NXP NFC controller PN544 for mobile phones and portable equipment

Industry-leading, 2nd-generation NFC controller

This high-quality, high-performance NFC controller enables a new range of contactless applications for improved on-the-go experiences. It complies with all released NFC and ETSI/SCP SWP and HCI standards, guarantees interoperability with the existing infrastructure, and provides a flexible, full-featured platform for meeting GSMA requirements in next-generation NFC-enabled devices and services. It offers fully host-controllable power states, delivers a small footprint, and supports multiple secure elements.

Key features
- Smallest package TFBGA64 (4.5 x 4.5 x 0.8 mm)
- High level of integration for greater flexibility
- Support for variety of RF protocols
- Integrated power management unit
- Battery Low mode and Power by the Field enabled to comply with deployed infrastructure when handset is off
- Integrated Frac-N PLL to save XTAL quartz
- Simultaneous multi cards management (ISO14443-A,B,B', MIFARE)
- Compliancy with Paypass and EMVCo polling loop
- Integrated self test to verify antenna matching circuit during production
- Up to 10 cm operating distance [1]
- Optimized 80C51 core processor with embedded firmware
- RoHS-2006 compliant

Key Benefits
- Support for all released NFC standards
- Guaranteed interoperability with existing infrastructure

[1] Depending on antenna design and device integration

- PN544 Single Wire Protocol (SWP) interface interoperability with major UICC/SIM suppliers
- Small footprint
- Shorter integration time due to qualified design-in support for antenna design & software
- Easy access to NFC technology
- Leverages NXP expertise and experience with major device manufacturers

Target markets
- Mobile phones (smart, feature, and low-cost phones)
- Portable equipment (PDAs, mobile Internet devices)
- Consumer devices

Key applications
- Mobile payment
- Transport and event ticketing
- Service discovery
- Easy pairing of Bluetooth, Wi-Fi, or WUSB devices
- Object exchange (vCards, digital rights)

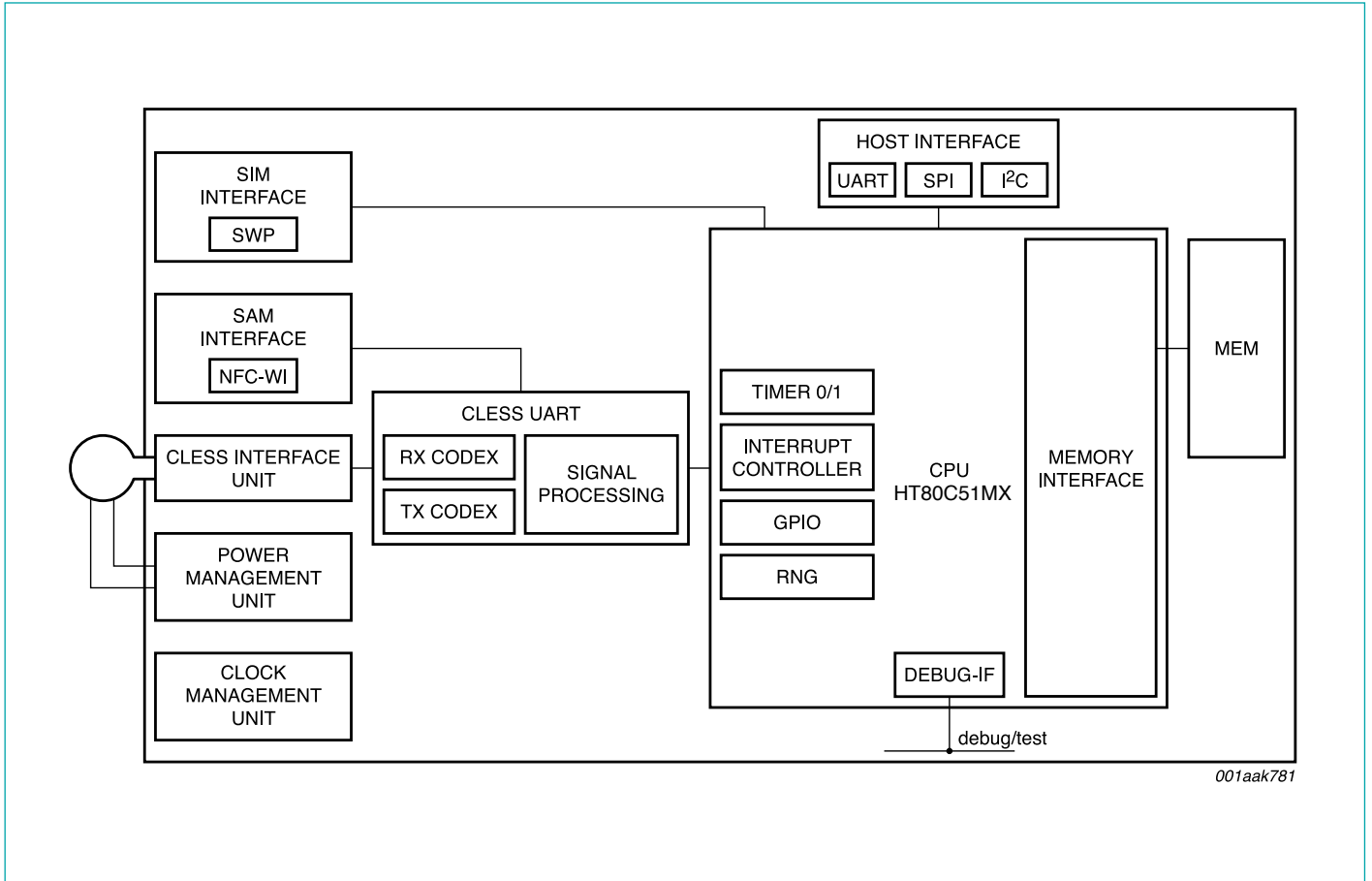## Key technical data

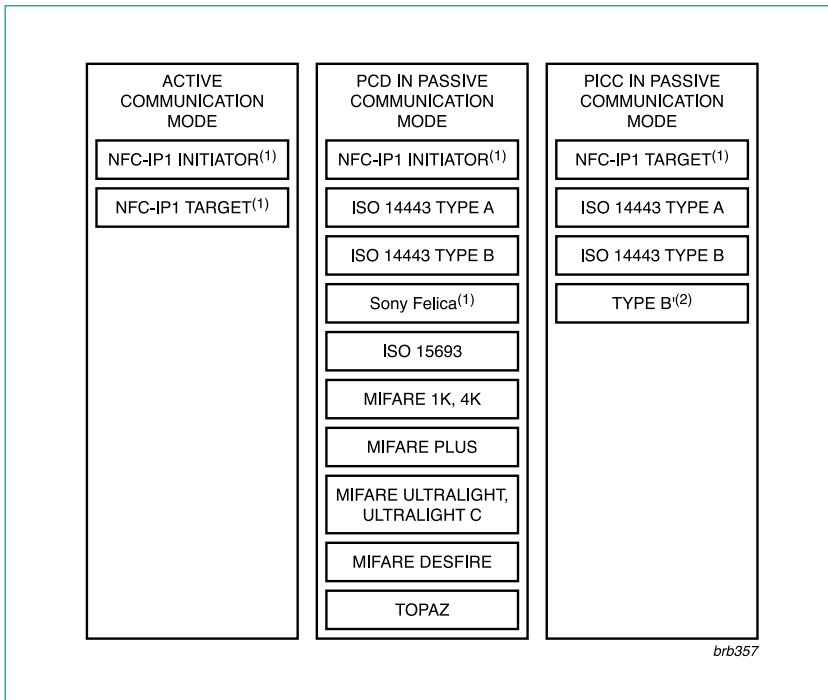|		PN544
Contactless protocols	Peer-to-peer	Full ISO 18092 (up to 424 Kbits/s)
	Reader/writer	ISO 14443 –A-B, MIFARE, FeliCa®, NFC Forum tags, ISO 15693
	Card emulation	ISO 14443 –A-B-B', MIFARE, FeliCa RF
Host interfaces	Serial UART	460800 bits/s
	I²C	400 Kbits/s or 3.4 M
	SPI	8 Mbits/s
	SWP	Yes
	Secure element interface	NFC-WI
	RAM/ROM/EEPROM	5 K / 128 K / 52 K
Power characteristics	Supply voltage	2.3 to 5.5 V
	Host interface voltage (min)	1.65 to 1.95 V
	Power down mode (typ)	3 µA
	RF active current (typ)	60 mA
	Battery-off mode	Yes
Temperature range		-25 to +85 °C
Package		TFBGA64 (4.5 x 4.5 x 0.8 mm)

PN544 block diagram

HOST INTERFACE
UART | SPI | I²C

| SIM INTERFACE | SAM INTERFACE | CLESS INTERFACE UNIT | POWER MANAGEMENT UNIT | CLOCK MANAGEMENT UNIT |

SWP

NFC-WI

CLESS UART
RX CODEX
TX CODEX
SIGNAL PROCESSING

TIMER 0/1
INTERRUPT CONTROLLER
GPIO
RNG

CPU HT80C51MX

MEMORY INTERFACE

MEM

DEBUG-IF

debug/test

001aak781

PN544 transmission modes

ACTIVE COMMUNICATION MODE	PCD IN PASSIVE COMMUNICATION MODE	PICC IN PASSIVE COMMUNICATION MODE
NFC-IP1 INITIATOR[1]	NFC-IP1 INITIATOR[1]	NFC-IP1 TARGET[1]
NFC-IP1 TARGET[1]	ISO 14443 TYPE A	ISO 14443 TYPE A
	ISO 14443 TYPE B	ISO 14443 TYPE B
	Sony Felica[1]	TYPE B'[2]
	ISO 15693	
	MIFARE 1K, 4K	
	MIFARE PLUS	
	MIFARE ULTRALIGHT, ULTRALIGHT C	
	MIFARE DESFIRE	
	TOPAZ	

brb357

[1] According to ISO/IEC 18092 (ECMA 340) standard
[2] Type B' via SWP only

Design-in kit

To support your product development and enable easy access to NFC technology, NXP has prepared a design-in kit with all the necessary hardware, software and documentation. It includes a reference board OM5596 (12NC 9352 900 17699), a data sheet, a user manual, and an application note, along with drivers, source code and examples in Windows and Linux. We also offer a reference implementation for the NFC Forum's protocol stack.

Ordering information

▸ PN544 ICs

Part number		PN5441A2ET/C20501	
Sales description	Package	TFBGA64	
Ordering information	12NC	9352 913 91157	MOQ = 2450
			(5 trays)
		9352 913 91118	MOQ = 4000
			(tape and reel)
		9352 913 91151	MOQ = 490
			(1 tray)

▸ Technical documentation
- List of available documents : http://www.nxp.com/nfc
- To place an order : http://www.nxp.com/acrobat_download/ other/identification/NFC_request_final.pdf

▸ Samples & design kits
- List of NXP distributors : http://www.nxp.com
- Portals for NXP distributor : https://extranet.nxp.com

Useful links

▸ NFC Forum specifications : http://www.nfc-forum.org/specs/
▸ MIFARE: http://www.mifare.net

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