

## Product Summary

$V_F$ (Typ)	$V_P$ (Typ)	$C_{OUT}$ (Typ)
0.8V	5V	1.5pF

## Description

DM1231-02SO is a high-performance device suitable for protecting two high-speed channels. This product is assembled in SOT26 package. It has high ESD surge capability and low capacitance.

## Applications

Typically used for high-speed ports such as:

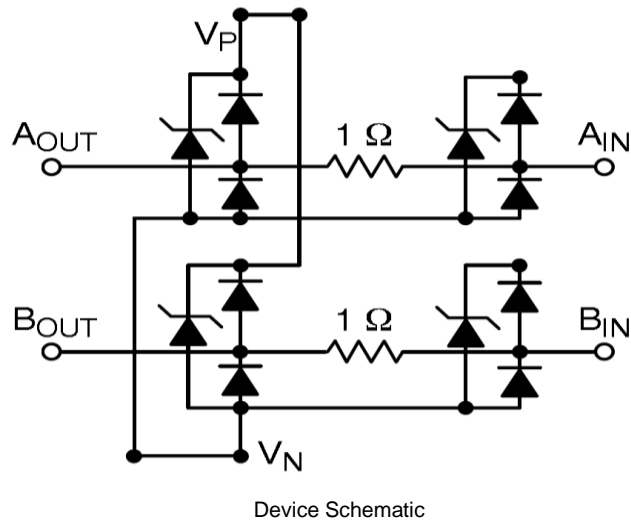
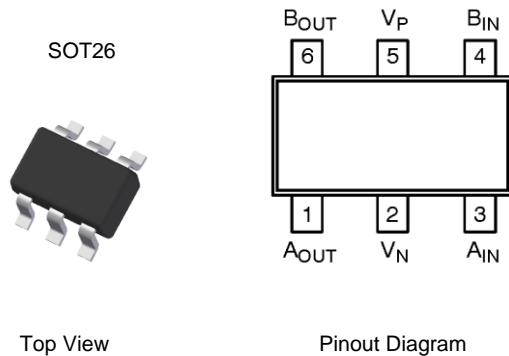
- USB 2.0
- IEEE1394
- HDMI
- Laptops and personal computers
- Flat panel displays
- Video graphics displays
- SIM ports

## Features

- Contact Discharge per IEC61000-4-2 Standard:  $\pm 12kV$  (OUT Pins),  $\pm 4kV$  (IN Pins)
- Withstands over 1000 ESD Strikes
- 1.5pF Typical Capacitance from OUT to  $V_N$
- Two Channels of ESD Protection
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

## Mechanical Data

- Package: SOT26
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020 (Lead-Free Plating)
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208
- Weight: 0.016 grams (Approximate)

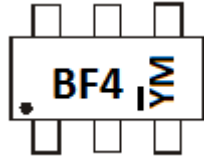


## Ordering Information (Note 4)

Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
DM1231-02SO-7	SOT26	BF4	7	8	3000	Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  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



BF4 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: L = 2024)  
 M = Month (ex: 9 = September)  
 Note: "—" Represents Internal Code

### Date Code Key

Year	2015	-	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Code	C	-	L	M	N	P	R	S	T	U	V	W

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	Value	Unit
Operating Supply Voltage (V <sub>P</sub> )	6	V
Diode Forward Current (A <sub>OUT</sub> /B <sub>OUT</sub> Side)	8	mA
Continuous Current through Signal Pins (IN to OUT) 1,000 Hours	125	mA
ESD Protection – Contact Discharge (Note 5)	±12	kV
	±4	kV

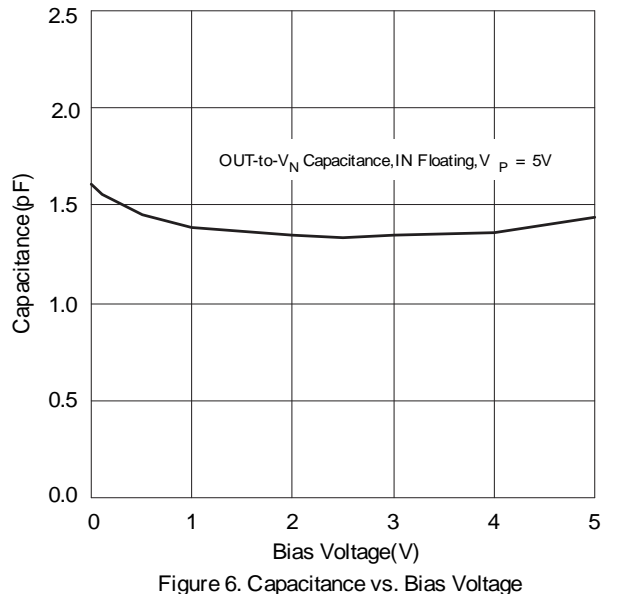
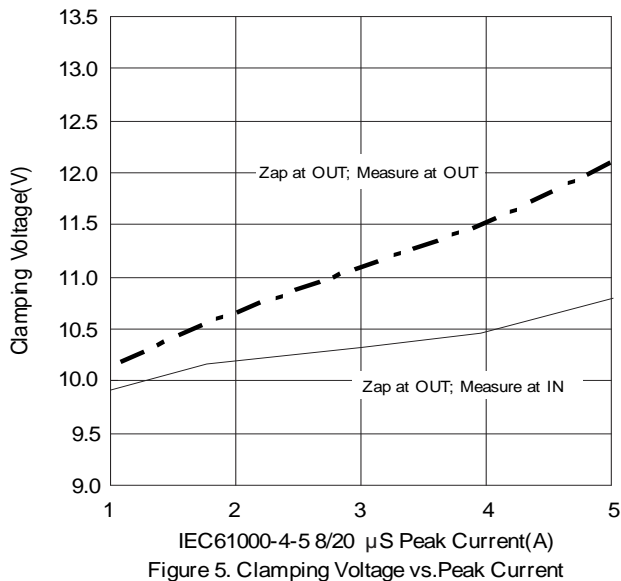
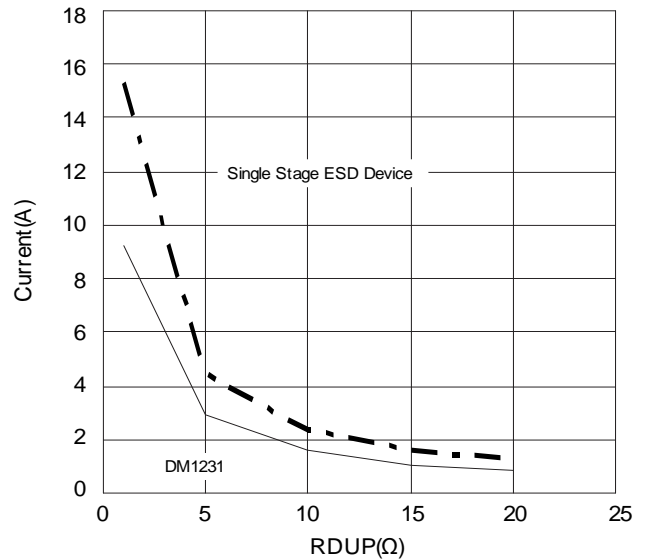
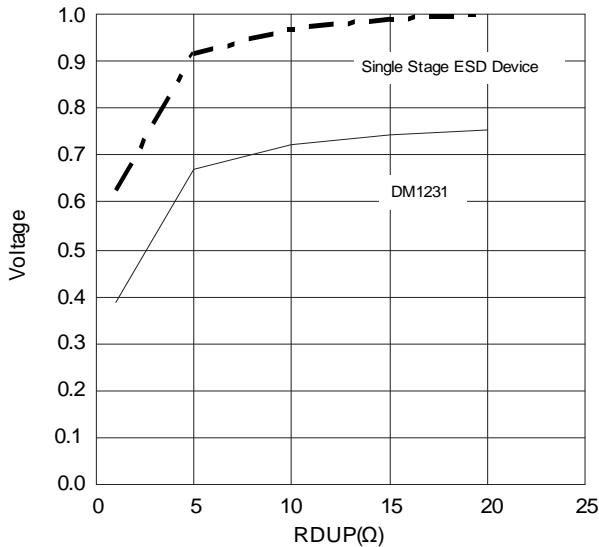
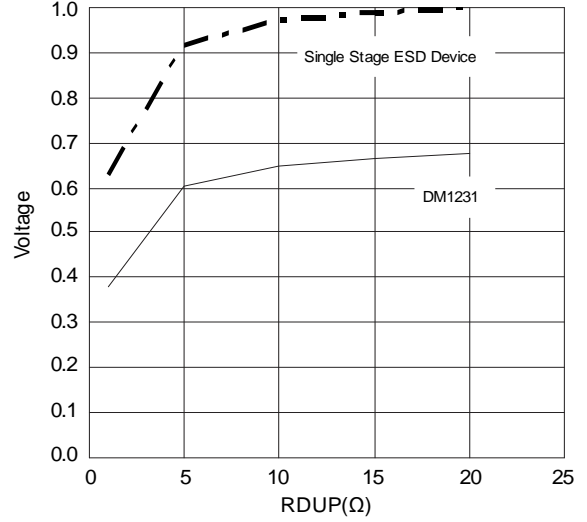
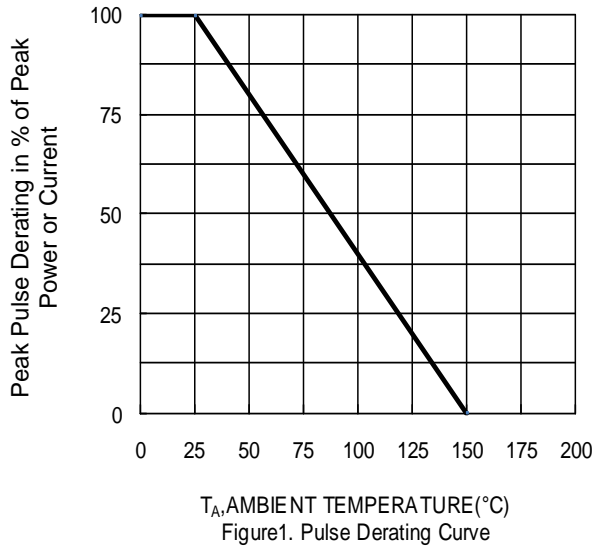
## Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation Typical (Note 6)	P <sub>D</sub>	300	mW
Thermal Resistance, Junction to Ambient Typical (Note 6)	R <sub>θJA</sub>	417	°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 Conditions
Operating Supply Voltage	V <sub>P</sub>	—	5	5.5	V	—
Reverse Current (Note 7)	I <sub>R</sub>	—	—	1	μA	V <sub>P</sub> = 5V, V <sub>P</sub> to V <sub>N</sub>
Diode Forward Voltage	V <sub>F</sub>	0.6	0.8	0.95	V	I <sub>F</sub> = 8mA, Top Diode
Diode Forward Voltage	V <sub>F</sub>	0.6	0.8	0.95	V	I <sub>F</sub> = 8mA, Bottom Diode
Residual ESD Peak Current on RDUP (Resistance of Device Under Protection)	I <sub>RES</sub>	—	2.3	—	A	IEC 61000-4-2 contact mode 8kV RDUP = 5Ω
Channel Clamping Voltage (Note 8)	V <sub>CL_Positive</sub>	—	+9	—	V	I <sub>PP</sub> = 1A, t <sub>p</sub> = 8/20μs
	V <sub>CL_Negative</sub>	—	-1.4	—	V	Zap at OUT, Measure at IN
Dynamic Resistance	R <sub>DYN_Positive</sub>	—	0.4	—	Ω	I <sub>PP</sub> = 1A, t <sub>p</sub> = 8/20μs
	R <sub>DYN_Negative</sub>	—	0.3	—	Ω	Zap at OUT, Measure at IN
Channel Input Capacitance (Note 9)	C <sub>OUT</sub>	—	1.5	—	pF	f = 1MHz, V <sub>P</sub> = 5V, V <sub>OSC</sub> = 2.5V V <sub>OSC</sub> = 30mV
Channel to Channel Capacitance Match	ΔC <sub>OUT</sub>	—	0.02	—	pF	f = 1MHz, V <sub>P</sub> = 5V, V <sub>OSC</sub> = 2.5V V <sub>OSC</sub> = 30mV
Series Resistance	R <sub>S</sub>	—	1	—	Ω	—
Channel to Channel Resistance Match	ΔR <sub>S</sub>	—	±10	±30	mΩ	—

- Notes:
- Standard test condition is IEC61000-4-2 level 4 test circuit with each (A<sub>OUT</sub>/B<sub>OUT</sub>) pin subjected to ±12kV contact discharge for 1000 pulses. **Discharges are timed at 1 second intervals and all 1000 strikes are completed in one continuous test run.**
  - Device mounted on FR-4 PCB pad layout (2oz copper) as shown on Diodes Incorporated's suggested pad layout, which can be found on our website at <http://www.diodes.com/package-outlines.html>.
  - Short duration pulse test used to minimize self-heating effect.
  - Clamping voltage value is based on an 8 x 20μs peak pulse current (I<sub>PP</sub>) waveform.
  - Capacitance measured from V<sub>OUT</sub> to V<sub>N</sub> with V<sub>IN</sub> floating.



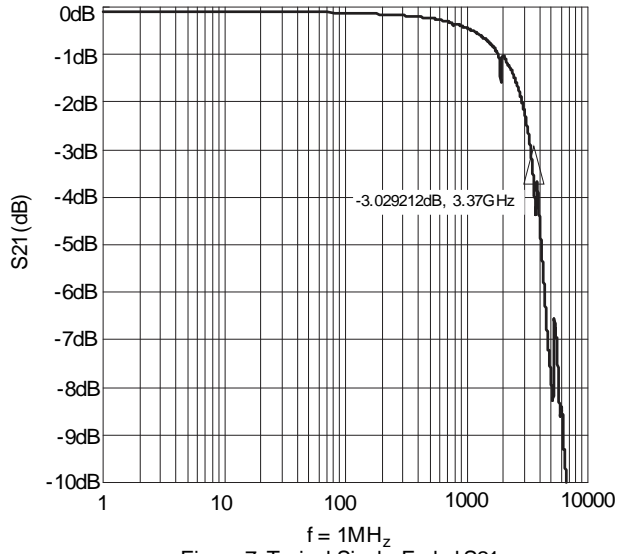
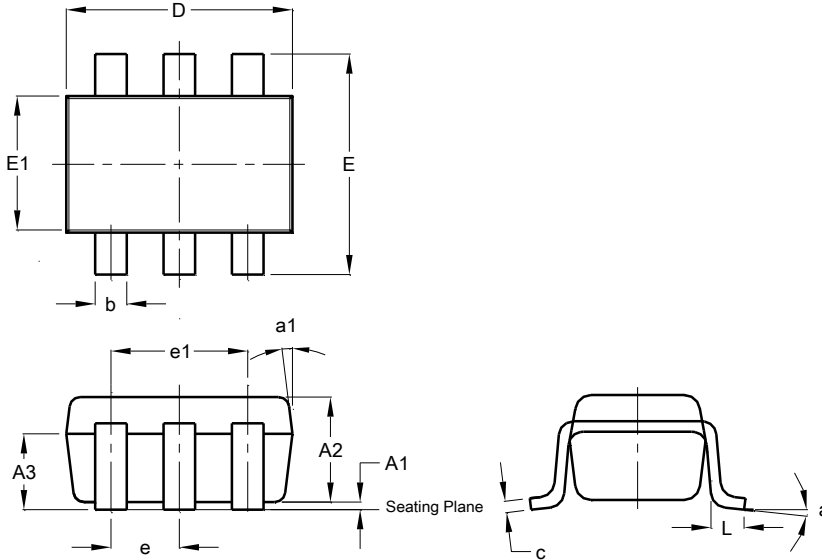


Figure 7, Typical Single-Ended S21 plot (1dB/div, 1MHz to 10GHz)

**Package Outline Dimensions**

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

**SOT26**

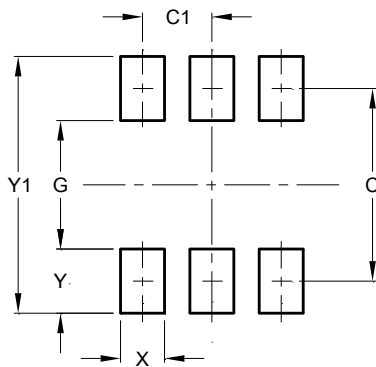


SOT26			
Dim	Min	Max	Typ
A1	0.013	0.10	0.05
A2	1.00	1.30	1.10
A3	0.70	0.80	0.75
b	0.35	0.50	0.38
c	0.10	0.20	0.15
D	2.90	3.10	3.00
e	-	-	0.95
e1	-	-	1.90
E	2.70	3.00	2.80
E1	1.50	1.70	1.60
L	0.35	0.55	0.40
a	-	-	8°
a1	-	-	7°
<b>All Dimensions in mm</b>			

**Suggested Pad Layout**

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

**SOT26**



Dimensions	Value (in mm)
C	2.40
C1	0.95
G	1.60
X	0.55
Y	0.80
Y1	3.20

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