


**2 CHANNEL LOW CAPACITANCE TVS DIODE ARRAY**

**Features**

- IEC 61000-4-2 (ESD): Air  $\pm 15\text{kV}$ , Contact  $\pm 8\text{kV}$
- 2 Channels of ESD protection
- 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)**
- **Qualified to AEC-Q101 Standards for High Reliability**

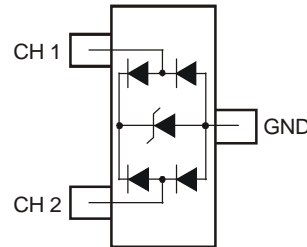
**Mechanical Data**

- Case: SOT323
- 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 Alloy 42 leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208 
- Weight: 0.006 grams (Approximate)

SOT323



Top View



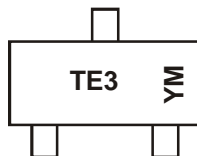
Device Schematic

**Ordering Information** (Note 4)

Part Number	Case	Packaging
D1213A-02WL-7	SOT323	3,000/Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. See <http://www.diodes.com> 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 <http://www.diodes.com>.

**Marking Information**



TE3 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: Z = 2012)  
 M = Month (ex: 9 = September)

Date Code Key

Year	2011	2012	2013	2014	2015	2016	2017
Code	Y	Z	A	B	C	D	E

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	Conditions
Peak Pulse Current (Note 7)	I <sub>PP</sub>	5	A	8/20μs, Per Figure 3
ESD Protection – Contact Discharge	V <sub>ESD_Contact</sub>	±8	kV	Standard IEC 61000-4-2
ESD Protection – Air Discharge	V <sub>ESD_Air</sub>	±15	kV	Standard IEC 61000-4-2

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Package Power Dissipation (Note 5)	P <sub>D</sub>	200	mW
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	625	°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.)

Characteristic (Note 7)	Symbol	Min	Typ	Max	Unit	Test Conditions
Reverse working voltage	V <sub>RWM</sub>	-	-	3.3	V	-
Reverse current (Note 6)	I <sub>R</sub>	-	0.1	1.0	μA	V <sub>R</sub> = V <sub>RWM</sub> = 3.3V
Reverse breakdown voltage	V <sub>BR</sub>	6.0	-	-	V	I <sub>R</sub> = 1mA
Forward voltage	V <sub>F</sub>	0.6	0.8	0.95	V	I <sub>F</sub> = 8mA
Reverse clamping voltage, Positive Transients	V <sub>CL1</sub>	-	10.0	-	V	I <sub>PP</sub> = 1A, t <sub>p</sub> = 8/20μs
Reverse clamping voltage, Negative Transients	V <sub>CL2</sub>	-	-1.7	-	V	I <sub>PP</sub> = -1A, t <sub>p</sub> = 8/20μs
Dynamic resistance	R <sub>DYN</sub>	-	0.9	-	Ω	I <sub>R</sub> = 1A, t <sub>p</sub> = 8/20μs
Capacitance	C <sub>T</sub>	-	0.85	1.2	pF	V <sub>R</sub> = 1.65V, f = 1MHz

- Notes:
- Device mounted on FR-4 PCB pad layout (2oz copper) as shown on Diodes, Inc. suggested pad layout AP02001, which can be found on our website at <http://www.diodes.com>.
  - Short duration pulse test used to minimize self-heating effect.
  - Measured between any channel and GND.
  - For information on the impact of Diodes' USB 2.0 compatible ESD protectors on signal integrity including eye diagram plots, please refer to AN77 at the following URL: [http://www.diodes.com/destdools/appnote\\_dnote.html](http://www.diodes.com/destdools/appnote_dnote.html).

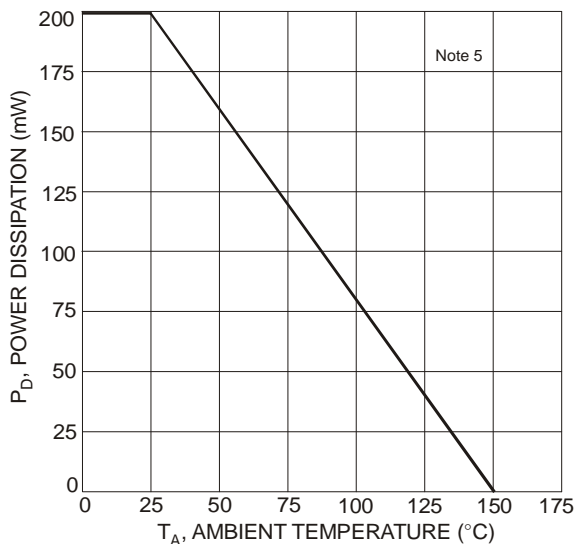


Figure 1 Power Derating Curve

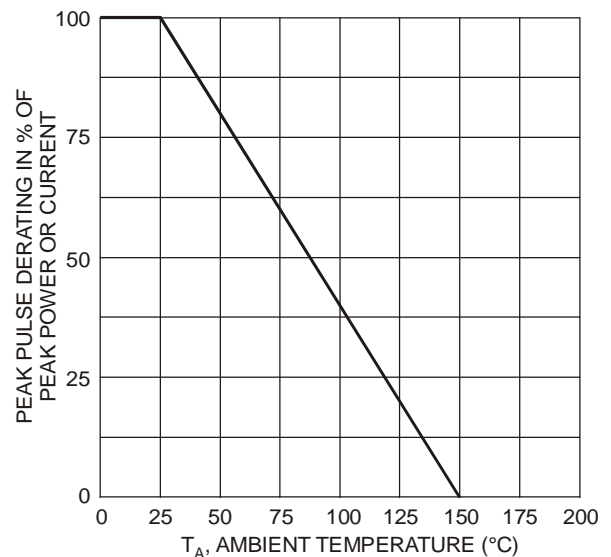


Figure 2 Pulse Derating Curve

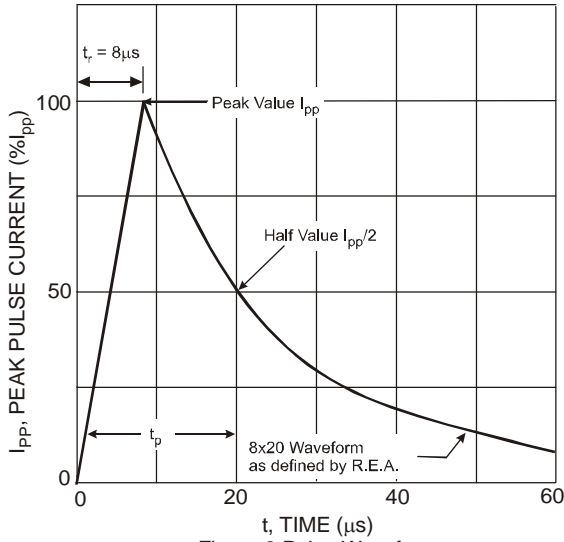


Figure 3 Pulse Waveform

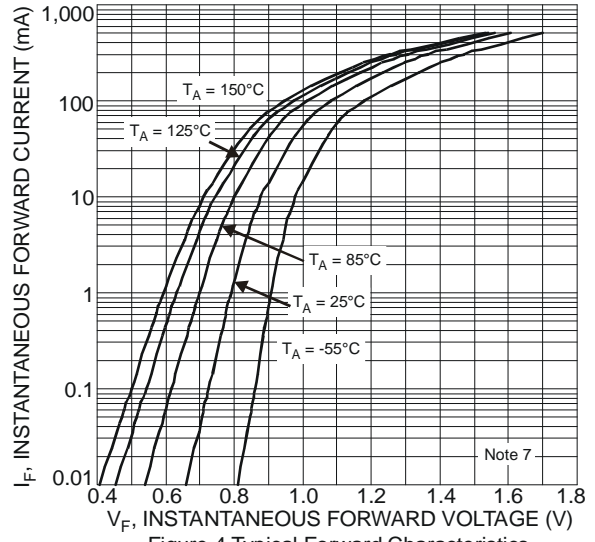


Figure 4 Typical Forward Characteristics

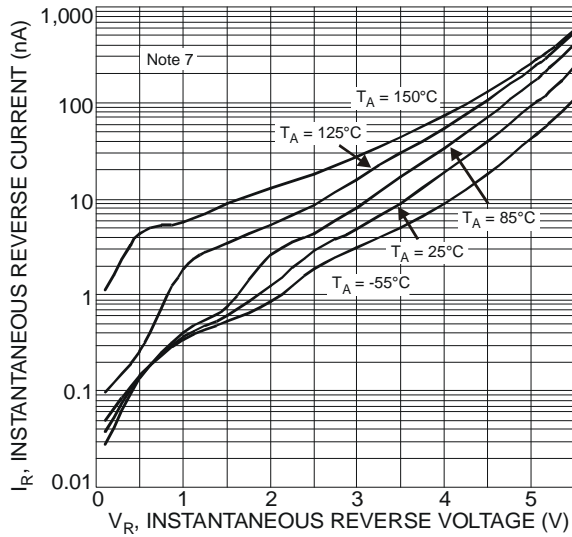


Figure 5 Typical Reverse Characteristics

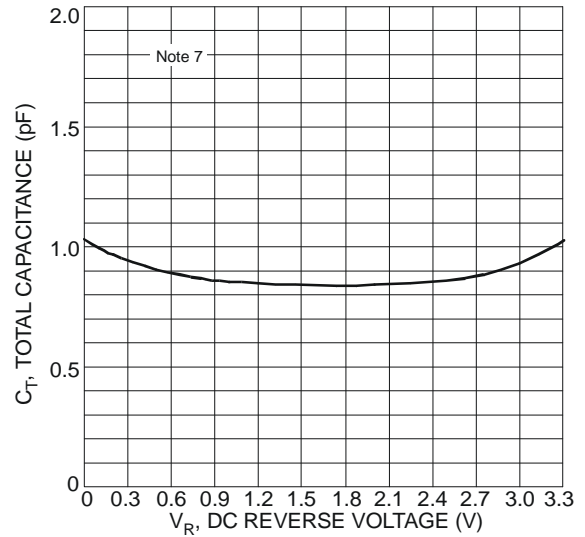
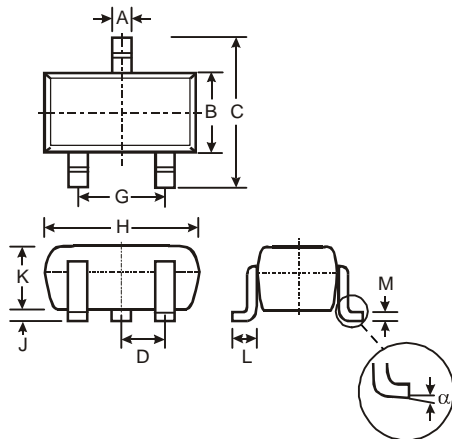


Figure 6 Total Capacitance vs. Reverse Voltage

## Package Outline Dimensions

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.

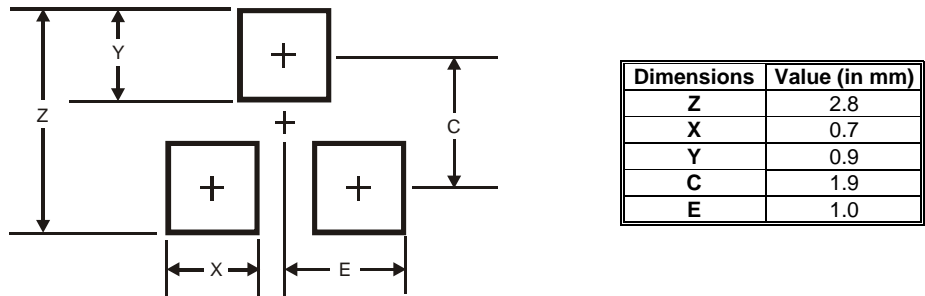


SOT323			
Dim	Min	Max	Typ
A	0.25	0.40	0.30
B	1.15	1.35	1.30
C	2.00	2.20	2.10
D	-	-	0.65
G	1.20	1.40	1.30
H	1.80	2.20	2.15
J	0.0	0.10	0.05
K	0.90	1.00	1.00
L	0.25	0.40	0.30
M	0.10	0.18	0.11
$\alpha$	0°	8°	-

All Dimensions in mm

## Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



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