DRF1212D10N
10dBm Mesh Network Node Module V1.02

Features

- FSK Network Node Module
- 433Mhz ISM frequency band
- 5K bps FSK data rate
- Multiple channels
- 10dBm Max. output power
- Baud rate configurable
- Net ID configurable
- Standby current < 1.5uA
- Supply voltage 2.1~3.6V

Application

- Home automation
- Automatic meter reading
- Wireless data logger
- Wireless sensor network

DESCRIPTION

DRF1212D10N is a low-cost sub-1 GHz transceiver module designed for operations in the unlicensed ISM (Industrial Scientific Medical) and LPRD bands. FSK (Frequency Shift Keying) modulation/demodulation, multi-channel operation, high bandwidth efficiency and anti-blocking performance make DRF1212D10N modules easy to realize the robust and reliable wireless link.

The module can be configured to work in different channels and different Net ID which make multiple networks coexist possibly. It adopts high efficient looped interleaving EDAC (Error Detection and correction) coding with coding gain up to 3dB which keeps in advance in error correction and coding efficiency over normal FEC (Forward Error Correction) coding. Because of its high reliability in correction, modules can filter error and fake information automatically and realize truly transparent wireless link, which makes DRF1212D10N very suitable in the rigid communication environment.

DRF1212D10N module adopts 4 bytes Node ID and 2 bytes Net ID. Under the commanding of concentrator module DRF1212D17C, the MNET network can support up to 1024 node modules with 6 levels of routing.

PIN FUNCTIONS

PIN	Name	Function	Description
1	SGND	Ground	Sensor ground
2	TXD	Output	UART output, TTL level
3	RXD	Input	UART input, TTL level; pull-up resistor:47K Ohm
4	BATT	Power	Positive power supply
5	BATT	Power	Connecting with Pin 4 internally
6	GND	Ground	Ground (0V)

Table 1 DRF1212D10N Pin functions

ELECTRICAL SPECIFICATIONS

Symbol	Parameter (condition)	Min.	Typ.	Max.	Units
VCC	Supply Voltage	2.1		3.6	V
Temp	Operating temperature range	-20	25	70	℃
RH	Operating relative humidity	10		90	%
Freq	Frequency range	430		437	MHz
F_{DEV}	Modulation deviation		67		KHz
Mod	Modulation type		FSK		
I_{DD}	Receive mode @1K bps Transmit mode @5K bps Receive mode @ polling Sleep mode		2.8 35 15 1.5		mA mA uA uA
Pout	Output power			10	dBm
Sen	Receiving sensitivity @5K bps		-107		dBm
DR_{IN}	UART data rate	1.2		57.6	Kbps
T_W	Wake-up time @5K bps		5		ms
T_S	Switching time		20		us
CH_{BW}	Channel spacing		200		KHz
Z_{ANT}	Antenna Impedance		50		Ohm

Table 2 DRF1212D10N Electrical Specifications

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Min.	Max.	Units
VCC	Supply Voltage	-0.3	3.7	V
V_I	Input voltage	-0.3	VCC+0.3	V

V_O	Output voltage	-0.3	VCC+0.3	V
T_{ST}	Storage temperature	-55	125	℃

Table 3 DRF1212D10N Maximum Ratings

APPLICATION INFORMATION

1. Coding Format

PREAMBLE	SYNCWORD	ID	DATA+FEC+CRC

Table 4 DRF1212D10N Coding Format

The preamble is alternative "1010" codes which is used to make the clock of receiver synchronous with transmitter. In normal conditions, 32 bits preamble is enough for use. When DRF1212D10N works in power-saving mode, the preamble also can be functioned to wake up the receiver and it must be long enough in order to obtain such a function.

If the receiver is configured to wake up at the interval of one second, it wakes up and searches the preamble (T_W) every other second and lasting 16 bits. The transmitter must send preamble longer than 1 second and then send synchronous word, which means the receiver can detect the preamble and wake up receiver successfully.

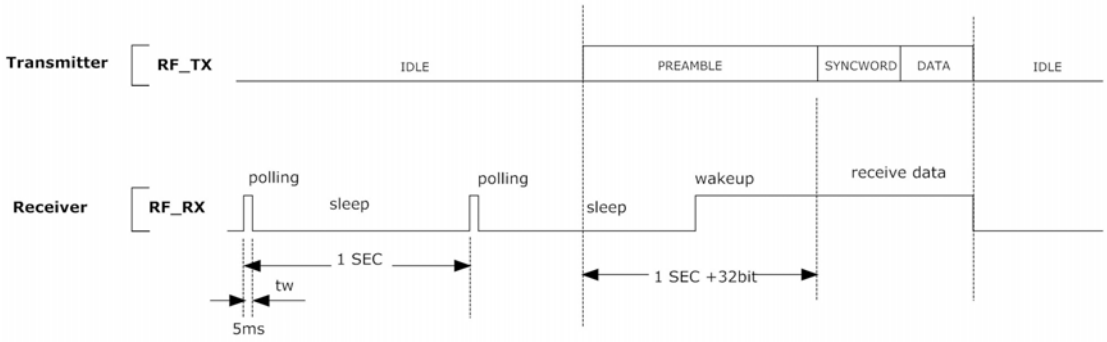

Figure 1: DRF1212D10N Timing Sequence

2. Parameter Setting

Users can configure the parameters of DRF1212D10N modules by software tool. The interface of module is UART/TTL. If connecting it to PC, users need to use a TTL-to-RS232 level converter to transform the levels. Dorji Applied Technologies also provides converter board for configuration. Firstly users need to insert module into converter board and connect converter board to PC, then open DORJI RF software. After that the status column of tool should display "Found Device". Users then can read/write the module. For more details, please check the operation manuals of converter boards on accessory page.

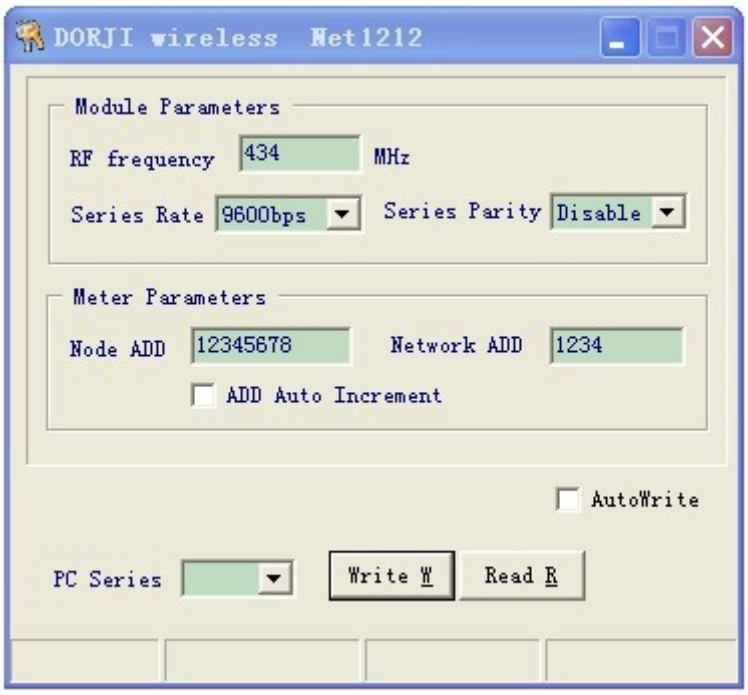

Figure 2: DORJI RF TOOL

3. Applications

The connection diagram between DRF1212D10N and terminal equipment is showed as below. The Pin 4 and Pin 5 are connected together internally. In normal status the Pin 1 (SGND) is in high level. When DRF1212D12N receive the command from concentrator module, the SGND will be in low level. Since the SGND pin can accept 20mA drive-in current, users can take advantage of it by connecting the positive port of Optical module to BATT and negative port of it to SGND pin. When receiving read command, the SGND pin will be at low level, the Optical module begins to work and sends data through its TXD pin to DRF1212D10N module. The DRF1212D10N will add the value of present battery voltage in the last byte of data package and send it back to concentrator module.

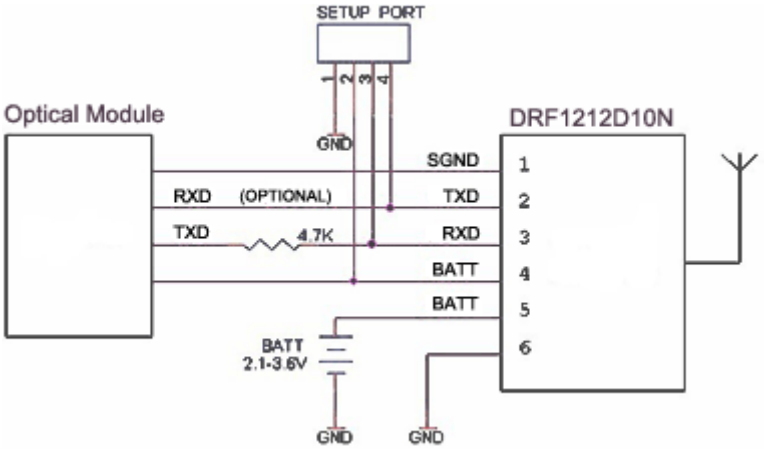

Figure 3: DRF1212D10N with Optical Module

DRF1212D10N integrates 12-bit high resolution AD converter so the Pin 1 (RXD) can be used as AD sampling to measure temperature or other analogue parameters.

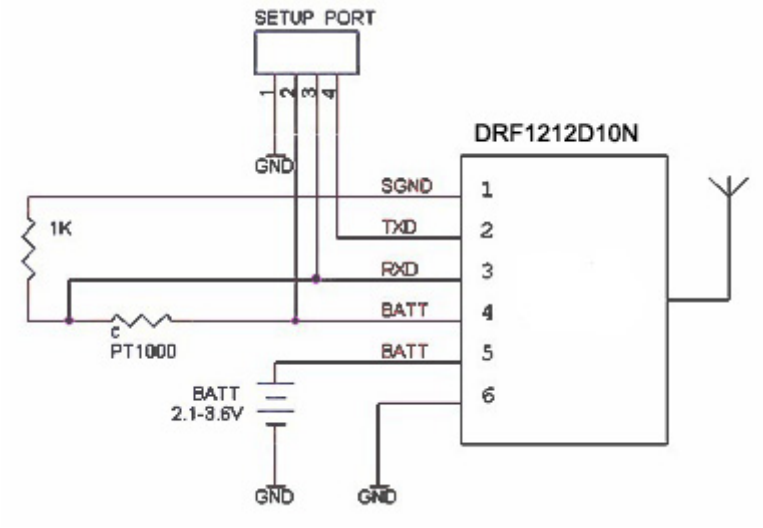

Figure 3: DRF1212D10N with Sensor Module

Mechanical Data

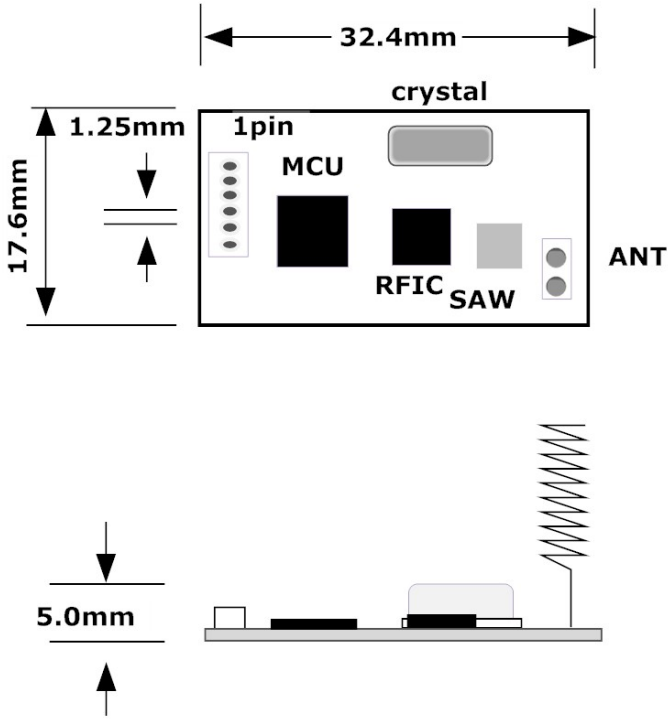

Figure 5: Mechanical Data

Ordering Information

DRF 1212 D 10 N — 043 D
① ② ③④⑤ ⑥ ⑦

Num	Symbol	Meaning
①	Category	RF FSK module
②	IC Type	SX1212
③	Module Type	Data transmission
④	Power	10dBm output power
⑤	Module Function	Network node module
⑥	Frequency Band	043: 433MHz
⑦	Package	DIP package

Table 5 Ordering information

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