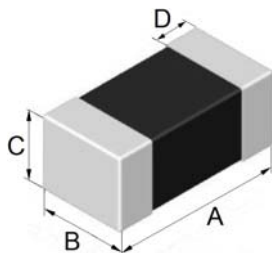


1. Dimension



Series	A(mm)	B(mm)	C(mm)	D(mm)
0402	1.00±0.05	0.60±0.05	0.50±0.05	0.20±0.05

2. Part Numbering

TVS	0402	S	050	-	100	A
A	B	C	D		E	F

A: Series

B: Dimension

C: Semiconductor TVS Device

D: Reverse Working Voltage 050=5V

E: Parasitic Capacitance 100=10pF

F: Inner Code

3. Features

1. Transient protection for high-speed data lines.

IEC61000-4-2 (ESD) ±15KV (air) @TVS0402S050-0R5A、TVS0402S050-2R5A、TVS0402S050-050A
 ±15KV (contact) @TVS0402S050-0R5A、TVS0402S050-2R5A、TVS0402S050-050A
 ±20KV (air) @TVS0402S050-0R3W
 ±20KV (contact) @TVS0402S050-0R3W
 ±30KV (air) @TVS0402S050-100A、TVS0402S050-170K
 ±30KV (contact) @TVS0402S050-100A、TVS0402S050-170K

IEC61000-4-4 (EFT) 40A (5/50ns) @TVS0402S050-2R5A、TVS0402S050-050A、TVS0402S050-100A、TVS0402S050-170K

IEC61000-4-4 (EFT) 20A (5/50ns) @TVS0402S050-0R3W、TVS0402S050-0R5A

IEC61000-4-5 (surge) 8A (8/20μs) @TVS0402S050-170K

Cable discharge event (CDE).

2. Package optimized for high-speed lines.
3. Ultra-small package
4. Protects one data, controller or power line.
5. Low leakage current : 1nA @V_{RWM} (typical)
6. Low clamping voltage.
7. Each I/O pin can withstand over 1000 ESD strikes for ±8KV contact discharge.

4. Applications

TVS0402S050-170K

1. Cellular handsets
2. Tablets
3. Laptops
4. Other portable devices
5. Network communication devices

TVS0402S050-2R5A TVS0402S050-050A TVS0402S050-100A

1. Portable electronics
2. Desktops, servers and notebooks
3. Cellular phones
4. MP3 ports
5. Digital camera ports
6. Subscriber identity module (SIM) card

TVS0402S050-0R3W

1. USB2.0 and USB3.0
2. HDMI1.3 and HDMI1.4
3. Cellular phones
4. DVI
5. Notebook
6. PCI express

TVS0402S050-0R5A

1. USB3.0 and USB3.1
2. HDMI.2.0
3. Cellular phones
4. Notebook

5. Absolute Maximum Ratings(Ta=25°C)

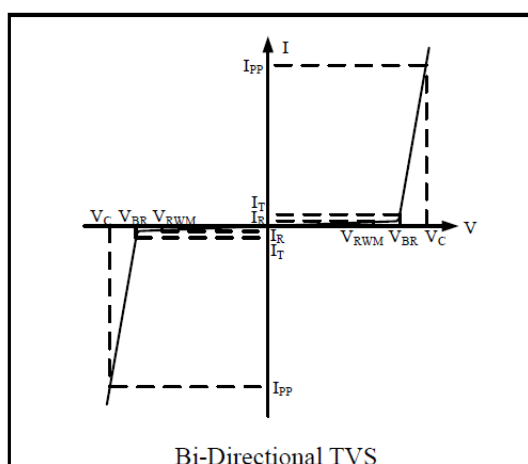
TAI-TECH Part Number	Peak pulse power (tp=8/20µs) P _{PK} (w)	Peak pulse current (tp=8/20µs) I _{PP} (A)	ESD per IEC61000-4-2 (air) V _{ESD} (KV)	ESD per IEC61000-4-2 (contact) V _{ESD} (KV)
TVS0402S050-0R3W	54	3	±20	±20
TVS0402S050-0R5A	60	4	±15	±15
TVS0402S050-2R5A	45	3	±15	±15
TVS0402S050-050A	64	4	±15	±15
TVS0402S050-100A	96	8	±30	±30
TVS0402S050-170K	80	8	±30	±30

Note:

1. Operating temperature range: -55~125°C
2. Storage temperature range: -55~150°C

6. Electrical Characteristics(Ta=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



TAI-TECH Part Number	Working peak reverse voltage V _{RWM} (V)	Maximum reverse leakage (@V _{RWM} , 25°C) (between I/O_1 and I/O_2) I _R (µA)	Breakdown voltage (@I _T =1mA) (between I/O_1 and I/O_2) V _{BR} (V)	Clamping voltage (@I _{PP} =16A, t _p =100ns, TLP) V _{CL} (V)	Clamping voltage (@V _{ESD} =8KV) V _{CL} (V)	Maximum clamping voltage (tp=8/20µs) (between I/O_1 and I/O_2) V _C (V)	Parasitic capacitance (@V _R =0V, f=1MHz) (between I/O_1 and I/O_2) C _{ESD} (pF)	ESD dynamic resistance (TLP, tp=100ns, I/O to GND) R _{DYN} (Ω)
TVS0402S050-0R3W	5	Typ. 0.001 (Max. 0.1)	Typ. 8.0 (Min. 6.0)	Max. 25	Max. 25	12 (@I _{PP} =1A) 18 (@I _{PP} =3A)	Typ. 0.3 Max. 0.4	0.8
TVS0402S050-0R5A	5	Typ. 0.001 (Max. 0.1)	Typ. 8.5 (Min. 6.0)	15	15	10 (@I _{PP} =1A) 12 (@I _{PP} =4A)	Typ. 0.35	0.35
TVS0402S050-2R5A	5	Typ. 0.001 (Max. 0.1)	Typ. 6.7 (Min. 5.5 Max.9.1)	16	16	12 (@I _{PP} =1A) 15 (@I _{PP} =3A)	Typ. 2.5	-
TVS0402S050-050A	5	Typ. 0.001 (Max. 0.2)	Typ. 7.0 (Min. 5.2 Max.8.8)	15	15	12 (@I _{PP} =1A) 16 (@I _{PP} =4A)	Typ. 5	-
TVS0402S050-100A	5	Typ. 0.001 (Max. 0.08)	Typ. 7.0 (Min. 5.5)	Max. 12	Max. 12	8 (@I _{PP} =1A) 12 (@I _{PP} =8A)	Typ. 10	Typ. 0.2
TVS0402S050-170K	5	Typ. 0.001 (Max. 1.0)	Typ. 6.0 (Min. 5.1)	12	12	6.5 (@I _{PP} =1A) 10 (@I _{PP} =8A)	Typ. 17	-

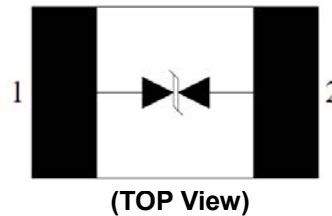
7. Mechanical Characteristics

1. Case : 0402
2. Flammability rating : UL 94V-0
3. Packaging : tape and reel
4. Polarity : bidirectional

Circuit Diagram



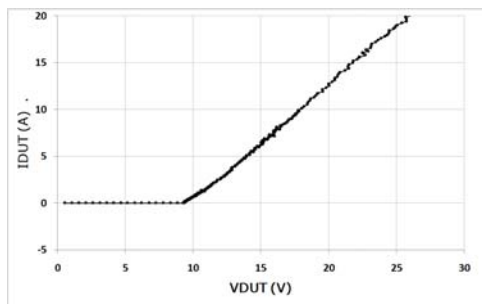
Pin Configuration



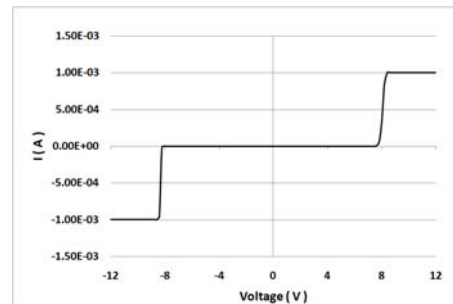
8. Rating and Characteristic Curves

TVS0402S050-0R3W

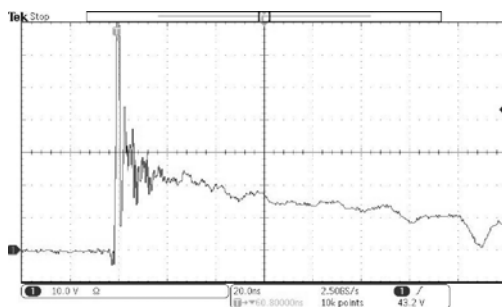
TLP Measurement



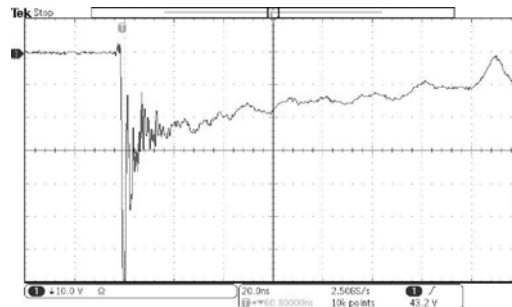
Voltage Sweeping of I/O_1 to I/O_2



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

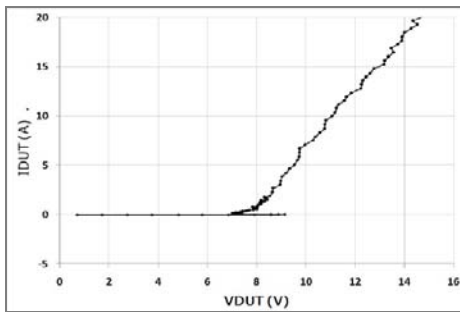


ESD Clamping of I/O_1 to I/O_2 (-8kV Contact per IEC 61000-4-2)

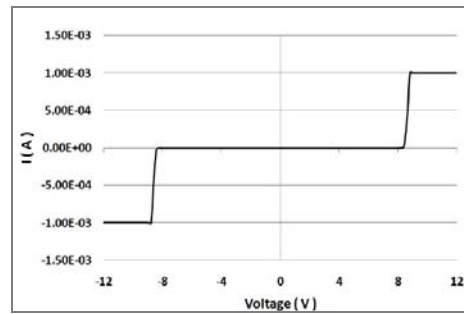


TVS0402S050-0R5A

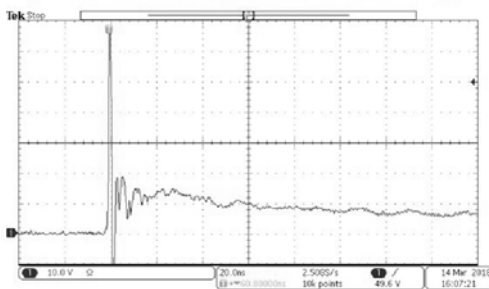
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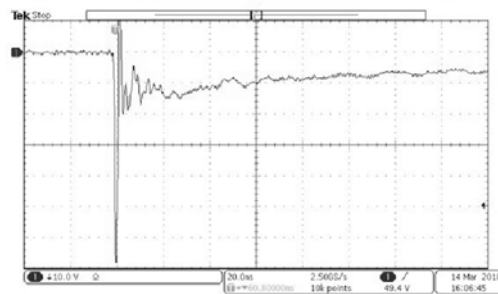
Voltage Sweeping of I/O_1 to I/O_2



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

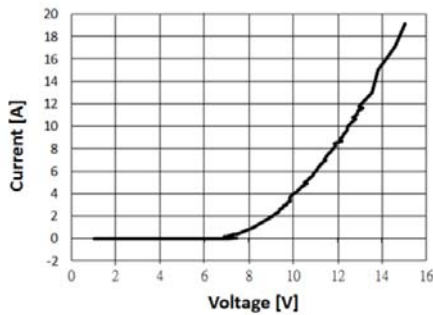


**ESD Clamping of I/O_1 to I/O_2
(-8kV Contact per IEC 61000-4-2)**

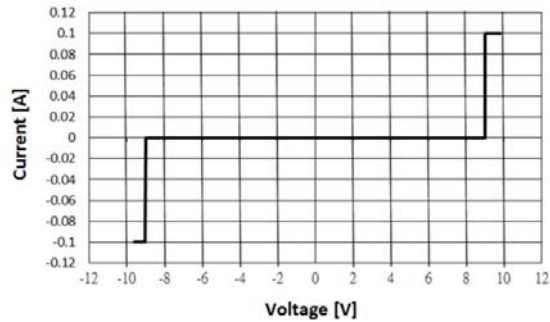


TVS0402S050-2R5A

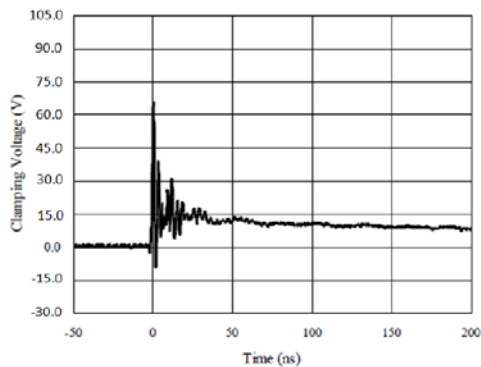
TLP Measurement



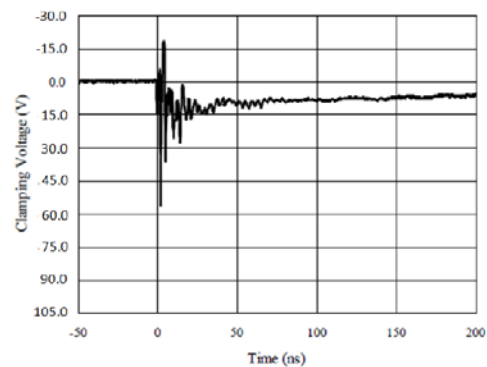
Voltage Sweeping of I/O_1 to I/O_2



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

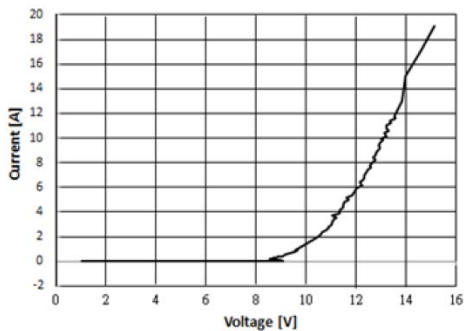


**ESD Clamping of I/O_1 to I/O_2
(-8kV Contact per IEC 61000-4-2)**

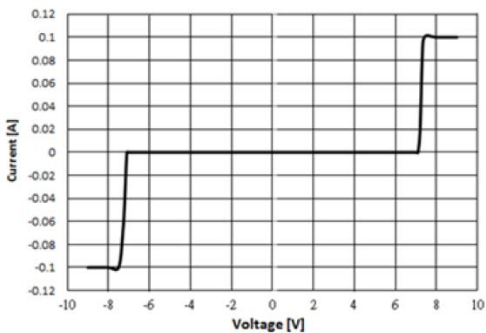


TVS0402S050-050A

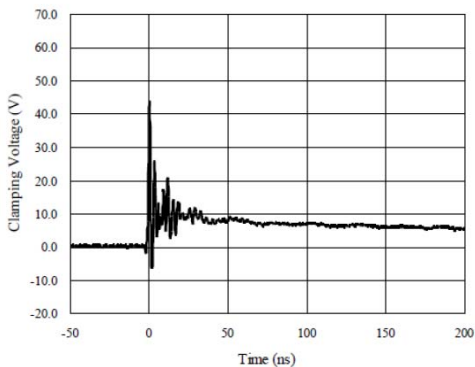
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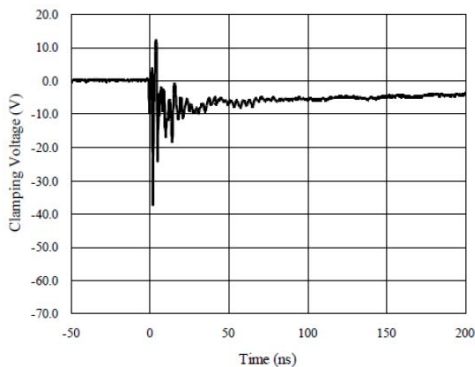
Voltage Sweeping of I/O_1 to I/O_2



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

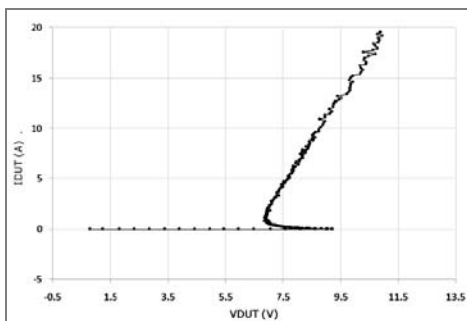


**ESD Clamping of I/O_1 to I/O_2
(-8kV Contact per IEC 61000-4-2)**

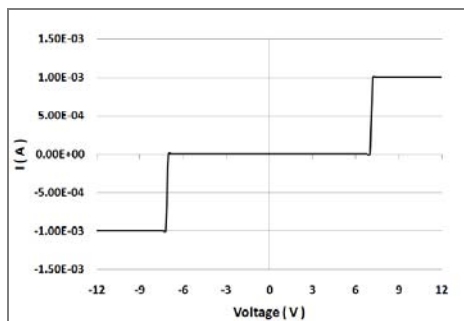


TVS0402S050-100A

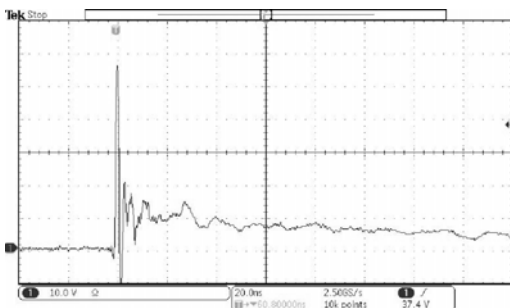
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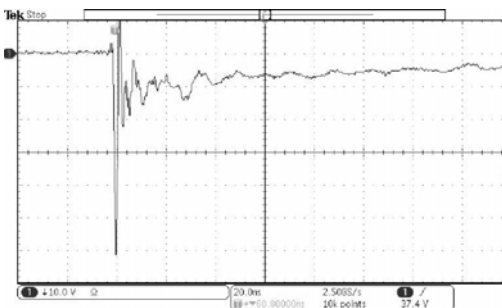
Voltage Sweeping of I/O_1 to I/O_2



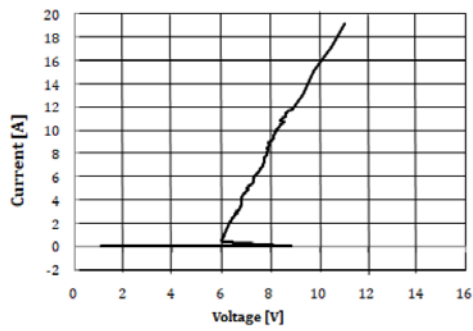
**ESD Clamping of I/O_1 to I/O_2
(+8kV Contact per IEC 61000-4-2)**



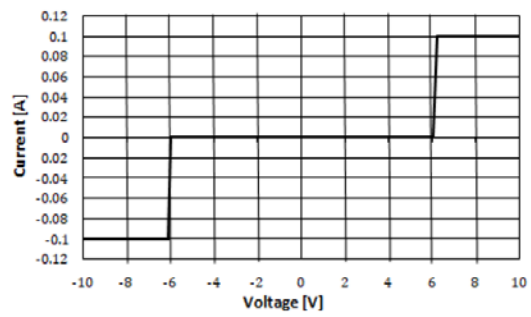
**ESD Clamping of I/O_1 to I/O_2
(-8kV Contact per IEC 61000-4-2)**



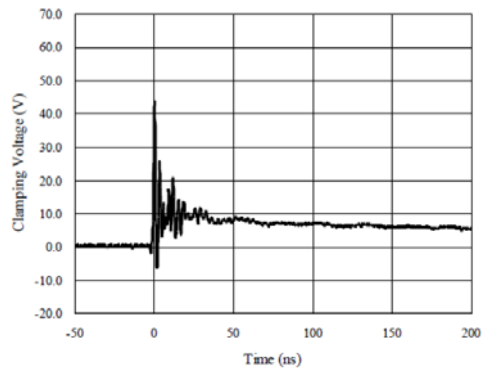
TLP Measurement



Voltage Sweeping of I/O_1 to I/O_2



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)

