

BX2400

Bluetooth Low Energy 5.0 SoC

Features

- Complies with Bluetooth 5.0 with 1Mbps / 2Mbps 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 7dBm
 - 50dB RSSI dynamic range
- Supply Current:
 - 3.4 mA in RX and 3.5 mA in TX with ideal DCDC Converter at 4.3V
 - 4.3 mA in RX and 4.4 mA in TX with on chip DCDC Converter at 4.3V
 - 5.5 mA in RX and 5.6 mA in TX with on chip DCDC Converter at 3.3V
- Analog Interfaces:
 - 6-channel 10-bit ADC with average capability (Oversampling up to 12 bits resolution)
 - Touch-Key Function
 - Battery monitoring function from 5.5V to 2.0V
 - Temperature sensor from -40°C to 125°C
- Digital Interfaces:
 - 5 PWM outputs
 - Quad-SPI Flash interface
 - 2 UART: flow control up to 1Mbps and supports all the baud rate under 1Mbps, IRDA is supported
 - 2 I2C: master/slave programmable and speed up to 1Mbps
 - 2 timers and 1 watch dog timer
- Integrated ARM Cortex-M0+
 - Clock frequency: 16MHz, 32MHz, 48MHz, 64MHz, 80MHz and 96MHz
 - 4-way associative cache
 - SWD debug interface
 - AHB/APB bus matrix with speed up to 96MHz
- Ultralow Current Mode
 - Sleep current 2.5uA ~ 6uA : SRAM (16 KB ~ 208 KB) retention
 - Average current 20uA during 1.28 sec active(broadcasting ADV)/sleep (208 KB SRAM retention) cycle time
- Memories
 - 8 Mbit Flash memory (FCLGA package only)
 - 208KB SRAM with retention capability, each 32KB can be set into retention state separately
 - 128 KB ROM (boot ROM and BLE stack)
 - 16 KB 4 way cache controller for external SPI flash which enable CPU run on the external SPI flash, the 16kB cache can be used as system SRAM when cache is disabled.
 - 32KB retention exchange memory for BLE connection data
- Power Management
 - Integrated DCDC buck converter
 - Battery Charger
 - 2.3-5.5V power input
 - One 1.8V LDO with 40mA output
 - Two 3.3V LDO with 50mA and 25mA output each
- Cryptographic engine:
 - ECC
 - AES-256
- Packages:
 - QFN 40 pins 5mm X 5mm
 - QFN 68 pins 8mm X 8mm
 - FCLGA 52 balls 4.5mm X 4.5mm X 0.75mm

Package QFN 40 pins (5mm X 5mm)

Pin	Symbol	Type	Description
1	P02	DIO	FUNC_IO02/GPIO02
2	P15	DIO	FUNC_IO13/GPIO15
3	P16	DIO	FUNC_IO14/GPIO16
4	P17	DIO	FUNC_IO15/GPIO17
5	P12	DIO	uart2ahb_txd/FUNC_IO10/GPIO12
6	P13	DIO	uart2ahb_rxd/FUNC_IO11/GPIO13
7	VDD_SRAM	PO	VDD_SRAM output
8	VDD_3V_1	PI	Supply to external 3.3V
9	VDD_1V8	PI	Supply to external 1.8V
10	VDD_DIG	PI	Digital circuit power supply
11	GND_D	GND	Ground for digital circuit
12	VDD_1V2	PO	DC/DC Converter output
13	VDD_BAT	PI	Battery supply voltage
14	P00	DIO	swck/GPIO00
15	P01	DIO	swd/GPIO01
16	VDD_CPU	PO	VDD_CPU output
17	VDD_AWO	PO	VDD_AWO output
18	P23	DIO	FUNC_IO21/GPIO23
19	P26	DIO	qspi_dat0/GPIO26
20	P25	DIO	qspi_clk/GPIO25
21	P29	DIO	qspi_dat3/GPIO29

Pin	Symbol	Type	Description
22	P28	DIO	qspi_dat2/GPIO28
23	P27	DIO	qspi_dat1/GPIO27
24	P24	DIO	qspi_cs_n/GPIO24
25	XTAL32K_P	AI	32.768 kHz Crystal input (+)
26	XTAL32K_N	AI	32.768 kHz Crystal input (-)
27	VDD_3V_2	PI	Supply to external 3.3V
28	VDD_BAT_2	PI	Guard ring power supply
29	VDD_VCO	PI	VCO power supply
30	LOOP_C	AIO	PLL loop filter external capacitor.
31	VDD_CP	PI	PLL power supply
32	PA_Output	PI	8dBm TX Output
33	VDD_RF1	PI	RF power supply
34	RF_P	AIO	RF input/output
35	RF_N	AIO	RF input/output
36	VDD_A	PI	Power supply for an analog circuit
37	VDD_BAT_1	PI	ADC power supply
38	P30	AI	ADC Input Channel 0
39	XTAL32M_P	AI	32 MHz Crystal input (+)
40	XTAL32M_N	AI	32 MHz Crystal input (-)
IC Ground pad		GND	Backside GND plane. Must be connected to the GND.

NOTE: AI : analog input AO : analog output AIO : analog input/output DI : digital input DIO : digital input/output PI : power input PO : power output

Package QFN 68 pins (8mm X 8mm)

Pin	Symbol	Type	Description
1	P02	DIO	spim0_cs1/FUNC_IO00/GPIO02
2	P03	DIO	spim0_cs0/SPIS_CS/FUNC_IO01/GPIO03
3	P04	DIO	spim0_clk/SPIS_CLK/FUNC_IO02/GPIO04
4	P05	DIO	spim0_miso/SPIS_MISO/FUNC_IO03/GPIO05
5	P06	DIO	spim0_mosi/SPIS_MOSI/FUNC_IO04/GPIO06
6	P15	DIO	FUNC_IO13/GPIO15
7	P16	DIO	FUNC_IO14/GPIO16
8	P17	DIO	FUNC_IO15/GPIO17
9	P07	DIO	spim1_cs1/FUNC_IO05/GPIO07
10	P08	DIO	spim1_cs0/FUNC_IO06/GPIO08
11	P09	DIO	spim1_clk/FUNC_IO07/GPIO09
12	P10	DIO	spim1_miso/FUNC_IO08/GPIO10
13	P11	DIO	spim1_mosi/FU:NC_IO09/GPIO11
14	P12	DIO	uart2ahb_txd/FUNC_IO10/GPIO12
15	P13	DIO	uart2ahb_rxd/FUNC_IO11/GPIO13
16	VDD_SRAM	PO	VDD_SRAM output
17	VDD_3V_1	PI	Supply to external 3.3V
19	VDD_1V8	PI	Supply to external 1.8V
20	VDD_DIG	PI	Digital circuit power supply
21	GND_D	GND	Ground for digital circuit
22	VDD_1V2	PO	DC/DC Converter output
23	VDD_BAT	PI	Battery supply voltage
24	VDD_BUS	PI	USB supply voltage -- Charger Input
26	Ext Reset	DI	Pull low internally. High active.
27	Test_PAD	DI	Digital Test Pin
28	P00	DIO	swck/GPIO00
29	P01	DIO	swd/GPIO01
30	VDD_CPU	PO	VDD_CPU output
31	VDD_AWO	PO	VDD_AWO output
32	P20	DIO	FUNC_IO18/GPIO20
33	P21	DIO	FUNC_IO21/GPIO21
34	P22	DIO	FUNC_IO20/GPIO22
35	P23	DIO	FUNC_IO21/GPIO23
36	P26	DIO	qspi_dat0/GPIO26

Pin	Symbol	Type	Description
37	P25	DIO	qspi_clk/GPIO25
38	P29	DIO	qspi_dat3/GPIO29
39	P28	DIO	qspi_dat2/GPIO28
40	P27	DIO	qspi_dat1/GPIO27
41	P24	DIO	qspi_cs_n/GPIO24
42	XTAL32K_P	AI	32.768 kHz Crystal input (+)
43	XTAL32K_N	AI	32.768 kHz Crystal input (-)
44	VDD_3V_2	PI	Supply to external 3.3V
45	VDD_BAT_2	PI	Guard ring power supply
46	GND_GR	GND	Ground for isolation
47	VDD_VCO	PI	VCO power supply
48	LOOP_C	AIO	PLL loop filter external capacitor.
49	VDD_CP	PI	PLL power supply
50	VDD_PLL	PI	PLL power supply
51	PA_Output	PI	8dBm TX Output
52	VDD_RF1	PI	RF power supply
53	RF_P	AIO	RF input/output
54	RF_N	AIO	RF input/output
55	VDD_A	PI	Power supply for an analog circuit
56	Test	AO	RX IF Output
57	VDD_BAT_1	PI	ADC power supply
58	GND_ADC	GND	Ground for ADC
59	P30	AI	ADC Input Channel 0
60	P31	AI	ADC Input Channel 1
61	P32	AI	ADC Input Channel 2
62	P33	AI	ADC Input Channel 3
63	P34	AI	ADC Input Channel 4
64	P35	AI	ADC Input Channel 5
65	Touch_IN	AI	Touch Input
66	Touch_OUT	AI	Touch Output
67	XTAL32M_P	AI	32 MHz Crystal input (+)
68	XTAL32M_N	AI	32 MHz Crystal input (-)
IC Ground pad		GND	Backside GND plane. Must be connected to the GND.

NOTE: AI : analog input AO : analog output AIO : analog input/output DI : digital input DIO : digital input/output PI : power input PO : power output

Package FCLGA 52 pins (4.5mm X 4.5mm X 0.75mm) 8Mbit Flash included

Pin	Symbol	Type	Description
A4	TRX_OUT	PIO	0dBm TX Output / RX Input
F1	PA_OUT	PO	8dBm TX Output
K6	P00	DIO	swck/GPIO00
K7	P01	DIO	swd/GPIO01
A7	P02	DIO	spim0_cs1/FUNC_IO00/GPIO02
A8	P03	DIO	spim0_cs0/SPIS_CS/FUNC_IO01/GPIO03
B7	P04	DIO	spim0_clk/SPIS_CLK/FUNC_IO02/GPIO04
B8	P05	DIO	spim0_miso/SPIS_MISO/FUNC_IO03/GPIO05
B9	P06	DIO	spim0_mosi/SPIS_MOSI/FUNC_IO04/GPIO06
G8	P07	DIO	spim1_cs1/FUNC_IO05/GPIO07
H8	P08	DIO	spim1_cs0/FUNC_IO06/GPIO08
G9	P09	DIO	spim1_clk/FUNC_IO07/GPIO09
H9	P10	DIO	spim1_miso/FUNC_IO08/GPIO10
J9	P11	DIO	spim1_mosi/FU:NC_IO09/GPIO11
K8	P12	DIO	uart2ahb_txd/FUNC_IO10/GPIO12
K9	P13	DIO	uart2ahb_rxd/FUNC_IO11/GPIO13
E9	P15	DIO	FUNC_IO13/GPIO15
D10	P16	DIO	FUNC_IO14/GPIO16
D9	P17	DIO	FUNC_IO15/GPIO17
D8	P20	DIO	FUNC_IO18/GPIO20
F7	P21	DIO	FUNC_IO21/GPIO21
E7	P22	DIO	FUNC_IO20/GPIO22
D7	P23	DIO	FUNC_IO21/GPIO23
J2	P24	DIO	qspi_cs_n/GPIO24
J5	P25	DIO	qspi_clk/GPIO25
H6	P26	DIO	qspi_dat0/GPIO26
J3	P27	DIO	qspi_dat1/GPIO27
J4	P28	DIO	qspi_dat2/GPIO28
H5	P29	DIO	qspi_dat3/GPIO29
A9	P30	AI	ADC Input Channel 0
B10	P31	AI	ADC Input Channel 1
C8	P32	AI	ADC Input Channel 2
C9	P33	AI	ADC Input Channel 3
A10	P34	AI	ADC Input Channel 4
C10	P35	AI	ADC Input Channel 5
J1	XTAL_32K_N	AI	32.768 kHz Crystal input (-)
K1	XTAL_32K_P	AI	32.768 kHz Crystal input (+)

Pin	Symbol	Type	Description
F10	XTAL_32M_N	AI	32 MHz Crystal input (-)
E10	XTAL_32M_P	AI	32 MHz Crystal input (+)
G1	VDD_CP	PI	PLL power supply
K5	VDD_1V2	PO	DC/DC Converter output
K10	VDD_1V8	PI	Supply to external 1.8V
J10	VDD_3V_1	PI	Supply to external 3.3V
H1	VDD_3V_2	PI	Supply to external 3.3V
K3	VDD_BUS	PI	USB supply voltage -- Charger Input
K4	VDD_BAT	PI	Battery supply voltage
J6	VDD_SRAM	PO	VDD_SRAM output
G6	VDD_AWO	PO	VDD_AWO output
G10	TOUCH_IN	AI	Touch Input
H10	TOUCH_OUT	AI	Touch Output
F9	TEST	AO	RX IF Output
J8	TEST_PAD	DIO	Digital Test Pin
K2	Ext Reset	DI	Pull low internally. High active.
H2	GND_D	GND	Ground for digital circuit
H7			
J7			
H3	GND_GR	GND	Ground for isolation
G3	GND_PLL	GND	Ground for PLL
H4			
G7	GND_ADC	GND	Ground for ADC
E8			
F8			
A1	GND_RF	GND	Ground for RF
B1			
C1			
A2			
B2			
C2			
E2			
F2			
A3			
B3			
C3			
D3			

Pin	Symbol	Type	Description
E3	GND_RF	GND	Ground for RF
F3			
B4			
C4			
D4			
E4			
F4			
A5			
B5			

Pin	Symbol	Type	Description
C5	GND_RF	GND	Ground for RF
D5			
E5			
F5			
A6			
B6			
C6			
D6			
E6			

NOTE: AI : analog input AO : analog output AIO : analog input/output DI : digital input DIO : digital input/output PI : power input PO : power output

	1	2	3	4	5	6	7	8	9	10
A	GND_RF	GND_RF	GND_RF	TXRX	GND_RF	GND_RF	P02	P03	P30	P34
B	GND_RF	GND_RF	GND_RF	GND_RF	GND_RF	GND_RF	P04	P05	P06	P31
C	GND_RF	GND_RF	GND_RF	GND_RF	GND_RF	GND_RF		P32	P33	P35
D			GND_RF	GND_RF	GND_RF	GND_RF	P23	P20	P17	P16
E		GND_RF	GND_RF	GND_RF	GND_RF	GND_RF	P22	GND_ADC	P15	XTAL_32M_P
F	PA_OUT	GND_RF	GND_RF	GND_RF	GND_RF		P21	GND_ADC	TEST	XTAL_32M_N
G	VDD_CP		GND_PLL			VDD_AWO	GND_ADC	P07	P09	TOUCH_IN
H	VDD_3V_2	GND_D	GND_GR	GND_PLL	P29	P26	GND_D	P08	P10	TOUCH_OUT
J	XTAL_32K_N	P24	P27	P28	P25	VDD_SRAM	GND_D	TEST_PAD	P11	VDD_3V_1
K	XTAL_32K_P	Ext Reset	VDD_BUS	VDD_BAT	VDD_1V2	P00	P01	P12	P13	VDD_1V8