PN5190B2

NFC Frontend

Rev. 4.2 — 14 September 2026 Product short data sheet

1 General description

This document describes the functionality and electrical specification of the high-power NFC-IC PN5190, silicon version B2, using firmware V3.0 or higher. There are no electrical differences between versions PN5190B1 and PN5190B2, the difference between the ICs is related to hardcoded firmware parts (ROM) only.

Additional documents supporting a design-in of the PN5190B2 are available from NXP, this additional design-in information is not part of this document.

The PN5190B2 supports highly innovative and unique features, which do not require any host controller interaction. These features include dynamic power control (DPC), adaptive waveshape control (AWC), and fully automatic EMD error handling.

The independence of real-time host controller interactions makes this product a good fit for systems, which operate a preemptive multitasking OS like Linux or Android.

In this document, the term "MIFARE card“ refers to a contactless card using an IC out of the MIFARE Classic, MIFARE Plus, MIFARE Ultralight, or MIFARE DESFire product family.

For more information, refer to the PN5190 product page ref.[1] and full data sheet ref.[2] on nxp.com.

2 Features and benefits

2.1 RF functionality

- As a highly integrated high performance full NFC Forum-compliant frontend IC for contactless communication at 13.56 MHz, this NFC frontend IC utilizes a modulation and demodulation concept completely integrated for relevant 13.56 MHz based contactless communication methods and protocols.
  PN5190B2 supports communication with all products of the MIFARE product-based card family including MIFARE Ultralight, MIFARE Classic 1K/4K, MIFARE DESFire EV1/EV2, and MIFARE Plus cards CRYPTO implemented in hardware for R/W of all NXP MIFARE product-based cards (includes intellectual-property licensing rights for NXP ISO/IEC 14443-A, Innovatron ISO/IEC 14443-B, and NXP MIFARE products).
  The PN5190B2 frontend IC supports the following RF operating modes:

2.1.1 ISO/IEC 14443-A

- Reader/writer mode supporting ISO/IEC 14443-A R/W up to 848 kbit/s

2.1.2 ISO/IEC 14443-B

- Reader/writer mode supporting ISO/IEC 14443-B up to 848 kbit/s

2.1.3 FeliCa

- Reader/writer mode supporting FeliCa 212 kbit/s and 424 kbit/s (without crypto)

2.1.4 Tag type reading

- Supports reading of all NFC tag types (type 1, type 2, type 3, type 4A and type 4B, type 5)

2.1.5 MIFARE card reading

- Reader/writer communication mode for the MIFARE card family including MIFARE Classic

2.1.6 ISO/IEC 15693

- Reader/writer mode supporting ISO/IEC 15693 (ICODE)
- Proprietary data rates based on ISO/IEC15693 with 106 kbit and 212 kbit/s (for NXP NTAG 5 communication)

2.1.7 ISO/IEC 18000-3 Mode 3

- Reader/writer mode supporting ISO/IEC 18000-3 Mode 3

2.1.8 ISO/IEC 18092

- ISO/IEC 18092 (NFC-IP1)

2.1.9 ISO/IEC 21481

- ISO/IEC 21481 (NFC-IP-2)

2.1.10 Peer to peer

- P2P Passive 106 kbit/s TO 424 kbit/s, initiator and target

- P2P Active 106 kbit/s TO 424 kbit/s, initiator and target
- Proprietary passive communication for type A up to 848 kbit/s
- Functionality according to ISO/IEC 21481 (NFC-IP-2)

2.1.11 Card emulation

- ISO/IEC 14443-A card mode from 106 kbit/s up to 848 kbit/s (PICC) with active load modulation for increased communication range.

2.2 Host interface

- One host interface based on SPI is implemented:
  - SPI interface with data rates up to 15 Mbit/s with MOSI, MISO, NSS, and SCK signals
  - Interrupt request line to inform host controller on events
  - Independent TX and RX buffer for RF data with size of 1024 bytes each

2.3 Integrated DC-DC

- The PN5190B2 implements an integrated DC-DC which can be used to supply the transmitter. Since the supply voltage of the transmitter LDO can be up to 6.0 Volts, this simplifies the design of the power supply.
  A single supply concept for the RF system, e.g. with single 3.3 V supply, is possible and allows making use of the maximum RF output power by providing a maximum transmitter supply voltage.
  The integrated DC-DC is used by the dynamic power control (DPC) to reduce the maximum power dissipation of the chip.
  The usage of the DC-DC is optional.
  For applications making use of the low-power card detection, the DC-DC is available. For applications using the ultra low-power card detection (ULPCD), the DC-DC cannot be used.

3 Applications

- Payment
- Physical access
- eGov

4 Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$VDD_{(VBAT)}$	supply voltage on pin VBAT (analog and digital supply)	VBAT ≥ VDDIO	2.4	-	5.5	V
$VDD_{(VDDIO)}$	supply voltage on pin VDDIO (supply for host interface and GPIOs)	1.8 V supply	1.62	-	1.98	V
		3.3 V supply	2.4	-	3.6	V
I_{pd}	power down current	$VDD_{(VDDPA)}$ = $VDD_{(VDDIO)}$ =$VDD_{(VDD)}$ 3.0 V; hard power down state; pin VEN set LOW, T_{amb} = 25 °C, External supply by VDDIO	-	40	105	µA
I_{stb}	standby current	T_{amb} = 25 °C	-	45	110	µA
I_{ULPCD}	average ultra-low-power card detection current	T_{amb} = 25 °C, VDD(VDDPA) = VDD(VDDIO) =VDD(VDD) 3.0 V, 330 ms Polling interval, 50 R antenna matching	-	22	-	µA
$IDD_{(VDDPA)}$	supply current on pin VDDPA	supplied via VUP_TX (TX_LDO active)	-	-	350	mA
		supplied without DC-DC and TXLDO active	-	-	400	mA
$P_{(PA)}$	Transmitter output power	supplied via VUP_TX (TX_LDO active)	-	-	2.0	W
		supplied without DC-DC and TXLDO active	-	-	2.3	W
T_{amb}	ambient operating temperature	in still air with exposed pins soldered on a 4 layer JEDEC PCB TX $current_{max}$ = 350 mA @ $VDDPA_{max}$ = 5.7V	-40	-	+85	°C
		in still air with exposed pins soldered on a 4 layer JEDEC PCB TX $current_{max}$ = 120 mA @ $VDDPA_{max}$ = 3.6 V	-40	-	+105	°C
T_{stg}	storage temperature	no supply voltage applied	-55	-	+150	°C
T_{j_max}	maximum junction temperature	-	-	-	+125	°C

5 Ordering information

Table 2. Ordering information

Type number	Package		
	Name	Description	Version
PN5190B2HN/C130Y	VFLGA40	very thin fine-pitch land grid array package, 40 terminals, 0.4 mm pitch, 5 mm x 5 mm x 0.8 mm body; delivered in one reel, MSL=3. Minimum order quantity = 4000 pcs, the ending Y in the product name is indicating the packing "reel" Initialized with FW 3.0, supports encrypted firmware download	SOT2062-1
PN5190B2HN/C130K	VFLGA40	very thin fine-pitch land grid array package, 40 terminals, 0.4 mm pitch, 5 mm x 5 mm x 0.8 mm body; delivered in multiple trays, MSL=3. Minimum order quantity = 2450 pcs, the ending K in the product name is indicating the packing "multiple trays" Initialized with FW 3.0, supports encrypted firmware download	SOT2062-1
PN5190B2HN/C131Y	VFLGA40	very thin fine-pitch land grid array package, 40 terminals, 0.4 mm pitch, 5 mm x 5 mm x 0.8 mm body; delivered in one reel, MSL=3. Minimum order quantity = 4000 pcs, the ending Y in the product name is indicating the packing "reel" Initialized with FW 3.2, supports encrypted firmware download	SOT2062-1
PN5190B2HN/C131K	VFLGA40	very thin fine-pitch land grid array package, 40 terminals, 0.4 mm pitch, 5 mm x 5 mm x 0.8 mm body; delivered in multiple trays, MSL=3. Minimum order quantity = 2450 pcs, the ending K in the product name is indicating the packing "multiple trays" Initialized with FW 3.2, supports encrypted firmware download	SOT2062-1
PN5190B2EV/C130Y	VFBGA64	plastic very thin fine-pitch ball grid array package; 64 balls; 4.5 mm x 4.5 mm x 0.80 mm, delivered on reel 13", MSL = 3. Minimum order quantity = 4000 pcs, the ending Y in the product name is indicating the packing "reel" Initialized with FW 3.0, supports encrypted firmware download	SOT1307-2
PN5190B2EV/C130K	VFBGA64	plastic very thin fine-pitch ball grid array package; 64 balls; 4.5 mm x 4.5 mm x 0.80 mm, delivered in one tray, MSL = 3. Minimum order quantity = 2450 pcs, the ending K in the product name is indicating the packing "multiple trays" Initialized with FW 3.0, supports encrypted firmware download	SOT1307-2
PN5190B2EV/C131Y	VFBGA64	plastic very thin fine-pitch ball grid array package; 64 balls; 4.5 mm x 4.5 mm x 0.80 mm, delivered on reel 13", MSL = 3. Minimum order quantity = 4000 pcs, the ending Y in the product name is indicating the packing "reel" Initialized with FW 3.2, supports encrypted firmware download	SOT1307-2
PN5190B2EV/C131K	VFBGA64	plastic very thin fine-pitch ball grid array package; 64 balls; 4.5 mm x 4.5 mm x 0.80 mm, delivered in one tray, MSL = 3. Minimum order quantity = 2450 pcs, the ending K in the product name is indicating the packing "multiple trays" Initialized with FW 3.2, supports encrypted firmware download	SOT1307-2

6 Block diagram with VFBGA64 connections

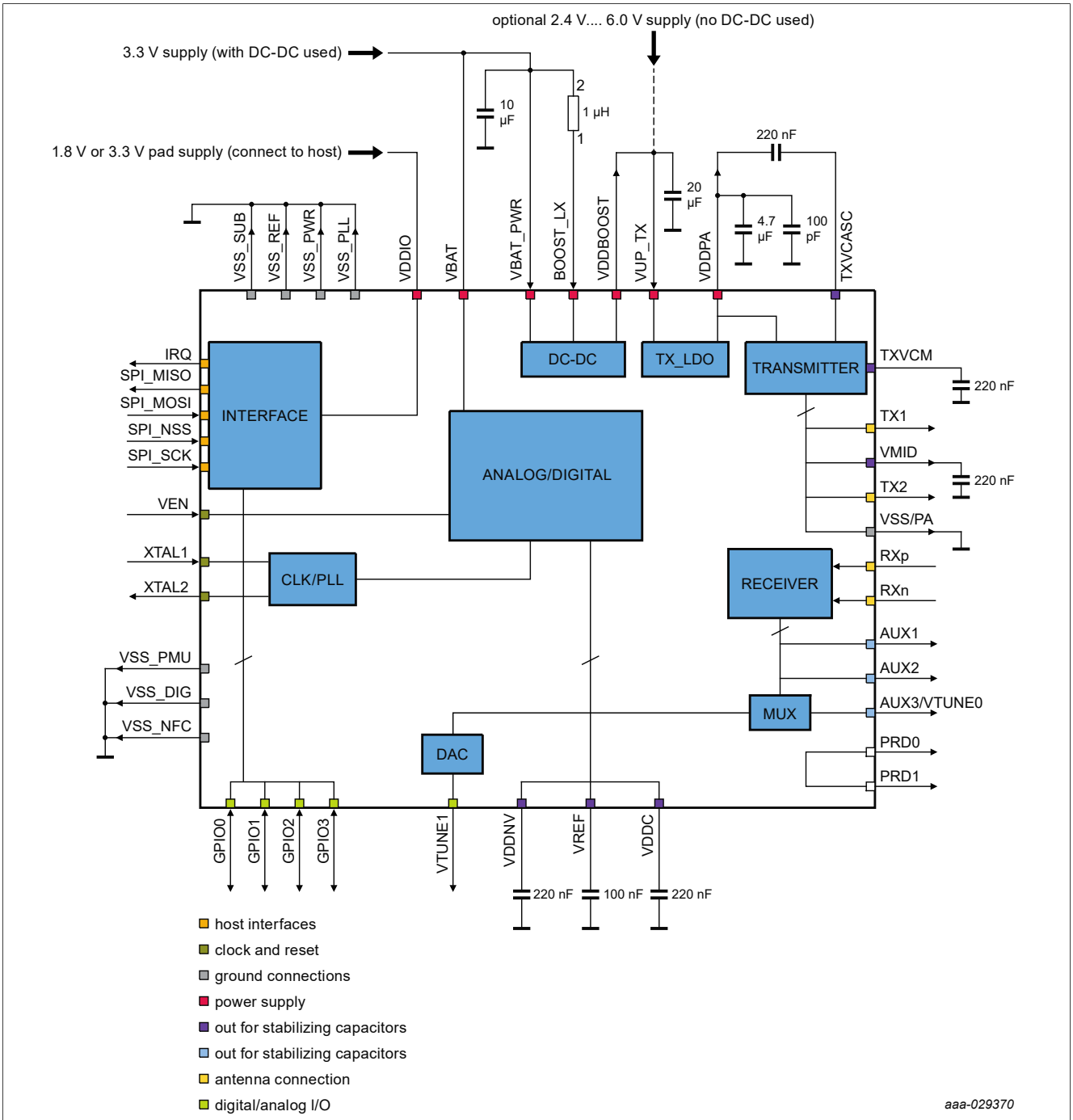

Figure 1. Block diagram (external connections: DC-DC mode)

7 Limiting values

Table 3. Limiting values

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

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{DD(VUP\_TX)}$	supply voltage on pin VUP_TX	-	-0.3	6.3	V
$V_{DD(VBAT)}$	supply voltage on pin VBAT	-	-0.3	5.8	V
$V_{DD(VDDIO)}$	supply voltage on pin VDDIO	on pin VDDIO, power supply for host interface and GPIOs	-0.3	3.8	V
$V_{DD(VDDPA)}$	supply voltage on pin VDDPA	maximum limiting values for $I_{DD(VDDPA)}$ and $T_{j(max)}$ not violated	-	6.0	V
$V_{i(RXP)}$	input voltage on pin RXP	-	-0.3	+ 2.0	V
$V_{i(RXN)}$	input voltage on pin RXN	-	-0.3	+ 2.0	V
V_{ESD}	electrostatic discharge voltage	human body model (HBM)[1]	-2000	2000	V
		charge device model (CDM)[2]	-500	+500	V
$T_{j(max)}$	junction temperature	-	-	125	°C
T_{stg}	storage temperature	no supply voltage applied	-55	+150	°C

[1] According to ANSI/ESDA/JEDEC JS-001
[2] According to ANSI/ESDA/JEDEC JS-002

Stress above one or more of the limiting values may cause permanent damage to the device or limit the lifetime.

Product might not behave according to specification.

8 References

[1] Webpage – PN5190: NFC Frontend Supporting Challenging RF Environment for Payment, Physical Access Control (link)

[2] Data sheet – PN5190B2 (link)

9 Revision history

Table 4. Revision history

Document ID	Release date	Description
PN5190B2_SDS v.4.2	14 September 2026	Released with data sheet update.

Legal information

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".
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Tables

Figures

Contents