

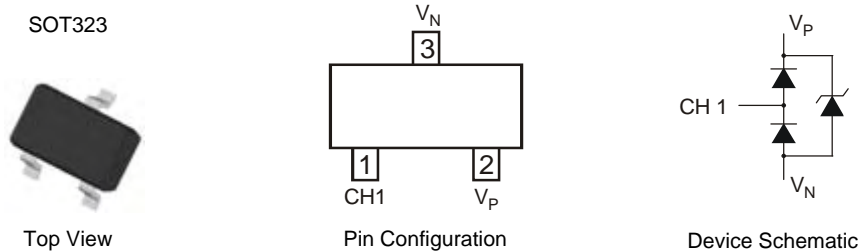
**1 CHANNEL LOW CAPACITANCE TVS DIODE ARRAY**
**Features**

- IEC 61000-4-2 (ESD): Air  $\pm 15$ kV, Contact  $\pm 8$ kV
- 1 Channel 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**

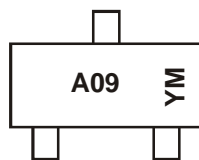
- Case: SOT323
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish annealed over Alloy 42 leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208 **e3**
- Weight: 0.006 grams (approximate)

NEW PRODUCT


**Ordering Information** (Note 4)

| Part Number  | Case   | Packaging        |
|--------------|--------|------------------|
| D1213A-01W-7 | SOT323 | 3000/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**


A09 = 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** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

| Characteristic                     | Symbol             | Value                          | Unit | Conditions                        |
|------------------------------------|--------------------|--------------------------------|------|-----------------------------------|
| 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 2 |
| ESD Protection – Contact Discharge | $V_{ESD\_Contact}$ | $\pm 8$                        | kV   | Standard IEC 61000-4-2            |
| ESD Protection – Air Discharge     | $V_{ESD\_Air}$     | $\pm 15$                       | kV   | Standard IEC 61000-4-2            |

**Thermal Characteristics**

| Characteristic                                   | Symbol          | Value       | Unit               |
|--|-----------------|-------------|--------------------|
| Power Dissipation (Note 5)                       | $P_D$           | 200         | mW                 |
| Thermal Resistance, Junction to Ambient (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 Conditions  |
|---------------------------------------|-----------|------|-----------|-----------|---------------|--|
| 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 6)      | $I_R$     | -    | $\pm 0.1$ | $\pm 1.0$ | $\mu\text{A}$ | $V_P = 5\text{V}, V_N = 0\text{V}$   |
| 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             | $I_F = 8\text{mA}, \text{CH1 to } V_P$                                       |
| Forward Voltage for Bottom Diode      | $V_{FD2}$ | 0.60 | 0.80      | 0.95      | V             | $I_F = 8\text{mA}, V_N \text{ to CH1}$                                       |
| 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, 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 from CH1 to  $V_N$ .
  - Measured from  $V_P$  to  $V_N$ .

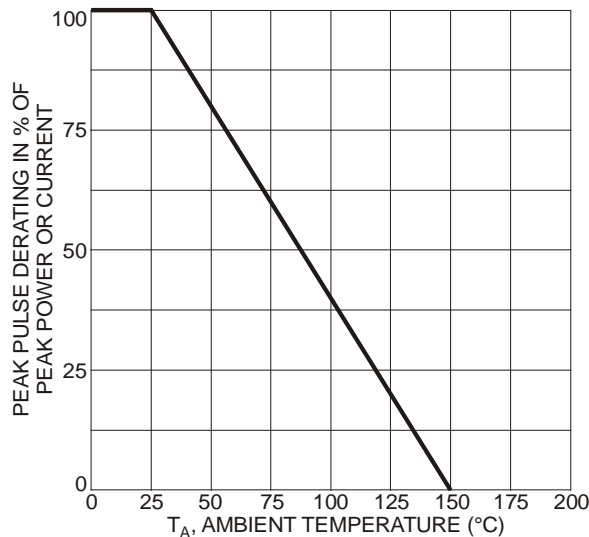
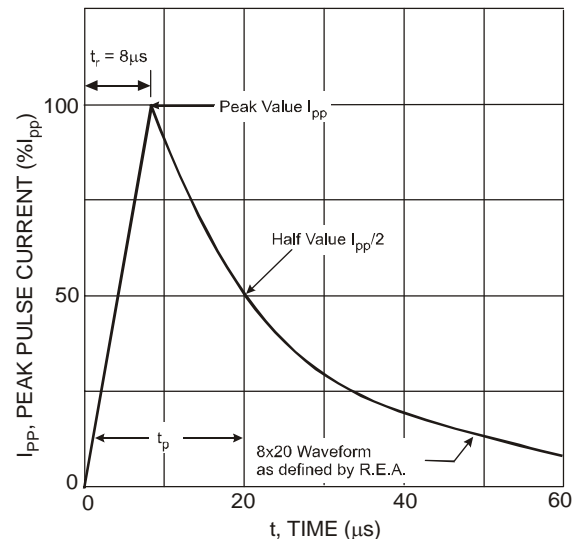
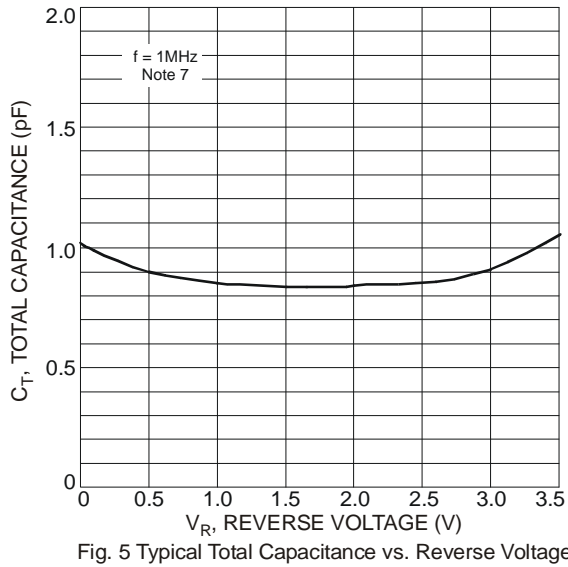
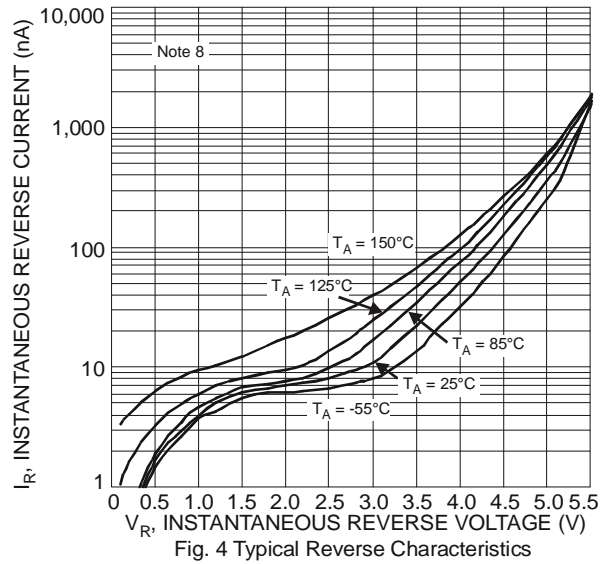
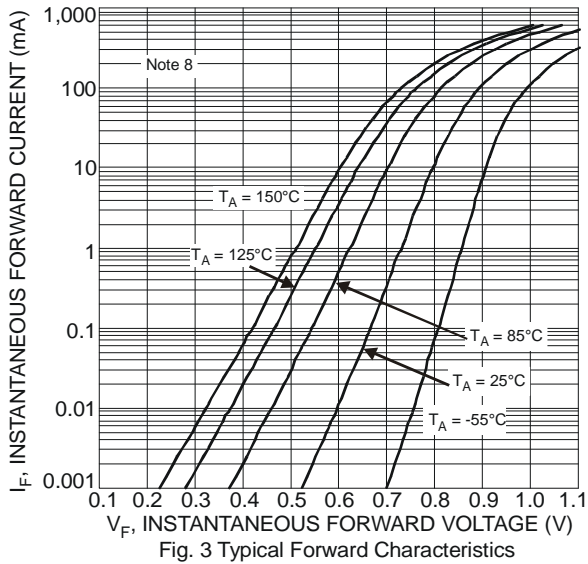
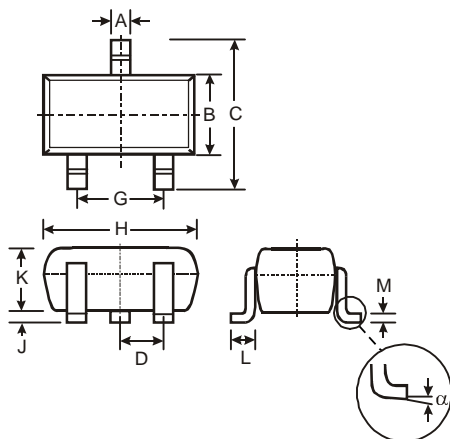


Fig. 1 Pulse Derating Curve


 Fig. 2 Typical 8 x 20 $\mu\text{s}$  Pulse Waveform

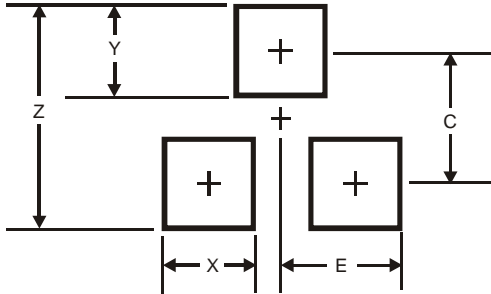


**Package Outline Dimensions**



| 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



| Dimensions | Value (in mm) |
|------------|---------------|
| Z          | 2.8           |
| X          | 0.7           |
| Y          | 0.9           |
| C          | 1.9           |
| E          | 1.0           |

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