

## Features

- Transient protection for high-speed data lines
 

IEC61000-4-2 (ESD)	±10kV (Air)
	±10kV (Contact)
IEC61000-4-5 (Lightning)	6.0A (8/20µs)
- Small package saves board space
- Protects one I/O line (bidirectional)
- Low capacitance: 0.34pF@0V (Typical) (I/O-I/O)
- Low leakage current: 0.01µA @  $V_{RWM}$ (Maximum)
- Low clamping voltage
- Each I/O pin can withstand over 1000 ESD strikes for ±10kV contact discharge

## Description

TT0341 SAX 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 0.34pF only, it is designed to protect parasitic-sensitive systems against over-voltage and over-current transient events.

The TT0341 SAX comes in a RoHS compliant and Halogen Free 0.6mm x 0.3mm x 0.3mm DFN0603-2L package.

## Applications

- Portable applications
- Communication systems
- Computers and peripherals
- High speed data lines:
  - USB 2.0/3.0/3.1
  - HDMI 1.4/2.0

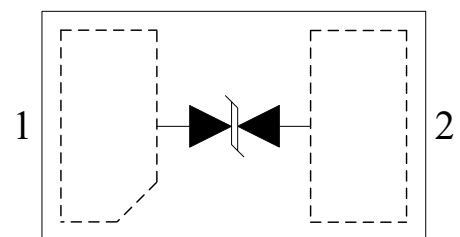
## Mechanical Characteristics

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

## Circuit Diagram



## Pin Configuration

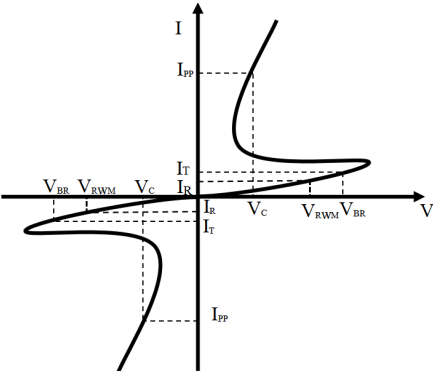


DFN0603-2L  
(Top View)

## Absolute Maximum Rating

Symbol	Parameter	Value	Units
$I_{PP}$	Peak Pulse Current (8/20 $\mu$ s)	6	A
$P_{PK}$	Peak Pulse Power (8/20 $\mu$ s)	33	W
$V_{ESD}$	ESD per IEC61000-4-2 (Air) ESD per IEC61000-4-2 (Contact)	$\pm 10$ $\pm 10$	kV
$T_{OPT}$	Operating Temperature	-55/+125	$^{\circ}$ C
$T_{STG}$	Storage Temperature	-55/+150	$^{\circ}$ C

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

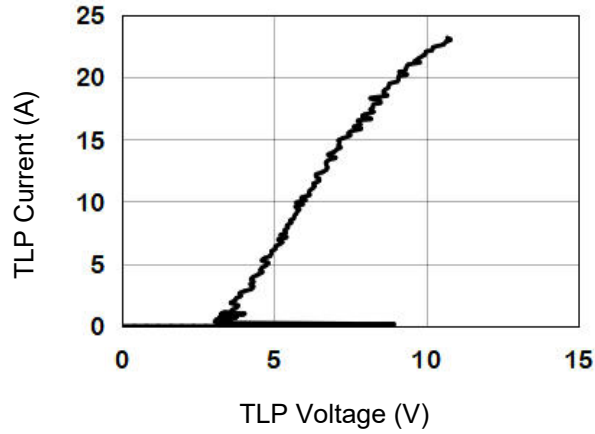
Symbol	Parameter	Diagram
$V_{RWM}$	Nominal Reverse Working Voltage	
$I_R$	Reverse Leakage Current @ $V_{RWM}$	
$V_{BR}$	Reverse Breakdown Voltage @ $I_T$	
$I_T$	Test Current for Reverse Breakdown	
$V_C$	Clamping Voltage @ $I_{PP}$	
$I_{PP}$	Maximum Peak Pulse Current	
$C_{ESD}$	Parasitic Capacitance	
$R_{dyn}$	Dynamic Resistance	

Symbol	Test Condition	Minimum	Typical	Maximum	Units
$V_{RWM}$				3.3	V
$I_R$	$V_{RWM} = 3.3V, T = 25^{\circ}C$		1	10	nA
$V_{BR}$	$I_T = 1mA$	6.0	7.2		V
$V_C$	$I_{PP} = 6A, t_p = 8/20\mu s$		5.5	8.0	V
$V_C$	$I_{PP} = 8.0A, t_p = 100ns^{(1)}$		6.0		V
	$I_{PP} = 16.0A, t_p = 100ns^{(1)}$		8.0		V
$R_{dyn}$	$I_{PP} = 12.0A, t_p = 100ns^{(1)}$		0.3		$\Omega$
$C_{ESD}$	$V_R = 0V, f = 1MHz$		0.34		pF

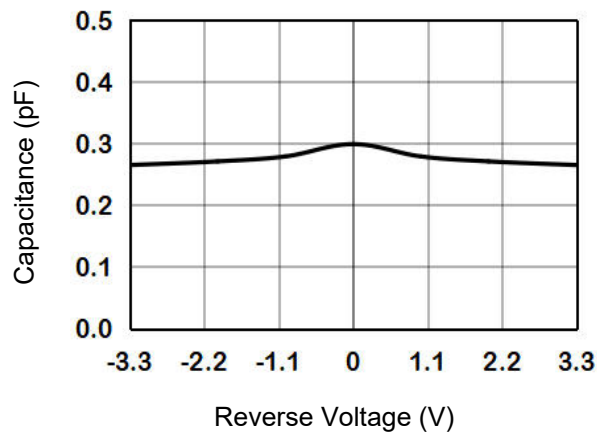
Notes:(1)Measurements performed using a 100ns Transmission Line Pulse(TLP) system.

## Typical Performance Characteristics

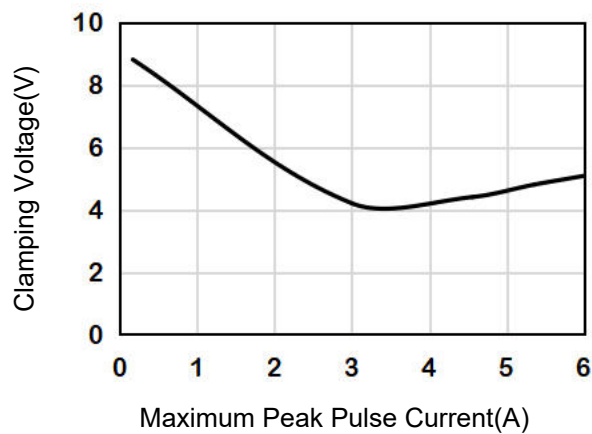
**TLP Measurement of I/O to I/O**



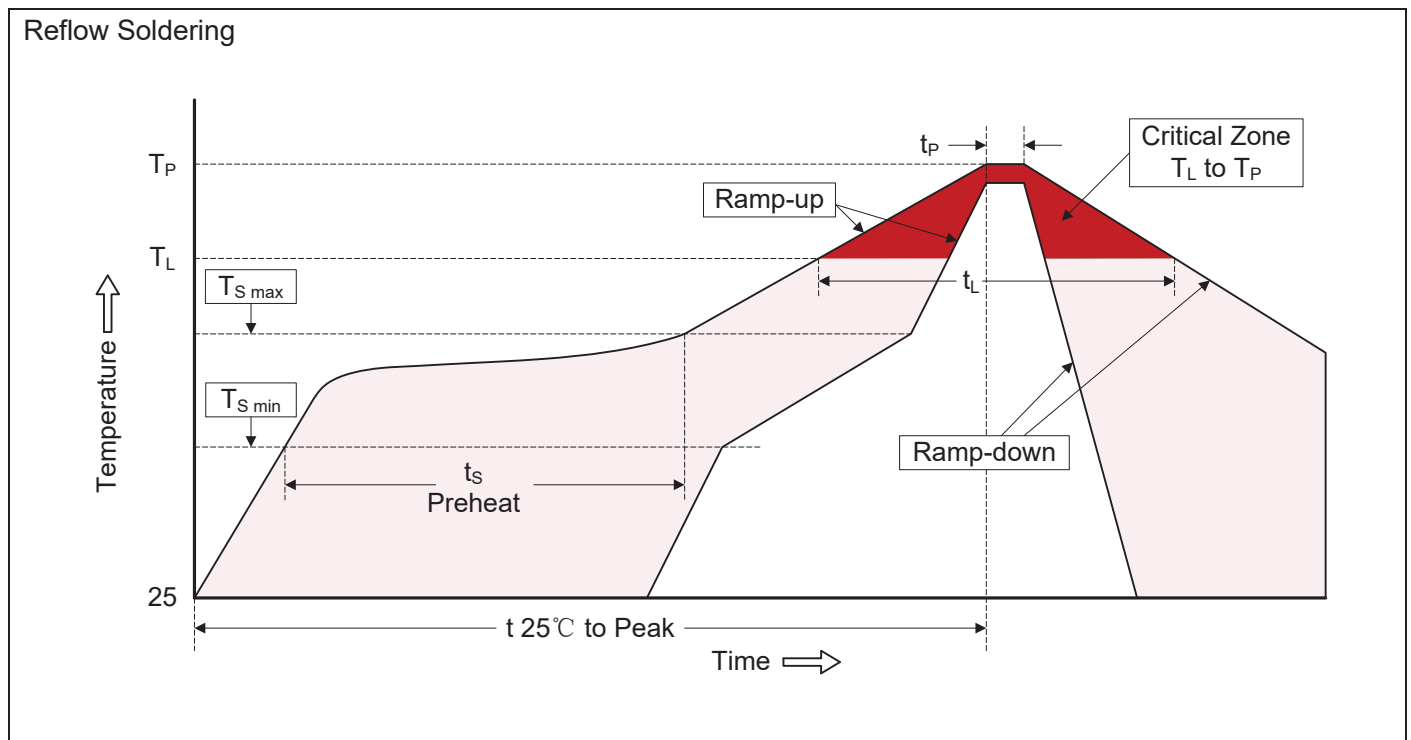
**Capacitance vs Reverse Voltage IO to IO**



**8/20us Current IO to IO**



## Recommended Soldering Conditions

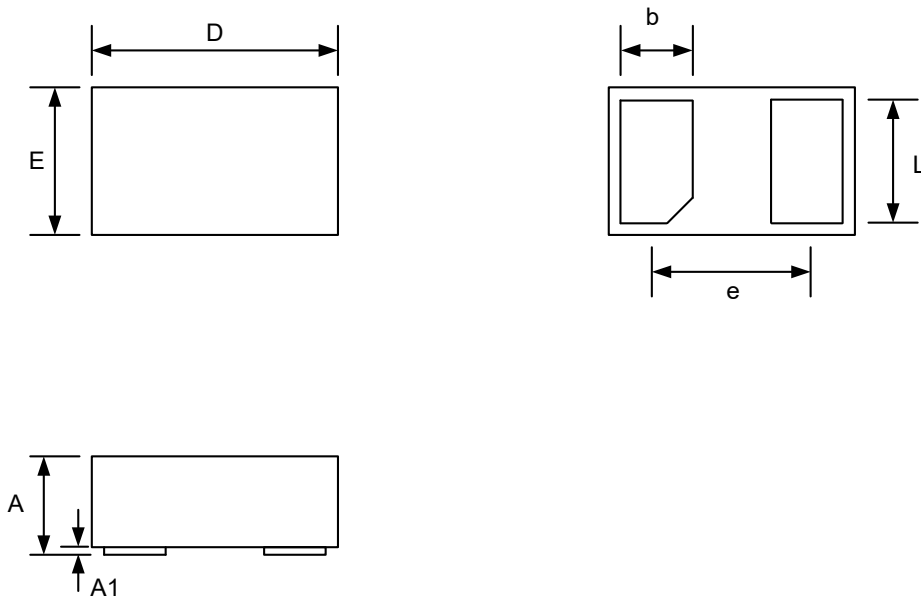


Recommended Conditions

Profile Feature	Pb-Free Assembly
Average ramp-up rate ( $T_L$ to $T_P$ )	3°C/second max.
Preheat	
-Temperature Min ( $T_{S\ min}$ )	150°C
-Temperature Max ( $T_{S\ max}$ )	200°C
-Time (min to max) ( $t_s$ )	60-180 seconds
$T_{S\ max}$ to $T_L$	
-Ramp-up Rate	3°C/second max.
Time maintained above:	
-Temperature ( $T_L$ )	217°C
-Time ( $t_L$ )	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

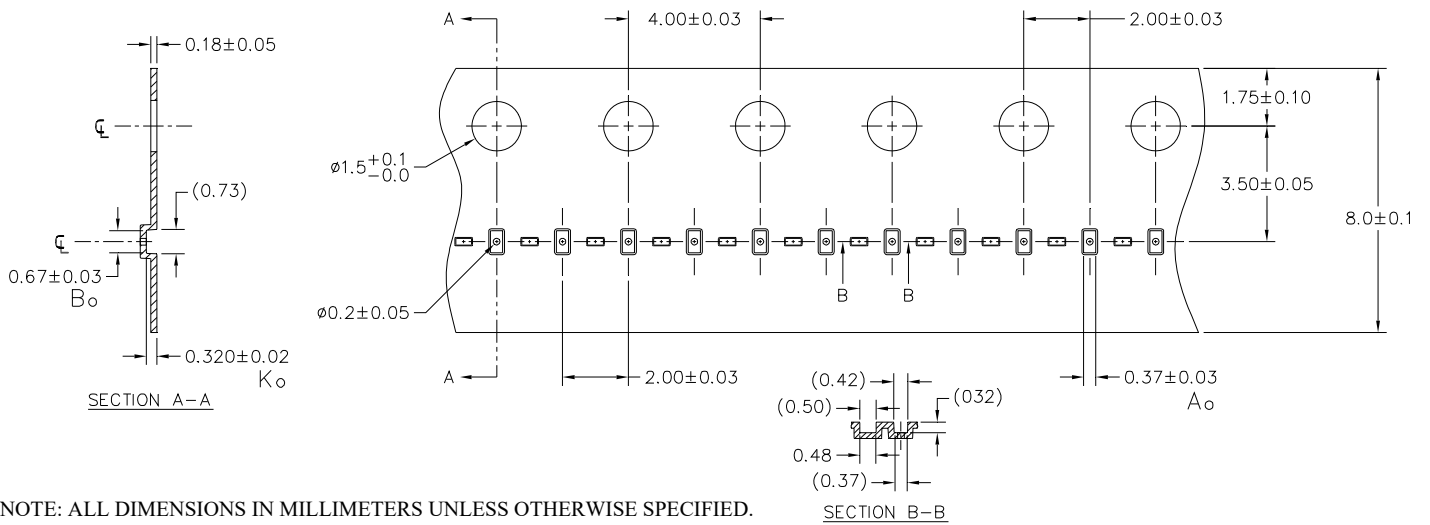
- ❑ DFN0603-2L package
- ❑ 2 leads, very small package
- ❑ MSL-1



Package Dimensions (Controlling dimensions are in millimeters)

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Minimum	Maximum	Minimum	Maximum
A	0.250	0.350	0.010	0.014
A1	0.000	0.020	0.000	0.001
D	0.550	0.650	0.022	0.026
E	0.250	0.350	0.010	0.014
b	0.150	0.250	0.006	0.010
e	0.350 BSC		0.014 BSC	
L	0.180	0.280	0.007	0.011

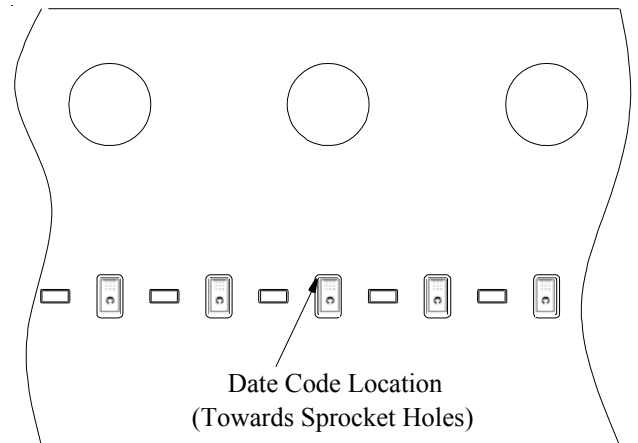
## Carries Tape Specification



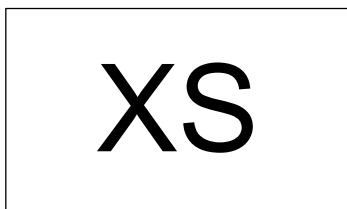
### Device Orientation in Tape

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



### Note:

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

## Ordering Information

Part Number	Working Voltage	Quantity Per Reel	Reel Size
TT0341SAX	3.3V	10,000	7 Inch