

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

| V <sub>BR</sub> (MIN) | I <sub>PP</sub> (MAX) | V <sub>C</sub> (MAX) |
|-----------------------|-----------------------|----------------------|
| 14.4V                 | 10.5A                 | 21.5V                |

**Description**

This new generation TVS is designed for transient overvoltage protection. The combination of small size and high ESD surge capability makes it ideal for use in power management and battery contact.

**Applications**

It is ideally suited for use in applications such as the following:

- Power Management
- Automotive
- Battery Contacts

**Features**

- 225W Peak Pulse Power Dissipation (10μs × 1000μs Waveform)
- 13V Standoff Voltage
- Provides ESD Protection per IEC 61000-4-2 Standard:  
Air ±30kV, Contact ±30kV
- Excellent Clamping Capability
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

**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
- Terminal Connections: Cathode Bar
- Terminals: Matte Tin Finish Annealed over Copper Alloy Leadframe. Solderable per MIL-STD-202, Method 208 Ⓜ3
- Weight: 0.018 grams (Approximate)

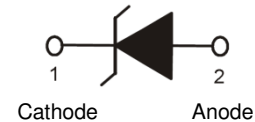
SOD123F (Type B)



Top View



Bottom View



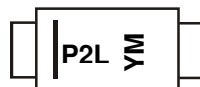
Cathode

Anode

**Ordering Information** (Note 4)

| Part Number | Compliance | Marking | Reel Size(inches) | Tape Width(mm) | Quantity per Reel |
|-------------|------------|---------|-------------------|----------------|-------------------|
| D13AP2WF-7  | Commercial | P2L     | 7                 | 8              | 3,000/Tape & Reel |

- Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
  2. See <https://www.diodes.com/quality/lead-free/> 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**


P2L = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: G = 2019)  
 M = Month (ex: 9 = September)  
 Bar Denotes Cathode Side

## Date Code Key

| Year | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 |
|------|------|------|------|------|------|------|------|
| Code | F    | G    | H    | I    | J    | K    | L    |

| 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.)

| Characteristic   | Symbol           | Value       | Unit |
|--|------------------|-------------|------|
| Peak Pulse Power Dissipation (Note 5) 10/1000µs<br>8/20µs        | P <sub>PK</sub>  | 225<br>1125 | W    |
| Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 6) | I <sub>FSM</sub> | 35          | A    |

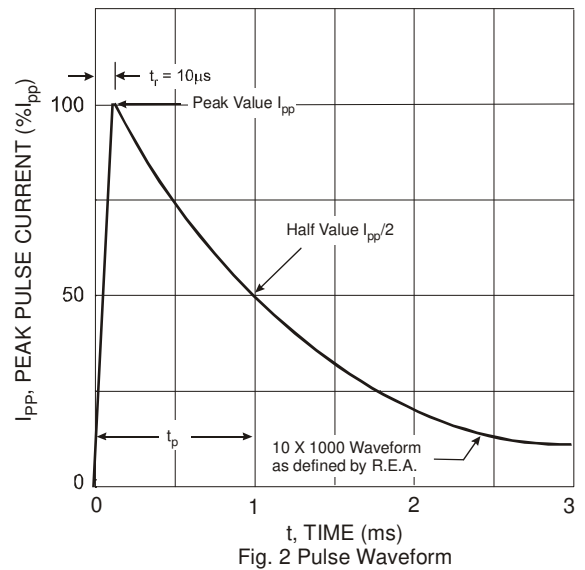
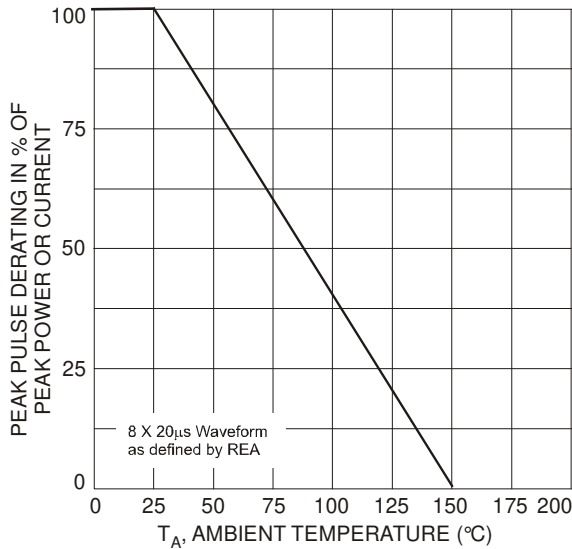
**Thermal Characteristics**

| Characteristic   | Symbol                            | Value       | Unit |
|--|-----------------------------------|-------------|------|
| DC Steady-State Power Dissipation (Note 7)               | P <sub>D</sub>                    | 1.0         | W    |
| Thermal Resistance, Junction to Ambient (Note 7)         | R <sub>θJA</sub>                  | 330         | °C/W |
| Thermal Resistance, Junction to Soldering Point (Note 8) | R <sub>θJS</sub>                  | 70          | °C/W |
| Operating and Storage Temperature Range                  | T <sub>J</sub> , T <sub>STG</sub> | -65 to +150 | °C   |

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Part Number | Reverse Standoff Voltage | Breakdown Voltage V <sub>BR</sub> @ I <sub>T</sub> (Note 9) |         | Test Current        | Max. Reverse Leakage @ V <sub>RWM</sub> | Max. Clamping Voltage @ I <sub>PP</sub> | Max. Peak Pulse Current I <sub>PP</sub> (Note 5) | Marking Code |
|-------------|--------------------------|---|---------|---------------------|---|---|--|--------------|
|             | V <sub>RWM</sub> (V)     | Min (V)   | Max (V) | I <sub>T</sub> (mA) | I <sub>R</sub> (µA)                     | V <sub>C</sub> (V)                      | (A)  |              |
| D13AP2WF    | 13                       | 14.4  | 15.9    | 1                   | 1                                       | 21.5                                    | 10.5   | P2L          |

- Notes:
5. Non-Repetitive current pulse as shown in Figure 2.
  6. 1/2 sine wave (or equivalent square wave), pulse width = 8.3ms, duty cycle = 4 pulses/minute maximum.
  7. Device mounted on 1" x 1", FR-4 PCB; 2 oz. Cu pad layout.
  8. Theoretical R<sub>θJS</sub> calculated from the top center of the die straight down to the PCB/cathode tab solder junction.
  9. V<sub>BR</sub> measured at pulse test current I<sub>T</sub> with t<sub>p</sub> ≤ 5.0ms at T<sub>A</sub> = +25°C.



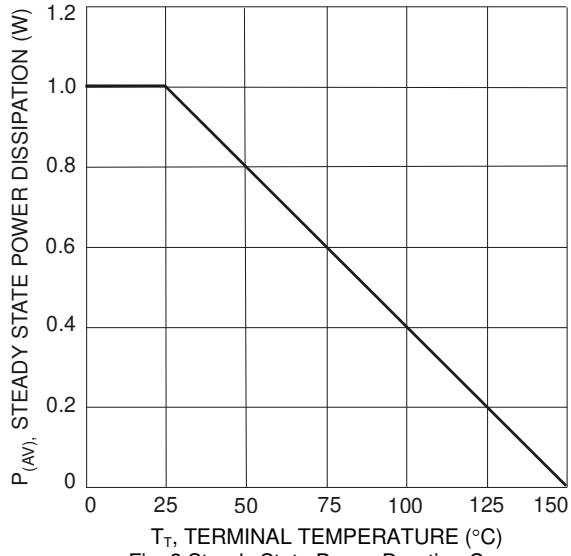


Fig. 3 Steady State Power Derating Curve

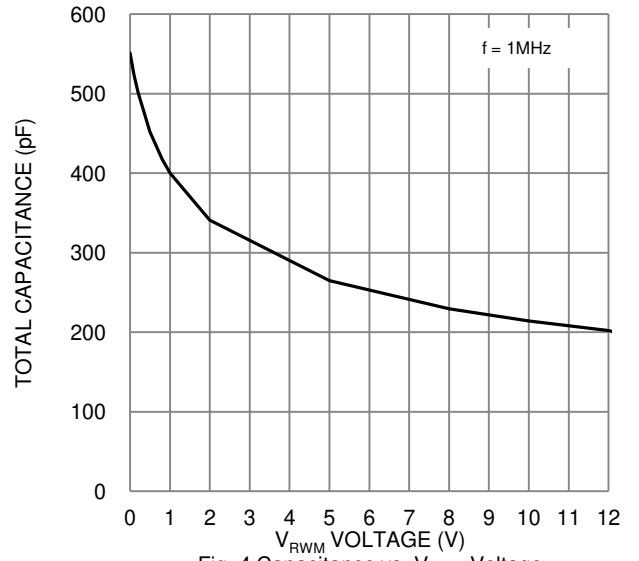
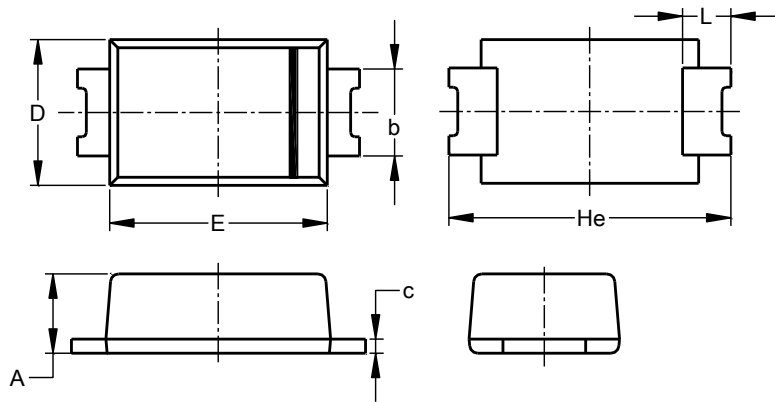


Fig. 4 Capacitance vs. V<sub>RWM</sub> Voltage

**Package Outline Dimensions**

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

**SOD123F (Type B)**

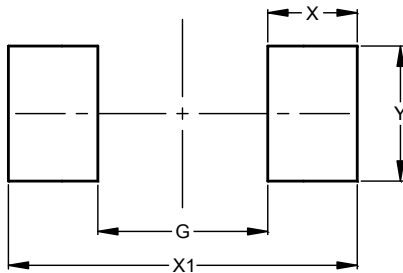


| SOD123F (Type B)            |      |      |      |
|-----------------------------|------|------|------|
| Dim                         | Min  | Max  | Typ  |
| A                           | 0.81 | 1.15 | —    |
| b                           | 0.80 | 1.35 | —    |
| c                           | 0.05 | 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 | —    |
| <b>All Dimensions in mm</b> |      |      |      |

**Suggested Pad Layout**

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

**SOD123F (Type B)**



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

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