TT0701MBX

Low Capacitance TVS Protection

Features

- Transient protection for high-speed data lines
  - IEC 61000-4-2 (ESD) ±30kV (Air)
  - ±30kV (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×0.55mm)
- Protects one data, control or power line
- Low capacitance: 15pF (Typical)
- Low leakage current: 0.1μA @ V_{RWM} (Maximum)
- Low clamping voltage
- Each I/O pin can withstand over 1000 ESD strikes for ±8kV contact discharge
- ROHS compliant

Applications

- Portable Electronics
- Desktops, Servers and Notebooks
- Cellular Phones
- MP3 Ports
- Digital Camera Ports
- Subscriber Identity Module (SIM) card

Mechanical Characteristics

- uDFN-2L package
- Flammability Rating: UL 94V-0
- Packaging: Tape and Reel

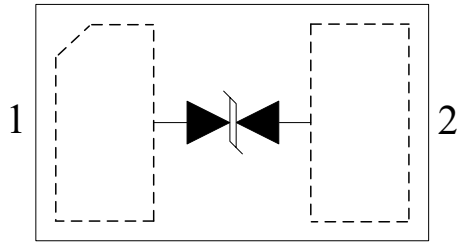
Description

TT0701MBX is a low-capacitance Transient Voltage Suppressor (TVS) designed to provide electrostatic discharge (ESD) protection for data, control or power lines. With typical capacitance of 15pF only, TT 0701 MBX 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 (±15 kV 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.

TT0701MBX uses ultra-small uDFN-2L package. Each TT0701MBX device can protect one data line. It offers system designers flexibility to protect single data line where space is a premium concern.

Circuit Diagram

Pin Configuration



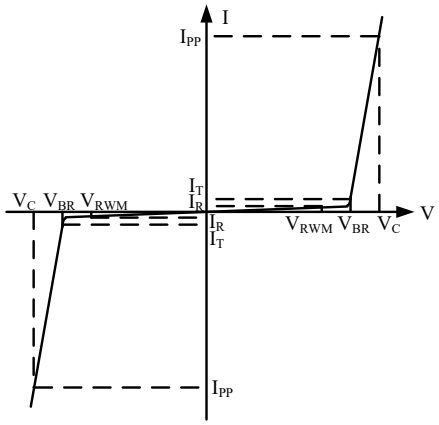
uDFN-2L
(Top View)

Absolute Maximum Rating

Symbol	Parameter	Value	Units
P_{PP}	Peak Pulse Power (8/20μs)	72	W
I_{PP}	Peak Pulse Current(tp=8/20us)	6	A
V_{ESD}	ESD per IEC 61000-4-2(Air) ESD per IEC 61000-4-2 (Contact)	±30 ±30	kV
T_{OPT}	Operating Temperature	-55/+125	°C
T_{STG}	Storage Temperature	-55/+150	°C

Electrical Characteristics (T = 25°C)

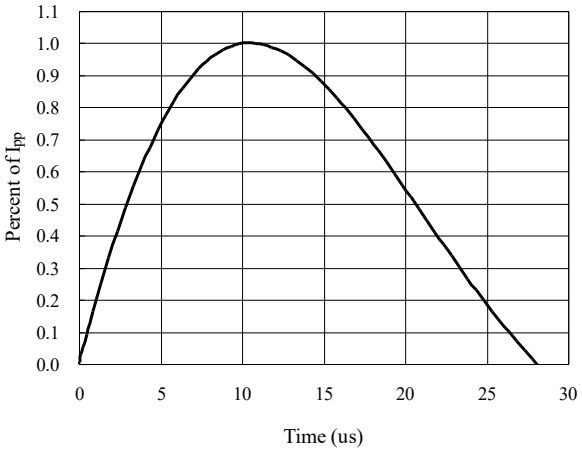
Symbol	Parameter
V_{RWM}	Nominal Reverse Working Voltage
I_R	Reverse Leakage Current @ V_{RWM}
V_{BR}	Reverse Breakdown Voltage @ I_T
I_T	Test Current for Reverse Breakdown
V_C	Clamping Voltage @ I_{PP}
I_{PP}	Maximum Peak Pulse Current
C_{ESD}	Parasitic Capacitance
V_R	Reverse Voltage
f	Small Signal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



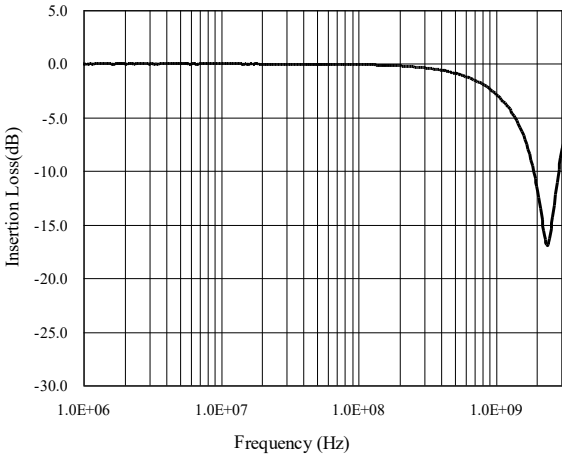
Bi-Directional TVS

Symbol	Test Condition	Minimum	Typical	Maximum	Units
V_{RWM}				7.0	V
I_R	V_{RWM} = 7V, T = 25°C Between I/O_1 and I/O_2			0.1	μA
V_{BR}	I_T = 1mA Between I/O_1 and I/O_2	7.2			V
V_C	I_{PP} = 1A, t_p = 8/20μs Between I/O_1 and I/O_2		9.0	12	V
V_C	I_{PP} = 6A, t_p = 8/20μs Between I/O_1 and I/O_2		12	16	V
C_{ESD}	V_R = 0V, f = 1MHz Between I/O_1 and I/O_2		15		pF

8/20μs Pulse Waveform

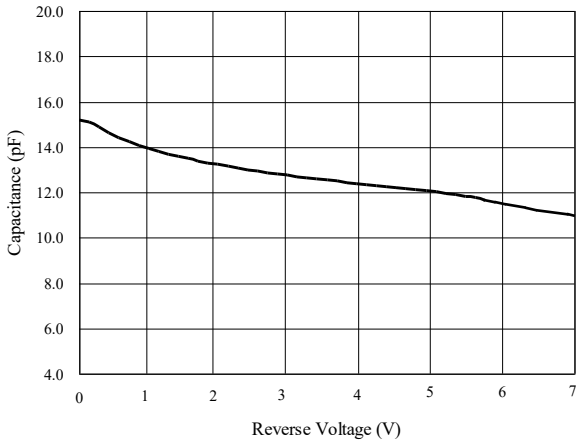


Insertion Loss S21

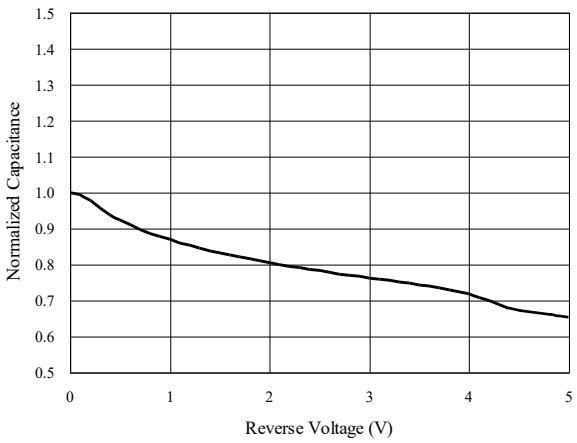


Capacitance vs. Voltage of I/O_1 to I/O_2 (f = 1MHz)

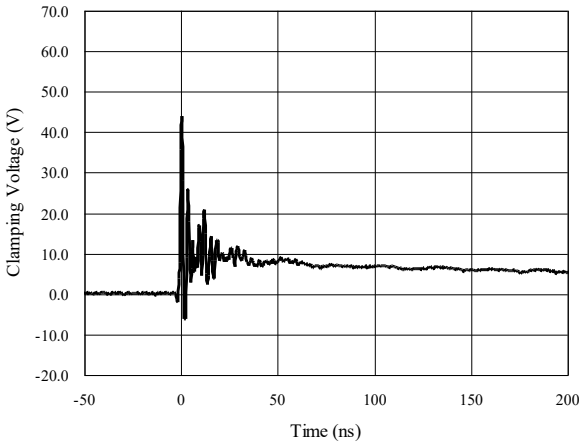
Capacitance *vs.* Reverse Voltage



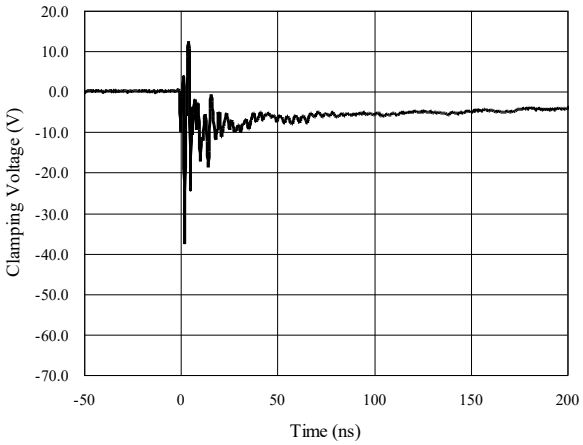
Normalized Capacitance *vs.* Reverse Voltage



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

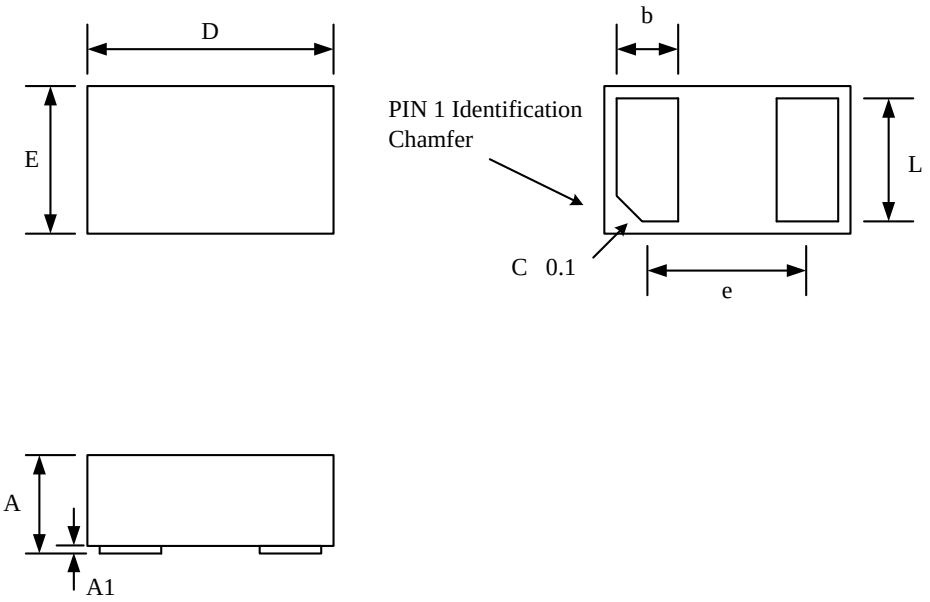


ESD Clamping of I/O_1 to I/O_2 (-8kV Contact per IEC 61000-4-2)



Package Outline

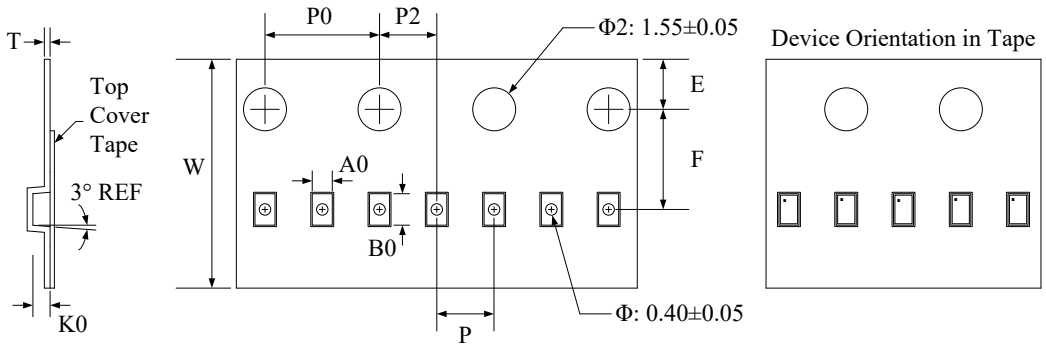
- DFN1006-2L Package
- MSL-1



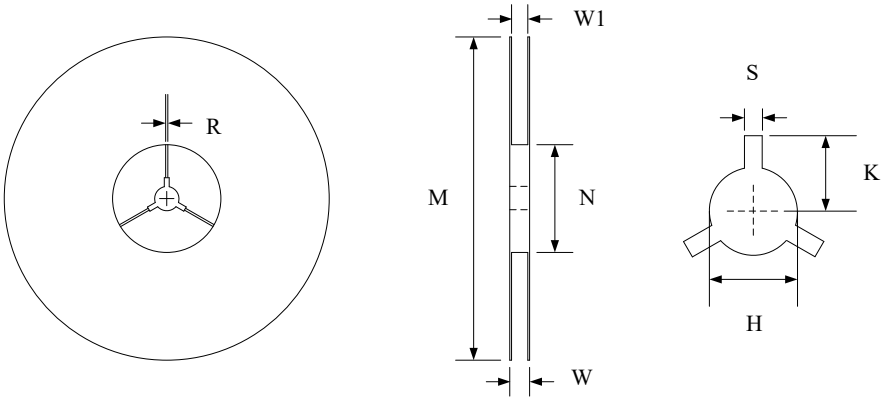
Package Dimensions (Controlling dimensions are in millimeters)

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Minimum	Maximum	Minimum	Maximum
A	0.400	0.550	0.016	0.022
A1	0.000	0.050	0.000	0.002
D	0.950	1.050	0.037	0.041
E	0.550	0.650	0.022	0.026
b	0.200	0.300	0.008	0.012
e	0.650 BSC		0.026 BSC	
L	0.450	0.550	0.018	0.022

Tape and Reel Specification



Symbol	W	A0	B0	K0	E	F	P	P0	P2	T
Dimensions (mm)	8.00±0.1	0.7±0.05	1.15±0.05	0.55±0.05	1.75±0.1	3.5±0.05	2.0±0.1	4.0±0.1	2.0±0.05	0.2±0.05



Symbol	Reel Size	M	N	W	W1	H	S	K	R
Dimensions (mm)	Φ178	178.0±1.0	60.0±1.0	11.5±0.5	9.0±0.5	13.0±0.5	2.0±0.1	11.0±0.2	1.0±0.05

Marking Codes

Note:
(1) "PD" is part number, fixed

Ordering Information

Part Number	Working Voltage	Quantity Per Reel	Reel Size
TT0701MBX	7V	10,000	7 Inch