

Features

- ❑ Transient protection for high-speed data lines
 - IEC 61000-4-2 (ESD) $\pm 30\text{kV}$ (Air)
 - $\pm 30\text{kV}$ (Contact)
 - IEC 61000-4-4 (EFT) 40A (5/50 ns)
 - Cable Discharge Event (CDE)
- ❑ Package optimized for high-speed lines
- ❑ Ultra-small package (1.0mm × 0.6mm × 0.4mm)
- ❑ Protects one data, control or power line
- ❑ Low capacitance: 10pF (Typical)
- ❑ Low leakage current: 0.1 μA @ V_{RWM} (Typical)
- ❑ Low clamping voltage
- ❑ Each I/O pin can withstand over 1000 ESD strikes for $\pm 8\text{kV}$ contact discharge

Description

TT0521MCX is a low-capacitance Transient Voltage Suppressor (TVS) designed to provide electrostatic discharge (ESD) protection for high-speed data interfaces. With typical capacitance of 10pF only, TT0521MCX is designed to protect parasitic-sensitive systems against over-voltage and over-current transient events. It complies with IEC 61000-4-2 (ESD), Level 4 ($\pm 15\text{kV}$ air, $\pm 8\text{kV}$ contact discharge), IEC 61000-4-4 (electrical fast transient - EFT) (40A, 5/50 ns), very fast charged device model (CDM) ESD and cable discharge event (CDE), etc.

TT0521MCX uses ultra-small SOD923 package. Each TT0521MCX device can protect one data line. It offers system designers flexibility to protect single data line where space is a premium concern.

Applications

- ❑ Portable Electronics
- ❑ Desktops, Servers and Notebooks
- ❑ Cellular Phones
- ❑ MP3 Ports
- ❑ Digital Camera Ports

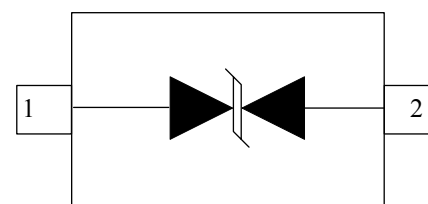
Mechanical Characteristics

- ❑ SOD-923 package
- ❑ Flammability Rating: UL 94V-0
- ❑ Marking: Part number
- ❑ Packaging: Tape and Reel

Circuit Diagram



Pin Configuration



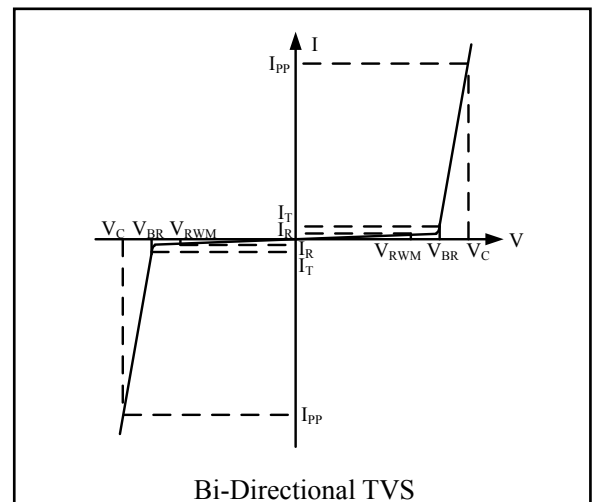
SOD-923
(Top View)

Absolute Maximum Rating

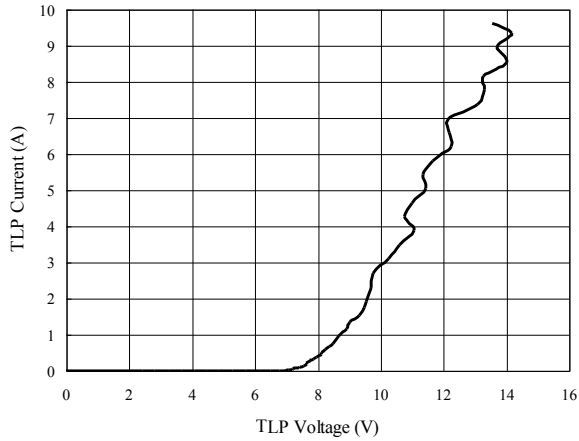
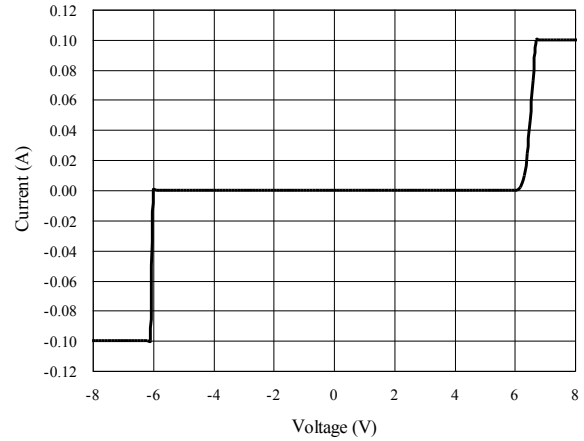
| Symbol | Parameter | Value | Units |
|-----------|---------------------------------|----------|-------|
| V_{ESD} | ESD per IEC 61000-4-2 (Air) | ±30 | kV |
| | ESD per IEC 61000-4-2 (Contact) | ±30 | |
| T_{OPT} | Operating Temperature | -55/+125 | °C |
| T_{STG} | Storage Temperature | -55/+150 | °C |

Electrical Characteristics (T = 25°C)

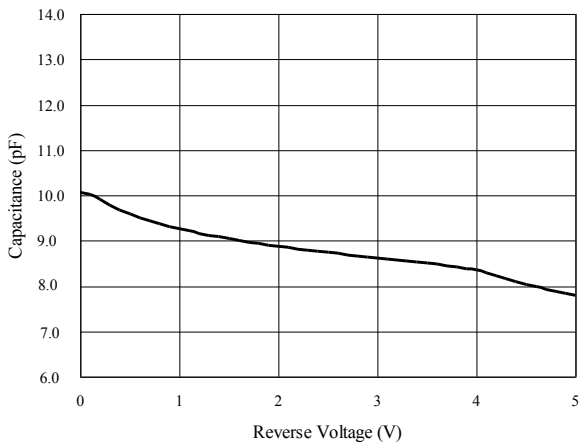
| Symbol | Parameter |
|-----------|-------------------------------------|
| V_{RWM} | Nominal Reverse Working Voltage |
| I_R | Reverse Leakage Current @ V_{RWM} |
| V_{BR} | Reverse Breakdown Voltage @ I_T |
| I_T | Test Current for Reverse Breakdown |
| V_C | Clamping Voltage @ I_{PP} |
| I_{PP} | Maximum Peak Pulse Current |
| C_{ESD} | Parasitic Capacitance |
| V_R | Reverse Voltage |
| f | Small Signal Frequency |



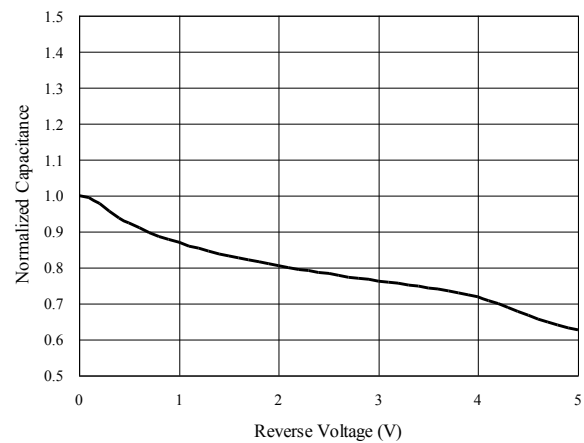
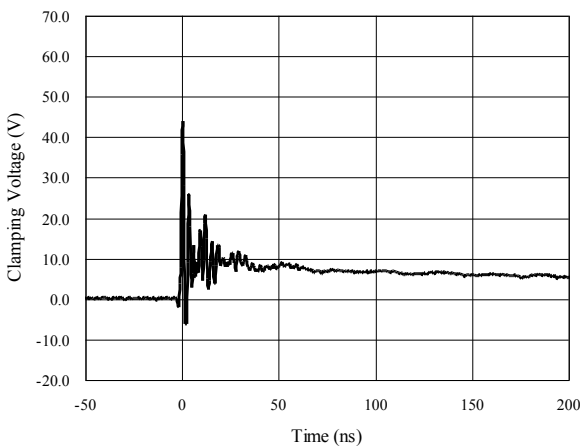
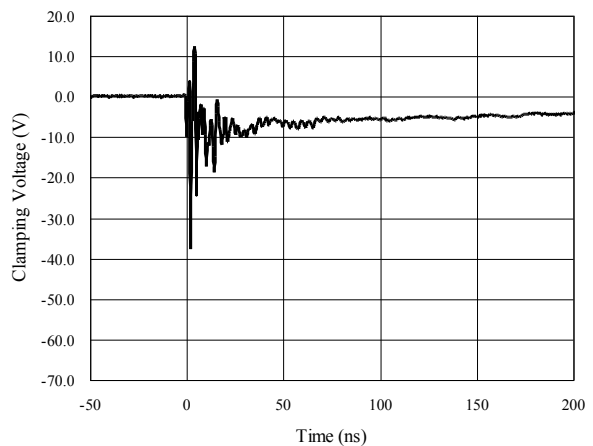
| Symbol | Test Condition | Minimum | Typical | Maximum | Units |
|-----------|---|---------|---------|---------|-------|
| V_{RWM} | | | | 5.0 | V |
| I_R | $V_{RWM} = 5V, T = 25^\circ C$ Between I/O_1 and I/O_2 | | 0.1 | 1.0 | μA |
| V_{BR} | $I_T = 1mA$ Between I/O_1 and I/O_2 | 5.5 | | 7.5 | V |
| V_C | $I_{PP} = 5A, t_p = 8/20\mu s$ Between I/O_1 and I/O_2 | | | 10 | V |
| V_C | $I_{PP} = 7A, t_p = 8/20\mu s$ Between I/O_1 and I/O_2 | | | 15 | V |
| C_{ESD} | $V_R = 0V, f = 1MHz$ Between I/O_1 and I/O_2 | | 10 | | pF |

TLP Measurement of I/O_1 to I/O_2

Voltage Sweeping of I/O_1 to I/O_2

Capacitance vs. Voltage of I/O_1 to I/O_2 (f = 1MHz)

Capacitance vs. Reverse Voltage

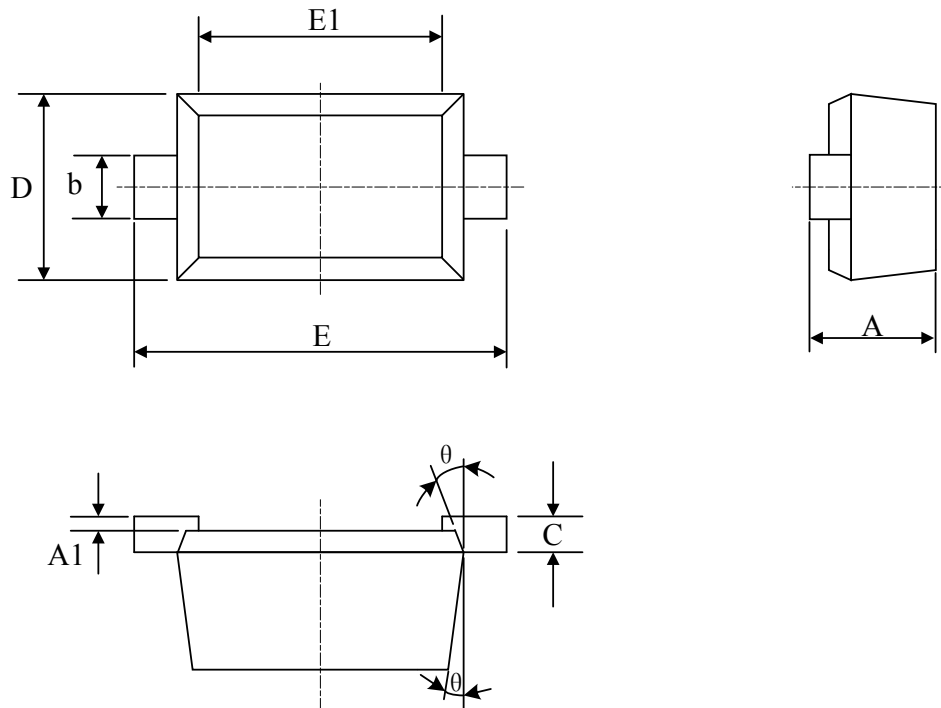


Normalized Capacitance vs. Reverse Voltage


**ESD Clamping of I/O_1 to I/O_2
(+8kV Contact per IEC 61000-4-2)**

**ESD Clamping of I/O_1 to I/O_2
(-8kV Contact per IEC 61000-4-2)**


Package Outline

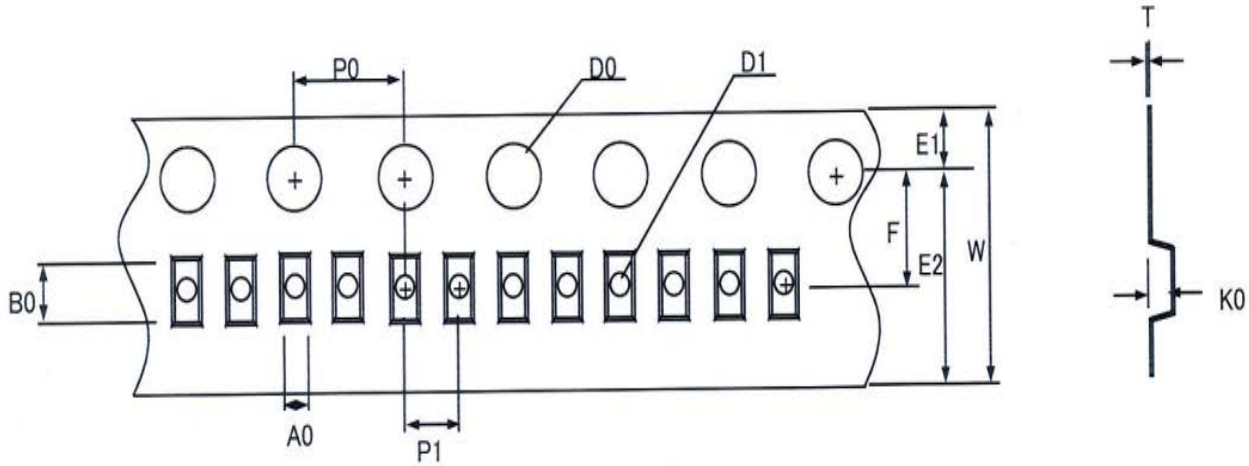
- ❑ SOD-923 package
- ❑ 2 leads, very small package
- ❑ MSL-1



Package Dimensions (Controlling dimensions are in millimeters)

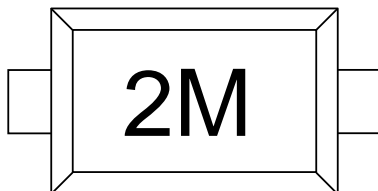
| Symbol | Dimensions (mm) | | Dimensions (Inches) | |
|--------|-----------------|---------|---------------------|---------|
| | Minimum | Maximum | Minimum | Maximum |
| A | 0.350 | 0.430 | 0.014 | 0.017 |
| A1 | 0.000 | 0.050 | 0.000 | 0.002 |
| b | 0.170 | 0.270 | 0.007 | 0.011 |
| C | | 0.150 | | 0.006 |
| D | 0.550 | 0.650 | 0.022 | 0.026 |
| E | 0.900 | 1.100 | 0.035 | 0.043 |
| E1 | 0.750 | 0.850 | 0.030 | 0.033 |
| θ | 7° REF. | | 7° REF. | |

Tape and Reel Specification



| ITEM | Dimensions (mm) |
|------|------------------|
| A0 | 0.67 +/- 0.05 |
| B0 | 1.12 +/- 0.05 |
| W | 8.0 +/- 0.2 |
| D0 | 1.55 +/- 0.05 |
| D1 | 0.50 +/- 0.05 |
| E1 | 1.75 +/- 0.10 |
| E2 | 6.25 MIN |
| F | 3.50 +/- 0.10 |
| P0 | 4.0 +/- 0.05 |
| P1 | 2.0 +/- 0.05 |
| K0 | 0.52 +/- 0.05 *1 |
| T | 0.20 +/- 0.020 |

Marking Codes



Ordering Information

| Part Number | Working Voltage | Quantity Per Reel | Reel Size |
|-------------|-----------------|-------------------|-----------|
| TT0521MCX | 5V | 10,000 | 7 Inch |

Note:

(1) "2M" is part number, fixed