



PRODUCT SPECIFICATION

DOCUMENT NO.ENS000136090

DESCRIPTION	DRAWN BY	DESIGNED BY	CHECKED BY	APPROVED BY
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TVC5VB1S-DFN0603-2LDG Engineering Specification

1. Features

- Bi-directional ESD protection for high-speed data lines
- IEC61000-4-2(ESD) $\pm 20\text{kV}$ (Air) / $\pm 20\text{kV}$ (Contact)
- IEC61000-4-5(Surge) 9A (8/20 μs)
- For 5V and below operating voltage
- Ultra Low capacitance: 0.2pF (Typical)
- Ultra-small package: 0.6mmx0.3mmx0.3mm

2. Applications

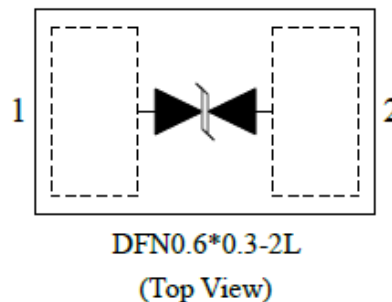
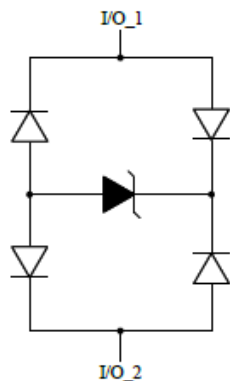
- Thunderbolt
- USB3.x
- USB Type-C

3. Explanation of Part Number

<u>TV</u>	<u>C</u>	<u>5V</u>	<u>B1</u>	<u>S</u>	<u>-DFN0603</u>	<u>-2L</u>	<u>DG</u>
-1	-2	-3	-4	-5	-6	-7	-8

- (1) Product Type : TV=TVS Diode
- (2) Capacitance Code
- (3) Working Voltage: 5V=5V
- (4) Direction/Channel Code : B=Bi-directional, 1=Channel
- (5) Control Code
- (6) Package Size
- (7) Pin Code: 2L: 2 Pins
- (8) Inpaq Control Code

4. Circuit Diagram & Pin Configuration



5. Maximum Ratings (Ta=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
IEC 61000-4-2 ESD Voltage Air Model Contact Model	V _{ESD} ⁽¹⁾	±20	kV
		±20	
Peak Pulse Current	I _{PP} ⁽²⁾	9	A
Operating Temperature Range	T _J	-40 ~ +125	°C
Storage Temperature Range	T _{STG}	-55 ~ +150	°C
Lead Soldering Temperature	T _{SOL}	260	°C

(1) Device stressed with ten non-repetitive ESD pulses.

(2) Non-repetitive current pulse 8/20µs exponential decay waveform according to IEC61000-4-5.

6. Electrical Characteristics (T = 25 °C)

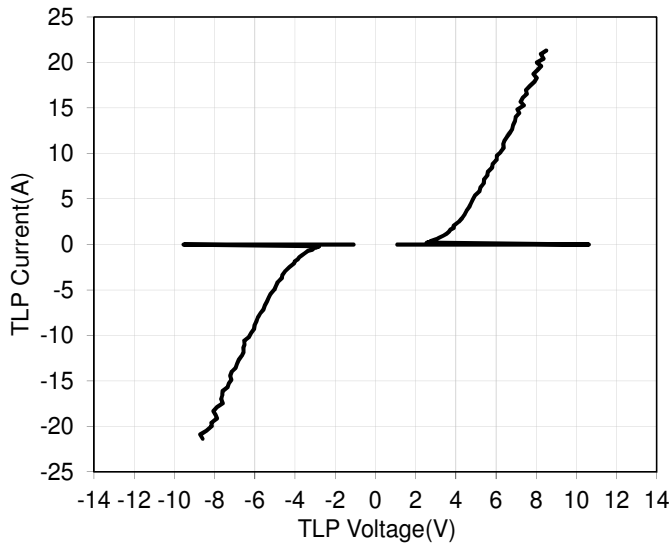
Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Reverse stand-off voltage	V _{RWM} ⁽¹⁾				5	V
Reverse Leakage Current	I _R	V _{RWM} = 5V, T = 25°C			2	µA
Breakdown Voltage	V _B	I _B = 0.5mA, I/O to GND	5.5	9		V
Clamping Voltage	V _C ⁽²⁾	I _{PP} = 16A, t _p = 10/100ns		6.8		V
Clamping Voltage	V _C	I _{PP} = 9A, t _p = 8/20us		6		V
Junction Capacitance	C _{ESD}	V _R = 0V, f = 1MHz		0.2	0.25	pF

(1) Guaranteed by design and not subject to production test.

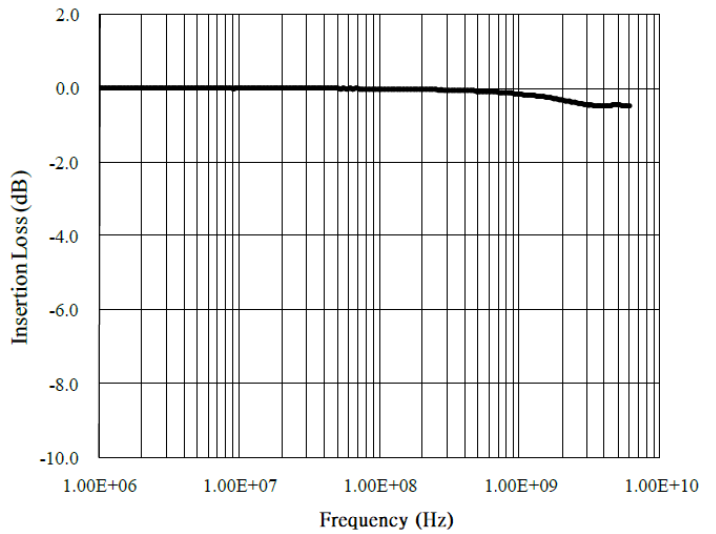
(2) Non-repetitive current pulse 8/20µs exponential decay waveform according to IEC61000-4-5.

7. Typical Characteristics

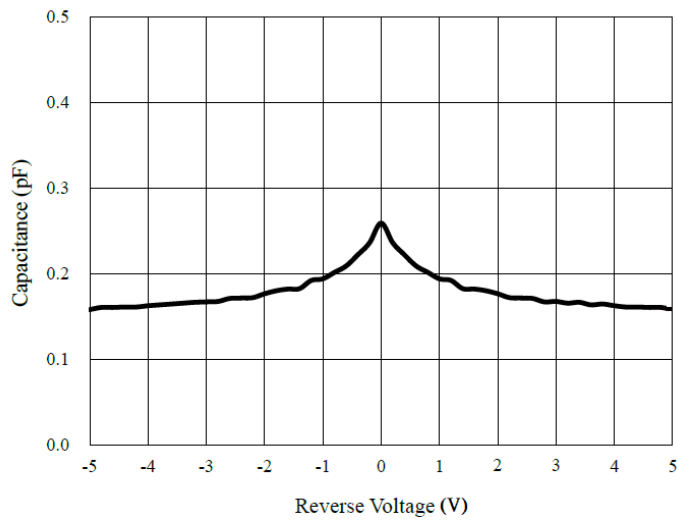
TLP Clamping Voltage



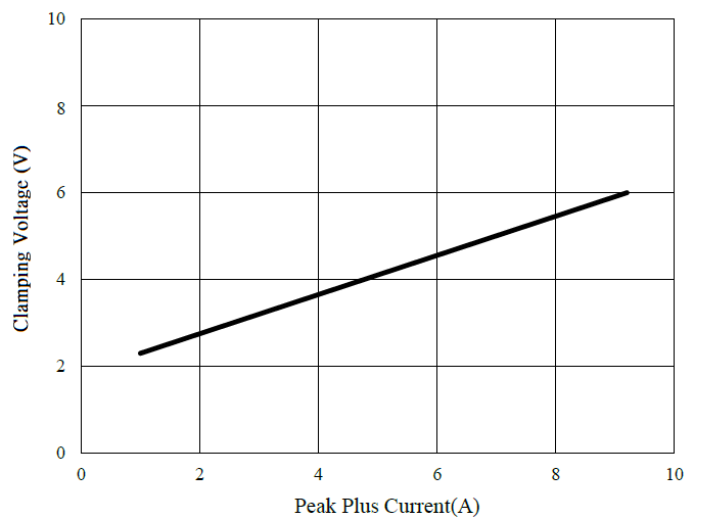
Insertion Loss S21



Capacitance vs. Voltage

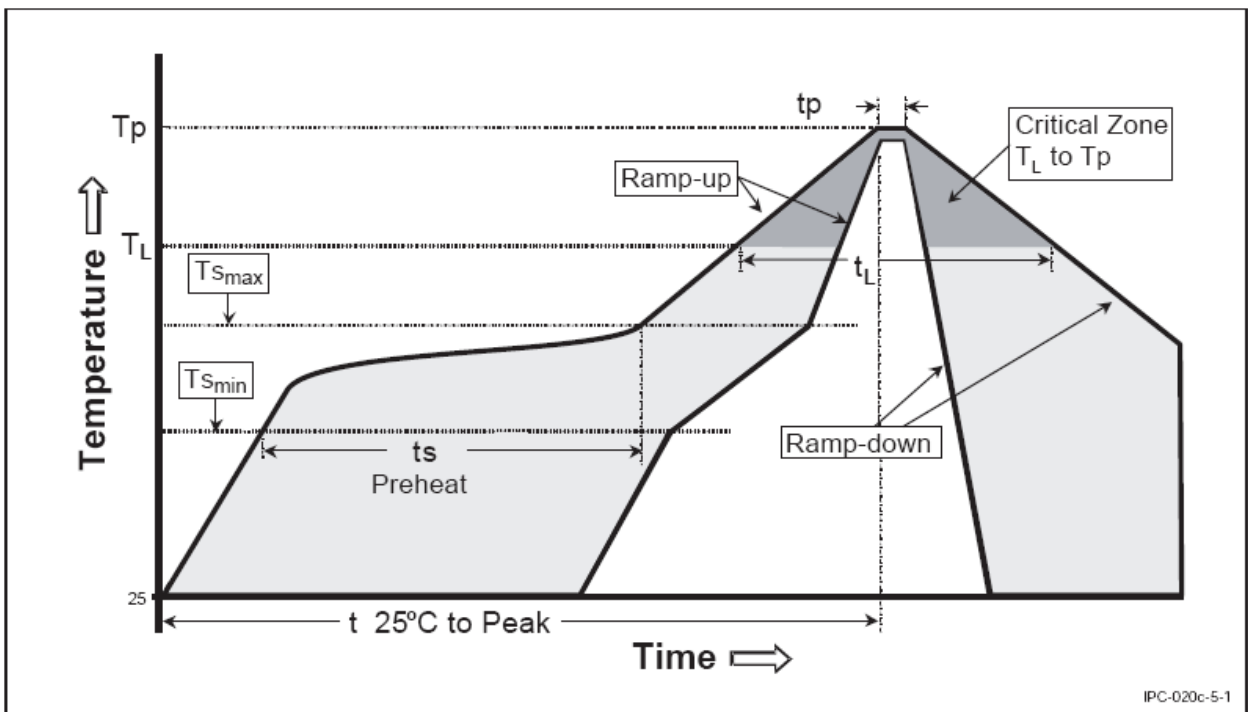


Clamping Voltage vs. Peak Pulse Current (8/20us)

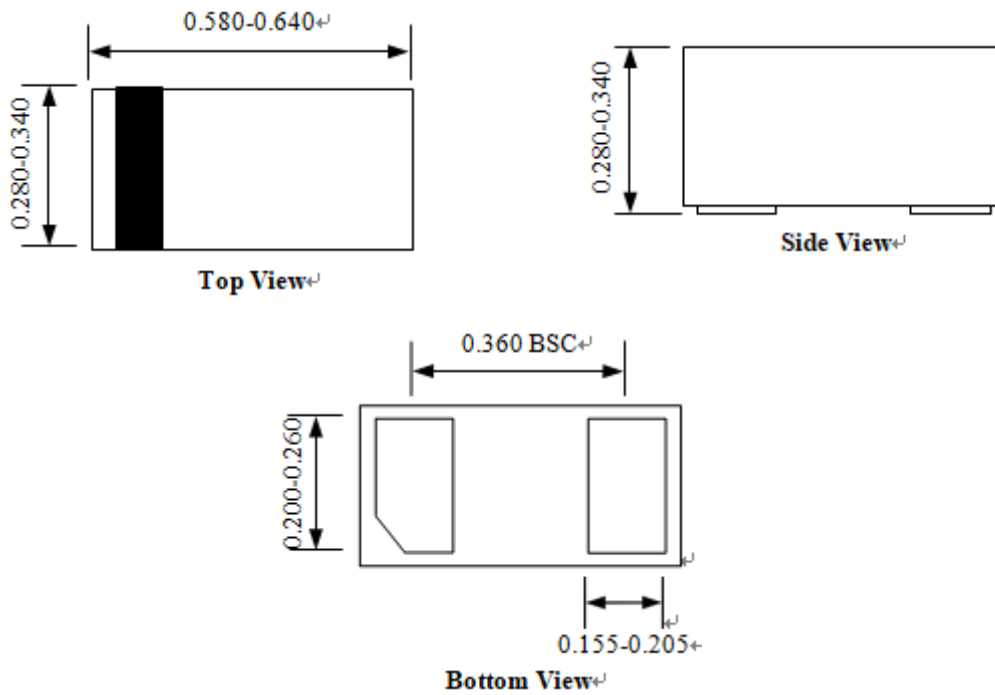


8. Soldering Parameters

Profile Feature	Pb-Free Assembly
Average Ramp-Up Rate (T _{smax} to T _p)	3°C/second max.
Preheat – Temperature Min (T _{smin}) – Temperature Max (T _{smax}) – Time (t _{smin} to t _{smax})	150°C 200°C 60-120 seconds
Time maintained above: – Temperature (T _L) – Time (t _L)	217°C 60-150 seconds
Peak/Classification Temperature (T _p)	260°C
Time within 5°C of actual Peak Temperature (t _p)	30 seconds
Ramp-Down Rate	6°C/second max.
Time 25°C to Peak Temperature	8 minutes max.

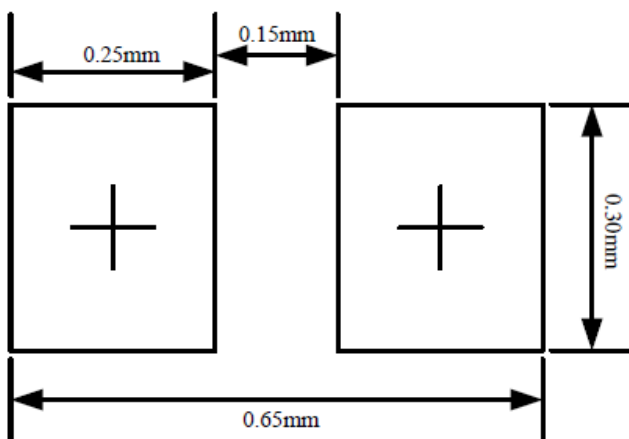


9. Package Outline



All dimensions in millimeters

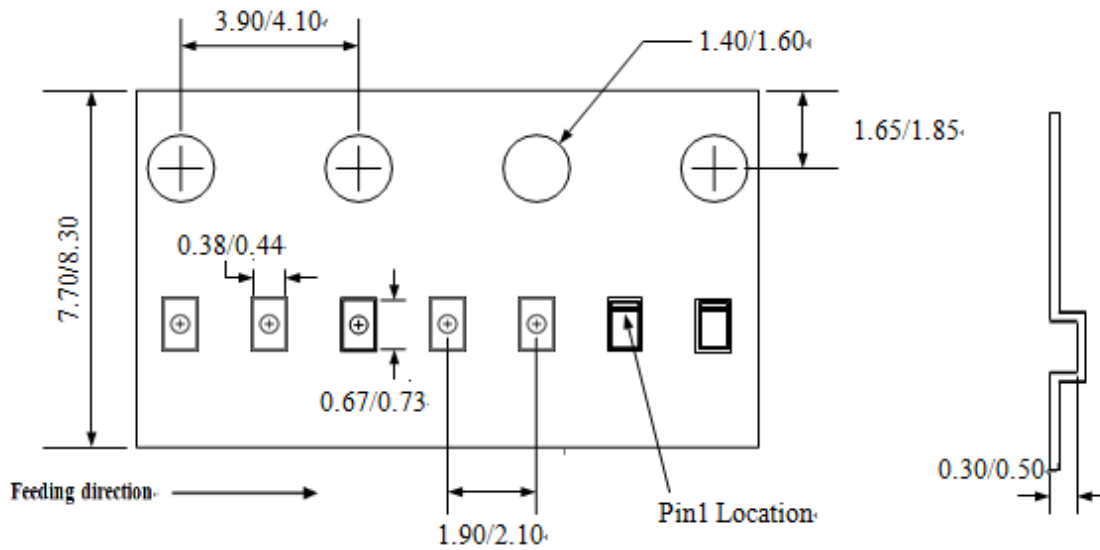
10. Pad Layout



Note:

1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.050\text{mm}$.
3. The pad layout is for reference purposes only.

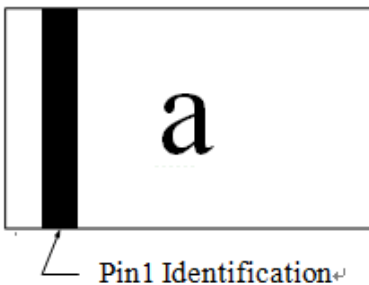
11. Tape Information



All dimensions in millimeters

12. Order Information

Marking Code



a=Device Code

Part Number	Marking Code	Quantity	Packaging Option
TVC5VB1S-DFN0603-2LDG	a	10,000pcs/reel	Tape & reel- 8mm tape/7"reel

13. MSL Description

MSL LEVEL 1