**PDS540Q**

**5A SCHOTTKY BARRIER RECTIFIER**
**PowerDI5**

## Product Summary

| $V_{RRM}$ (V) | $I_F$ (A) | $V_{F\ MAX}$ (V) @ +25°C | $I_{R\ MAX}$ (mA) @ +25°C |
|---|---|---|---|
| 40 | 5.0 | 0.52 | 0.25 |

## Description And Applications

This Schottky Barrier Rectifier has been designed to meet the stringent requirements of Automotive Applications. It is ideally suited to use as:

- Polarity Protection Diode
- Re-Circulating Diode
- Switching Diode

## Features and Benefits

- Guard Ring Die Construction for Transient Protection
- Low Power Loss, High Efficiency
- Low Forward Voltage Drop
- For Use in Low Voltage, High Frequency Inverters, Free Wheeling, and Polarity Protection Applications
- High Forward Surge Current Capability
- **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)**

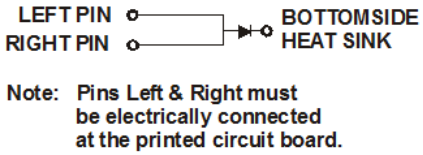
## Mechanical Data

- Case: PowerDI®5
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Polarity: See Diagram
- Weight: 0.093 grams (Approximate)

PowerDI5

Top View

Bottom View



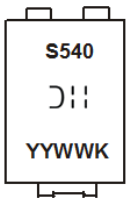

**Note: Pins Left & Right must be electrically connected at the printed circuit board.**

## Ordering Information (Notes 4 & 5)

| Part Number | Compliance | Case | Packaging |
|---|---|---|---|
| PDS540Q-13 | Automotive | PowerDI5 | 5000/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 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 https://www.diodes.com/quality/product-compliance-definitions/
5. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

## Marking Information




S540 = Product Type Marking Code
= Manufacturers' Code Marking
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 17 for 2017)
WW = Week Code (01 to 53)
K = Factory Designator

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## Maximum Ratings (@$T_A$ = +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>$V_R$ | 40 | V |
| RMS Reverse Voltage | $V_{R(RMS)}$ | 28 | V |
| Average Rectified Output Current (See Figure 6) | $I_O$ | 5 | 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 | $R_{\theta JS}$ | — | 4.0 | °C/W |
| Thermal Resistance Junction to Ambient Air (Note 6) | $R_{\theta JA}$ | 90 | — | °C/W |
| Thermal Resistance Junction to Ambient Air (Note 7) | $R_{\theta JA}$ | 65 | — | °C/W |
| Thermal Resistance Junction to Ambient Air (Note 8) | $R_{\theta JA}$ | 50 | — | °C/W |
| Operating and Storage Temperature Range | $T_J$, $T_{STG}$ | -65 to +150 | | °C |

## Electrical Characteristics (@$T_A$ = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| Reverse Breakdown Voltage (Note 10) | $V_{(BR)R}$ | 40 | — | — | V | $I_R$ = 0.5mA |
| Forward Voltage | $V_F$ | —<br>—<br>—<br>— | 0.48<br>0.43<br>0.57<br>0.55 | 0.52<br>0.47<br>0.65<br>0.59 | V | $I_F$ = 5A, $T_S$ = +25°C<br>$I_F$ = 5A, $T_S$ = +125°C<br>$I_F$ = 10A, $T_S$ = +25°C<br>$I_F$ = 10A, $T_S$ = +125°C |
| Reverse Leakage Current (Note 10) | $I_R$ | —<br>—<br>— | 0.015<br>3<br>10 | 0.25<br>15<br>40 | mA | $T_S$ = +25°C, $V_R$ = 40V<br>$T_S$ = +100°C, $V_R$ = 40V<br>$T_S$ = +125°C, $V_R$ = 40V |

Notes:
6. FR-4 PCB, 2 oz. Copper, minimum recommended pad layout per http://www.diodes.com/package-outlines.html.
7. Polyimide PCB, 2 oz. Copper, minimum recommended pad layout per http://www.diodes.com/package-outlines.html.
8. Polyimide PCB, 2 oz. Copper. Cathode pad dimensions 9.4mm x 7.2mm. Anode pad dimensions 2.7mm x 1.6mm.
9. Polyimide PCB, 2 oz. Copper. Cathode pad dimensions 6.5mm x 5.0mm. Anode pad dimensions 1.8mm x 1.1mm.
10. Short duration pulse test used to minimize self-heating effect.

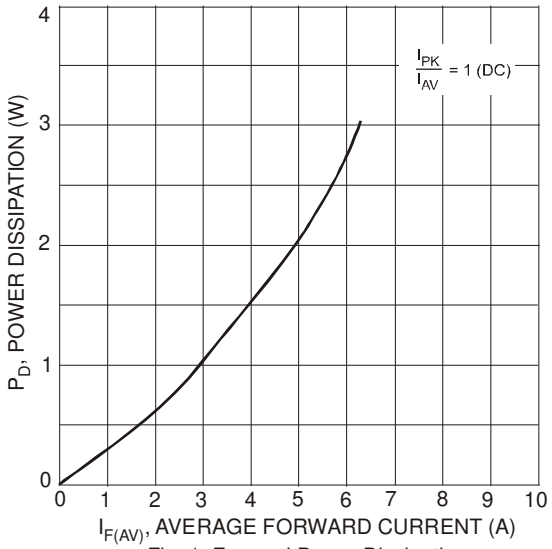



Fig. 1 Forward Power Dissipation

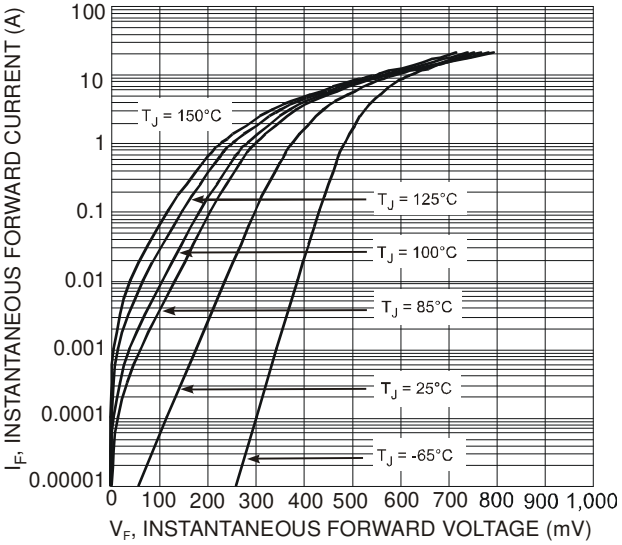



Fig. 2 Typical Forward Characteristics

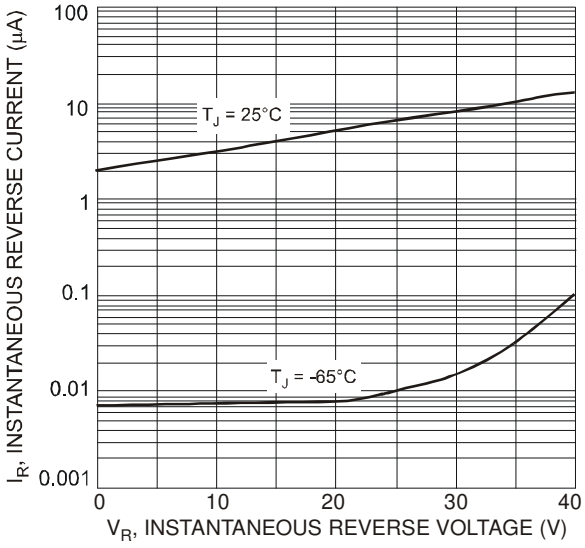



Fig. 3 Typical Reverse Characteristics

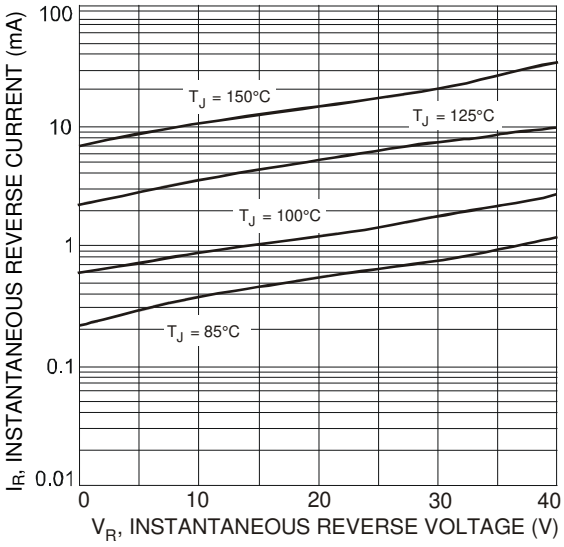



Fig. 4 Typical Reverse Characteristics

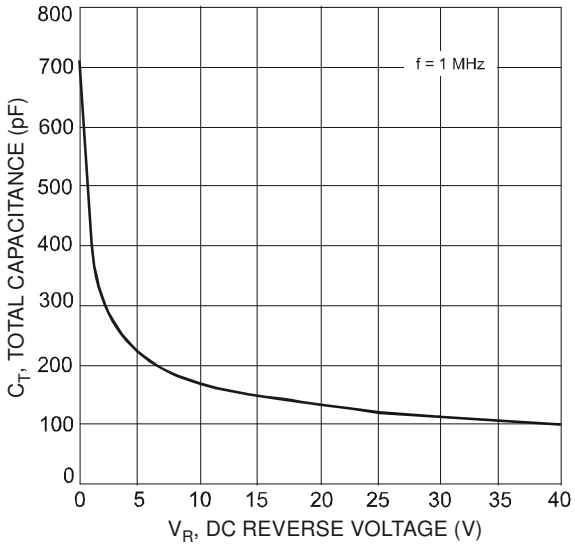



Fig. 5 Total Capacitance vs. Reverse Voltage

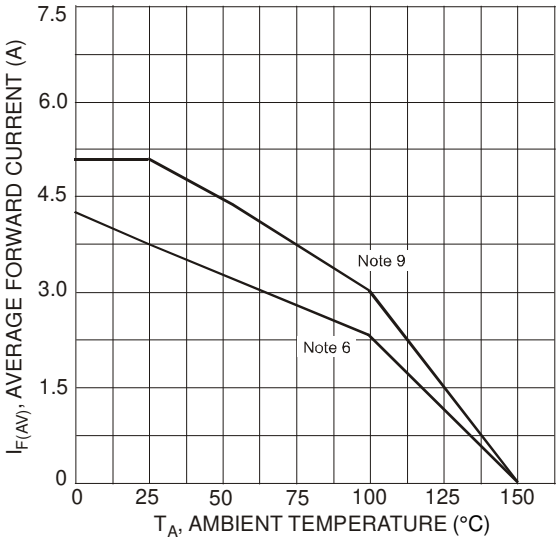



Fig. 6 Forward Current Derating Curve

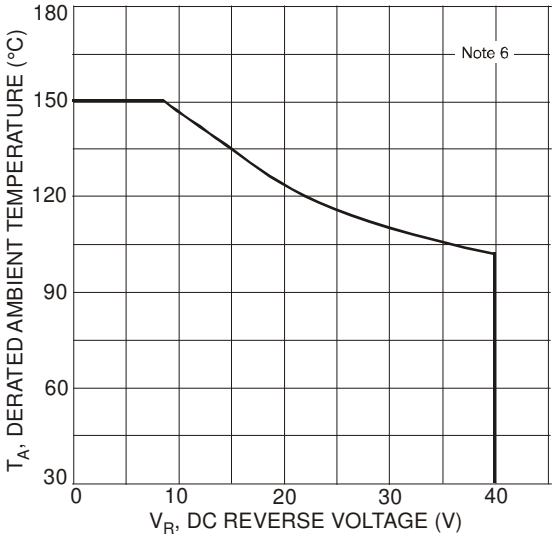
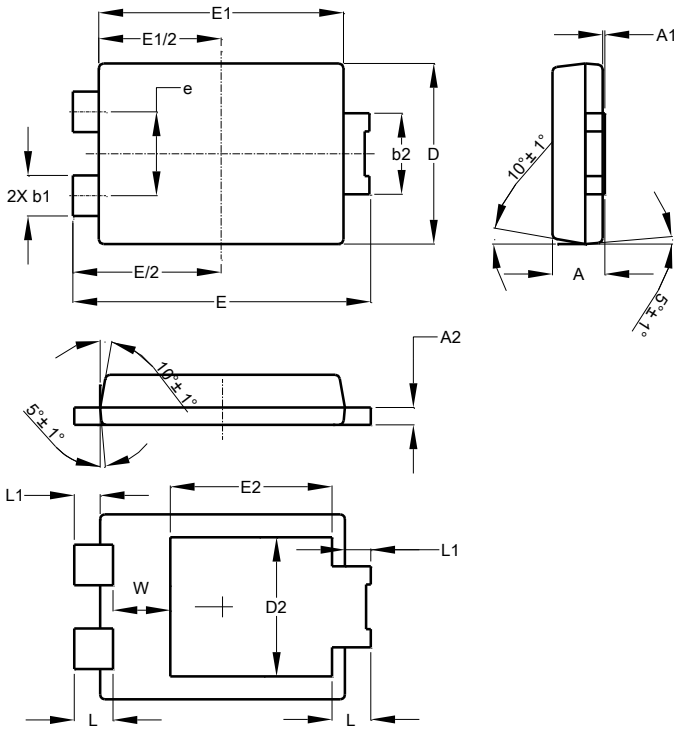



Fig. 7 Operating Temperature Derating

## Package Outline Dimensions

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

**PowerDI5**

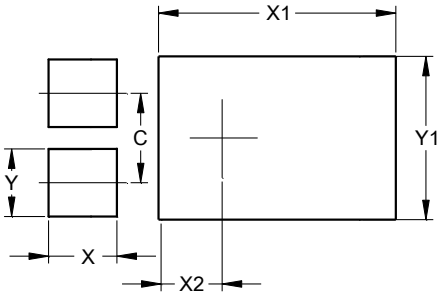



| PowerDI5 | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | 1.05 | 1.15 | 1.10 |
| **A1** | 0.00 | 0.05 | -- |
| **A2** | 0.33 | 0.43 | 0.381 |
| **b1** | 0.80 | 0.99 | 0.89 |
| **b2** | 1.70 | 1.88 | 1.78 |
| **D** | 3.90 | 4.05 | 3.966 |
| **D2** | -- | -- | 3.054 |
| **E** | 6.40 | 6.60 | 6.51 |
| **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 |
| **X** | 1.400 |
| **X1** | 4.860 |
| **X2** | 0.852 |
| **Y** | 1.390 |
| **Y1** | 3.360 |

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