

AN11064

PR533 USB stick - Evaluation board

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232313

Application note
COMPANY PUBLIC

Document information

Info	Content
Keywords	PR533, CCID, USB Stick, Contactless Reader
Abstract	This application notes describes the PR533 evaluation board delivered in USB stick form factor. It provides the schematics and layout for easier understanding and evaluation



Revision history

Rev	Date	Description
1.3	20180517	Editorial updates
1.2	20171102	Security status changed into COMPANY PUBLIC, no content change
1.1	20120801	Section License updated
1.0	20120503	First release

1. Introduction

The PR5331C3HN with embedded firmware has following features:

- Supports ISO/IEC 14443A reader/writer up to 847Kbit/s
- Supports ISO/IEC 14443B reader/writer up to 847Kbit/s
- MIFARE Classic with 1K/4K encryption in reader/writer mode at 106Kbit/s
- Supports contactless RF communication according to the Felica protocol at 212Kbit/s and 424Kbit/s
- Embedded firmware commands allow compliancy with EMVCo v2.0.1 specifications
- Reader mode for Jewel cards
- Includes 80C51 micro-controller
- Integrated LDO to allow 2.7 to 5.4V power supply voltage
- Integrated antenna component detector
- Host interface: USB 2.0 full speed
- USB bus-powered or host-powered mode possibility
- On-chip PLL to generate internally 96 MHz for the USB interface
- I2C master interface to fetch PID, VID, USB descriptor and RF settings from an external EEPROM
- I2C master interface to support the bridge to the TDA8029 contact reader (2 dedicated GP-IOs)
- 3 additional GP-IOs for external devices control

The PR533 demoboard so-called “USB Stick” or bsx0252 is described in this application note.

This board is an example of implementation of a reader/writer on a small USB stick. The bsx0252 board is described in paragraph 2.1.

Information for using this demoboard is given in paragraph 2.2.

Paragraphs 2.3, 2.4, 2.5 and 2.6 contain electrical schematic, PCB layout and components.

2. PN533 USB stick description

The bsx0252 board can be used as a reference design for a PR533 USB stick.

The interface with the host controller is USB 2.0 full speed.

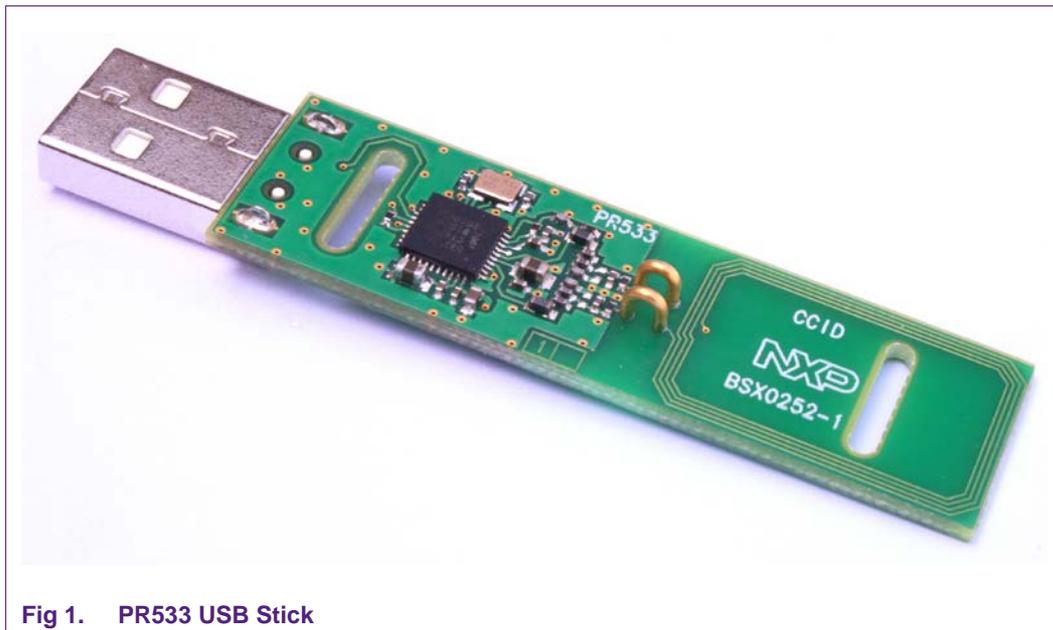


Fig 1. PR533 USB Stick

2.1 Description

On the stick board 4 parts are easily visible:

- The USB connector
- The IC part (containing PR533 IC + oscillator crystal + decoupling capacitors)
- The antenna matching components
- The antenna itself.

The 2 jumpers connecting matching components to antenna may be removed to use another antenna.

Two long holes can be seen: they may be used to fix a ferrite antenna instead of the usual antenna made of printed circuit. Using a small ferrite antenna makes the USB stick shorter.

The board uses a type A male USB connector to be connected to a PC.

It is bus powered. All the IC supplies (DVDD, AVDD, TVDD, PVDD) are generated from the USB supply (VBUS) by the internal LDO regulator.

2.2 How to use this demoboard

This demoboard has simply to be connected through USB interface to a PC with CCID driver embedded. This driver is available in most of the OS, so that the PR533 USB Stick should be recognized and installed automatically as soon as it is plugged. If it is not the case a simple OS update may resolve the issue.

The PR533 can be used as a PC/SC smart card reader as soon as it is plugged. Any PC/SC application can be used to test this evaluation kit.

A PC/SC application is supplied together with the PR533 Product Support Package, as well as its source code. Refer to the PR533 Product Support Package documentation to get and use it.

Notice that due to very small size of the antenna, communication distance is limited to about 3 cm.

2.3 Electrical diagram

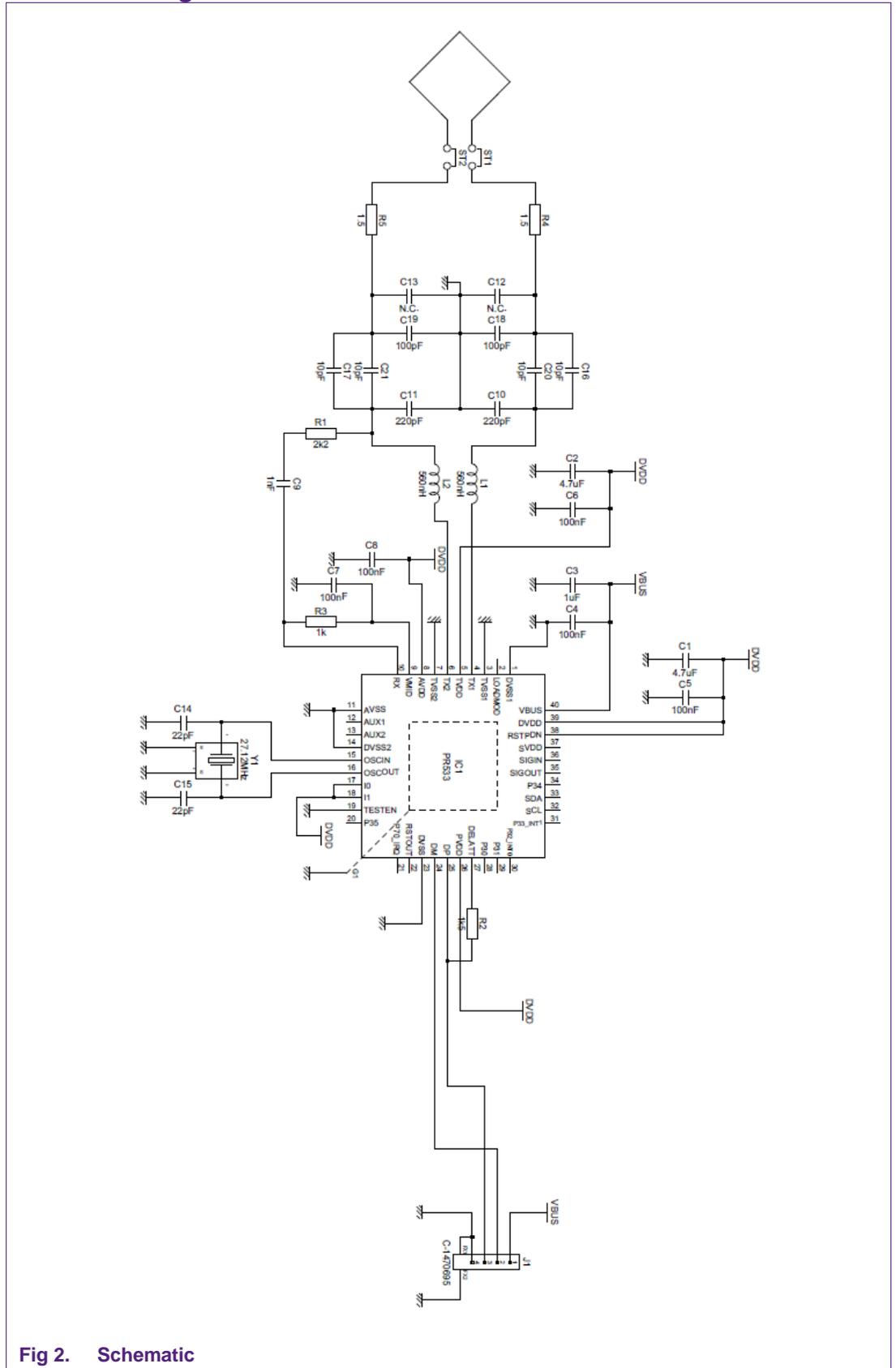


Fig 2. Schematic

2.4 Layout Top

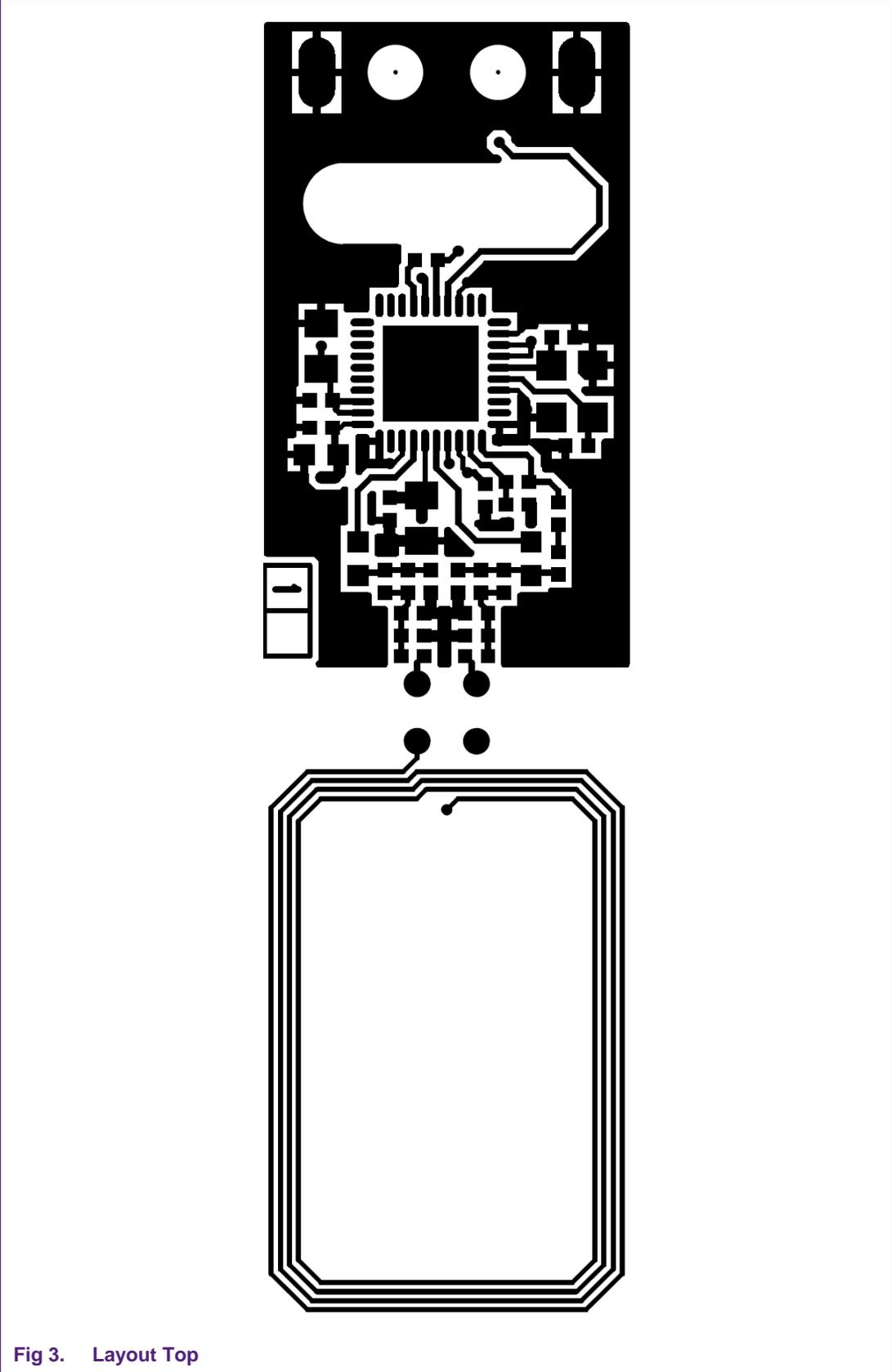


Fig 3. Layout Top

2.5 Layout Bottom

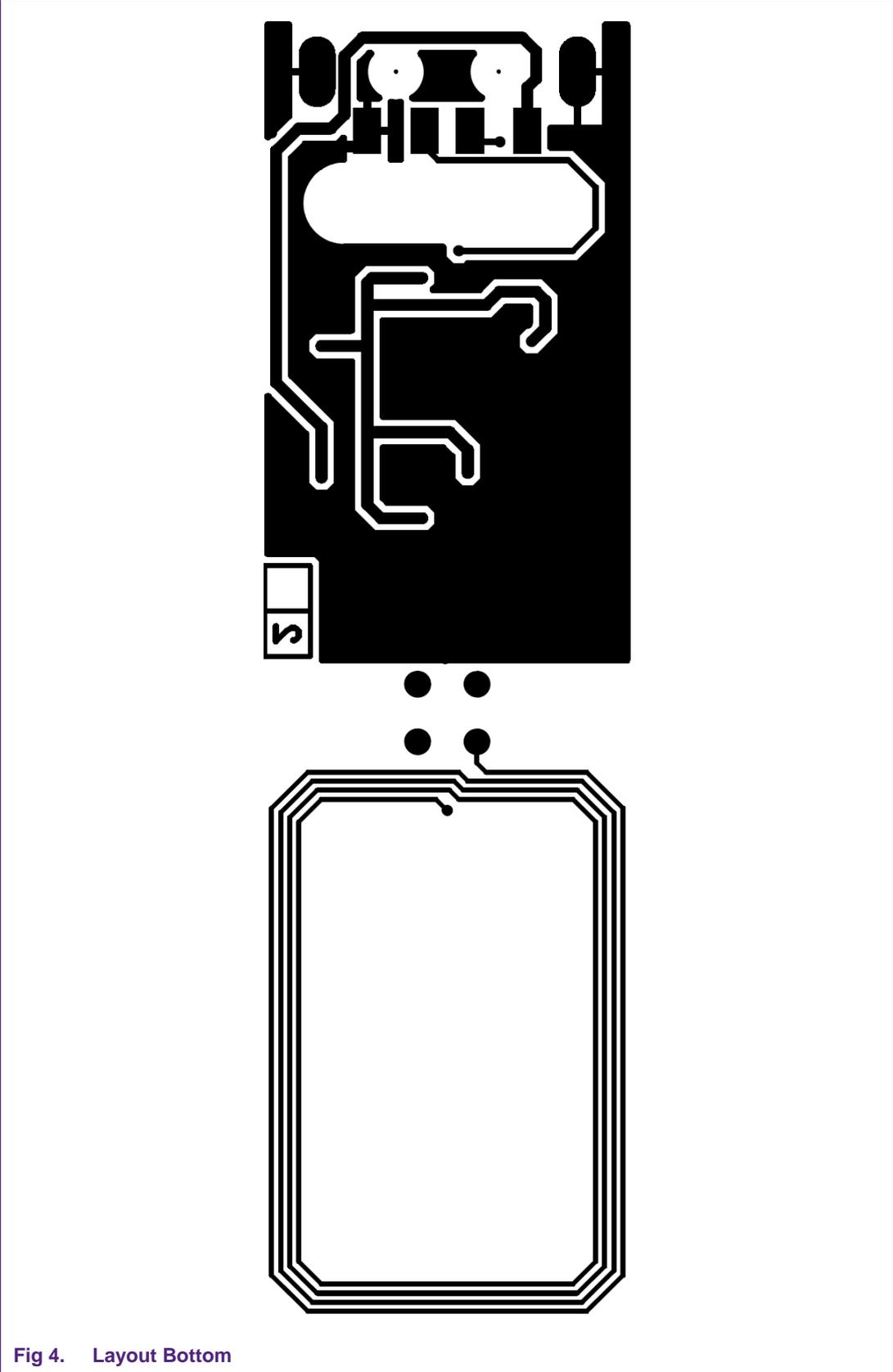


Fig 4. Layout Bottom

2.6 Components view

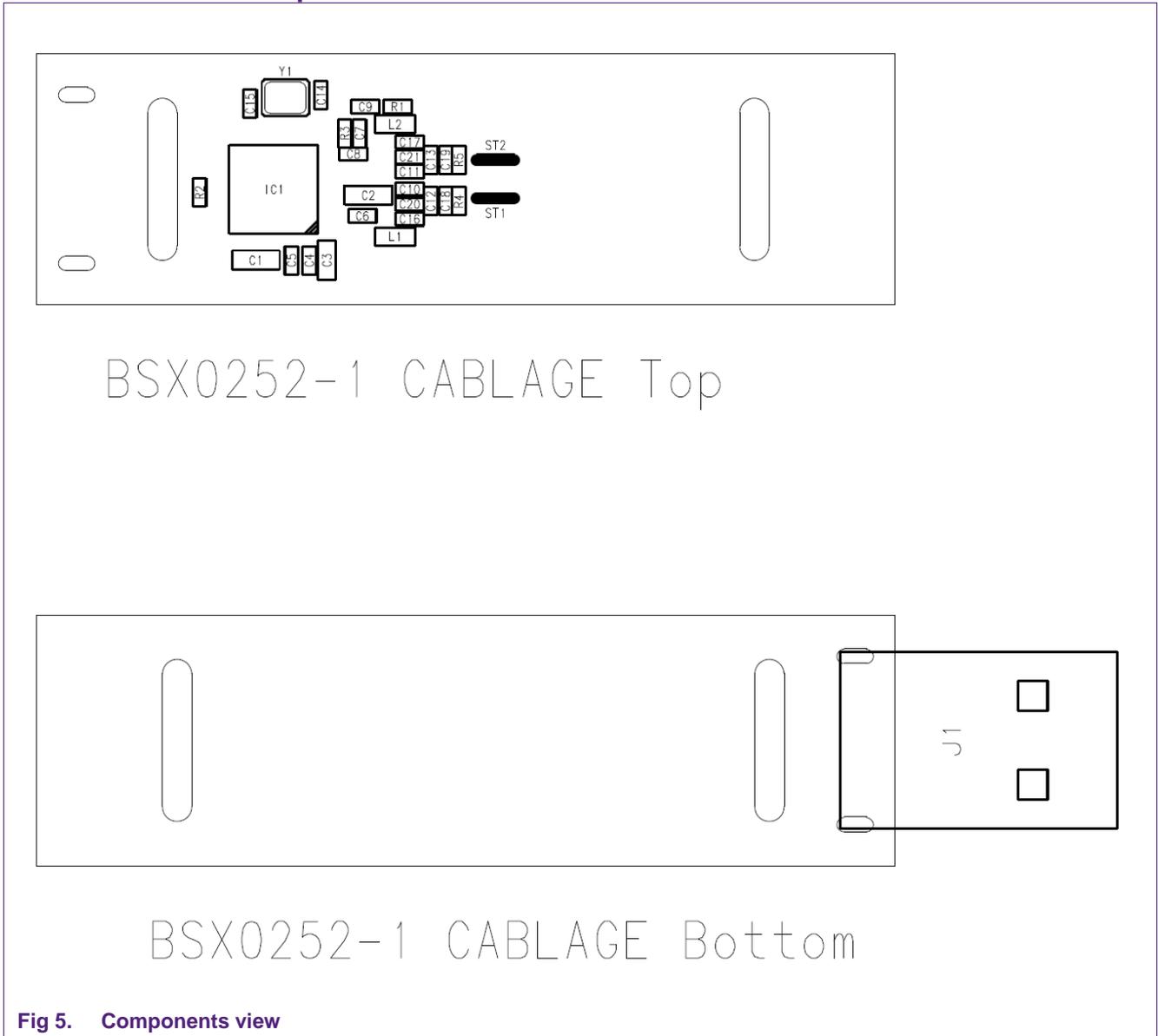


Fig 5. Components view

2.7 Components list

COMPANY PART NO.	COUNT	REFERENCE	GEOMETRY	DESCRIPTION	Fournisseur
25EGNDA3GK105	1	C3	c0603	1uF, Capacite XSR 0603 6.3V, 10%	
25EGNDA4GN475	2	C1 C2	c0805	4.7uF, Capacite XSR 0805 16V - ex:KEMET: C0805C475K4PAC, 10%	
25EGNDB2GN104MA	5	C4 C5 C6 C7 C8	c0402	100nF, MURATA:GRM155SR71C104KA88D Capacite 0402 X7R 16V, 10%	
25EGNDD2FS100MA	4	C16 C17 C20 C21	c0402	10pF, MURATA:GRM155C1H100J201D Capacite 0402 C0G 50V, 5%	
25EGNDD2FS101MA	2	C18 C19	c0402	100pF, MURATA:GRM1555C1H101J201D Capacite 0402 C0G 50V, 5%	
25EGNDD2FS102MA	1	C9	c0402	1nF, MURATA:GRM1555C1H102JA01D Capacite 0402 C0G 50V, 5%	
25EGNDD2FS220MA	2	C14 C15	c0402	22pF, MURATA:GRM1555C1H22J201D Capacite 0402 C0G 50V, 5%	
25EGNDD2FS221MA	2	C10 C11	c0402	220pF, MURATA:GRM1555C1H221JA01D Capacite 0402 C0G 50V, 5%	
25EGNTN200001TS	1	J1	con_usba_mrc_c147	C-1470695, TYCO-C-1470695, USB type A, plug, right angle, SMT	NXP
25EINDC3G0561TK	2	L1 L2	i0603	560nH, TDK:MLF1608DR56K, Inductance Package CMS 0603/1608 35mA, 10%	
25EINTK000001KK	2	ST1 ST2	cav_254	CAV_2.54, Cavalleri dore 2.54mm KONTEK:3130826000500	
25ERESA2D1001	1	R3	r0402	1k, Resistance Package CMS 0402 1% 0.0625W	
25ERESA2D1501	1	R2	r0402	1k5, Resistance Package CMS 0402 1% 0.0625W	
25ERESA2D150B	2	R4 R5	r0402	1.5, Resistance Package CMS 0402 1% 0.0625W	
25ERESA2D2201	1	R1	r0402	2k2, Resistance Package CMS 0402 1% 0.0625W	
25EXTAAKH0001	1	Y1	xtal_1a3225	27.12MHz, Quartz serie TAS-3225A 27.12MHz	
pn5x_g0402_nc	2	C12 C13	c0402	N.C., Capacite CER2,0402,***NON CABLE***,-	
pn5x_pi533	1	IC1	hvf/nr40_050_600x600_sot618_1	PR533, NXP: PR533 NFC Controller package:hvf/nr40	NXP
zbulle01	1		IC1	Circuit_impriime:BSX0252-1	

Fig 6. Components list

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