

VC4SMN512

Wireless Module

Instruction Manual

Vesta Lighting Inc.

! CAUTION

To prevent damage to the module, be sure to observe the following precautions :

- Supply voltage not more than 3.8V
- Do not modify the module
- Do not wet the module or use the module when your hands are wet
- Do not use the module for applications other than communications
- Do not force the knock on the module
- Welding process ,to prevent electrostatic damage to the module
- While using the module,don't do anything which may cause bodily harm or physical damage

TABLE OF CONTENTS

1 Description	1
2 Features	1
3 Electrical Specifications	1
4 Functional Block Diagram.....	2
4.1 SoC.....	2
4.2 Antenna.....	3
5 Pin Description	3
6 Module Size	5
7 FCC Cautions.....	5

List of Figures

Figure 1.1 VC4SMN512Module.....	1
Figure4.1 VC4SMN512Functional Block Diagram	2
Figure5.1 VC4SMN512Pin Descriptions	3
Figure6.1 VC4SMN512 Size	5

List of Tables

Table 3.1 Absolute Maximum Ratings.....	1
Table3.2 Operating Conditions.....	1
Table3.3 RF Parameter	2
Table3.4 Other Parameter.....	2
Table5.1 Pin Descriptions.....	3

1 Description

VC4SMN512 have very low power consumption (sleep current $1.53\mu\text{A}$), High Performance ZigBee solution. It uses industry-leading ZigBee Pro Stack——EmberZNet, provides stable and reliable ZigBee network. VC4SMN512 module integrated ARM® Cortex-M4 32-bit microprocessor, have extensive memory resources and I/O interfaces, Customers can quickly achieve simple or complex product development.



Figure 1.1. VC4SMN512 Module

2 Features

- 32-bit ARM® Cortex-M4 processor
- +19dB normal mode output power
- 512KB flash, 64KB RAM Memory
- Low deep sleep current, with retained RAM and GPIO: $1.53\mu\text{A}$. Sleep modes selectable;
- Optional OTA firmware upgrade mode
- AES-128 encryption accelerator
- Flexible ADC, UART/SPI/TWI serial communications
- Temperature range: -40 to $+85^{\circ}\text{C}$
- Normal mode link budget up to 121.7 dB @250 kbps O-QPSK DSSS;

3 Electrical Specifications

Table 3.1. Absolute Maximum Ratings

Parameter	Min	Max	Unit
Regulator input voltage (VDD)	-0.3	+3.8	V
Voltage on any GPIO	-0.3	VDD+0.3	V
Analog, Memory and Core voltage	-0.3	+2.0	V
RF Input Power	—	+10	dBm
Storage temperature	-40	+125	$^{\circ}\text{C}$

Table 3.2. Operating Conditions

Parameter	Min	Typ	Max	Unit
-----------	-----	-----	-----	------

Supply voltage (VDD)	2.1	3.3	+3.8	V
Operating temperature range	-40	25	+85	°C

Table3.3.RF Parameter

Parameter	Min	Typ	Max	Unit
Frequency range	2400	—	2483.5	MHz
Sensitivity(1%PER ,Boost Mode)	—	-102.7	—	dBm
TX Power	-30	+19	+19.5	dBm
Frequency tolerance (@25°C)	-96.2	—	+96.2	kHz

Note : In the open distance test,the transmission distance up to 0.497 mile

Table3.4.Other Parameter

Parameter	Min	Typ	Min	Unit
Total TX current (+19.5dBm , Boost Mode)	—	131	—	mA
Total RX current (Boost Mode)	—	10.2	—	mA
Sleep Current	—	1.53	—	μA

4 Functional Block Diagram

VC4SMN512with high performance ZigBee SoC

Figure4.1 shows functional block diagram of the VC4SMN512 Module

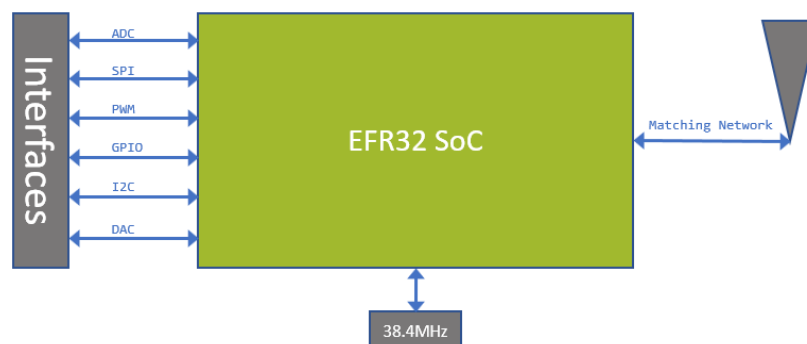


Figure4.1.VC4SMN512Module functional block diagram

4.1 SoC

VC4SMN512 uses SiliconLabs's EFR32MG13P732F512GM48 chip.The chip integrates RF RF and baseband、The MAC hardware、Hardware capture module、ARM® Cortex™-M4 microprocessor、Large capacity Flash and RAM. Therefore, the chip provides users with a low-cost, high-performance ZigBee solutions.

4.2 Antenna

VC4SMN512 default connection board PCB antenna, Users can also choose to connect an external antenna via zero ohm resistor.

In order to guarantee the transmission performance, it can not exist around the module ground plane. When using an external antenna, you need to pay attention to the antenna lead-out portion of the motherboard design. Ensure the transmission line impedance matching. Avoid the impedance mismatch caused by radio signal reflection, the actual antenna signal power drops, affect the transmission distance.

5 Pin Description

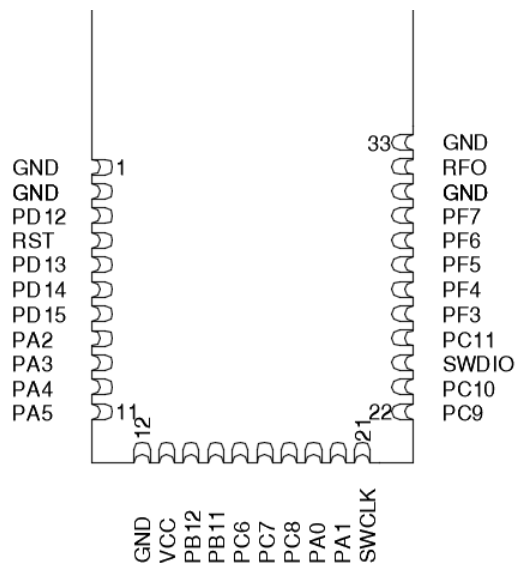


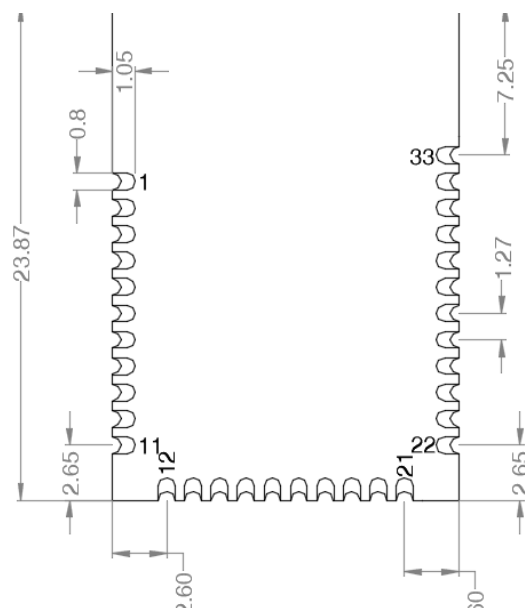
Figure 5.1. VC4SMN512 pin descriptions

Table 5.1. pin descriptions

PIN#	Signal	Description
1	GND	GND
2	GND	GND
3	PD12	GPIO
4	RST	RESET
5	PD13	GPIO
6	PD14	GPIO
7	PD15	GPIO

8	PA2	GPIO
9	PA3	GPIO
10	PA4	GPIO
11	PA5	GPIO
12	GND	GND
13	VCC	+3.3V
14	PB12	GPIO
15	PB11	GPIO
16	PC6	GPIO
17	PC7	GPIO
18	PC8	GPIO
19	PA0	GPIO
20	PA1	GPIO
21	SWCLK	SWD 下载时钟引脚
22	PC9	GPIO
23	PC10	GPIO
24	SWDIO	SWD 下载数据引脚
25	PC11	GPIO
26	PF3	GPIO
27	PF4	GPIO
28	PF5	GPIO
29	PF6	GPIO
30	PF7	GPIO
31	GND	GND
32	RFO	RF 输出引脚
33	GND	GND

6 Module Size



7 FCC Cautions

- Labeling requirements

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.

- Information to user

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 and used 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. Note: The Grantee is not responsible for any changes or modifications not expressly approved by the party responsible for com-

pliance. such modifications could void the user's authority to operate the equipment. the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed

IMPORTANT NOTE: In the event that these conditions cannot be met (for example co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

- **Manual Information To the End User:**

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

- **Modular Approval:**

The VC4SMN512 module is designed to comply with the FCC statement. FCC ID is 2ATL8VC4SMN512. The host system using VC4SMN512, should have label indicated it contain modular's FCC ID 2ATL8VC4SMN512.

- **RF warning:**

The device has been evaluated to meet general RF exposure requirement. To maintain compliance with FCC's RF exposure guidelines, the distance must be at least 20 cm between the radiator and your body, and fully supported by the operating and installation configurations of transmitter and its antenna(s).