

PRTR5V0U4D

Integrated quad ultra-low capacitance ESD protection

Rev. 01 — 11 January 2008

Product data sheet

1. Product profile

1.1 General description

The PRTR5V0U4D is designed to protect Input/Output (I/O) ports that are sensitive concerning capacitive load, such as USB 2.0, Ethernet, DVI, etc. from destruction by ElectroStatic Discharges (ESD). It provides protection to downstream signal and supply components from ESD voltages as high as ± 8 kV (contact discharge).

The PRTR5V0U4D incorporates four pairs of ultra-low capacitance rail-to-rail diodes plus an additional Zener diode. The rail-to-rail diodes are connected to the Zener diode which allows ESD protection to be independent of the availability of a supply voltage.

The PRTR5V0U4D is fabricated using monolithic silicon technology integrating four ultra-low capacitance rail-to-rail ESD protection diodes in a miniature 6-lead SOT457 package.

1.2 Features

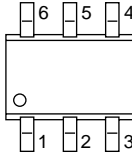
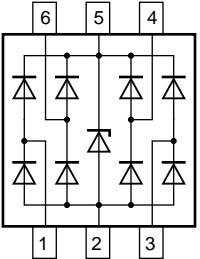
- Pb-free and RoHS compliant, dark green
- ESD protection compliant to IEC 61000-4-2 level 4, ± 8 kV contact discharge
- Low voltage clamping due to integrated Zener diode
- Four ultra-low input capacitance (1 pF typical) rail-to-rail ESD protection diodes
- Small 6-lead SOT457 package

1.3 Applications

- General-purpose downstream ESD protection of high frequency analog signals and high-speed serial data transmission for ports inside:
 - ◆ Cellular and Personal Communication Service (PCS) mobile handsets
 - ◆ USB 2.0 and IEEE 1394 ports in PC and notebook
 - ◆ Digital Video Interface (DVI) and High Definition Multimedia Interface (HDMI) interfaces
 - ◆ Cordless telephones
 - ◆ Wireless data systems: Wide Area Network (WAN) and Local Area Network (LAN)
 - ◆ Personal Digital Assistants (PDAs)

2. Pinning information

Table 1. Pinning

Pin	Description	Simplified outline	Symbol
1	ESD protection I/O 1		
2	ground (GND)		
3	ESD protection I/O 2		
4	ESD protection I/O 3		
5	supply voltage (V _{CC})		
6	ESD protection I/O 4		

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3. Ordering information

Table 2. Ordering information

Type number	Package		Version
	Name	Description	
PRTR5V0U4D	TSOP6	plastic surface-mounted package (TSOP6); 6 leads	SOT457

4. Limiting values

Table 3. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
V _I	input voltage		0	5.5	V
V _{esd}	electrostatic discharge voltage	all pins; IEC 61000-4-2 level 4			
		contact discharge	-8	+8	kV
		air discharge	-15	+15	kV
T _{stg}	storage temperature		-55	+125	°C

5. Recommended operating conditions

Table 4. Operating conditions

Symbol	Parameter	Conditions	Min	Max	Unit
T _{amb}	ambient temperature		-40	+85	°C

6. Characteristics

Table 5. Characteristics

$T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
$C_{(I/O-GND)}$	input/output to ground capacitance	$V_{(I/O-GND)} = 0\text{ V}$; $V_{CC} = 3.0\text{ V}$; $f = 1\text{ MHz}$	[1]	-	1.0	-	pF
I_{LR}	reverse leakage current	$V_R = 3.0\text{ V}$	[1]	-	-	100	nA
V_{BR}	breakdown voltage	$I_I = 1\text{ mA}$	6	-	9	V	
C_{sup}	supply pin to ground capacitance	$V_{(I/O-GND)} = 0\text{ V}$; $V_{CC} = 3.0\text{ V}$; $f = 1\text{ MHz}$	[2]	-	40	-	pF
V_F	forward voltage		-	0.7	-	V	

[1] Measured from pins 1, 3, 4 and 6 to pin 2.

[2] Measured from pin 5 to pin 2.

7. Application information

The PRTR5V0U4D is optimized to protect e.g. two USB 2.0 ports against ESD. Each device is capable to protect both USB data lines and the V_{BUS} supply.

A typical application is shown in [Figure 1](#).

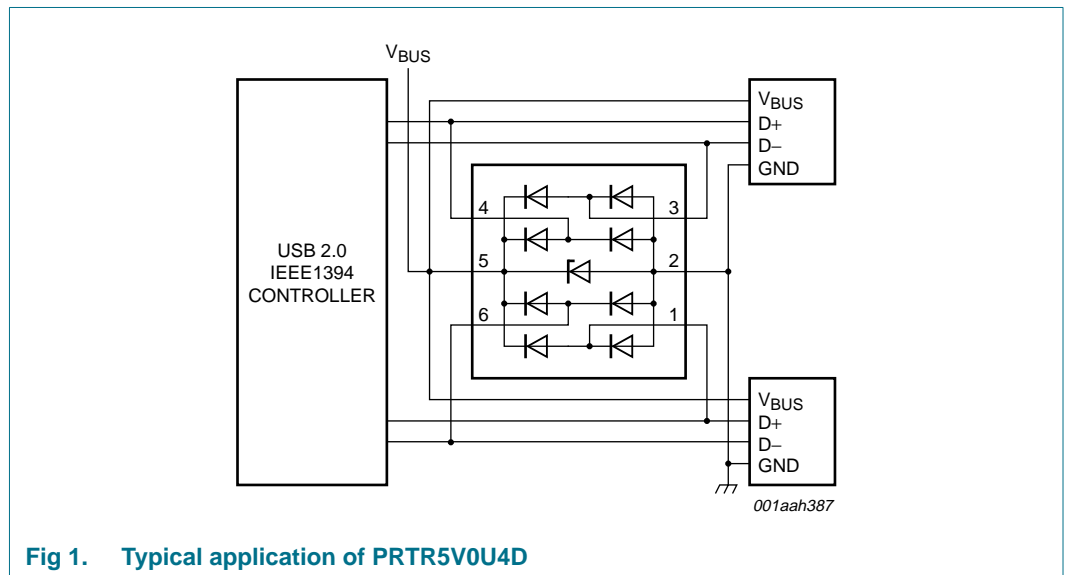


Fig 1. Typical application of PRTR5V0U4D

8. Package outline

Plastic surface-mounted package (TSOP6); 6 leads

SOT457

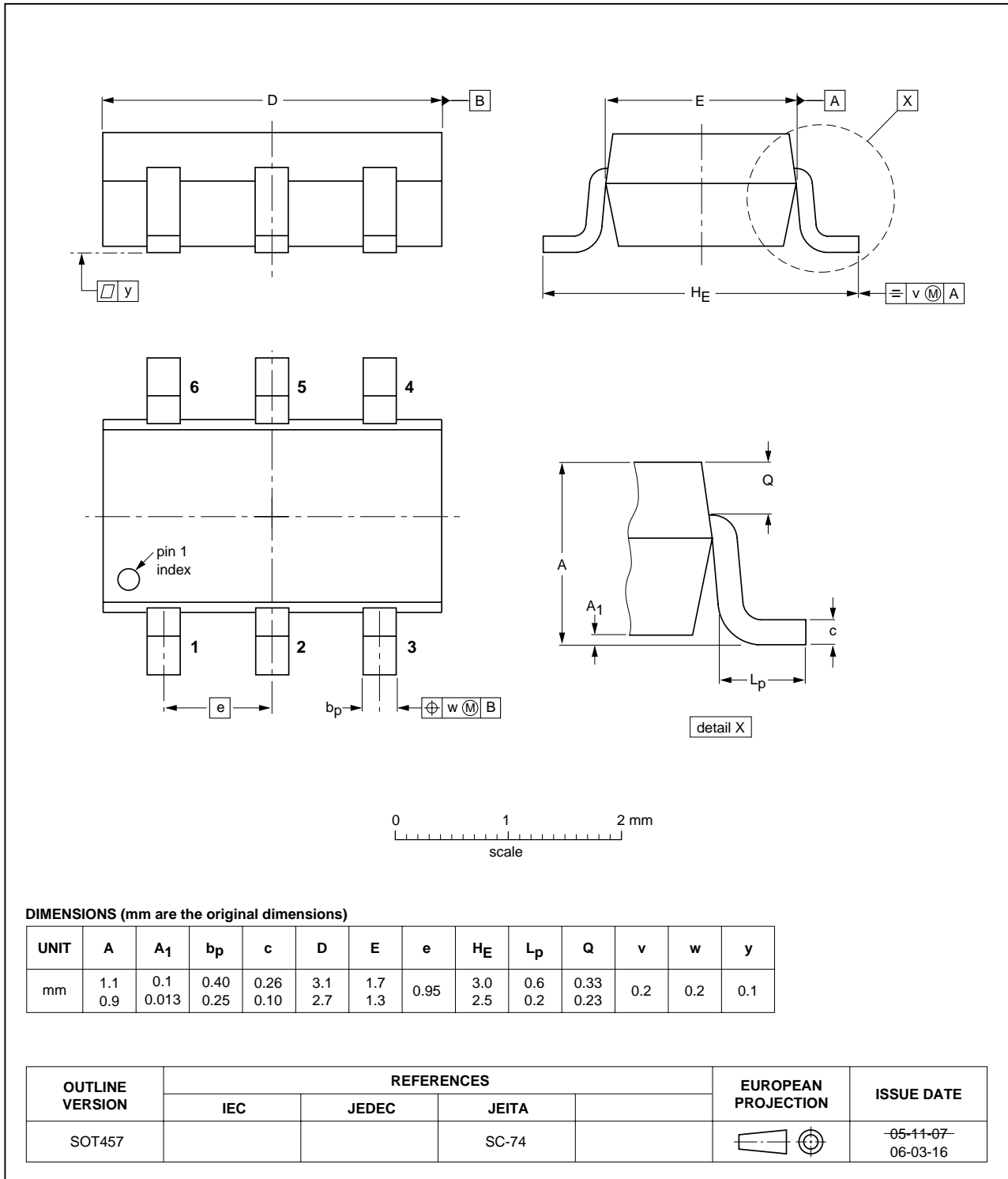


Fig 2. Package outline SOT457 (TSOP6)

9. Abbreviations

Table 6. Abbreviations

Acronym	Description
DVI	Digital Video Interface
ESD	ElectroStatic Discharge
HDMI	High Definition Multimedia Interface
LAN	Local Area Network
PCS	Personal Communication Service
PDA	Personal Digital Assistant
RoHS	Restriction of Hazardous Substances
USB	Universal Serial Bus
WAN	Wide Area Network

10. Revision history

Table 7. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
PRTR5V0U4D_1	20080111	Product data sheet	-	-

11. Legal information

11.1 Data sheet status

Document status ^{[1][2]}	Product status ^[3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nxp.com>.

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Date of release: 11 January 2008

Document identifier: PRTR5V0UD4_1