



# PRODUCT SPECIFICATION

DOCUMENT NO. ENS000028890

DESCRIPTION	DRAWN BY	DESIGNED BY	CHECKED BY	APPROVED BY
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## TVU1240R1ADG Engineering Specification

### 1. Scope

This specification is applied to protect sensitive electronic circuits from the threat of electrostatic discharge (ESD). The function meets with the requirement of IEC61000-4-2 specification. The extreme low capacitance is suit for HDMI ESD protection application.

#### Feature

- Protection against ESD voltages and currents (IEC61000-4-2 Level 4)
- Extremely quick response time (<1ns) present ideal ESD protection
- Extremely low capacitance (0.1pF typical)
- Extremely low leakage current
- SMD (Surface Mount Device)
- Zero signal distortion
- Lead Free, RoHS Compliance

#### Applications

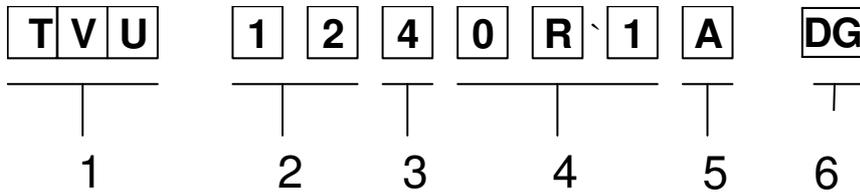
TVU1240R1A is applied to high speed signal interface.

- Antenna circuit
- USB2.0
- IEEE-1394
- DVI
- HDMI

#### Product Model

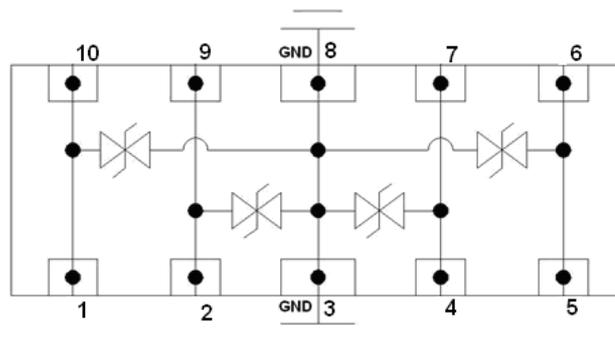
- Digital Video Equipment
- Mobile Phone
- GPS Antenna
- Bluetooth Communication Equipment

## 2. Explanation of Part Number

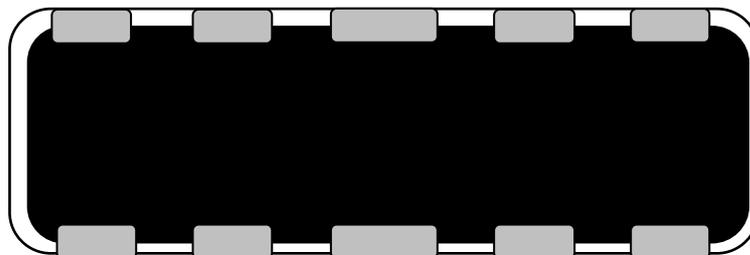


- ◆ 1 : TVU : ultra capacitance
- ◆ 2 : Working voltage:VDC 12V
- ◆ 3 : Channel : 4 channels
- ◆ 4 : Capacitance: 0.1pF
- ◆ 5 : Chip size:L:2.5mm W:1.0mm
- ◆ 6 : Inpaq Control Code

## 3. Circuit symbol



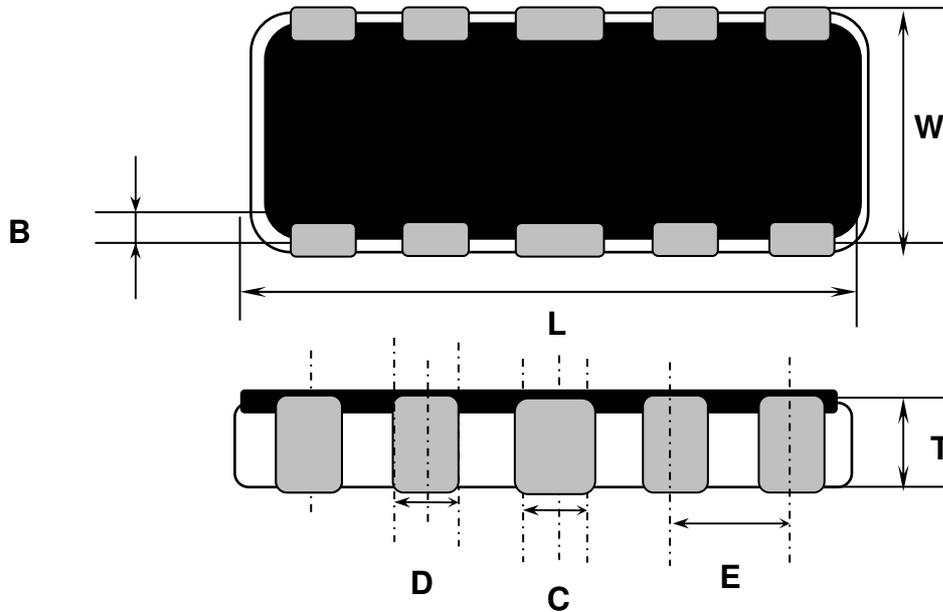
Pin	Identification
1,2,4,5,	Data Lines
6,7,9,10	Data Lines (No Internal Connection)
3,8 (GND)	Ground



#### 4. Construction & Dimensions

4.1. End termination: Ag/Ni/Sn

4.2. Construction & Dimension :



Unit: mm

L	W	T	B	C	D	E
2.5±0.1	1.0±0.1	0.5±0.1	0.2±0.1	0.3±0.05	0.2±0.05	0.5±0.05

## 5. General specifications

### 5.1. Temperature Specifications

Operating Temperature range	: -55°C to +125°C
Storage Temperature range	: -55°C to +125°C

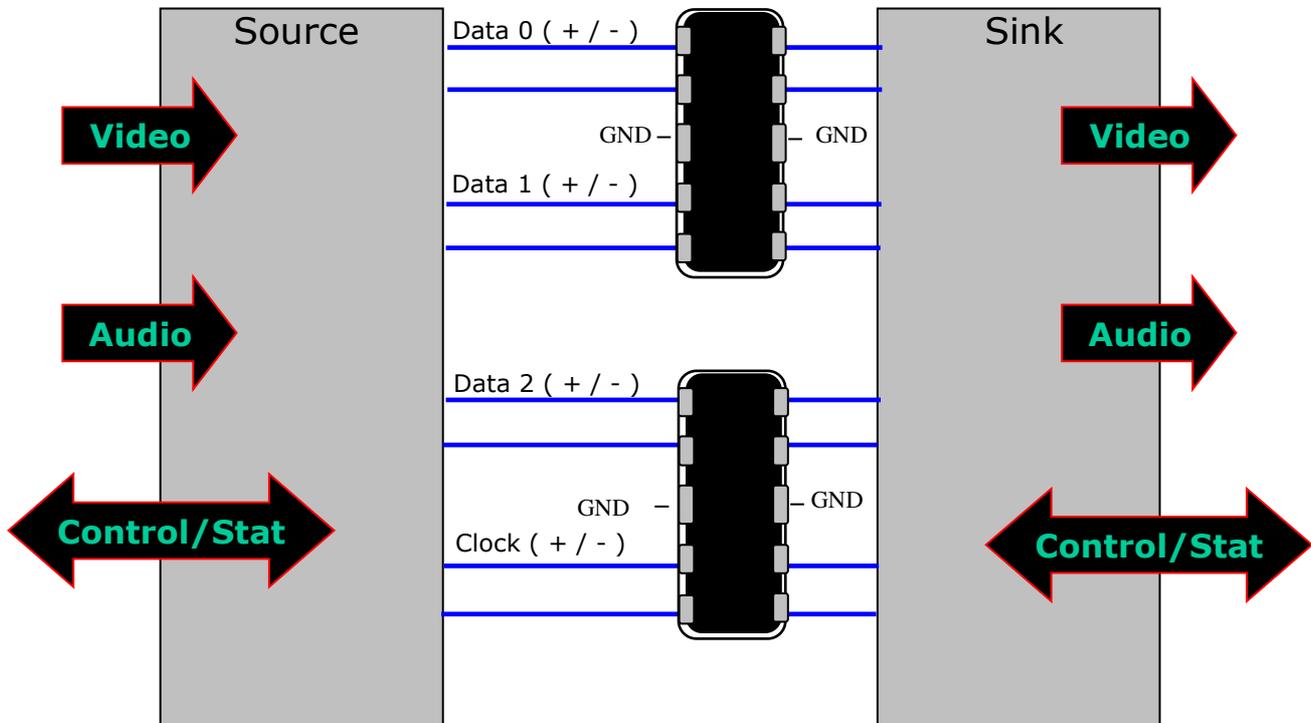
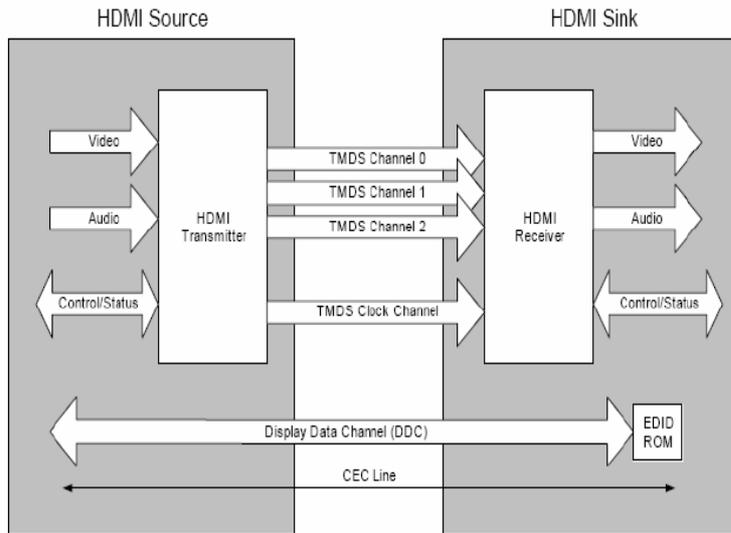
## 6. Performance Characteristics

Characteristic	Value
Rated voltage (max)	12V
Leakage current (max) ( @12VDC)	0.01μA
Trigger voltage ( Vt )	300V typical
Clamping voltage ( Vc)	30V typical
Capacitance (Cp), @1MHz	0.1pF typical
Response time	<1ns
ESD voltage capability, IEC 61000-4-2 Contact discharge mode	10KV
ESD voltage capability, IEC 61000-4-2 Air discharge mode	15KV
ESD withstand pulses	1000 typical

Cp – Device capacitance measured with 1Vrms

## 7. HDMI Interface Application

HDMI block Diagram



## 8. Taping Package and Label Marking

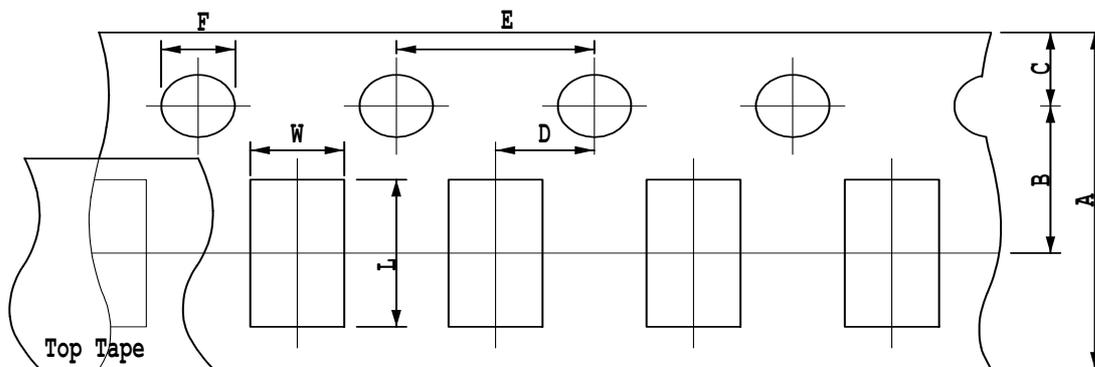
### 8.1. Packaging method

8.1.1. Products shall be heat-sealed in the chip pocket, spacing pitch 2-mm of paper carrier tape with cover tape, and the carrier tape shall be reeled to the reel.

8.1.2. Tape material to be paper. Tape thickness to be  $0.75 \pm 0.05$  mm.

8.1.3. Cover tape adhesion to be  $35 \pm 25$  grams.

### 8.2. Carrier tape dimensions

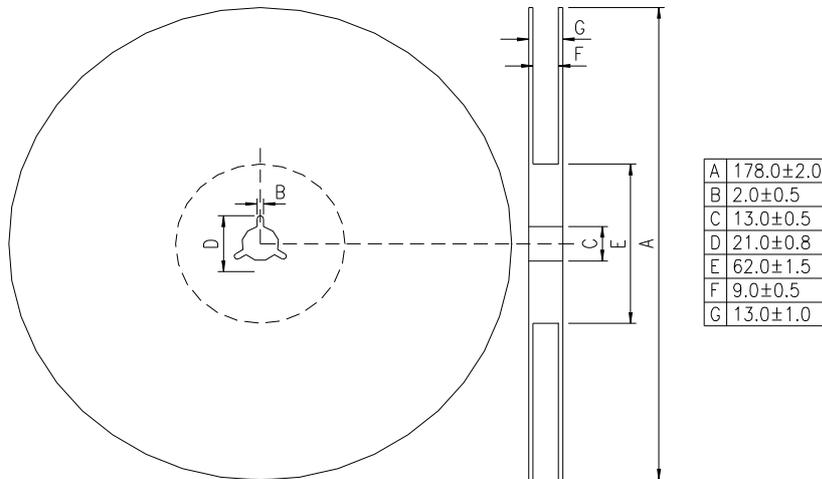


Unit: mm

A	$8.00 \pm 0.30$
B	$3.50 \pm 0.05$
C	$1.75 \pm 0.10$
D	$2.00 \pm 0.05$
E	$4.00 \pm 0.10$
F	$1.50 \pm 0.10$
L	$2.72 \pm 0.10$
W	$1.22 \pm 0.10$

**8.3. Taping reel dimensions**

Unit: mm



**8.4. 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.

**8.5. 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.

**8.6. Quantity of products in the taping package**

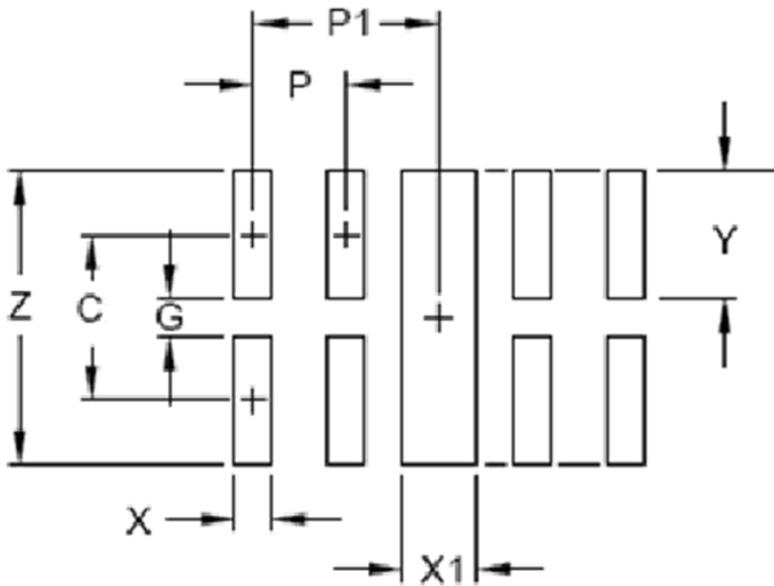
- (1) Standard quantity : 5000pcs/Reel
- (2) Shipping quantity is a multiple of standard quantity.

## 9. Precautions for Handling

### 9.1. 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 0.1 to 0.15 mm.



	(mm)
Y	0.6
G	0.2
Z	1.4
X	0.2
X1	0.3
P	0.5
P1	1
C	0.8

### 9.2. Precaution for handling of substrate

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

(reference examples)

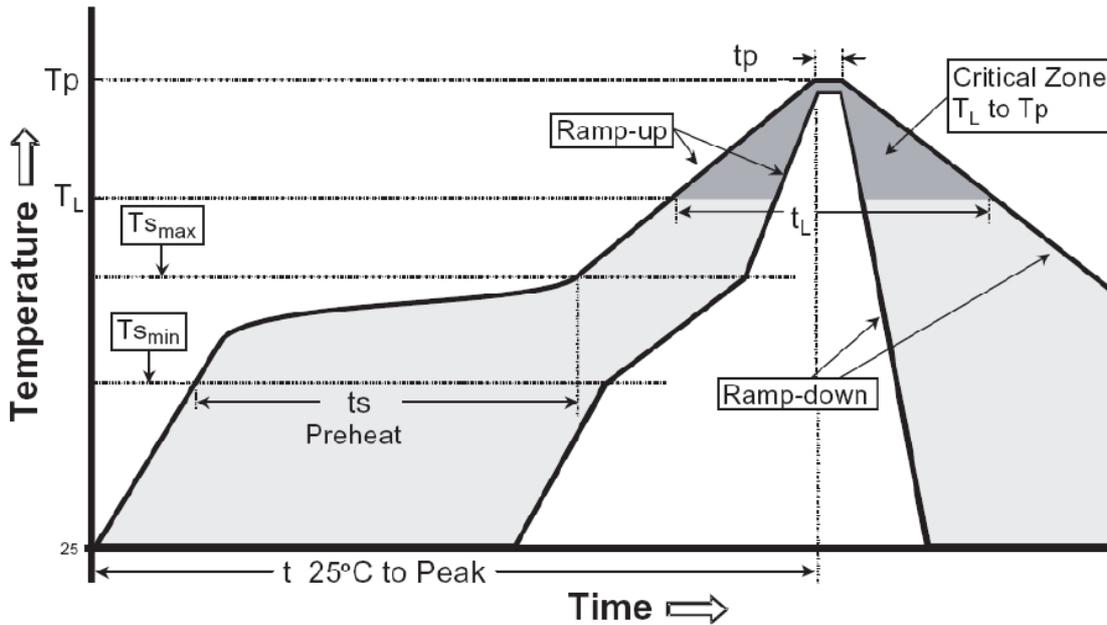
- Mounting place must be as far as possible from the position, which is close to the break line of board, or on the line of large holes of board.
- Do not bend extremely the board, in mounting another components.  
If necessary, use back-up pin (support pin) to prevent from bending extremely.
- Do not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

**9.3. Precaution for soldering**

Note that this product will be easily damaged by rapid heating, rapid cooling or local heating.

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

**9.4. Recommendable reflow soldering**



Reference IPC-020c-5-1

Profile Feature	Pb free Assembly
Average Ramp Rate (Ts max to Tp)	3 °C/second max
Preheat	
- Temperature Min (Tsmin)	150°C
- Temperature Min (Tsmax)	200°C
- Time(tsmin to tsmin)	60-180 seconds
Time maintained above:	
- Temperature (TL)	217°C
- Time (tL)	60-150 seconds
Peak Temperature (Tp)	260°C +0/-5 °C
Time within 5 °C of actual Peak Temperature (Tp)	20-40 seconds
Ramp-Down Rate	6 °C/second max.
Time 25°C to Peak Temperature	8 minutes max

### 9.5. Soldering gun procedure

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

- (1) The tip temperature must be less than 280°C for the period within 3 seconds by using soldering gun under 30 W.
- (2) The soldering gun tip shall not touch this product directly.

### 9.6. Soldering volume

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

### 9.7. Taping Package Storage Condition

Storage Temperature : 5 to 40 °C

Relative Humidity: < 65%RH

Storage Time : 12 months max