# 2.0A SURFACE MOUNT SCHOTTKY BARRIER RECTIFIER

PowerDI®323

## Product Summary

| $V_R$(V) | $I_F$ (A) | $V_{F\ MAX}$ (V) @ +25°C | $I_{R\ MAX}$ (mA) @ +25°C |
|---|---|---|---|
| 20 | 2.0 | 0.49 | 0.16 |

## Features and Benefits

- Ultra-Small Surface Mount Package
- Guard Ring Die Construction for Transient Protection
- High Surge 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)**

## 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

## Mechanical Data

- Case: PowerDI®323
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Polarity: Cathode Band
- Terminals: Finish - Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.006 grams (approximate)

POWERDI323

Top View

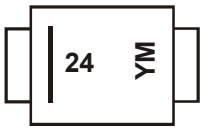
Bottom View

## Ordering Information (Note 5)

| Part Number | Compliance | Case | Packaging |
|---|---|---|---|
| PD3S220LQ-7 | Automotive | PowerDI®323 | 3000/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. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/quality/product_compliance_definitions/.
5. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

## Marking Information




24 = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: B = 2014)
M = Month (ex: 9 = September)

Date Code Key

| Year | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|---|
| Code | B | C | D | E | F | G | H |

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | O | N | D |

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

Single phase, half wave, 60Hz, resistive or inductive load.
For capacitance 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>$V_R$ | 20 | V |
| Average Forward Current | $I_{F(AV)}$ | 2.0 | A |
| Non-Repetitive Peak Forward Surge Current 8.3ms single half sine-wave superimposed on rated load | $I_{FSM}$ | 33 | A |

## Thermal Characteristics

| Characteristic | Symbol | Typ | Max | Unit |
|---|---|---|---|---|
| Thermal Resistance Junction to Soldering Point | $R_{\theta JS}$ | — | 6 | °C/W |
| Thermal Resistance Junction to Ambient Air (Note 6) | $R_{\theta JA}$ | +170 | — | °C/W |
| Thermal Resistance Junction to Ambient Air (Note 7) | $R_{\theta JA}$ | +144 | — | °C/W |
| Operating and Storage Temperature Range | $T_J$, $T_{STG}$ | -55 to +125 | | °C |

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

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| Forward Voltage | $V_F$ | —<br>—<br>—<br>— | —<br>0.42<br>—<br>0.35 | 0.44<br>0.49<br>0.36<br>0.47 | V | $I_F$ = 1.0A, $T_A$ = +25°C<br>$I_F$ = 2.0A, $T_A$ = +25°C<br>$I_F$ = 1.0A, $T_A$ = +125°C<br>$I_F$ = 2.0A, $T_A$ = +125°C |
| Leakage Current (Note 9) | $I_R$ | — | 30<br>11 | 160<br>30 | µA<br>mA | $V_R$ = 20V, $T_A$ = +25°C<br>$V_R$ = 20V, $T_A$ = +125°C |
| Total Capacitance | $C_T$ | — | 46 | — | pF | $V_R$ = 10V, f = 1.0MHz |

Notes:
6. FR-4 PCB, 2 oz. Copper, minimum recommended pad layout per http://www.diodes.com/datasheets/ap02001.pdf.
7. Polymide PCB, 2 oz. Copper, minimum recommended pad layout per http://www.diodes.com/datasheets/ap02001.pdf.
8. Short duration pulse test to minimize self-heating effect.


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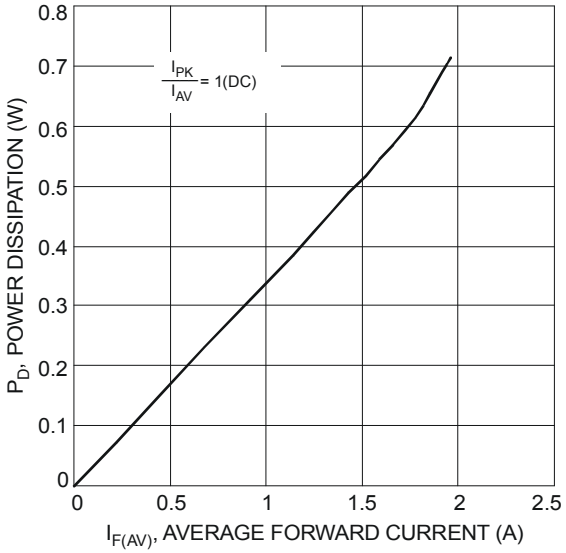

Fig. 1 Forward Power Dissipation

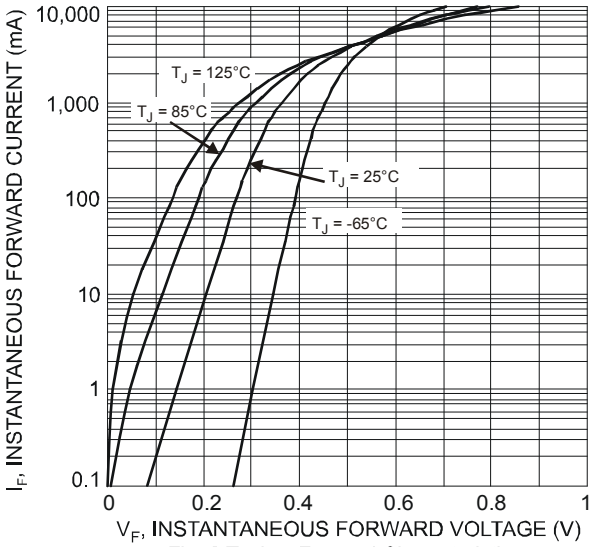

Fig. 2 Typical Forward Characteristics

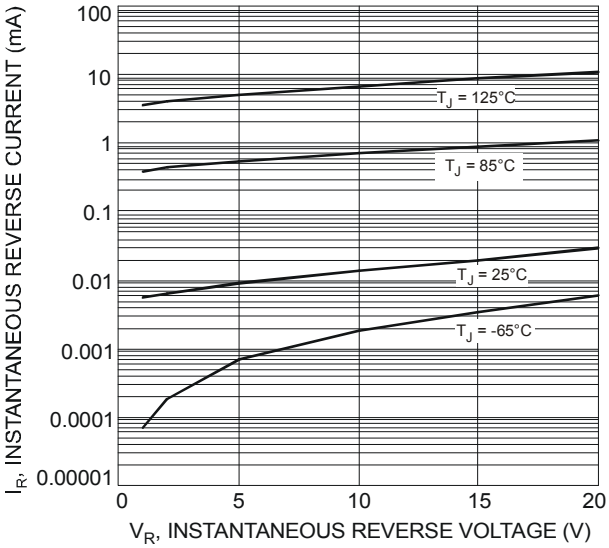

Fig. 3 Typical Reverse Characteristics

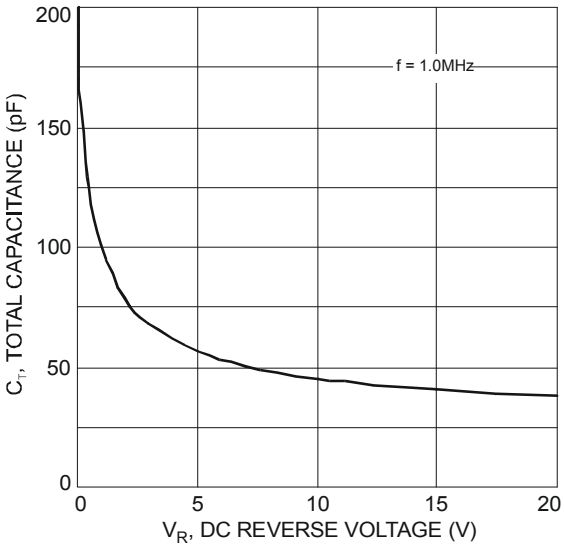

Fig. 4 Total Capacitance vs. Reverse Voltage

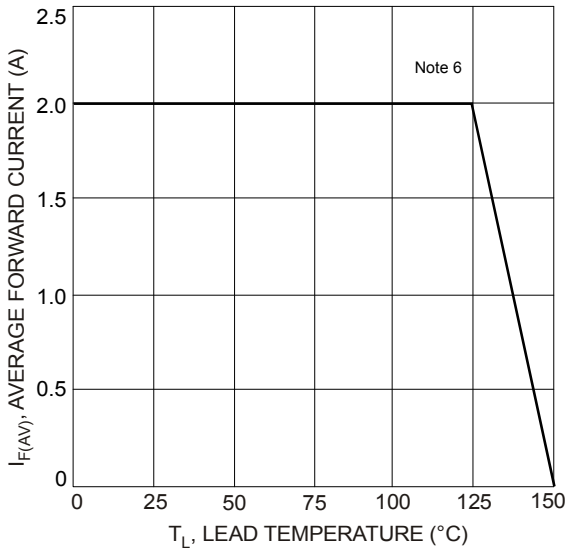

Fig. 5 Forward Current Derating Curve

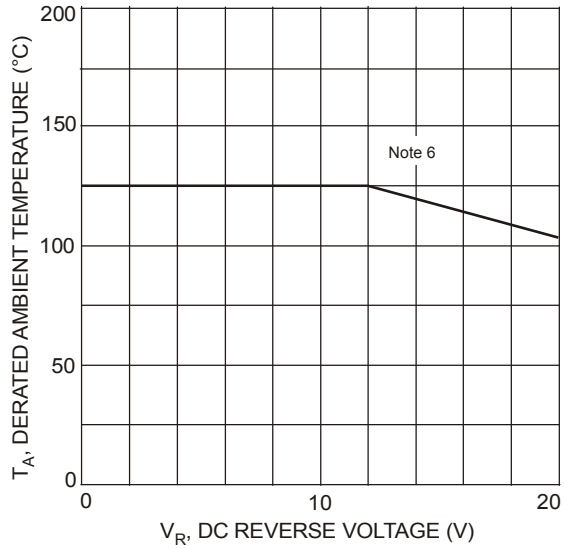

Fig. 6 Operating Temperature Derating


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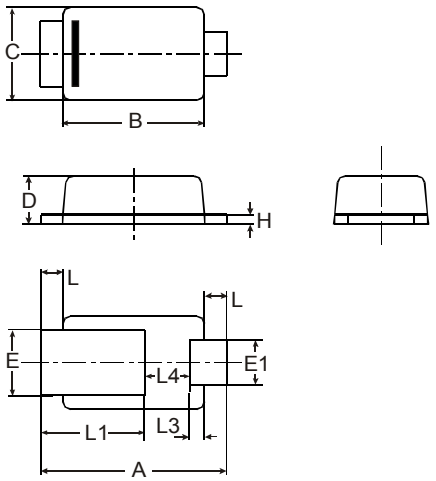
## Package Outline Dimensions

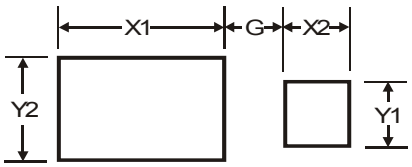
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.




| PowerDI®323 | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | 2.40 | 2.60 | 2.50 |
| **B** | 1.85 | 1.95 | 1.90 |
| **C** | 1.20 | 1.30 | 1.25 |
| **D** | 0.60 | 0.70 | 0.65 |
| **E** | 0.78 | 0.98 | 0.88 |
| **E1** | 0.50 | 0.70 | 0.60 |
| **H** | 0.08 | 0.18 | 0.13 |
| **L** | 0.20 | 0.40 | 0.30 |
| **L1** | — | — | 1.40 |
| **L3** | — | — | 0.20 |
| **L4** | 0.40 | 0.80 | 0.60 |
| **All Dimensions in mm** | | | |

## Suggested Pad Layout

Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.




| Dimensions | Value (in mm) |
|---|---|
| **G** | 0.5 |
| **X1** | 2.0 |
| **X2** | 0.8 |
| **Y1** | 0.8 |
| **Y2** | 1.1 |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