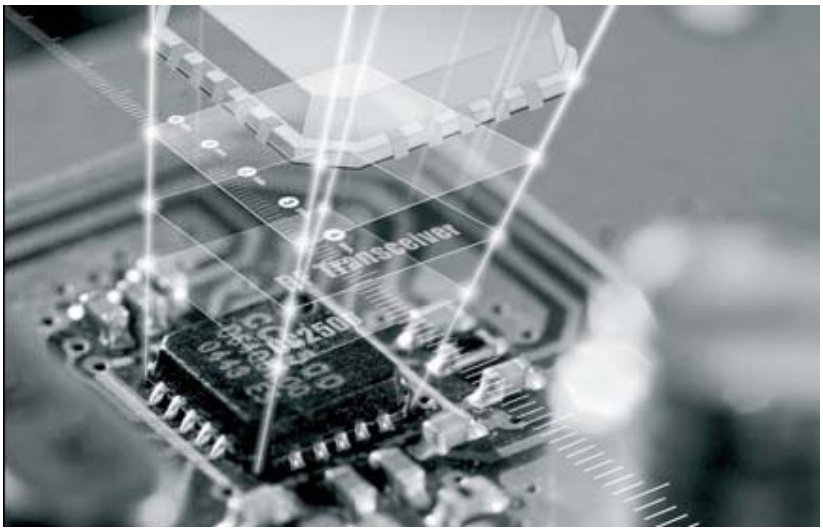
Bluetooth 4.0 Low Energy Module for System-on-Chip Solution



Model : **BLE SoC RF Module**
Part No : **nROBLE822-Fxxx**
Version : V1.0
Date : 2014.1.24

■ Application

- **Computer peripherals and I/O devices**
  Mouse
  Keyboard
  Multi-touch trackpad

- **Interactive entertainment devices**
  Remote control
  3D Glasses
  Gaming controller

- **Personal Area Networks**
  Health/fitness sensor and monitor devices
  Medical devices
  Key-fobs + wrist watch

- **Remote control toys**

■ Selection Guide

Description：Ultra-low-power Bluetooth Low Energy/ 2.4-GHz RF SoC

Part No. ：nROBLE822-F**xxx**

128/256 KB in-system Programmable Flash
822: Chip solution nRF51822

■ Absolute Maximum Ratings

Caution! ESD sensitive device. Precaution should be used when handling the device in order to prevent permanent damage.

Symbol	Parameter	Min.	Max.	Unit
Supply voltages				
VDD		-0.3	+3.6	V
DEC2[1]			2	V
VSS			0	V
I/O pin voltage				
VIO		-0.3	VDD + 0.3	V
Environmental QFN48 package				
Storage temperature		-40	+125	℃
MSL	Moisture Sensitivity Level		2	
ESD HBM	Human Body Model		4	kV
ESD CDM	Charged Device Model		750	V

1. Force in low voltage mode

■ General Operation Characteristics

Symbol	Parameter	Notes	Min.	Typ.	Max.	Units
VDD	Supply voltage, normal mode		1.8	3.0	3.6	V
VDD	Supply voltage, normal mode, DC/DC converter output voltage 1.9 V		2.1	3.0	3.6	V
VDD	Supply voltage, low voltage mode	1	1.75	1.8	1.95	V
t_{R_VDD}	Supply rise time (0 V to 1.8 V)	2			60	ms
T_A	Operating temperature		-25	25	75	℃

■ Radio Transceiver

● Current Consumption

Symbol	Description	Note	Min.	Typ.	Max.	Units	Test level
f_{OP}	Operating frequencies	1 MHz channel spacing	2400		2483	MHz	N/A
PLL_{res}	PLL programming resolution			1		MHz	N/A
Δf250	Frequency deviation @ 250 kbps			±170		kHz	2
Δf_{1M}	Frequency deviation @ 1 Mbps			±170		kHz	2
Δf_{2M}	Frequency deviation @ 2 Mbps			±320		kHz	2
Δf_{BLE}	Frequency deviation @ BLE		±225	±250	±275	kHz	4
bps_{FSK}	On-air data rate		250		2000	kbps	N/A

● Current Consumption

Symbol	Description	Note	Min.	Typ.	Max.	Units	Test level
$I_{TX,+4dBm}$	TX only run current @ P_{OUT} = +4 dBm	1		16		mA	4
$I_{TX,0dBm}$	TX only run current @ P_{OUT} = 0 dBm	1		10.5		mA	4
$I_{TX,-4dBm}$	TX only run current @ P_{OUT} = -4 dBm	1		8		mA	2
$I_{TX,-8dBm}$	TX only run current @ P_{OUT} = -8 dBm	1		7		mA	2
$I_{TX,-12dBm}$	TX only run current @ P_{OUT} = -12 dBm	1		6.5		mA	2
$I_{TX,-16dBm}$	TX only run current @ P_{OUT} = -16 dBm	1		6		mA	2
$I_{TX,-20dBm}$	TX only run current @ P_{OUT} = -20 dBm	1		5.5		mA	2
$I_{TX,-30dBm}$	TX only run current @ P_{OUT} = -30 dBm	1		5.5		mA	2
$I_{START,TX}$	TX startup current	2		7		mA	1
$I_{RX,250}$	RX only run current @ 250 kbps			12.6		mA	1
$I_{RX,1M}$	RX only run current @ 1 Mbps			13		mA	4
$I_{RX,2M}$	RX only run current @ 2 Mbps			13.4		mA	1
$I_{START,RX}$	RX startup current	3		8.7		mA	1

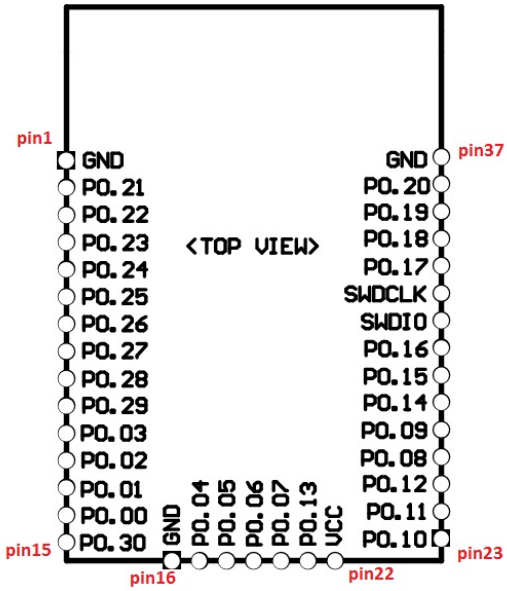
● Transmitter Specification

Symbol	Description	Min.	Typ.	Max.	Units	Test level
P_{RF}	Maximum output power		4		dBm	4
P_{RFC}	RF power control range	20	24		dB	2
PRFCR	RF power accuracy			±4	dB	1

● Receiver Specification

Symbol	Description	Min.	Typ.	Max.	Units	Test level
Receiver operation						
PRX_{MAX}	Maximum received signal strength at < 0.1% PER		0		dBm	1
$PRX_{SENS,2M}$	Sensitivity (0.1% BER) @ 2 Mbps		-85		dBm	2
$PRX_{SENS,1M}$	Sensitivity (0.1% BER) @ 1 Mbps		-90		dBm	2
$PRX_{SENS,250k}$	Sensitivity (0.1% BER) @ 250 kbps		-96		dBm	2

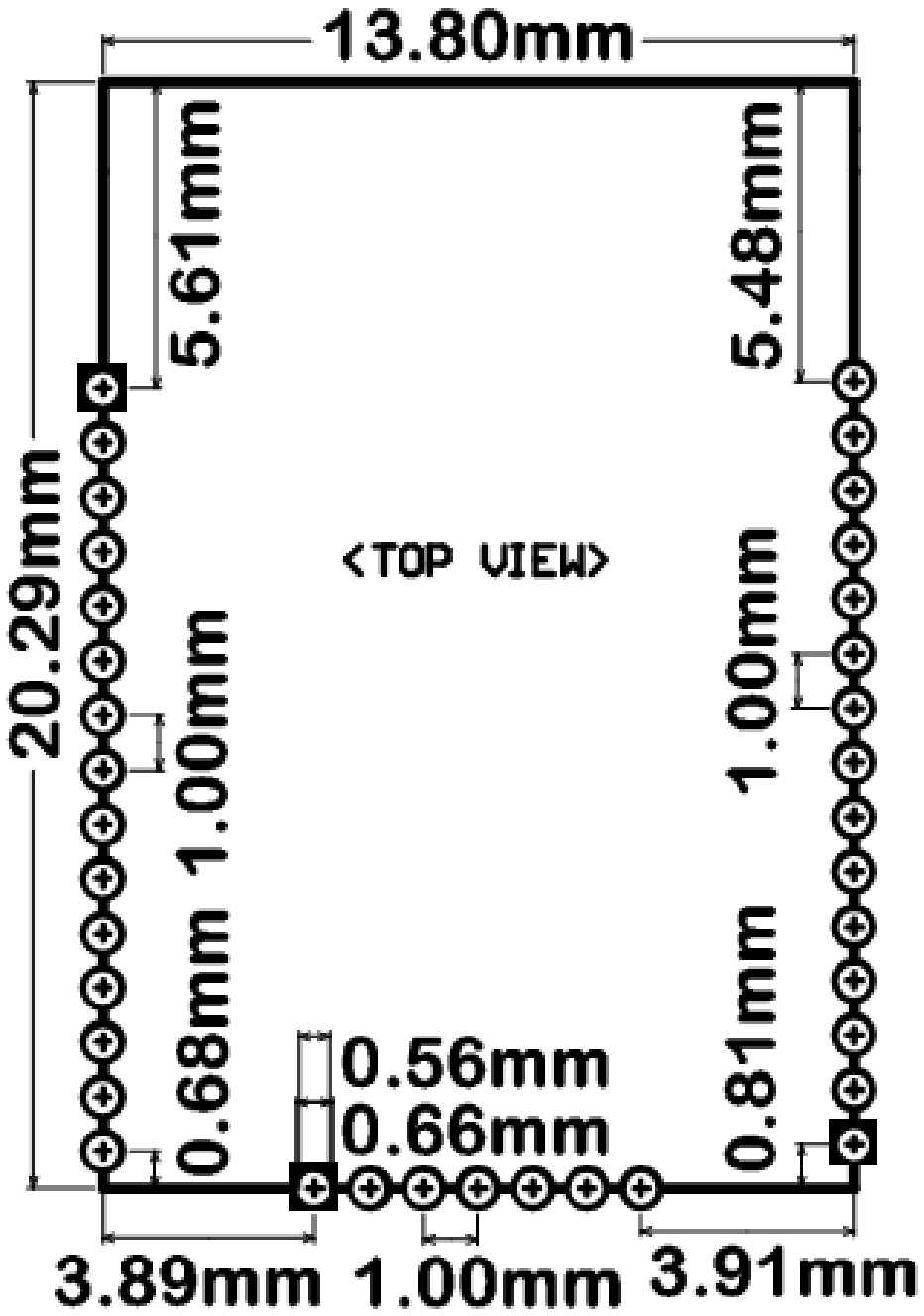
■ nROBLE822-Fxxx RF Module Pin Configuration



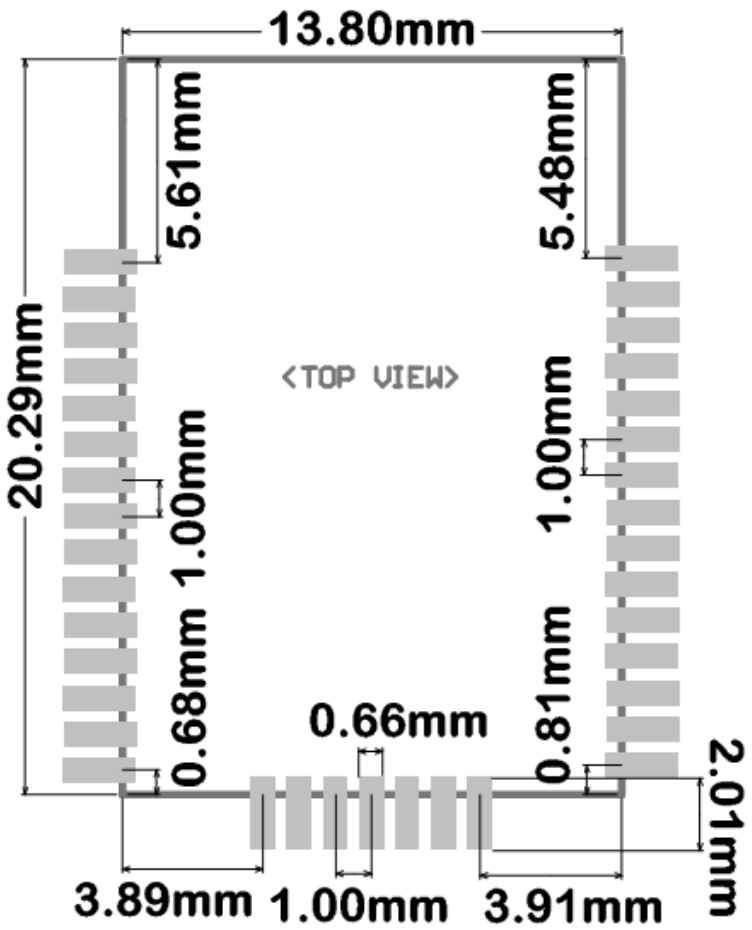
Pin #.	Pin Name	Pin Type	Description
1	GND	GND	Ground
2	P0.21	General purpose I/O	General purpose I/O
3	P0.22	General purpose I/O	General purpose I/O
4	P0.23	General purpose I/O	General purpose I/O
5	P0.24	General purpose I/O	General purpose I/O
6	P0.25	General purpose I/O	General purpose I/O
7	P0.26	General purpose I/O	General purpose I/O
8	P0.27	General purpose I/O	General purpose I/O
9	P0.28	General purpose I/O	General purpose I/O
10	P0.29	General purpose I/O	General purpose I/O
11	P0.03	General purpose I/O	General purpose I/O
12	P0.02	General purpose I/O	General purpose I/O
13	P0.01	General purpose I/O	General purpose I/O
14	P0.0	General purpose I/O	General purpose I/O
15	P0.30	General purpose I/O	General purpose I/O
16	GND	GND	Ground
17	P0.04	General purpose I/O	General purpose I/O
18	P0.05	General purpose I/O	General purpose I/O
19	P0.06	General purpose I/O	General purpose I/O
20	P0.07	General purpose I/O	General purpose I/O
21	P0.13	General purpose I/O	General purpose I/O
22	VCC	POWER	Power supply
23	P0.10	General purpose I/O	General purpose I/O
24	P0.11	General purpose I/O	General purpose I/O
25	P0.12	General purpose I/O	General purpose I/O

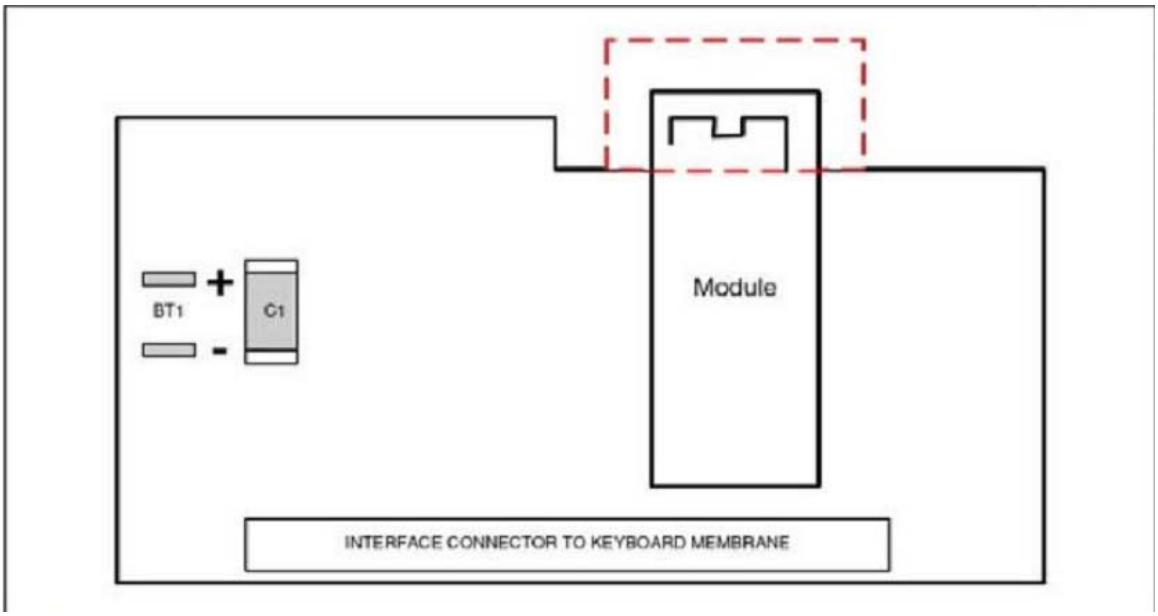
Pin #.	Pin Name	Pin Type	Description
26	P0.08	General purpose I/O	General purpose I/O
27	P0.09	General purpose I/O	General purpose I/O
28	P0.14	General purpose I/O	General purpose I/O
29	P0.15	General purpose I/O	General purpose I/O
30	P0.16	General purpose I/O	General purpose I/O
31	SWDIO	Digital I/O	System reset / HW debug and Flash programming IO
32	SWDCLK	Digital Input	HW debug and Flash programming IO
33	P0.17	General purpose I/O	General purpose I/O
34	P0.18	General purpose I/O	General purpose I/O
35	P0.19	General purpose I/O	General purpose I/O
36	P0.20	General purpose I/O	General purpose I/O
37	GND	GND	Ground

■ nROBLE822-Fxxx Module Demension



■ TC2530-PAFxxx Module layout Suggestion





■ Document History

Revision	Date	Description/Changes
1.0	2014.1.22	First release

Rm. 4, 7F., No.14, Ln. 609, Sec. 5, Chongxin Rd., Sanchong Dist., New Taipei City 24159, Taiwan (R.O.C.)

TEL:+886-2-2992-1360

FAX:+886-2-2999-9268