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PTR9022 *Multiprotocol ANT™/Bluetooth Low Energy Module Embedded ARM Cortex™ M0*

Features

➢ Worldwide 2.4GHz ISM Band，250 kbps/1 Mbps/2 Mbps on-air data rate options

➢ ARM® Cortex™-M0 32 bit processor, 256 kB flash memory, 16 kB RAM

➢ TX Power -20 to +4 dBm in 4 dB steps

➢ -90 dBm sensitivity in ANT mode

➢ -93 dBm sensitivity in Bluetooth® low energy mode

➢ 10.5 mA peak TX (0 dBm)，13 mA peak RX, RSSI (1 dBm resolution)

➢ Flexible real-time counter and Two 16 bit and one 24 bit timers with counter mode

➢ Rich set of digital interfaces including: SPI, 2-wire , and UART

➢ Programmable Peripheral Interconnect(PPI)

➢ 32.768Khz crystal on board

➢ 8/9/10 bit ADC - 8 configurable channels

➢ AES encryption/decryption accelerator

➢ Minimum Size about 26mmx19mm x2mm with Antenna，1.27mm pin pitch.

➢ The Module Design with nRF51422

Typical Applications:

• Personal Area Networks
• Health/fitness sensor and monitor devices
• Medical devices
• Key-fobs + wrist watches
• Remote control toys
• Home/industrial automation
• Environmental sensor networks
• Active RFID
• Logistics/goods tracking
• Audience-response systems
• Interactive entertainment devices
• Remote control
• 3D Glasses
• Gaming controller

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
$P_{SENS}IT$ 1 Mbps BLE	Receiver sensitivity: Ideal transmitter		-93		dBm	2
$P_{SENS}DT$ 1 Mbps BLE	Receiver sensitivity: Dirty transmitter		-91		dBm	2

Radio current consumption:

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

1. Average current consumption (at 0 dBm TX output power) for TX startup (130 μs), and when changing mode from RX to TX (130 μs).
2. Average current consumption for RX startup (130 μs), and when changing mode from TX to RX (130 μs).

CPU current consumption:

Symbol	Description	Min.	Typ.	Max.	Units	Test level
$I_{CPU, Flash}$	Run current @ 16 MHz, Executing code from flash memory		4.4^1		mA	2
$I_{CPU, RAM}$	Run current @ 16 MHz, Executing code from RAM		2.4^2		mA	1
$I_{START, CPU}$	CPU startup current		600		µA	1
$t_{START, CPU}$	IDLE to CPU execute	0	3		µs	1

1. Includes CPU, flash, 1V2, 1V7, RC16M
2. Includes CPU, RAM, 1V2, RC16M
3. t_{1V2} if 1V2 regulator is not running already

Power management:

Symbol	Description	Note	Min.	Typ.	Max.	Units	Test level
I_{OFF}	Current in SYSTEM-OFF, no RAM retention			420		nA	1
$I_{OFF, 16 k}$	Current in SYSTEM-OFF mode 16 kB SRAM retention			740		nA	1
$I_{OFF, 8 k}$	Current in SYSTEM-OFF mode 8 kB SRAM retention			530		nA	1
I_{OFF2ON}	OFF to CPU execute transition current			400		µA	1
t_{OFF2ON}	OFF to CPU execute			9.6	10.6	µs	1
I_{ON}	SYSTEM-ON base current			2.3		µA	2

Pin Description（Top View）:
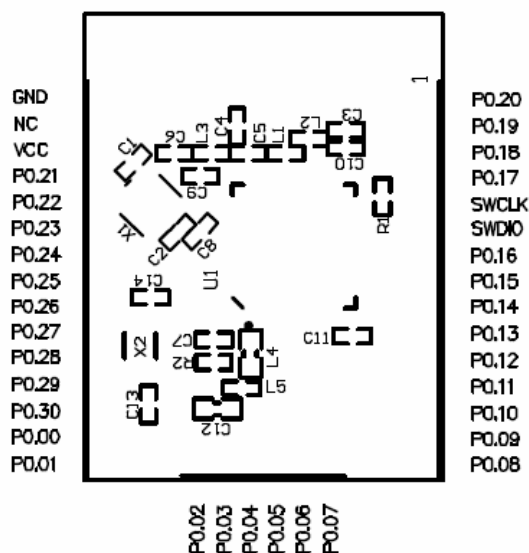
Pin	Name		Description	Note
Pin1	P0.20		Digital I/O	
Pin2	P0.19		Digital I/O	
Pin3	P0.18		Digital I/O	
Pin4	P0.17		Digital I/O	
Pin5	SWCLK		HW debug and flash programming I/O	
Pin6	SWDIO		HW debug and flash programming I/O	
Pin7	P0.16		Digital I/O	
Pin8	P0.15		Digital I/O	
Pin9	P0.14		Digital I/O	
Pin10	P0.13		Digital I/O	
Pin11	P0.12		Digital I/O	
Pin12	P0.11		Digital I/O	
Pin13	P0.10		Digital I/O	
Pin14	P0.09		Digital I/O	
Pin15	P0.08		Digital I/O	
Pin16	P0.07		Digital I/O	
Pin17	P0.06		Digital I/O	
Pin18	P0.05		Digital I/O	
Pin19	P0.04		Digital I/O	
Pin20	P0.03		Digital I/O	
Pin21	P0.02		Digital I/O	
Pin22	P0.01		Digital I/O	
Pin23	P0.00		Digital I/O	
Pin24	P0.30		Digital I/O	
Pin25	P0.29		Digital I/O	
Pin26	P0.28		Digital I/O	
Pin27	P0.27		Digital I/O	
Pin28	P0.26		Digital I/O	
Pin29	P0.25		Digital I/O	
Pin30	P0.24		Digital I/O	
Pin31	P0.23		Digital I/O	
Pin32	P0.22		Digital I/O	
Pin33	P0.21		Digital I/O	
Pin34	VCC		Power Supply（1.8～3.6V）	
Pin35	NC			
Pin36	GND		Ground	

Overall Dimensions (Top View):

17.4244 (mm)

4.064mm

22.6568mm

0.8128mm

1.27mm

5.5118 (mm)
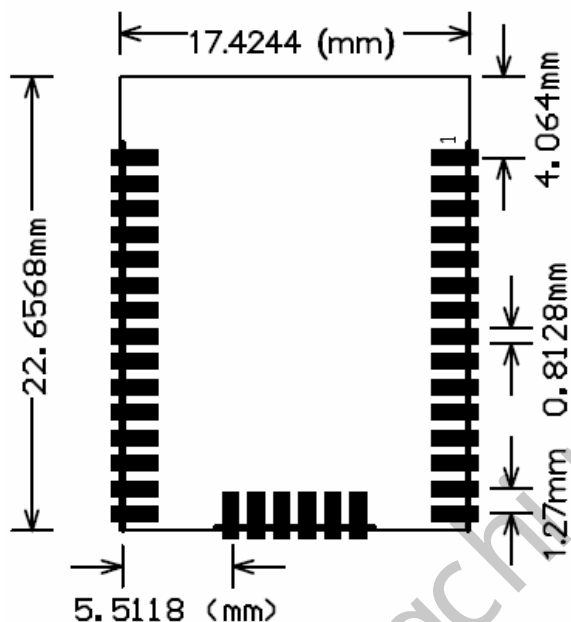
For more application information, please refer nRF51422 datasheet.

Important Notice:

■ Reserves the right to make corrections, modifications, and/or improvements to the product and/or its specifications at any time without notice.

■ Assumes no liability for the user's product and/or applications.

■ Products are not authorized for use in safety-critical applications, including but not limited to life-support applications.

ATTENTION!

Electrostatic Sensitive Device

Observe Precaution for handling.

ATTENTION
OBSERVE PRECAUTION FOR HANDLING
ELECTROSTATIC SENSITIVE DEVICE
HBM (Human Body Model): Class 2