E106-433G27P2 User Manual



Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

CONTENTS

1 Introduction 2
1.1 Product overview 2
1.2. Main feature 2
1.3. Module block diagram 2
2 Interface description 3
2.1. Interface definition 3
2.2. Power pin 7
2.3. SPI interface 7
2.4. Control signal 8
2.4.1. PPS signal 8
2.4.2. NRESET signal 8
2.4.3. RX_ON signal 8
2.4.4. TX_ON signal 8
2.4.5. CFG_ON signal 8
2.4.6.TX_LED indicator light 8
2.4.7.RX_LED indicator light 8
3 Antenna interface 9
4 Interface Electrical and RF Performance 10
4.1. Power Characteristics 10
4.2. IO interface characteristics 10
4.3. Working current 10
4.4. RF performance 11
5 Dimensions 12
6 Internal connection 13
7 Reference design 14
About us 14

Copyright ©2012–2026，Chengdu Ebyte Electronic Technology Co.,Ltd

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

1 Introduction

1.1 Product overview

The E106-433G27P2 module is a LoRa gateway RF module designed based on the SX1302 chip scheme. It uses standard Mini PCI-e form packaging, SPI interface, built-in PA and LNA in the module, and half duplex design to facilitate users to quickly develop LoRa gateway equipment.

SX1302 is a new generation of LoRa gateway baseband chip introduced by Semtech, equipped with front-end SX1250, which can support spread spectrum factors SF5~SF12. Compared with the previous generation SX1301 gateway scheme, it can support higher rate data communication, while significantly reducing power consumption, simplifying the hot design of the gateway, and significantly improving performance.

1.2. Main feature

- PCI Express Mini Card 1.2 standard interface is adopted;
- The maximum sending current is 360mA, and the receiving current is 60mA;
- I-PEX antenna interface, half duplex communication;
- Standard SPI digital interface;
- Support 8 receiving channels, SF5~SF12 full solution, and the receiving sensitivity is as low as - 141dBm;
- Support 1 transmission channel, and the maximum transmission power is 27dBm (typical value is 26dBm);
- Support for license free frequency bands: EU433, CN470, EU868, US915;

1.3. Module block diagram

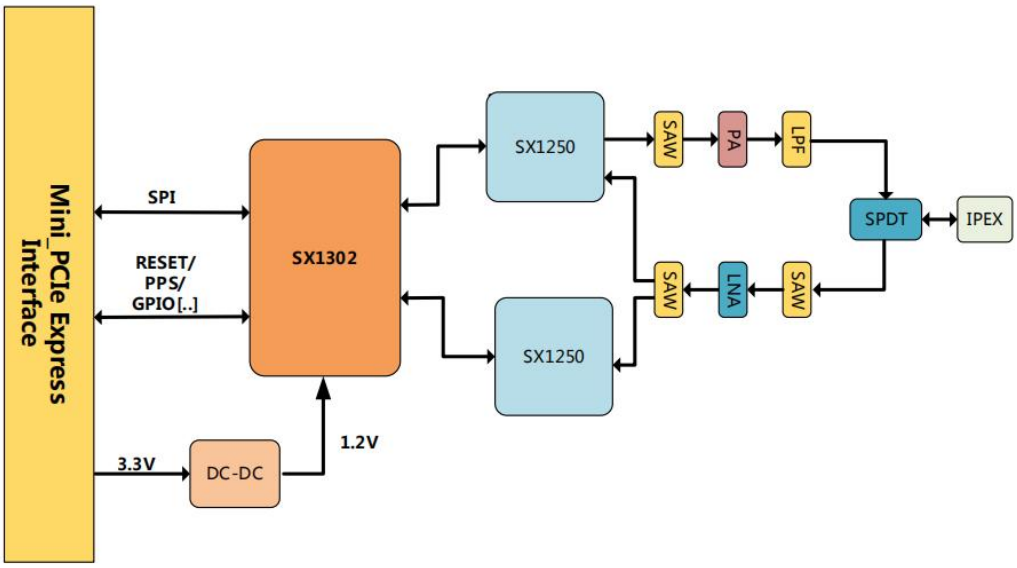


Figure 1：E106-433G27P2 Gateway Module Function Block Diagram

Copyright ©2012–2026，Chengdu Ebyte Electronic Technology Co.,Ltd

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

2 Interface description

2.1. Interface definition

The signal interface of E106-433G27P2 is a standard Mini PCI Express interface. The following table gives the functional definition and description of the 52 pin gold finger pin corresponding to the module.

Table 1：IO Parameter definition

Attribute	Description
DI	Digital input
DO	Digital output
IO	Dual-way input and output
PI	Power input

Table 2： Main function pin definitions

Name	Pin number
GND	4,9,15,18,21,26,27,29,34,35,37,40,43,50
3.3V	2,24,39,41,52
PPS	19
NRESET	22
RX_ON	42
TX_ON	44
CFG_ON	46
SX_SCK	45
SX_MISO	47
SX_MOSI	49
SX_CSN	51

Copyright ©2012–2026，Chengdu Ebyte Electronic Technology Co.,Ltd

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

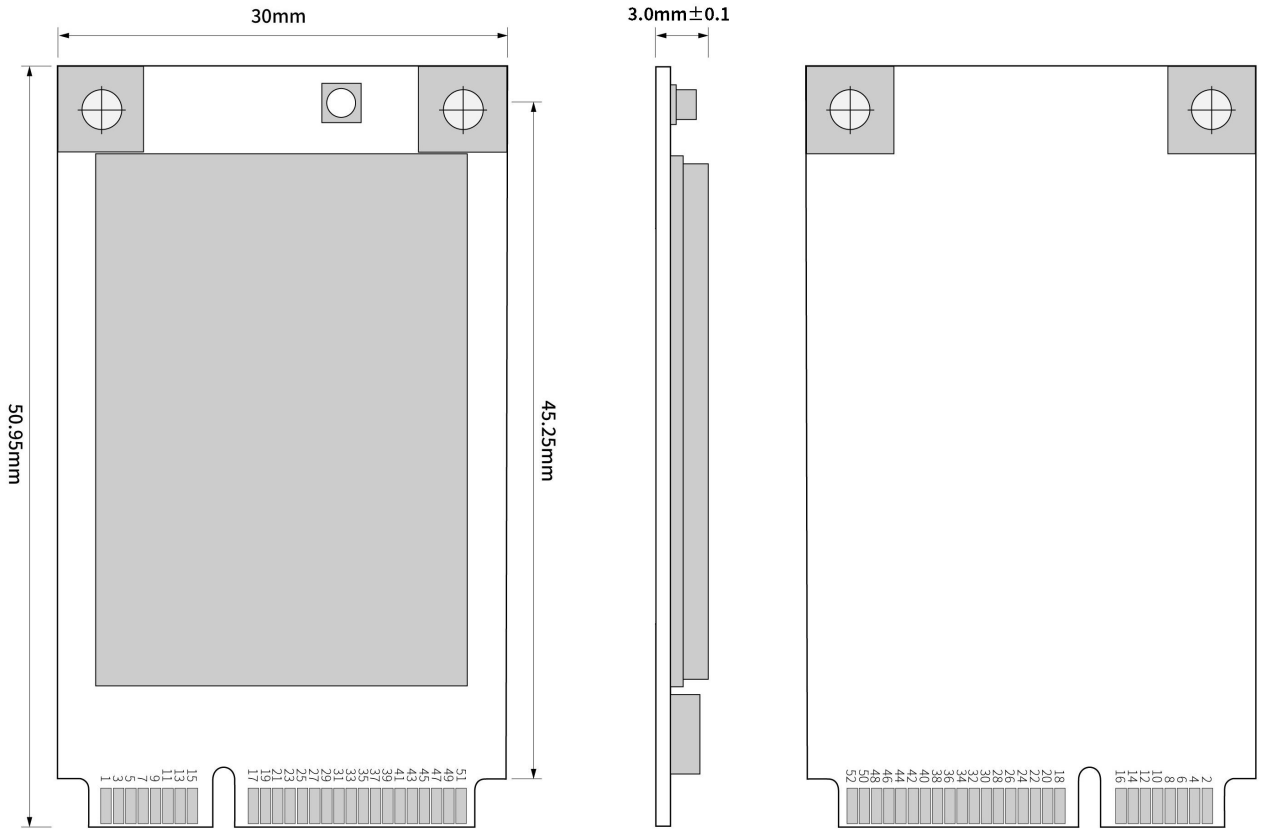


Table 3：pins definition

No.	Mini PCIe pin	E106-xxxG27P2 pin	I/O	Function	Notes
1	WAKE#	RESERVED	DO	Used by transparent transmission version, floating	
2	3.3Vaux	VCC_3V3	PI	3.3V DC main power input	
3	COEX1	NC	—	For internal use, keep floating	
4	GND	GND	—	Ground	
5	COEX2	NC	—	For internal use, keep floating	
6	1.5V	NC	—	Unused	
7	CLKREQ#	NC	—	For internal use, keep floating	
8	UIM_PWR	NC	—	Unused	
9	GND	GND	—	Ground	
10	UIM_DATA	RESERVED	IO	Used by transparent transmission version, floating	
11	REFCLK-	RESERVED	DI	Used by transparent transmission version, floating	
12	UIM_CLK	RESERVED	IO	Used by transparent transmission	

Copyright ©2012–2026，Chengdu Ebyte Electronic Technology Co.,Ltd

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

				version, floating	
13	REFCLK+	RESERVED	DO	Used by transparent transmission version, floating	
14	UIM_RESET	NC	—	Unused	
15	GND	GND	—	Ground	
16	UIM_VPP	NC	—	For internal use, keep floating	
17	RESERVED	NC	—	For internal use, keep floating	
18	GND	GND	—	Ground	
19	RESERVED	PPS	DI	GPS timing input	Can be floated
20	W_DISABLE#	NC	—	For internal use, keep floating	
21	GND	GND	—	Ground	
22	PERST#	NRESET	DI	Reset control pin	High level reset
23	PERn0	RESERVED	DI	Reserved, external floating	
24	3.3Vaux	VCC_3V3	PI	3.3V DC main power input	
25	PERp0	NC	—	Unused	
26	GND	GND	—	Ground	
27	GND	GND	—	Ground	
28	1.5V	NC	—	Unused	
29	GND	GND	—	Ground	
30	SMB_CLK	NC	—	For internal use, keep floating	
31	PETn0	RESERVED	DO	Reserved, external floating	
32	SMB_DATA	NC	—	For internal use, keep floating	
33	PETp0	NC	—	Unused	
34	GND	GND	—	Ground	
35	GND	GND	—	Ground	
36	USB_D-	RESERVED	IO	Used by transparent transmission version, floating	
37	GND	GND	—	Ground	
38	USB_D+	RESERVED	IO	Used by transparent transmission version, floating	

Copyright ©2012–2026，Chengdu Ebyte Electronic Technology Co.,Ltd

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

39	3.3Vaux	VCC_3V3	PI	3.3V DC main power input	
40	GND	GND	—	Ground	
41	3.3Vaux	VCC_3V3	PI	3.3V DC main power input	
42	LED_WWAN#	RX_ON	DO	connected to the GPIO3 of SX1302.	
43	GND	GND	—	Ground	
44	LED_WLAN#	TX_ON	DO	connected to the GPIO3 of SX1302.	
45	RESERVED	SX_SCK	DI	SPI clock signal input	
46	LED_WPAN#	CFG_ON	DO	CFG indication, connected to onboard LED	
47	RESERVED	SX_MISO	DO	SPI data output	
48	1.5V	NC	—	Unused	
49	RESERVED	SX_MOSI	DI	SPI data input	
50	GND	GND	—	Ground	
51	RESERVED	SX_CSN	DI	SPI chip select signal input	
52	3.3Vaux	VCC_3V3	PI	3.3V DC main power input	

Copyright ©2012–2026，Chengdu Ebyte Electronic Technology Co.,Ltd

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

2.2. Power pin

Table 4：Power interface

Name	Pin	IO property	Function
GND	4,9,15,18,21,26,27,29,34,35,37,40,43,50		
3.3V	2,24,39,41,52	PI	3.3V input

The E106-433G27P2 module uses 3.3V power supply. In TX mode, the maximum instantaneous peak current may reach 400mA. In order to prevent voltage drop, the switching power supply or LDO used needs to be able to provide sufficient current, and a capacitor needs to be added at the power supply port of the module. Larger value tantalum capacitors or electrolytic capacitors. If a switching power supply is used to supply power to the module, the circuit wiring should try to avoid the antenna part to prevent EMC interference.

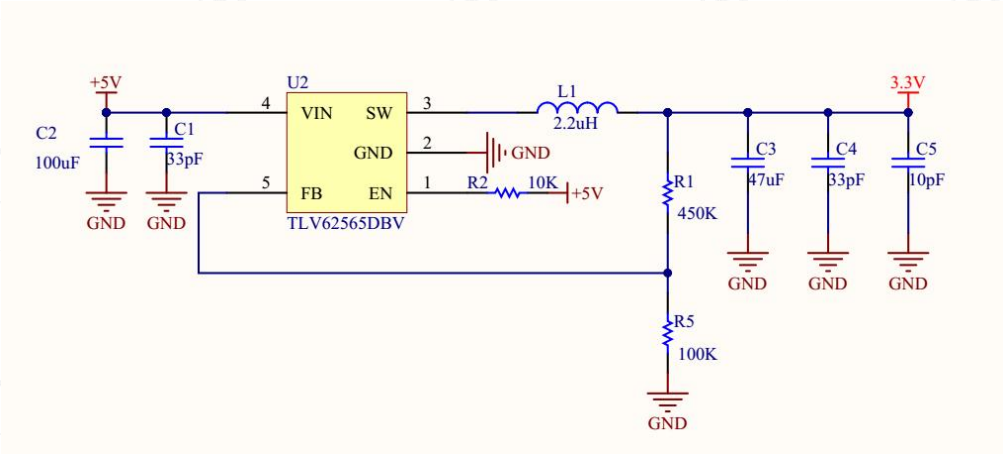


Figure 2：DC-DC Circuit Diagram

2.3. SPI interface

Table 5：SPI signal definition

Name	Pin	I/O property	Function	Voltage
SX_SCK	45	DI	SPI clock signal input	3.3V
SX_MISO	47	DO	SPI data output	3.3V
SX_MOSI	49	DI	SPI data input	3.3V
SX_CSN	51	DI	SPI chip select signal input	3.3V

The main control SPI needs to support full duplex, please refer to the Datasheet of SX1302 for the specific timing.

Copyright ©2012–2026，Chengdu Ebyte Electronic Technology Co.,Ltd

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

2.4. Control signal

Table 6：Control signal pins definition

Name	Pin	I/O property	Function	Voltage
PPS	11	DI	GPS 授时输入	3.3V
NRESET	22	DI	复位控制管脚	3.3V
RX_ON	42	DO	RX 信号指示	3.3V
TX_ON	44	DO	TX 信号指示	3.3V
CFG_ON	46	DO	CFG 信号指示	3.3V

2.4.1. PPS signal

Supports GPS-PPS input for receiving time-stamped packets.

2.4.2. NRESET signal

The external control circuit can realize the reset of the module. Pull up the NRESET interface level for 0.05~0.2s and then release it to reset the module. The NRESET signal is sensitive to interference, and the wiring on the module interface board should be as short as possible, and it should be grounded.

2.4.3. RX_ON signal

connected to the GPIO3 of SX1302.

2.4.4. TX_ON signal

connected to the GPIO5 of the SX1302.

2.4.5. CFG_ON signal

When the module successfully configures the parameters, the pin outputs a high level, and the onboard LED lights up at the same time, and is connected to the GPIO of the SX1302.

2.4.6.TX_LED indicator light

The LED lights when the module is in the emission state.

2.4.7.RX_LED indicator light

The LED lights when the module is in the receiving state.

Copyright ©2012–2026，Chengdu Ebyte Electronic Technology Co.,Ltd

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

3 Antenna interface

The antenna connection seat of the module adopts the I-PEX 1st generation interface. Figure 3 shows the dimensions of the RF connector in mm.

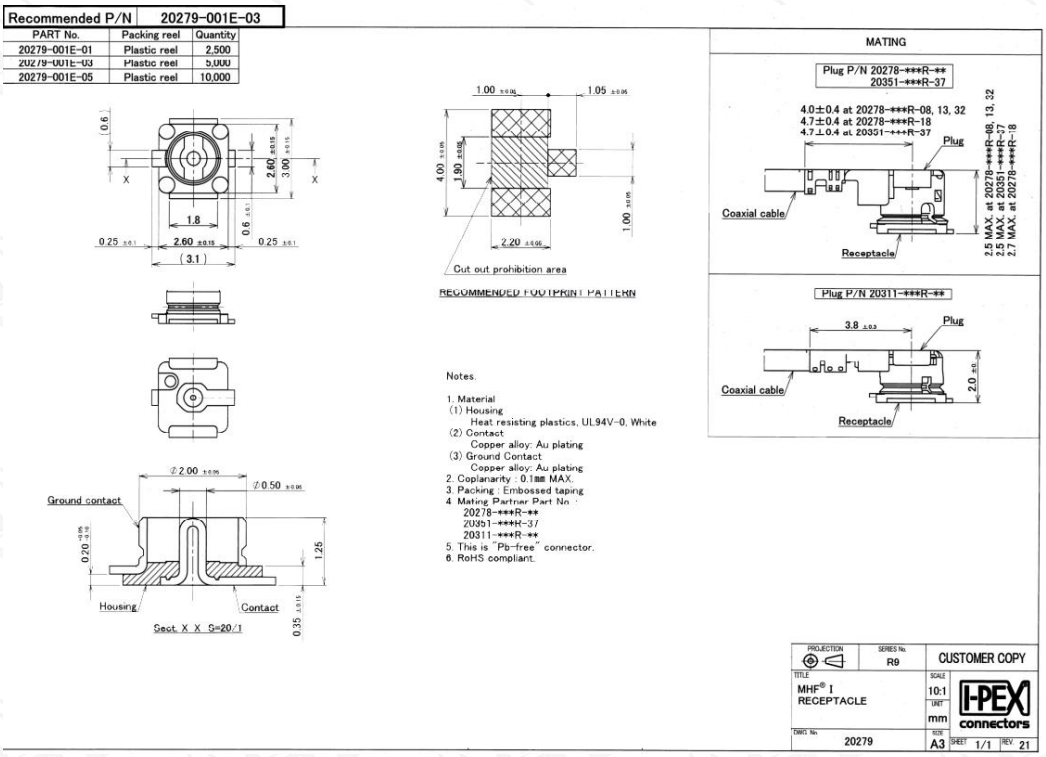


Figure 3: Dimensions of the RF Connector

Copyright ©2012–2026，Chengdu Ebyte Electronic Technology Co.,Ltd

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

4 Interface Electrical and RF Performance

4.1. Power Characteristics

The E106-433G27P2 module is powered by 3.3V, the input voltage is 3.3V±9%, and the power supply input must meet the current supply capacity of at least 500mA. The module input current requirements are shown in the table below:

Table 7：power input range

Parameter	Description	Min.	Typ.	Max.	Unit
VCC	Module supply voltage	3.0	3.3	3.6	V

4.2. IO interface characteristics

Table 8：IO Interface electrical characteristics

Parameter	Description	Min.	Max.	Unit
VIH	Input high level voltage	0.7*VCC	VCC+0.3	V
VIL	Input low level voltage	-0.3	0.3*VCC	V
VOH	Output high level voltage	VCC-0.5	VCC	V
VOL	Output low level voltage	0	0.4	V

4.3. Working current

Table 9：Working current

Parameter	Working condition	Typ.	Unit
RX	Enable receive, disable TX	54	mA
TX/RX	Turn on receive, turn on TX@25dBm	360	mA
IDLE	idle mode	27	mA

Copyright ©2012–2026，Chengdu Ebyte Electronic Technology Co.,Ltd

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

4.4. RF performance

Table 10： RF module transmitting power

Working frequency	Max power	Unit
505.5MHz	26	dBm
868.5MHz	TBD	dBm
915.5MHz	TBD	dBm

Table 11：RF Receive Sensitivity

Working Frequency	Spreading Factor （BW=125KHZ）	Receive Sensitivity (Typical Value dBm)
475.5MHz	SF=5	-121
	SF=7	-127
	SF=12	-141
868.5MHz	SF=5	TBD
	SF=7	TBD
	SF=12	TBD
915.5MHz	SF=05	TBD
	SF=07	TBD
	SF=12	TBD

Copyright ©2012–2026，Chengdu Ebyte Electronic Technology Co.,Ltd

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

5 Dimensions

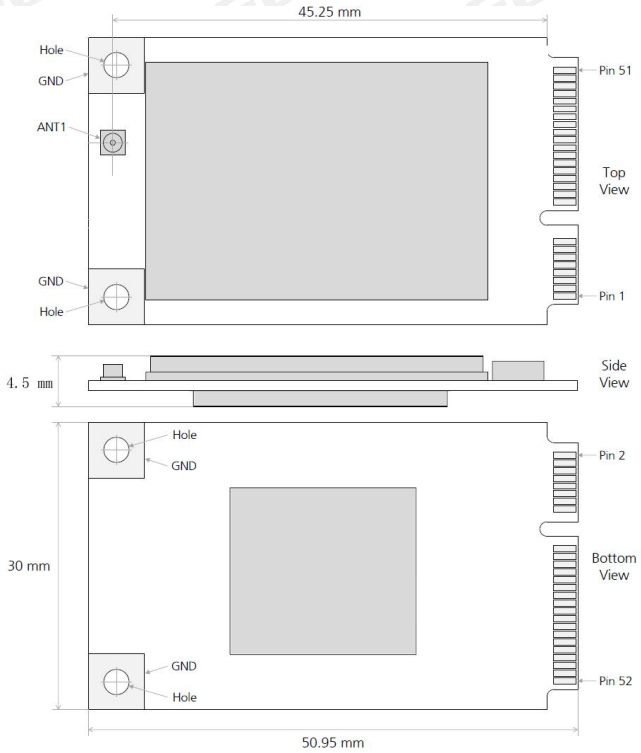
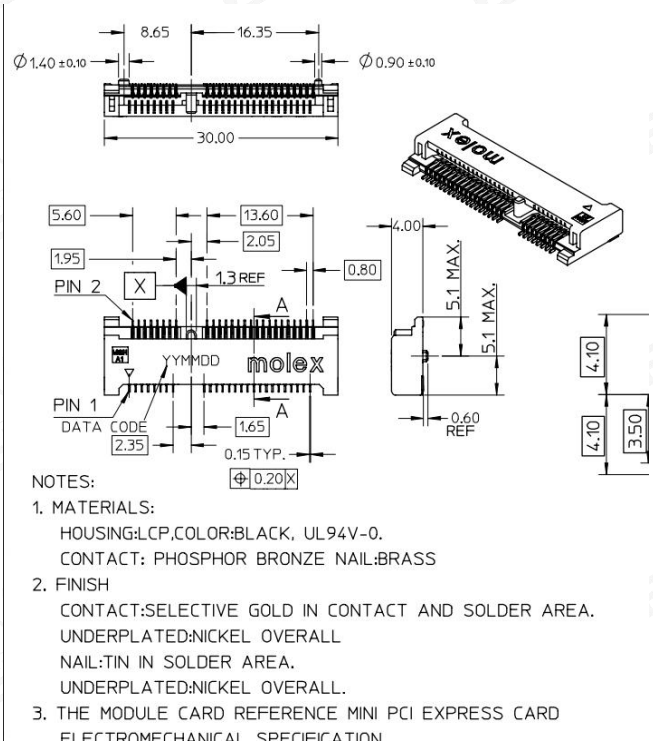


Figure 4：E106-433G27P2 Module size

Any standard PCI Express Mini Card connector can be used with this module, such as the 679100002 connector of Molex Company as shown in the figure below.



Copyright ©2012–2026，Chengdu Ebyte Electronic Technology Co.,Ltd

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Figure 5：Mini PCI Express connector

6 Internal connection

The following figure is the internal connection diagram of E106-433G27P2 for reference.

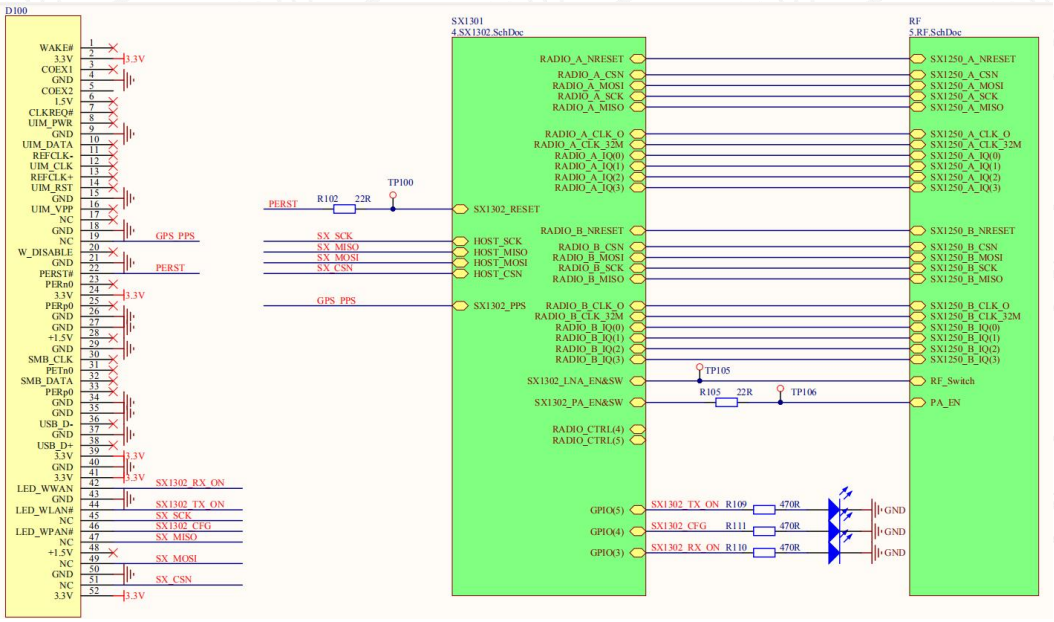


Figure 6：E106-433G27P2 internal connection

Copyright ©2012–2026，Chengdu Ebyte Electronic Technology Co.,Ltd

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

7 Reference design

E106-433G27P2 uses SPI interface to connect with the main control, and uses DC-DC to supply power to the module. Users can modify it according to their needs.

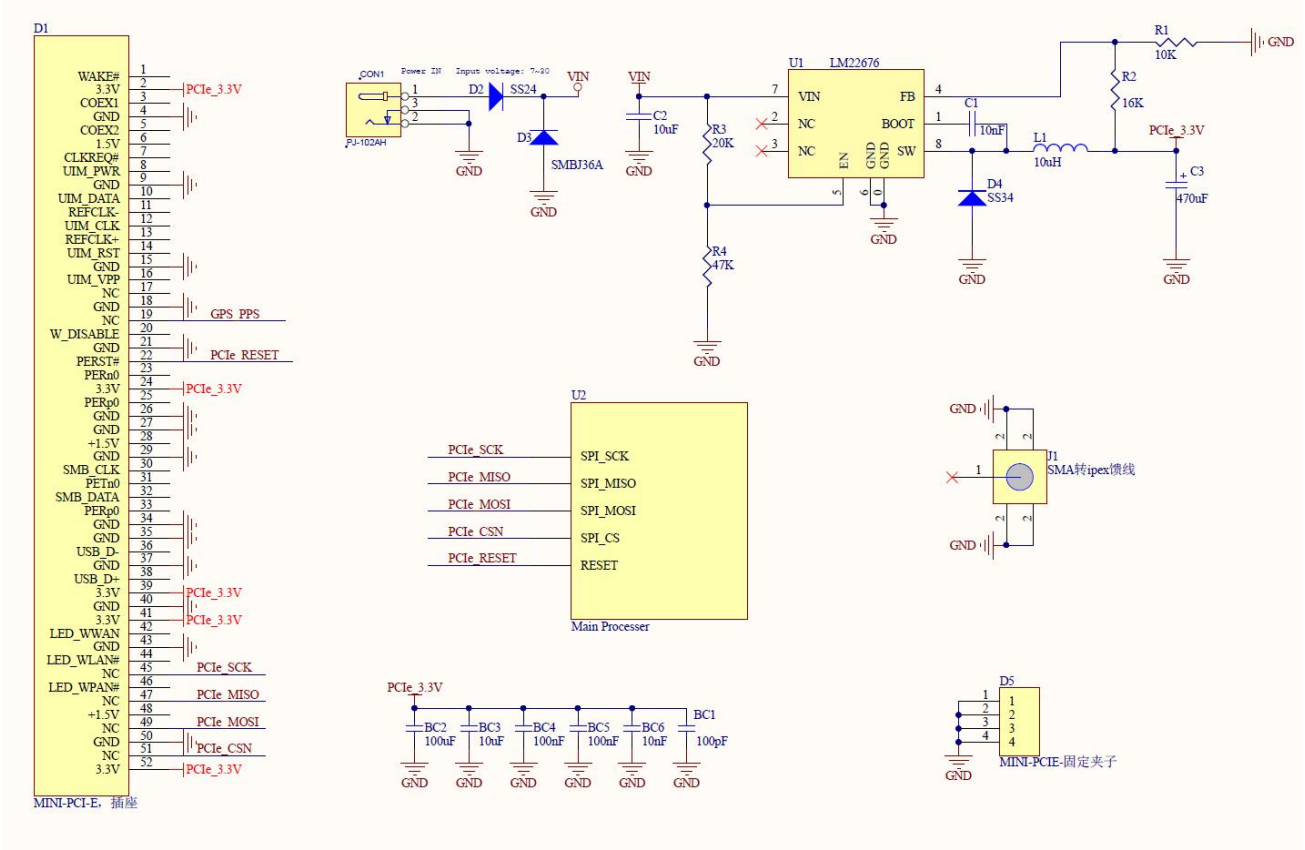


Figure 7：E106-433G27P2 reference design

About us

Technical support: support@cdebyte.com

Documents and RF Setting download link:： https://www.cdebyte.com

Thank you for using Ebyte products! Please contact us with any questions or suggestions: info@cdebyte.com

---

Web:https://www.cdebyte.com

Address: B5 Mould Park, 199# Xiqu Ave, High-tech District, Sichuan, China

Chengdu Ebyte Electronic Technology Co.,Ltd.

Copyright ©2012–2026，Chengdu Ebyte Electronic Technology Co.,Ltd

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000