

Ultra Low Power Sub-1GHz Transceiver

Features

- Frequency Range: 213 to 960 MHz
- Modulation: OOK, (G)FSK 和(G)MSK
- Data Rate: 0.5 to 250 kbps
- Sensitivity: -120 dBm at 2.4 kbps, $F_{RF} = 433.92$ MHz
-109 dBm at 50 kbps, $F_{RF} = 840$ MHz
-109 dBm at 50 kbps, $F_{RF} = 920$ MHz
- Voltage Range: 1.8 至 3.6 V
- Tx Current: 27 mA @ 13 dBm, 920 MHz, FSK
- Rx Current: 6.9 mA @ 433.92 MHz, FSK
- Support Super Low Power Mode
- Sleep Current
 - 300 nA when sleep timer is off
 - 800 nA when sleep timer is on
- 4-wire SPI Interface
- Support Direct Mode and Packet Mode
- Configurable Packet Handler and 64-Byte FIFO
- Manchester, Data Whitening and Forward Error Correction
- 16 Pin QFN 3x3 Package

Descriptions

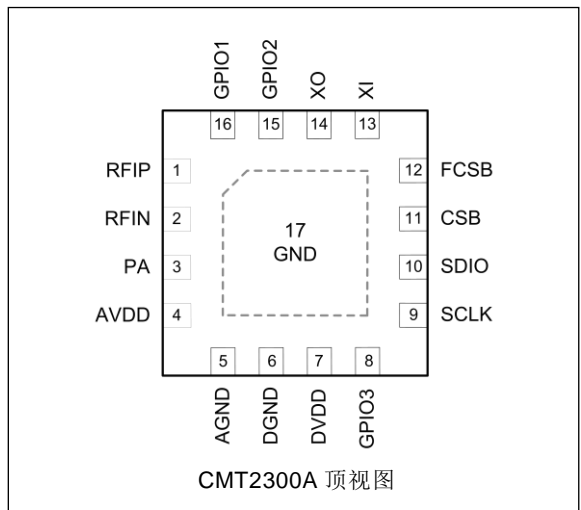
The CMT2300A is an ultra-low power, high performance, OOK, FSK, MSK, GFSK and GMSK transceiver for various 213 to 960 MHz wireless applications. It is part of the CMOSTEK NextGenRF™ family, which includes a complete line of transmitters, receivers and transceivers. With the high level integration, CMT2300A simplify the external BOM. Up to +20 dBm Tx Power and -120 dBm sensitivity optimize the RF link performance. It supports multiple data packet formats and data encode/decode engines, meets the data format requirements of different applications. CMT2300A supports 64-byte Tx/Rx FIFO, rich GPIO and interruption sources, Duty Cycle Operation Mode, Carrier Sensing, high accuracy RSSI, Low Battery Detection, Power Up Reset, Low Frequency Oscillator Clock Output, Fast Frequency Hopping and Muting Functions, making the application design more flexible, differentiating the end product. The CMT2300A operates from a supply voltage of 1.8 to 3.6 V. It consumes only 6.9 mA current while achieving 120 dBm receiving sensitivity and consumes only 300 nA in sleep state, which makes it an ideal solution for battery powered application. Transmitting at 13 dBm only consumes 27 mA.

Applications

- Auto Metering Reading
- Home Security and Building Automation
- ISM Band Data Communication
- Industrial Monitoring and Controls
- Remote Control and Alarm System
- Remote Keyless Entry
- Wireless Sensor Networking
- Tag Readers

Ordering Information

Part Number	Frequency	Package	MOQ
CMT2300A-EQR	433.92 MHz	QFN16	5,000 pcs



1. Electrical Characteristics

Table 1. CMT2300A Typical Specification

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Supply Voltage	V_{DD}		1.8		3.6	V
Operation Temp	T_{OP}		-40		85	°C
Supply Voltage Slew Rate			1			mV/us
Sleep Current	I_{SLEEP}	Sleep Timer off		300		nA
		Sleep Timer on		800		nA
Rx Current (Low Power)	I_{RX-LP}	FSK, 434 MHz, 50 kbps, 20 kHz F_{DEV}		6.9		mA
		FSK, 840 MHz, 50 kbps, 20 kHz F_{DEV}		7.2		mA
		FSK, 920 MHz, 50 kbps, 20 kHz F_{DEV}		7.2		mA
Rx Current (High Power)	I_{RX-HP}	FSK, 434 MHz, 50 kbps, 20 kHz F_{DEV}		7.0		mA
		FSK, 840 MHz, 50 kbps, 20 kHz F_{DEV}		7.8		mA
		FSK, 920 MHz, 50 kbps, 20 kHz F_{DEV}		8.0		mA
Tx Current	I_{TX}	FSK, 434 MHz, +13 dBm		27		mA
		FSK, 840 MHz, +13 dBm		28		mA
		FSK, 920 MHz, +13 dBm		27		mA
Tx Power	P_{OUT}	Different matching network needed	-20		+20	dBm
Tx Power Step	P_{STEP}			1		dB
Frequency Range	F_{RF}		850		960	MHz
			425		480	MHz
			285		320	MHz
			213		240	MHz
Data Rate	DR	OOK	0.1		40	kbps
		FSK and GFSK	0.5		250	kbps
Frequency Deviation	F_{DEV}	FSK and GFSK	2		200	kHz
FSK Rx Sensitivity, High Power Mode	$S_{434-FSK}$	434 MHz, DR = 2.4 kbps, F_{DEV} = 10 kHz		-120		dBm
		434 MHz, DR = 50 kbps, F_{DEV} = 20 kHz		-111		dBm
	$S_{840-FSK}$	840 MHz, DR = 2.4 kbps, F_{DEV} = 10 kHz		-118		dBm
		840 MHz, DR = 50 kbps, F_{DEV} = 20 kHz		-109		dBm
	$S_{920-FSK}$	920 MHz, DR = 2.4 kbps, F_{DEV} = 10 kHz		-118		dBm
		920 MHz, DR = 50 kbps, F_{DEV} = 20 kHz		-109		dBm
Phase Noise @ 434 MHz	PN_{434}	10 kHz Frequency Offset		-98		dBc/Hz
		100 kHz Frequency Offset		-104		dBc/Hz
		500 kHz Frequency Offset		-122		dBc/Hz
		1 MHz Frequency Offset		-127		dBc/Hz
		10 MHz Frequency Offset		-137		dBc/Hz

2. Pin Assignment

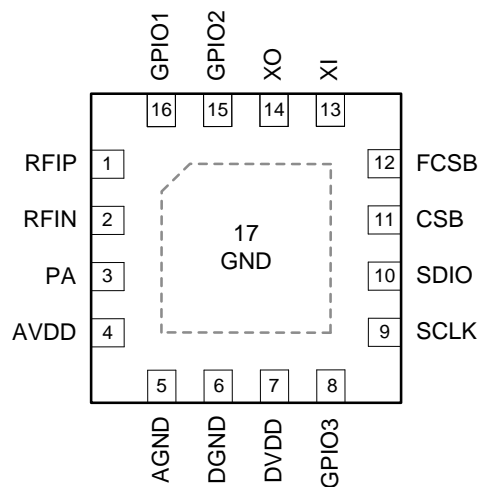


Figure 1. CMT2300A Pin Assignment

Table 2. CMT2300A Pin Descriptions

Pin Number	Name	I/O	Descriptions
1	RFIP	I	RF Signal Input - Positive
2	RFIN	I	RF Signal Input - Negative
3	PA	O	PA Output
4	AVDD	IO	Analog VDD
5	AGND	IO	Analog GND
6	DGND	IO	Digital GND
7	DVDD	IO	Digital VDD
8 ^[1]	GPIO3	O	Configurable: CLKO, DOUT/DIN, INT2, DCLK (TX/RX)
9	SCLK	I	SPI – Clock Input
10	SDIO	IO	SPI – Data input/output
11	CSB	I	SPI – Chip Select Bar, active low
12	FCSB	I	SPI – Chip Select Bar for FIFO access, active low.
13	XI	I	Crystal Oscillator Input
14	XO	O	Crystal Oscillator Output
15 ^[1]	GPIO2	O	Configurable: INT1, INT2, DOUT/DIN, DCLK (TX/RX), RF_SWT
16 ^[1]	GPIO1	O	Configurable: DOUT/DIN, INT1, INT2, DCLK (TX/RX), RF_SWT
17	GND	I	Analog GND, Must Connect to ground

Note:

[1]. INT1 and INT2 are interruptions; DOUT is demodulation output; DIN is modulation input; DCLK is synchronized clock for modulation/demodulation signal, will automatically change when switching between Tx and Rx.

3. Typical Application Schematic

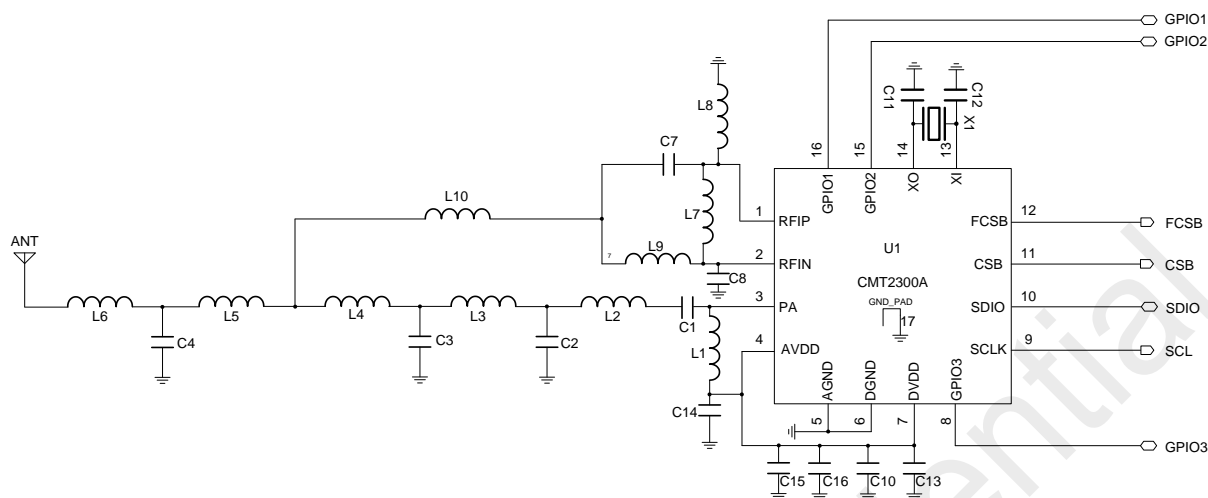


Figure 2. CMT2300A Typical Application Schematic

Table 3. CMT2300A BOM

Designation	Description	Value		Unit	Supplier
		@ 434 MHz	@ 920 MHz		
U1	CMT2300A, Ultra Low Power Sub-1GHz Transceiver	-		-	CMOSTEK
L1	±5%, 0603 Multi-layer chip inductor	180	100	nH	Murata LQG18
L2	±5%, 0603 Multi-layer chip inductor	56	8.2	nH	Murata LQG18
L3	±5%, 0603 Multi-layer chip inductor	47	15	nH	Murata LQG18
L4	±5%, 0603 Multi-layer chip inductor	33	10	nH	Murata LQG18
L5	±5%, 0603 Multi-layer chip inductor	27	10	nH	Murata LQG18
L6	±5%, 0603 Multi-layer chip inductor	27	10	nH	Murata LQG18
L7	±5%, 0603 Multi-layer chip inductor	68	18	nH	Murata LQG18
L8	±5%, 0603 Multi-layer chip inductor	33	10	nH	Murata LQG18
L9	±5%, 0603 Multi-layer chip inductor	33	10	nH	Murata LQG18
L10	±5%, 0603 Multi-layer chip inductor	8.2	0	nH	Murata LQG18
C1	±0.25 pF, 0402 NP0, 50 V	12	22	pF	Murata GRM15
C2	±0.25 pF, 0402 NP0, 50 V	3.6	5.6	pF	Murata GRM15
C3	±0.25 pF, 0402 NP0, 50 V	3.3	2	pF	Murata GRM15
C4	±0.25 pF, 0402 NP0, 50 V	6.8	3.3	pF	Murata GRM15
C7	±0.25 pF, 0402 NP0, 50 V	3.9	2	TBD	Murata GRM15
C8	±20%, 0402 X7R, 25 V	3.9	8	TBD	Murata GRM15
C10	±20%, 0402 X7R, 25 V	10		uF	Murata GRM15
C11, C12	±0.25 pF, 0402 NP0, 50 V	27		pF	Murata GRM15
C13	±20%, 0402 X7R, 25 V	0.1		uF	Murata GRM15
C14	±20%, 0402 X7R, 25 V	0.1		uF	Murata GRM15
C15	±20%, 0402 X7R, 25 V	470		pF	Murata GRM15
C16	±20%, 0402 X7R, 25 V	4.7		uF	Murata GRM15
X1	±20 ppm, SMD32*25 mm, crystal	26		MHz	EPSON

4. Package Outline

CMT2300A 16 Pin QFN 3x3 Package detail is shown as below. And the table below lists the dimension.

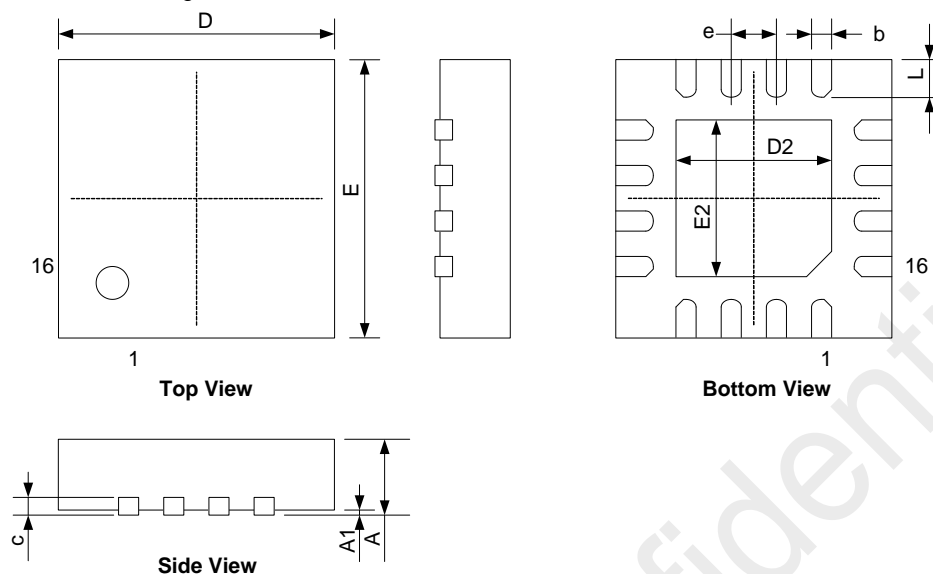


Figure 3. 16 Pin QFN 3x3 Package

Table 4. 16 Pin QFN 3x3 Package Dimension

Designation	Dimension (millimeters)	
	Min	Max
A	0.7	0.8
A1	—	0.05
b	0.18	0.30
c	0.18	0.25
D	2.90	3.10
D2	1.55	1.75
e	0.50 BSC	
E	2.90	3.10
E2	1.55	1.75
L	0.35	0.45

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