

Features

- ❑ Transient protection for high-speed data lines
 - IEC 61000-4-2 (ESD) ±15kV (Air)
 - ±8kV (Contact)
 - IEC 61000-4-4 (EFT) 40A (5/50 ns)
 - Cable Discharge Event (CDE)
- ❑ Protects two data lines
- ❑ Low capacitance: 5pF Typical (I/O-GND)
- ❑ Low leakage current: 0.1μA @ V_{RWM} (Typical)
- ❑ Low clamping voltage
- ❑ Each I/O pin can withstand over 1000 ESD strikes for ±8kV contact discharge
- ❑ ROHS compliant

Description

TT0502PKX is an ultra-low capacitance Transient Voltage Suppressor (TVS) designed to provide electrostatic discharge (ESD) protection for high-speed data interfaces. With typical capacitance of 5.0 pF only, TT0502PK 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 (±15kV air, ±8kV 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.

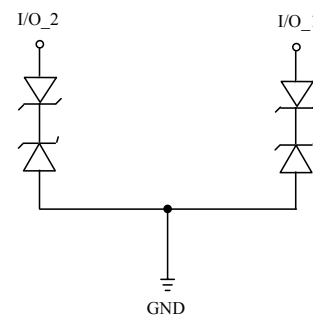
Applications

- ❑ Serial ATA
- ❑ PCI Express
- ❑ Desktops, Servers and Notebooks
- ❑ MDDI Ports
- ❑ Display Ports

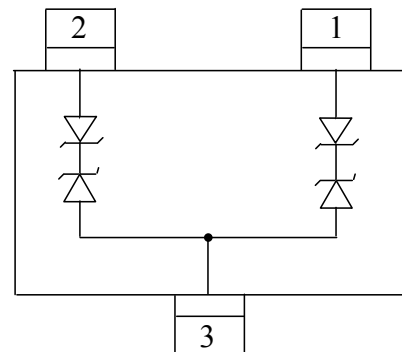
Mechanical Characteristics

- ❑ SOT23 package
- ❑ Flammability Rating: UL 94V-0
- ❑ Marking: Part number
- ❑ Packaging: Tape and Reel
- ❑ Matte Tin
- ❑ MSL-3

Circuit Diagram



Pin Configuration



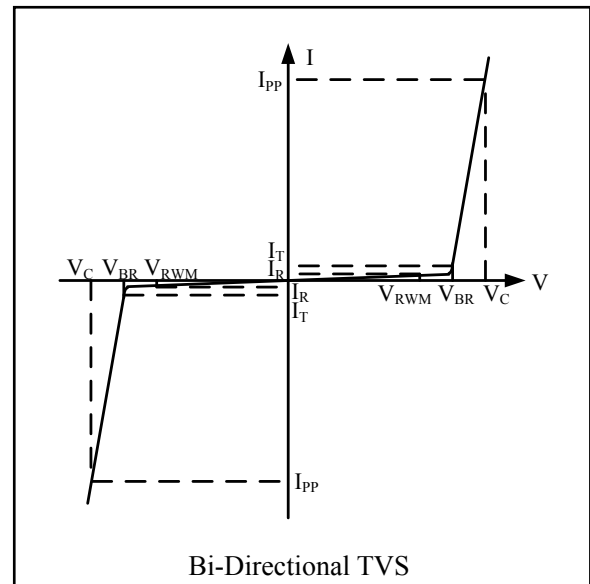
SOT23
(Top View)

Absolute Maximum Rating

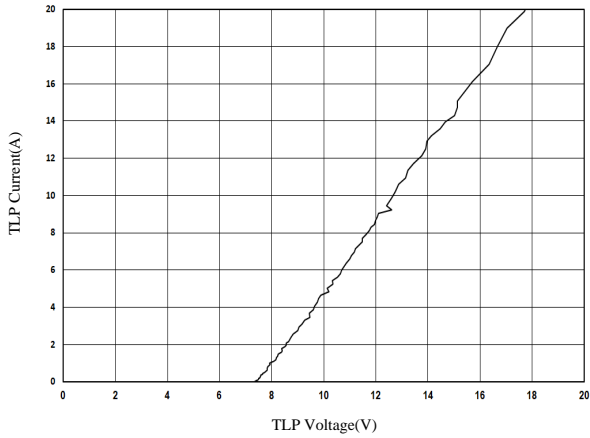
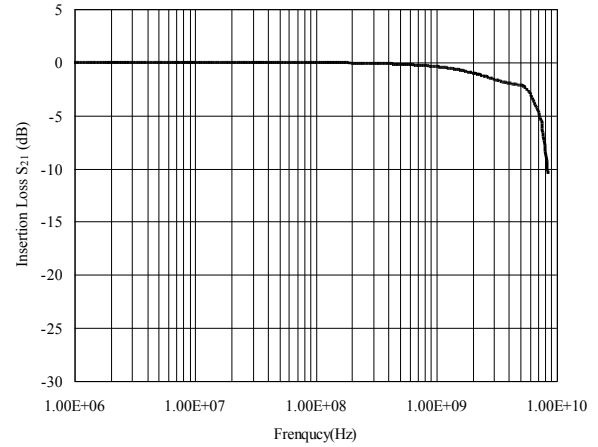
| Symbol | Parameter | Value | Units |
|-----------|--|----------------------|-------|
| I_{PP} | Peak Pulse Current($t_p=8/20\mu s$) | 4 | A |
| V_{ESD} | ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact) | ± 30 ± 25 | kV |
| HBM | Human body model | ± 2500 | V |
| CDM | Charged device model | ± 1000 | V |
| MM | Machine model | ± 200 | V |
| T_{OPT} | Operating Temperature | -55/+125 | °C |
| T_{STG} | Storage Temperature | -55/+150 | °C |

Electrical Characteristics (T = 25°C)

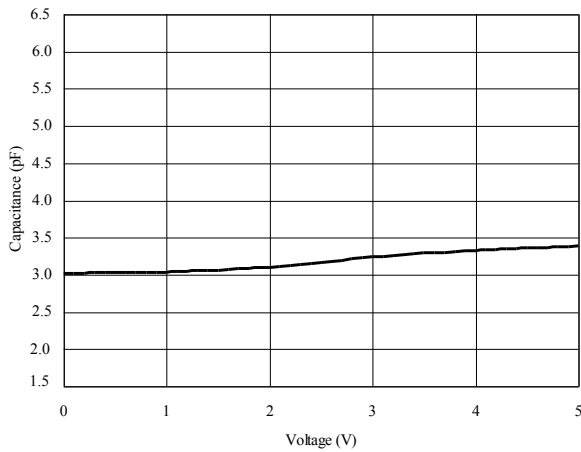
| Symbol | Parameter |
|-----------|-------------------------------------|
| V_{RWM} | Nominal Reverse Working Voltage |
| I_R | Reverse Leakage Current @ V_{RWM} |
| V_{BR} | Reverse Breakdown Voltage @ I_T |
| I_T | Test Current for Reverse Breakdown |
| V_C | Clamping Voltage @ I_{PP} |
| I_{PP} |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



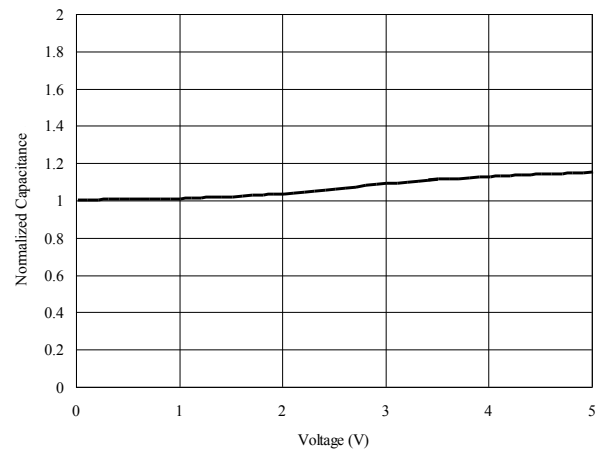
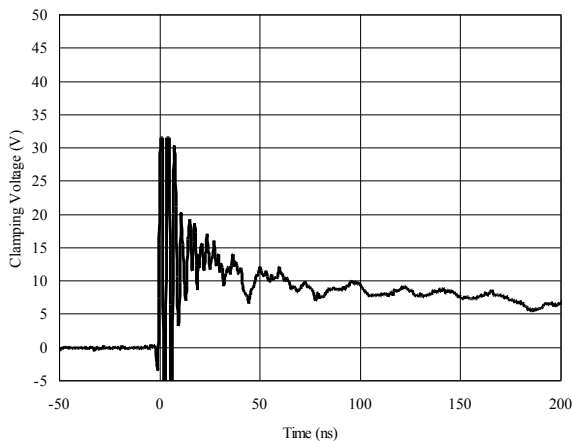
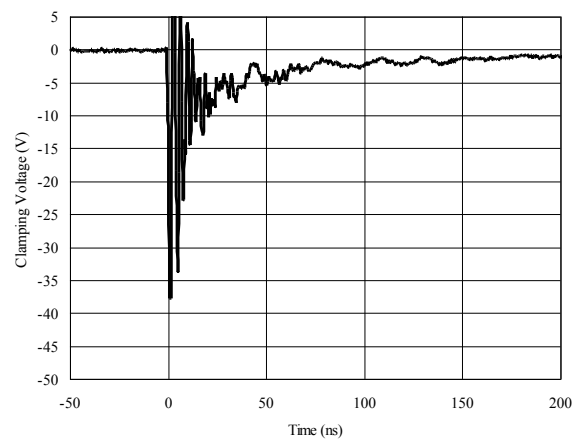
| Symbol | Test Condition | Minimum | Typical | Maximum | Units |
|-----------|---|---------|---------|---------|---------|
| V_{RWM} | | | | 5.0 | V |
| I_R | $V_{RWM} = 5V, T = 25^\circ C$ Between I/O and GND | | 0.1 | 1.0 | μA |
| V_{BR} | $I_T = 1mA$ Between I/O and GND | 6.0 | | 8.0 | V |
| V_C | $I_{PP} = 1A, t_p = 8/20\mu s$ Between I/O and GND | | | 9 | V |
| C_{ESD} | $V_R = 0V, f = 1MHz$ Between I/O and GND | | 5 | 7 | pF |

TLP Measurement of I/O to GND

Insertion Loss S21 of I/O to GND

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

Capacitance vs. Reverse Voltage

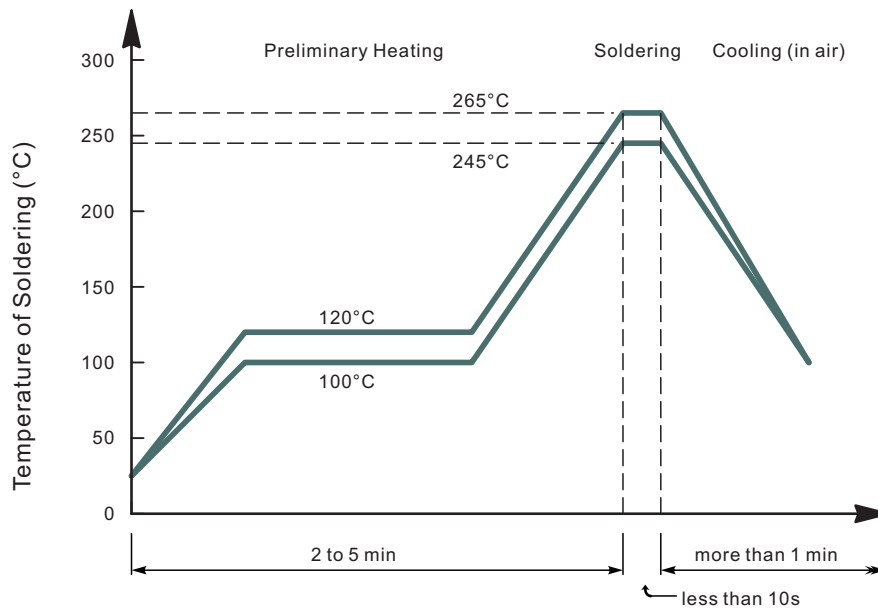


Normalized Capacitance vs. Reverse Voltage

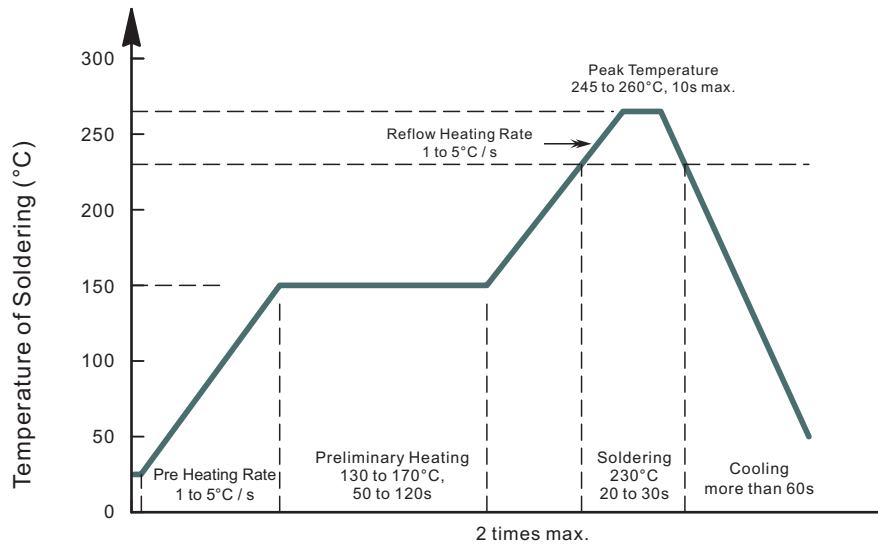

ESD Clamping (+8kV Contact per IEC 61000-4-2)

ESD Clamping (-8kV Contact per IEC 61000-4-2)




• Recommended condition of flow soldering

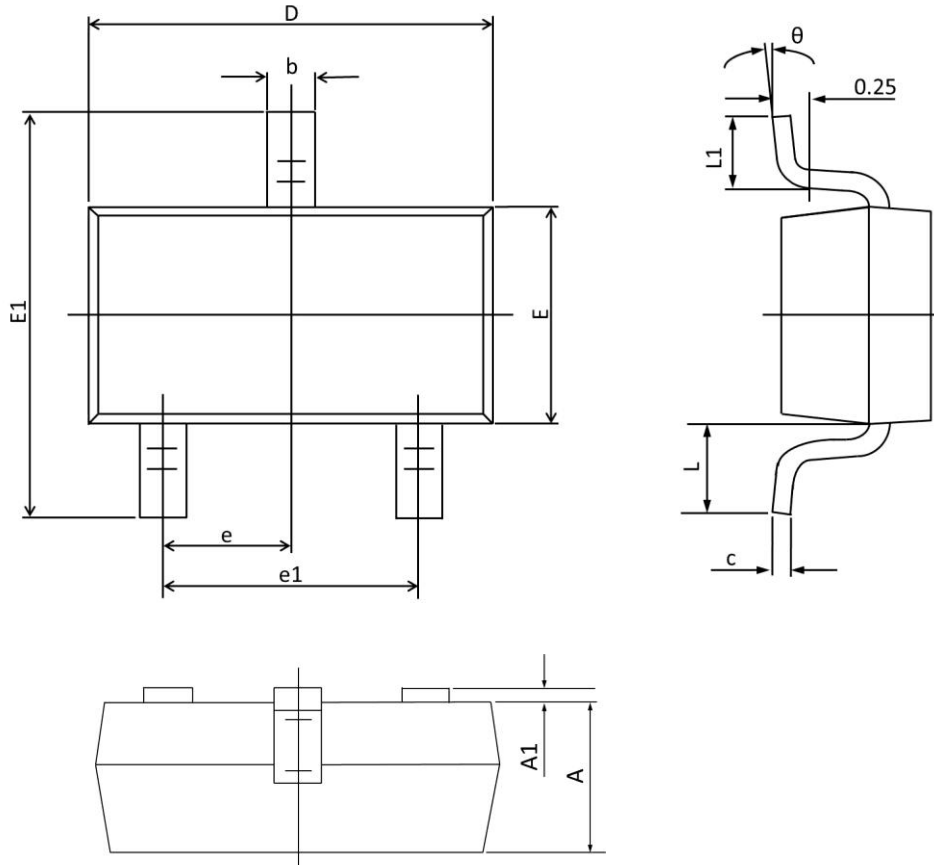


• Recommended condition of reflow soldering



Package Outline Demensions

- SOT23 package
- MSL-3

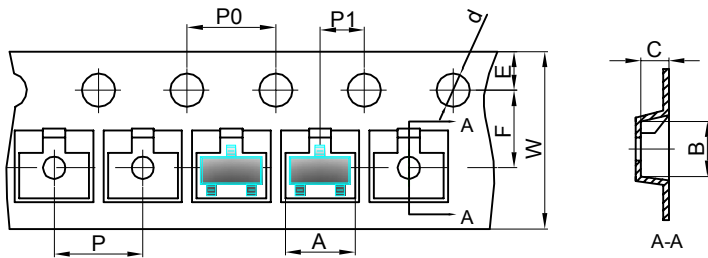


| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 0.900 | 1.000 | 0.035 | 0.039 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.090 | 0.110 | 0.003 | 0.004 |
| D | 2.800 | 3.000 | 0.110 | 0.118 |
| E | 1.200 | 1.700 | 0.047 | 0.066 |
| E1 | 2.250 | 2.550 | 0.089 | 0.100 |
| e | 0.950 TYP. | | 0.037 TYP. | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.550 REF. | | 0.022 REF. | |
| L1 | 0.300 | 0.500 | 0.012 | 0.020 |
| θ | 1° | 7° | 1° | 7° |

Tape and Reel Specification

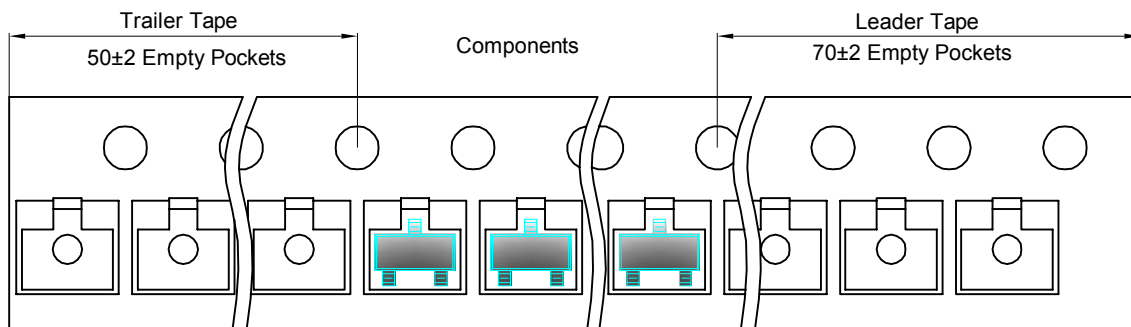
SOT23 Tape and reel

SOT23 Embossed Carrier Tape



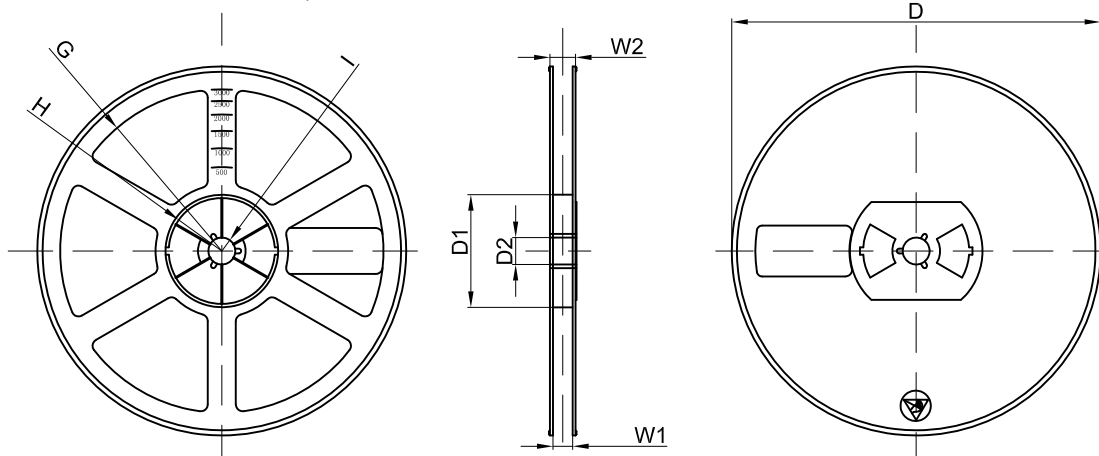
| Dimensions are in millimeter | | | | | | | | | | |
|------------------------------|------|------|------|-------|------|------|------|------|------|------|
| Pkg type | A | B | C | d | E | F | P0 | P | P1 | W |
| SOT23 | 3.15 | 2.77 | 1.22 | Ø1.50 | 1.75 | 3.50 | 4.00 | 4.00 | 2.00 | 8.00 |

SOT23 Tape Leader and Trailer



SOT23 Reel

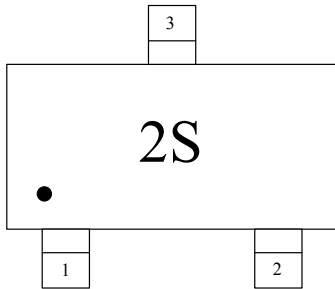
3000 pcs



| Dimensions are in millimeter | | | | | | | | |
|------------------------------|---------|-------|-------|--------|--------|-------|------|-------|
| Reel Option | D | D1 | D2 | G | H | I | W1 | W2 |
| 7" Dia | Ø178.00 | 54.40 | 13.00 | R78.00 | R25.60 | R6.50 | 9.50 | 12.30 |

service@jy-electronics.com.cn

Marking Codes



Note:

(1) "2S" is part number, fixed.

Ordering Information

| Part Number | Working Voltage | Quantity Per Reel | Reel Size |
|-------------|-----------------|-------------------|-----------|
| TT0502PKX | 5.0V | 3,000 | 7 Inch |