

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

V <sub>BR</sub> (MIN)	I <sub>PP</sub> (MAX)	V <sub>C</sub> (MAX)
22.2V to 24.4V	12.3A to 11.3A	32.4V to 35.5V

## 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

- 400W Peak Pulse Power Dissipation (10μs x 1000μs Waveform)
- 20V to 22V Standoff Voltages
- Provides ESD Protection per IEC61000-4-2 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 Ⓔ
- Weight: 0.018 grams (Approximate)

SOD123F (Type B)



Top View



Bottom View



Cathode

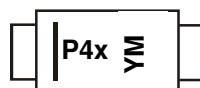
Anode

## Ordering Information (Note 4)

Part Number	Compliance	Marking	Reel Size(inches)	Tape Width(mm)	Quantity per Reel
DTVSxxSP4UR-7	Commercial	P4x	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



P4x = 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	2019	2020	2021	2022	2023	2024	2025
Code	G	H	I	J	K	L	M

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** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Peak Pulse Power Dissipation (Note 5) 10/1000 $\mu\text{s}$	$P_{PK}$	400	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 6)	$I_{FSM}$	50	A

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
DC Steady-State Power Dissipation (Note 7)	$P_D$	1.5	W
Thermal Resistance, Junction to Ambient (Note 7)	$R_{\theta JA}$	330	$^\circ\text{C/W}$
Thermal Resistance, Junction to Soldering Point (Note 8)	$R_{\theta JS}$	70	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Part Number	Reverse Standoff Voltage	Breakdown Voltage		Test Current	Maximum Reverse Leakage @ $V_{RWM}$	Maximum Clamping Voltage @ $I_{PP}$	Maximum Peak Pulse Current	Marking Code
		$V_{BR} @ I_T$ (Note 9)						
	$V_{RWM}$ (V)	Min (V)	Max (V)	$I_T$ (mA)	$I_R$ ( $\mu\text{A}$ )	$V_C$ (V)	$I_{PP}$ (Note 5) (A)	
DTVS20SP4UR	20	22.2	24.5	1	1	32.4	12.3	P4T
DTVS22SP4UR	22	24.4	26.9	1	1	35.5	11.3	P4V

- 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"x1", FR-4 PCB; 2 oz. Cu pad layout.
  8. Theoretical  $R_{\theta JS}$  calculated from the top center of the die straight down to the PCB/cathode tab solder junction.
  9.  $V_{BR}$  measured at pulse test current  $I_T$  with  $t_p \leq 5.0\text{ms}$  at  $T_A = +25^\circ\text{C}$ .

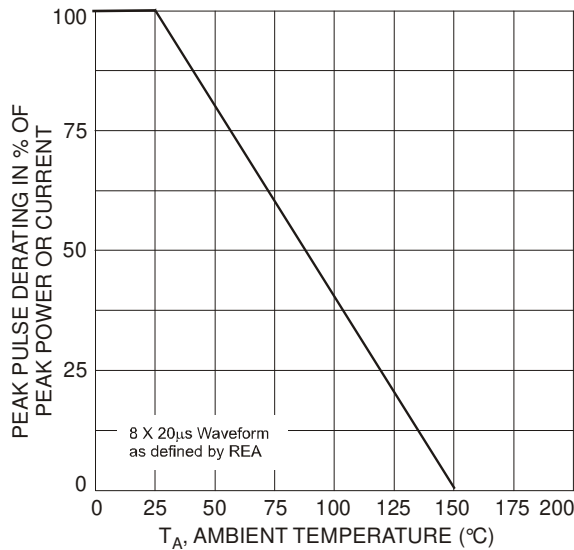


Fig. 1 Pulse Derating Curve

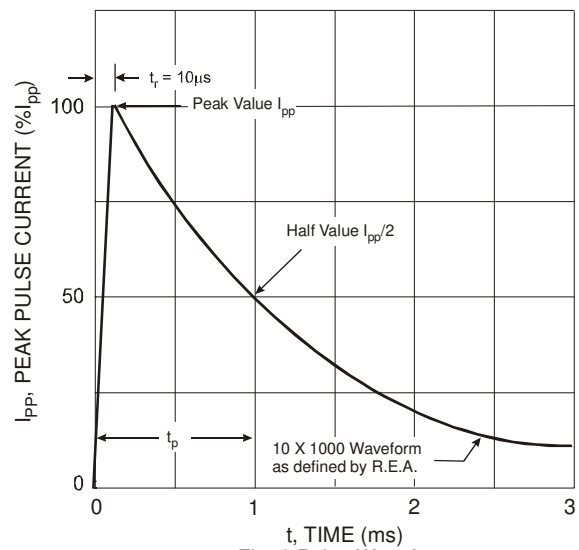


Fig. 2 Pulse Waveform

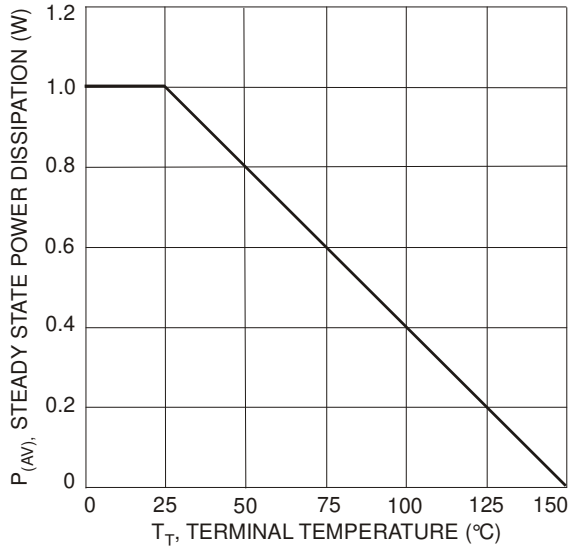


Fig.3 Steady State Power Derating Curve

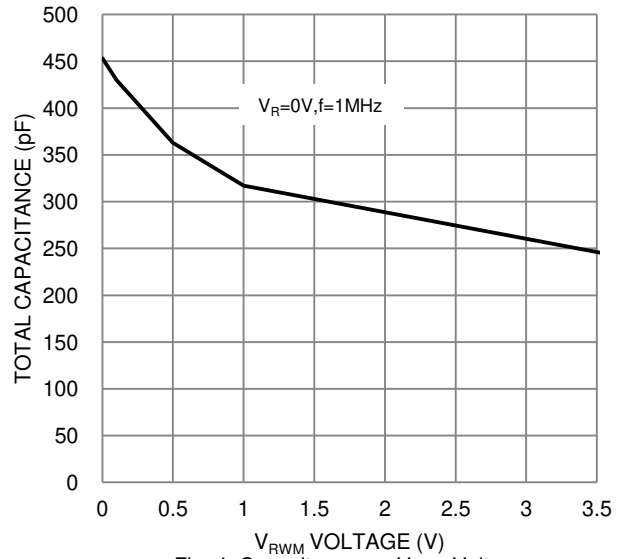
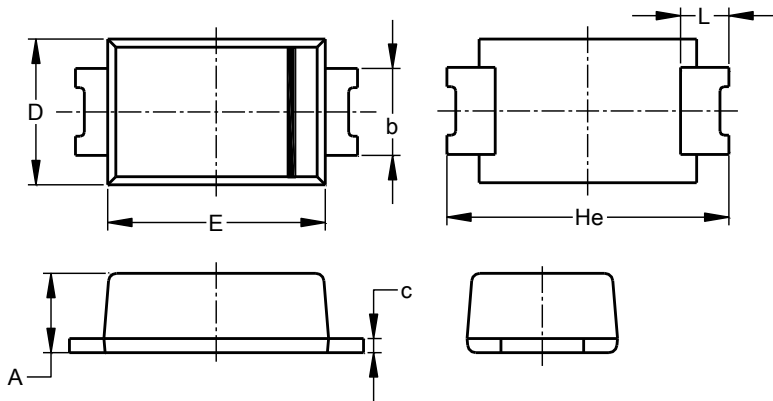


Fig. 4 Capacitance vs. V<sub>RWM</sub> Voltage

## Package Outline Dimensions

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

### SOD123F (Type B)

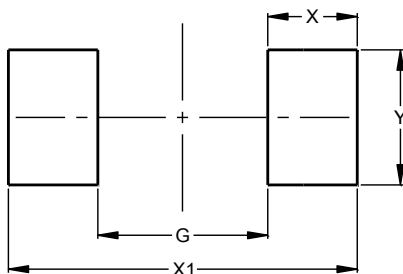


SOD123F (Type B)			
Dim	Min	Max	Typ
A	0.81	1.15	—
b	0.80	1.35	—
c	0.05	0.30	—
D	1.70	1.90	1.80
E	2.60	2.80	2.70
He	3.30	3.70	3.50
L	0.35	0.85	—
<b>All Dimensions in mm</b>			

## 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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