

Product Preview

MICS-Band RF Transceiver



Wireless for Implantable Medical Devices

The ultra-low-power ZL70102 RF transceiver chip supports a very high data rate RF link for medical implantable communication applications. The chip's unique design allows patient health and device performance data to be quickly transmitted, with little impact to the useful battery life of the implanted device.

The ZL70102 is designed for use both in implanted medical devices and in base stations and operates in the 402-MHz – 405-MHz MICS (Medical Implantable Communications Service) band. Merging Microsemi's ultra-low-power and RF expertise, the ZL70102 delivers key performance and integration benefits.

The chip is very flexible and supports several low-power wake-up options. Extreme ultra-low-power operation is achieved using the 2.45-GHz ISM-band wake-up receiver option. The high level of integration includes a MAC (media access controller) providing coding and decoding of RF messages, forward error correction, and CRC (cyclical redundancy check) error detection to achieve an extremely reliable link. A standard serial peripheral interface (SPI) provides for easy access by the application.

Applications

RF telemetry systems used in implantable medical devices, external remote monitoring, and programming equipment utilizing the MICS band include:

- Pacemakers
- Implantable cardioverter defibrillators (ICDs)
- Neurostimulators
- Cardiac implantable loop recorders
- Sensors and diagnostic devices
- Drug pumps
- Physiologic monitors
- Short-range body area network applications using the 433-MHz ISM band

Key Features

- Meets performance, power, and size requirements for implanted communication systems
- Operates in the 402-MHz – 405-MHz (10 MICS channels) and 433-MHz – 434-MHz (2 ISM channels) frequency bands
- High data rates (400/200 kbit/s raw data rate) allow for short-duty-cycle, power-efficient bidirectional transmission of patient and device data
- Ultralow power consumption of typically less than 5 mA average TX/RX extends implanted device battery operating life
- High level of integration System-on-Chip (SoC) design with integrated high-performance MAC with automatic error handling and flow control
- Very few external components (three components plus antenna matching)
- Ultra-low-power RF wake-up receiver (typical 290 nA at 1-second strobe period)
- Compliant with MICS, FCC, ETSI, and IEC standards

Customer Support

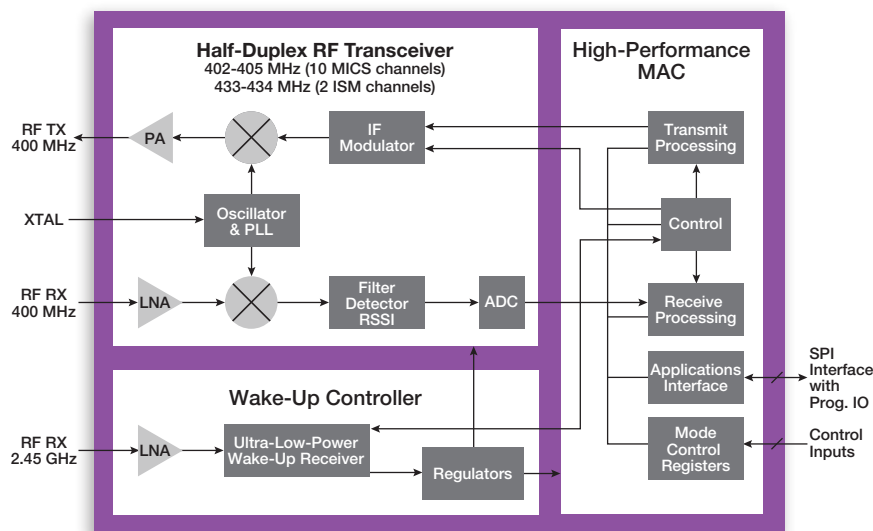
The ZL70102 MICS-band RF transceiver IC is supported by a full featured Application Development Kit.

Ordering Information

Please refer to the ZL70102 Data Sheet located at <http://www.microsemi.com/ultra-low-power-wireless/implantable-medical-transceivers> for more information or contact Microsemi's Medical Product Group sales.



ZL70102 Simplified Block Diagram



ZL70102

Implantable Communications Systems

Microsemi's ZL70102 MICS-band RF transceiver IC (integrated circuit) allows medical device manufacturers to more easily design wireless communication systems supporting advanced applications, including home-based patient remote monitoring and operating room device programming.

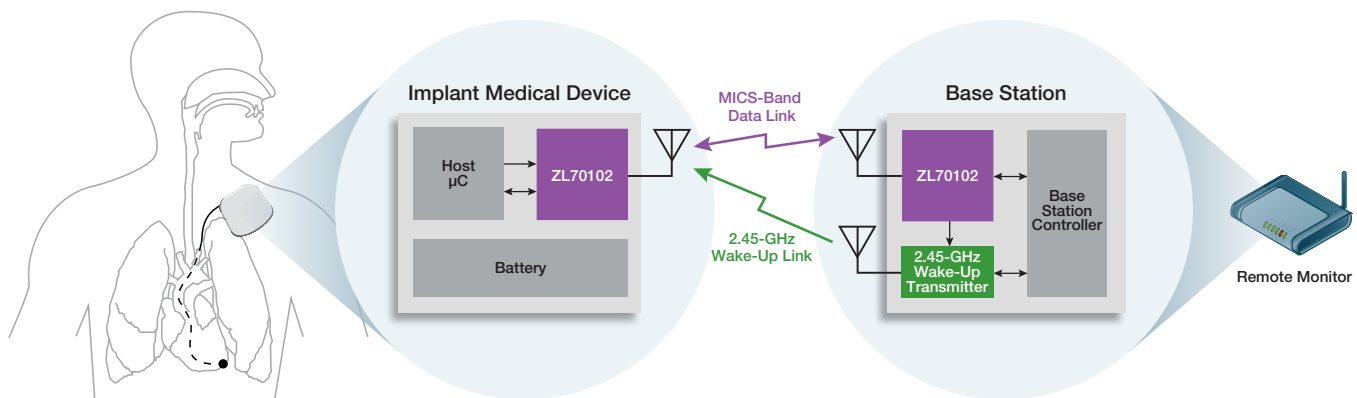
The ZL70102 IC operates in the 402-MHz – 405-MHz MICS band to enable wireless links connecting implanted medical devices and control equipment. Previous implanted device communication systems relied on inductive links. These systems have a limited operating range and low data rates, and are not user-friendly for home monitoring applications, as they require the patient to accurately position an inductive wand over the implanted device.

In comparison, the ZL70102's higher data rate and longer operating range allow medical device manufacturers to enable new value-added services to improve patient care. By supporting higher data rates, patient events can be captured in the implanted device's memory and quickly uploaded to a base station for analysis to shorten doctor/

patient consultancy times. In surgical situations, longer operating range allows the base station (and the programmer) to be located outside the sterile environment.

Longer operating ranges also simplify remote-monitoring applications. As illustrated, an ultra-low-power RF transceiver in a pacemaker can wirelessly transmit patient event and device performance data to a base station in the home. Data is then forwarded over the telephone or internet to a physician's office. If a problem is detected, the patient goes to the hospital where the high-speed, two-way RF link is used to monitor and adjust device performance under a doctor's supervision.

Battery life is a critical performance parameter for implanted devices. The ZL70102 transceiver incorporates a "wake-up" receiver that allows the IC to operate in an extremely low current (290 nA average) sleep state. Communication between implanted and base station transceivers is then initiated using a specially coded wake-up signal from the 2.45-GHz base transmitter. Alternative wake-up mechanisms using 400-MHz or direct wake-up by the implanted medical device are also supported.



Microsemi Corporation (NASDAQ: MSCC) offers a comprehensive portfolio of semiconductor solutions for: aerospace, defense and security; enterprise and communications; and industrial and alternative energy markets. Products include high-performance, high-reliability analog and RF devices, mixed signal and RF integrated circuits, customizable SoCs, FPGAs, and complete subsystems. Microsemi is headquartered in Aliso Viejo, Calif. Learn more at www.microsemi.com.