

## Product Summary

| $V_R$ (V) | $I_F$ (A) | $V_{F\ MAX}$ (V)<br>@ +25°C | $I_{R\ MAX}$ (mA)<br>@ +25°C |
|-----------|-----------|-----------------------------|------------------------------|
| 40        | 1.0       | 0.55                        | 0.1                          |

## Description and Applications

This Schottky Barrier Rectifier is designed to meet the stringent requirements of automotive applications. It is ideally suited to use as:

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

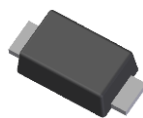
## Features and Benefits

- Guard Ring Die Construction for Transient Protection
- Low Power Loss, High Efficiency
- Patented Interlocking Clip Design for High Surge Current Capacity
- High Current Capability and Low Forward Voltage Drop
- **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 (See Note 4)**

## Mechanical Data

- Case: PowerDI®123
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: Cathode Band
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208③
- Weight: 0.096 grams (Approximate)

PowerDI®123



Top View

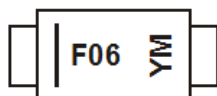
## Ordering Information (Note 5)

| Part Number | Compliance | Case        | Packaging         |
|-------------|------------|-------------|-------------------|
| DFLS140LQ-7 | Automotive | PowerDI®123 | 3,000/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. 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/](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

PowerDI®123



F06 = 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 | 2021 | 2022 |
|------|------|------|------|------|------|------|------|------|------|
| Code | B    | C    | D    | E    | F    | G    | H    | I    | J    |

| 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   |

**Maximum Ratings** (@T<sub>A</sub> = +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  | V <sub>RRM</sub>    | 40    | V    |
| Working Peak Reverse Voltage   | V <sub>RWM</sub>    |       |      |
| DC Blocking Voltage  | V <sub>R</sub>      |       |      |
| RMS Reverse Voltage  | V <sub>R(RMS)</sub> | 28    | V    |
| Average Forward Current @ T <sub>T</sub> = +120°C  | I <sub>F(AV)</sub>  | 1.0   | A    |
| Non-Repetitive Peak Forward Surge Current 8.3ms single half sine-wave superimposed on rated load | I <sub>FSM</sub>    | 50    | A    |

**Thermal Characteristics**

| Characteristic  | Symbol           | Value       | Unit |
|---|------------------|-------------|------|
| Power Dissipation (Note 6)                              | P <sub>D</sub>   | 1.67        | W    |
| Power Dissipation (Note 7)                              | P <sub>D</sub>   | 556         | mW   |
| Thermal Resistance Junction to Soldering Point (Note 8) | R <sub>θJS</sub> | 10          | °C/W |
| Thermal Resistance Junction to Ambient (Note 6)         | R <sub>θJA</sub> | 60          | °C/W |
| Thermal Resistance Junction to Ambient (Note 7)         | R <sub>θJA</sub> | 180         | °C/W |
| Operating Temperature Range                             | T <sub>J</sub>   | -55 to +125 | °C   |
| Storage Temperature Range                               | 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                                |
|------------------------------------|--------------------|-----|-----|-------|------|---|
| Reverse Breakdown Voltage (Note 9) | V <sub>(BR)R</sub> | 40  | —   | —     | V    | I <sub>R</sub> = 500μA                        |
| Forward Voltage                    | V <sub>F</sub>     | —   | —   | 0.36  | V    | I <sub>F</sub> = 0.1A, T <sub>J</sub> = +25°C |
|                                    |                    | —   | —   | 0.30  |      | I <sub>F</sub> = 0.1A, T <sub>J</sub> = +85°C |
|                                    |                    | —   | —   | 0.55  |      | I <sub>F</sub> = 1.0A, T <sub>J</sub> = +25°C |
|                                    |                    | —   | —   | 0.515 |      | I <sub>F</sub> = 1.0A, T <sub>J</sub> = +85°C |
|                                    |                    | —   | —   | 0.85  |      | I <sub>F</sub> = 3.0A, T <sub>J</sub> = +25°C |
|                                    |                    | —   | —   | 0.88  |      | I <sub>F</sub> = 3.0A, T <sub>J</sub> = +85°C |
| Leakage Current (Note 9)           | I <sub>R</sub>     | —   | —   | 0.1   | mA   | V <sub>R</sub> = 40V, T <sub>J</sub> = +25°C  |
|                                    |                    | —   | —   | 10    |      | V <sub>R</sub> = 40V, T <sub>J</sub> = +85°C  |
|                                    |                    | —   | —   | 0.05  |      | V <sub>R</sub> = 20V, T <sub>J</sub> = +25°C  |
|                                    |                    | —   | —   | 5     |      | V <sub>R</sub> = 20V, T <sub>J</sub> = +85°C  |
| Total Capacitance                  | C <sub>T</sub>     | —   | 90  | —     | pF   | V <sub>R</sub> = 10V, f = 1.0MHz              |

- Notes:
- Part mounted on 50.8mm X 50.8mm GETEK board with 25.4mm X 25.4mm copper pad, 25% anode, 75% cathode. T<sub>A</sub> = +25°C.
  - Part mounted on FR-4 board with 1.8mm X 2.5mm cathode and 1.8mm X 1.2mm anode, 1 oz. copper pads. T<sub>A</sub> = +25°C.
  - Theoretical R<sub>θJS</sub> calculated from the top center of the die straight down to the PCB cathode tab solder junction.
  - Short duration pulse test to minimize self-heating effect.

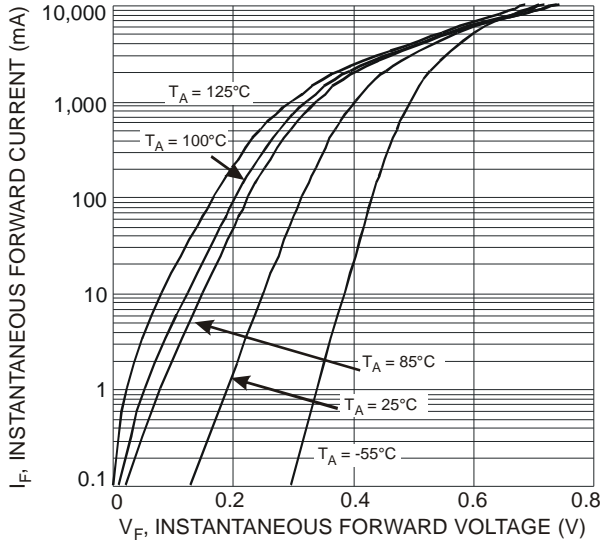


Fig. 1 Typical Forward Characteristics

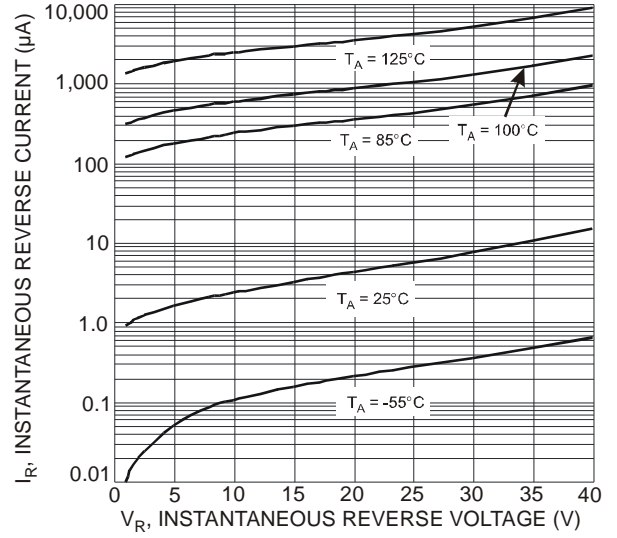


Fig. 2 Typical Reverse Characteristics

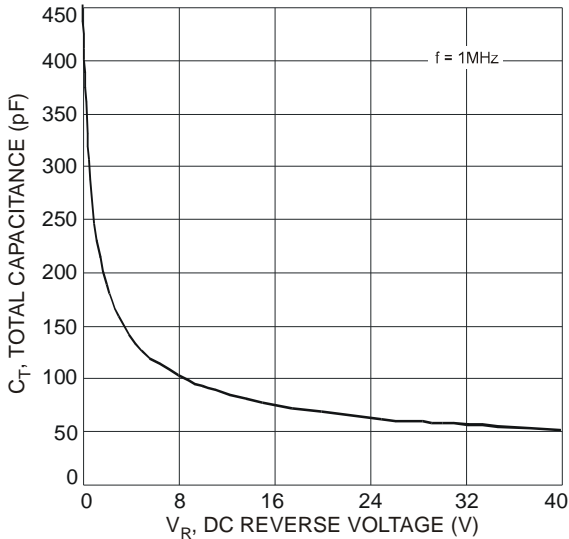


Fig. 3 Total Capacitance vs Reverse Voltage

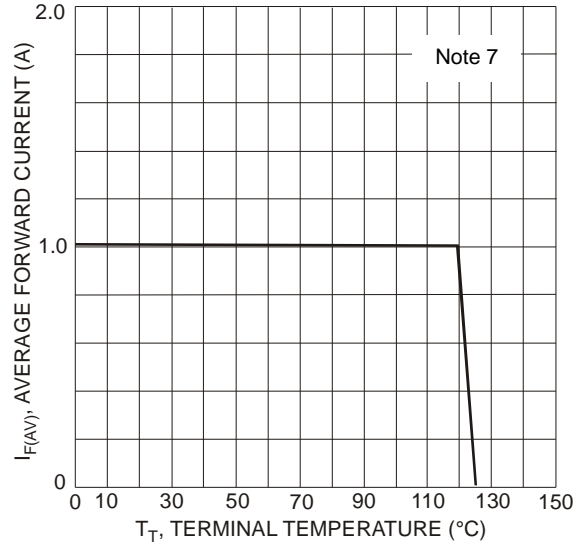


Fig. 4 Forward Current Derating Curve

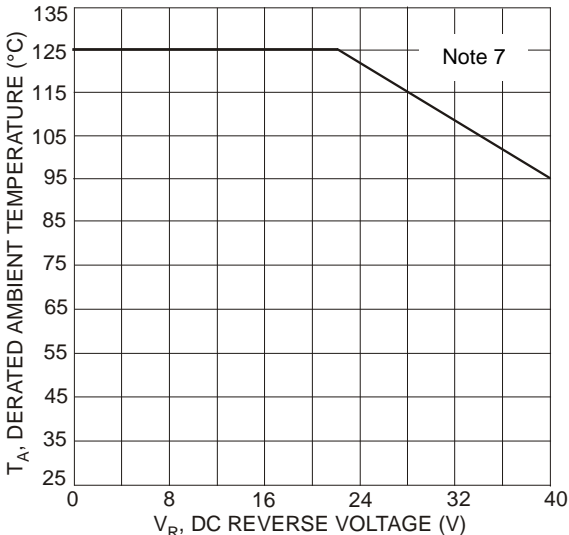
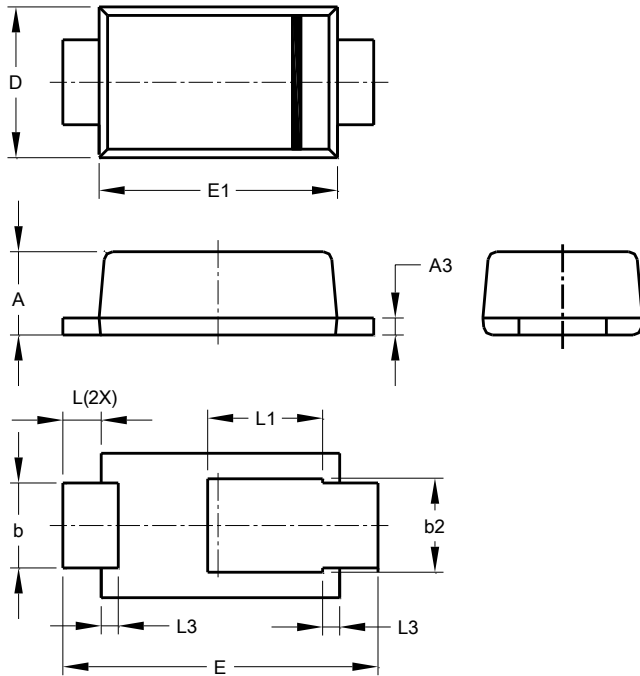


Fig. 5 Operating Temperature Derating

**Package Outline Dimensions**

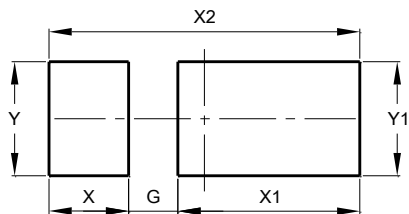
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| POWERDI <sup>®</sup> 123 |       |       |      |
|--------------------------|-------|-------|------|
| Dim                      | Min   | Max   | Typ  |
| A                        | 0.93  | 1.00  | 0.98 |
| A3                       | 0.15  | 0.25  | 0.20 |
| b                        | 0.85  | 1.25  | 1.00 |
| b2                       | 1.025 | 1.125 | 1.10 |
| D                        | 1.63  | 1.93  | 1.78 |
| E                        | 3.50  | 3.90  | 3.70 |
| E1                       | 2.60  | 3.00  | 2.80 |
| L                        | 0.40  | 0.50  | 0.45 |
| L1                       | 1.25  | 1.40  | 1.35 |
| L3                       | 0.125 | 0.275 | 0.20 |
| 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          | 0.65          |
| X          | 1.05          |
| X1         | 2.40          |
| X2         | 4.10          |
| Y          | 1.50          |
| Y1         | 1.50          |

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