

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.

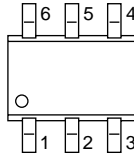
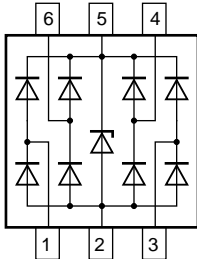
1.2 Features

- 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		
001aag273			

3. Ordering information

Table 2. Ordering information			
Type number	Package		
	Name	Description	Version
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 °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 V; V _{CC} = 3.0 V; f = 1 MHz	[1] -	1.0	-	pF
I _{LR}	reverse leakage current	V _R = 3.0 V	[1] -	-	100	nA
V _{BR}	breakdown voltage	I _I = 1 mA	6	-	9	V
C _{sup}	supply pin to ground capacitance	V _(I/O-GND) = 0 V; V _{CC} = 3.0 V; f = 1 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](#).

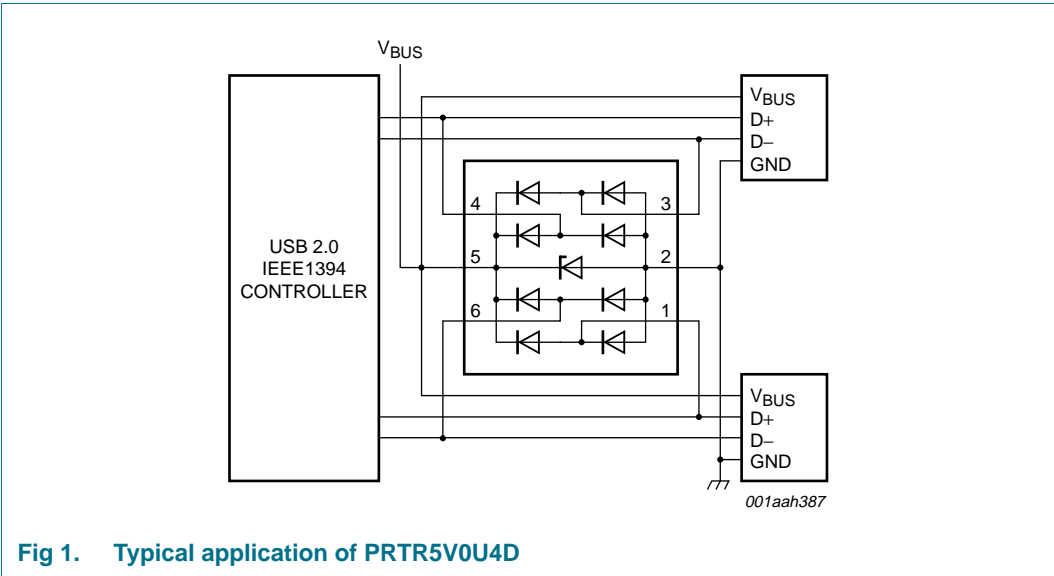


Fig 1. Typical application of PRTR5V0U4D

8. Package outline

Plastic surface-mounted package (TSOP6); 6 leads

SOT457

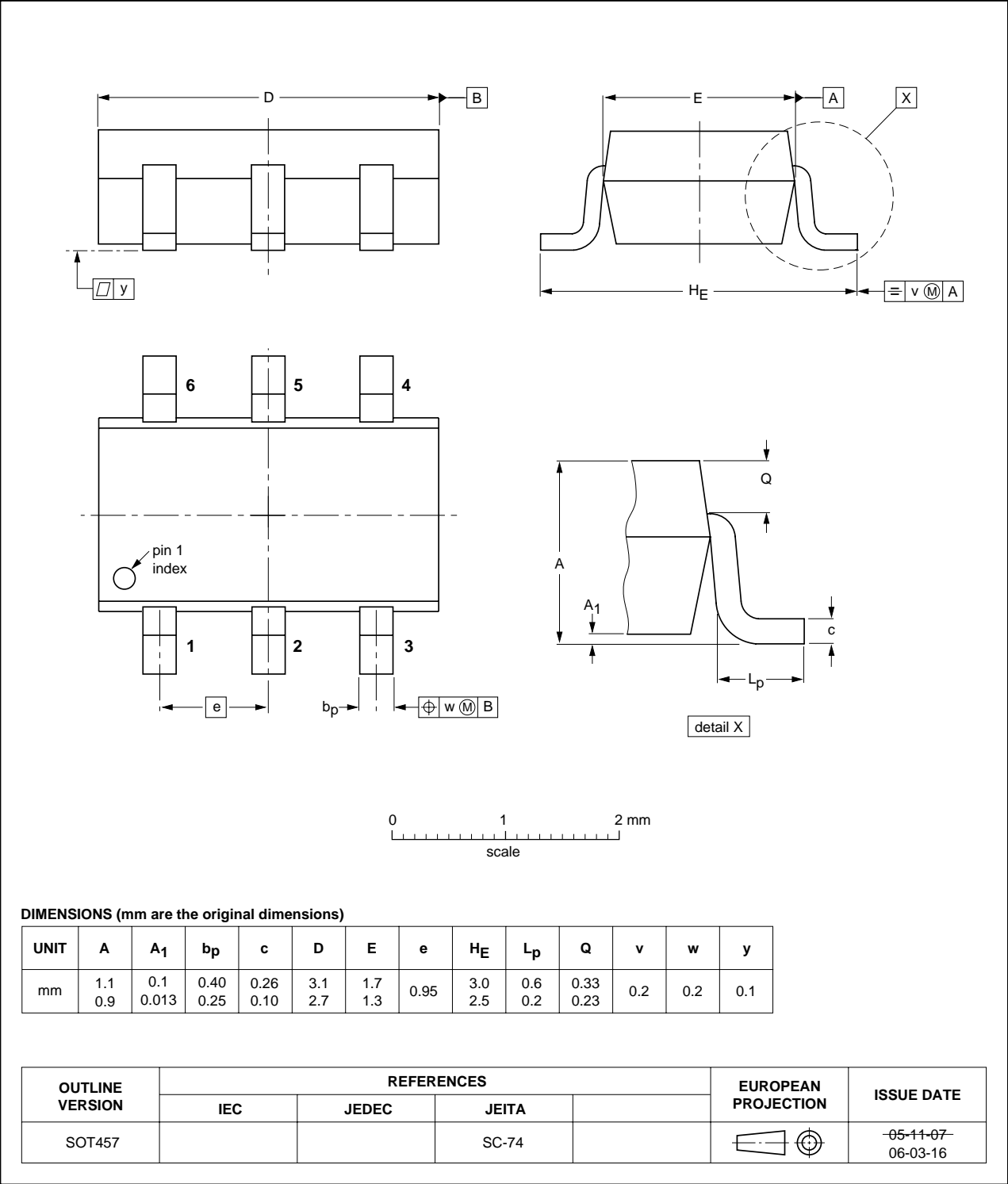


Fig 2. Package outline SOT457 (TSOP6)

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>.

11.2 Definitions

Draft — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. NXP Semiconductors does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

Short data sheet — A short data sheet is an extract from a full data sheet with the same product type number(s) and title. A short data sheet is intended for quick reference only and should not be relied upon to contain detailed and full information. For detailed and full information see the relevant full data sheet, which is available on request via the local NXP Semiconductors sales office. In case of any inconsistency or conflict with the short data sheet, the full data sheet shall prevail.

11.3 Disclaimers

General — Information in this document is believed to be accurate and reliable. However, NXP Semiconductors does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information.

Right to make changes — NXP Semiconductors reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Suitability for use — NXP Semiconductors products are not designed, authorized or warranted to be suitable for use in medical, military, aircraft, space or life support equipment, nor in applications where failure or

malfunction of an NXP Semiconductors product can reasonably be expected to result in personal injury, death or severe property or environmental damage. NXP Semiconductors accepts no liability for inclusion and/or use of NXP Semiconductors products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

Applications — Applications that are described herein for any of these products are for illustrative purposes only. NXP Semiconductors makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Limiting values — Stress above one or more limiting values (as defined in the Absolute Maximum Ratings System of IEC 60134) may cause permanent damage to the device. Limiting values are stress ratings only and operation of the device at these or any other conditions above those given in the Characteristics sections of this document is not implied. Exposure to limiting values for extended periods may affect device reliability.

Terms and conditions of sale — NXP Semiconductors products are sold subject to the general terms and conditions of commercial sale, as published at <http://www.nxp.com/profile/terms>, including those pertaining to warranty, intellectual property rights infringement and limitation of liability, unless explicitly otherwise agreed to in writing by NXP Semiconductors. In case of any inconsistency or conflict between information in this document and such terms and conditions, the latter will prevail.

No offer to sell or license — Nothing in this document may be interpreted or construed as an offer to sell products that is open for acceptance or the grant, conveyance or implication of any license under any copyrights, patents or other industrial or intellectual property rights.

11.4 Trademarks

Notice: All referenced brands, product names, service names and trademarks are the property of their respective owners.

12. Contact information

For more information, please visit: <http://www.nxp.com>

For sales office addresses, please send an email to: salesaddresses@nxp.com

13. Contents

1 Product profile 1

1.1 General description..... 1

1.2 Features 1

1.3 Applications 1

2 Pinning information..... 2

3 Ordering information..... 2

4 Limiting values..... 2

5 Recommended operating conditions..... 2

6 Characteristics..... 3

7 Application information..... 3

8 Package outline 4

9 Abbreviations..... 5

10 Revision history..... 5

11 Legal information..... 6

11.1 Data sheet status 6

11.2 Definitions..... 6

11.3 Disclaimers..... 6

11.4 Trademarks..... 6

12 Contact information..... 6

13 Contents 7



Please be aware that important notices concerning this document and the product(s) described herein, have been included in section 'Legal information'.