Bluetooth ® 4.0 Low Energy Module

EYSFCNZXX

Bluetooth® 4.0 Low Energy

Brief Data Report

TAIYO YUDEN

EYSFCNZXX

Document constituent list

Rev. record

29-Nov.-2013 > Ver.1.0 Release
04-Feb.-2014 > Ver.1.1 Update
10-Mar.-2014 > Ver.1.11 Update

EYSFCNZXX

Control No.		Control name
HD-AG-A121277	(1/1)	General Items

Scope
This specification ("Specification") applies to the hybrid IC "EYSFCNZXX", a ***Bluetooth***® 4.0 Low Energy module ("Product") manufactured by TAIYO YUDEN Co., Ltd. ("TAIYO YUDEN")

1. Model: EYSFCN
   Version Code: EYSFCNZXX
   Digit3: Customer Code ex) S: TAIYO YUDEN Standard
   Digit8: Firmware Code ex) X: TAIYO YUDEN Standard
   *Version Code may be changed for mass production or other cases.

2. Function:
   Radio frequency module. ***Bluetooth***® standard Ver 4.0 Low Energy conformity

3. Application: Health & Fitness Equipment, Sensor, Toys

4. Structure: Hybrid IC loaded with silicon monolithic semiconductor
   Hybrid IC loaded with silicon monolithic semiconductor
   Compatible with industrial standard reflow profile for Pb-free solders
   Can meet with RoHS compliance (Pb, Cd, Hg, Cr^{+6}, PBB, PBDE)

5. Outline: 12.9x 9.6 x 2.0 mm
   49-pin Land Grid Array

6. Marking: Part number, Lot number, Japan ID, FCC ID, IC ID

7. Features:
   - Small outline by PCB substrate
   - Low power consumption
   - Integrated antenna
   - Integrated system and sleep clock
   - ***Bluetooth***® 4.0 Low Energy conformity
     - Slave Role

8. Packaging:
   Packaging method: Tape & reel + aluminum moisture barrier bag
   Packaging unit: 1000
   *It might be provided as tray at sample stage.

Control No.	Control name
HD-AM-A121277 (1/1)	Absolute maximum ratings

Absolute maximum ratings

Symbol	Parameter	Min.	Max.	Units
VCC_NRF		-0.3	+3.6	V
GND			0	V
VIO		-0.3	VCC_NRF+ 0.3	V
Storage temperature		-40	+125	Deg-C
MSL	Moisture Sensitivity Level	2		
ESD HBM	Human Body Model		1	kV
ESD CDM	Charged Device Model		100	V
Endurance	Flash Memory Endurance	20000		write/erase cycles
Retention	Flash Memory Retention	10 years		At 40 deg-C
Number of times an address can be written between erase cycles			2	times

Control No.	Control name
HD-AE-A121277 (1/1)	Electrical characteristics

Electrical characteristics

Recommendation operating range

Symbol	Parameter	Min.	Typ.	Max.	Units
VCC_NRF	Supply voltage, normal mode	1.8	3.0	3.6	V
VCC_NRF	Supply voltage, normal mode, DC/DC converter output voltage 1.9 V	2.1	3.0	3.6	V
tR_VCC_NRF	Supply rise time (0V to 1.8V)			60	ms
TA	Operation temperature	-25	25	75	Deg-C

The on-chip power-on reset circuitry may not function properly for rise times outside the specified interval.

DC Specifications

The Specification applies for Topr.= 25 degrees C, VCC_NRF = 3.0V

Symbol	Parameter (condition)	Min.	Typ.	Max.	Units
ITX,+4dBm	TX only run current @ POUT =+4 dBm		16		mA
ITX,0dBm	TX only run current @ POUT = 0 dBm		10.5		mA
IRX	RX only run current		13		mA
IOFF	Current in SYSTEM-OFF, no RAM retention		0.4		uA
ION	SYSTEM-ON base current		2.3		uA

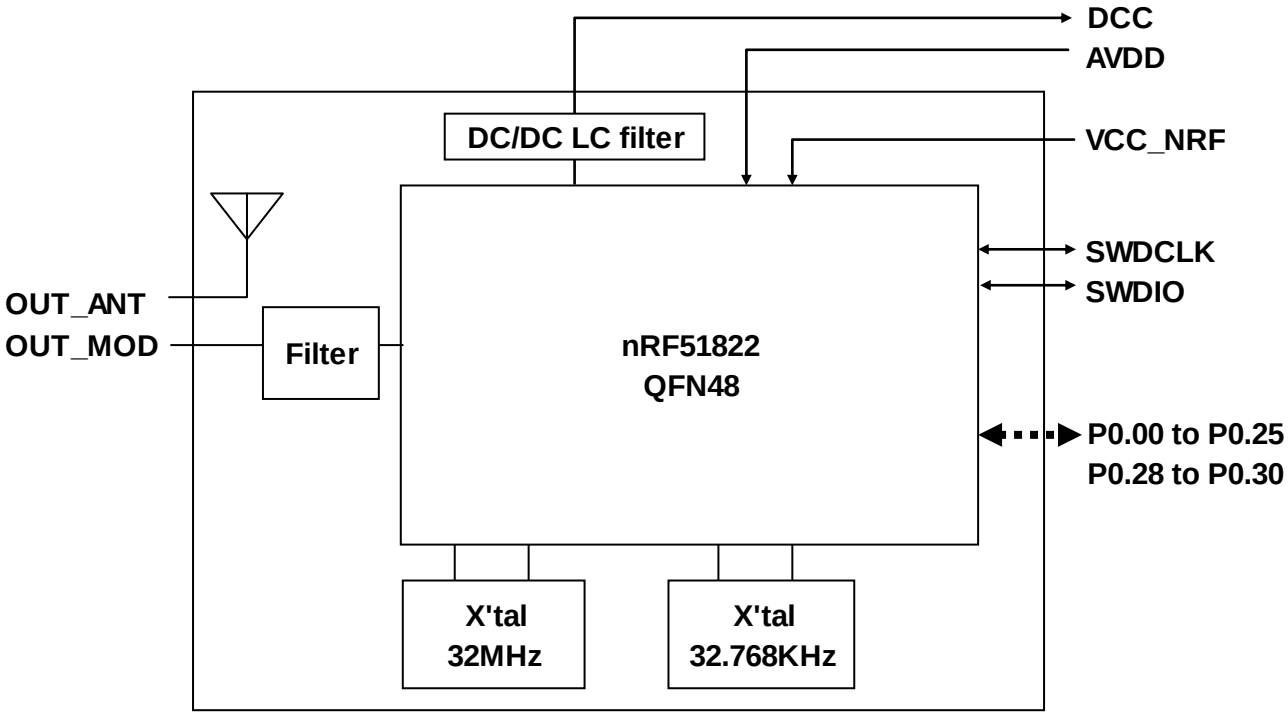
Internal DC/DC converter operation is not recommended due to long startup time.
Please refer to chapter 11 on "nRF51 Series Reference Manual v2.1" by Nordic Semiconductor for more information regarding DC/DC converter characteristics.

RF Specifications

Symbol	Description	Min.	Typ.	Max.	Units
Fop	Operating frequencies	2402		2480	MHz
PRF	Maximum output power		4		dBm
PRXMAX	Maximum received signal strength at < 0.1% PER		0		dBm
PSENS IT	Receiver sensitivity (0.1% BER) Ideal transmitter		-93		dBm

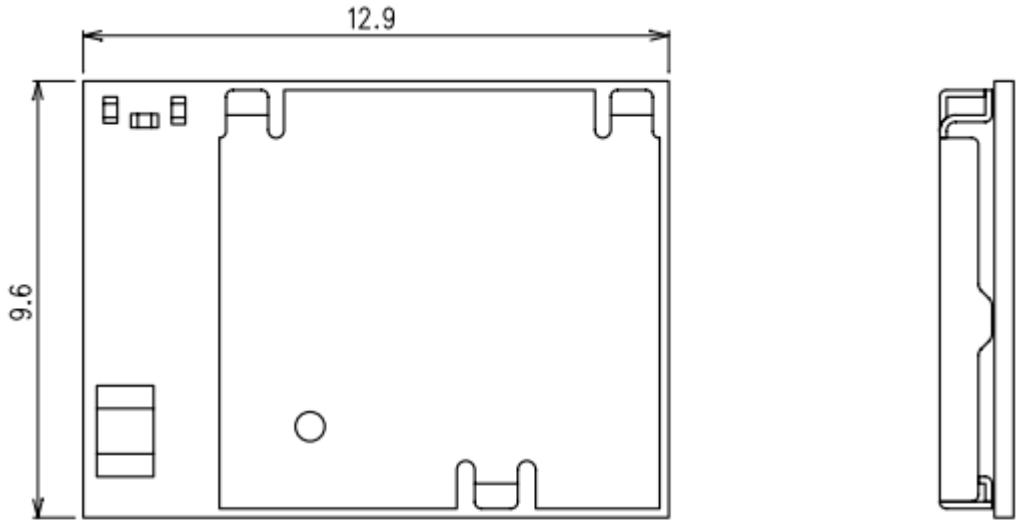
Control No.		Control name
HD-MC-A121277	(1/1)	Circuit Schematic

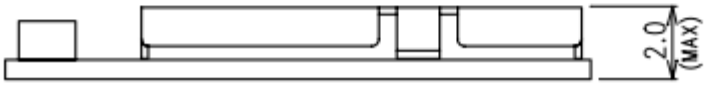
Block Diagram



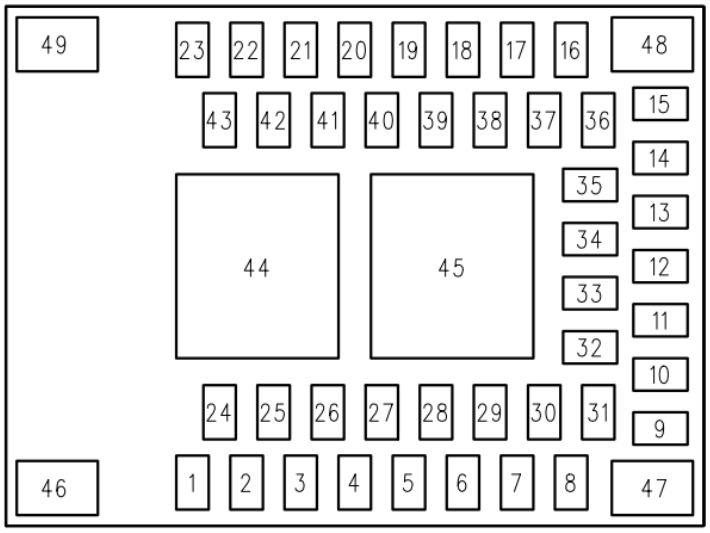
EYSFCNZXX

Control No.	Control name
HD-AD-A121277 (1/1)	Outline/Appearance





Tolerance: +/- 0.2mm
Unit : (mm)



Control No.		Control name
HD-BA-A121277	(1/2)	Pin Layout

Pin Descriptions

Pin	Pin name	Pin function	Description
1	DCC	Power	DC/DC output (built-in LC for DC/DC)
2	AVDD	Power	Analog Power supply
3	GND	Ground	Ground (0 V)
4	VCC_NRF	Power	Power supply
5	GND	Ground	Ground (0 V)
6	P0.00 AREF0	Digital I/O Analog input	General purpose I/O pin ADC Reference voltage
7	P0.01 AIN2	Digital I/O Analog input	General purpose I/O pin ADC input 2
8	P0.02 AIN3	Digital I/O Analog input	General purpose I/O pin ADC input 3
9	P0.06 AIN7 AREF1	Digital I/O Analog input Analog input	General purpose I/O pin ADC input 7 ADC Reference voltage
10	P0.05 AIN6	Digital I/O Analog input	General purpose I/O pin ADC input 6
11	P0.04 AIN5	Digital I/O Analog input	General purpose I/O pin ADC input 5
12	P0.03 AIN4	Digital I/O Analog input	General purpose I/O pin ADC input 4
13	GND	Ground	Ground (0 V)
14	SWDIO	Digital I/O	System reset (active low). Also HW debug and flash programming I/O
15	SWDCLK	Digital input	HW debug and flash programming I/O
16	P0.17	Digital I/O	General purpose I/O pin
17	P0.19	Digital I/O	General purpose I/O pin
18	P0.21	Digital I/O	General purpose I/O pin
19	P0.23	Digital I/O	General purpose I/O pin
20	P0.25	Digital I/O	General purpose I/O pin
21	GND	Ground	Ground (0 V)
22	OUT_MOD	RF In/Out	RF I/O pin. It should be connected to Pin 23 OUT_ANT for normal operation.

Control No.		Control name
HD-BA-A121277	(2/2)	Pin Layout

Pin	Pin name	Pin function	Description
23	OUT_ANT	Antenna In/Out	Internal antenna. It should be connected to Pin 22 OUT_MOD for normal operation.
24	P0.28	Digital I/O	General purpose I/O pin
25	P0.29	Digital I/O	General purpose I/O pin
26	P0.30	Digital I/O	General purpose I/O pin
27	P0.07	Digital I/O	General purpose I/O pin
28	P0.11	Digital I/O	General purpose I/O pin
29	P0.10	Digital I/O	General purpose I/O pin
30	P0.09	Digital I/O	General purpose I/O pin
31	P0.08	Digital I/O	General purpose I/O pin
32	P0.12	Digital I/O	General purpose I/O pin
33	P0.13	Digital I/O	General purpose I/O pin
34	P0.14	Digital I/O	General purpose I/O pin
35	P0.15	Digital I/O	General purpose I/O pin
36	P0.16	Digital I/O	General purpose I/O pin
37	P0.18	Digital I/O	General purpose I/O pin
38	P0.20	Digital I/O	General purpose I/O pin
39	P0.22	Digital I/O	General purpose I/O pin
40	P0.24	Digital I/O	General purpose I/O pin
41 to 45	GND	Ground	Ground (0 V)
46	NC	Not Connected	Isolated pad on PCB for mechanical stability
47 to 48	GND	Ground	Ground (0 V)
49	NC	Not Connected	Isolated pad on PCB for mechanical stability