

Features

- Transient protection for high-speed data lines
 - IEC 61000-4-2 (ESD) $\pm 30\text{kV}$ (Air)
 - $\pm 30\text{kV}$ (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 x 0.6mm x 0.55mm)
- Protects one data, control or power line
- Low capacitance: 12pF (Typical)
- Low leakage current: 0.1 μA @ V_{RWM} (Typical)
- Low clamping voltage
- Each I/O pin can withstand over 1000 ESD strikes for $\pm 8\text{ kV}$ contact discharge

Description

T0501MB is a low-capacitance Transient Voltage Suppressor (TVS) designed to provide electrostatic discharge (ESD) protection for data, control or power line. With typical capacitance of 12pF only, T0501MB 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 ($\pm 15\text{ kV}$ air, $\pm 8\text{ kV}$ 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.

T0501MB uses ultra-small DFN1006 package. Each T0501MB device can protect one data line. It offers system designers flexibility to protect single data line where space is a premium concern.

Applications

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

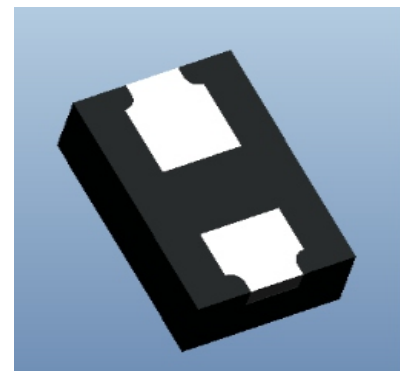
Mechanical Characteristics

- DFN1006 package
- Flammability Rating: UL 94V-0
- Marking: Part number, date code
- Packaging: Tape and Reel

Circuit Diagram



Pin Configuration



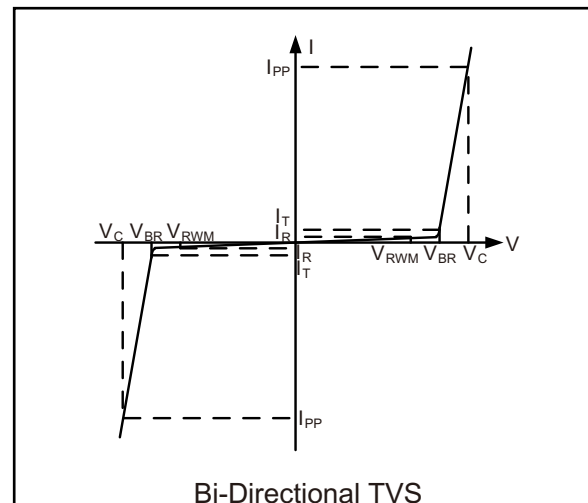
DFN1006
(Top View)

Absolute Maximum Rating

Symbol	Parameter	Value	Units
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	$^{\circ}C$
T_{STG}	Storage Temperature	-55/+150	$^{\circ}C$

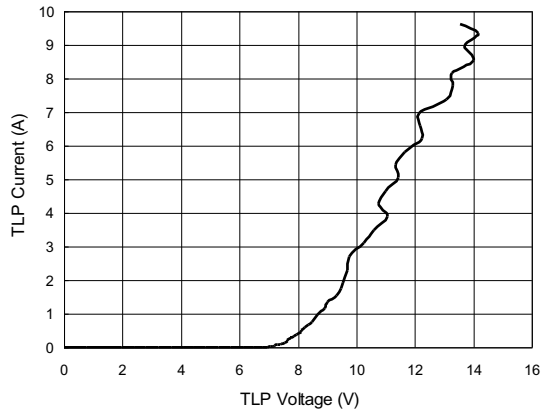
Electrical Characteristics (T=25 $^{\circ}C$)

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}	Peak Pulse Current
C_{ESD}	Parasitic Capacitance
V_R	Reverse Voltage
f	Small Signal Frequency

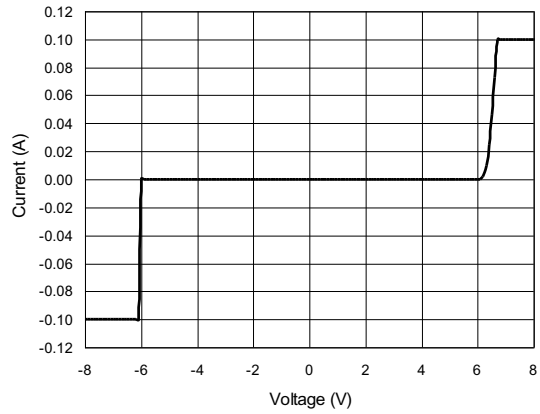


Symbol	Test Condition	Minimum	Typical	Maximum	Units
V_{RWM}				5.0	V
I_R	$V_{RWM} = 5V, T = 25^{\circ}C$ Between I/O1 and I/O2		0.1	1.0	μA
V_{BR}	$I_T = 1mA$ Between I/O1 and I/O2	5.5	6.0	8.0	V
V_C	$I_{PP} = 1A, t_p = 8/20\mu s$ Between I/O1 and I/O2			10	V
V_C	$I_{PP} = 4A, t_p = 8/20\mu s$ Between I/O1 and I/O2			15	V
C_{ESD}	$V_R = 0V, f = 1MHz$ Between I/O1 and I/O2		12	15	pF

TLP Measurement of I/O _1 to I/O_2

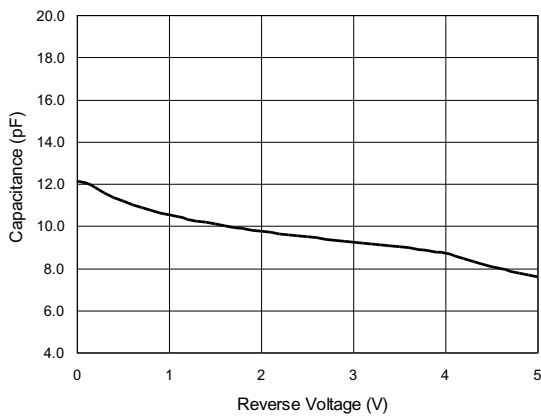


Voltage Sweeping of I/O_1 to I/O_2

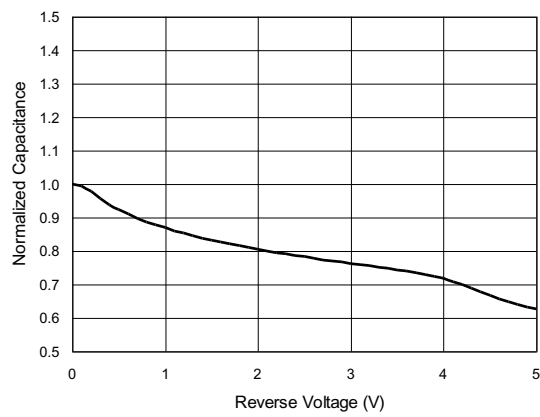


Capacitance vs. Voltage of I/O_1 to I/O_2 (f = 1MHz)

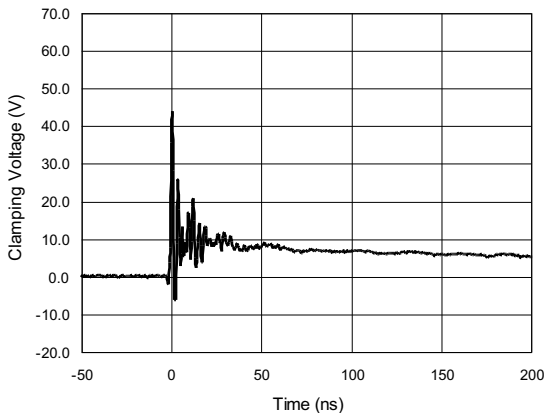
Capacitance vs. Reverse Voltage



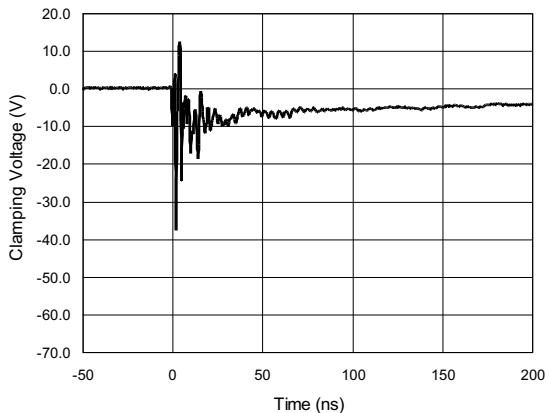
Normalized Capacitance vs. Reverse Voltage



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

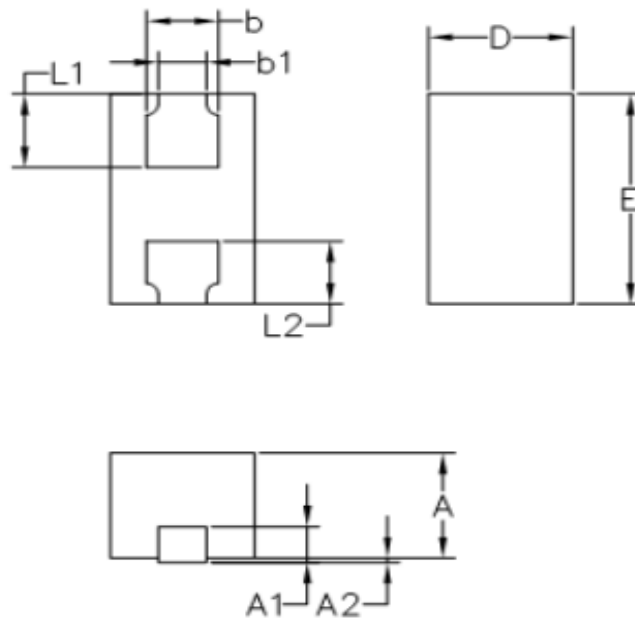


ESD Clamping of I/O_1 to I/O_2 (-8kV Contact per IEC 61000 -4-2)



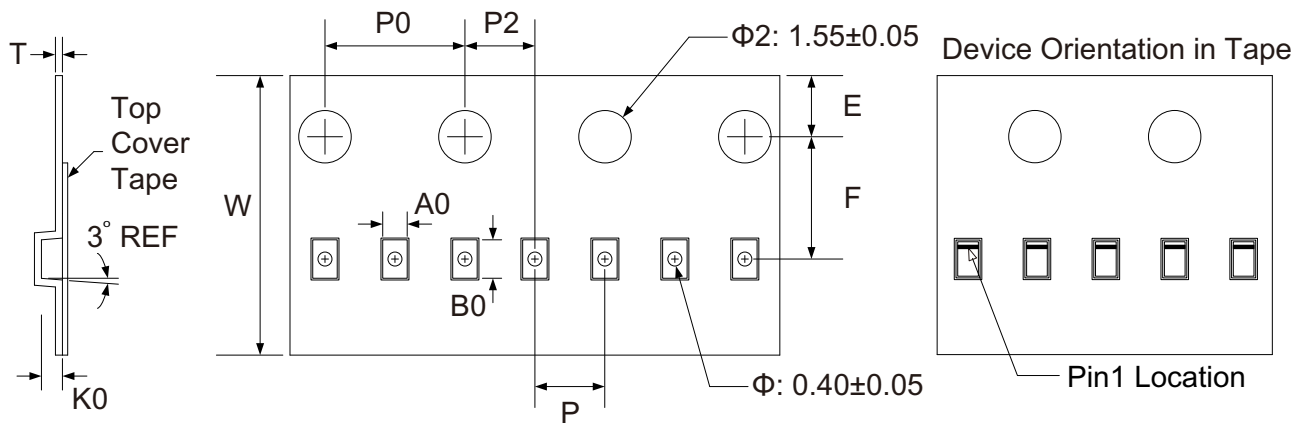
Package Outline

DFN1006 package
 2 leads, very small package
 MSL-1

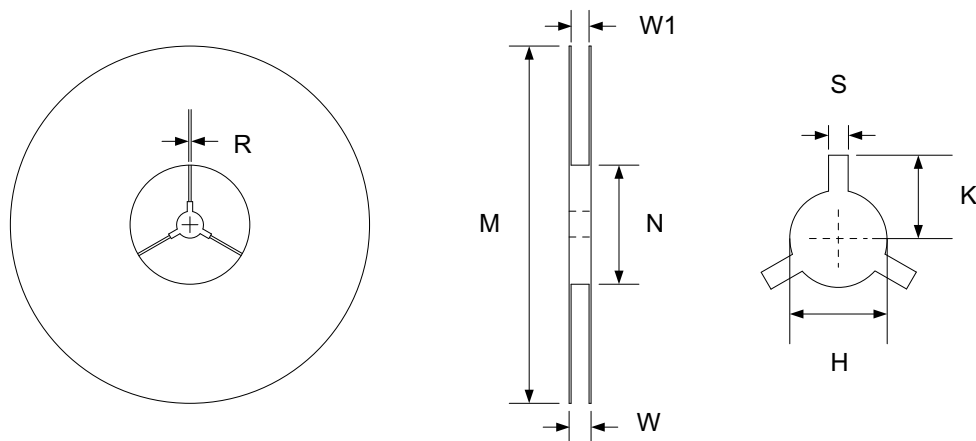


Package Dimensions (Controlling dimensions are in millimeters)

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Minimum	Maximum	Minimum	Maximum
A	0.450	0.550	0.018	0.022
A1	0.15 REF			
A2	0.000	0.050	0.000	0.002
E	0.950	1.050	0.037	0.041
D	0.550	0.650	0.022	0.026
b	0.250	0.350	0.010	0.014
b1	0.150	0.250	0.006	0.010
L1	0.300	0.400	0.012	0.016
L2	0.250	0.350	0.010	0.014

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



└ Pin1 Identification

Note:

- (1) "F" is part number, fixed
- (2) "M" is data code, which is the assembly month in three years, changing as (1~9,0,A~Z)

Ordering Information

Part Number	Working Voltage	Quantity Per Reel	Reel Size
T0501MB	5V	10,000	7 Inch

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