NFC READER SOLUTIONS

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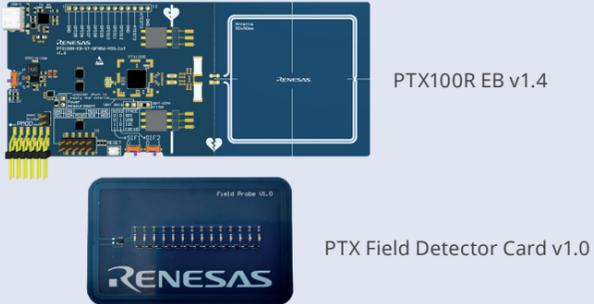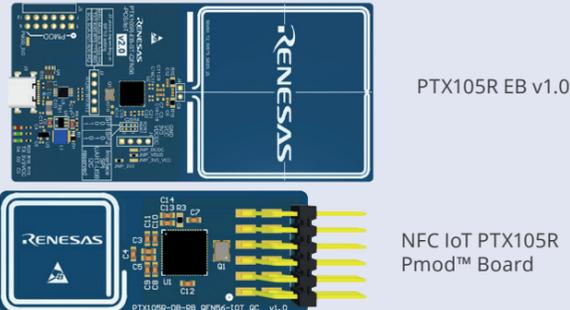| PRODUCT	PTX100R	PTX105R	PTX130R
Product description	High-performance, high-power, multi-protocol NFC Forum reader. Universal SW device integration.	**Mid-power**, multi-protocol NFC Forum compliant reader. Universal SW device integration.	High-performance, **high-efficiency** and high-power multi-protocol NFC Forum compliant reader. Universal SW device integration. Additional applications and new Form-Factors.
Technology	180nm	180nm	180nm
STANDARDS & PROTOCOLS			
NFC Forum certification, FeliCa pre-certification test	NFC Forum compliance, ✓	NFC Forum compliance, -	NFC Forum compliance, -
Reader / Writer	ISO/IEC 14443 A/B, EMVCo 3.0/3.1 ISO/IEC 18092, FeliCa™ ISO/IEC 15693 ISO/IEC 18000-3 M1	ISO/IEC 14443 A/B, ISO/IEC 18092, FeliCa™ ISO/IEC 15693 ISO/IEC 18000-3 M1	ISO/IEC 14443 A/B, EMVCo 3.1 ISO/IEC 18092, FeliCa™ ISO/IEC 15693 ISO/IEC 18000-3 M1
Carrier frequency [MHz]	13,56 MHz	13,56 MHz	13,56 MHz
NFC Forum Tag-Type support	2, 3, 4, 5	2, 3, 4, 5	2, 3, 4, 5
ISO/IEC 14443 bitrate [kbit/s]	106/212/424/848 kbit/s	106/212/424/848 kbit/s	106/212/424/848 kbit/s
ISO/IEC 18092 / FeliCa™[1], bitrate [kbit/s]	212/424 kbit/s	212/424 kbit/s	212/424 kbit/s
MIFARE Classic®[2] support (MFCC)	✓	✓	✓
Support Apple ECP "Enhanced Contactless Polling"[3]	✓	✓	✓
ISO/IEC 15693 bitrate [kbit/s]	26.5 kbit/s	26.5 kbit/s	26.5 kbit/s
ISO/IEC 18000-3 M1	✓	✓	✓
EMVCo compliance	✓ (3.1)	-	✓ (3.1)
EMVCo High Power behind Display Compliance (HPDC)	✓	-	✓
Card emulation (HCE)	✓	✓	✓
NFC Tag-Type emulation @ bitrate [kbit/s]	4A @ [106 kbit/s]	4A @ [106 kbit/s]	4A @ [106 kbit/s]
Peer-to-peer (ISO/IEC 18092)	✓	✓	✓
Passive communication	Initiator	Initiator	Initiator
Active communication	-	-	-
Special Protocols & Features	China ID	China ID	China ID
PRODUCT FEATURES			
Ultra-low power on-chip MCU with integrated Firmware	✓	✓	✓
High power digital conversion sine wave RF frontend	✓	✓	✓
Digital dynamic power control (DDPC)	✓	✓	✓
DIRAC®: EMI filter-less solution	✓	✓	✓
Advanced Digital Wave-Shaping	✓	✓	✓
Phase Accurate Active Load-Modulation HCE	✓	✓	✓
High receiver/LMA sensitivity [dBc]	-80 dBc	-80 dBc	-80 dBc
Very High Dynamic Range Receiver (VHDRR)	✓	✓	✓
Operating distance up to [mm], ISO 14443[4] / ISO 15693[5]	140 mm / 320 mm	100 mm / 200 mm	140 mm / 320 mm
RF transmitter supply voltage [V]	2.5 V – 5.5 V	2.5 V – 5.5 V	2.5 V – 5.5 V
Transmitter supply current, max. [mA]	650 mA	430 mA	650 mA
Power Output, max. [W]	2.0 W	1.0 W	2.0 W
Host interface	SPI, I2C, UART	SPI, I2C, UART	SPI, I2C, UART
Supply voltage host interface [V]	1.8V, 3.3V, 5.0V	1.8V, 3.3V, 5.0V	1.8V, 3.3V, 5.0V
Power-down mode current, typ. [µA]	3 µA	3 µA	3 µA
Standby current with LPFD[5] @ HCE, typ. [µA]	16,5 µA	16,5 µA	16,5 µA
Standby current with LPFD and Host event, typ. [µA]	16,5 µA	16,5 µA	16,5 µA
Low Power Card Detection mode (LPCD), typ. [µA], @ 2 Hz	100 µA	100 µA	100 µA
Customizable GPIO	✓	✓	✓
Temperature range [°C]	-40 to +70	-40 to +85	-40 to +85[7]
Field-detection signal output	IRQ	IRQ	IRQ
PRODUCT SUPPORT AND ORDERING INFORMATION			
Product packages	QFN56	QFN56	QFN56
Product type	PTX100RDQ56	PTX105RDQ56	PTX130RDQ56
Order code single tray (dry pack)	PTX100RDQ56B	PTX105RDQ56B	PTX130RDQ56B
Order code reel (TR dry reel 13")	PTX100RDQ56D13	PTX105RDQ56D13	PTX130RDQ56D13
EVALUATION BOARDS			
Name of evaluation kit	PTX100R NFC Reader Eval Kit	PTX105R NFC Reader Eval Kit	PTX130R NFC Reader Eval Kit
Order number of evaluation kit	10009100	10009105	10009130
NFC IoT PTX105R Pmod™ Board (Renesas Quick Connect IoT)	-	Get your QC PTX105R Pmod board	-
SOFTWARE / SDKS / GUI	NFC reader libraries (SDK's) for PoS (EMVCo 3.1) and IoT in Non-OS (MCU's, RTOS) and OS versions (Linux, Multi-Tasking-OS). Config Tool GUI for evaluation of IC features, RF optimization and Tag reading (Windows® and Linux)	NFC reader libraries (SDK's) IoT in Non-OS (MCU's, RTOS) and OS versions (Linux, Multi-Tasking-OS). Config Tool GUI for evaluation of IC features, RF optimization and Tag reading (Windows® and Linux)	NFC reader libraries (SDK's) for PoS (EMVCo 3.1), IoT in Non-OS (MCU's, RTOS) and OS versions (Linux, Multi-Tasking-OS). NCI 2.0 SDK. AIS (Android™[8] Integration Stack). Config Tool GUI for evaluation of IC features, RF optimization and Tag reading (Windows® and Linux)

FULL PRODUCT DETAILS AT: **WWW.RENESAS.COM**

1. FeliCa™ is a registered trademark of Sony Group Corporation
2. MIFARE Classic® is a registered trademark of NXP B.V.
3. Only for customer authorized by Apple
4. 6,5 x 6,5 cm coil @ 3,5V supply voltage
5. 19 x 19 cm coil @ 3,5V supply voltage
6. Low Power Field Detection (LPFD)
7. Depending on output power
8. Android is the trademark of Google LLC

EVALUATION KIT (ORDER NUMBER)	PTX100R NFC READER EVAL KIT (10009100)	PTX105R NFC READER EVAL KITS (10009105) NFC IOT PTX105R PMOD™ BOARD: GET YOUR QC PTX105R PMOD BOARD AND VIA RENESAS RA PARTNER ECOSYSTEM	PTX130R NFC READER EVAL KIT (10009130)
Supported products	PTX100R	PTX105R	PTX130R
Contents (Order number of boards)	• 1 PTX100R EB v1.4 (10009001) • 1 PTX H-Field Detector Card v1.0 (10009006) • 1 USB-A to USB-C cable	• 1 PTX105R EB v1.0 (10009018) • 1 PTX H-Field Detector Card v1.0 (10009006) • 1 USB-A to USB-C cable	• 1 PTX130R EB v1.0 (1009019) • 1 PTX H-Field Detector Card v1.0 (10009006) • 1 USB-A to USB-C cable
Key features	• High-power (2W), high-performance NFC Reader kit for universal reader hardware platform IC PTX100R. EMVCo L1 with antenna behind display. • Easy-to-use, ready-to-go SW integration into any terminal/device Host-MCU architecture supporting all types of NFC protocols, standards, and Tag protocols (ISO14443 A/B, ISO18092, ISO15693, FeliCa and others). EMVCo L1 compliant protocols (PoS SDK). • NFC P2P (initiator) and Card Emulation (HCE) • Digital dynamic power control (DDPC), DIRAC®: EMI filter-less solution, Advanced Digital Wave-Shaping, Phase Accurate Active Load-Modulation in Card Mode, Very High Dynamic Range Receiver (VHDRR) • RF-design supported with Config Tool and SDKs	• Mid-power (1W) NFC Reader kit for universal reader hardware platform IC PTX105R. • Easy-to-use, ready-to-go SW integration into any terminal/device host MCU architecture supporting all types of NFC protocols, standards, and Tag protocols (ISO14443 A/B, ISO18092, ISO15693, FeliCa. • NFC P2P (initiator) and Card Emulation (HCE) • Digital dynamic power control (DDPC), DIRAC®: EMI filter-less solution, Advanced Digital Wave-Shaping, Phase Accurate Active Load-Modulation in Card Mode, Very High Dynamic Range Receiver (VHDRR) • RF-design supported with Config Tool and SDKs	• High-efficiency, high-power (2W), high-performance NFC Reader kit for universal reader hardware platform IC PTX130R. EMVCo L1 with antenna behind display. • Easy-to-use, ready-to-go SW integration into any terminal/device host MCU architecture supporting all types of NFC protocols, standards, and Tag protocols (ISO14443 A/B, ISO18092, ISO15693, FeliCa and others). EMVCo L1 compliant protocols (PoS SDK). • NFC P2P (initiator) and Card Emulation (HCE) • Digital dynamic power control (DDPC), DIRAC®: EMI filter-less solution, Advanced Digital Wave-Shaping, Phase Accurate Active Load-Modulation in Card Mode, Very High Dynamic Range Receiver (VHDRR) • RF-design supported with Config Tool and SDKs
Certifications	FCC & CE compliant, MIC Japan compliance (TELEC labs), SONY FeliCa® pre-test passed	Planned: CE, FCC	Planned: CE, FCC

Software and tools	• SDKs "Non-OS" optimized Software solution for integration with any Host-MCU/RTOS. High performance APIs in C source code with compact code size:
	  • PoS SDK compliant to EMVCo and NFC standards
	  • IoT SDK compliant to all relevant NFC standards
	• SDKs "OS": PoS (EMVCo compliant) and IoT reader libraries in C source code including extended SW functions for OS´s:
	  • Linux®, RTOS and any Multi-Tasking OS
	• Config Tool for evaluation and Demo GUI (Windows® and Linux): Demonstration and evaluation of IC-Features, RF/antenna optimization and Tag read (via USB interface)
	• 'Tunneling'-SDK: UART to SPI bridge in C-source code for any MCU providing direct connection of the Config Tool to the PTX-IC to optimize RF/coil design and RF parameters.
	• Antenna design support with open-source tool Qucs Studio.
		• SDKs "Non-OS" optimized Software solution for integration with any Host- MCU/RTOS. High performance APIs in C source code with compact code size:
		  • IoT SDK compliant to all relevant NFC standards
		• SDKs "OS": IoT reader libraries in C source code including extended SW functions for OS´s:
		  • Linux®, RTOS and any Multi-Tasking OS
		• Config Tool for evaluation and Demo GUI (Windows® and Linux): Demonstration and evaluation of IC-Features, RF/antenna optimization and Tag read (via USB interface)
		• 'Tunneling'-SDK: UART to SPI bridge in C-source code for any MCU providing direct connection of the Config Tool to the PTX-IC to optimize RF/coil design and RF parameters.
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			• SDKs "Non-OS" optimized Software solution for integration with any Host-MCU/RTOS. High performance APIs in C source code with compact code size:
			  • PoS SDK compliant to EMVCo and NFC standards
			  • IoT SDK compliant to all relevant NFC standards
			• SDKs "OS": PoS (EMVCo compliant) and IoT reader libraries in C source code including extended SW functions for OS´s:
			  • Linux®, RTOS and any Multi-Tasking OS
			• Android Integration Stack (AIS) on NCI specification
			• Config Tool for evaluation and Demo GUI (Windows® and Linux): Demonstration and evaluation of IC-Features, RF/antenna optimization and Tag read (via USB interface)
			• 'Tunneling'-SDK: UART to SPI bridge in C-source code for any MCU providing direct connection of the Config Tool to the PTX-IC to optimize RF/coil design and RF parameters.
			• Antenna design support with open-source tool Qucs Studio

Target applications	**High-power universal multi-market reader solutions:** • EMVCo POS, mPOS and SmartPOS terminals (antenna behind display) • Compact POS Chip&Sign, ATM POS modules • Transportation terminals, gateways, industrial application • High-end access control, door locks • Accessories identification, brand protection, printing devices • Gaming consoles, fitness accessories and Smart-TV • e-Government, eMRTD, home eID • Small FormFactor NFC Reader (e.g.: Dongle, medical, pen-reader)	**Mid-power universal multi-market reader solutions:** • Transportation terminals, gateways, industrial application • Access control, door locks • Accessories identification, brand protection, printing devices • Gaming consoles, fitness accessories and Smart TV • e-Government, eMTRD, home eID • Small FormFactor NFC Reader (e.g.: Dongle, medical, pen-reader) • NFC tag protection for Qi Wireless charging systems	**High-efficiency, high-power universal multi-market reader solutions:** • EMVCo POS, mPOS and SmartPOS terminals (antenna behind display) • Compact POS Chip&Sign, ATM POS modules • Mobile Handheld PDA, phones or other devices running Android • Transportation terminals, gateways, industrial application • High-end access control, door locks • Accessories identification, brand protection, printing devices • Gaming consoles, fitness accessories and Smart-TV • e-Government, eMRTD, home eID • Small FormFactor NFC Reader (e.g.: Dongle, medical, pen-reader)

Application team support (Registered customers)	• SW-expert team supports you with target system Software/Firmware integration
	• Expert support for RF and antenna design for your end application
	  • Retrofit support: Customer antenna retrofitted with customer antenna
	  • End form factor RF optimization and verification with 'Tunneling'-SDKs
	• EMVCo L1 certification support
		• SW-expert team supports you with target system Software/Firmware integration
		• Expert support for RF and antenna design for your end application
		  • Retrofit support: Customer antenna retrofitted with customer antenna
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			  • End form factor RF optimization and verification with 'Tunneling'-SDKs
			• EMVCo L1 certification support

For registration, ordering of boards and SDK's please visit our website	PTX100R EB v1.4 PTX Field Detector Card v1.0	PTX105R EB v1.0 NFC IoT PTX105R Pmod™ Board	