



**THE DATASHEET OF
D1213A-02SOL-7**

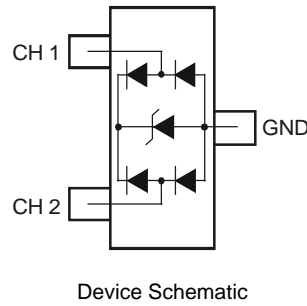


2 CHANNEL LOW CAPACITANCE TVS DIODE ARRAY
Features

- IEC 61000-4-2 (ESD): Air $\pm 15\text{kV}$, Contact $\pm 8\text{kV}$
- 2 Channels of ESD protection
- Low Channel Input Capacitance
- 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)**

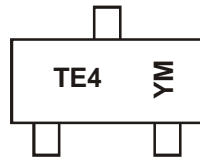
Mechanical Data

- Case: SOT23
- 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: 0.009 grams (Approximate)


Ordering Information (Note 4)

| Part Number | Case | Packaging |
|----------------|-------|-------------------|
| D1213A-02SOL-7 | SOT23 | 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


TE4 = 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 |
|------------------------------------|--------------------|----------|------|---------------------------------|
| Peak Pulse Current (Note 7) | I_{PP} | 5 | A | 8/20 μs , Per Fig. 2 |
| ESD Protection – Contact Discharge | $V_{ESD_Contact}$ | ± 8 | kV | Standard IEC 61000-4-2 |
| ESD Protection – Air Discharge | V_{ESD_Air} | ± 15 | kV | Standard IEC 61000-4-2 |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|--|-----------------|-------------|---------------------------|
| Package Power Dissipation (Note 5) | P_D | 300 | mW |
| Thermal Resistance, Junction to Ambient (Note 5) | $R_{\theta JA}$ | 417 | $^\circ\text{C}/\text{W}$ |
| Operating Temperature Range | T_J | -55 to +125 | $^\circ\text{C}$ |
| Storage Temperature Range | T_{STG} | -65 to +150 | $^\circ\text{C}$ |

Electrical Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic (Note 7) | Symbol | Min | Typ | Max | Unit | Test Conditions |
|---|-----------|-----|------|------|---------------|---|
| Reverse working voltage | V_{RWM} | - | - | 3.3 | V | - |
| Reverse current (Note 6) | I_R | - | 0.1 | 1.0 | μA | $V_R = V_{RWM} = 3.3\text{V}$ |
| Reverse breakdown voltage | V_{BR} | 6.0 | 7.5 | 9.0 | V | $I_R = 1\text{mA}$ |
| Forward voltage | V_F | 0.6 | 0.8 | 0.95 | V | $I_F = 8\text{mA}$ |
| Reverse clamping voltage, Positive Transients | V_{CL1} | - | 10.0 | - | V | $I_{PP} = 1\text{A}$, $t_p = 8/20\mu\text{s}$ |
| Reverse clamping voltage, Negative Transients | V_{CL2} | - | -1.7 | - | V | $I_{PP} = -1\text{A}$, $t_p = 8/20\mu\text{s}$ |
| Dynamic resistance | R_{DYN} | - | 0.9 | - | Ω | $I_R = 1\text{A}$, $t_p = 8/20\mu\text{s}$ |
| Capacitance | C_T | - | 0.85 | 1.2 | pF | $V_R = 1.65\text{V}$, $f = 1\text{MHz}$ |

- 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 between any channel and GND

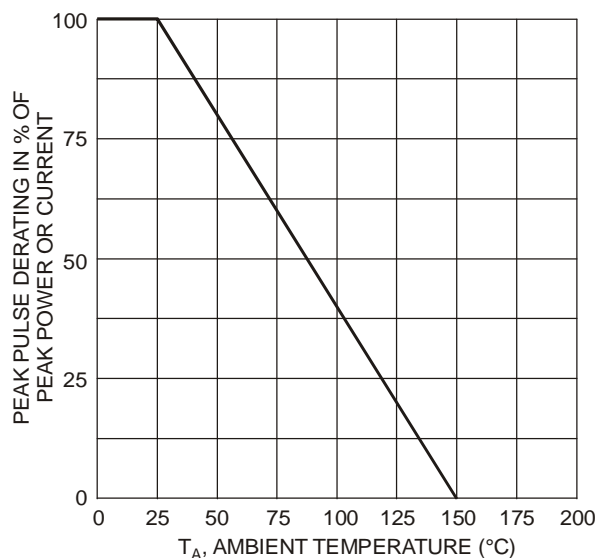


Fig. 1 Pulse Derating Curve

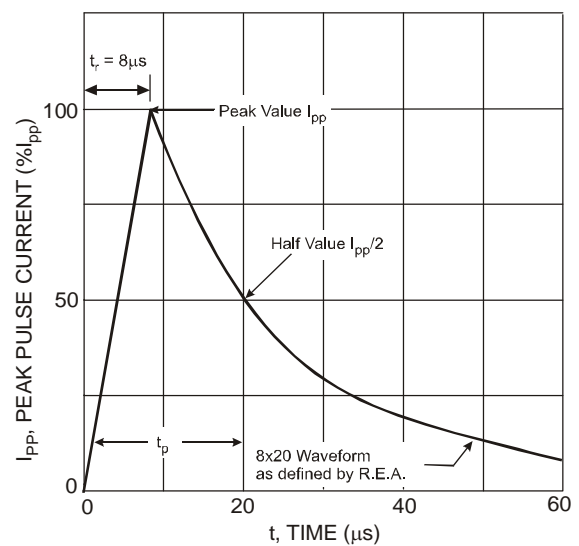
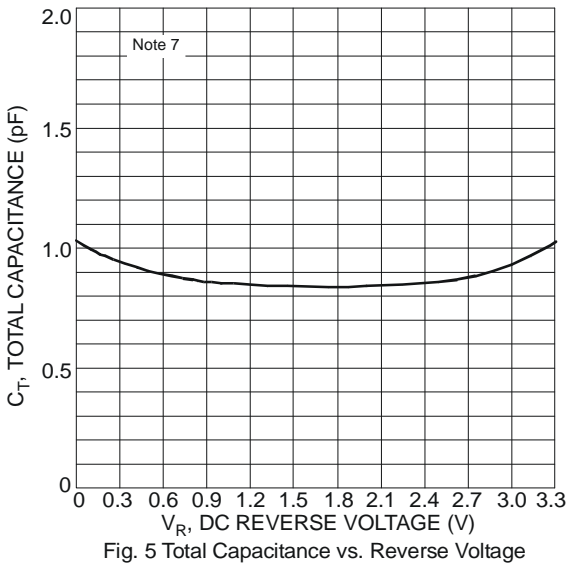
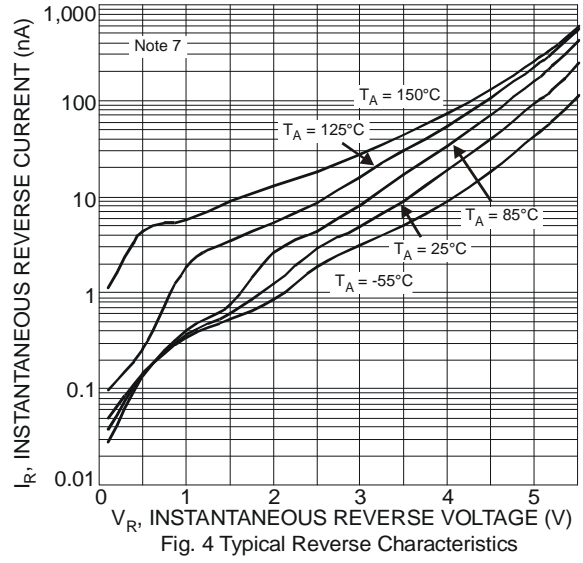
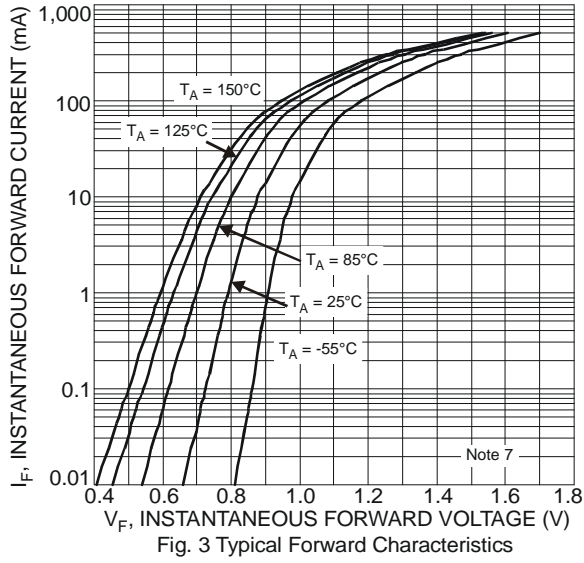
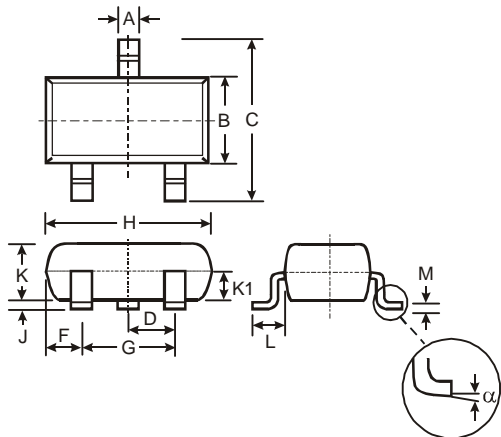


Fig. 2 Pulse Waveform



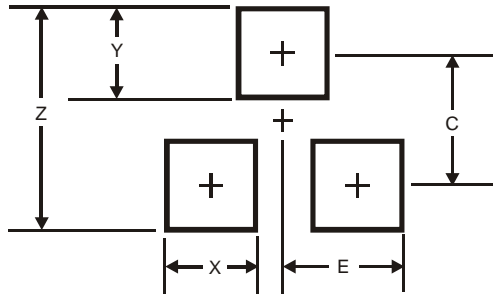
Package Outline Dimensions



| SOT23 | | | |
|-------|-------|------|-------|
| Dim | Min | Max | Typ |
| A | 0.37 | 0.51 | 0.40 |
| B | 1.20 | 1.40 | 1.30 |
| C | 2.30 | 2.50 | 2.40 |
| D | 0.89 | 1.03 | 0.915 |
| F | 0.45 | 0.60 | 0.535 |
| G | 1.78 | 2.05 | 1.83 |
| H | 2.80 | 3.00 | 2.90 |
| J | 0.013 | 0.10 | 0.05 |
| K | 0.903 | 1.10 | 1.00 |
| K1 | - | - | 0.400 |
| L | 0.45 | 0.61 | 0.55 |
| M | 0.085 | 0.18 | 0.11 |
| α | 0° | 8° | - |

All Dimensions in mm

Suggested Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| Z | 2.9 |
| X | 0.8 |
| Y | 0.9 |
| C | 2.0 |
| E | 1.35 |

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