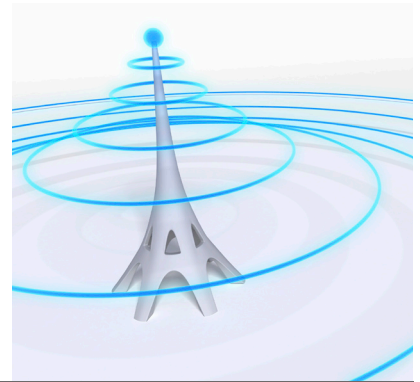


Product Selector Guide



SEMTECH ADVANCED COMMUNICATIONS & SENSING



Wireless ISM Portfolio

Industrial, Scientific and Medical Portfolio

Offering the world's highest link budget transceiver through to the lowest RX current of any UHF transceiver

Semtech's latest wireless Industrial, Scientific and Medical (ISM) portfolio features state of the art highly integrated solutions offering the world's highest link budget transceiver through to the lowest RX current of any UHF transceiver.

Semtech offers both transceiver and transmitter products that cover the frequency spectrum from low kHz to 1 GHz.

Semtech's devices are engineered to meet and exceed the following international wireless regulations:

- FCC Part 15.247
- FCC Part 15.249
- ETSI EN 300 220

The high level of both performance and integration leads to a very low system solution cost, with very few external passive components required to achieve a high level of RF performance and ultra low power operation.

Features

- Link Budget supports communication from 1 to 15 km range
- Up to ± 15 dBm Output Power
- -121 dBm sensitivity @1.2 kB
- Up to 304 kbps data rates
- Low Power Consumption
- 200 nA sleep mode current
- 200 μ A RX current for NFC
- 3 mA RX current

Highly Integrated

- Bi-CMOS and CMOS processes
- Multi Die packaging
- TX/RX FIFO
- Packet handling with automatic CRC
- Data whitening
- Hardware AFC
- I/Q channel outputs
- Integrated Digital or Analog Baseband processors

Wireless ISM Products

Semtech Know-how

- Over 10 years of Wireless Legacy
- Regulatory compliant reference designs
- Dedicated, Worldwide applications support
- RoHS & WEEE Compliant

Applications

- Wireless AMR
- Wireless sub-metering
- FHSS / DSSS communications
- Active RFID and RTLS
- Long range telemetry
- NFC and bodyLAN
- Proprietary networks
- Low power MESH networks
- Wireless car alarms
- One and two way remote control
- Battery optimized wireless communication

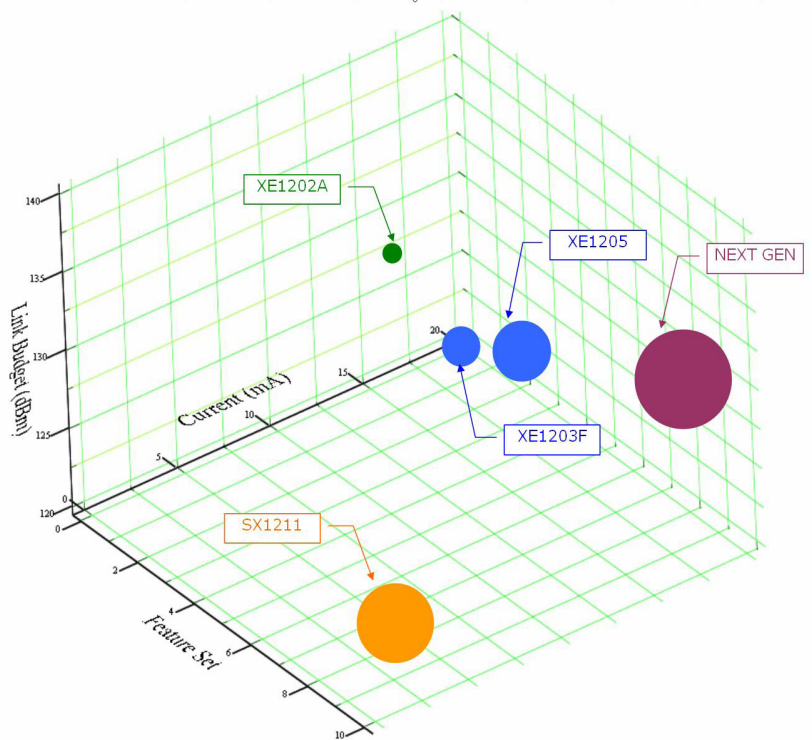


Figure 1: ISM Link Budget

Product Positioning	XE1202A	XE1203F	XE1205	SX1211	NEXT GEN	XE1209
Link Budget (dB)	131	129	131	124	135	-
Rx Current Consumption (mA)	14	14	14	3	16	0.12
Feature Set	2	4	6	8	10	4

Wireless ISM Application Notes

RF Design Guidelines: PCB Layout and Circuit Optimization

This application note provides simple to follow, practical, guidelines for both RF circuit optimization and the subsequent PCB layout. It uses the ETSI and FCC pre-qualified Semtech reference designs as a template upon which to base future RF circuit design and ensure that optimum performance is achieved for all Semtech RF IC circuits.

FCC Regulations for ISM Band Devices: 902 - 928 MHz

This technical note aims to assist the engineer in the understanding the technical requirements, including the test methodology, of the Federal Communications Commission (FCC) regulations towards operating of non-licensed devices operating in the 902 - 928 MHz ISM band.

Calculating Radiated Power and Field Strength for Conducted Power Measurements

This application note explains the relationship between conducted power levels and radiated power field strengths. It enables the engineer to estimate the radiated field strength at the antenna port from a knowledge of the measured conducted output power.

Transceiver Standard API Definitions (and source code)

Provides a simple to use Application Program Interface (API) and provide basic software drivers for Semtech transceivers. This API allows a quick evaluation of the XE1200 transceivers and aims to ease the start of a development, using standard calls to low level functions. All functions are open source and the API allows developers to evaluate performance and electrical characteristics of the transceiver and to subsequently modify or optimize Object code to meet their design requirements.

SM1211 User Guide

This document describes the SM1211 reference design module and includes both the circuit schematic and PCB stack information. The Bill of Material is also included.

SM1211 Reference Design

PCB Gerber Files, Schematic and BOM. Enables the customer to manufacture and/or “cut and paste” the SM1211 reference design into his application.

SX1211 PLL Frequency Synthesizer Calculator

Useful utility that allows the customer to calculate the R, P and S divider ratios for the SX1211's Integer-N PLL frequency synthesizer. The tool allows for the calculation of both single and multi-channel frequency plans, as well as calculating all the possible frequency combinations available in a range. An additional feature of this tool is the ability to compensate for frequency errors introduced by crystal tolerances.

SX1211SK EVK User Guide

User Guide for the SX1211SK EVK

SX1211SK Configuration Files (and Code Examples)

The application note provides a simple description of typical pre-defined configurations for various FSK and OOK modes. It is recommended that the application note is read in conjunction with the SX1211 datasheet and EVK User Guide.

XE1203F High Resolution RSSI

This application note describes the implementation of a wide dynamic range of greater than 60 dB better than 1 dB resolution using the I or Q signals available at the output of the analog receiver chain. Source code is available from the Application Support Team. While the source code is optimized for the XE1203F (and wideband communications protocols) it can be readily adapted for both XE1202A and XE1205.

XM1203F Reference Design

PCB Gerber Files, Schematic and BOM. Enables the customer to manufacture and/or “cut and paste” the XM1203F reference design into his application.

XM1205 Reference Design

PCB Gerber Files, Schematic and BOM. Enables the customer to manufacture and/or “cut and paste” the XM1203F reference design into his application.

To download ISM Application Notes, please visit our website:
www.semtech.com/ISMguide

ISM Comparison Table

Characteristics	Conditions	XE1202A	XE1203F	XE1205
Functional Description		Programmable TXVR	Programmable TXVR	Programmable TXVR
FSK Link Budget (dBm)	4.8 kbps	131	129	131
	25 kbps	-	-	-
Modulation Modes		FSK	FSK	FSK / GFSK (1)
Modulation Index Range		≥ 2	≥ 2	≥ 2 (2)
Min. SSB Channel BW (kHz)		10	100	7
Max. SSB Channel BW (kHz)		200	300	400
Data Rates (kb/s)	OOK / ASK	-	-	-
	FSK	4.8, 9.6, 19.2, 38.4, 76.8	1.2 – 152.34	1.2 – 304
	GMSK / MSK	-	-	-
Operating Temperature (°C)		-40 – +85	-40 – +85	-40 – +85
Power Supply (VDD)	Over Temp Range	2.4 – 3.6	2.4 – 3.6	2.4 – 3.6
Sleep Mode Current (nA)	+25°C	200	200	200
StandBy Mode Current (µA)	+25°C	850	850	850
RF Performance				
Frequency Range (MHz)		160 – 1000	130 – 1000	130 – 1000
	Sub Range -1-	433 – 435	433 – 435	433 – 435
	Sub Range -2-	863 – 870	863 – 870	863 – 870
	Sub Range -3-	902 – 928	902 – 928	902 – 928
	Sub Range -4-	-	-	-
Nom. Synthesizer Resolution (Hz)		500	500	500
Transmitter				
Output Power (dBm)		+15	+15	+15
Current Consumption (mA)	Max TX Power at +25°C	62	62	62
Programmable Step Size	dB	5	5	5
Wake-Up time from Sleep (µs)		600	450	550
Receiver				
Current Consumption (mA)	Rx mode @ room Temp	14	14	14
FSK Sensitivity (dBm)	4.8 kbps	-116	-114	-116
	25 kbps	-	-	-
FEI/AGC		•	•	•
RSSI Dynamic Range		30	30	30
In Band IIP3 (dBm)	at Max Gain	-33	-33	-33
Wake-Up time from Sleep (µs)		900	800	800

Notes:

- (1) FIR filter offers GFSK performance
- (2) Modulation index of 1 may be used for datarates > 38.4 kbps
- (3) FSK Mode min RX freq deviation = 33 kHz

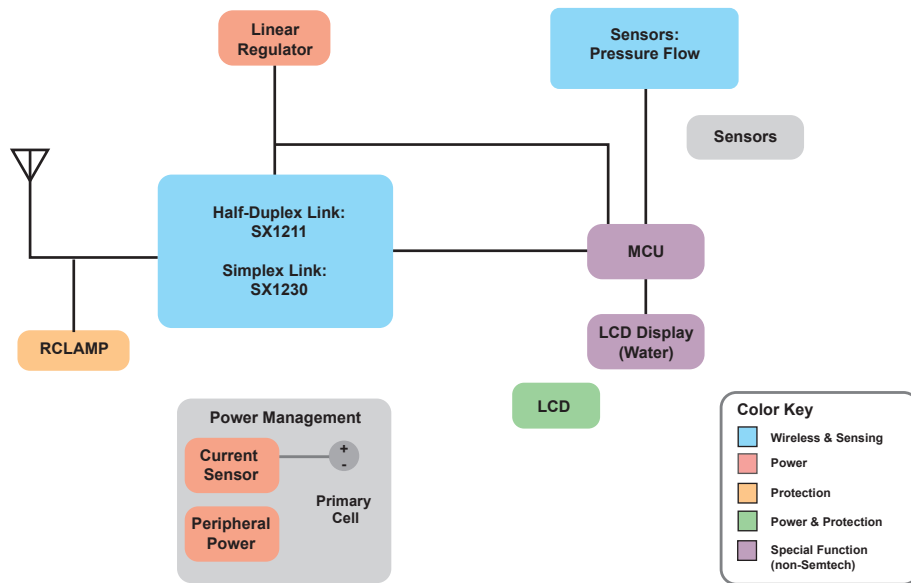
***Soon To Be Released Products**

SX1211	SX1223	XE1209	SX1210	SX1212	SX1230
Programmable TXVR	Programmable Transmitter	Field Inductance TXVR	Programmable Receiver	Programmable TXVR	Programmable Transmitter
	-	-	-	-	-
119.5	-	-	-	116.5	-
FSK / OOK	FSK/GFSK	FSK	FSK/OOK	FSK/OOK	(G)FSK/(G)MSK/OOK
≥ 2 (3)	-	-	≥ 2	≥ 2	-
50	-	-	50	50	-
400	-	-	400	400	-
1.56 – 32	1.2 – 153.6	-	1.56 – 32	0.78 – 32	1.2 – 32.768
1.56 – 200	-	1.82	1.56 – 200	0.78 – 150	1.2 – 300
-	-	-	-	-	1.2 – 300
-40 – +85	-40 – +85	-40 – +85	-40 – +85	-40 – +85	-40 – +85
2.1 – 3.6	2.0 – 3.6	2.0 – 3.2	2.1 – 3.6	2.1 – 3.6	1.8 – 3.7
100	300	150	100	100	500
65	200	1	65	65	500
-	-	0.036 – 0.045	-	300 – 510	-
-	425 – 475	-	-	300 – 365	290 – 340
863 – 870	850 – 950	-	863 – 870	365 – 440	431 – 510
902 – 928	-	-	902 – 928	440 – 510	862 – 1020
950 – 960	-	-	950 – 960	-	-
2000	2000	-	2000	2000	60
12.5	10	-	-	12.5	17
25	25.8	110	-	25	95
3	3	-	-	3	61
2100	2600	-	-	2100	520
3	-	0.2	3	3	-
-	-	-	-	-	-
-107	-	-	-107	-104	-
-	-	-	-	-	-
70	-	-	70	70	-
-28	-	-	-28	-28	-
2100	-	1800	2100	2100	-

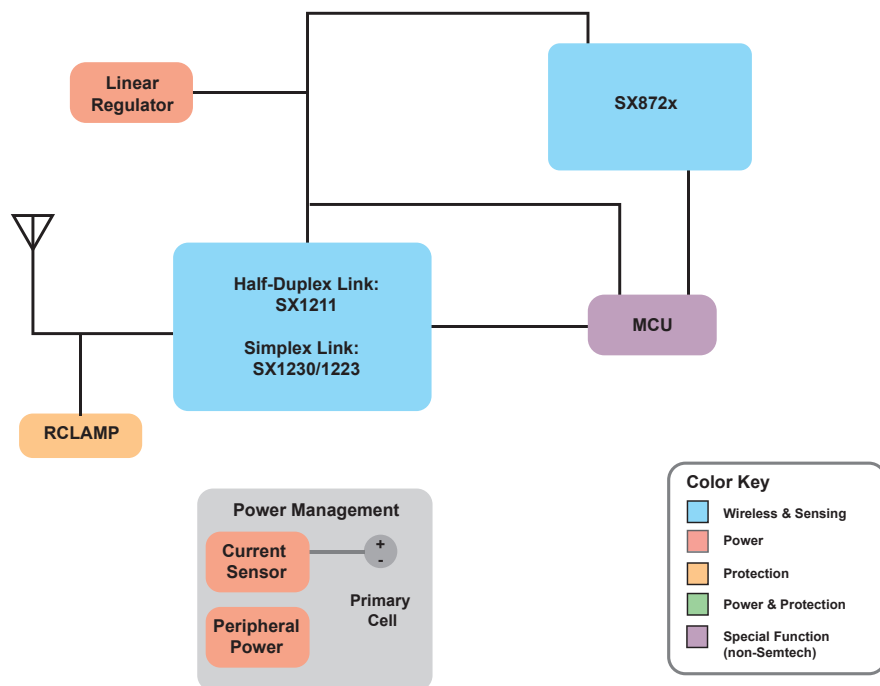
* Semtech's soon to be released product specs are subjected to change without notice.

Wireless ISM Multi-Application Block Diagrams

Water/Gas Wireless AMR

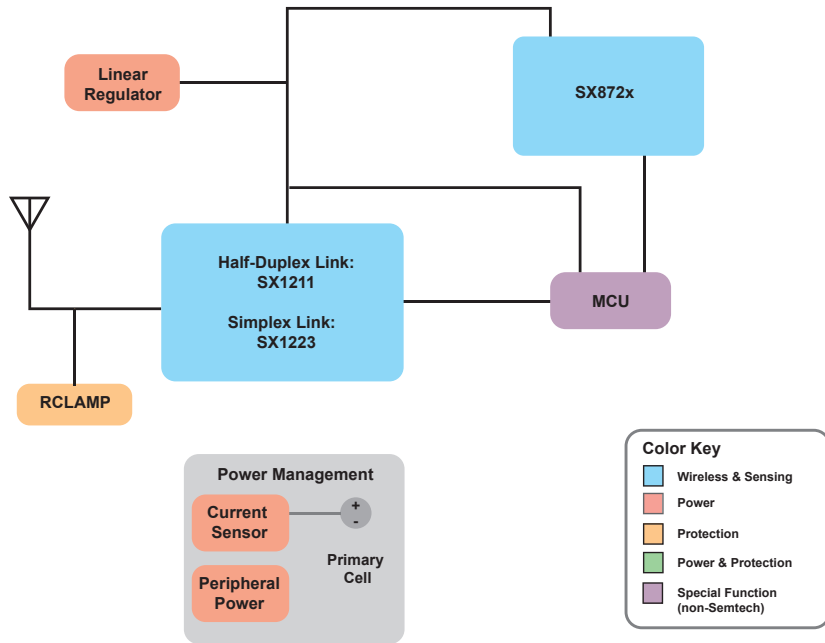


Active RFID/Real Time Location System

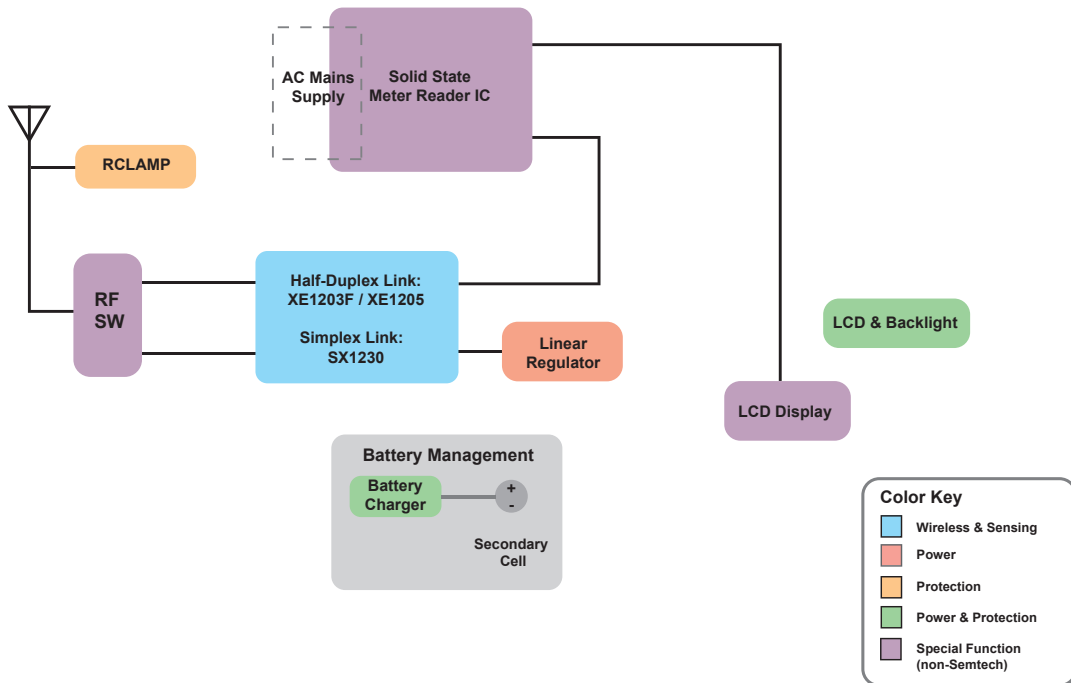


Wireless ISM Multi-Application Block Diagrams

High Power FHSS Telemetry System



Solid State Electricity Wireless AMR



Power It. Protect It. Connect It.® with Semtech Products



Power It.

Semtech's latest power management portfolio consists of robust, highly efficient, integrated solutions in small form factor designed to conserve PCB real estate and streamline end-equipment manufacturing.

The wide breadth of product offering features: switching regulators and linear regulators & controllers, LED drivers and sinks, and battery chargers designed to provide an overall system solution.

Key Features:

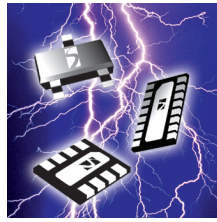
- High Power Density
- Highly integrated solutions in small form factor
- High reliability
- Low BOM cost

Semtech provides Industry leading BCD process and strong technical support to address the needs of the following markets:

- Portable devices
- Displays
- Integrated Access Devices/Telecom

Applications:

- Portable/Personal Electronics
- Broadband Communications
- Displays
- Computing



Protect It.

Semtech's protection products are industry-leading, state-of-the-art devices for protecting sensitive circuitry from Electrostatic Discharge (ESD), Electrical Fast Transients (EFT), Lightning, Cable Discharge Events (CDE) and other disturbances. They are designed to meet the industry's immunity standards, such as:

- IEC 61000-4-2 (ESD) $\pm 15\text{kV}$ (air)
- IEC 61000-4-2 (ESD) $\pm 8\text{kV}$ (contact)
- IEC 61000-4-4 (EFT) 40A (5/50ns)
- IEC 61000-4-5 (lightning)
- Telcordia GR-1089

Key Features:

- Sub 5V solutions: 2.8V, 3.3V
- Ultra-low capacitance: $< 1\text{pF}$
- Industry's lowest clamping voltage
- ESD protection + EMI/RFI filtering
- Single-line and multi-line protection
- Small package solutions
- High reliability end product
- High volume manufacturing
- RoHS/WEEE Compliant

Applications:

- Portables
- Ethernet
- Set Top Box
- Digital Video: HDMI/DVI
- DisplayPort



Connect It.

Semtech also offers a range of low-power mixed-signal ICs for Data Acquisition. The range includes the ZoomingADC high resolution ADC with its associated MCU. Semtech Data Acquisition Solutions are characterized by their miniaturization and low-power operation.

Key Features:

- 16 + 10 bit ZoomingADC
 - gain 1/12 to 1000
 - sensor offset compensation
 - up to 16 bits resolution
- Low power, 200 μA for 16 bits at 1kHz
- Wide voltage range, 2.4 – 5.5V

Sensors supported:

- All piezo-resistive sensors, pressure, force...
- Wheatstone bridge sensors
- Thermovoltaic sensors
- Resistive bridges

Applications:

- Portable, battery operated instruments
- RF powered instruments
- 4-20 mA loop powered sensors
- Pressure and Magnetic sensors
- Acceleration and tilt sensors
- Humidity sensors
- Wireless sensing



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