



# VC700X Product Brief

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### General Description

RF transceiver VC700X series is Vertexcom's first-generation sub-GHz radios to fulfill the wireless communications needs for IoT applications. It features low power consumption, long-range and robust wireless links, being able to reject nearby and far-off large interfering RF signals. Its resistance to de-sensitizing strong interferers make it a perfect solution to applications of complex sub-GHz mesh networking. Varieties of power-saving modes are employed to reflect characteristics of IoT networks and can be leveraged to reduce power consumption at the system level. With these features, VC700X is a perfect fit for IoT applications, demanding wide coverage, reliable link quality and long battery life.

RF transmit/receive frontend, RF synthesizer, T/R switches, power amplifiers and high-dynamic range ADCs are integrated on a single die. In addition, a radio controller is embedded for radio control and simple protocol processing; SPI is the interface to host system. The high-level integration enables low-cost and small footprint solutions for the ever-increasing demands of IoT applications.

### Key Features

- Support IEEE 802.15.4g/Wi-SUN
- Support wireless M-Bus
- ISM Frequency bands: 315, 433, 490, 868, 915 MHz ISM
- Excellent selectivity performance
  - Adjacent channel rejection: 48 dB
  - Blocking performance: 75 dB
- Best-in-class receiver sensitivity
  - -109 dBm at 50 kbps GFSK
- Maximum data rate: 300 kbps
- Configurable maximum transmit output power
  - +20 dBm
  - +13 dBm
- Automatic output power ramping
- Current consumption
  - Shut-down: 70 nA
  - Sleep mode: 0.8  $\mu$ A
  - Receive mode: 16 mA
  - Transmit mode: 96 mA at +20 dBm
- Modulation schemes: OOK, (G)FSK, 4(G)FSK and GMSK
- Automatic RX wake-up for low power listen
- Fast wake-up and AGC for low-power listen
- Functions for wireless link robustness
  - RF channel hopping
  - Retransmission
  - Auto-acknowledgement
- Digital RSSI and clear channel assessment for CSMA and listen-before-talk systems
- Support packet over packet reception for reliable communication
- Early termination of receive mode for

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### Low-power High-performance Sub-GHz RF Transceiver

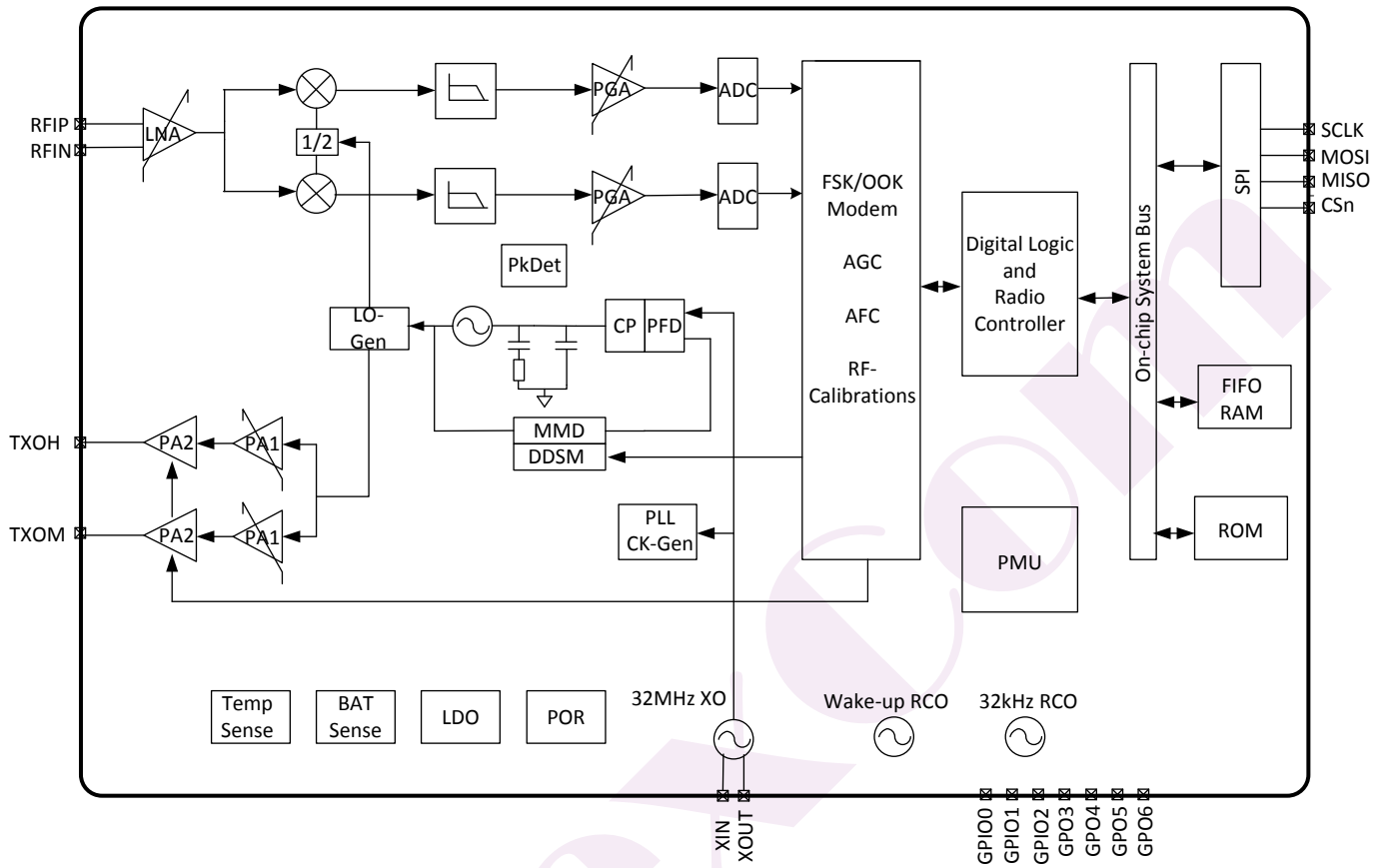
- incorrect preamble reception
- Hardware-based user identification listen to eliminate false wake-up
- Oscillators: 32 MHz XO, 32 kHz RCO and a fast wake-up RCO
- One SPI interface to host MCU
- Single power supply voltage with integrated LDOs: 2.0 V ~ 3.6 V
- Package: QFN-32 (5mm x 5mm)
- Ambient temperature range: -40 °C ~ +85 °C

## Applications

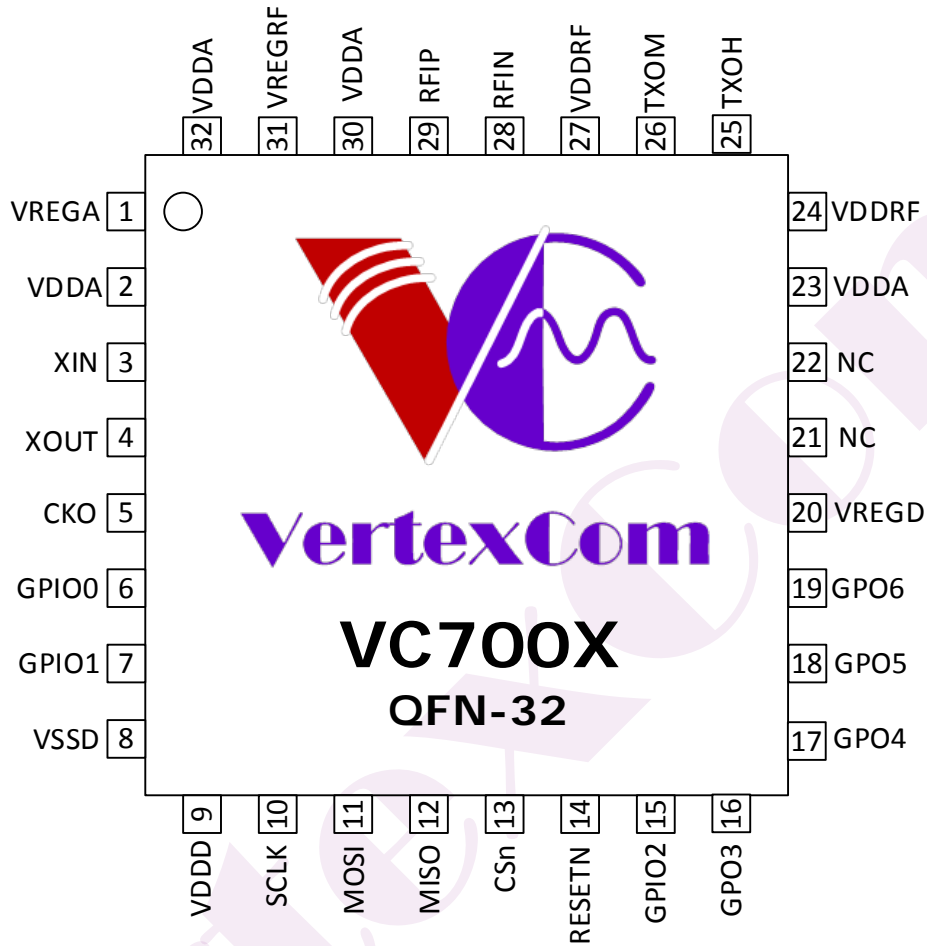
- 802.15.4g-based proprietary networking
- Wi-SUN FAN applications
- Wireless M-Bus
- Smart metering, such as gas, water, and electricity meters, etc.
- Smart home and building
- Industrial monitoring and control
- Wireless alarm and security systems



# Functional Block Diagram



# Pin Assignments



NOTE: The exposed thermal pad is connected to the ground.

## Pin Descriptions

(Pin type: "O"=Output, "I"= Input, "P"=Power, "G"=Ground)

No.	Mnemonic	Type	Description
1	VREGA	O	Regulated voltage; connected to 100nF capacitor
2	VDDA	P	2.0 V to 3.6 V supply; 3.3 V is recommended
3	XIN	I	32 MHz crystal oscillator driver
4	XOUT	O	32 MHz crystal oscillator driver
5	CKO	O	Floated or output a clock signal
6	GPIO0	I/O	General purpose I/O
7	GPIO1	I/O	General purpose I/O
8	VSSD	G	Ground for digital circuits
9	VDDD	P	2.0 V to 3.6 V supply; 3.3 V is recommended
10	SCLK	I	SPI clock input
11	MISO	O	SPI data output
12	MOSI	I	SPI data input
13	CSn	I	SPI chip select, active low
14	RESETN	I	Reset signal, active low
15	GPIO2	O	General purpose I/O
16	GPO3	O	General purpose Output
17	GPO4	O	General purpose Output
18	GPO5	O	General purpose Output
19	GPO6	O	General purpose Output
20	VREGD	O	Regulated voltage supply for digital circuits; connected to 1 $\mu$ F capacitor
21	NC	O	Not connected; only for testing purpose
22	NC	O	Not connected; only for testing purpose
23	VDDA	P	2.0 V to 3.6 V supply; 3.3 V is recommended
24	VDDRF	P	2.0 V to 3.6 V supply; 3.3 V is recommended
25	TXOH	O	PA output, high power

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No.	Mnemonic	Type	Description
26	TXOM	O	PA output, medium power
27	VDDRF	P	2.0 V to 3.6 V supply; 3.3 V is recommended
28	RFIN	I	RF receiver input
29	RFIP	I	RF receiver input
30	VDDA	P	2.0 V to 3.6 V supply; 3.3 V is recommended
31	VREGRF	O	Regulated voltage; connected to 100nF capacitor
32	VDDA	P	2.0 V to 3.6 V supply; 3.3 V is recommended
	EPAD	G	

