NEW PRODUCT

# US1NWF

## 1.0A SURFACE MOUNT ULTRA-FAST RECTIFIER

## Product Summary (@ $T_A$ = +25°C)

| $V_{RRM}$ (V) | $I_O$ (A) | $V_F$ Max (V) | $I_R$ Max (μA) |
|---|---|---|---|
| 1200 | 1 | 2.0 | 5 |

## Description

The US1NWF is a rectifier packaged in the SOD123F 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

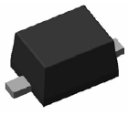
## Features and Benefits

- Low Profile, Small Form Factor Package
- Low Leakage Current
- Glass Passivate Die Construction
- 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**

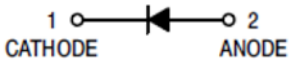
## Mechanical Data

- Case: SOD123F
- 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 e3
- Polarity: Cathode Band
- Weight: 0.016 grams (Approximate)

SOD123F



Top View




Schematic View

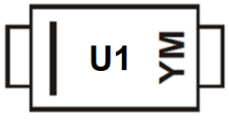
## Ordering Information (Note 4)

| Part Number | Compliance | Case | Packaging |
|---|---|---|---|
| US1NWF-7 | AEC-Q101 | SOD123F | 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 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. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

## Marking Information

SOD123F




U1 = 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 |

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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>$V_R$ | 1200 | V |
| Average Rectified Output Current | $I_O$ | 1 | A |
| Non-Repetitive Peak Forward Surge Current<br>8.3ms Single Half Sine-Wave Superimposed on Rated Load | $I_{FSM}$ | 30 | A |

## Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Typical Thermal Resistance Junction to Case (Note 6) | $R_{\theta JC}$ | 33 | °C/W |
| Typical Thermal Resistance Junction to Ambient (Note 5) | $R_{\theta JA}$ | 100 | °C/W |
| Typical Thermal Resistance Junction to Ambient (Note 6) | $R_{\theta JA}$ | 82 | °C/W |
| Operating and Storage Temperature Range | $T_J$, $T_{STG}$ | -55 to +150 | °C |

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

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| Reverse Breakdown Voltage (Note 7) | $V_{(BR)R}$ | 1200 | — | — | V | $I_R$ = 10μA |
| Forward Voltage | $V_F$ | — | 1.3<br>1.4<br>1.5 | 1.7<br>1.9<br>2.0 | V | $I_F$ = 0.5A, $T_J$ = +25°C<br>$I_F$ = 0.8A, $T_J$ = +25°C<br>$I_F$ = 1A, $T_J$ = +25°C |
| Reverse Leakage Current (Note 7) | $I_R$ | — | 0.5<br>10 | 5<br>100 | μA | $V_R$ = 1200V, $T_J$ = +25°C<br>$V_R$ = 1200V, $T_J$ = +125°C |
| Reverse Recovery Time | $t_{RR}$ | — | 70 | 80 | ns | $I_F$ = 0.5A, $I_R$ = 1.0A, $I_{RR}$ = 0.25A |
| Total Capacitance | $C_T$ | — | 5 | — | pF | $V_R$ = 4V, f=1MHz |

Notes: 5. Device mounted on FR-4 substrate, 25.4*25.4mm, 2oz, single-sided, PC boards with 2.1*2.1mm copper.
6. Device mounted on FR-4 substrate, 0.4"*0.5", 2oz, single-sided, PC boards with 0.2"*0.25" copper pad.
7. Short duration pulse test used to minimize self-heating effect.

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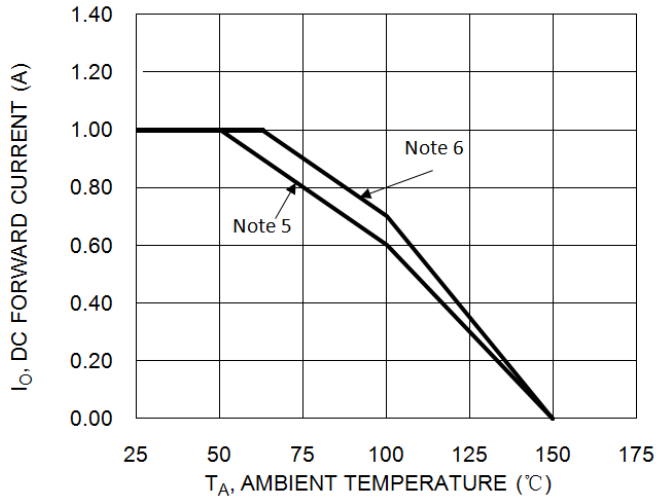


Figure 1. DC Forward Current Derating

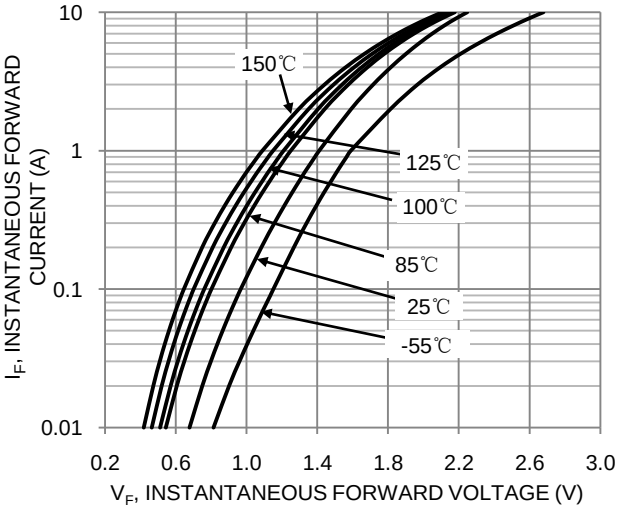


Figure 2. Typical Forward Characteristics

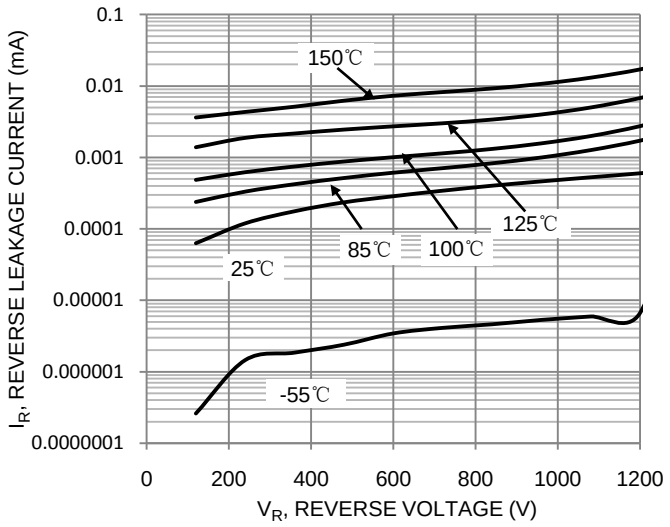


Figure 3. Typical Reverse Characteristics

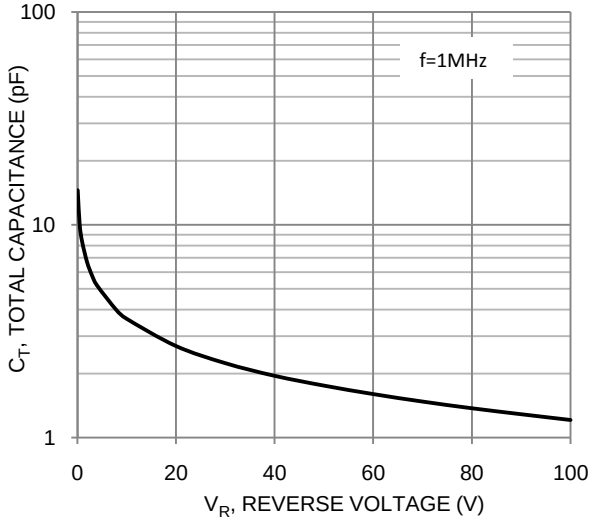


Figure 4. Typical Forward Characteristics

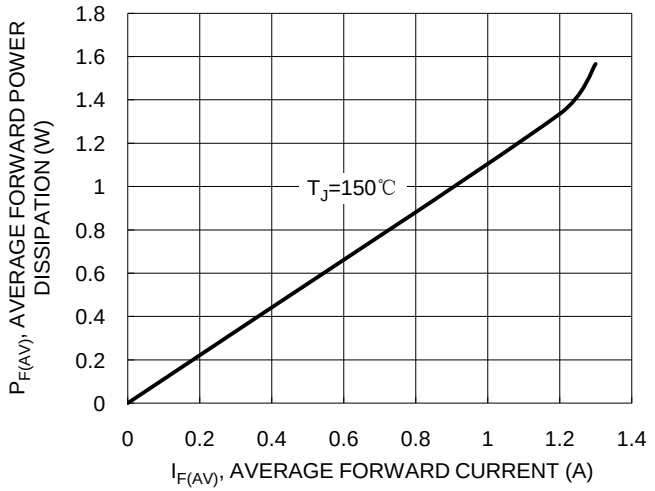


Figure 5. Forward Power Dissipation

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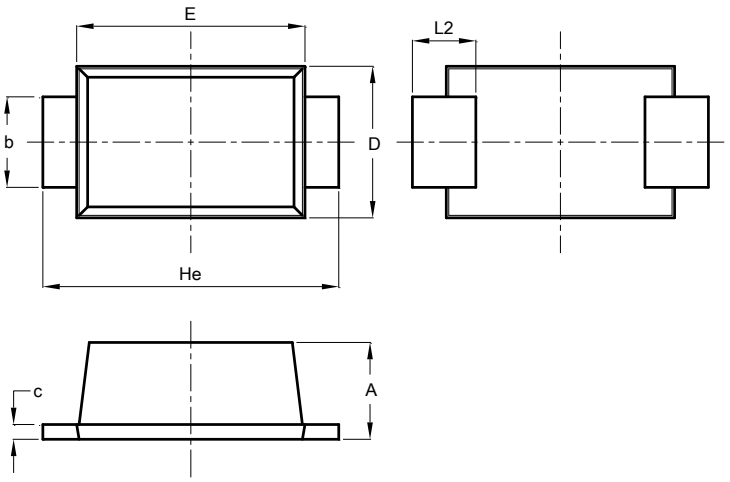
## Package Outline Dimensions

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

**SOD123F**

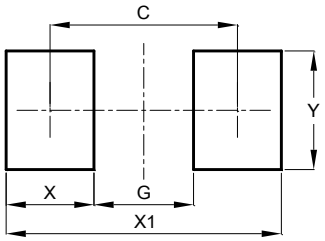



| SOD123F | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | 0.81 | 1.15 | - |
| **b** | 0.80 | 1.05 | - |
| **c** | 0.05 | 0.30 | - |
| **D** | 1.70 | 1.90 | 1.80 |
| **E** | 2.60 | 2.80 | 2.70 |
| **He** | 3.30 | 3.70 | 3.50 |
| **L2** | 0.35 | 0.85 | - |
| **All Dimensions in mm** | | | |

## Suggested Pad Layout

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

**SOD123F**




| Dimensions | Value (in mm) |
|---|---|
| **C** | 2.86 |
| **G** | 1.52 |
| **X** | 1.34 |
| **X1** | 4.20 |
| **Y** | 1.80 |

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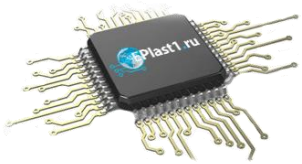


**Как с нами связаться**

**Телефон:** 8 (812) 309 58 32 (многоканальный)
**Факс:** 8 (812) 320-02-42
**Электронная почта:** org@eplast1.ru
**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.