Features

- Transient protection for high-speed data lines
  IEC61000-4-2 (ESD) ±8kV (Air)
  ±8kV (Contact)
  IEC61000-4-5 (Lightning) 5.5A (8/20μs)
- Small package saves board space
- Protects one I/O line (bidirectional)
- Low capacitance: 0.27pF@0V (Typical) (I/O-I/O)
- Low leakage current: 10nA @ V_{RWM}(Maximum)
- Low clamping voltage
- Each I/O pin can withstand over 1000 ESD strikes for ±8kV contact discharge
- Those with A meet the AEC-Q101 standard

Description

TTA0541SAX 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 0.27pF only, it is designed to protect parasitic-sensitive systems against over-voltage and over-current transient events.

The TTA0541SAX comes in a RoHS compliant and Halogen Free 0.6mm x 0.3mm x 0.3mm DFN 0603-2L package.

Applications

- Protable applications
- Communication systems
- Computers and peripherals
- High speed data lines:
  - ➢USB 2.0/3.0/3.1(Gen 1)
  - ➢eSATA
  - ➢DisplayPort

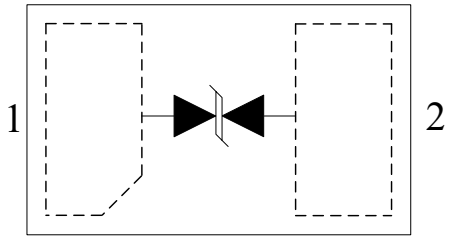
Mechanical Characteristics

- Package: DFN0603-2L
- Marking: Part number
- Packaging: Tape and Reel
- ROHS compliant

Circuit Diagram



Pin Configuration

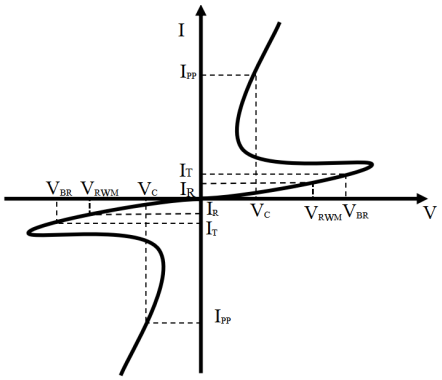


DFN0603-2L
(Top View)

Absolute Maximum Rating

Symbol	Parameter	Value	Units
I_{PP}	Peak Pulse Current (8/20μs)	5.5	A
P_{PK}	Peak Pulse Power (8/20μs)	26	W
V_{ESD}	ESD per IEC61000-4-2 (Air) ESD per IEC61000-4-2 (Contact)	±8 ±8	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	
R_{dyn}	Dynamic Resistance	
α_{IL}	Insertion Loss	

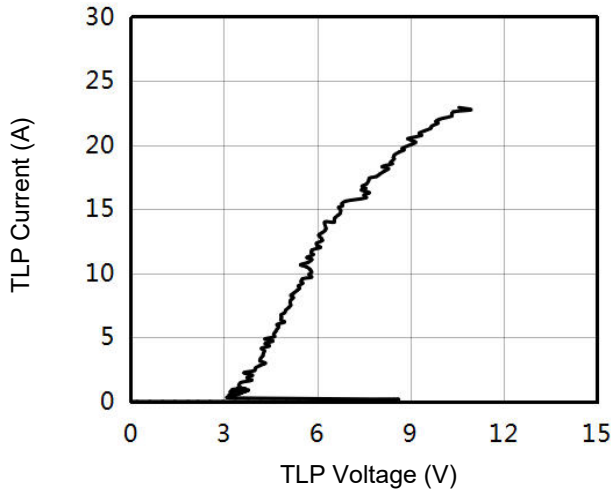
Symbol	Test Condition	Minimum	Typical	Maximum	Units
V_{RWM}				5.0	V
I_R	V_{RWM} = 5.0V , T = 25°C		1	10	nA
V_{BR}	I_T = 1mA	6.0	8.2		V
V_C	I_{PP} = 5.5A, t_p = 8/20μs		5.2		V
V_C	I_{PP} = 8.0A, t_p= 100ns(1)		5.3		V
	I_{PP} = 16.0A, t_p=100ns(1)		7.5		V
R_{dyn}	I_{PP} = 12.0A, t_p= 100ns(1)		0.27		Ω

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

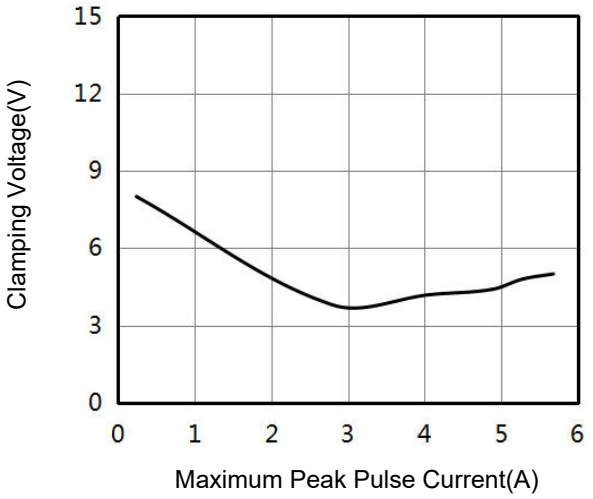
Symbol	Test Condition	Minimum	Typical	Maximum	Units
C_{ESD}	V_R = 0V, f = 1MHz		0.27		pF
	V_R = 0V, f = 5GHz		0.20		pF
α_{IL}	f = 5GHz		-0.15		dB
	f = 10GHz		-1.1		dB

Typical Performance Characteristics

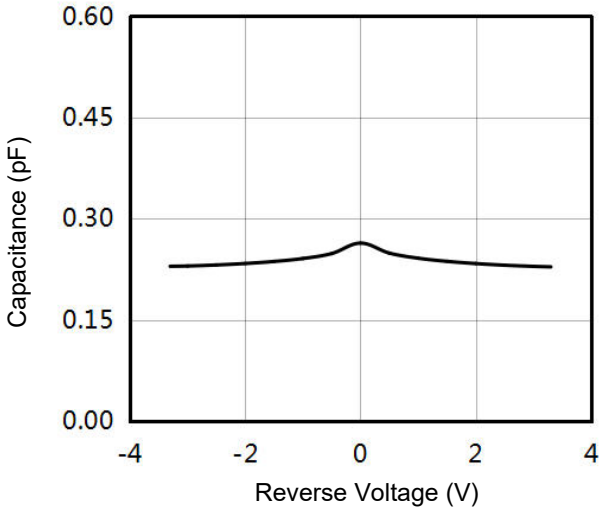
TLP Measurement of I/O to I/O



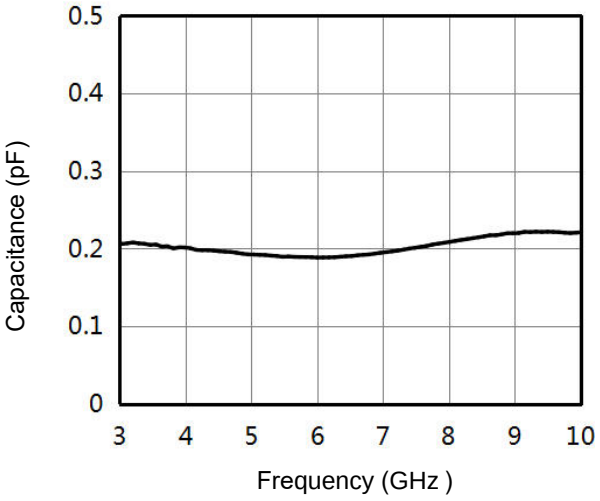
8/20us Current of I/O to I/O



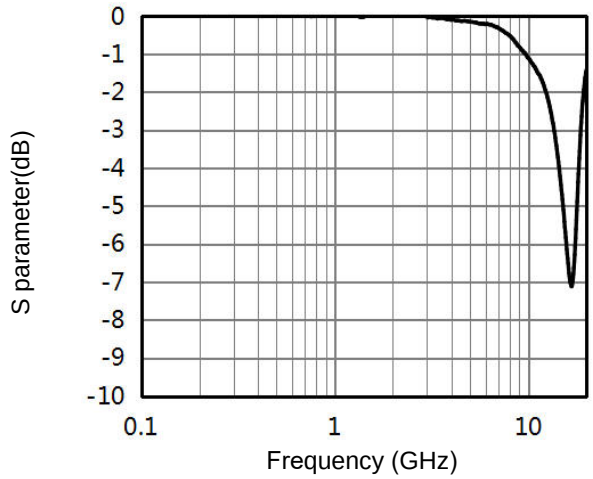
Capacitance vs Reverse Voltage of I/O to I/O



Capacitance vs Frequency of I/O to I/O

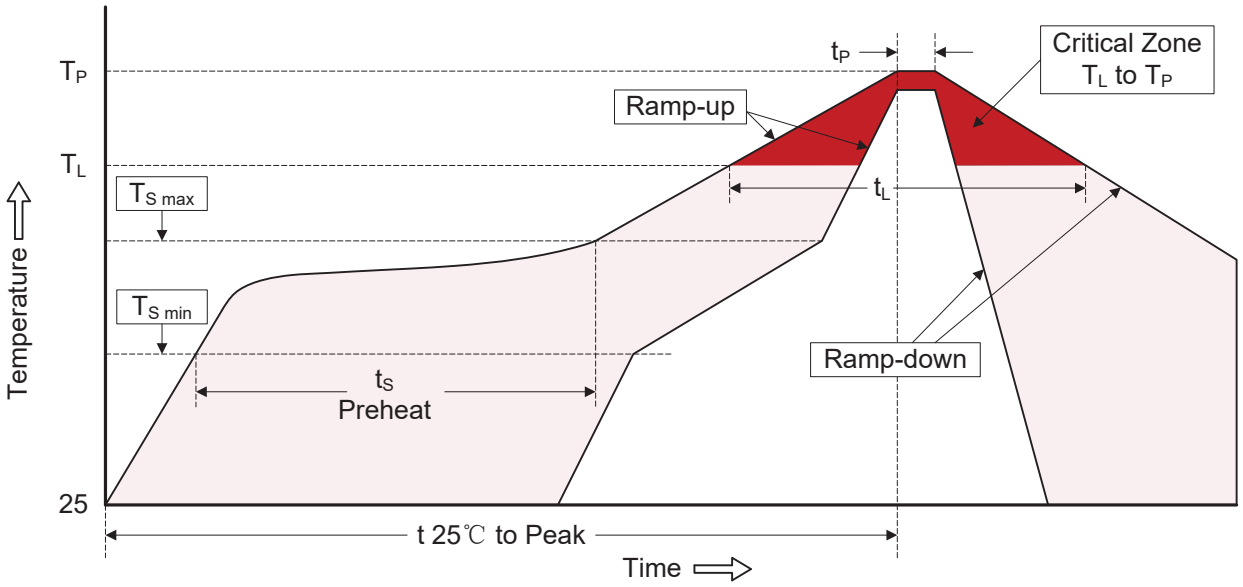


Insertion loss



Recommended Soldering Conditions

Reflow Soldering

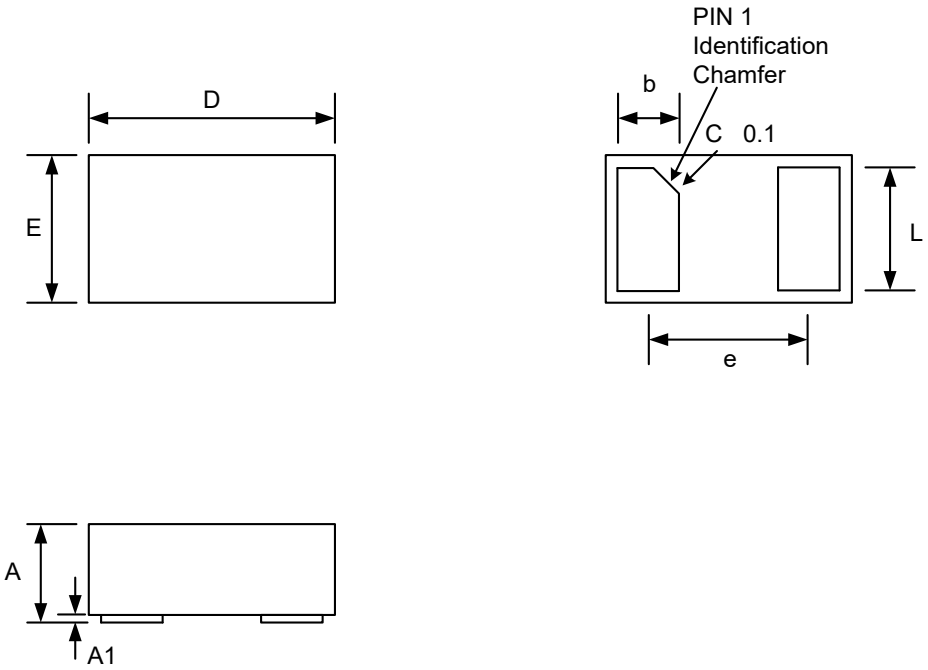


Recommended Conditions

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

Package Outline

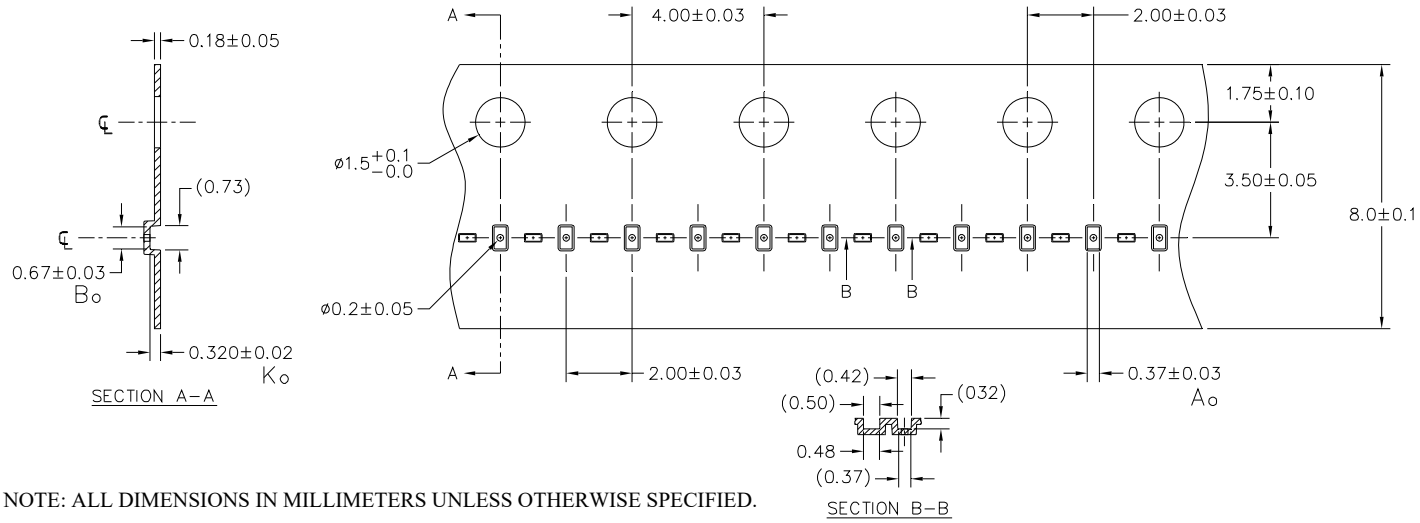
- ❑ DFN0603-2L package
- ❑ 2 leads, very small package
- ❑ MSL-1



Package Dimensions (Controlling dimensions are in millimeters)

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Minimum	Maximum	Minimum	Maximum
A	0.270	0.330	0.011	0.013
A1	0.000	0.050	0.000	0.002
D	0.600	0.640	0.023	0.025
E	0.300	0.340	0.011	0.013
b	0.115	0.175	0.005	0.007
e	0.400 BSC		0.016 BSC	
L	0.215	0.275	0.008	0.011

Carries Tape Specification

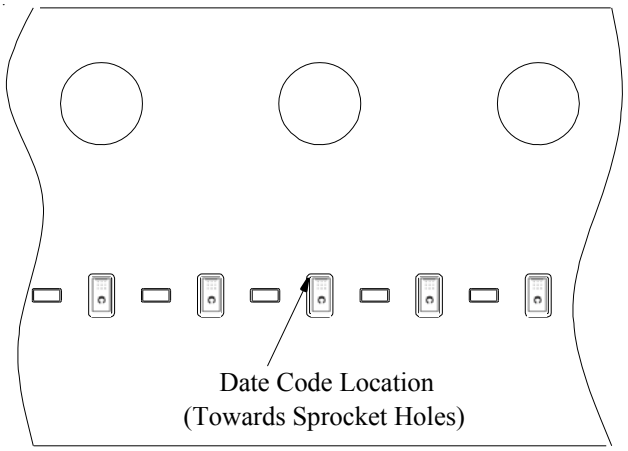


NOTE: ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.

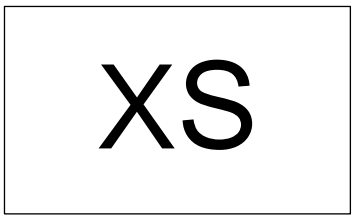
A0	B0	K0
0.37 +/-0.03	0.67 +/-0.03	0.32 +/-0.02 mm

Note: All dimensions in mm unless otherwise specified

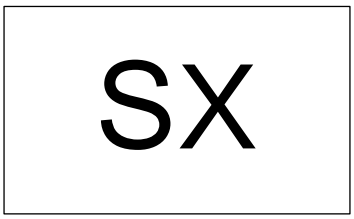
Device Orientation in Tape



Marking Codes



OR



Note:
(1) "S" is part number.
(2) "X" is the internal code.

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(2) "X" is the internal code.

Ordering Information

Part Number	Working Voltage	Quantity Per Reel	Reel Size
TTA0541SAX	5.0V	10,000	7Inch

Unikeyic Electronics

Global Electronic Components Distributor

Click to view pricing, inventory, delivery, and lifecycle information:

JY:

JY2312X MMBT3906X TNM01K20FX TS0512PMX TT1501SBX P0300SCX RCLAMP0524P TS2411LEX TT0514TLX B5819WX JY1103-H390BX JY1117E50AX JY1106-ADJBX TS0421LEX TS1811LD-CX JY2126AX JY9425X P3100SCX TS0321LEX TS0334PLX SMCJ20AX TT0301MAX TT0511TEX TL431 TP6063F-TDX TT0201SAX TT0401TBX TT0314TPX JY1103-H330QX JY1106-180EX