SPZB260C-PRO
SPZB260A-PRO

ZigBee® MODULE

June 2009

FEATURES

- Integrated 2.4 GHz, IEEE 802.15.4 compliant transceiver (PHY and MAC)
  - + 3 dBm nominal TX output power (at UFL connector level)
  - + 5 dBm in boost mode
  - -95 dBm typ RX sensitivity
  - RX filtering for co-existence with IEEE 802.11g and Bluetooth devices
  - Integrated VCO and loop filter
- Enabled access to EZSP over synchronous serial interface (SPI) or to EZSP over asynchronous serial (UART)
- Integrated EmberZNet network stack version 3.1.1 for SPI access
- Embedded flash and integrated RAM for program and data storage
- On board 24 MHz stable Xtal
- Integrated RC oscillator (typ 10KHz) for low power operation
- Operation over the industrial temperature range of -40°C to +85°C
- 1 uA power consumption in deep sleep mode
- Watchdog timer and power on reset
- Pins available for Non-Intrusive debug interface (SIF)
- Single supply voltage (2.1V to 3.6V)
- Available Link and Activity outputs for external Indication / monitor
- Integrated RF UFL connector for external antenna (SPZB260C-PRO) or integrated antenna (SPZB260A-PRO)
- CE compliant
- FCC compliant (FCC ID: S9NZB260B)

APPLICATIONS

- Industrial controls
- Sensor Networking
- Monitoring of remote systems
- Home applications
- Security systems
- Lighting controls

DESCRIPTION

SPZB260C-PRO /SPZB260A-PRO is a low power consumption ZigBee ® module optimized for embedded applications. It enables OEMs to easily add wireless capability to electronic devices.

The module is based on the SN260 ZigBee® Network Processor which integrates a 2.4GHz, IEEE 802.15.4-compliant RF and MAC.

A single supply voltage is requested to power the module. The voltage supply also determines the I/O port level allowing an easy interface with the host system .

SPZB260C-PRO integrates a RF UFL connector allowing the use of an external antenna.
SPZB260A-PRO has a specific 2.4GHz Murata integrated antenna aboard.

The module allows a great flexibility in its integration with an host processor as it allows connection with the external controller via SPI or UART interfaces.

For other information and details, please refer to SN260 datasheet available at www.st.com)

Contents

1 - BLOCK DIAGRAM

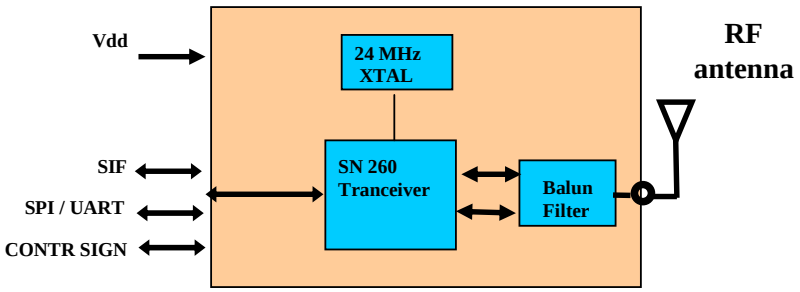


Figure 1. SPZB260C-PRO block diagram

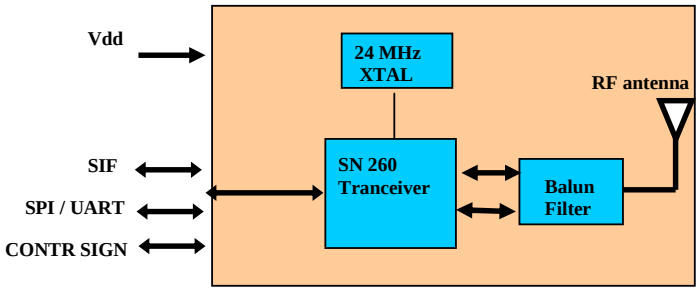


Figure 2. SPZB260A-PRO block diagram

2 - PIN SETTING

2.1 PIN CONFIGURATION

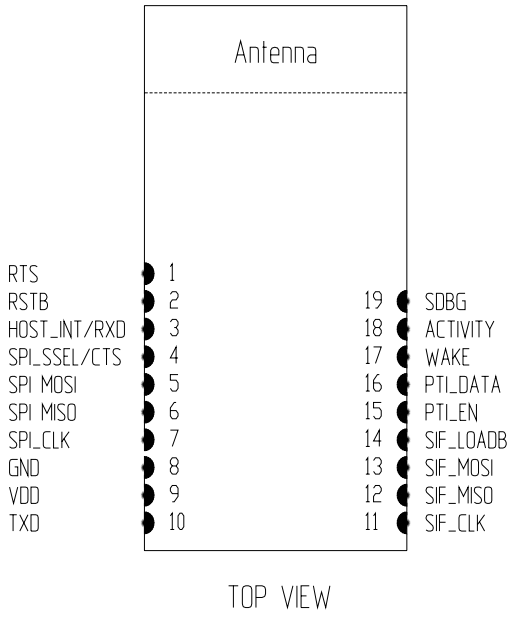


Figure 3. Pin Configuration

2.2 – PIN DESCRIPTION

The SPZB260C-PRO/ SPZB260A-PRO allows the use of EZSP application from SPI or UART.
The pin description is given in table1 for both the configurations. Note that the SPZB260C-PRO / SPZB260A-PRO is shipped with the SPI EZSP application installed.

Table1. Pin Description

Pin #	PIN Name	Direction	Description	
			SPI Mode	UART Mode
1	RTS	O	Not used	RTS signal (10kΩ pull-up to VDD)
2	RSTB	I	Active low reset (a pull-up of 10 kohm typ is provided with 10nF to GND)	
3	HOST_INT / RXD	O /I	Host Interrupt Signal (from ZB Module to Host) (SPI Mode)	RXD signal
4	SPI_SSEL / CTS	I	SPI Slave Select (from Host to ZB Module)	CTS signal
5	SPI MOSI	I	SPI Data , Master Out / Slave In (from host to ZB Module)	Not used
6	SPI MISO	O	SPI Data , Master In / Slave Out (from ZB Module to host)	Not used
7	SPI_CLK	I	SPI clock	Not used
8	GND	---	Ground	
9	VDD	---	Input power supply	
10	TXD	O	Not used	TXD signal (10kΩ pull-up to VDD)
11	SIF_CLK	I	Non-intrusive debug Interface Serial interface Clock Signal (internal pull-down)	
12	SIF_MISO	O	Non-intrusive debug Interface Serial interface Master IN/ Slave Out	
13	SIF_MOSI	I	Non-intrusive debug Interface Serial interface Master Out/ Slave In To guarantee a proper signal level when in deep sleep mode a 10kΩ resistor to GND is provided	
14	SIF_LOADB	I/O	Non-intrusive debug Interface Serial interface Load strobe (Open collector with internal pull-up). To improve noise immunity a 10kΩ resistor to Vdd is provided	
15	PTI_EN	O	Frame Signal of Packet Trace Interface (PTI)	
16	PTI_DATA	O	Data Signal of Packet Trace Interface (PTI)	
17	WAKE	I	Wake Interrupt Signal from Host to ZB Module	
18	ACTIVITY	O	Activity signal for application debug /monitor	
19	SDBG	O	Spare debug signal	

3 – ELECTRICAL CHARACTERISTICS

3.1 - ABSOLUTE MAXIMUM RATINGS

Table 2. Absolute maximum ratings

Symbol	Parameter	Min	Max	Unit
VDD	Module supply voltage	- 0.3	3.6	V
Vin	Input voltage on any digital pin	- 0.3	Vdd + 0.3	V
Tstg	Storage tempeature	-40	+85	°C
Tsold.	Soldering temperature < 10s		250	°C

3.2 - RECOMMENDED OPERATING CONDITIONS

Table 3. Recommended operating conditions

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
VDD	Module supply voltage	-40°C < T < 85°C	2.1	3.3	3.6	V
Tstg	Operating ambient temperature		-40		+85	°C

4 - ELECTRICAL CHARACTERISTICS

4.1 – DC ELECTRICAL CHARACTERISTICS

Tabl4. DC Electrical Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
IRX	RX current (boost mode)	Vdd = 3.0 V T= 25 °C		38		mA
IRX	RX current (normal mode)	Vdd = 3.0 V T= 25 °C		36		mA
ITX	TX current (boost mode)	Vdd = 3.0 V T= 25 °C		42		mA
ITX	TX current (normal mode)	Vdd = 3.0 V T= 25 °C		36		mA
IDS	Deep Sleep Current	2.1 < Vdd < 3.6 V T = 25°C			1	µA

4.2 - DIGITAL I/O SPECIFICATIONS

Table5. Digital I/O Specifications

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
VIL	Low Level Input Voltage	2.1 < Vdd < 3.6 V	0		0.2 x Vdd	V
VIH	High level input voltage	2.1 < Vdd < 3.6 V	0.8 x Vdd		Vdd	V
Iil	Input current for logic 0	2.1 < Vdd < 3.6 V			-0.5	µA
Iih	Input current for logic 1	2.1 < Vdd < 3.6 V			0.5	µA
Ripu	Input pull-up resistor			30		kΩ
Ripd	Input pull-down resistor			30		kΩ
VOL	Low level output voltage		0		0.18 x Vdd	V
VOH	High level output voltage		0.82 x Vdd		Vdd	V
IOHS	Output source current (standard pin)				4	mA
IOLS	Output sink current (standard pin)				4	mA
IOHH	Output source current (pin 17,18,19)				8	mA
IOLH	Output sink current (pin 17,18,19)				8	mA
IOTot	Total output current for I/O pins				40	mA

4.3 - RF ELECTRICAL CHARACTERISTICS

Table6. RF Electrical Characteristics (with UFL connector)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
	Frequency range	2.1 < Vdd < 3.6 V	2405		2480	MHz
TX	Output power	Vdd = 3.0V F= 2450 Mhz		3		dBm
RX	Sensitivity	Vdd = 3.0V 1% PER		-95		dBm
	Carrier frequency error	Vdd=3.0V -20 / + 70 °C	-40		40	ppm

5- Package mechanical dimensions

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect . The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

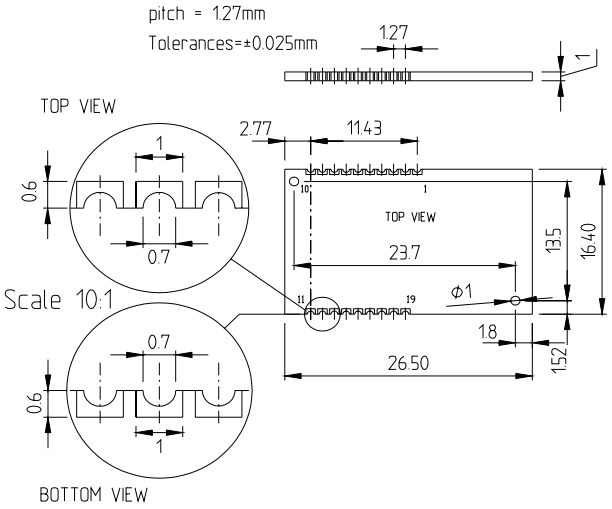


Figure 4. Mechanical dimension

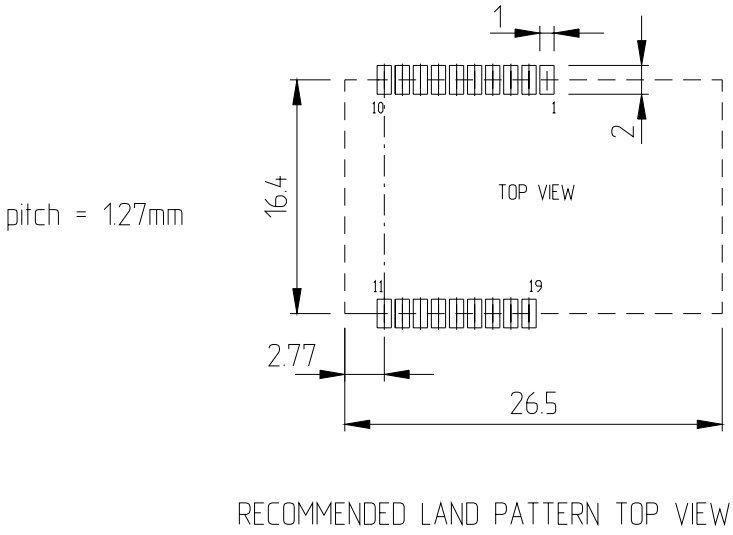


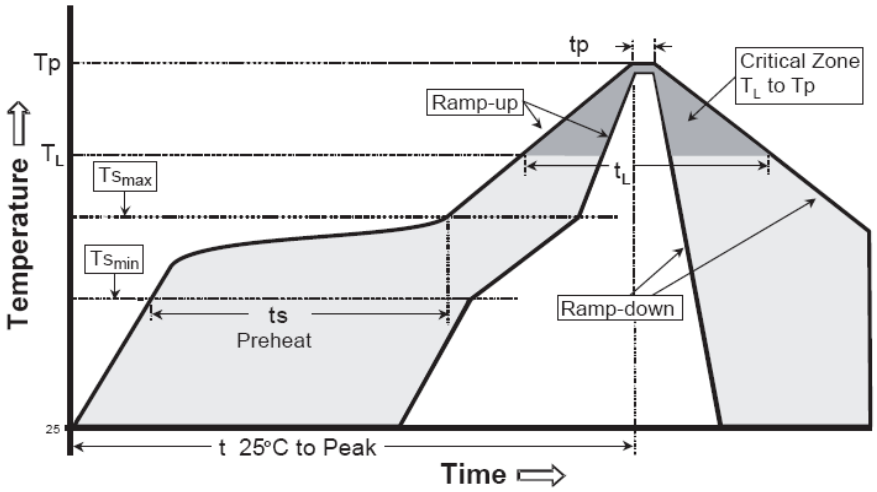
Figure 5. Solder pad layout

6 - SOLDERING

Soldering phase has to be execute with care : in order to avoid undesired melting phenomenon, particular attention has to be take on the set up of the Peak Temperature.
Here following some suggestions for the temperature profile based on IPC/JEDEC J-STD-020C ,July 2004 recommendations.

Table7. Soldering profile

Profile feature	PB free assembly
Average ramp up rate (T_{SMAX} to T_P)	3°C / sec max
Preheat Temperature min ($T_{S\ MIN}$) Temperature max ($T_{S\ MAX}$) Time ($T_{S\ MIN}$ to $T_{S\ MAX}$) (t_S)	 150 ° C 200 ° C 60 – 100 sec
Time maintained above : Temperature T_L Time t_L	 217 ° C 40 – 70 sec
Peak Temperature (Tp)	240+0 ° C
Time within 5°C of actual peak temperature (t_P)	10 – 20 sec
Ramp down rate	6 °C / sec
Time from 25° C to peak temperature	8 minutes max



Appendix A - FCC Statement

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.

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

Antenna

Our module type SPZB260C-PRO / SPZB260A-PRO is for OEM integrations only. The end-user product will be professionally installed in such a manner that only the authorized antennas are used.

Caution

Any changes or modifications not expressed approved by the part responsible for compliance could cause the module to cease to comply with FCC rules part 15, and thus void the user's authority to operate the equipment.
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A.1 - LABEL INSTRUCTION

INSTRUCTION MANUAL FOR FCC ID LABELING

Module type : ZigBee modules *SPZB260C-PRO / SPZB260A-PRO*

FCC-ID : S9NZB260B

This intends to inform you how to specify the FCC ID of our ZigBee modules *SPZB260C-PRO / SPZB260A-PRO in* your final product.

Based on the Public Notice from FCC, the product into which our transmitter module is installed must display a label referring to the enclosed module.
The label should use wording such as "Contains Transmitter module FCC ID: S9NZB260B or "Contains FCC ID: S9NZB260B , any similar wording that expressed the same meaning may be use.

It shows an example below

Contains FCC ID: S9NZB260B

A.2 - Special requirement for Modular application

The following requirements are fulfilled:

1) The modular transmitter must have its own RF shielding:

The RF module used on the board fulfils the emission requirements of the FCC rules without additional shielding.

2) The modular transmitter must have buffered modulation/data inputs:

The module has a memory management unit inside of the IC. The processor interfacing with the external application by means general purpose I/O (GPIO) , Uart, SPI. The processor interfaces also the RF part of the module exchanging data and command with it. Inside the processor a flash memory is available to download the customer application and the ZigBee profiles.

3) The modular transmitter must have its own power supply regulation:

The IC contains an own voltage regulation. In case of changes in the supply voltage VCC (for example caused by temperature changes or other effects), the internal voltage will be stabilized.

4) The modular transmitter must comply with the antenna requirements of Section 15.203 and 15.204:

The RF module is for OEM (Original Equipment Manufacturer) integration only. The end-user product will be professionally installed in such a manner that only the authorized antenna is used.

5) The modular transmitter must be tested in a stand-alone configuration:

The RF module was tested in a stand-alone configuration.

6) The modular transmitter must be labelled with its own FCC ID number:

The RF module will be labelled with its own FCC ID number. When the module is installed inside the end-product, the label is not visible. The OEM manufacturer is instructed how to apply the exterior label.

7) The modular transmitter must comply with any specific rule or operating requirements applicable to the transmitter and the manufacturer must provide adequate instructions along with the module to explain any such requirements:

The EUT is compliant with all applicable FCC rules. Detail instructions are given in the product Users Guide.

8) The modular transmitter must comply with any applicable RF exposure requirements.

- Maximum measured power output: 3,17 mW
- Maximum antenna gain:2.2 dBi = numeric gain 1,66 (see also FCC test report)

Maximum permissible exposure defined in 47 CFR 1.1310: 1 mW/cm².

The RF module operates at low power level so it does not exceed the Commission's RF exposure guidelines limits; furthermore, Spread spectrum transmitters operate according to the Section 15.247 are categorically excluded from routine environmental evaluation.

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