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 (0.6mm×0.3mm×0.3mm)
- Protects one data, control or power line
- Low capacitance: 16pF (Typical)
- Low leakage current: 0.1μA @ V_{RWM} (Typical)
- Low clamping voltage
- Each I/O pin can withstand over 1000 ESD strikes for ±8kV contact discharge

Description

TT0301NAX is a low-capacitance Transient Voltage Suppressor (TVS) designed to provide electrostatic discharge (ESD) protection for high-speed data interfaces. With typical capacitance of 16pF only, TT0301NAX 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 (±15kV 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.

TT0301NAX uses ultra-small DFN0603 package. Each TT0301NAX device can protect one data line. It offers system designers flexibility to protect single data line where space is a premium concern.

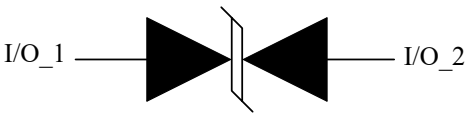
Applications

- Portable Electronics
- Desktops, Servers and Notebooks
- Cellular Phones
- MP3 Ports
- Digital Camera Ports

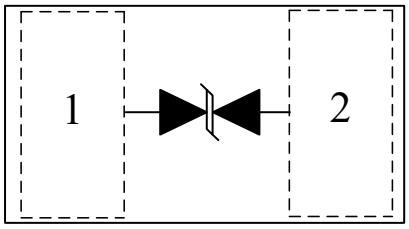
Mechanical Characteristics

- DFN0603-2L package
- Flammability Rating: UL 94V-0
- Marking: Part number
- Packaging: Tape and Reel

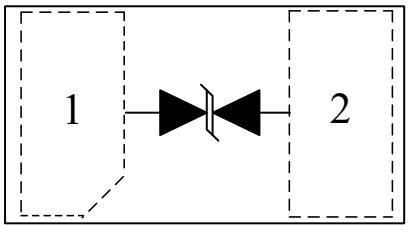
Circuit Diagram



Pin Configuration



OR



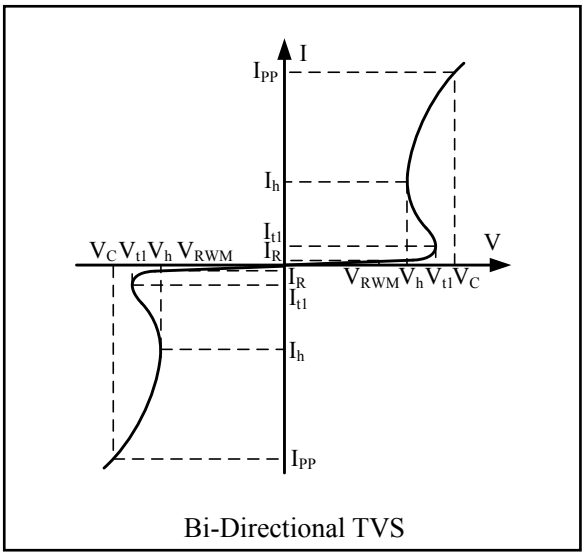
DFN0603-2
(Top View)

Absolute Maximum Rating

Symbol	Parameter	Value	Units
I_{PP}	Peak Pulse Current(tp=8/20us)	10	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)

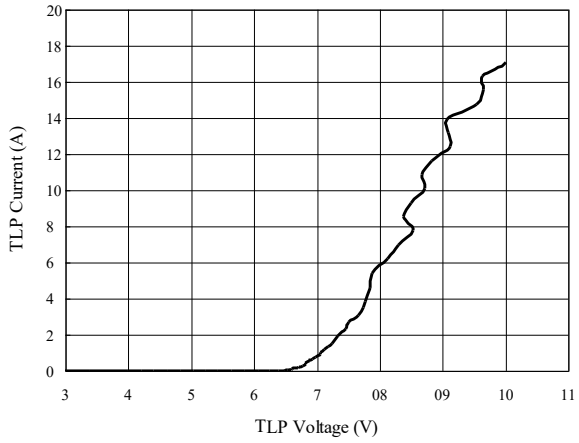
Symbol	Parameter
V_{RWM}	Nominal Reverse Working Voltage
I_R	Reverse Leakage Current @ V_{RWM}
V_{t1}	Trigger Voltage
I_{t1}	Trigger Current @ V_{t1}
V_h	Holding Voltage
I_h	Holding Current @ V_h
V_C	Clamping Voltage @ I_{PP}
V_{CR}	Reverse Clamping Voltage @ I_{PP}
I_{PP}	Maximum Peak Pulse Current
C_{ESD}	Parasitic Capacitance



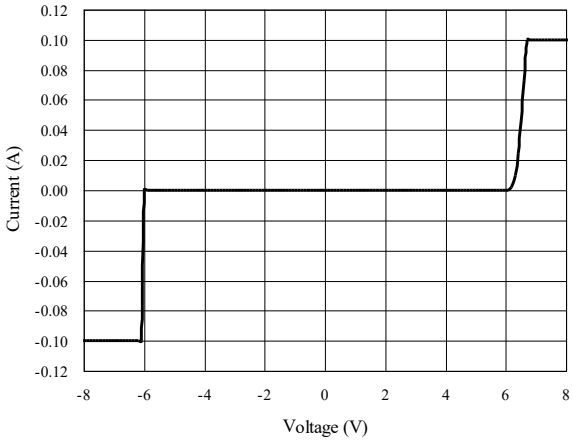
Bi-Directional TVS

Symbol	Test Condition	Minimum	Typical	Maximum	Units
V_{RWM}				3.3	V
I_R	V_{RWM} = 3.3V, T = 25°C		0.01	0.1	µA
V_{t1}	I_{t1} = 1µA	5.2	6.5	7.0	V
V_h	I_h = 5mA	4.9		6.0	V
V_C	I_{PP} = 1A, t_p = 8/20µs			7.0	V
V_C	I_{PP} = 4 A, t_p = 8/20µs			8.5	V
V_{CR}	I_{PP} = 8A, t_p = 8/20µs			10.0	V
C_{ESD}	V_R = 0V, f = 1MHz		16	20	pF

TLP Measurement of I/O_1 to I/O_2

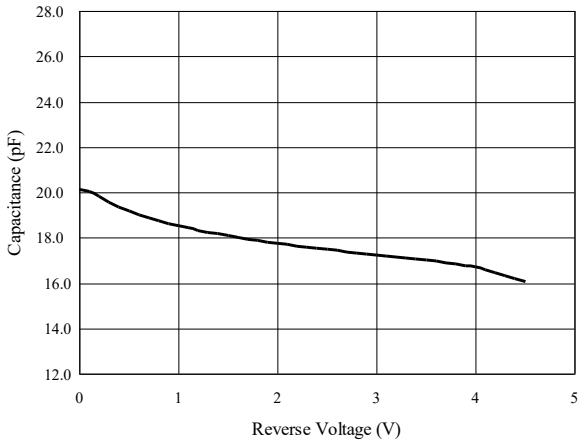


Voltage Sweeping of I/O_1 to I/O_2

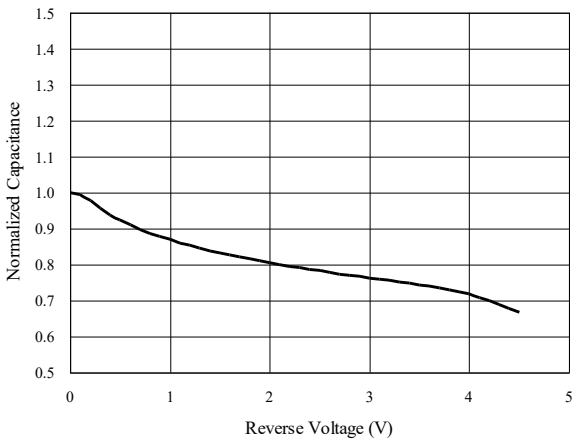


Capacitance vs. Voltage of I/O_1 to I/O_2 (f = 1MHz)

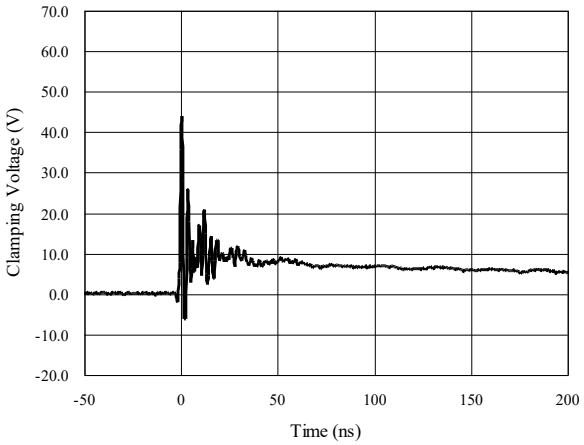
Capacitance *vs.* Reverse Voltage



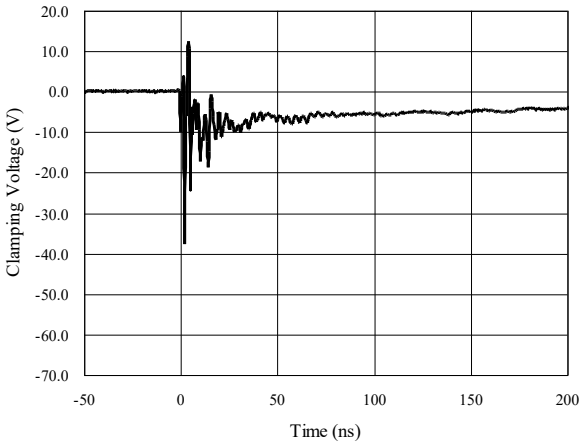
Normalized Capacitance *vs.* Reverse Voltage



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



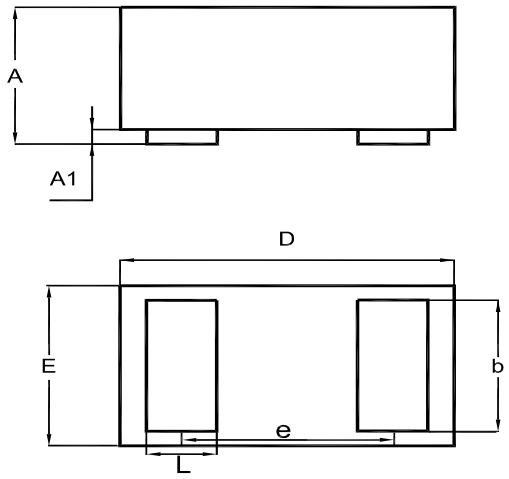
ESD Clamping of I/O_1 to I/O_2 (-8kV Contact per IEC 61000-4-2)



PACKAGE OUTLINE

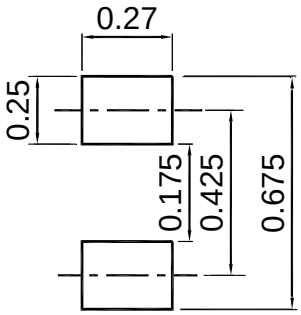
Plastic surface mounted package; 2 leads

DFN0603-2L



UNIT	A	A1	b	D	E	e	L
mm	0.27 0.33	0 0.025	0.21 0.29	0.57 0.65	0.28 0.35	0.355	0.14 0.22

Recommended Soldering Footprint

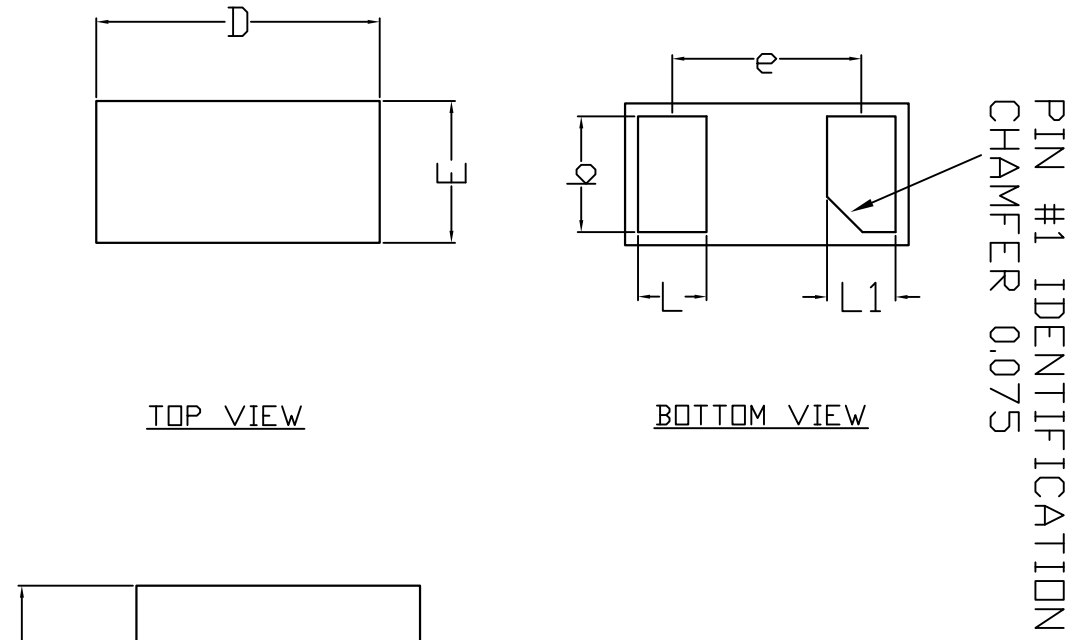


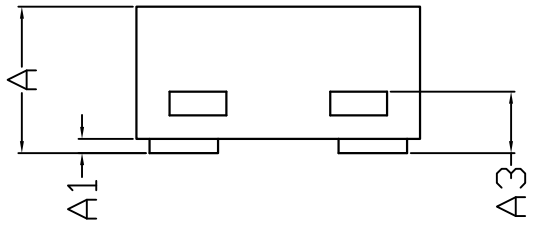
Packing information

Package	Tape Width (mm)	Pitch		Reel Size		Per Reel Packing Quantity
		mm	inch	mm	inch	
DFN0603	8	4 ± 0.1	0.157 ± 0.004	178	7	10,000

Package Outline

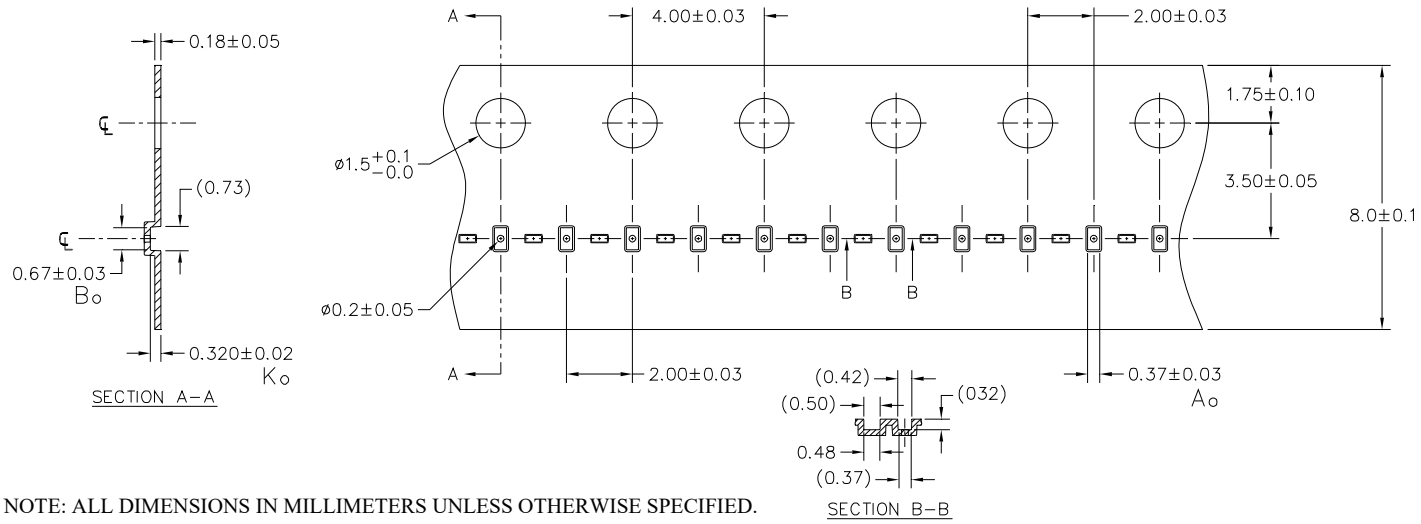
- DFN0603 package
- 2 leads
- MSL-1





COMMON DIMENSIONS(MM)			
PKG.	X3-EXTREME THIN		
REF.	MIN.	NOM.	MAX
A	>0.23	–	0.33
A1	0.00	–	0.05
A3	0.102REF.		
D	0.55	0.60	0.65
E	0.25	0.30	0.35
b	0.215	0.245	0.275
L	0.115	0.145	0.175
L1	0.115	0.145	0.175
e	0.40BSC		

Carries Tape Specification

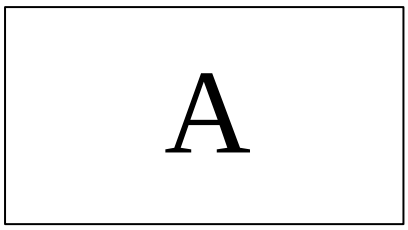


NOTE: ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.

A0	B0	K0
0.37 +/-0.03	0.67 +/-0.03	0.32 +/-0.02 mm

Note: All dimensions in mm unless otherwise specified

Marking Codes



Ordering Information

Part Number	Qty per Reel	Reel Size
TT0301NAX	10, 000	7 inch

Note:

(1) "A" is part number, fixed