BX_RF05

BT 5.0 – BLE / MESH SoC

Features

Complies with Bluetooth 5.0 with 1M / 2M bps data rates.

Radio Transceiver

- -93 dBm RX sensitivity at 1Mbps mode
- -90 dBm RX sensitivity at 2Mbps mode
- RF output power levels: -20dBm, 0dBm, 3dBm and 8dBm
- 50dB RSSI dynamic range

Supply Current

- 4.3mA in RX and 4.4mA in TX with On Chip DCDC Converter@4.3V
- 5.5mA in RX and 5.7mA in TX with On Chip DCDC Converter@3.3V

Ultralow Current Mode

- Sleep current : 2.5uA ~ 6uA，SRAM (16 KB ~ 208 KB) retention
- Average current: 20uA，during 1.28 sec cycle time (Active / Sleep)
  Notice: Active (Broadcasting ADV) / Sleep (208 KB SRAM retention)

Analog Interfaces

- **1** Embedding ADC in pin VBAT with Battery monitoring function from 5.5V to 2.0V
- **6** External channel of ADC (ENOB = 10) with average capability (Oversampling up to ENOB = 12)
- Temperature sensor from -40℃ to 125℃

Digital Interfaces

- Up to **20** GPIOs
- 1 General SPI interface
  - Support both SPIM / SPIS Mode
- 2 UART -
  Flow control up to 1Mbps and supports all the baud rate under 1Mbps, IRDA is supported
- 2 IIC -
  Master / Slave programmable and speed up to 1Mbps
- 2 Timers and 1 Watch-dog Timer
- 5 PWM Outputs

Integrated 32-bit MCU

- Clock frequency: 16MHz, **32MHz (Major)** , 48MHz, 64MHz, 80MHz and **96MHz (Max)**
- CPU Benchmarking : 2.07 Coremark / MHz
- SWD debug interface
- AHB / APB bus matrix with speed up to 96MHz

Memories

- 2Mb Flash
- 128 KB ROM (Boot ROM and BLE stack)
- 208 KB SRAM
  - Composed of **6 pages of 32KB** and **1 page of 16KB** , with retention capability
  - Each 32KB can be set into retention state separately and exchange memory for BLE connection data
  - 16KB of 4 way cache controller for external SPI flash which enable CPU run on the external SPI flash, this 16KB cache can be also used as system SRAM when cache is disabled

Power Management

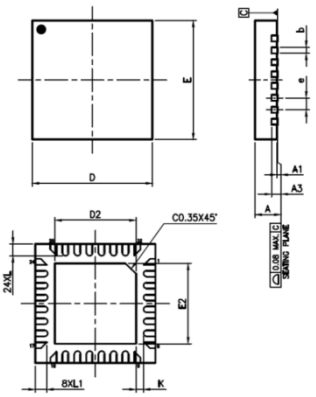
- 2.3-5.0V power input
- One 1.2V Integrated DCDC buck converter
- One 1.8V LDO with 40mA output

Cryptographic Engine

- ECC
- AES-128

Package

- QFN32 (4 X 4 mm²)



PKG CODE	VQFN			
SYMBOLS	MIN.	NOM.	MAX.	UNIT
A	0.80	0.85	0.90	mm
A1	0.00	0.02	0.05	
A3		0.203 REF		
b	0.15	0.20	0.25	
D		4.00 BSC		
E		4.00 BSC		
e		0.40 BSC		
K	0.20	-	-	
Lead Frame PAD SIZE	114 X 11* MIL			
SYMBOLS	MIN.	NOM.	MAX.	UNIT
D2	2.65	2.70	2.75	mm
E2	2.65	2.70	2.75	
L	0.35	0.40	0.45	

Pin Description

Pin	Symbol	Type	Description	Pin	Symbol	Type	Description
1	P02/P35	DIO/AI	SPIM0_CS1/FUNC_IO02/ GPIO02/ADC Input Channel 5	18	P21	DIO	FUNC_IO19/GPIO21
2	XTAL32M_P	AI	32 MHz Crystal input (+)	19	P20	DIO	FUNC_IO18/GPIO20
3	XTAL32M_N	AI	32 MHz Crystal input (-)	20	VDD_CPU	PO	VDD_CPU output
4	P03	DIO	SPIM0_CS0/SPIS_CS/FUNC_IO01/GPIO03	21	P23	DIO	FUNC_IO21/GPIO23
5	P04	DIO	SPIM0_CLK/SPIS_CLK/FUNC_IO02/GPIO04	22	P22	DIO	FUNC_IO20/GPIO22
6	P05	DIO	SPIM0_MISO/SPIS_MISO/FUNC_IO03/GPIO05	23	VDD_BAT	PI	Battery supply voltage
7	P06	DIO	SPIM0_MOSI/SPIS_MOSI/FUNC_IO04/GPIO06	24	LOOP_C	AIO	PLL loop filter external capacitor.
8	P16	DIO	FUNC_IO14/GPIO16	25	VDD_RF1	PI	RF power supply
9	P08	DIO	SPIM1_CS0/FUNC_IO06/GPIO08	26	RF_P	AIO	RF input/output
10	NA	NA	N/A, Floating	27	RF_N	AIO	RF input/output
11	VDD_1V8	PO	Supply to external 1.8V	28	P11/P30	DIO/AI	FUNC_IO09/GPIO11/ADC Input Channel 0
12	P13	DIO	FUNC_IO11/GPIO13	29	P10/P31	DIO/AI	FUNC_IO08/GPIO10/ADC Input Channel 1
13	P12	DIO	FUNC_IO10/GPIO12	30	P07/P32	DIO/AI	FUNC_IO05/GPIO07/ADC Input Channel 2
14	VDD_1V2	PO	DC/DC Converter output	31	P17/P33	DIO/AI	FUNC_IO15/GPIO17/ADC Input Channel 3
15	P00	DIO	SWCLK/GPIO00	32	P15/P34	DIO/AI	FUNC_IO13/GPIO15/ADC Input Channel 4
16	P01	DIO	SWDIO/GPIO01	IC Ground pad		IC Ground pad	GND
17	VDD_AWO	PO	VDD_AWO output				

NOTE: AI : analog input AO : analog output AIO : analog input/output

DI : digital input DIO : digital input/output PI : power input PO : power output

Operating Temperature

- -25℃ to 85℃

Ver 1.1