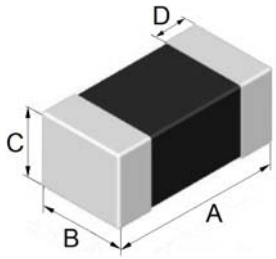
SMD Transient Voltage Suppressors TVSD0402EHXV-Series

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 EHX V 050 - 0R3 P □

A B C D E F G H

A: Series TVS Diode
B: Dimension
C: Category Code High Performance ESD Protection
D: Product Grade Vehicle 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

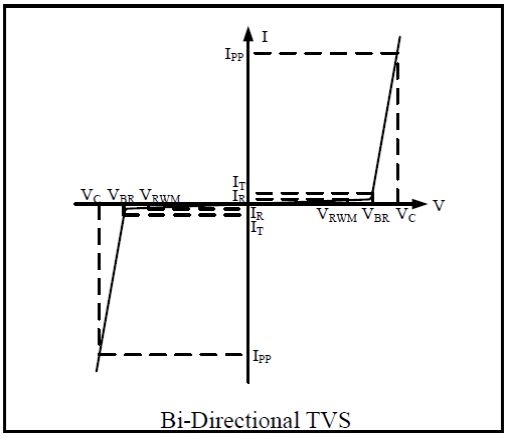
1. Transient protection for high-speed data lines.
   ISO 10605 (ESD) ±12KV (air) @TVSD0402EHXV050-2R5P
   ±12KV (contact) @TVSD0402EHXV050-2R5P
   ±20KV (air) @TVSD0402EHXV050-0R3P
   ±20KV (contact) @TVSD0402EHXV050-0R3P
   ±25KV (air) @TVSD0402EHXV050-100P、TVSD0402EHXV120-060P
   ±25KV (contact) @ TVSD0402EHXV050-100P、TVSD0402EHXV120-060P
   IEC61000-4-4 (EFT) 20A (5/50ns) @TVSD0402EHXV050-0R3P
   IEC61000-4-4 (EFT) 40A (5/50ns) @TVSD0402EHXV050-2R5P、TVSD0402EHXV050-100P 、TVSD0402EHXV120-060P
   IEC61000-4-5 (surge) 6A (8/20μs) @TVSD0402EHXV120-060P
   Cable discharge event (CDE).
   AEC-Q101 qualified
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. Absolute Maximum Ratings(Ta=25℃)

TAI-TECH Part Number	Peak pulse power (tp=8/20μs) P_{PK} (w)	Peak pulse current (tp=8/20μs) I_{PP} (A)	ESD per ISO 10605 (air) V_{ESD} (KV)	ESD per ISO 10605 (contact) V_{ESD} (KV)	Operating temperature range T_{OPT} (℃)	Storage temperature range T_{STG} (℃)
TVSD0402EHXV050-0R3P	54	3	±20	±20	-55~150	-55~150
TVSD0402EHXV050-2R5P	45	3	±12	±12	-55~125	-55~150
TVSD0402EHXV050-100P	96	8	±25	±25	-55~150	-55~150
TVSD0402EHXV120-060P	130	6	±25	±25	-55~150	-55~150

5. Electrical Characteristics(Ta=25℃)

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



Bi-Directional TVS

TAI-TECH Part Number	Working peak reverse voltage V_{RWM} (V)	Maximum reverse leakage (@V_{RWM}, 25℃) (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)
TVSD0402EHXV050-0R3P	5	Typ. 0.001 (Max. 0.1)	Typ. 9.0 (Min. 6.5 Max. 11.5)	Max. 30	Max. 30	Max. 12 (@I_{PP}=1A) Max. 18 (@I_{PP}=3A)	Typ. 0.3 (Max. 0.5)
TVSD0402EHXV050-2R5P	5	Typ. 0.001 (Max. 0.1)	Typ. 6.7 (Min. 5.5 Max. 9.0)	Max. 16	Max. 16	Max. 12 (@I_{PP}=1A) Max. 15 (@I_{PP}=3A)	Typ. 2.5
TVSD0402EHXV050-100P	5	Typ. 0.001 (Max. 0.1)	Typ. 7.0 (Min. 5.2 Max. 8.8)	Max. 12	Max. 12	Max. 8 (@I_{PP}=1A) Max. 12 (@I_{PP}=8A)	Typ. 10 (Max. 14)
TVSD0402EHXV120-060P	5	Typ. 0.001 (Max. 0.1)	Typ. 18 (Min. 15 Max. 21)	Max. 22	Max. 22	Max. 18 (@I_{PP}=1A) Max. 22 (@I_{PP}=6A)	Typ. 6 (Max. 9)

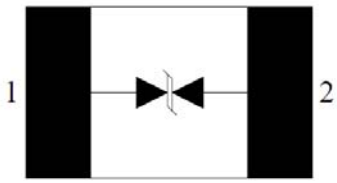
6. Mechanical Characteristics

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

Circuit Diagram



Pin Configuration

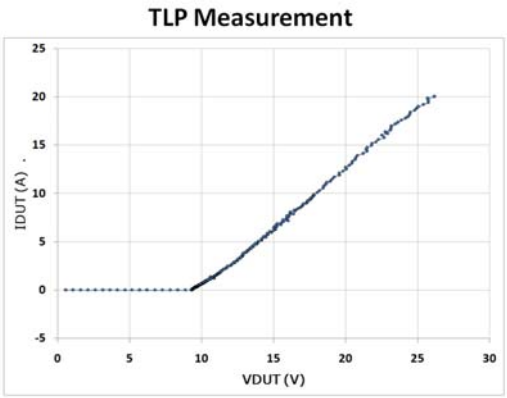


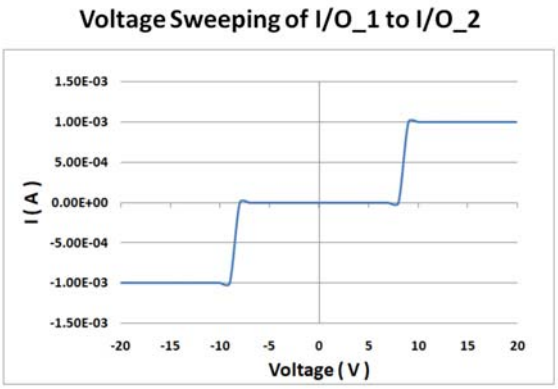
0402

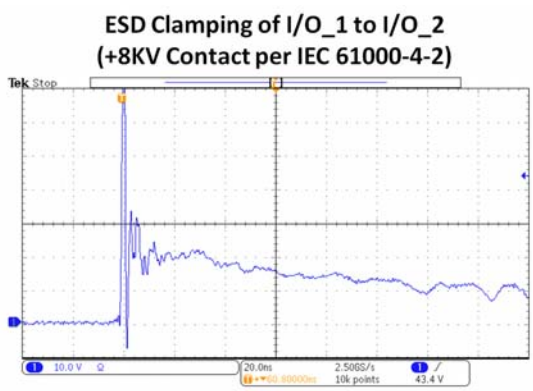
(TOP View)

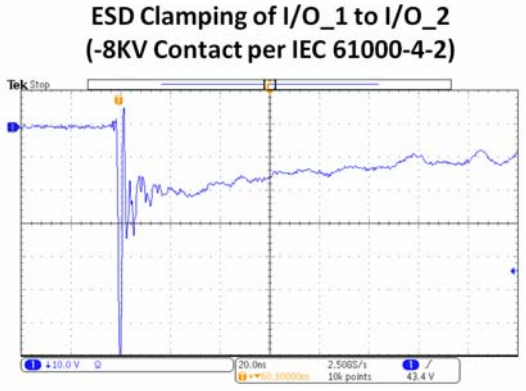
7. Rating and Characteristic Curves

TVSD0402EHXV050-0R3P

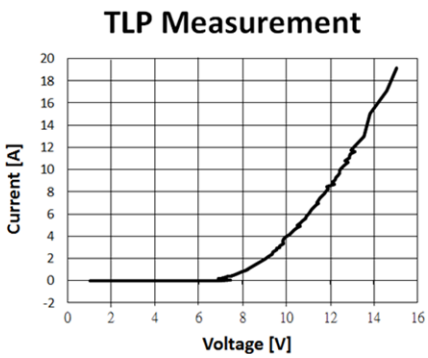


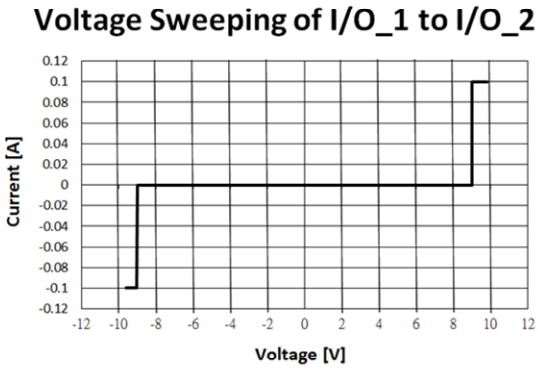


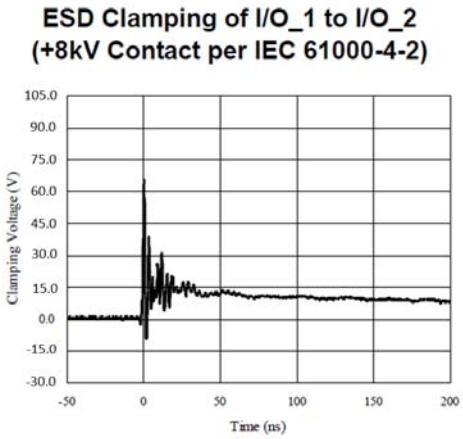


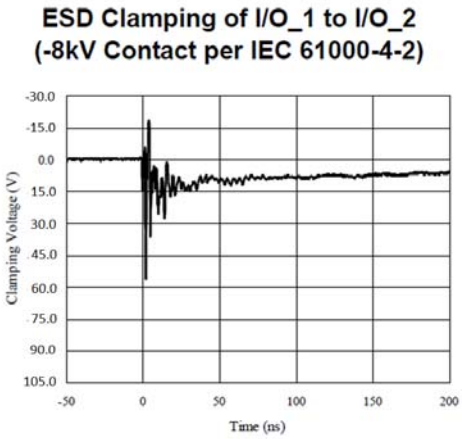


TVSD0402EHXV050-2R5P

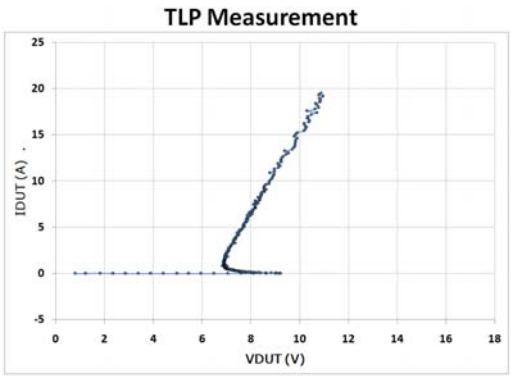


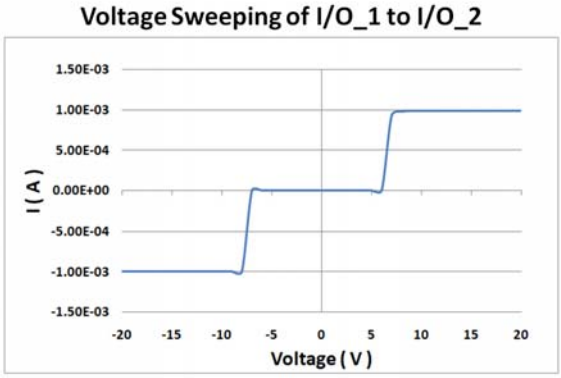


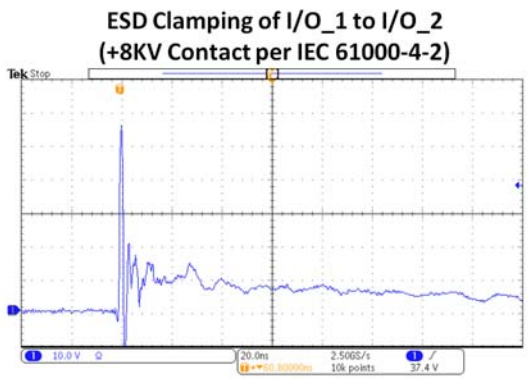


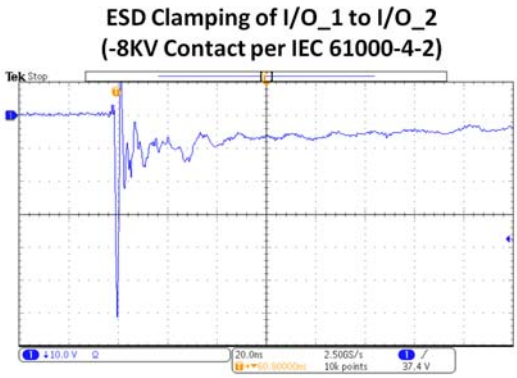


TVSD0402EHXV050-100P

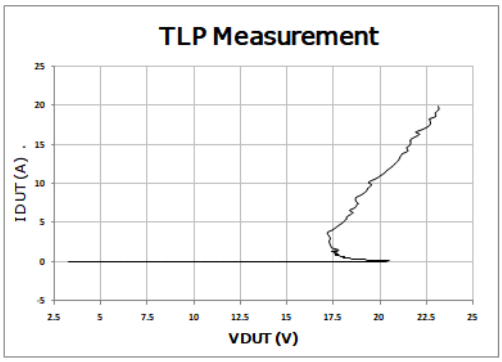


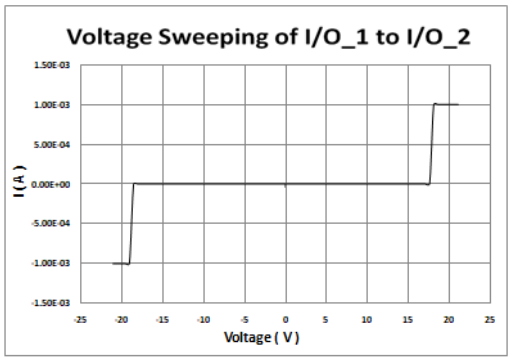




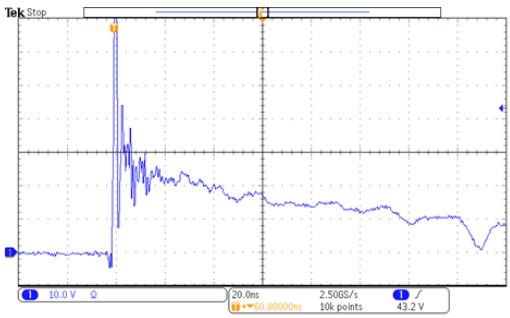


TVSD0402EHXV120-060P





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)

