wireless

Ultimate Long-Range, Low-Power Solutions

Wireless & RF Selector Guide

- Excels in harsh environments
- Long range > 2-mile range in dense urban environments
  Up to 30 miles outdoor LOS
- Multi-year battery operation up to 20 years
- Scalable network with tens of thousands of nodes per gateway

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SEMTECH

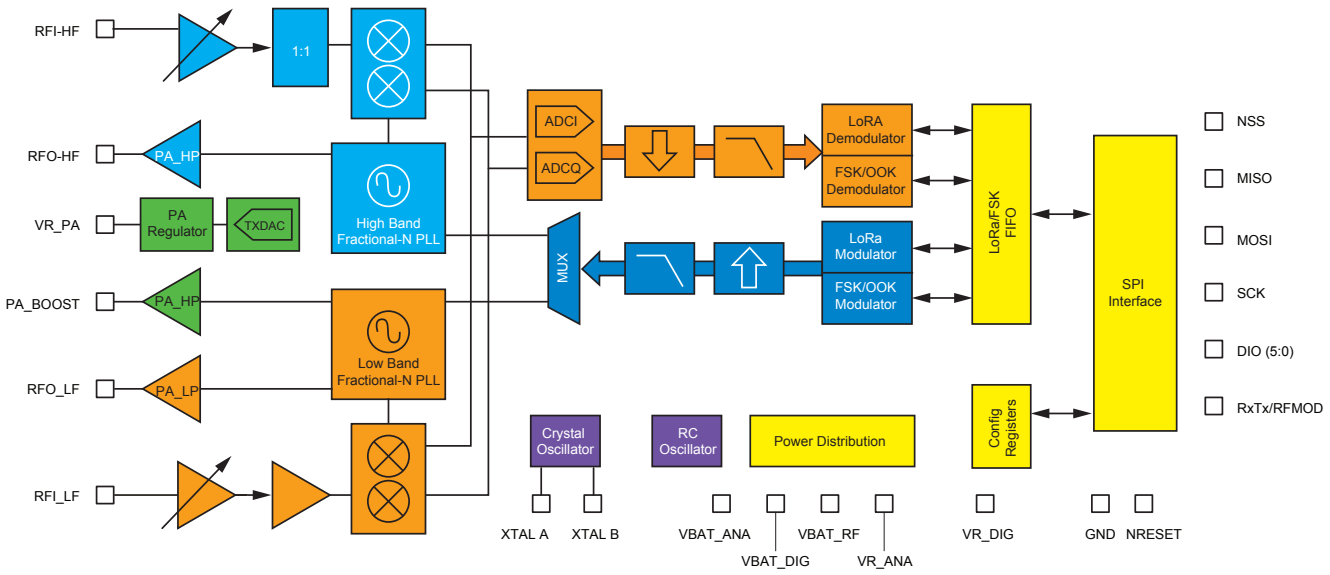
LoRa® — The Ultimate Long-Range Solutions

Ideal for eliminating repeaters, reducing infrastructure cost, extending battery lifetime, and improving network capacity

LoRa PRODUCTS

- Long range of up to 30 miles outdoor line of sight
- Deep indoor coverage for hard to reach areas
- Bi-directional communication link with adaptive data rates
- Low power sensors with extended battery lifetime of up to 20 years
  - 100nA sleep mode
  - 9.7mA active receive mode
- LoRa, IEEE 802.15.4g and WMBus compliant.
- GFSK modes supported by a single radio
- Scalable, multi-channel, high-capacity gateways powered by SX1301
- Available for any environment
- LoRa modulation offers 30dB improvement over FSK for co-channel interference rejection
- Programmable registers for maximum flexibility
- Footprint-compatible ICs for global coverage
- Supported by over 400 members of LoRa Alliance™ that defines the open LoRaWAN protocol
- Large and growing online developer community for LoRa-based products
- Public, semi-private and private networks available worldwide

SX1276 BLOCK DIAGRAM

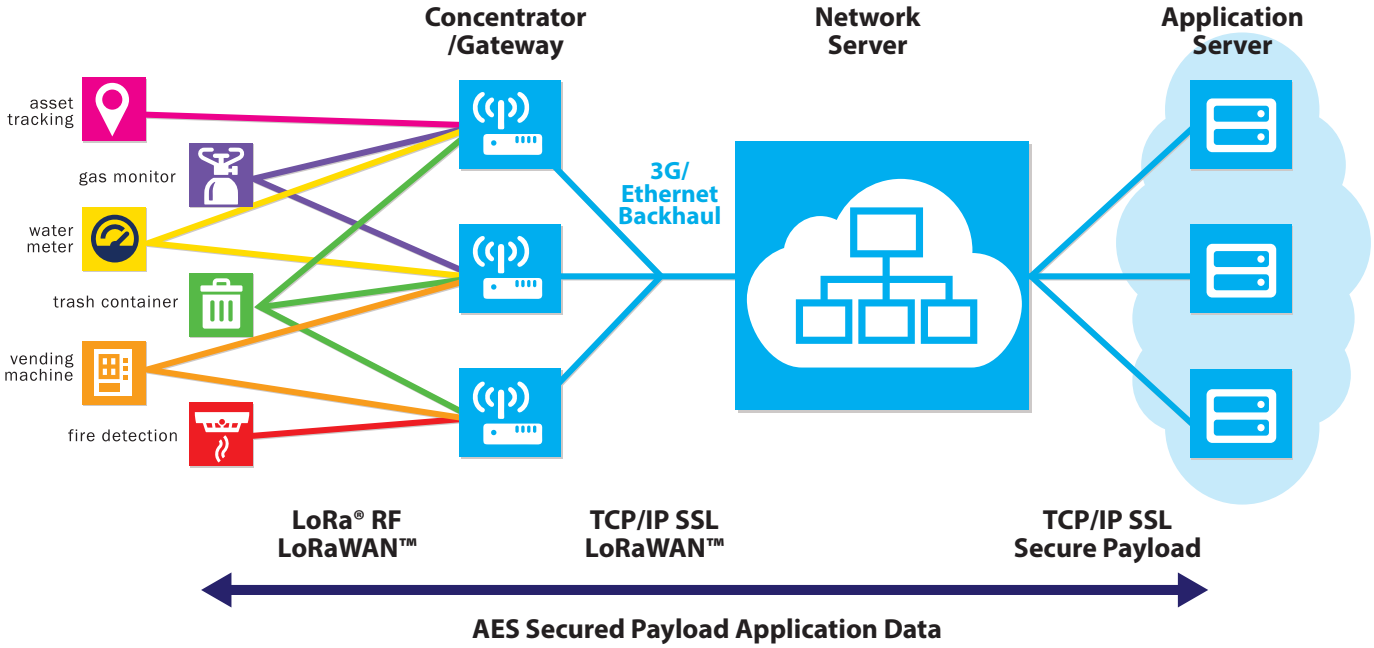


LoRa Products

Part Number	Frequency Range (MHz)	Link Budget (dB)	RXCurrent (mA)	FSK Max DR (kbps)	LoRa DR (kbps)	Max Sensitivity (dBm)	TX Power (dBm)
SX1272	862–1020	158	10	300	0.3–40	-138	+ 20
SX1273	862–1020	150	10	300	1.7–40	-130	+ 20
SX1276	137–1020	168	11	300	0.018–40	-148	+ 20
SX1277	137–1020	158	11	300	1.7–40	-138	+ 20
SX1278	137–525	168	11	300	0.018–40	-148	+ 20
SX1279	137–960	168	11	300	0.018–40	-148	+20

LoRa® Gateway/Concentrator Solution

The ultimate long-range, high capacity solution for IoT and M2M networks



KEY FEATURES OF SEMTECH'S LoRa WIRELESS RF TECHNOLOGY

Long Range	Penetrates in dense urban and deep indoor environments, connecting to sensors up to 30 miles away in rural areas
Low Power	Designed specifically for low power consumption extending battery lifetime up to 20 years
High Capacity	Supports millions of messages per basestation
Geolocation	Enables GPS free, low power tracking applications
Standardized	LoRaWAN specification ensures global interoperability among applications, IoT solution providers and telecom operators
Secure	Embedded end-to-end AES-128 encryption of data for optimal privacy and protection
Low Cost	Reduces costs three ways: infrastructure investment, operating expenses and end-node sensors

PICOCELL SOLUTIONS

- LoRa Picocell Platforms are designed for a variety of indoor applications
- SX1308 picocell IC is coupled with a SX1255 or SX1257 LoRa RF transceiver, and is expected to help bring low cost LoRaWAN networks to market for consumers and private enterprises

GATEWAY SOLUTIONS

- Multi-channel, multi-modem receiver including LoRa and FSK modems
- Inherent two-way communication
- Receives simultaneously different data rates on same channel

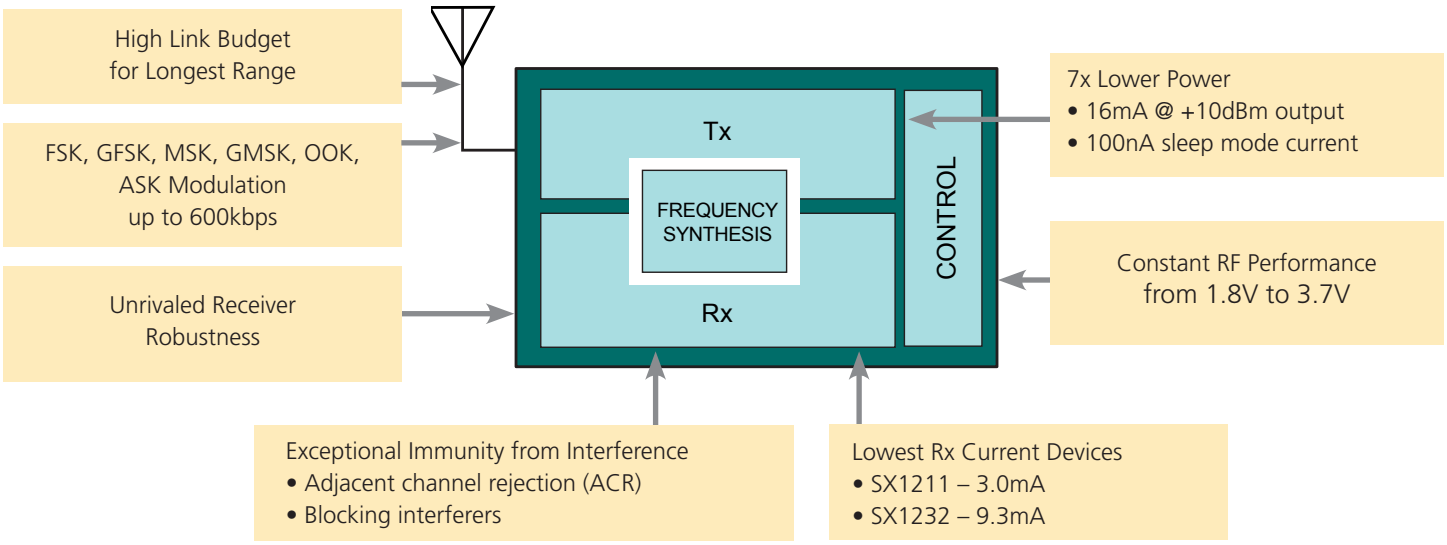
RF ICs and for Gateway and Picocells

Part Number	Tx/Rx	Operating Temp. Range	LoRa Modem	FSK Modem	Capacity
SX1301	Tx/Rx	-40– 85°C	9	1	Varies by application
SX1308	Tx/Rx	0–70°C	9	1	Varies by application

RF Transceivers

Part Number	Tx/Rx	Band (MHz)	Tx Power	NF
SX1257	Tx/Rx	860–1000	-20–8	7
SX1255	Tx/Rx	400–510	-20–8	7

Robust, Low-Power Communications For Next-Generation ISM-Band Applications



Complete Line of Semtech G/F/MSK & OOK RF ICs

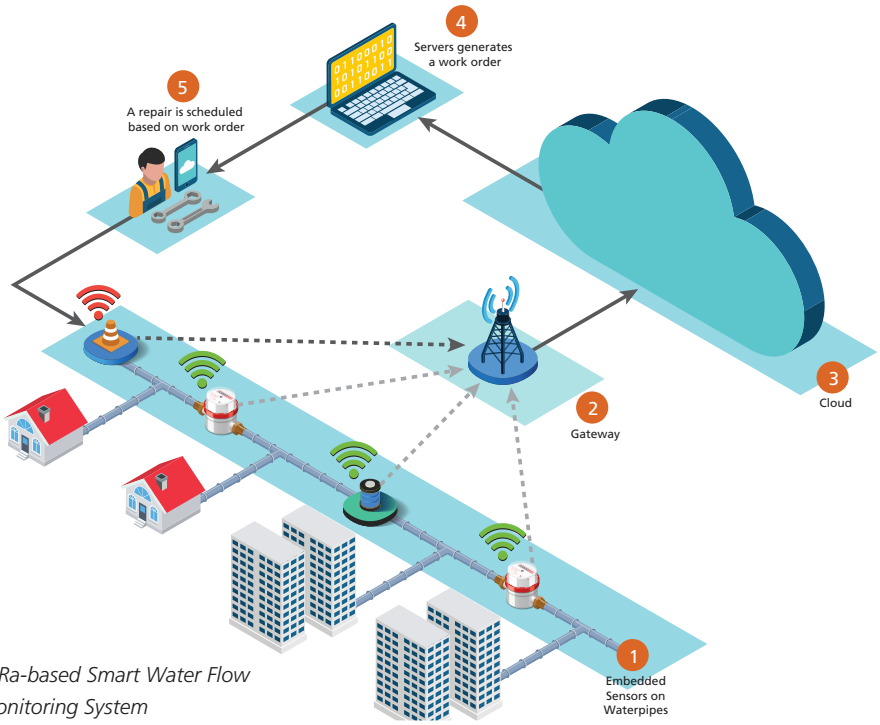
Part Number	Tx/Rx	Band (MHz)	Tx Power (dBm)	Modulation	Max Bit Rate	Rx Sensitivity (dBm)	Link Budget (dB)	Tx Current	Rx Current (mA)
SX1230	Tx	290–1000	-20 ~ 17	G/F/MSK & OOK	300kbps (FSK) 32.7kbps (OOK)	-	-	33mA @ 10dBm	-
SX1243	Tx	310–928	10	G/F/MSK & OOK	100kbps (FSK) 10kbps (OOK	-	-	15mA @ 10dBm	-
SX1239	Rx	290–1000	-20 ~ 17	G/F/MSK & OOK	300kbps (FSK) 32.7kbps (OOK)	-120	-	-	16
SX1231	Tx/Rx	290–1000	-20 ~ 17	G/F/MSK & OOK	300kbps (FSK) 32.7kbps (OOK)	-120	137	33mA @ 10dBm	16
SX1231H	Tx/Rx	290–1000	-20 ~ 20	G/F/MSK & OOK	600kbps (FSK) 32.7kbps (OOK)	-120	140	120mA @ 20dBm	16
SX1232	Tx/Rx	860–1000	-20 ~ 20	G/F/MSK & OOK	300kbps (FSK) 32.7kbps (OOK)	-123	143	120mA @ 20dBm	9.3
SX1236	Tx/Rx	137–1020	-20 ~ 20	G/F/MSK & OOK	300kbps (FSK) 32.7kbps (OOK)	-123	143	120mA @ 20dBm	9.9
SX1233	Tx/Rx	290–1000	-20 ~ 17	G/F/MSK & OOK	600kbps (FSK) 32.7kbps (OOK)	-120	137	33mA @ 10dBm	16
ETSI Class 1 SX1235	Tx/Rx	860–1000	-20 ~ 20	G/F/MSK & OOK	300kbps (FSK)	-123	143	120mA @ 20dBm	9.3
SX1211	Tx/Rx	862–960	-8.5 ~ +12.5	FSK/OOK/ASK	200kbps (FSK) 32.7kbps (OOK)	-107	120	25mA @ 10dBm	3

High Tx Power Devices

Part Number	Tx/Rx	Band (MHz)	Tx Power (dBm)	Modulation	Max Bit Rate	Rx Sensitivity (dBm)	Link Budget (dB)	Tx Current	Rx Current (mA)
SX1238	Tx/Rx	902 – 928	+27	G/F/MSK & OOK	300kbps	-124	151	408mA @ 27dBm	+20

Transform the Grid with LoRa-based Smart Meters and Smart Sensors

With over 20 years of experience providing RF communications and sensing ICs for battery-operated water and gas meters. Semtech offers the widest range of RF ICs for ultra long range, narrow-band, and wide-band machine-to-machine (M2M) communications.



LoRa-based Smart Water Flow Monitoring System

High-Link Budget

- 30dB higher than competing devices when using a low-cost BOM

High Rx Sensitivity Solutions

7x Lower Power Consumption

- 100nA sleep
- 2.5mA Rx
- 27mA @ +13dBm Tx

Support for Major Wireless Communications Protocols

- IEEE 802.15.4g
- Wireless M-Bus
- 6LoWPAN

Ultra-low Rx Current Consumption

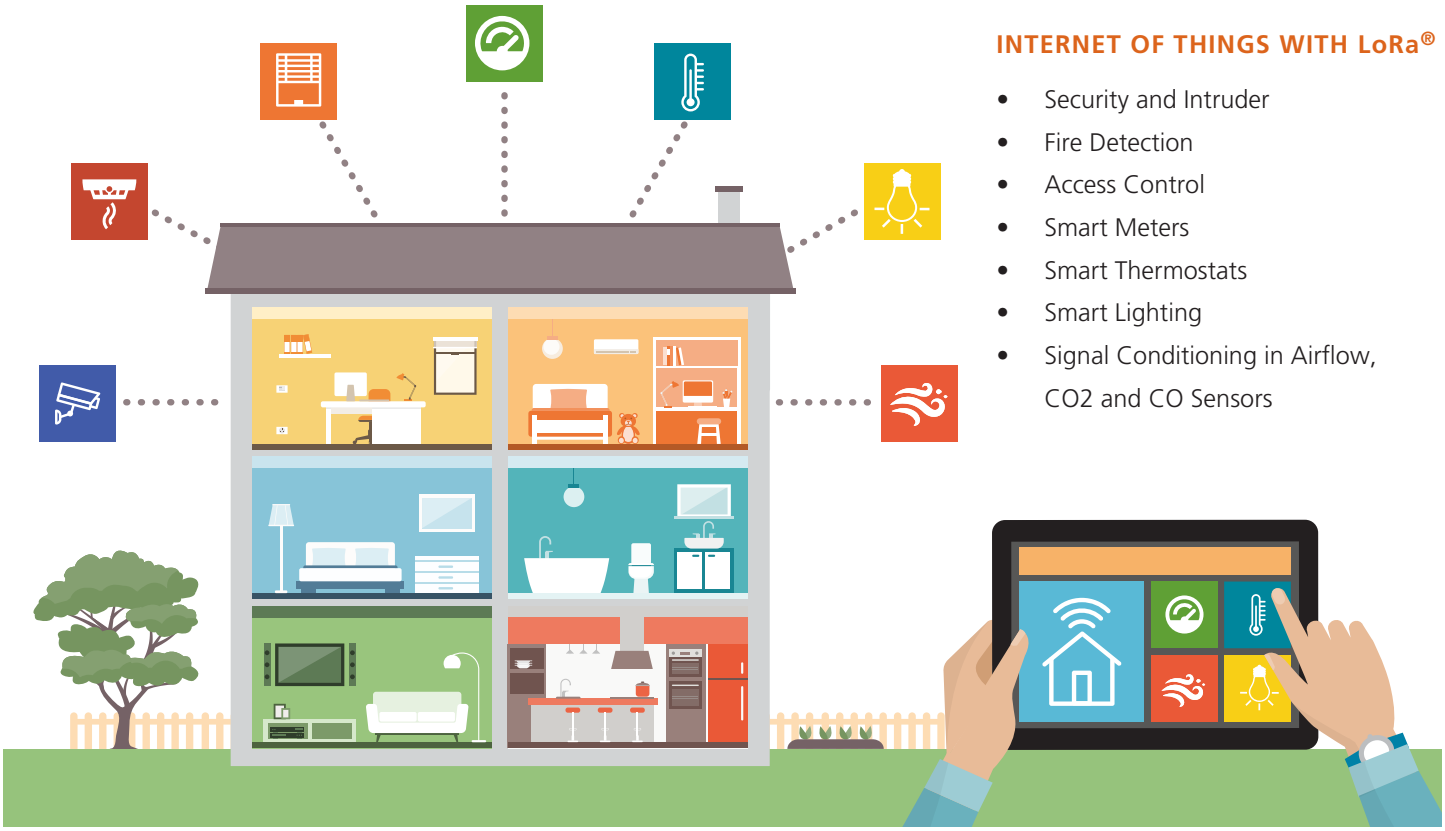
- <3mA
- Up to 7x lower than competing devices

RF ICs for Smart Energy Meters and Smart Sensors

Part Number	Description	Link Budget (dB)	Rx Current (mA)	Evaluation Kit
SX1232	860–11020MHz Low Power G/FSK/OOK/ASK RF Transceiver	143	9.3	SX1232-32SKA868/915
SX1272	860–11020MHz Long Range LoRa G/FSK Transceiver	158	10	SX1272DVK1BAS (868MHz) SX1272DVK1CAS (915MHz)
SX1273	860–11020MHz Long Range LoRa G/FSK Transceiver	150	10	SX1272DVK
SX1276	138–11020MHz Long Range LoRa G/FSK Transceiver	168	9.9	SX1276DVK1IAS (169/868MHz) SX1276DVK1IAS (433/868MHz) SX1276DVK1IAS (490/915MHz)
SX1277	138–11020MHz Long Range LoRa G/FSK Transceiver	158	9.9	SX1276DVK
SX1278	138–1510MHz Long Range LoRa G/FSK Transceiver	168	9.9	SX1276DVK
SX1279	138–1960MHz Long Range LoRa G/FSK Transceiver	168	9.9	SX1276DVK
SX1231	290–11000MHz G/FSK/OOK/ASK RF Transceiver	140	16	SX1231SKB433/868/915
SX1233	290–11000MHz G/FSK/OOK/ASK RF Transceiver	140	16	SX1233-33SKA868/915
SX1211	862–1960 MHz Low Power FSK/OOK/ASK RF Transceiver	125	3	SX1211SKA868/915
SX1212	310–510 MHz Low Power FSK/OOK/ASK RF Transceiver	122.5	3	SX1212SKA868/915

Green Solutions for Smart Homes and Buildings

Semtech breaks the cost and quality of service entry barriers for smart, energy-efficient residential and commercial buildings with 7x lower power consumption and unrivaled RF link robustness.



INTERNET OF THINGS WITH LoRa®

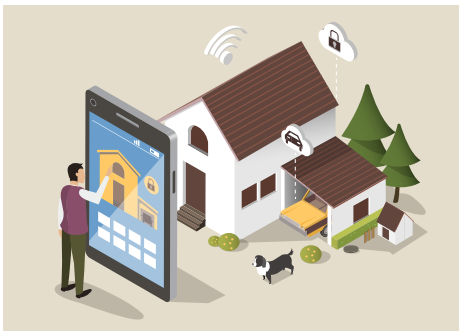
- Security and Intruder
- Fire Detection
- Access Control
- Smart Meters
- Smart Thermostats
- Smart Lighting
- Signal Conditioning in Airflow, CO2 and CO Sensors

RF ICs for Residential and Commercial Building Applications

Part Number	Description	Package (mm)	Evaluation Kit
SX1230	290MHz–11GHz FSK/OOK/ASK RF Transmitter	QFN 4x4	SX1230SKA433/868/915
SX1243	310MHz–1928MHz Low Cost FSK/OOK/ASK RF Transmitter	DFN 2x3	SX1243SKA433/868/915
SX1239	290MHz–11GHz FSK/OOK/ASK RF Receiver	QFN 5x5	SX1231SKB433/868/915
SX1231	290MHz–11GHz FSK/OOK/ASK RF Transceiver	QFN 5x5	SX1231SKB433/868/915
SX1231H	290MHz–11GHz FSK/OOK/ASK RF Transceiver	QFN 5x5	SX1231SKB433/868/915
SX1232	868MHz & 915MHz FSK/OOK/ASK RF Transceiver	QFN 5x5	SX1232-32SKA868/915
SX1233	290MHz–11GHz FSK/OOK/ASK RF Transceiver	QFN 5x5	SX1233-33SKA868/915
SX1236	137–11000 Dual band/RF Input Transceiver	QFN 6x6	SX1276DVK1JAS SX1276DVK1KAS
SX1211	862MHz–1960MHz FSK/OOK/ASK RF Transceiver	QFN 5x5	SX1211SKA868/915
SX1212	310MHz–1510MHz FSK/OOK/ASK RF Transceiver	QFN 5x5	SX1212SKA433
SX1208	290MHz–1510MHz GFSK/GMSK/OOK RF Transceiver	QFN 5x5	-

Design Ultra-Low Power, Highly-Secure RKE and Active RFID Systems

Semtech offers highly-integrated, cost-effective, turn-key RF solutions for emerging wireless applications requiring ultra-low power consumption, very high link budgets and secure data transmission.



REMOTE KEYLESS ENTRY (RKE) SYSTEMS

- One-way and two-way, non-line-of-sight systems
- Garage door openers
- Car alarms and remote starters

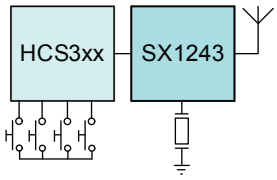
DASH7 SUPPORT FOR ACTIVE RFID SYSTEMS

- Container shipment and asset tracking systems
- Patient monitoring systems
- Social alarms

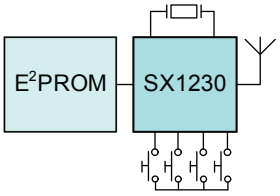
DESIGN SUPPORT TOOLS AND PARTNER SOLUTIONS

- Microchip RKE reference design
- Semtech wireless remote control energy harvesting reference design

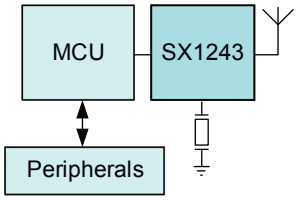
SEMTECH TURN-KEY RF SOLUTIONS BALANCE DESIGN COST AND FLEXIBILITY NEEDS (SX1243)



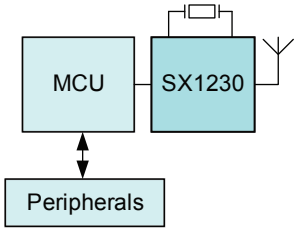
Rolling Code Reference Design



Static Payload Reference Design



Low-Cost Tx Solution



Fully Programable Digital Tx

RF ICs for Remote Keyless Entry and Active RFID Systems

Part Number	Description	Application	Package (mm)	Evaluation Kit
SX1230	290MHz–11GHz FSK/OOK/ASK RF Transmitter	1-way remote control (MCU-less mode)	QFN 4x4	SX1230SKA433/868/915
SX1243	310MHz–1928MHz Low Cost FSK/OOK/ASK RF Transmitter	1-way remote control	DFN 2x3	SX1243SKA433/868/915
SX1239	290MHz–11GHz FSK/OOK/ASK RF Receiver	1-way remote control	QFN 5x5	SX1231SKB433/868/915
SX1231	290MHz–11GHz FSK/OOK/ASK RF Transceiver	2-way remote control	QFN 5x5	SX1231SKB433/868/915
SX1231H	290MHz–11GHz FSK/OOK/ASK RF Transceiver	2-way remote control	QFN 5x5	SX1231SKB433/868/915
SX1212	310MHz–1510MHz FSK/OOK/ASK RF Transceiver	DASH7 Technology	QFN 5x5	SX1212-DK7A433

Application-Specific RF Evaluation Kits

Tx/Rx Kits with LoRa®

Part Number	Description	Frequency band	Kit contents	Evaluation Kit
SX1272	Low-Power RF Transceiver 860–1020MHz with LoRa Modem	868MHz/915MHz	2 SX1272 Demo units, PER	SX1272DVK1BAS (868MHz) SX1272DVK1CAS (915MHz)
SX1273	Low-Power RF Transceiver 860–1020MHz with LoRa Modem	868MHz/915MHz	2 SX1272 Demo units, PER	Use SX1272 kit (SX1272 is a superset)
SX1276	Low-Power RF Transceiver 138–1020MHz with LoRa Modem	137MHz–1020MHz	2 SX1276 Demo units, PER	SX1276DVK1IAS (169MHz and 868MHz)
	Low-Power RF Transceiver 138–1020MHz with LoRa Modem	137MHz–1020MHz	2 SX1276 Demo units, PER	SX1276DVK1JAS (433MHz and 868MHz)
	Low-Power RF Transceiver 138–1020MHz with LoRa Modem	137MHz–1020MHz	2 SX1276 Demo units, PER	SX1276DVK1KAS (490MHz and 915MHz)
SX1277	Low-Power RF Transceiver 138–1020MHz with LoRa Modem	137MHz–1020MHz	2 SX1276 Demo units, PER	Use SX1276 kit (SX1276 is a superset)
SX1278	Low-Power RF Transceiver 138–510MHz with LoRa Modem	137MHz–510MHz	2 SX1276 Demo units, PER	Use SX1276 kit (SX1276 is a superset)

G/F/MSK & OOK Kits

SX1211	Ultra-Low Power RF Transceiver 862–960MHz	868MHz/915MHz	Single USB dongle	SX1211SKA868/SX1211SKA915
	Ultra-Low Power RF Transceiver 862–960MHz	868MHz/915MHz	2 USB dongle, PER	SX1211-11SKA868/SX1211-11SKA915
	Ultra-Low Power RF Transceiver 862–960MHz	868MHz/915MHz	1 SM module	SM1211E868/SM1211E915
SX1212	Ultra-Low Power RF Transceiver 310–510MHz	433MHz	Dash7 dev kit	SX1212-DK7A433
	Ultra-Low Power RF Transceiver 310–510MHz	433MHz	Single USB dongle	SX1212SKA433
	Ultra-Low Power RF Transceiver 310–510MHz	433MHz	2 USB dongle, PER	SX1212-12SKA433
	Ultra-Low Power RF Transceiver 310–510MHz	433MHz	1 SM module	SM1212E433
SX1231	Low-Power Integrated RF Transceiver 290–1000MHz	433MHz/868MHz/ 915MHz	1 SM module	SM1231E433A/SM1231E868A / SM1231E915A
	Low-Power Integrated RF Transceiver 290–1000MHz	433MHz/868MHz/ 915MHz	1 SM module + interface board	SX1231SKB433/SX1231SKB868/ SX1231SKB915
	Low-Power Integrated RF Transceiver 290–1000MHz	433MHz/868MHz/ 915MHz	2 SM modules + interface boards	SX1231-31SKB433/SX1231-31SKB868/ SX1231-31SKB915
SX1232	Low-Power Integrated RF Transceiver 868/915MHz	868MHz/915MHz	2 SM modules + interface boards	SX1232-32SKA868/SX1232-32SKA915
SX1233	Low-Power Integrated RF Transceiver 290–1000MHz	868MHz/915MHz	1 SM module	SM1233E868B/SM1233E915B
	Low-Power Integrated RF Transceiver 290–1000MHz	868MHz/915MHz	1 SM module + interface board	SX1233SKA868/SX1233SKA915
	Low-Power Integrated RF Transceiver 290-1000MHz	868MHz/915MHz	2 SM modules + interface boards	SX1233-33SKA868/SX1233-33SKA915
SX1239	Low-Power Integrated RF Receiver 290–1000MHz	433MHz/868MHz/ 915MHz	1 SM module	SM1231E433A / SM1231E868A / SM1231E915A
	Low-Power Integrated RF Receiver 290–1000MHz	433MHz / 868MHz / 915MHz	1 SM module + interface board	SX1231SKB433/SX1231SKB868 / SX1231SKB915
	Low-Power Integrated RF Receiver 290–1000MHz	433MHz/868MHz/ 915MHz	2 SM modules + interface boards	SX1231-31SKB433/SX1231-31SKB868/ SX1231-31SKB915
SX1243	Low-Cost, Low-Current Integrated Transmitter 310–928MHz	433MHz/868MHz/ 915MHz	USB Dongle with SM module	SX1243SKA433/SX1243SKA868/ SX1243SKA915

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Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001
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Данный компонент на территории Российской Федерации

Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

http://moschip.ru/get-element

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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