CHIPSEA
TECHNOLOGIES

CSM92F30 Module
User's Manual

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Revision History

Revision	Changes	Date
REV1.0	Initial draft	2018/1/15

Contents

1 Product Overview

1.1 Introduction

The CSM92F30 Module is a highly integrated Bluetooth 5.0 low energy SOC module. It has 32-bit ARM® Cortex™-M0 CPU with 512KB Flash, 138KB SRAM and an ultra-low power, high performance, multi-mode radio. It intergrate rich feature peripheral units, programmable protocol and profile to support BLE application, enables customer product to be built with minimum bill-of-material (BOM) cost.

1.2 Features

CPU

- 32-bit ARM® Cortex™-M0 CPU

Memories

- 512KB Flash
- 138KB SRAM

2.4GHz Transceiver

- Compliant to Bluetooth 5.0
- Single-pin antenna: no RF matching or RX/TX switching required
- Support four datarate
  - 2Mbps
  - 1Mbps
  - 500Kbps
  - 125Kbps
- Sensitivity:
  - -94dBm@BLE 2Mbps data rate
  - -97dBm@BLE 1Mbps data rate
  - -98dBm@BLE 500Kbps data rate
  - -103dBm@BLE 125Kbps data rate

Low power consumption

- Transmitter: 8mA@0dBm Tx power
- Receiver: 8mA @sensitivity level
- 2μA @ Sleep Mode with 32KHz RTC
- 0.7μA @ OFF Mode(IO wake up only)

Oscillator

- Support 16M XTAL

Interfaces

- 33/20 general purpose I/O pins
  - All pins can be configured as digital interface and programmable IO MUX function mapping
  - All pins can be configured for wake-up
  - 18 pins for triggering interrupt
- 6-channel output PWM
- 1x quadrature decoder(QDEC)
- 1x I2S
- 1x PDM
- 2x I2C
- 1x UART
- 2x SPI
- Support 16*18keyboard scan
- 1x 12bit ADC with analog PGA
- 8x 24bit timer
- one watchdog timer
- Real timer counter (RTC)
- JTAG

Flexible power management

- Supply voltage range 1.8V to 3.6V
- Embedded buck DC-DC

Package

- QFN32（4*4mm）
- QFN48（5*5mm）

Application

- Wearables
- Beacon
- Health and medical
- Appliances
- Internet of things (IOT)
- BLE MESH

1.3 Pin Assignments and Functions

This section describes the pin assignment and the pin functions for CSM92F30 Module.

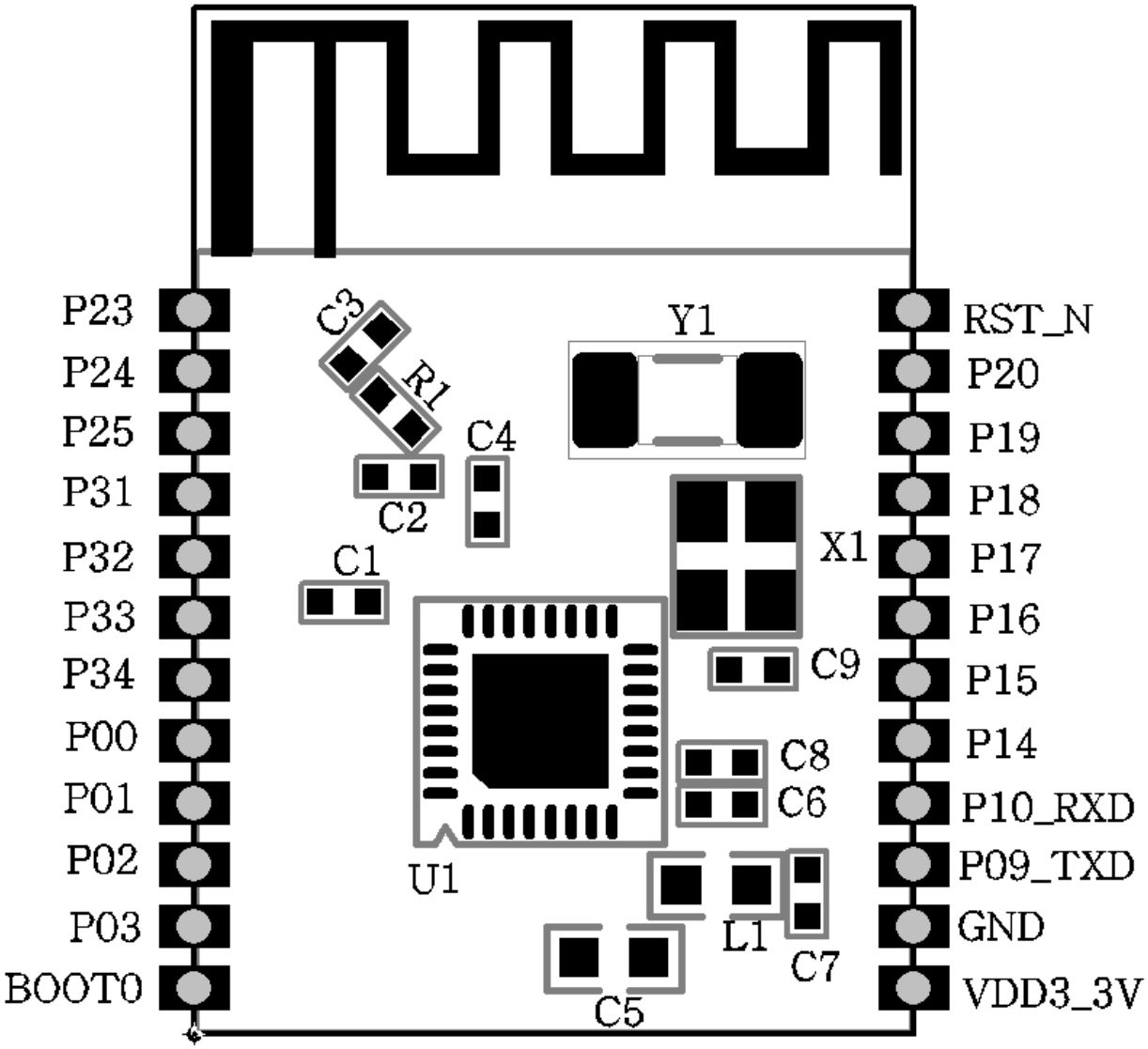


Table 1 Pin description

QFN48 No.	QFN32 No.	Pin name	Type	Description
1	1	P00	I/O	General purpose input/output0
				JTAG_TDO
2	2	P01	I/O	General purpose input/output1
				JTAG_TDI
3	3	P02	I/O	General purpose input/outpu2
				JTAG_TMS
4	4	P03	I/O	General purpose input/output3
				JTAG_TCK
9	5	BOOT0	I	Boot_select[0]
20	13	P14	I/O	General purpose input/output14
				AIO3
21	14	P15	I/O	General purpose input/output15
				AIO4
25	18	P16	I/O	General purpose input/output16
				AIO5
				32K crystal input
26	19	P17	I/O	General purpose input/output17
				AIO6
				32K crystal output
27	20	P18	I/O	General purpose input/output18 *Note: Not support interrupt function
				AIO7
				PGA differential positive input
28	21	P19	I/O	General purpose input/output19 *Note: Not support interrupt function
				AIO8
				PGA differential negative input
29	22	P20	I/O	General purpose input/output20 *Note: Not support interrupt function
				AIO9
				Micphone bias output
30	23	RST_N	I	reset pin, low level active
37	26	P23	I/O	General purpose input/output23 *Note: Not support interrupt function
38	27	P24	I/O	General purpose input/output24 *Note: Not support interrupt function
				Boot_select[1]
39	28	P25	I/O	General purpose input/output25 *Note: Not support interrupt function
				Boot_select[2]
45	29	P31	I/O	General purpose input/output31 *Note: Not support interrupt function
46	30	P32	I/O	General purpose input/output32 *Note: Not support interrupt function
47	31	P33	I/O	General purpose input/output33 *Note: Not support interrupt function
48	32	P34	I/O	General purpose input/output34 *Note: Not support interrupt function

2 Electrical Specifications

2.1 Absolute Maximum Ratings

Maximum ratings are the extreme limits to which CSM92F30 Module can be exposed without permanently damaging it. Exposure to absolute maximum ratings for prolonged periods of time may affect the reliability of the CSM92F30 Module.Table2 Specifies the absolute maximum ratings for CSM92F30 Module.

Table 13 CSM92F30 Module Absolute Maximum Ratings

Symbol	Range	Unit
Supply voltage	0~3.6	V
I/O pin voltage	-0.3~VIN+0.3	V
Operating temperature	-40~+125	ºC
Storage temperature	-55~+150	ºC
Solder temperature,time	220ºC，10s	

2.2 DC Characteristics

Table 14 DC Characteristics

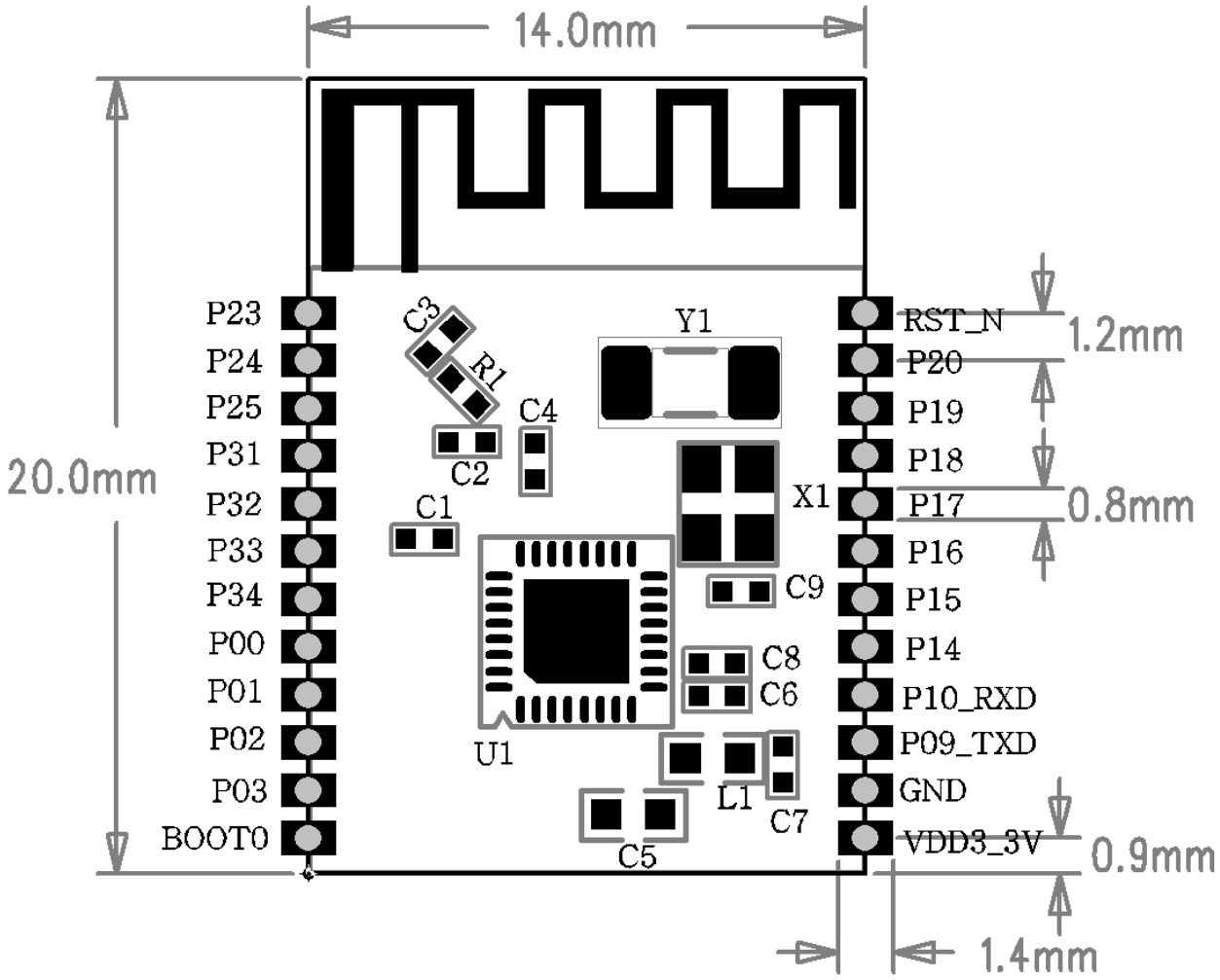
Symbol	Parameter	Min.	Typ.	Max.	Unit
VIN	Supply voltage, normal mode	1.8	3.3	3.6	V
VIH	Digital input high level	VIN-0.3	-	VIN+0.3	V
VIL	Digital input low level	0	-	0.3	V
VOH	Digital output high level	VIN-0.3	-	VIN+0.3	V
VOL	Digital output low level	0	-	0.3	V

2.3 Receiver Specification

Table 15 Receiver Specification

Parameter	Min.	Typ.	Max.	Unit
Receive sensitivity@ 125Kbps GFSK		-103		dBm
Receive sensitivity @500Kbps GFSK		-98		dBm
Receive sensitivity @1Mbps BLE		-97		dBm
Receive sensitivity@2Mbps BLE		-94		dBm
Maximum input signal level		-5		dBm

3 Package Dimensions



4 Application Schematic

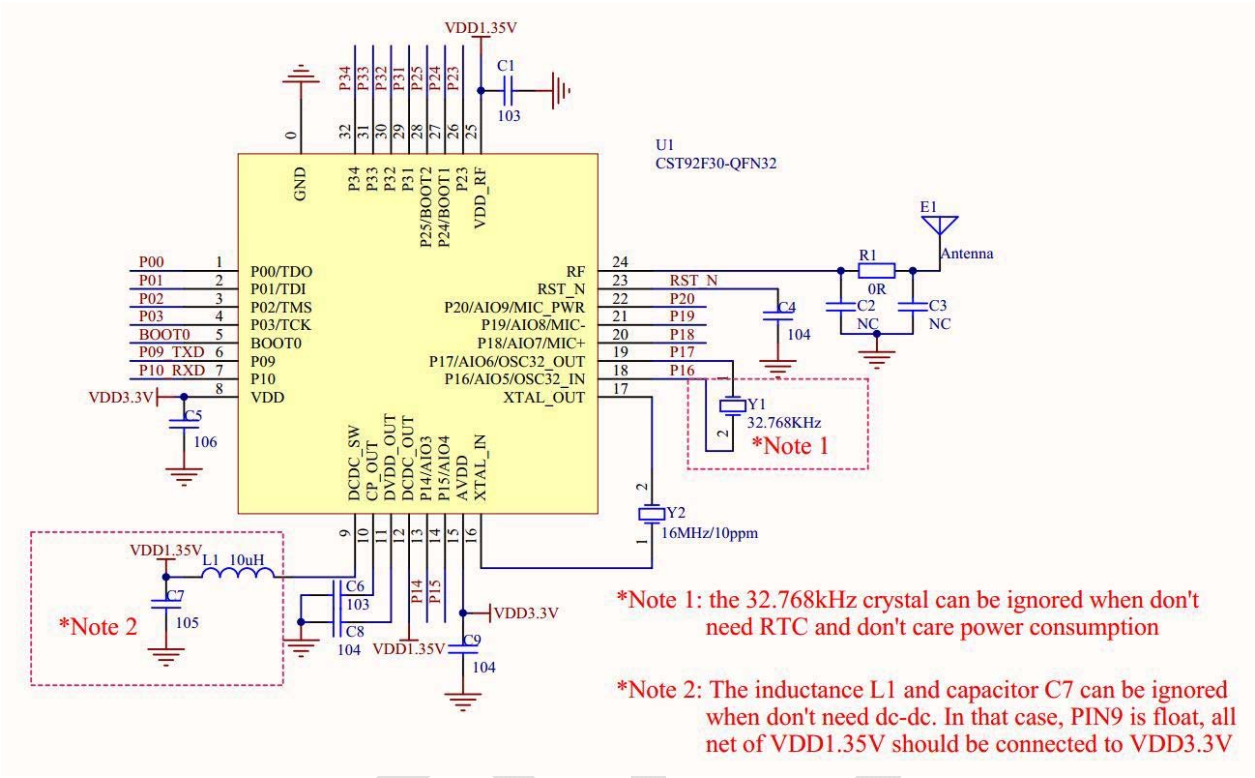


Figure 17 CSM92F30 Module Application Schematic

A. Appendix A

A.1. Requirement of FCC KDB 996369 D03 for module certification:

1.1 List of applicable FCC rules:
The module complies with FCC Part 15.247

1.2 Summarize the specific operational use conditions:
The module has been certified for Fix, Mobile, Portable applications. This transmitter must not be co‐located or operating in conjunction with any other antenna or transmitter.

1.3 Limited module procedures:
The module has not its own RF shielding, which belong to Limited module Standard requires:
Clear and specific instructions describing the conditions, limitations and procedures for third‐parties to use and/or integrate the module into a host device (see Comprehensive integration instructions below).

Resolve: Supply example as follows:
Installation Notes:
1) CSM92F30 Module Power supply range is DC 1.8V~3.6V, when you use CSM92F30 Module design product, the power supply cannot exceed this range.
2) When connect CSM92F30 Module to the host device, the host device must be power off.
3) Make sure the module pins correctly installed.
4) Make sure that the module does not allow users to replace or demolition.

1.4 Trace antenna designs:
Not applicable.

1.5 RF exposure considerations:
This modular complies with FCC RF radiation exposure limits set forth for an uncontrolled environment.
This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
This modular must be installed and operated with a minimum distance of 20 cm between the radiator and user body.

Note: the host product manuals must include a statement in order to alert the users of FCC RF exposure compliance.

1.6 Antennas:

Type	Gain	Frequency Bands	Modulation Mode
PCB	0.5dBi	2402-2480 MHz	GFSK

The antenna is permanently attached, can’t be replaced.

1.7 Label and compliance information
This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio

frequency energy and, if not installed andused in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

The system integrator must place an exterior label on the outside of the final product housing the 2AGM5CSM92F30 Modules. Below is the content that must be included on this label.

The host product Labeling Requirements:
NOTICE: The host product must make sure that FCC labeling requirements are met. This includes clearly visible exterior label on the outside of the final product housing that
displays the contents shown in below:

Contains FCC ID:2AGM5CSM92F30

1.8 Information on test modes and additional testing requirements:
When testing host product, the host manufacture should follow FCC KDB Publication 996369 D04 Module Integration Guide for testing the host products. The host manufacturer may operate their product during the measurements. In setting up the configurations, if the pairing and call box options for testing does not work, then the host product manufacturer should coordinate with the module manufacturer for access to test mode software

1.9 Additional testing, Part 15 Subpart B disclaimer:
The modular transmitter is only FCC authorized for the specific rule parts (FCC Part 15.247) list on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. The final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed when contains digital circuity.

1.10 Information on test modes and additional testing requirements:
When testing host product, the host manufacture should follow FCC KDB Publication 996369 D04 Module Integration Guide for testing the host products. The host manufacturer may operate their product during the measurements.