



# PRODUCT SPECIFICATION

**DOCUMENT NO. ENS000126960**

DESCRIPTION	DRAWN BY	DESIGNED BY	CHECKED BY	APPROVED BY
TVL 0201 01 5V AA0DG	Owen	Owen	Anderson	Shawn

## TVL0201 01 5V AA0DG Product Engineering Specification

### 1. Scope

TVL 0201 01 5V AA0 is a TVS diode designed to protect one power/control line or one low speed signal line from overvoltage hazard of Electrostatic Discharge (**ESD**).

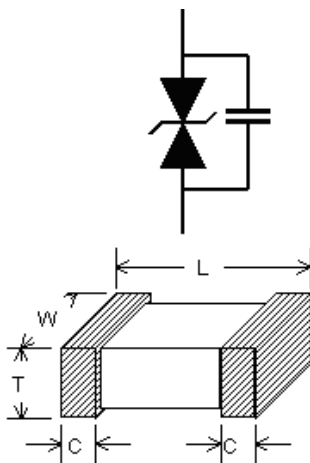
These interfaces can be used in computer interfaces protection, microprocessors protection, serial and parallel ports protection, control signal lines protection, power lines on PCB protection, latch-up protection. The actual application examples are USB2.0, VBUS, and VGA, etc. The ESD protection of TVS meets the immunity standard of IEC 61000-4-2, level 4 ( $\pm 15\text{kV}$  air,  $\pm 15\text{kV}$  contact discharge).

### 2. Explanation of Part Number

<u>TV</u>	<u>L</u>	<u>0201</u>	<u>01</u>	<u>5V</u>	<u>AA0</u>	<u>DG</u>
(1)	(2)	(3)	(4)	(5)	(6)	(7)

- (1) Product Type : TV=TVS Diode
- (2) Capacitance Code : L=Low Capacitance
- (3) Package Code
- (4) Channel Code : 01=1 Channels
- (5) Working Voltage
- (6) Special code
- (7) Inpaq Control Code

### 3. Circuit Diagram & Dimension



Unit: mm	0201
L	0.60 $\pm$ 0.05
W	0.30 $\pm$ 0.04
T	0.30 $\pm$ 0.04
C	0.20 $\pm$ 0.06

## 4. Specifications

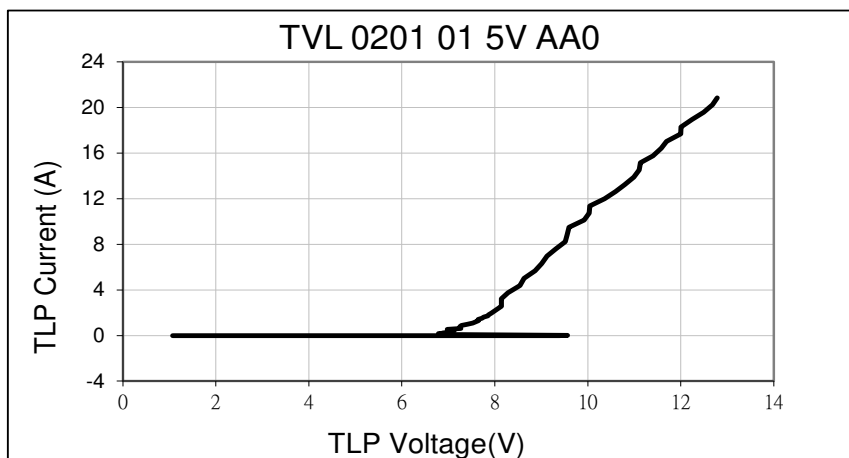
### 4.1. Absolute Maximum Ratings

Parameter	Symbol	Rating	Units
Operating Supply Voltage	$V_{DC}$	5	V
Peak Pulse Current (8/20 $\mu$ s)	$I_{PP}$	6	A
Peak Pulse Power(8/20 $\mu$ s)	$P_{PP}$	90	W
ESD per IEC 61000-4-2 (Air)	$V_{ESD}$	$\pm 15$	kV
ESD per IEC 61000-4-2 (Contact)		$\pm 15$	
Lead Soldering Temperature	$T_{SOL}$	260 (10 sec.)	$^{\circ}C$

### 4.2. Electrical Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Reverse Stand-Off Voltage	$V_{RWM}$	$T=25^{\circ}C$ .		5	5.5	V
Reverse Leakage Current	$I_{Leak}$	$V_{RWM} = 5V, T=25^{\circ}C$ .			1	$\mu A$
Reverse Breakdown Voltage	$V_{BV}$	$I_{BV} = 1mA, T=25^{\circ}C$ .	7	10	13	V
Clamping Voltage	$V_{CL}$	$I_{PP} = 1A, t_p = 8/20\mu s, T=25^{\circ}C$ .		11		V
	$V_{TLP}$	$I_{TLP} = 1A$ (100ns transmission line) $I_{TLP} = 16A$ (100ns transmission line)		7.5 11.5		
Channel Input Capacitance	$C_{IN}$	$V_R = 0V, f = 1MHz, T=25^{\circ}C$ .		5		pF

### 4.3. Typical Characteristics

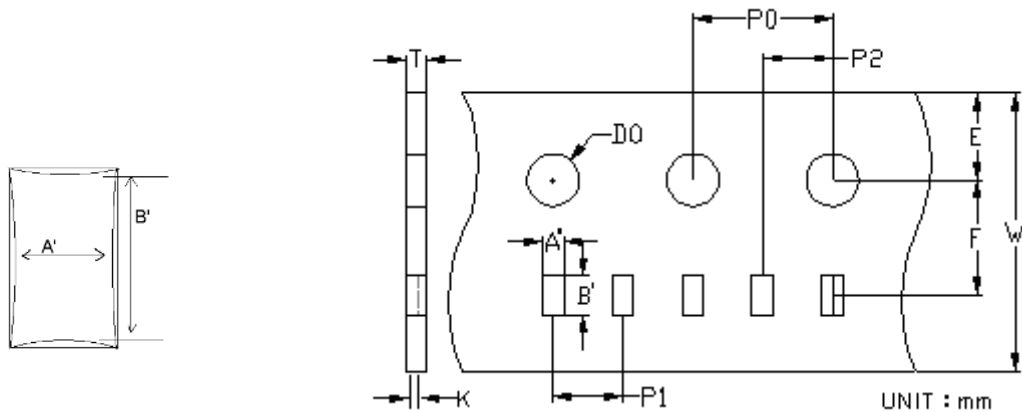


## 5. Taping Package and Label Marking

### 5.1. Packaging Method (Material: paper)

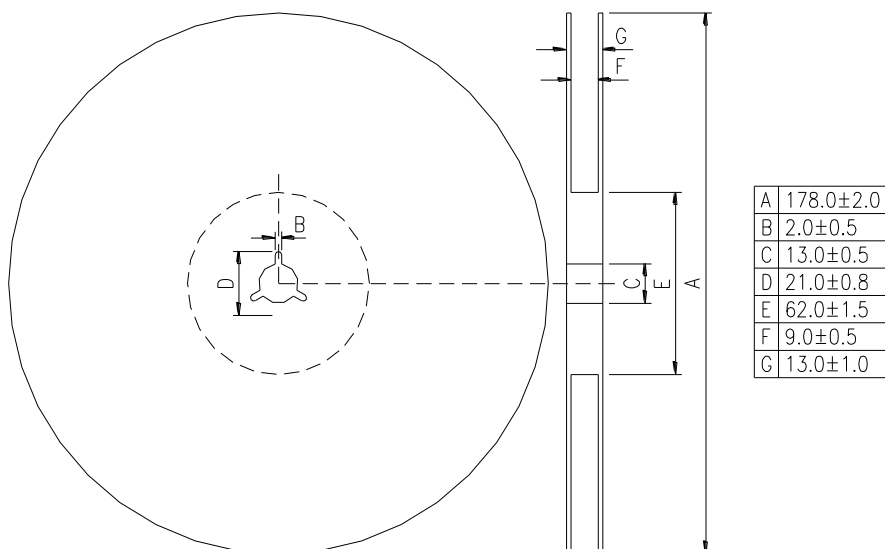
Products shall be heat-sealed in the chip pocket, spacing pitch 4-mm of paper carrier tape with plastic cover tape, and the carrier tape shall be reeled to the reel.

### 5.2. Carrier Tape Dimensions



Type	A'	B'	W	E	F	P0	P1	P2	D0	T	K
0201	0.35 ±0.02	0.67 ±0.02	8.0 ±0.1	1.75 ±0.05	3.5 ±0.05	4.0 ±0.03	2.0 ±0.03	2.0 ±0.03	1.55 ±0.05	0.42 ±0.03	0.35 ±0.02

### 5.3. Taping Reel Dimensions



Unit: mm

**5.4. Taping Specifications**

There shall be the portion having no product in both the head and the end of taping, and there shall be the cover tape in the head of taping.

**5.5. Label Marking**

The label specified as follows shall be put on the side of reel.

- (1)Part No.
- (2)Quantity
- (3)Lot No.

\*Part No. And Quantity shall be marked on outer packaging.

**5.6. Quantity of Products in the Taping Package**

- (1) Standard quantity : 15000pcs/Reel for TVL0201 Series
- (2) Shipping quantity is a multiple of standard quantity.

**5.7. Storage Condition with Package**

Storage Time: 12 months max

Storage Temperature : 5 to 40°C

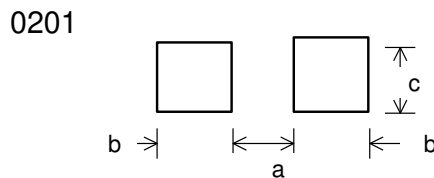
Relative Humidity: 0 to 60 %

**6. Precautions for Handling**

**6.1. Solder Cream in Reflow Soldering**

Refer to the recommendable land pattern as printing mask pattern for solder cream.

- (1) Print solder in a thickness of 150 to 200 μm.
- (2) Dimensions: millimeters (inches)



Unit: mm

Type	a	b	c
0201	0.2~0.3	0.25~0.30	0.3~0.4

Notes: This LAND LAYOUT is for reference purposes only. Please consult your manufacturing partners to ensure your company’s PCB design guidelines are met.

## 6.2. Precaution for Handling of Substrate

Do not exceed to bend the board after soldering this product extremely.

(Reference examples)

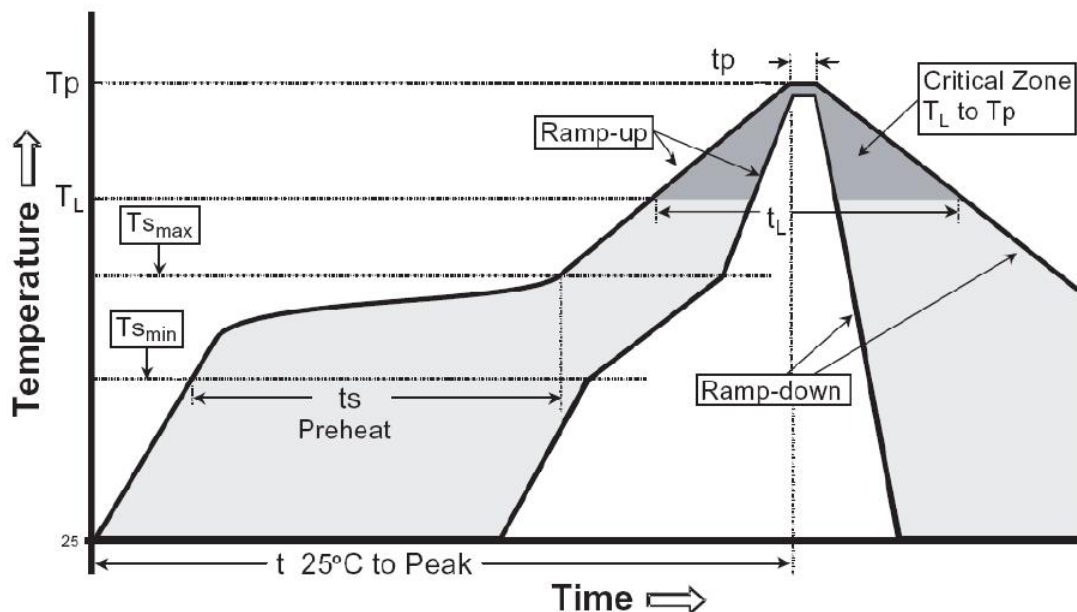
- Mounting place must be as far as possible from the position, which is close to the break line of board, or on the line of large holes of board.
- Do not bend extremely the board, in mounting other components.  
If necessary, use back-up pin (support pin) to prevent from bending extremely.
- Do not break the board by hand. We recommend using the machine or the jig to break it.

## 6.3. Precaution for Soldering

Note that rapid heating, rapid cooling or local heating will easily damage this product.

Do not give heat shock over 100°C in the process of soldering. We recommend taking preheating and gradual cooling.

## 6.4. Recommendable Reflow Soldering



Profile Feature	Pb free Assembly
Average Ramp Rate (Ts max to Tp)	3°C/second max
Preheat - Temperature Min (Ts <sub>min</sub> ) - Temperature Min (Ts <sub>max</sub> ) - Time(ts <sub>min</sub> to ts <sub>min</sub> )	150°C 200°C 60-180 seconds
Time maintained above: - Temperature (T <sub>L</sub> ) - Time (t <sub>L</sub> )	217°C 60-150 seconds
Peak Temperature (T <sub>p</sub> )	260°C +0/-5 °C
Time within 5 °C of actual Peak Temperature (T <sub>p</sub> )	Max 10 seconds.
Ramp-Down Rate	6°C/second max.
Time 25°C to Peak Temperature	8 minutes max

\*According to J-STD-020C

### 6.5. Soldering Gun Procedure

Note the follows, in case of using solder gun for replacement.

- (1) The tip temperature must be less than 350°C for the period within 5 seconds by using soldering gun less than 30 W.
- (2) The soldering gun tip shall not touch this product directly.

### 6.6. Soldering Volume

Note that excess of soldering volume will easily get crack the body of this product.