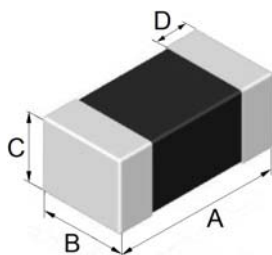


SMD Transient Voltage Suppressors

TVSD0402ESXF-Series

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

TVSD 0402 ESX F 050 - 0R3 P □

A B C D E F G H

A: Series	TVS Diode
B: Dimension	
C: Category Code	Standard ESD Protection
D: Product Grade	General Grade
E: Voltage Code	050=Reverse Working Voltage 5V
F: Characteristic Code	0R3=Parasitic Capacitance 0.3 pF
G: Characteristic Unit Code	P=pF
H: Inner Code	

3. Features

1. Transient protection for high-speed data lines.

IEC61000-4-2 (ESD) ±30KV (air) @TVSD0402ESXF050-0R3P、TVSD0402ESXF050-100P

±30KV (contact) @TVSD0402ESXF050-0R3P、TVSD0402ESXF050-100P

±25KV (contact) @ TVSD0402ESXF120-060P

±25KV (air) @ TVSD0402ESXF120-060P

±15KV (air) @TVSD0402ESXF050-2R5P

±15KV (contact) @TVSD0402ESXF050-2R5P

IEC61000-4-4 (EFT) 20A (5/50ns) @TVSD0402ESXF050-0R3P

IEC61000-4-4 (EFT) 40A (5/50ns) @TVSD0402ESXF050-2R5P、TVSD0402ESXF050-100P、TVSD0402ESXF120-060P

Cable discharge event (CDE).

AEC-Q101 qualified

2. Package optimized for high-speed lines.
3. Ultra-small package (1.0mmX0.6mmX0.5mm)
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. Absolute Maximum Ratings(Ta=25°C)

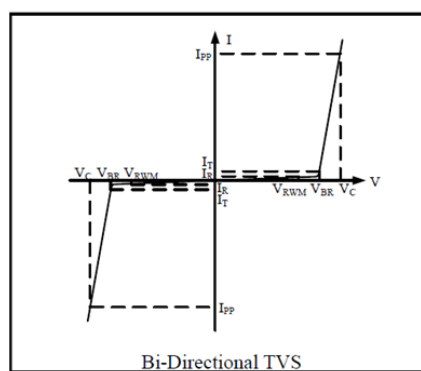
TAI-TECH Part Number	Peak pulse power ($t_p=8/20\mu s$) P_{PK} (W)	Peak pulse current ($t_p=8/20\mu s$) I_{PP} (A)	ESD per IEC61000-4-2 (air) V_{ESD} (KV)	ESD per IEC61000-4-2 (contact) V_{ESD} (KV)
TVSD0402ESXF050-0R3P	54	3	±30	±30
TVSD0402ESXF050-2R5P	45	3	±15	±15
TVSD0402ESXF050-100P	96	8	±30	±30
TVSD0402ESXF120-060P	130	6	±25	±25

Note:

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

5. 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)
TVSD0402ESXF050-0R3P	5	Typ. 0.001 (Max. 0.1)	Typ. 8.0 (Min. 6)	Max. 25	Max. 25
TVSD0402ESXF050-2R5P	5	Typ. 0.001 (Max. 0.1)	Typ. 6.7 (Min. 5.5, Max. 9.1)	Typ. 16	Typ. 16
TVSD0402ESXF050-100P	5	Typ. 0.001 (Max. 0.08)	Typ. 7.0 (Min. 5.5)	Max. 12	Max. 12
TVSD0402ESXF120-060P	12	Typ. 0.001 (Max. 0.08)	Typ. 18.0 (Min. 15.0)	Typ. 22	Typ. 22

TAI-TECH Part Number	Maximum clamping voltage (@I _{pp} =1A, t _p =8/20μs) (between I/O_1 and I/O_2) V _c (V)	Maximum clamping voltage (t _p =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)
TVSD0402ESXF050-0R3P	Max. 12	Max. 18@I _{pp} =3A	Typ. 0.3 (Max. 0.4)	0.8
TVSD0402ESXF050-2R5P	Max. 12	Max. 15@I _{pp} =3A	Typ. 2.5	-
TVSD0402ESXF050-100P	Max. 8	Max. 12@I _{pp} =8A	Typ. 10.0	Typ. 0.2
TVSD0402ESXF120-060P	Max. 18	Max. 22@I _{pp} =6A	Typ. 6.0	-

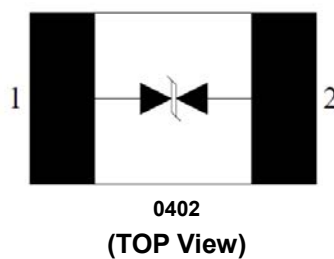
6. Mechanical Characteristics

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

Circuit Diagram



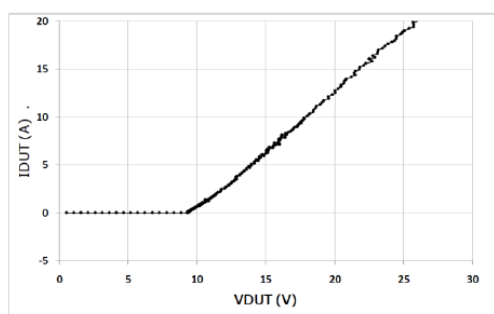
Pin Configuration



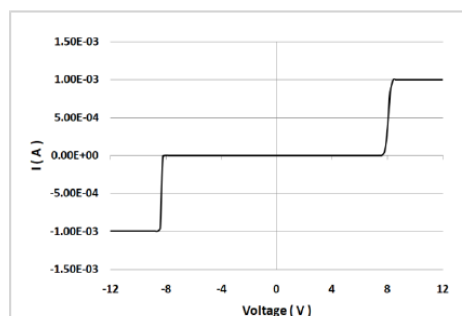
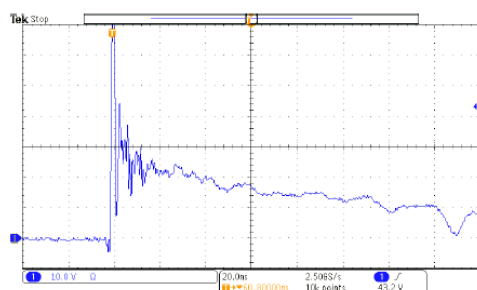
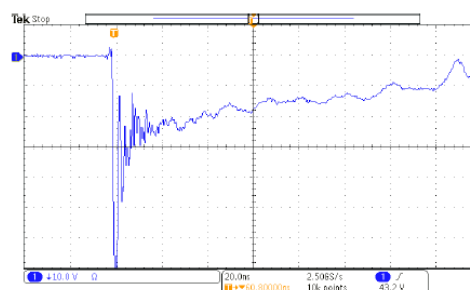
7. Rating and Characteristic Curves

TVSD0402ESXF050-0R3P

TLP Measurement

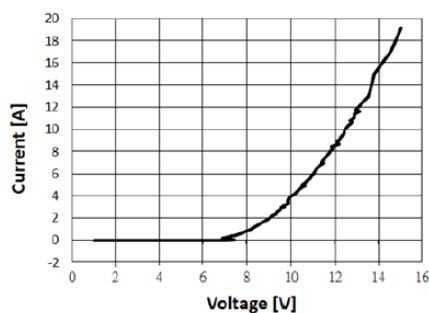


Voltage Sweeping of I/O_1 to I/O_2

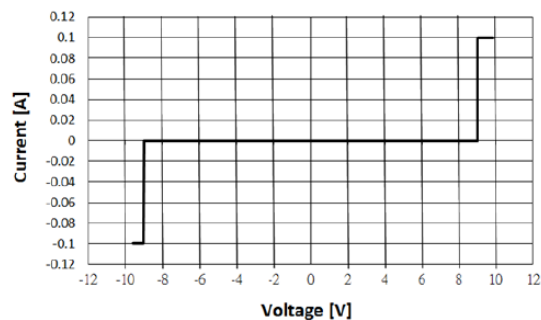
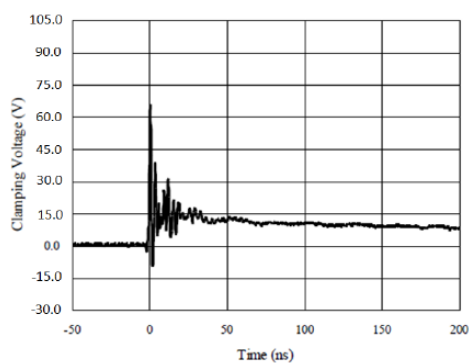
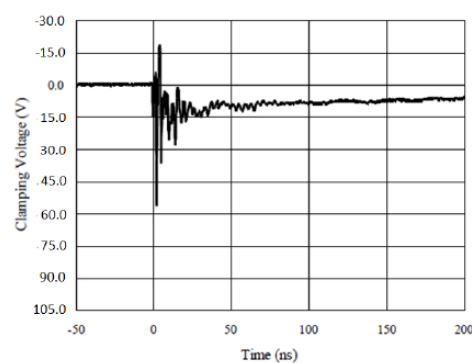
ESD Clamping of I/O_1 to I/O_2
(+8kV Contact per IEC 61000-4-2)ESD Clamping of I/O_1 to I/O_2
(-8kV Contact per IEC 61000-4-2)

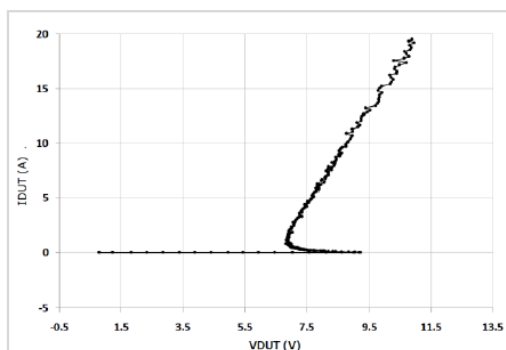
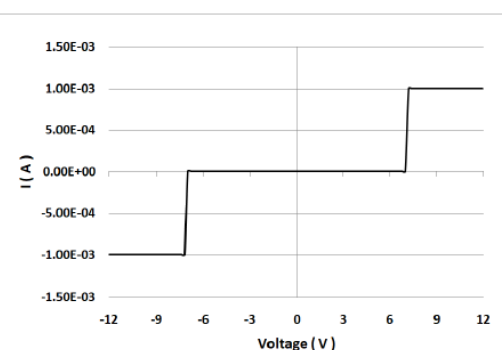
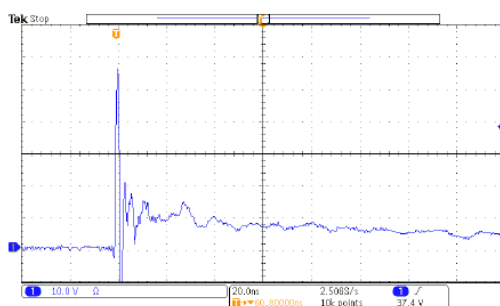
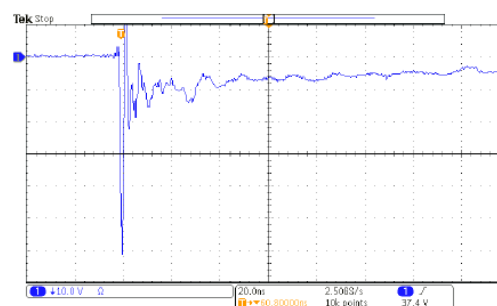
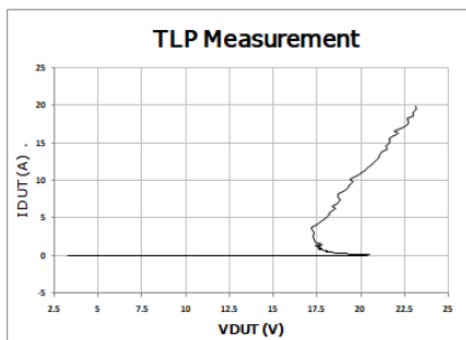
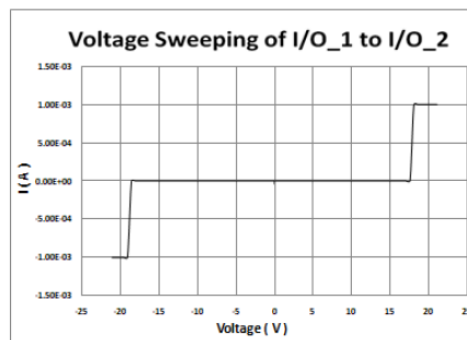
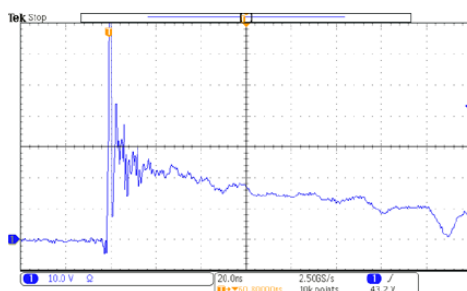
TVSD0402ESXF050-2R5P

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)

TVSD0402ESXF050-100P**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)****TVSD0402ESXF120-060P****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)**