

### 1. General Description

A8107M0 is a high performance and low cost 2.4GHz FSK/GFSK system-on-chip (SOC) wireless transceiver. With on chip fraction-N synthesizer, it can support the application of data rate from 5Kbps to 2Mbps and frequency hopping system and it is designed for Bluetooth Low Energy (Bluetooth 4.0 Single MODE). It is a Bluetooth smart device. This device integrates high ARM-M0 MCU, 256K Bytes In-system programmable flash memory, 32KB SRAM, various powerful functions and excellent performance of a leading 2.4GHz FSK/GFSK RF transceiver. It can be operated with wide voltage from 2.0V ~ 3.6V. A8107M0 has various operating MODEs, making it highly suited for systems where ultra-low power consumption is required. A8107M0 has 256K bytes flash that supports AES128 engine and CCM. For low current consumption, A8107M0 is integrated with both LDO and DC-DC (buck) so that this device can be operated more efficient when VDD voltage range from 2.7V to 3.6V. User can configure one of them (LDO or DC-DC) as a powered source for device operations. The device has 2 package sizes: QFN5X5 40 pin package and QFN6x6 48pin package.

### 2. Typical Applications

- 2400 ~ 2483.5 MHz ISM frequency hopping system
- Smart remote controller
- Home and building automation
- Wireless keyboard and mouse
- Wireless toy and gaming
- Helicopter and airplane radio controller
- Bluetooth smart device

### 3. Features

- Package size (QFN5X5, 40 pins/ QFN6X6 48 pins).
- High performance ARM-M0 MCU
- Operation clock: 1, 1/2, 1/4, 1/8, 1/16, 1/32, 1/64 of crystal oscillator.
- TFT DMA controller and 8080 output interface(I80)
- 256KB Flash memory with copy protection, 32KB SARM
- UART, I<sup>2</sup>C, SPI serial communication
- Two 32-bit timers and one 32-bit dual MODE timer.
- Four Channel PWM
- Watchdog timer
- Two 16-bit Sleep timer
- In-Circuit Debugger
- In-System programming/ In-Application programming
- 23/31 GPIO for QFN40/48
- RX current consumption with MCU stop and DC-DC turn on: 6.4mA @BATH= 3.3V
- TX current consumption with MCU stop and DC-DC turn on: 9mA @ 5dBm, BATH=3.3V.
- Power saving MODE without sleep timer, no SRAM retention (1.3 uA)
- Power saving MODE with sleep timer, 16K SRAM retentio (2.1uA)
- Frequency band: 2400 – 2483MHz.
- FSK and GFSK modulation
- High sensitivity:
  - ◆ -97dBm at 500Kbps data rate
  - ◆ -94dm at 1Mbps data rate
  - ◆ -91dBm at 2Mbps data rate
- Programmable data rate 5K ~ 2Mbps.
- Fast settling time synthesizer for frequency hopping system.
- Built-in thermal sensor for monitoring relative temperature.
- Built-in one channel 8-bits ADC for external analog voltage. (0V ~ 0.9V).
- Built-in eight channels 12-bits ADC for general purpose analog input (0V ~ 1.8 V).
- Built-in Low Battery Detector.
- Support 16MHz crystal
- Easy to use.
  - ◆ Change frequency channel by one register setting.
  - ◆ 8-bits Digital RSSI for clear channel indication.
  - ◆ Auto RSSI measurement.
  - ◆ Auto WOR (wake up when receive RX packet).
  - ◆ Auto WOT (wake up to transmit TX packet).
  - ◆ Auto Calibrations.
  - ◆ Auto IF function.
  - ◆ Auto Frequency Compensation.
  - ◆ Auto CRC Check.

- ◆ Separated 256 bytes RX and TX FIFO.

### 4. Pin Configurations

#### 4.1 QFN40 5x5

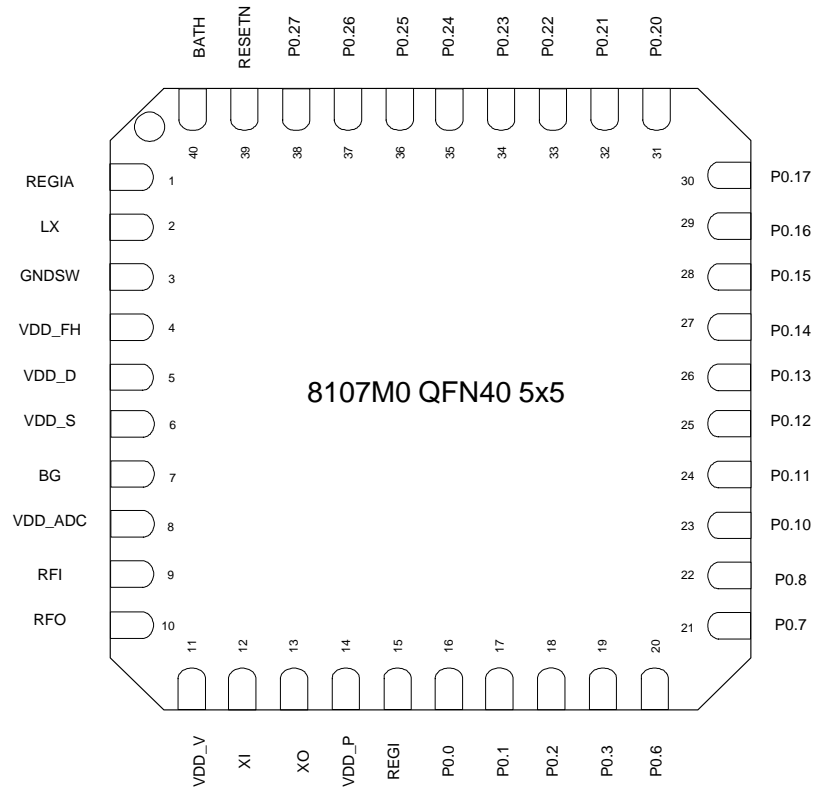


Fig 4-1. A8107M0 QFN40 5x5 Package Top View

### 4.2 QFN48 6x6

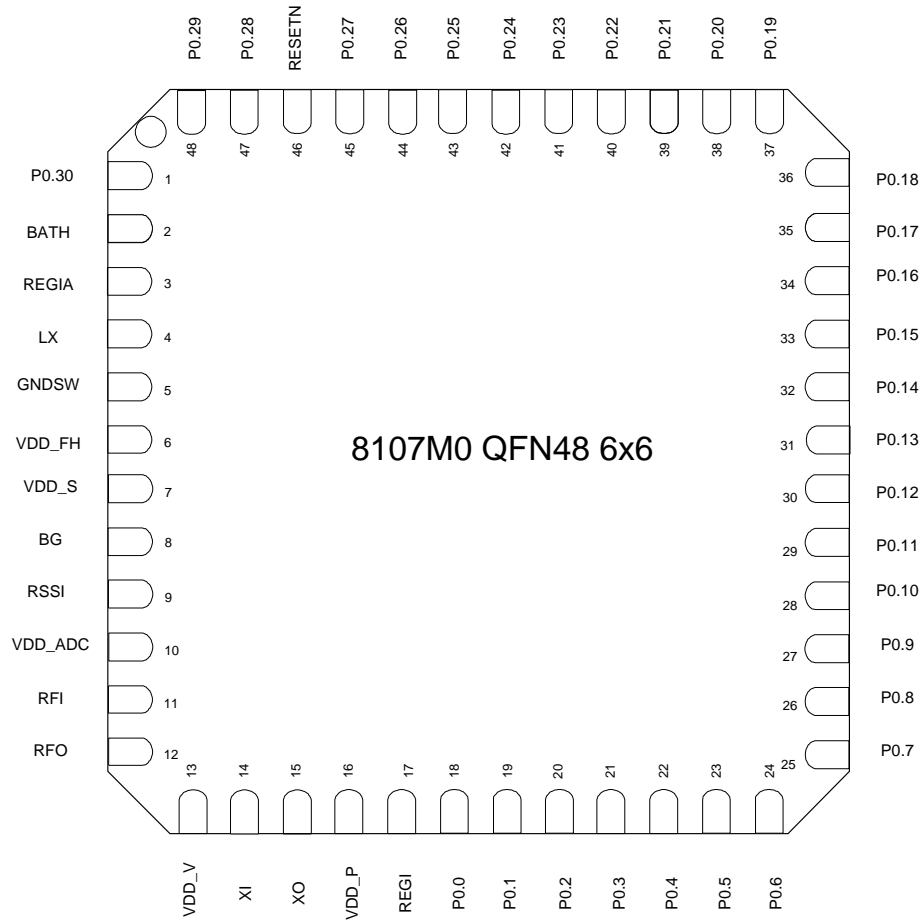


Fig 4-2. A8107M0 QFN48 6x6 Package Top View

### 5. Pin Descriptions (I: input; O: output, I/O: input or output)

#### 5.1 A8107M0 QFN40 5x5 Package

Pin No.	Symbol	I/O	Function Description
1	REGIA	AO	DC-DC regulator output for buck
2	LX	AI	DC-DC Inductor connection pin
3	GND SW	AI	Ground
4	VDD_FH	AO	Flash high voltage output
5	VDD_D	AO	VDD_D supply voltage output
6	VDD_S	AO	VDD_S supply voltage output
7	BG	AO	Band gap output
8	VDD_ADC	AO	VDD_ADC supply voltage output
9	RFI	AI	RF input
10	RFO	AO	RF output
11	VDD_V	AI	VCO supply voltage input
12	XI	AI	Crystal oscillator input
13	XO	AO	Crystal oscillator output
14	VDD_P	AO	PLL supply voltage output
15	REGI	AI	Regulator input
16	P0.0	DIO/AIO	SPI_CS
17	P0.1	DIO/AIO	SPI_MISO
18	P0.2	DIO/AIO	SPI_MOSI
19	P0.3	DIO/AIO	SPI_SCK
20	P0.6	DIO	SWDIOTMS
21	P0.7	DIO	SWCLKTCK
22	P0.8	DIO/AIO	timer0_EIN / ADC2 / BB_GIO1
23	P0.10	DIO/AIO	PWM2 / I <sup>2</sup> C_SCL
24	P0.11	DIO/AIO	PWM3 / I <sup>2</sup> C_SDA / LCD_TE
25	P0.12	DIO/AIO	ADC4 / ICE_MODE / LCD_nRD
26	P0.13	DIO/AIO	ADC5/BB_GIO1 / LCD_Data[2]
27	P0.14	DIO/AIO	ADC6/BB_GIO2 / LCD_Data[1]
28	P0.15	DIO/AIO	ADC7/BB_CKO / LCD_Data[0]
29	P0.16	DIO/AIO	UART0_RX / LCD_nCS
30	P0.17	DIO/AIO	UART0_TX / LCD_A0
31	P0.20	DIO/AIO	UART2_RX / PWM0 / LCD_nWR/ s_LCD_SCL
32	P0.21	DIO/AIO	UART2_TX / PWM1 / LCD_Data[7]
33	P0.22	DIO/AIO	RTCI
34	P0.23	DIO/AIO	RTCO
35	P0.24	DIO	General IO / LCD_Data[6]
36	P0.25	DIO	General IO / LCD_Data[5]
37	P0.26	DIO	General IO / LCD_Data(4)

38	P0.27	DIO	General IO / LCD_Data[3]
39	RESETN	AI	RESETN input
40	BATH	DIO/AIO	DC-DC converter voltage input for buck mode

### 5.2 A8107M0 QFN48 6x6 Package

Pin No.	Symbol	I/O	Function Description
1	P0.30	DIO	General IO
2	BATH	DIO/AIO	DC-DC converter voltage input for buck mode
3	REGIA	AO	DC-DC regulator output voltage
4	LX	AI	DC-DC Inductor connection pin
5	GND SW	AI	Ground
6	VDD_FH	AO	Flash high voltage output
7	VDD_S	AO	VDD_S supply voltage output
8	BG	AO	Band gap output
9	RSSI	AO	RSSI Bypass
10	VDD_ADC	AO	VDD_ADC supply voltage output
11	RFI	AI	RF input
12	RFO	AO	RF output
13	VDD_V	AI	VCO supply voltage input
14	XI	AI	Crystal oscillator input
15	XO	AO	Crystal oscillator output
16	VDD_P	AO	PLL supply voltage output
17	REGI	AI	Regulator input
18	P0.0	DIO/AIO	SPI_CS
19	P0.1	DIO/AIO	SPI_MISO
20	P0.2	DIO/AIO	SPI_MOSI
21	P0.3	DIO/AIO	SPI_SCK
22	P0.4	DIO/AIO	I <sup>2</sup> C_SCL
23	P0.5	DIO/AIO	I <sup>2</sup> C_SDA
24	P0.6	DIO	SWDIOTMS
25	P0.7	DIO	SWCLKTCK
26	P0.8	DIO/AIO	Timer0_EIN / ADC2 / BB_GIO1
27	P0.9	DIO/AIO	Timer1_EIN / ADC3 / BB_GIO2
28	P0.10	DIO/AIO	PWM2 / I <sup>2</sup> C_SCL
29	P0.11	DIO/AIO	PWM3 / I <sup>2</sup> C_SDA / LCD_TE
30	P0.12	DIO/AIO	ADC4 / ICE_MODE / LCD_nRD
31	P0.13	DIO/AIO	ADC5/BB_GIO1 / LCD_Data[2]
32	P0.14	DIO/AIO	ADC6/BB_GIO2 / LCD_Data[1]
33	P0.15	DIO/AIO	ADC7/BB_CKO / LCD_Data[0] / s_LCD_SDA
34	P0.16	DIO/AIO	UART0_RX / LCD_nCS
35	P0.17	DIO/AIO	UART0_TX / LCD_A0
36	P0.18	DIO/AIO	UART1_RX / BB_GIO1

37	P0.19	DIO/AIO	UART1_TX / BB_GIO2
38	P0.20	DIO/AIO	UART2_RX / PWM0 / LCD_nWR/ s_LCD_SCL
39	P0.21	DIO/AIO	UART2_TX / PWM1 / LCD_Data[7]
40	P0.22	DIO/AIO	RTCI
41	P0.23	DIO/AIO	RTCO
42	P0.24	DIO	General IO / LCD_Data[6]
43	P0.25	DIO	General IO / LCD_Data[5]
44	P0.26	DIO	General IO / LCD_Data[4]
45	P0.27	DIO	General IO / LCD_Data[3]
46	RESETN	AI	RESETN input
47	P0.28	DIO	General IO
48	P0.29	DIO	General IO