UNISONIC TECHNOLOGIES CO., LTD

TVS4S009   **Preliminary**   *TVS*

4-CHANNEL ESD SOLUTION FOR HIGH-SPEED DIFFERENTIAL INTERFACE

SOT-26

■ DESCRIPTION

The UTC **TVS4S009** has four clamp circuits for dual differential lines, which is an electrostatic discharge solution for high-speed differential lines.

The excellent matching between the differential pair signal lines enables this device to operate at high-speed differential data rates (3dB bandwidth>4GHz). The UTC **TVS4S009** is suitable for high-speed differential applications, such as high-definition multimedia interface (HDMI), low-voltage differential signaling (LVDS), serial advanced technology attachment (SATA), Ethernet, etc. It also complies with IEC 61000-4-2 (Level 4) ESD.

The UTC **TVS4S009** can operate over the ambient air temperature range of -40°C~85°C.
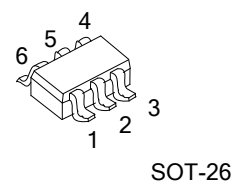
■ FEATURES
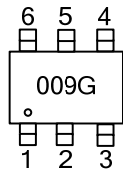
* Supports high-speed differential data rates (3dB bandwidth>4 GHz)
* 0.05pF matching capacitance between differential signal pairs
* Flow-through single-in-line pin mapping for high-speed lines
  ensures no additional board layout burden while placing ESD
  protection chip near connector
* Low 0.8pF line capacitance for each data line to GND
* 2.5A peak pulse current (8/20µs pulse)
* IEC 61000-4-2 (Level 4) system-level ESD compliance
* Industrial temperature range: -40°C~85°C
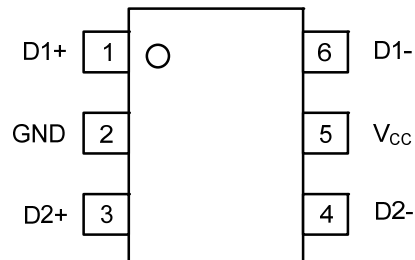
■ ORDERING INFORMATION

Ordering Number	Package	Packing
TVS4S009G-AG6-R	SOT-26	Tape Reel

TVS4S009G-AG6-R		
	(1)Packing Type	(1) R: Tape Reel
	(2)Package Type	(2) AG6: SOT-26
	(3)Green Package	(3) G: Halogen Free and Lead Free

■ **MARKING**

```
  6   5   4
  009G
  o
  1   2   3
```

■ **PIN CONFIGURATION**

```
D1+  [1]  O      [6]  D1-

GND  [2]         [5]  Vcc

D2+  [3]         [4]  D2-
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■ **PIN DESCRIPTION**

PIN NO.	PIN NAME	DESCRIPTION
1	D1+	High-speed ESD clamp provides ESD protection to the high-speed differential data lines
2	GND	Ground
3	D2+	High-speed ESD clamp provides ESD protection to the high-speed differential data lines
4	D2-	High-speed ESD clamp provides ESD protection to the high-speed differential data lines
5	V_{CC}	Supply
6	D1-	High-speed ESD clamp provides ESD protection to the high-speed differential data lines

■ **BLOCK DIAGRAM**
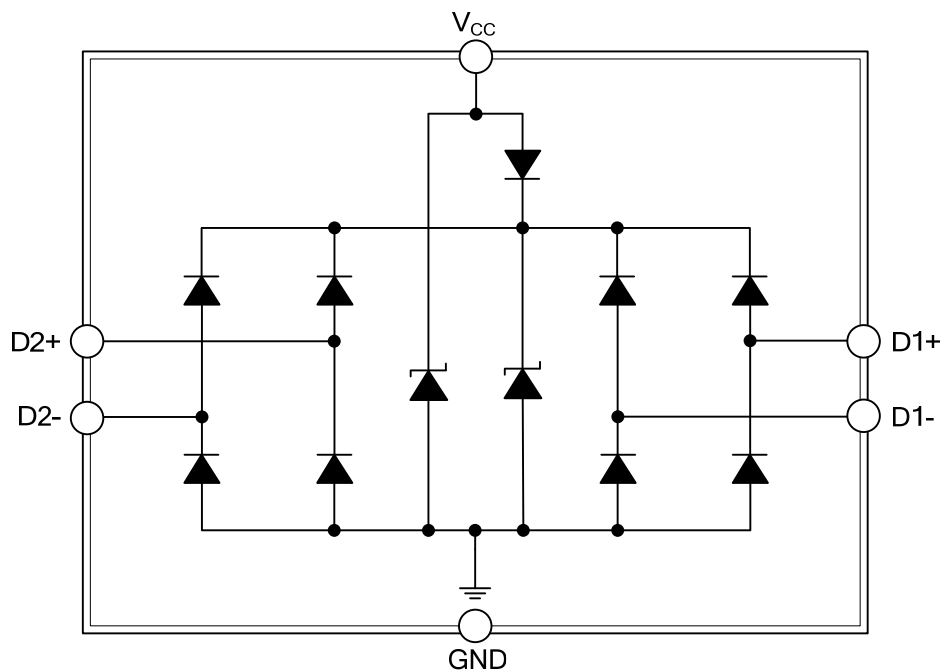
■ **ABSOLUTE MAXIMUM RATING** (Over operating free-air temperature range, unless otherwise noted)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage Range	V_{CC}	-0.3~+6.0	V
IO Signal Voltage Range	V_{IO}	0~V_{CC}	V
EC 61000-4-2 Contact Discharge		±8.0	kV
IEC 61000-4-2 Air-Gap Discharge		±9.0	kV
Peak Pulse Power		25	W
Peak Pulse Current		2.5	A
Storage Temperature Range	T_{STG}	-50~125	°C
Characterized Free-Air Operating Temperature Range	T_A	-40~85	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ **ELECTRICAL CHARACTERISTICS** (T_A=25°C, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Reverse Standoff Voltage	V_{RWM}	Any IO Pin to Ground				5.5	V
Breakdown Voltage	V_{BR}	I_{IO}=1mA	Any IO Pin to Ground	9.0			V
IO Port Current	I_{IO}	V_{CC}=5.0V, V_{IO}=3.3V	Any IO Pin		0.01	0.1	µA
Current from IO Port to Supply Pins	I_{OFF}	V_{CC}=5.0V, V_{IO}=3.3V	Any IO Pin		0.01	0.1	µA
Diode Forward Voltage	V_D	I_{IO}=8mA	Lower Clamp Diode	0.60	0.80	0.95	V
Dynamic Resistance	R_{DYN}	I=1A	Any IO Pin		1.1		Ω
IO Capacitance	C_{IO}	V_{CC}=5.0V,V_{IO}=2.5V	Any IO Pin		0.8		pF
Operating Supply Current	I_{CC}	V_{CC}=5.0V,V_{IO}=Open,	V_{CC} Pin		0.1	1.0	µA