

Features

- Transient protection for high-speed data lines
 - IEC61000-4-2 (ESD) $\pm 25\text{kV}$ (Air)
 - $\pm 20\text{kV}$ (Contact)
 - IEC61000-4-5 (Lightning) 4A (8/20 μs)
- Small package saves board space
- Protects one I/O line (unidirectional)
- Low capacitance: 0.65pF@0V (Typical) (I/O-GND)
- Low leakage current: 100nA @ V_{RWM} (Maximum)
- Low clamping voltage
- Each I/O pin can withstand over 1000 ESD strikes for $\pm 20\text{kV}$ contact discharge

Description

TT0511TBX is an ultra-low capacitance Transient Voltage Suppressor (TVS) designed to provide electrostatic discharge (ESD) protection for high-speed data interfaces. With typical capacitance of 0.65pF only, it is designed to protect parasitic-sensitive systems against over-voltage and over-current transient events.

The TT0511TBX comes in a RoHS compliant and Halogen Free 1.0mm x 0.6mm x 0.5mm DFN1006-2L package.

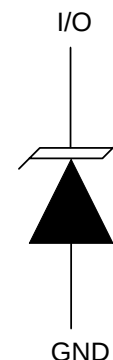
Applications

- Portable applications
- Communication systems
- Computers and peripherals
- High speed data lines
 - USB 2.0/3.0(Gen 1)
 - eSATA
 - DisplayPort

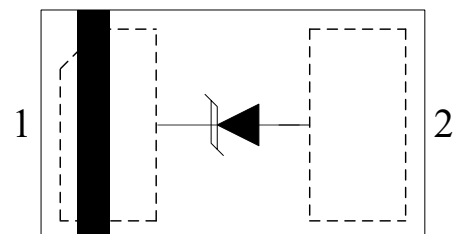
Mechanical Characteristics

- Package: DFN1006-2L
- Marking: Part number
- Packaging: Tape and Reel
- ROHS compliant

Circuit Diagram



Pin Configuration

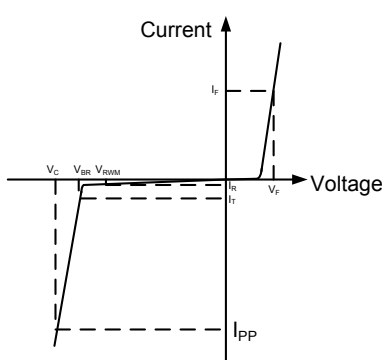


DFN1006-2L
(Top View)

Absolute Maximum Rating

Symbol	Parameter	Value	Units
I_{PP}	Peak Pulse Current (8/20 μ s)	4.0	A
P_{PK}	Peak Pulse Power (8/20 μ s)	60	W
V_{ESD}	ESD per IEC61000-4-2 (Air) ESD per IEC61000-4-2 (Contact)	± 25 ± 20	kV
T_{OPT}	Operating Temperature	-55/+125	°C
T_{STG}	Storage Temperature	-55/+150	°C

Electrical Characteristics (T = 25°C)

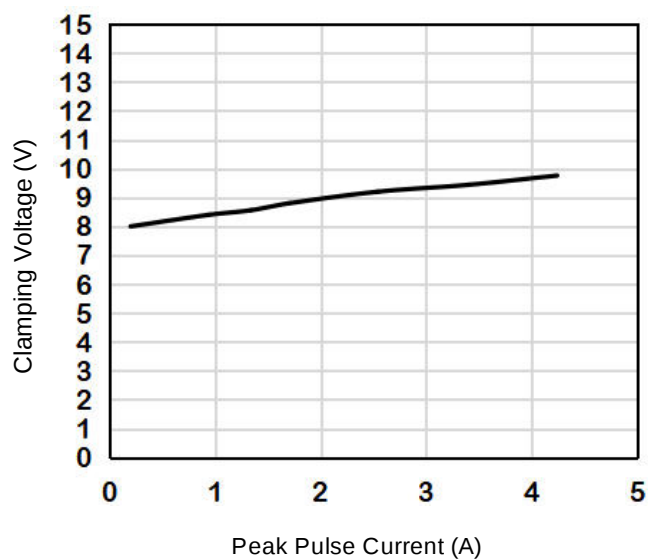
Symbol	Parameter	Diagram
V_{RWM}	Nominal Reverse Working Voltage	
I_R	Reverse Leakage Current @ V_{RWM}	
V_{BR}	Reverse Breakdown Voltage @ I_T	
I_T	Test Current for Reverse Breakdown	
V_C	Clamping Voltage @ I_{PP}	
I_{PP}	Maximum Peak Pulse Current	
C_{ESD}	Parasitic Capacitance	
I_F	Forward Current	
V_F	Forward Voltage @ I_F	

Symbol	Test Condition	Minimum	Typical	Maximum	Units
V_{RWM}				5.0	V
I_R	$V_{RWM} = 5.0V$, $T = 25^\circ C$		1	100	nA
V_{BR}	$I_T = 1mA$	6.0	8.0		V
V_C	$I_{PP} = 4.0A$, $t_p = 8/20\mu s$			15.0	V
V_C	$I_{PP} = 8.0A$, $t_p = 100ns^{(1)}$		9.6		V
	$I_{PP} = 16.0A$, $t_p = 100ns^{(1)}$		11.5		V
R_{dyn}	$I_{PP} = 12.0A$, $t_p = 100ns^{(1)}$		0.24		Ω
C_{ESD}	$V_R = 0V$, $f = 1MHz$		0.65		pF

Notes:(1)Measurements performed using a 100ns Transmission Line Pulse(TLP) system.

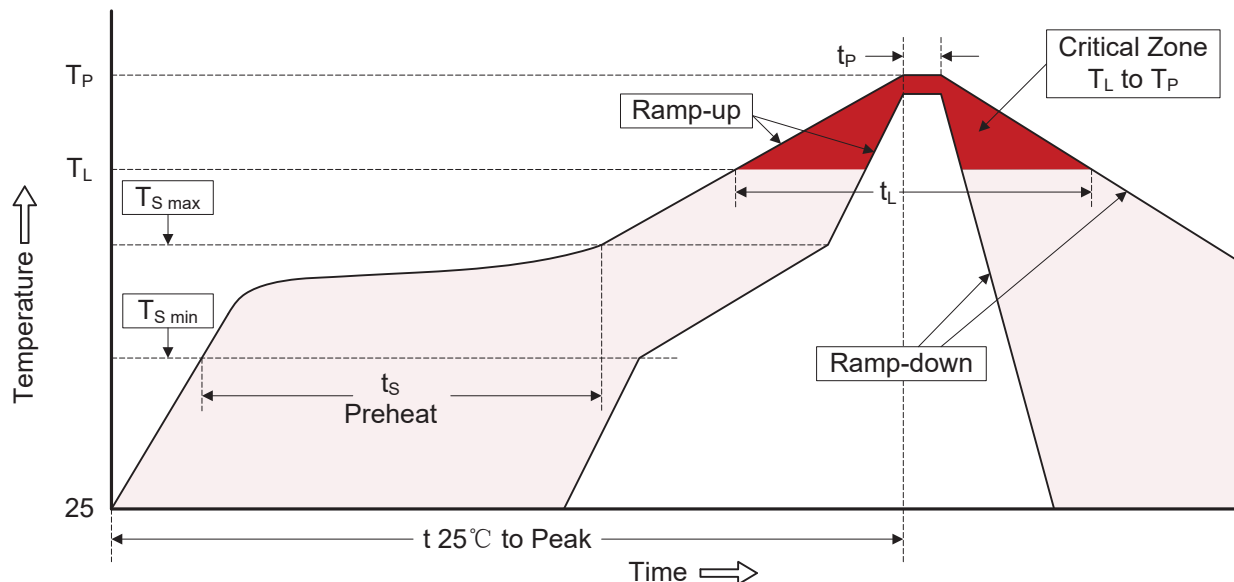
Typical Performance Characteristics

Clamping Voltage vs. Peak Pulse Current



Recommended Soldering Conditions

Reflow Soldering

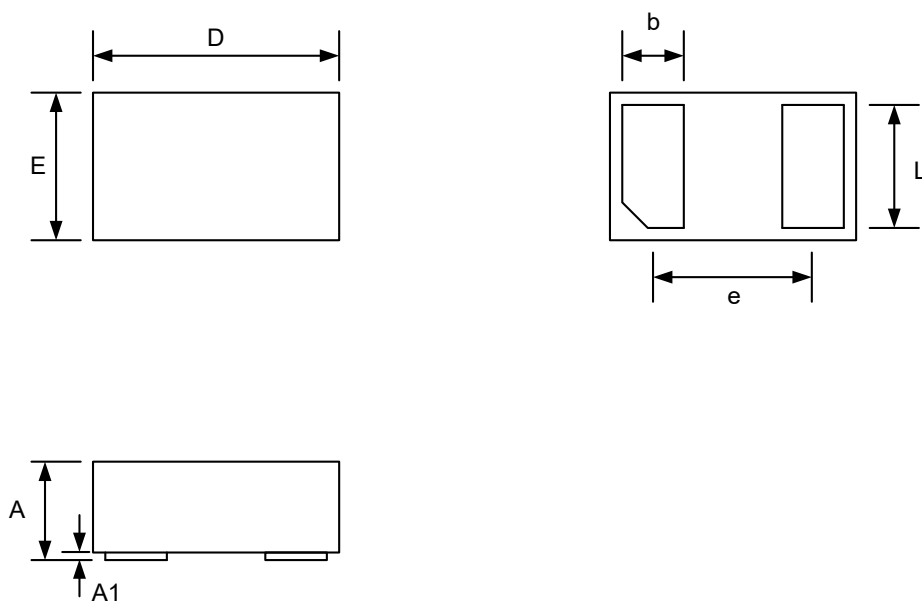


Recommended Conditions

Profile Feature	Pb-Free Assembly
Average ramp-up rate (T_L to T_P)	3°C/second max.
Preheat -Temperature Min ($T_{S\ min}$) -Temperature Max ($T_{S\ max}$) -Time (min to max) (t_s)	150°C 200°C 60-180 seconds
$T_{S\ max}$ to T_L -Ramp-up Rate	3°C/second max.
Time maintained above: -Temperature (T_L) -Time (t_L)	217°C 60-150 seconds
Peak Temperature (T_P)	260°C
Time within 5°C of actual Peak Temperature (t_P)	20-40 seconds
Ramp-down Rate	6°C/second max.
Time 25°C to Peak Temperature	8 minutes max.

Package Outline

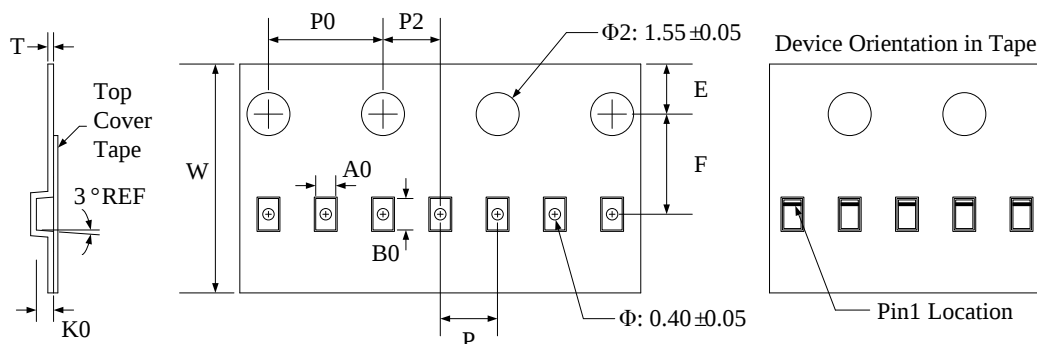
- ❑ DFN1006-2L package
- ❑ 2 leads, very small package
- ❑ MSL-1



Package Dimensions (Controlling dimensions are in millimeters)

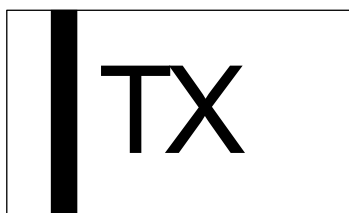
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Minimum	Maximum	Minimum	Maximum
A	0.450	0.550	0.017	0.022
A1	0.000	0.050	0.000	0.002
D	0.950	1.050	0.037	0.041
E	0.550	0.650	0.022	0.026
b	0.200	0.300	0.008	0.012
e	0.650 BSC		0.026 BSC	
L	0.450	0.550	0.018	0.022

Carries Tape 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

Marking Codes



Note:

- (1) "T" is part number.
- (2) "X" is the internal code.

Ordering Information

Part Number	Working Voltage	Quantity Per Reel	Reel Size
TT0511TBX	5.0V	10,000	7 Inch