

**4 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>I/O</sub> (typ)</b> |
| 6V                          | 10A                         | 1.2pF                        |

**Description**

This new generation TVS is designed to protect sensitive electronics from the damage due to ESD. The combination of low capacitance and high ESD surge capability makes it ideal for use in high-speed ports such as USB 2.0, IEEE1394, HDMI, Laptop and Personal Computers, Flat Panel Displays, Video Graphics Displays, SIM Ports.

**Applications**

- USB 2.0
- IEEE1394
- SIM Ports
- Portable Electronics
- Computers and Peripheral

**Features**

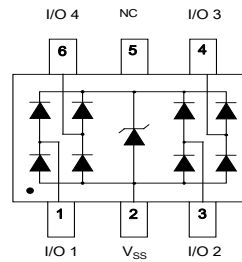
- Low Clamping Voltage  
Typical 9V at 10A 100ns, TLP  
Typical 9V at 10A 8μs/20μs
- IEC 61000-4-2 (ESD): Air – ±30kV, Contact – ±30kV
- IEC 61000-4-4 (EFT): 60A(5/50ns, I/O to V<sub>SS</sub>)
- 4 Channels of ESD protection
- TLP Dynamic Resistance: 0.25Ω
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

**Mechanical Data**

- Case: TSOT26
- 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 Copper Leadframe  
(Lead Free Plating).  
Solderable per MIL-STD-202, Method 208 <sup>Ⓔ</sup>
- Weight: 0.013 grams (Approximate)



Top View

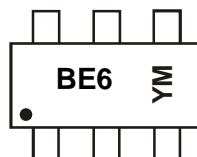


Device Schematic

**Ordering Information (Note 4)**

| Product       | Compliance | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Reel |
|---------------|------------|---------|--------------------|-----------------|-------------------|
| DT2042-04TS-7 | Standard   | BE6     | 7                  | 8               | 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/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) 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/products/packages.html>.

**Marking Information**


BE6= Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: A = 2013)  
 M = Month (ex: 9 = September)

## Date Code Key

| Year | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|------|------|------|------|------|------|------|
| Code | A    | B    | C    | D    | E    | F    |

| 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, per IEC 61000-4-5                | I <sub>PP</sub>          | ±10   | A    | I/O to V <sub>SS</sub> , 8/20μs |
| Peak Pulse Power, per IEC 61000-4-5                  | P <sub>PP</sub>          | 105   | W    | I/O to V <sub>SS</sub> , 8/20μs |
| Operating Voltage (DC)                               | V <sub>DC</sub>          | 5.5   | V    | I/O to V <sub>SS</sub>          |
| ESD Protection – Contact Discharge, per IEC61000-4-2 | V <sub>ESD_Contact</sub> | ±30   | kV   | I/O to V <sub>SS</sub>          |
| ESD Protection – Air Discharge, per IEC 61000-4-2    | V <sub>ESD_Air</sub>     | ±30   | kV   | I/O to V <sub>SS</sub>          |

**Thermal Characteristics**

| Characteristic   | Symbol           | Value       | Unit |
|--|------------------|-------------|------|
| Power Dissipation Typical (Note 5)                       | P <sub>D</sub>   | 300         | mW   |
| Thermal Resistance, Junction to Ambient Typical (Note 5) | R <sub>θJA</sub> | 417         | °C/W |
| Operating Junction Temperature Range                     | T <sub>J</sub>   | -65 to +150 | °C   |
| Storage Temperature Range                                | T <sub>STG</sub> | -65 to +150 | °C   |

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                         | Symbol             | Min  | Typ  | Max  | Unit | Test Conditions  |
|--|--------------------|------|------|------|------|--|
| Reverse Working Voltage                | V <sub>RWM</sub>   | —    | —    | 5.5  | V    | I/O to V <sub>SS</sub>   |
| Reverse Current(Note6)                 | I <sub>R</sub>     | —    | —    | 1    | μA   | V <sub>R</sub> = 5V, any I/O to V <sub>SS</sub>  |
| Reverse Breakdown Voltage              | V <sub>BR</sub>    | 6    | —    | 9    | V    | I <sub>R</sub> = 1mA, I/O to V <sub>SS</sub>   |
| Forward Clamping Voltage               | V <sub>F</sub>     | -1.0 | -0.8 | —    | V    | I <sub>F</sub> = -15mA, I/O to V <sub>SS</sub>   |
| Holding Voltage                        | V <sub>H</sub>     | 5.5  | —    | —    | V    | —  |
| Trigger Voltage                        | V <sub>TRIG</sub>  | —    | 9    | 9.5  | V    | —  |
| Reverse Clamping Voltage (Note 7)      | V <sub>C_5A</sub>  | —    | 7.5  | —    | V    | I <sub>PP</sub> = 5A, I/O to V <sub>SS</sub> , 8/20μs  |
| Reverse Clamping Voltage (Note 7)      | V <sub>C_10A</sub> | —    | 9    | 10.5 | V    | I <sub>PP</sub> = 10A, I/O to V <sub>SS</sub> , 8/20μs   |
| ESD Clamping Voltage                   | V <sub>ESD</sub>   | —    | 9    | —    | V    | TLP, 10A, tp = 100 ns, I/O to V <sub>SS</sub> , per Figure 7   |
| Dynamic Resistance                     | R <sub>DIF</sub>   | —    | 0.25 | —    | Ω    | TLP, 10A, tp = 100 ns, I/O to V <sub>SS</sub>  |
| Channel Input Capacitance              | C <sub>I/O</sub>   | —    | 1.2  | 1.5  | pF   | V <sub>R</sub> = 2.5V, f = 1MHz  |
| Variation of Channel Input Capacitance | ΔC <sub>I/O</sub>  | —    | 0.02 | —    | pF   | V <sub>SS</sub> = 0V, I/O = 2.5V, f = 1MHz, T = +25°C, I/O <sub>x</sub> to V <sub>SS</sub> – I/O <sub>y</sub> to V <sub>SS</sub> |

- 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.
  - Clamping voltage value is based on an 8x20μs peak pulse current (I<sub>pp</sub>) waveform.

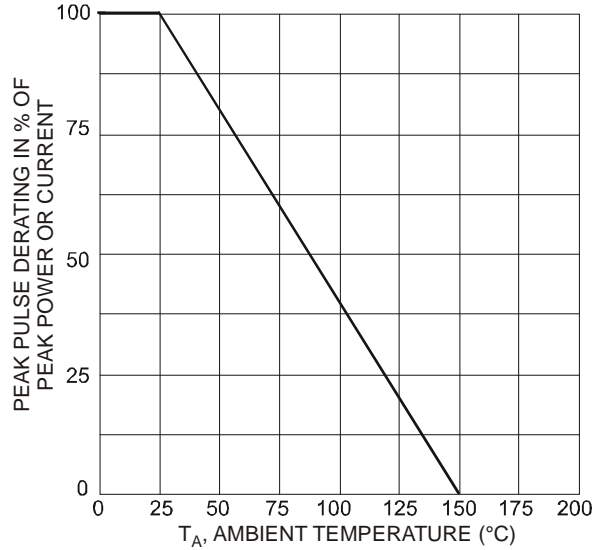


Figure 1 Pulse Derating Curve

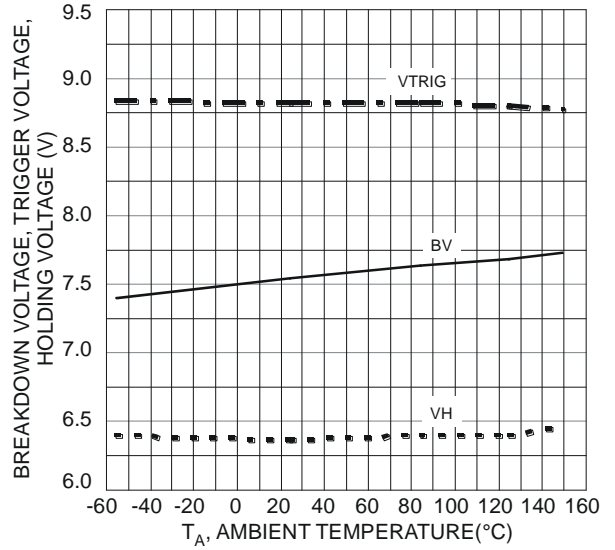


Figure 2 BV, Trigger Voltage, Holding Voltage vs. Ambient Temperature

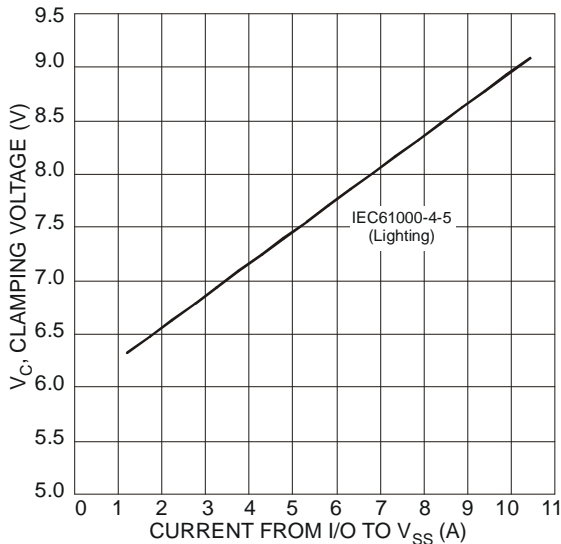


Figure 3 Clamping Voltage Characteristic

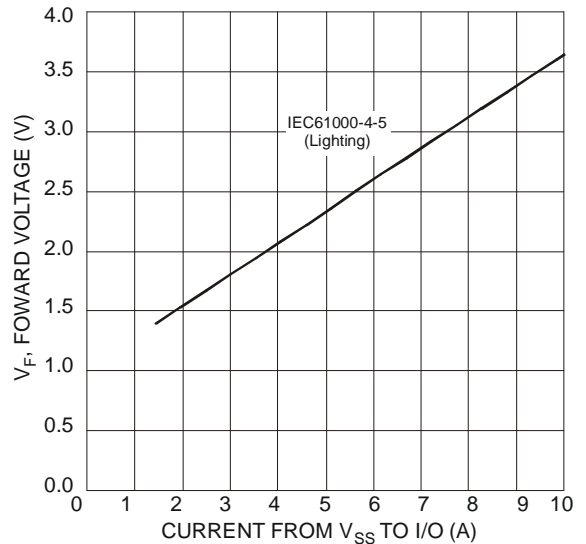


Figure 4 Forward Voltage Characteristic

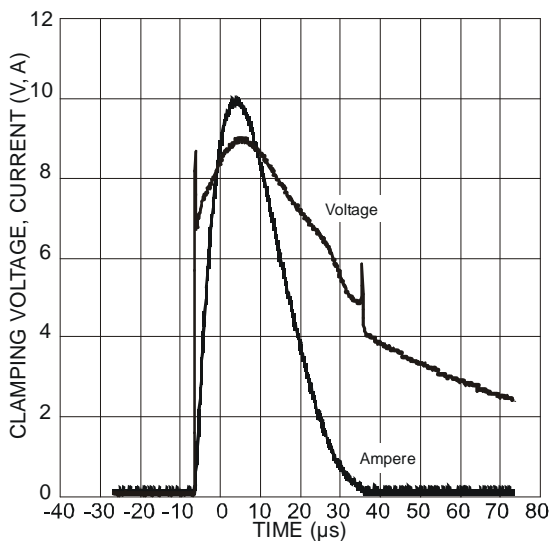


Figure 5 Waveform of Clamping Voltage, Current vs. Time (8/20µs, I/O to VSS)

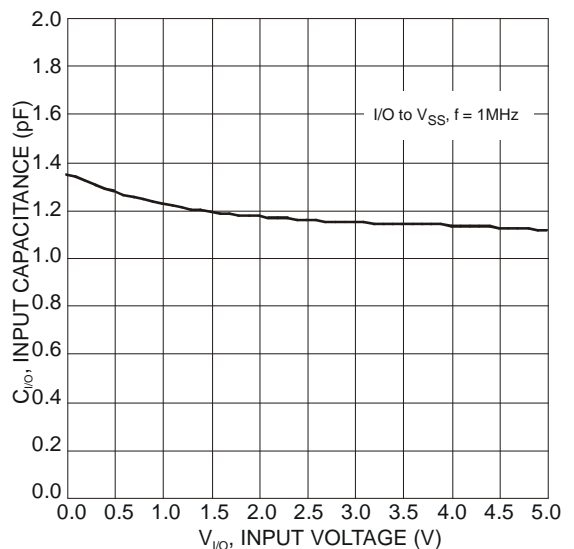


Figure 6 Input Capacitance vs. Input Voltage

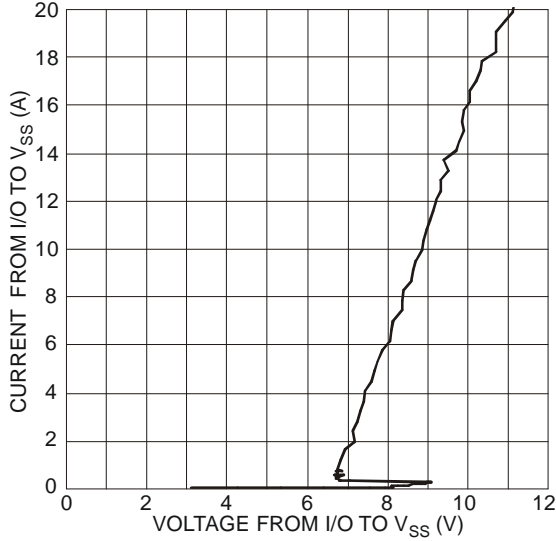
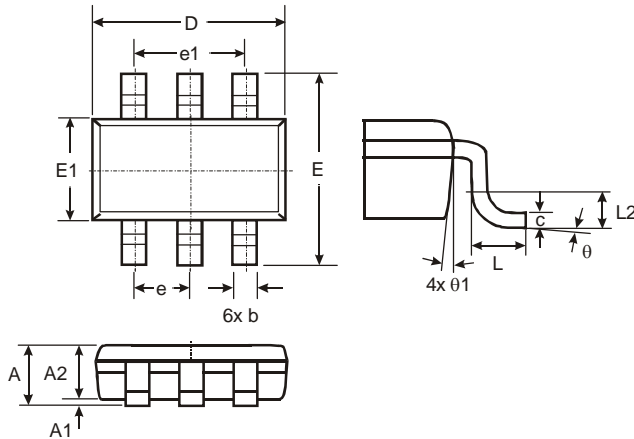


Figure 7 Current vs. Voltage

**Package Outline Dimensions**

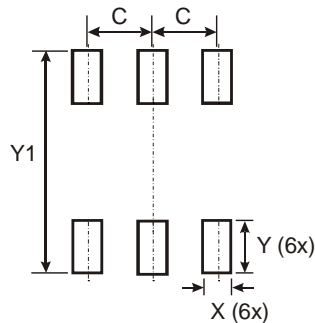
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| TSOT26               |      |      |      |
|----------------------|------|------|------|
| Dim                  | Min  | Max  | Typ  |
| A                    | -    | 1.00 | -    |
| A1                   | 0.01 | 0.10 | -    |
| A2                   | 0.84 | 0.90 | -    |
| D                    | -    | -    | 2.90 |
| E                    | -    | -    | 2.80 |
| E1                   | -    | -    | 1.60 |
| b                    | 0.30 | 0.45 | -    |
| c                    | 0.12 | 0.20 | -    |
| e                    | -    | -    | 0.95 |
| e1                   | -    | -    | 1.90 |
| L                    | 0.30 | 0.50 | -    |
| L2                   | -    | -    | 0.25 |
| θ                    | 0°   | 8°   | 4°   |
| θ1                   | 4°   | 12°  | -    |
| All Dimensions in mm |      |      |      |

**Suggested Pad Layout**

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



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 0.950         |
| X          | 0.700         |
| Y          | 1.000         |
| Y1         | 3.199         |

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