture sensitivity: Level 1 per J-STD-020C
- Terminals: Finish – Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 **(e3)**
- Polarity: See Diagram on Page 4
- Marking: See Page 3
- Weight: 0.096 grams (approx.)



TOP VIEW



BOTTOM VIEW

### Maximum Ratings @ T<sub>A</sub> = 25°C unless otherwise specified

Single phase, half wave, 60Hz, resistive or inductive load.  
For capacitive load, derate current by 20%.

| Characteristic                                                                                      | Symbol                          | Value | Unit |
|-----------------------------------------------------------------------------------------------------|---------------------------------|-------|------|
| Peak Repetitive Reverse Voltage<br>Working Peak Reverse Voltage<br>DC Blocking Voltage              | $V_{RRM}$<br>$V_{RWM}$<br>$V_R$ | 200   | V    |
| RMS Reverse Voltage                                                                                 | $V_{R(RMS)}$                    | 141   | V    |
| Average Rectified Output Current (See also figure 4)                                                | $I_O$                           | 6     | A    |
| Non-Repetitive Peak Forward Surge Current<br>8.3ms Single half sine-wave Superimposed on Rated Load | $I_{FSM}$                       | 150   | A    |

### Thermal Characteristics

| Characteristic                                      | Symbol          | Typ         | Max | Unit |
|-----------------------------------------------------|-----------------|-------------|-----|------|
| Thermal Resistance Junction to Soldering Point      | $R_{\theta JS}$ | —           | 1.5 | °C/W |
| Thermal Resistance Junction to Ambient Air (Note 2) | $R_{\theta JA}$ | 95          | —   | °C/W |
| Thermal Resistance Junction to Ambient Air (Note 3) | $R_{\theta JA}$ | 60          | —   | °C/W |
| Thermal Resistance Junction to Ambient Air (Note 4) | $R_{\theta JA}$ | 40          | —   | °C/W |
| Operating Temperature Range                         | $T_j$           | -65 to +175 |     | °C   |
| Storage Temperature Range                           | $T_{STG}$       | -65 to +175 |     | °C   |

- Notes:
1. RoHS revision 13.2.2003. Glass and High Temperature Solder Exemptions Applied, see *EU Directive Annex Notes 5 and 7*.
  2. FR-4 PCB, 2 oz. Copper, minimum recommended pad layout per <http://www.diodes.com/datasheets/ap02001.pdf>.
  3. Polyimide PCB, 2 oz. Copper, minimum recommended pad layout per <http://www.diodes.com/datasheets/ap02001.pdf>.
  4. Polyimide PCB, 2 oz. Copper. Cathode pad dimensions 9.4mm x 7.2mm. Anode pad dimensions 2.7mm x 1.6mm.

**Electrical Characteristics** @  $T_A = 25^\circ\text{C}$  unless otherwise specified

| Characteristic                             | Symbol      | Value                            | Unit          | Test Condition                                                                                                                                                                     |
|--------------------------------------------|-------------|----------------------------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Minimum Reverse Breakdown Voltage (Note 5) | $V_{(BR)R}$ | 200                              | V             | $I_R = 5\mu\text{A}$                                                                                                                                                               |
| Maximum Forward Voltage                    | $V_{FM}$    | 0.940<br>0.860<br>0.975<br>0.895 | V             | $I_F = 6\text{A}, T_S = 25^\circ\text{C}$<br>$I_F = 6\text{A}, T_S = 150^\circ\text{C}$<br>$I_F = 8\text{A}, T_S = 25^\circ\text{C}$<br>$I_F = 8\text{A}, T_S = 150^\circ\text{C}$ |
| Maximum Reverse Leakage Current (Note 5)   | $I_{RM}$    | 5<br>500                         | $\mu\text{A}$ | $T_S = 25^\circ\text{C}, V_R = 200\text{V}$<br>$T_S = 100^\circ\text{C}, V_R = 200\text{V}$                                                                                        |
| Maximum Reverse Recovery Time              | $t_{rr}$    | 25                               | ns            | $I_F = 0.5\text{A}, I_R = 1.0\text{A}$<br>$I_{RR} = 0.25\text{A}$ (See figure 7)                                                                                                   |

Notes: 5. Short duration test pulse used to minimize self-heating effect.

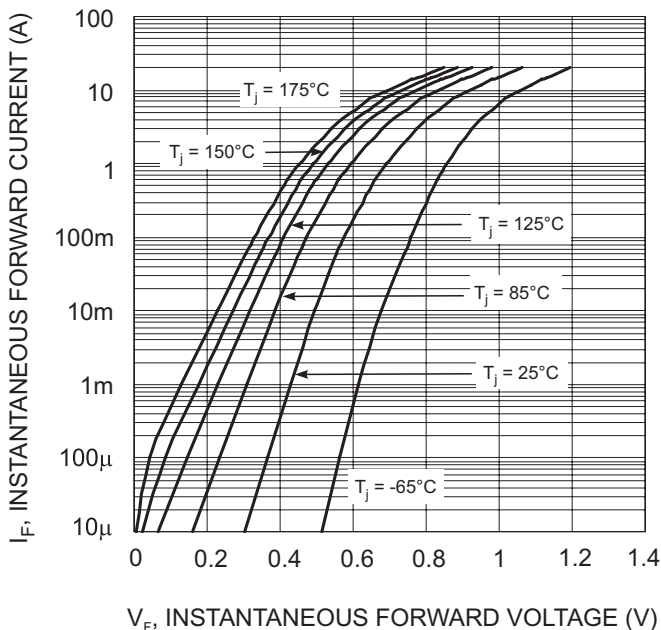


Fig. 1 Typical Forward Characteristics

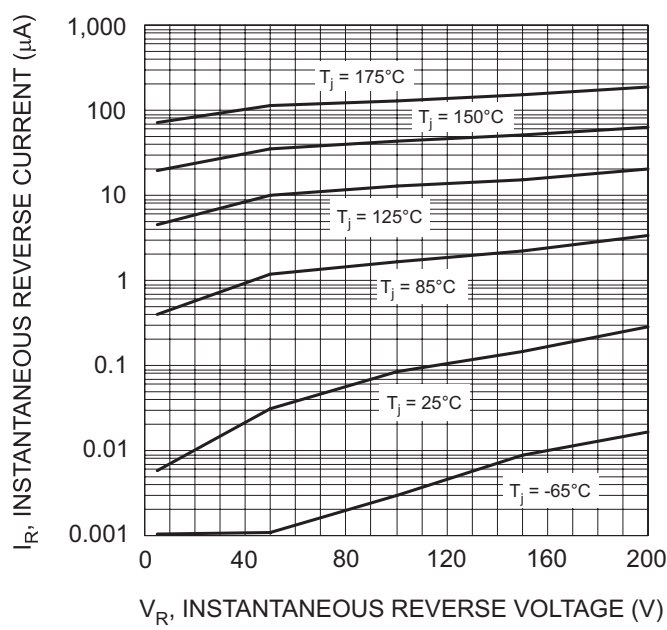


Fig. 2 Typical Reverse Characteristics

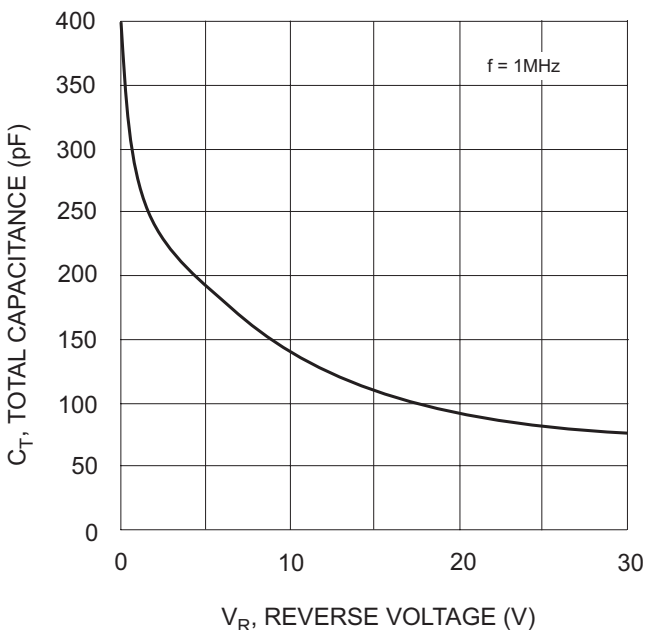


Fig. 3 Typical Total Capacitance vs. Reverse Voltage

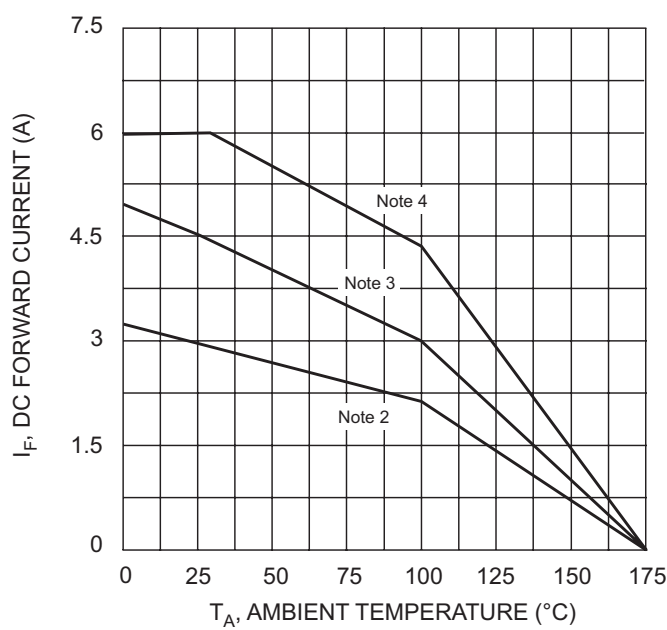
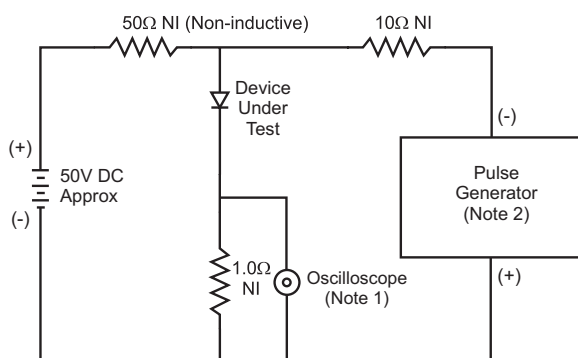
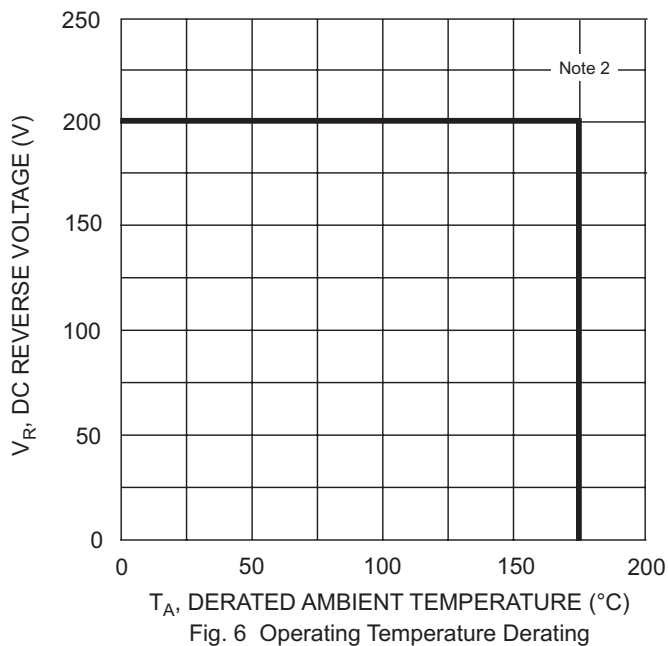
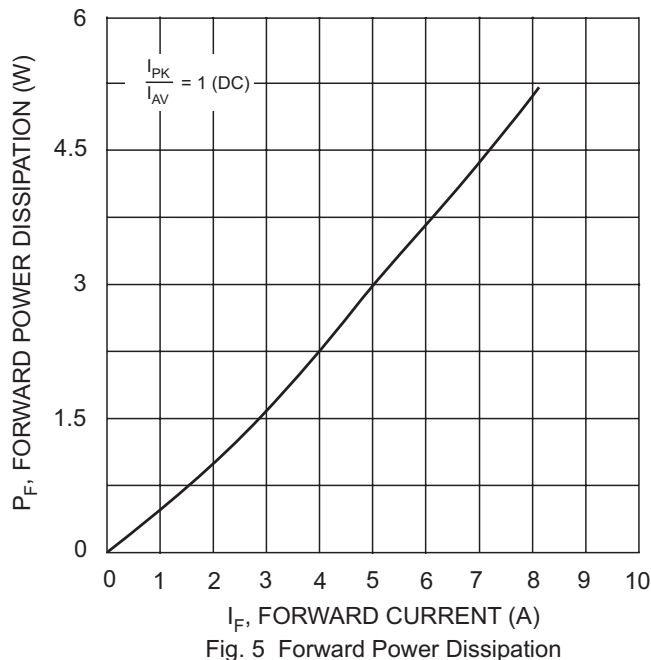


Fig. 4 DC Forward Current Derating



- Notes:
1. Rise Time = 7.0ns max. Input Impedance = 1.0MΩ, 22pF.
  2. Rise Time = 10ns max. Input Impedance = 50Ω.

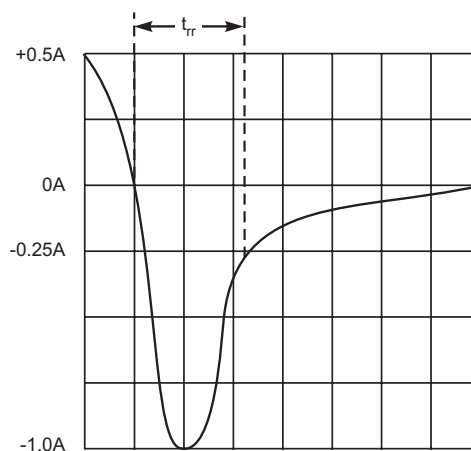


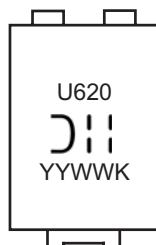
Fig. 7 Reverse Recovery Time Characteristic and Test Circuit

## Ordering Information (Note 6)

| Device    | Packaging | Shipping         |
|-----------|-----------|------------------|
| PDU620-13 | PowerDI™5 | 5000/Tape & Reel |

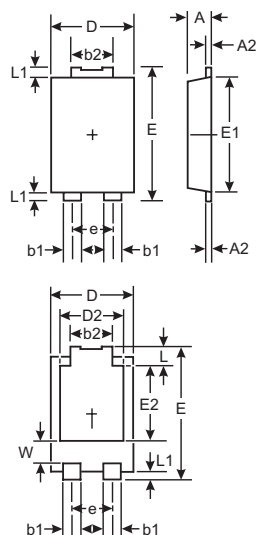
Notes: 6. For Packaging Details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

## Marking Information



U620 = Product type marking code  
D = Manufacturers' code marking  
YYWW = Date code marking  
YY = Last digit of year ex: 06 for 2006  
WW = Week code 01 to 52  
K = Factory Designator

## Package Outline Dimensions



LEFT PIN ○  
RIGHT PIN ○  
BOTTOMSIDE  
HEAT SINK ○

Note: Pins Left & Right must  
be electrically connected  
at the printed circuit board.

| PowerDI™5            |          |      |
|----------------------|----------|------|
| Dim                  | Min      | Max  |
| A                    | 1.05     | 1.15 |
| A2                   | 0.33     | 0.43 |
| b1                   | 0.80     | 0.99 |
| b2                   | 1.70     | 1.88 |
| D                    | 3.90     | 4.05 |
| D2                   | 3.05 NOM |      |
| E                    | 6.40     | 6.60 |
| e                    | 1.84 NOM |      |
| E1                   | 5.30     | 5.45 |
| E2                   | 3.55 NOM |      |
| L                    | 0.75     | 0.95 |
| L1                   | 0.50     | 0.65 |
| W                    | 1.20     | 1.50 |
| All Dimensions in mm |          |      |

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