

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

| V <sub>RRM</sub> (V) | I <sub>O</sub> (A) | V <sub>F</sub> Max (V) | I <sub>R</sub> Max (μA) |
|----------------------|--------------------|------------------------|-------------------------|
| 400                  | 1                  | 1.25                   | 1                       |

**Description**

The US1GWF is a rectifier packaged in the SOD123F (Standard) package and is suited as a boost diode in power factor correction circuitry. For use in secondary rectification and freewheeling for ultra-fast switching speed AC-AC and DC-DC converters in high-temperature conditions for consumer applications.

**Applications**

- Flat Panel Display
- Switching Power Supplies/Chargers
- LED Lighting
- Freewheeling Diode

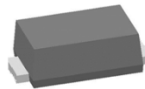
**Features and Benefits**

- Low Profile, Small Form Factor Package
- Very Low Leakage Current
- Glass Passivate Die Construction
- Enhanced Ultrafast Recovery Times for High Efficiency
- Low Forward Voltage, Low Power Loss
- Lead-Free Finish & RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**
- Qualified to AEC-Q101 Standards for High Reliability**

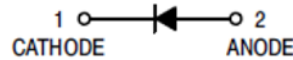
**Mechanical Data**

- Case: SOD123F (Standard)
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 Ⓔ
- Polarity: Cathode Band
- Weight: 0.016 grams (Approximate)

SOD123F (Standard)



Top View



Schematic View

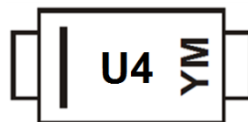
**Ordering Information (Note 4)**

| Part Number | Qualification | Case               | Packaging         |
|-------------|---------------|--------------------|-------------------|
| US1GWF-7    | AEC-Q101      | SOD123F (Standard) | 3,000/Tape & Reel |

- Notes:
- EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
  - 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.
  - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  - For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

**Marking Information**

SOD123F (Standard)



U4 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: E = 2017)  
 M = Month (ex: 9 = September)

**Date Code Key**

| Year | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|------|------|------|------|------|------|------|------|------|
| Code | 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 capacitive load, derate current by 20%.

| Characteristic                                                                                      | Symbol           | Value | Unit |
|-----------------------------------------------------------------------------------------------------|------------------|-------|------|
| Peak Repetitive Reverse Voltage                                                                     | V <sub>RRM</sub> | 400   | V    |
| Working Peak Reverse Voltage                                                                        | V <sub>RWM</sub> |       |      |
| DC Blocking Voltage                                                                                 | V <sub>R</sub>   |       |      |
| Average Rectified Output Current                                                                    | I <sub>O</sub>   | 1     | A    |
| Non-Repetitive Peak Forward Surge Current<br>8.3ms Single Half Sine-Wave Superimposed on Rated Load | I <sub>FSM</sub> | 30    | A    |

## Thermal Characteristics

| Characteristic                                          | Symbol                            | Value       | Unit |
|---------------------------------------------------------|-----------------------------------|-------------|------|
| Typical Thermal Resistance Junction to Case (Note 6)    | R <sub>θJC</sub>                  | 63          | °C/W |
| Typical Thermal Resistance Junction to Ambient (Note 5) | R <sub>θJA</sub>                  | 118         | °C/W |
| Typical Thermal Resistance Junction to Ambient (Note 6) | R <sub>θJA</sub>                  | 95          | °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                                                                                  |
|------------------------------------|--------------------|-----|------------|-----------|------|-------------------------------------------------------------------------------------------------|
| Reverse Breakdown Voltage (Note 7) | V <sub>(BR)R</sub> | 400 | —          | —         | V    | I <sub>R</sub> = 10μA                                                                           |
| Forward Voltage                    | V <sub>F</sub>     | —   | 1.1<br>0.9 | 1.25<br>— | V    | I <sub>F</sub> = 1A, T <sub>J</sub> = +25°C<br>I <sub>F</sub> = 1A, T <sub>J</sub> = +125°C     |
| Reverse Leakage Current (Note 7)   | I <sub>R</sub>     | —   | 0.1<br>2   | 1<br>10   | μA   | V <sub>R</sub> = 400V, T <sub>J</sub> = +25°C<br>V <sub>R</sub> = 400V, T <sub>J</sub> = +100°C |
| Reverse Recovery Time              | t <sub>RR</sub>    | —   | 28         | 35        | ns   | I <sub>F</sub> = 0.5A, I <sub>R</sub> = 1.0A, I <sub>RR</sub> = 0.25A                           |
| Typical Total Capacitance          | C <sub>T</sub>     | —   | 9          | —         | pF   | V <sub>R</sub> = 4V, f=1MHz                                                                     |

- Notes:
- Device mounted on FR-4 substrate, 1"×1", 2oz, single-sided, PC boards with 0.1"×0.15" copper pad.
  - Device mounted on FR-4 substrate, 0.4"×0.5", 2oz, single-sided, PC boards with 0.2"×0.25" copper pad.
  - Short duration pulse test used to minimize self-heating effect.

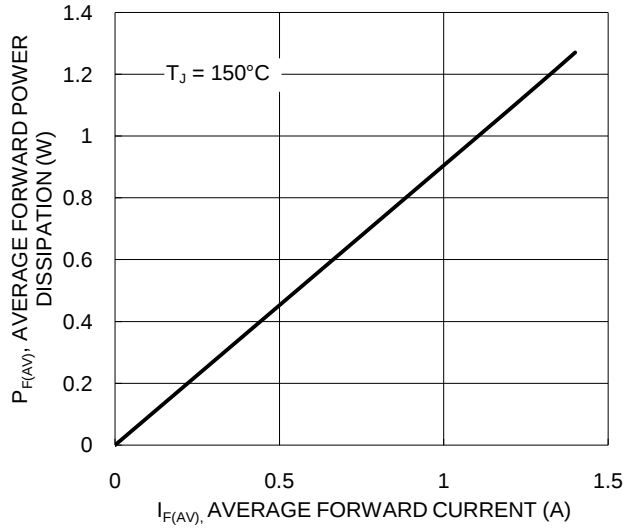


Figure 1. Forward Power Dissipation

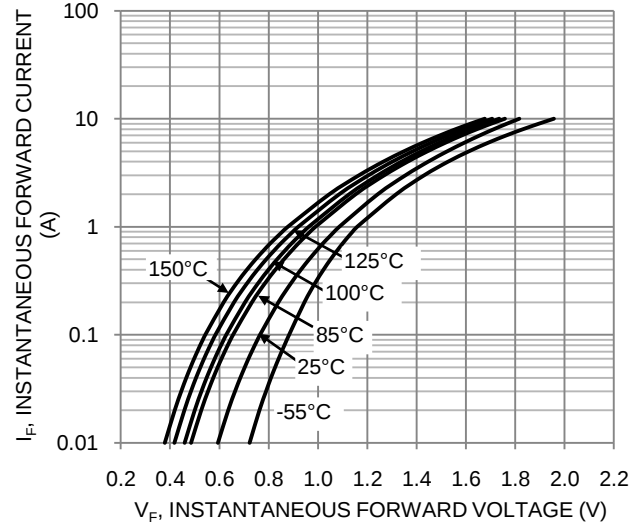


Figure 2. Typical Forward Characteristic

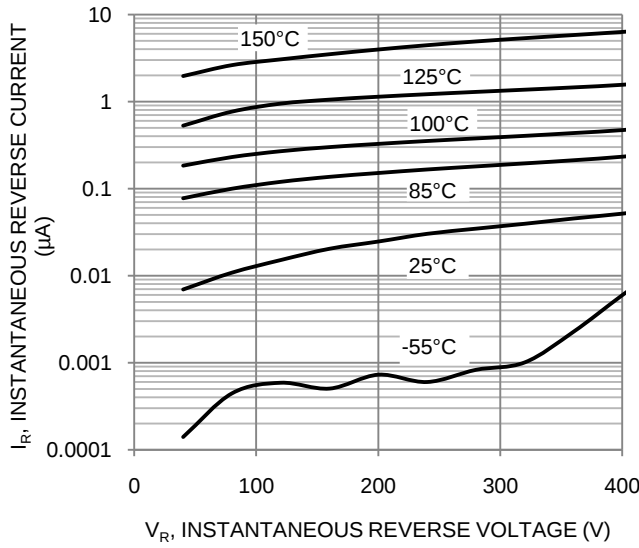


Figure 3. Typical Reverse Characteristic

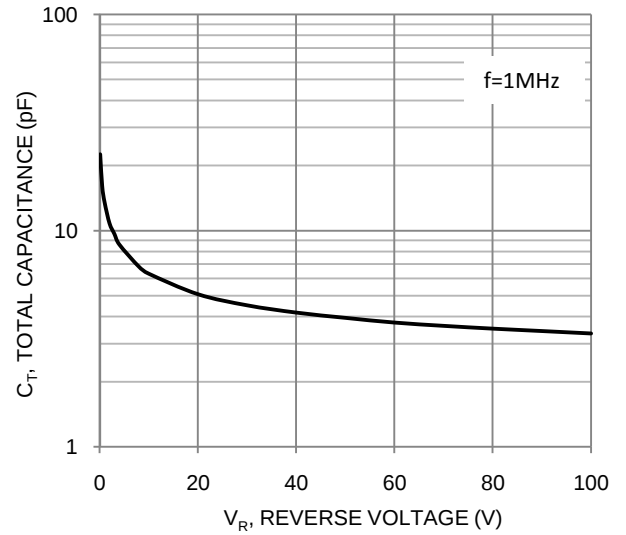


Figure 4. Total Capacitance vs. Reverse Voltage

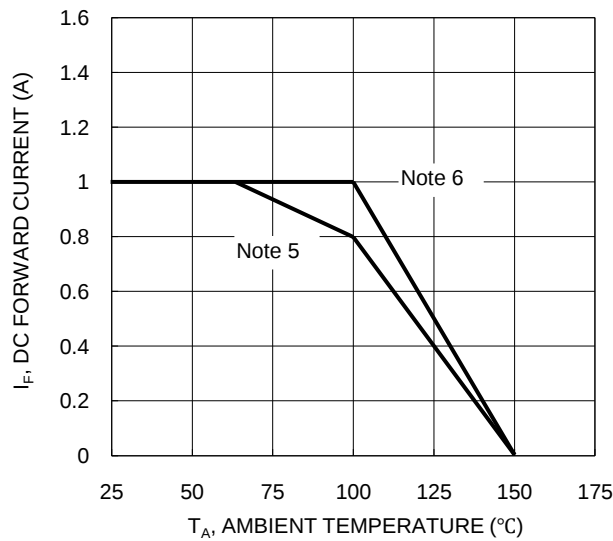
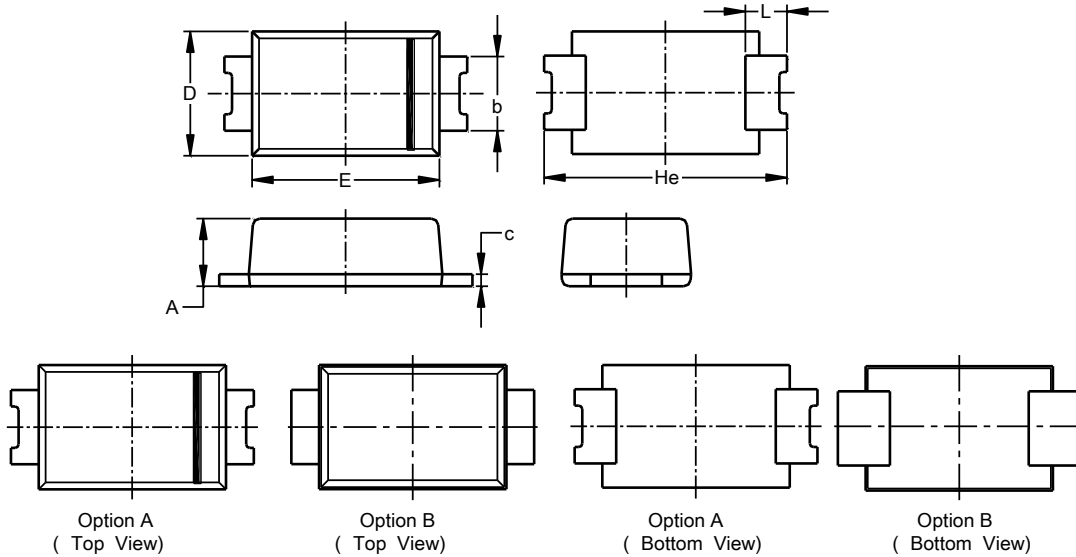


Figure 5. DC Forward Current Derating

## Package Outline Dimensions

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

### SOD123F (Standard)

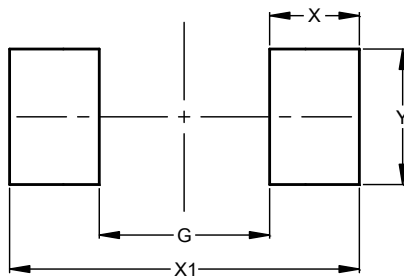


| SOD123F (Standard)   |      |      |      |
|----------------------|------|------|------|
| Dim                  | Min  | Max  | Typ  |
| A                    | 0.81 | 1.15 | -    |
| b                    | 0.80 | 1.35 | -    |
| c                    | 0.05 | 0.30 | -    |
| D                    | 1.70 | 1.90 | 1.80 |
| E                    | 2.60 | 2.80 | 2.70 |
| He                   | 3.30 | 3.70 | 3.50 |
| L                    | 0.35 | 0.85 | -    |
| All Dimensions in mm |      |      |      |

## Suggested Pad Layout

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

### SOD123F (Standard)



| Dimensions | Value (in mm) |
|------------|---------------|
| G          | 1.90          |
| X          | 1.00          |
| X1         | 3.90          |
| Y          | 1.50          |

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