

**1 CHANNEL LOW CAPACITANCE TVS DIODE ARRAY**
**Product Summary**

<b>V<sub>BR</sub> (MIN)</b>	<b>I<sub>PP</sub> (MAX)</b>	<b>C<sub>T</sub> (TYP)</b>
6V	5A	0.85pF

**Description**

This new generation TVS is designed to protect sensitive electronics from the damage due to ESD. The combination of small size and high ESD surge capability makes it ideal for use in automotive infotainment applications.

**Applications**

- USB Modules
- HDMI Inputs
- Infotainment Consoles

**Features**

- Provides ESD Protection per IEC 61000-4-2 Standard: Air ±15kV, Contact ±8kV
  - 1 Channel of ESD Protection (Note 5)
  - Low Channel Input Capacitance of 0.85pF Typical
  - Typically Used at High Speed Ports such as USB 2.0, IEEE1394, Serial ATA, DVI, HDMI, PCI
  - **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
  - **Halogen and Antimony Free. "Green" Device (Note 3)**
- The D1213A-01WQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**

<https://www.diodes.com/quality/product-definitions/>

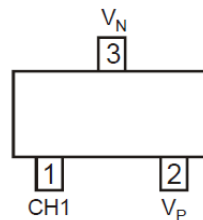
**Mechanical Data**

- Package: SOT323
- Package 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 Alloy 42 Lead Frame. Solderable per MIL-STD-202, Method 208@3
- Weight: 0.006 grams (Approximate)

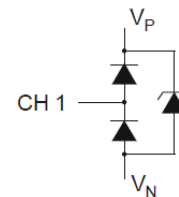
SOT323



Top View



Pin Configuration



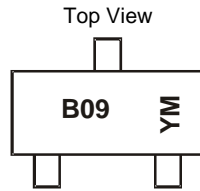
Device Schematic

**Ordering Information** (Note 4)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
D1213A-01WQ-7	Automotive	B09	7	8	3,000/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



B09 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: H = 2020)  
 M = Month (ex: 9 = September)

### Date Code Key

Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Code	H	I	J	K	L	M	N	O	P	R	S	T

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	Condition
Operating Supply Voltage	$V_P - V_N$	6.0	V	—
DC Voltage at any Channel Input	—	$(V_N - 0.5)$ to $(V_P + 0.5)$	V	—
Peak Pulse Current	$I_{PP}$	5	A	8/20 $\mu\text{s}$ , Per Figure 3
ESD Protection – Contact Discharge	$V_{ESD\_CONTACT}$	$\pm 8$	kV	Standard IEC61000-4-2
ESD Protection – Air Discharge	$V_{ESD\_AIR}$	$\pm 15$	kV	Standard IEC61000-4-2

## Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	$P_D$	200	mW
Thermal Resistance, Junction to Ambient $T_A = +25^\circ\text{C}$ (Note 5)	$R_{\theta JA}$	625	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-65 to +150	$^\circ\text{C}$

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Operating Supply Voltage	$V_P$	—	3.3	5.5	V	—
Operating Supply Current (Note 6)	$I_P$	—	—	8.0	$\mu\text{A}$	$(V_P - V_N) = 3.3\text{V}$
Channel Leakage Current (Note 7)	$I_R$	—	$\pm 0.1$	$\pm 1.0$	$\mu\text{A}$	$V_P = 5\text{V}, V_N = 0\text{V}$
Reverse Breakdown Voltage	$V_{BR}$	6.0	—	—	V	$I_R = 1\text{mA}$
Clamping Voltage, Positive Transients	$V_{CL1}$	—	10.0	—	V	$I_{PP} = 1\text{A}, t_p = 8/20\mu\text{s}$
Clamping Voltage, Negative Transients	$V_{CL2}$	—	-1.7	—	V	$I_{PP} = -1\text{A}, t_p = 8/20\mu\text{s}$
Forward Voltage for Top Diode	$V_{FD1}$	0.60	0.80	0.95	V	$I_F = 8\text{mA}, \text{CH1 to VP}$
Forward Voltage for Bottom Diode	$V_{FD2}$	0.60	0.80	0.95	V	$I_F = 8\text{mA}, \text{VN to CH1}$
Dynamic Resistance	$R_{DYN}$	—	0.9	—	$\Omega$	$I_{PP} = 1\text{A}, t_p = 8/20\mu\text{s}$
Channel Input Capacitance	$C_T$	—	0.85	1.2	pF	$V_{IN} = 1.65\text{V}, V_P = 3.3\text{V}, V_N = 0\text{V}, f = 1\text{MHz}$

- Notes:
- 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 [https://www.diodes.com/design/support/packaging/diodes-packaging/..](https://www.diodes.com/design/support/packaging/diodes-packaging/)
  - Short duration pulse test used to minimize self-heating effect. Measured from  $V_P$  to  $V_N$ .
  - Short duration pulse test used to minimize self-heating effect. Measured from CH1 to  $V_N$ .

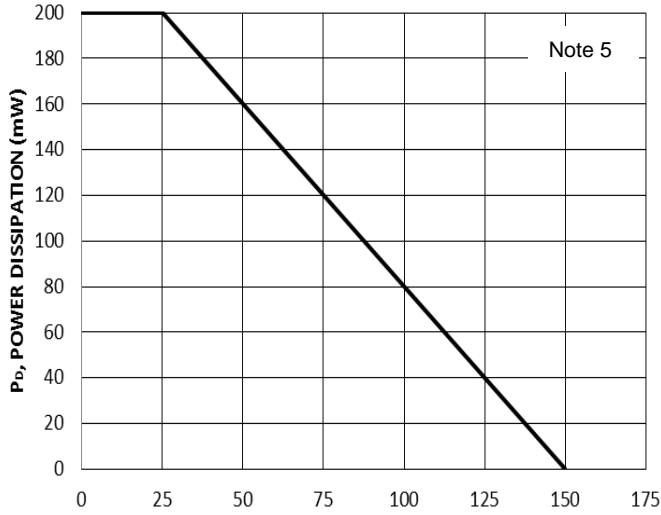


Figure 1 Power Derating Curve

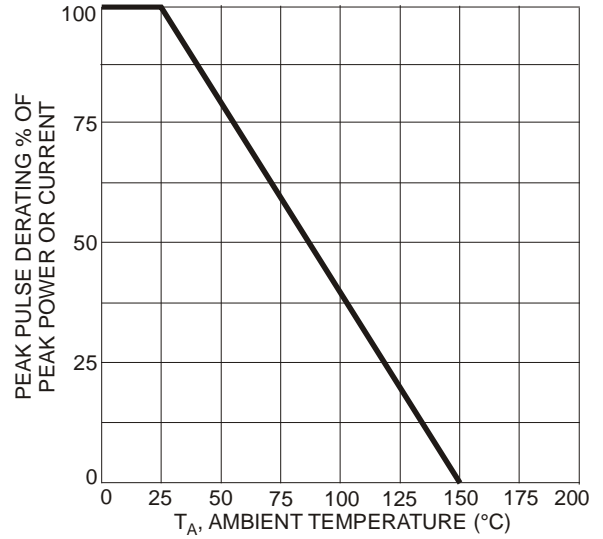


Figure 2 Pulse Derating Curve

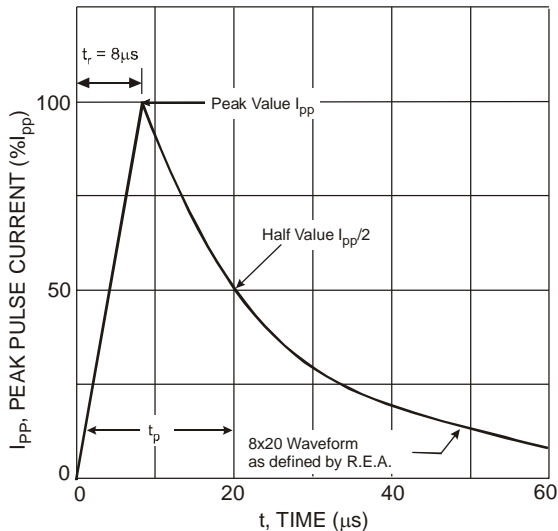


Figure 3 Pulse Waveform

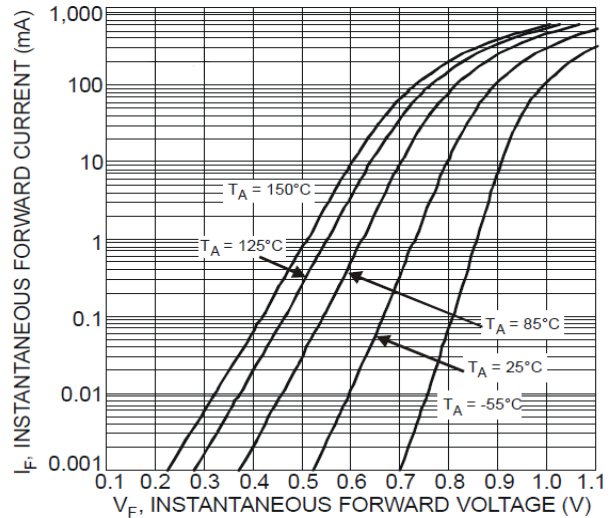


Figure 4 Typical Forward Characteristics

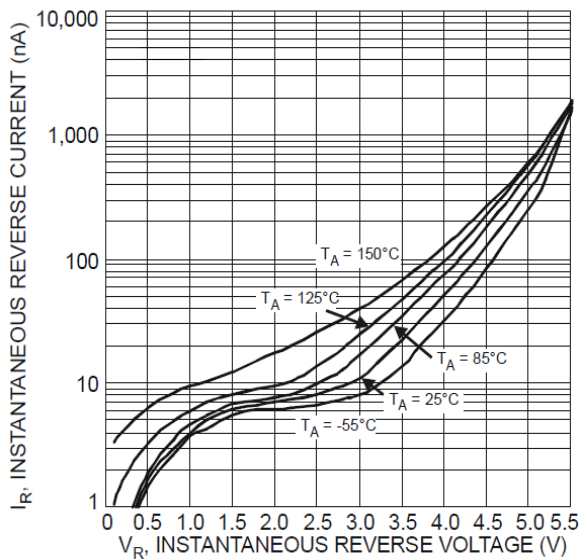


Figure 5 Typical Reverse Characteristics

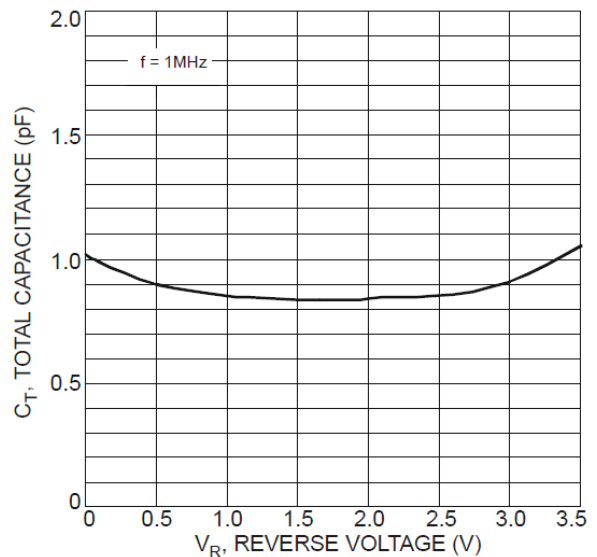


Figure 6 Typical Total Capacitance vs. Reverse Voltage

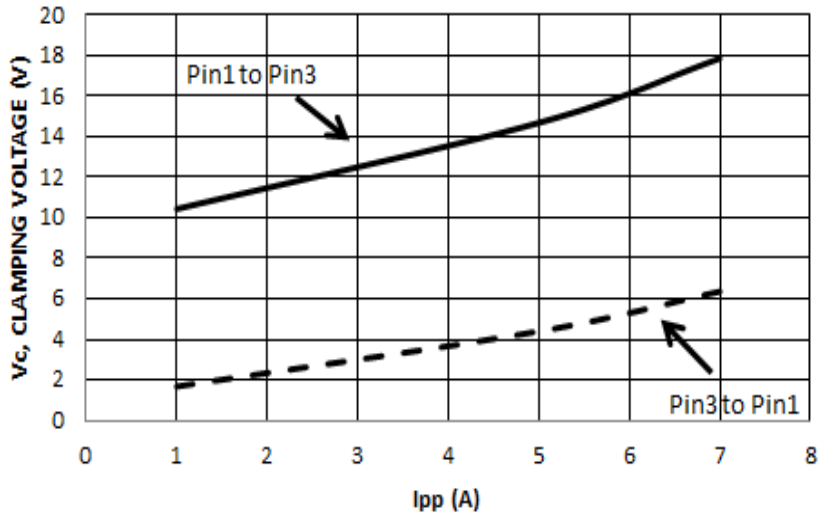


Figure 7 Clamping Voltage Characteristics ( $t_p=8/20\mu s$ )

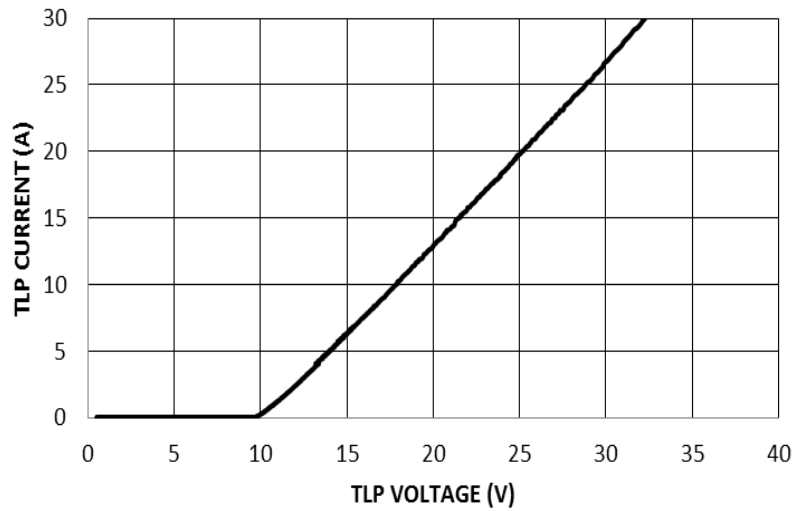
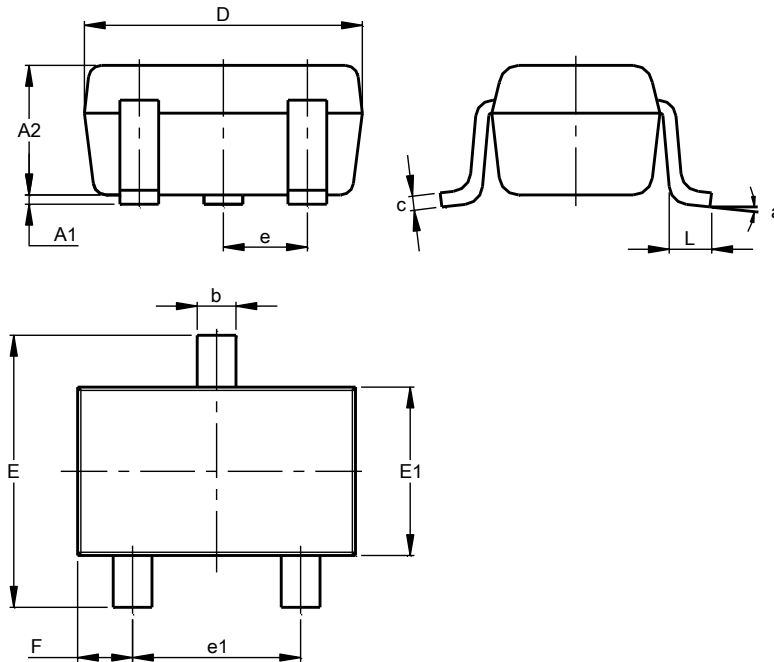


Figure 8 TLP Curve ( $t_p=100ns$ )

**Package Outline Dimensions**

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

**SOT323**

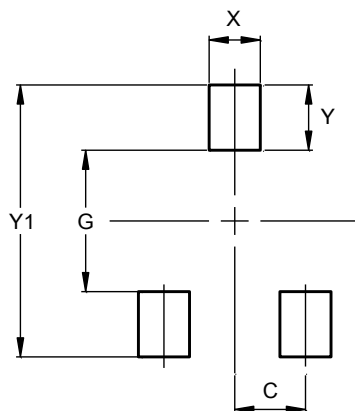


SOT323			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.25	0.40	0.30
c	0.10	0.18	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
e1	1.20	1.40	1.30
F	0.375	0.475	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

**Suggested Pad Layout**

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

**SOT323**



Dimensions	Value (in mm)
C	0.650
G	1.300
X	0.470
Y	0.600
Y1	2.500

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