

**Product Summary (@ T<sub>A</sub> = +25°C)**

| V <sub>RRM</sub> (V) | I <sub>O</sub> (A) | V <sub>F(MAX)</sub> (V) | I <sub>R(MAX)</sub> (μA) |
|----------------------|--------------------|-------------------------|--------------------------|
| 120                  | 12                 | 0.80                    | 500                      |

**Description and Applications**

Packaged in the compact thermally efficient PowerDI<sup>®</sup>5 package, the SDT12A120P5Q provides very low V<sub>F</sub> and excellent reverse leakage stability at high temperatures. It is ideal for use as a rectifier, freewheel diode or blocking diode in:

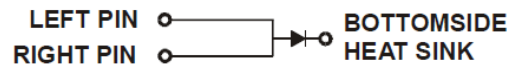
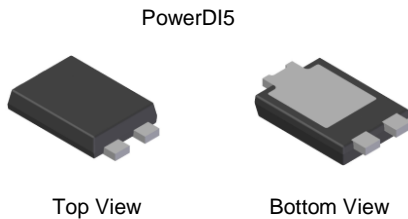
- DC/DC Converters
- AC/DC Adaptors

**Features and Benefits**

- Low Forward Voltage Drop
- Excellent High Temperature Stability
- Soft, Fast Switching Capability
- +150°C Operating Junction Temperature
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

**Mechanical Data**

- Case: PowerDI5
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram Below
- Weight: 0.093 grams (Approximate)

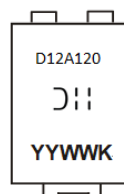


**Note:** Pins Left & Right must be electrically connected at the printed circuit board.

**Ordering Information (Note 5)**

| Part Number               | Case     | Packaging         |
|---------------------------|----------|-------------------|
| SDT12A120P5Q-7            | PowerDI5 | 1,500/Tape & Reel |
| SDT12A120P5Q-7D (Note 6)  | PowerDI5 | 1,500/Tape & Reel |
| SDT12A120P5Q-13           | PowerDI5 | 5,000/Tape & Reel |
| SDT12A120P5Q-13D (Note 6) | PowerDI5 | 5,000/Tape & Reel |

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to [http://www.diodes.com/product\\_compliance\\_definitions.html](http://www.diodes.com/product_compliance_definitions.html).
  5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.
  6. PowerDI5 available in 5K quantity on 13-inch reel & 12mm tape, part number suffix "13D"; Diodes Incorporated also provides 12mm tape with 7-inch reel, part number suffix "7D".

**Marking Information**


= Manufacturer's Marking  
 D12A120 = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Last Two Digits of Year (ex: 17 = 2017)  
 WW = Week (01 to 53)  
 K = Factory Designator

PowerDI is a registered trademark of Diodes Incorporated.

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic   | Symbol           | Value | Unit |
|--|------------------|-------|------|
| Peak Repetitive Reverse Voltage<br>Working Peak Reverse Voltage<br>DC Blocking Voltage | V <sub>RRM</sub> | 120   | V    |
| Average Rectified Output Current   | I <sub>O</sub>   | 12    | A    |
| Non-Repetitive Peak Forward Surge Current 8.3ms  | I <sub>FSM</sub> | 300   | A    |

**Thermal Characteristics**

| Characteristic  | Symbol                            | Value       | Unit |
|---|-----------------------------------|-------------|------|
| Typical Thermal Resistance Junction to Ambient (Note 7) | R <sub>θJA</sub>                  | 88          | °C/W |
| Typical Thermal Resistance Junction to Ambient (Note 8) | R <sub>θJA</sub>                  | 18          | °C/W |
| Operating and Storage Temperature Range                 | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic           | Symbol         | Min | Typ  | Max  | Unit | Test Condition                                 |
|--------------------------|----------------|-----|------|------|------|--|
| Forward Voltage Drop     | V <sub>F</sub> | —   | 0.57 | —    | V    | I <sub>F</sub> = 6A, T <sub>J</sub> = +25°C    |
|                          |                | —   | 0.72 | 0.80 |      | I <sub>F</sub> = 12A, T <sub>J</sub> = +25°C   |
|                          |                | —   | 0.51 | —    |      | I <sub>F</sub> = 6A, T <sub>J</sub> = +125°C   |
|                          |                | —   | 0.63 | 0.70 |      | I <sub>F</sub> = 12A, T <sub>J</sub> = +125°C  |
| Leakage Current (Note 9) | I <sub>R</sub> | —   | —    | 0.5  | mA   | V <sub>R</sub> = 120V, T <sub>J</sub> = +25°C  |
|                          |                | —   | 5    | 35   |      | V <sub>R</sub> = 120V, T <sub>J</sub> = +125°C |

- Notes:
7. FR-4 PCB, 2oz. Copper, minimum recommended pad layout per <http://www.diodes.com/package-outlines.html>.
  8. Aluminum 2inch\*2inch substrate PCB with 50mm x 50mm x 23mm Al heat sink.
  9. Short duration pulse test used to minimize self-heating effect.

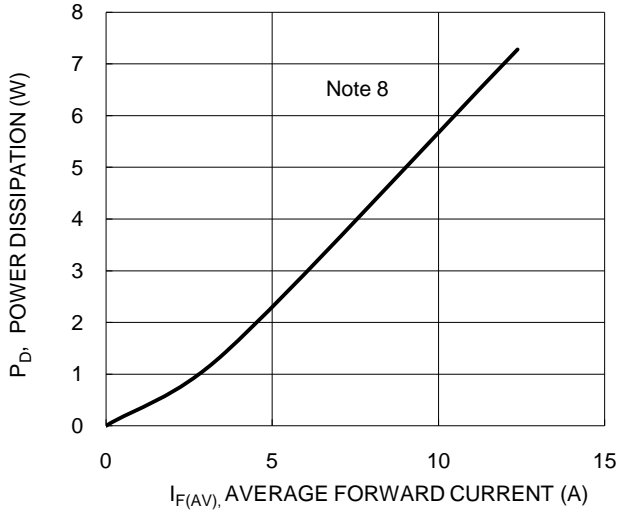


Figure 1. Forward Power Dissipation

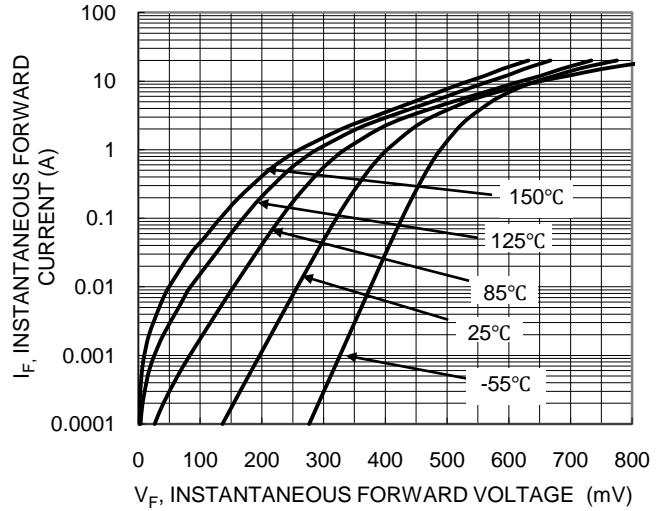


Figure 2. Typical Forward Characteristics

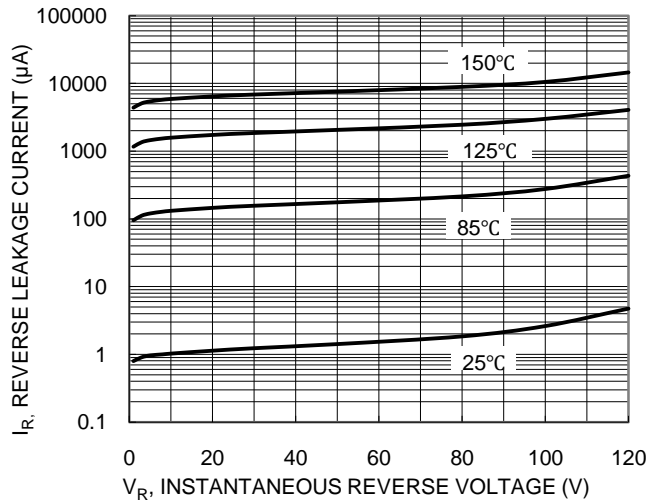


Figure 3. Typical Reverse Characteristics

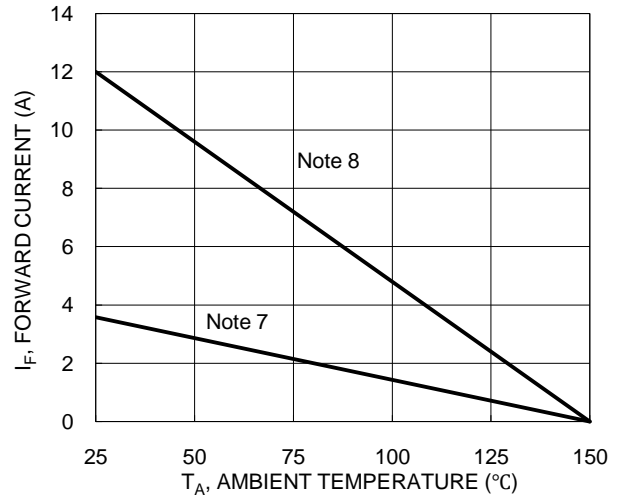


Figure 4. Forward Current Derating Curve

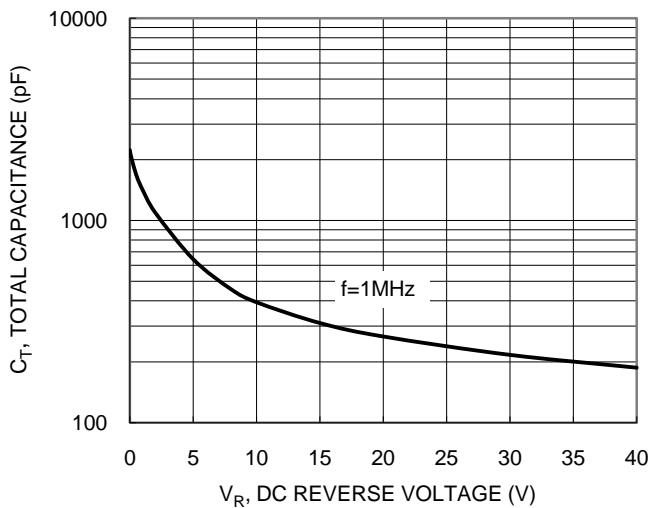
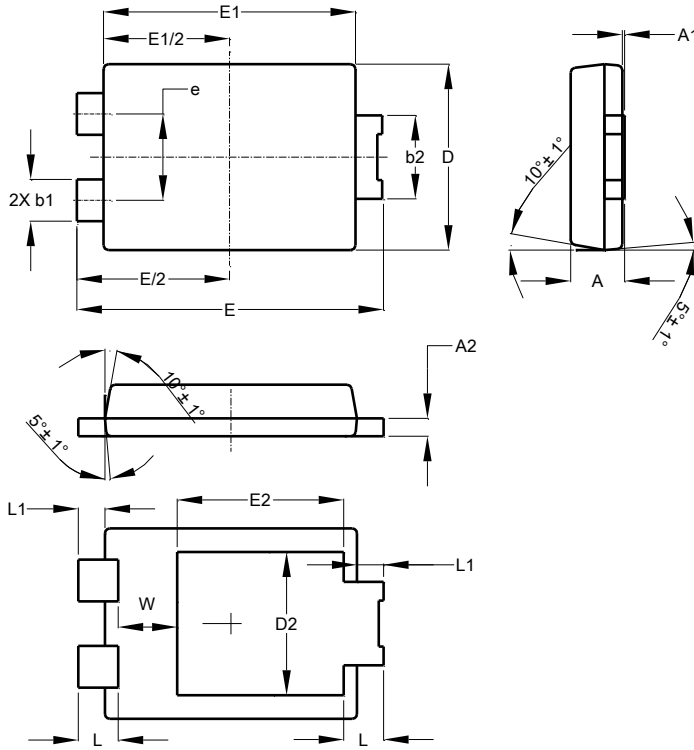


Figure 5. Total Capacitance vs. Reverse Voltage

**Package Outline Dimensions**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**PowerDI5**

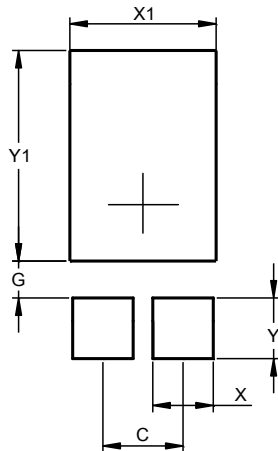


| PowerDI5             |      |      |       |
|----------------------|------|------|-------|
| Dim                  | Min  | Max  | Typ   |
| A                    | 1.05 | 1.15 | 1.10  |
| A1                   | 0.00 | 0.05 | --    |
| A2                   | 0.33 | 0.43 | 0.381 |
| b1                   | 0.80 | 0.99 | 0.89  |
| b2                   | 1.70 | 1.88 | 1.78  |
| D                    | 3.90 | 4.05 | 3.966 |
| D2                   | --   | --   | 3.054 |
| E                    | 6.40 | 6.60 | 6.504 |
| e                    | --   | --   | 1.84  |
| E1                   | 5.30 | 5.45 | 5.37  |
| E2                   | --   | --   | 3.549 |
| L                    | 0.75 | 0.95 | 0.85  |
| L1                   | 0.50 | 0.65 | 0.57  |
| W                    | 1.10 | 1.41 | 1.255 |
| All Dimensions in mm |      |      |       |

**Suggested Pad Layout**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**PowerDI5**



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 1.840         |
| G          | 0.852         |
| X          | 1.390         |
| X1         | 3.360         |
| Y          | 1.400         |
| Y1         | 4.860         |

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