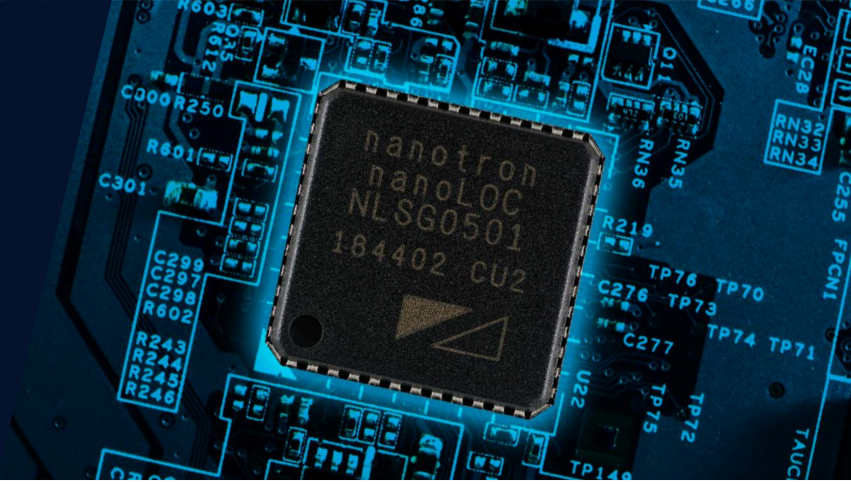
Inpixon nanoLOC

Chirp (CSS) RTLS Transceiver Chip



High-Performance Chip to Power Custom RTLS and Ranging Devices

The Inpixon nanoLOC transceiver chip provides a more flexible approach to RTLS and ranging applications, bringing an unparalleled balance of positioning range, accuracy, and reliability into custom location-aware devices. Powered by our unique 2.4 GHz chirp technology, Inpixon nanoLOC chips enable you to develop tailored solutions that can deliver long-range positioning beyond 500 m and high location accuracy (1-2 m), with scalability to meet RTLS needs across the entire enterprise.

Inpixon's transceiver chip is low-power, highly integrated and engineered to minimize the external components needed to build a full RTLS node, which supports interoperability with a wide array of custom RTLS device designs.

Support concurrent TDoA-based real-time tracking, ToF-based ranging, and wireless communication, all with a single, robust location chip. This can power a multitude of location-aware applications including asset and personnel tracking, collision avoidance, automation, location-based services, workflow optimization and more in large-scale industrial and business deployments.

With the Inpixon nanoLOC chip as the centerpiece of your solution, you can integrate high-performance RTLS into your custom solutions while experiencing complete design flexibility and control for specialized hardware that meets your unique needs and requirements.

nanoLOC Highlights:

- Long-Range chirp (CSS) 2.4 GHz technology
  - Range with PA: 500+ m
  - Accuracy: 1-2 m
  - Strong protection against interference, multipath fading, and other environmental disturbances
  - Frequency: ISM-band 2.4 GHz (2.4-2.4835)
- 3-in-1 technology to address diverse location-aware use cases
  - TDoA real-time location tracking
  - ToF two-way ranging (SDS-TWR)
  - Wireless communication
- Industrial-grade location tracking across harsh indoor, outdoor and underground environments
- Supports scalable, cost-effective solutions for thousands of concurrently tracked entities
- Low power architecture to support long lasting devices
- Engineered to minimize external components required
- Supports a freely adjustable center frequency
- Coexistence with narrowband technologies like Wi-Fi and BLE

Chirp (CSS) Performance | **Complete Design Flexibility** | **Low Power**

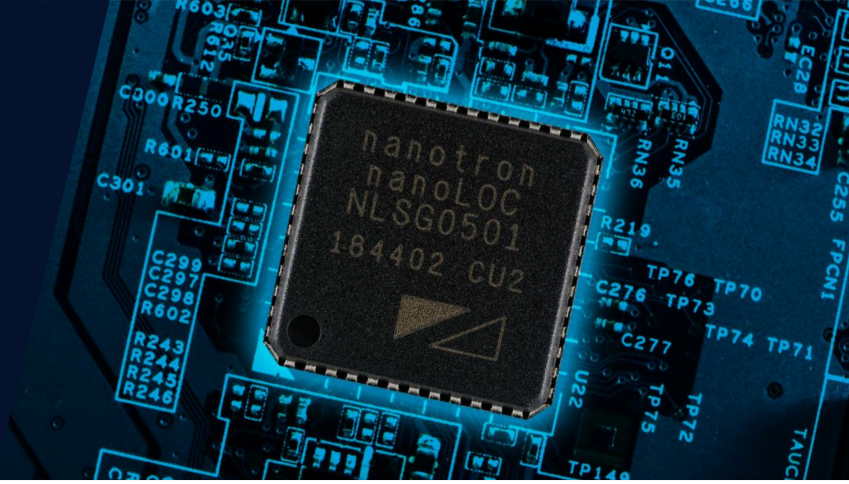
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Flexible, Long-Range Chirp (CSS) Technology

Utilizing the unique Chirp Spread Spectrum IEEE 802.15.4a standard, Inpixon transceiver chips help you develop custom location-aware devices and solutions that deliver long-range real-time positioning beyond 500 m (with PA) for wide coverage of indoor, outdoor and underground areas, with high 1-2 m location accuracy, low latency, and enhanced protection against interference, multipath fading and other disturbances. This allows Inpixon nanoLOC-based solutions to power various location-aware use cases across large-scale facilities and operate reliably in some of the harshest industrial environments – including underground mines, factories and more.

3 in 1: RTLS, Ranging & Wireless Communication

The Inpixon nanoLOC chip enables concurrent time-of-flight (ToF) ranging, anchor-based time difference of arrival (TDoA) tracking and wireless communication of sensor data all with a single chip. This versatility allows for custom RTLS-enabled devices that can support diverse location-aware applications. With its unique ranging feature, the Inpixon nanoLOC chip can measure the link distance between two nodes for location-aware applications with no additional infrastructure required.

Scalability

With Inpixon nanoLOC as the centerpiece of your custom location-aware devices, you can build scalable solutions that support real-time tracking for thousands of concurrently located entities across large facilities. Chirp technology's long-range coverage typically requires less infrastructure than other common location technologies, allowing for more cost-effective and simple deployments.

Low Power

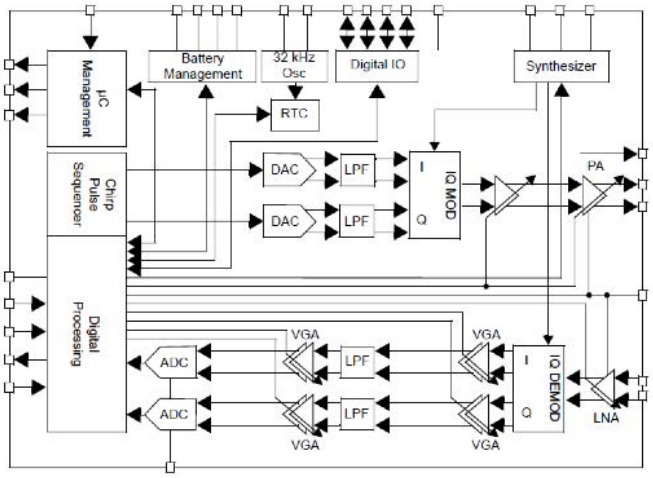
Engineered to consume low power, Inpixon nanoLOC chips help you achieve optimal operating time of your battery driven devices.

Enhanced Interoperability

Engineered to minimize external components needed to build an RTLS node, Inpixon nanoLOC helps you simplify development of custom devices that meet your specialized needs. Inpixon nanoLOC provides scrambling, automatic address matching, packet retransmission, and hardware acknowledgements. It features a sophisticated MAC controller with carrier sense multiple access and collision avoidance (CSMA/CA), time-division multiple access (TDMA), and frequency division multiple access (FDMA). This enables it to coexist reliably with other RF technologies within the 2.4 GHz band.

Design Flexibility

Our industry-proven technology allows you to create custom RTLS hardware with complete flexibility and control. Leverage our decades-plus industry expertise, dedicated support, and helpful development tools to ease the development process.



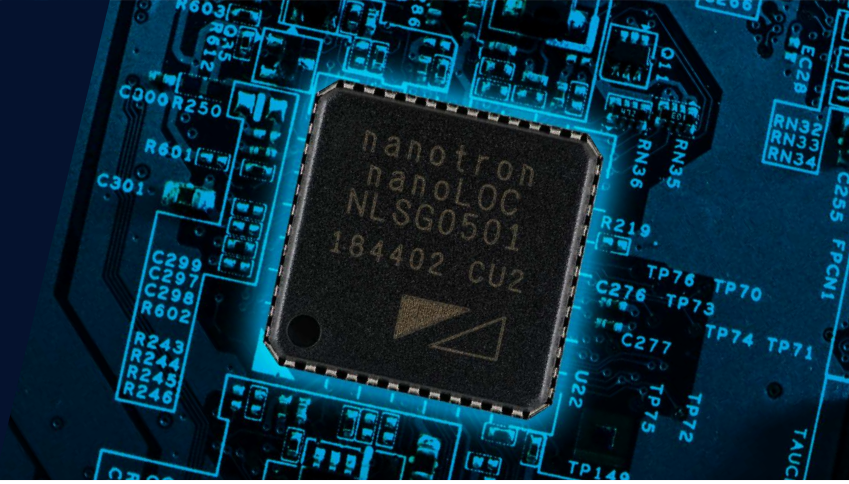
Inpixon nanoLOC transceiver block diagram

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Inpixon nanoLOC Embedded Software Driver

Inpixon nanoLOC's embedded software driver provides convenient access to chip functions, including chip-specific settings and performance criteria that can be adapted to a wide range of microcontrollers.

Inpixon Chirp (CSS) Technology

Inpixon is the global leader in chirp (CSS) technology, providing solutions that helps organizations harness chirp technology to build location-aware operations. Inpixon's chirp-enabled offerings include flexible, long-range location tracking tags, anchors, transceiver modules and Inpixon's own nanoLOC location chip which serves as the foundation of many chirp technology location solutions worldwide.

Benefits of CSS Technology:

- Longer range than most RF technologies with high accuracy
- Real-time results, very low latency
- Indoor to outdoor support, no license needed
- CSMA support to mitigate interference
- Very low power consumption
- Less anchors required for deployments
- Low cost, great ROI

Specifications	
Typical Range	500+ m with power amplifier (PA)
Typical Range in Mining Tunnel	< 300 m *
Typical Location Accuracy	1-2 m *
Supply Voltage	2.3 to 2.7 V
Output Power	-33 to 0 dBm
Data Rates	125 kbps to 2 Mbps
Receiver sensitivity (FEC on)	up to -97 dBm
Current consumption TX	30 mA @ 0 dBm
Current consumption RX	Starts at 33 mA
SPI interface	27 Mbps, agent mode only
RSSI sensitivity	-95 dBm
Dimensions	7 x 7 x 1 mm

**With optimal conditions and deployment, depends on topology and antenna. Signal amplified to +20 dBm*

Applications

Inpixon nanoLOC is the ideal choice for zoning, collision avoidance solutions and real-time location systems (RTLS):

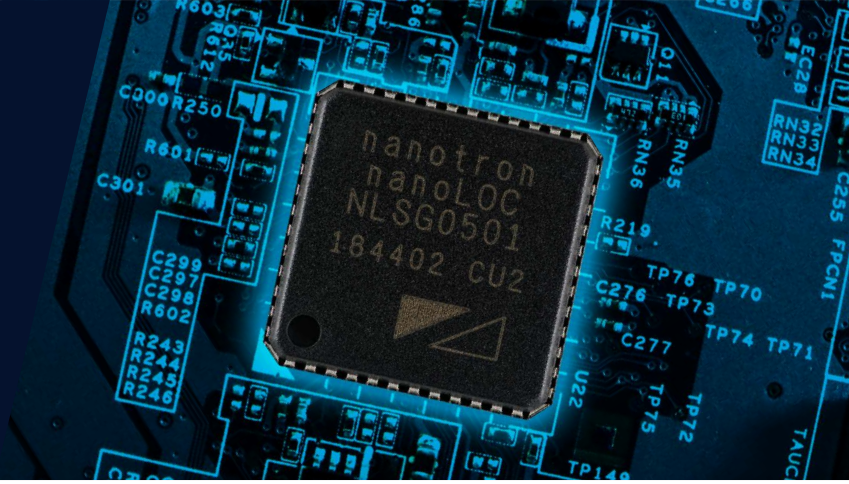
- Smart RF devices for proximity detection
- Tags for scalable real-time position monitoring solutions leveraging Inpixon's RTLS infrastructure
- Location-aware IoT sensor nodes

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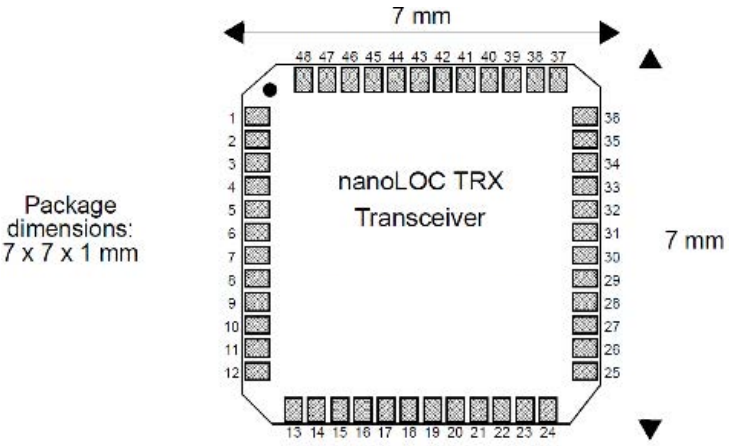


Inpixon nanoLOC Transceiver Pin Description

Pin	Name
1, 35, 36, 48	VDDA
12, 13, 24	VDDD
3, 34, 39, 40, 43, 46	VSSA
10, 11, 14, 23, 25, 31	VSSD
33, 37, 38	nc
4	Xtal32kP
5	Xtal32kN
6	Xtal32MP
7	Xtal32MN
8	Tx/Rx
15	SpiClk
16	/SpiSsn
17	SpiTxd
18	SpiRxd
19	D0
20	D1
21	D2
22	D3
26	µcReset
27	µcIRQ
28	VDD1V2_Cap
29	µcVcc
30	/POnReset
31	VDDA_ADC
41	RxN
42	RxP
44	TxN
45	TxP
47	VBalun

Footprint, Package & Pinout

Package dimensions:
7 x 7 x 1 mm



Ordering information

Order No.	Description
NLSG0501A	Inpixon nanoLOC Transceiver

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