

## nanoPAN 5360, 5361

High Speed, Low Power RF Modules  
for the 2.45 GHz ISM Band

### Overview

nanoNET is a high-performance and low-power network for the 2.4 GHz ISM band. It is based on Nanotron's patented Chirp Spread Spectrum (CSS) transmission technology and provides a long range of up to 900 meters in free space and typically 60 meters indoors (@ 1 Mbps and 8 dBm output power). The network is extremely robust against disturbances such as noise and multipath fading. Due to its primarily analog signal processing and the robustness of the Chirp signal, nanoNET has an extremely low power consumption per successfully transmitted bit.

For easy product development and fast market entry, Nanotron Technologies provides the RF Modules nanoPAN 5360 and nanoPAN 5361. They contain the complete RF part of a nanoNET network node and provide an asymmetrical 50  $\Omega$  antenna port. The data rate is selectable between 500 kbps, 1 Mbps, and 2 Mbps.

The nanoPAN RF modules are available in two versions. The nanoPAN 5360 contains an additional ISM band pass filter for an even improved robustness. The nanoPAN 5361 does not include the band pass filter, but provides a higher output power and better receiver sensitivity.

Driver software, a Portable Protocol Stack (PPS), an Evaluation Kit, and a Development Kit for nanoNET are available.

### Main Features

#### Both Modules

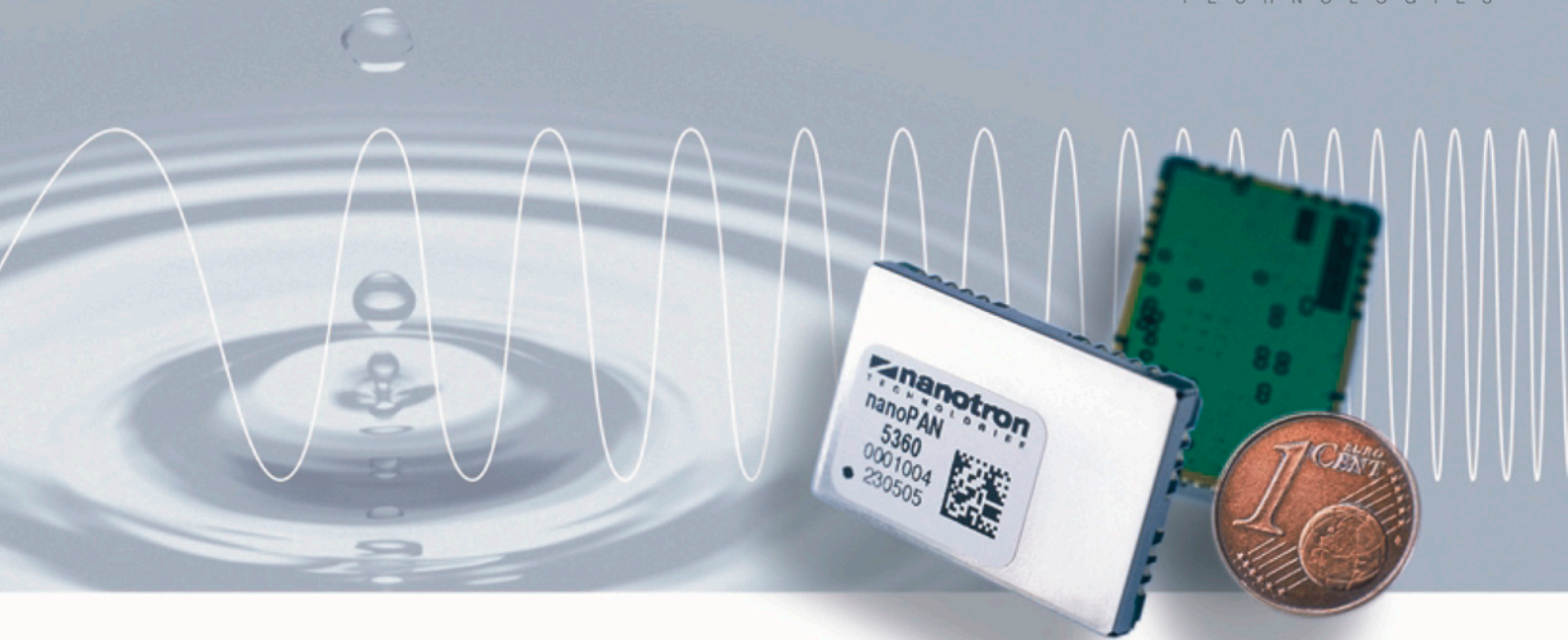
- Operating worldwide in the 2.45 GHz ISM band
- Data rates: 2 Mbps, 1 Mbps, 500 kbps
- Modulation technique: Chirp Spread Spectrum (CSS)
- Chirp bandwidth: 64 MHz effective
- SPI interface to external  $\mu$ c (up to 16 MHz SPI clock)
- Asymmetric 50  $\Omega$  antenna port
- Supply voltage: 2.4 V to 3.6 V
- Current consumption: 35 mA (RX), 78 mA (TX, Maximum output power)
- TX power adjustment in 19 steps
- Operating temperature range: -40° C to +85° C
- 4 channel digital I/O
- Small metal housing (20 X 30 X 3.5 mm)
- Two assembly options: pads for soldering and reflow

#### nanoPAN 5360

- Maximum output power: 6 dBm
- Receiver sensitivity: -90 dBm (@ BER=10<sup>-3</sup> and 1 Mbps)
- ISM band pass filter for maximum robustness

#### nanoPAN 5361

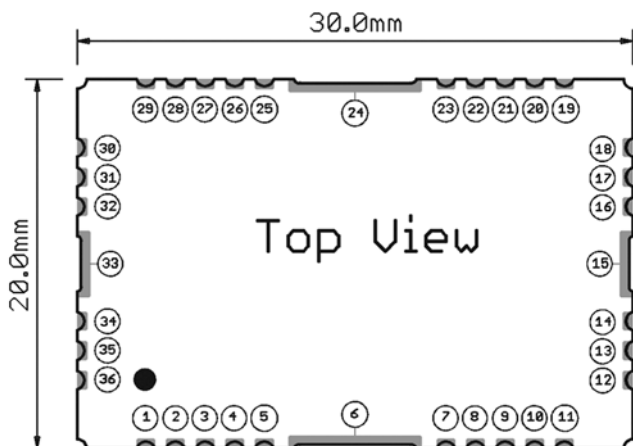
- Maximum output power: 8 dBm
- Receiver sensitivity: -92 dBm (@ BER=10<sup>-3</sup> and 1 Mbps)
- High range: maximum 900 meters in free space, typically 60 m indoors



## Applications

- Active RFID
- Industrial Monitoring and Control
- Medical Applications
- Meter and Sensor Reading
- Building Safety
- Multimedia

## Pin Assignment



| Pin no.        | Pin name | Pin no. | Pin name   |
|----------------|----------|---------|------------|
| 1,3,4,6,15-22  | GND      | 12      | DII02      |
| 24-26,28,30-33 |          | 13      | DII01      |
| 2              | VCC      | 14      | PWRUPRESET |
| 5              | SPICLK   | 23      | VCC_OUT    |
| 7              | UCVCC    | 27      | ANT        |
| 8              | SPITXD   | 29      | TX_RX      |
| 9              | SPIRXD   | 34      | UCIRQ      |
| 10             | DII04    | 35      | UCRESET    |
| 11             | DII03    | 36      | SPISSN     |

## Software

Nanotron Technologies provides two software products to speed up your product development: a transceiver driver and a Portable Protocol Stack (PPS). The driver provides all functionality required to access the nanoNET TRX transceiver, such as initializing the chip and sending and receiving of data. For larger networks, our PPS is the ideal solution – it provides advanced services such as broadcasting, frame forwarding, fragmentation, and software acknowledgements between end stations. Both software products can run even on 8 bit microcontrollers.

## Evaluation and Development Kits

For an easy start into the world of Chirp transmission technology, Nanotron provides an Evaluation Kit. Just connect the RF Test Modules to the microcontroller boards, connect the boards via RS 232 to your PC or laptop, and start the software. The GUI allows you to conveniently set the RF parameters, and it demonstrates the performance of the air link in real time on your computer screen. The nanoNET Development Kit is the ideal tool to develop your own applications based on Nanotron's nanoNET TRX Transceiver.

## Ordering Information

| Number  | Description            |
|---------|------------------------|
| MP5360M | nanoPAN 5360 RF Module |
| MP5361M | nanoPAN 5361 RF Module |

### Further Information:

Nanotron Technologies GmbH  
 Alt-Moabit 60 | 10555 Berlin | Germany  
 Phone +49 30 399 954 - 0 | Fax +49 30 399 954 - 188  
 E-mail [sales@nanotron.com](mailto:sales@nanotron.com) | Web [www.nanotron.com](http://www.nanotron.com)