MEDICAL IMPLANTABLE RF TRANSCEIVER **ZL70101**

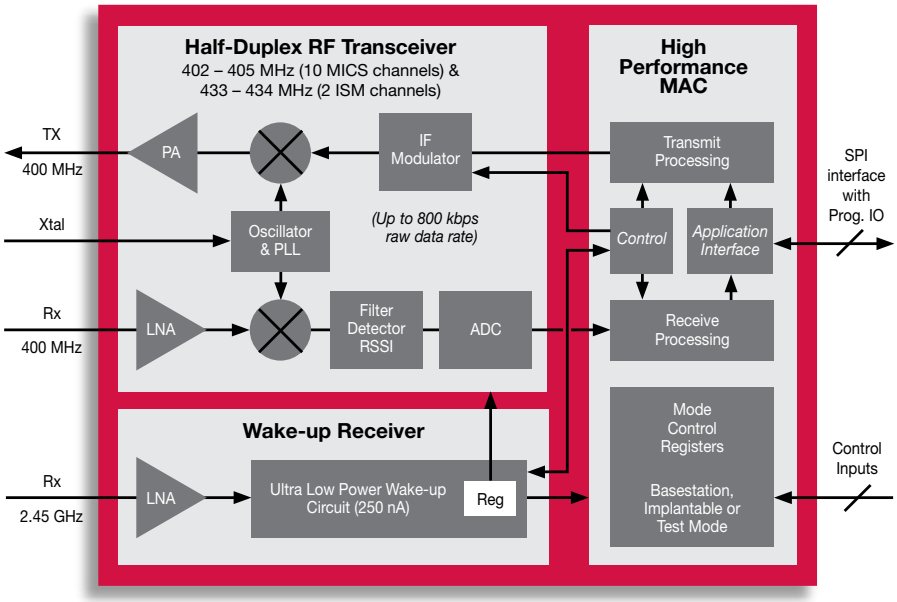
PRODUCT PREVIEW

The ultra low-power ZL70101 transceiver chip support a very high data rate RF (radio frequency) 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 ZL70101 is designed for use in both implanted devices and base stations and operates in the 402 – 405 MHz MICS (Medical Implantable Communications Service) band. Merging Zarlink's ultra low-power and RF expertise, the ZL70101 delivers key performance and integration benefits.

The chip is very flexible and supports several low power wake-up options. Extremely 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 and Reed-Solomon error correction together with 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.

ZL70101 Simplified Block Diagram



Applications

- Implantable medical devices, including pacemakers, ICDs (implantable cardioverter defibrillators), neurostimulators, implantable drug pumps, bladder control devices, implantable physiological monitors
- Short-range Body Area Network applications using 433 MHz ISM band

MICS Transceiver IC for In-Body Communication System

- Meets performance, power and size requirements for implanted communication systems
- Operates in the 402 – 405 MHz (10 MICS channels) and 433 – 434 MHz (2 ISM channels) frequency bands
- High data rates (800/400/200 kbps) allow for short duty-cycle, power efficient bidirectional transmission of patient and device data
- Ultra low-power consumption of typically less than 5 mA TX/RX extends implanted device battery operating life
- System-on-chip (SoC) design with integrated MAC provides complete MICS protocol functions, including re-transmissions and flow control, forward-error correction and error detection
- Requires just three external components (plus antenna matching), saving board space and lowering BoM cost
- Low-current RF wake-up receiver averages 250 nA in "sleep" mode

Full solution capability

- Transceiver designed for monitoring base stations, programmers, and implanted medical devices
- Contact Zarlink regarding implantable RF modules

Standards

- Meets MICS, FCC, ETSI and IEC requirements

Customer Support

The ZL70101 RF transceiver IC is fully supported by an evaluation board and design tools.

ZARLINK SEMICONDUCTOR

ZL70101 MEDICAL IMPLANTABLE RF TRANSCEIVER

APPLICATION

Implantable Communications Systems

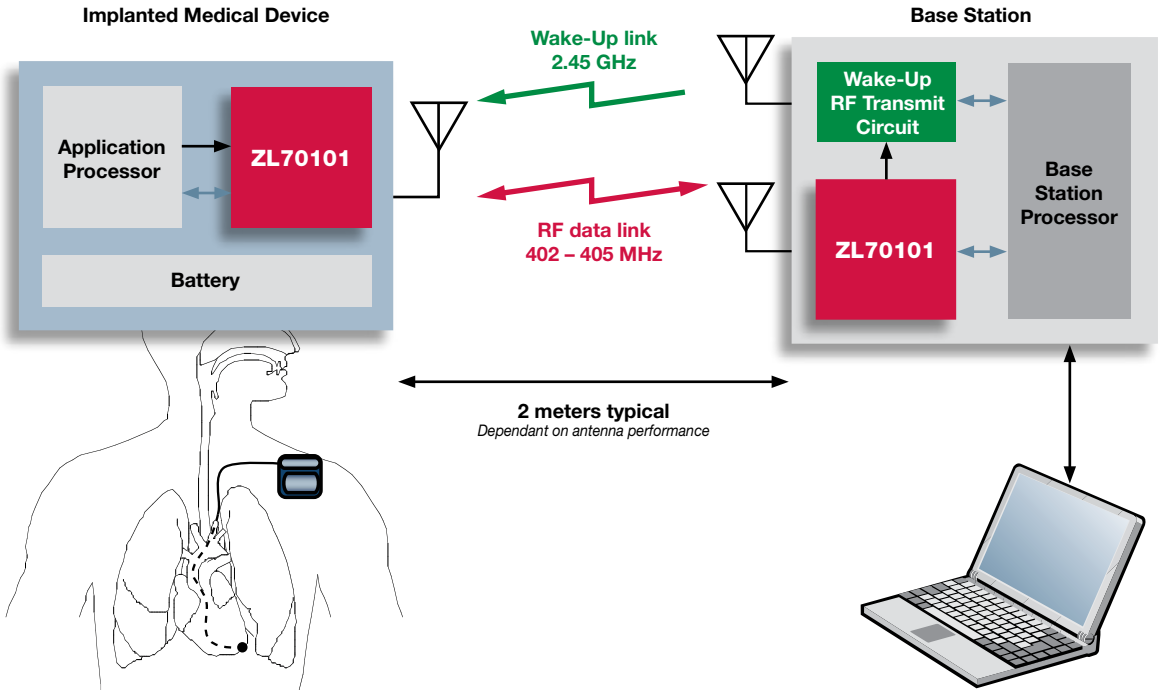
Zarlink's ZL70101 RF transceiver IC (integrated circuit) allows medical device manufacturers to more easily design wireless communication systems supporting advanced applications, including home-based patient monitoring and operating room programming.

The ZL70101 IC operates in the 402 – 405 MHz MICS band to enable longer-range 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 MICS band's higher data rate and longer operating range allows 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 (programmer) to be located outside the sterile environment.

Longer operating ranges also simplify home-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 ZL70101 transceiver incorporates a "wake-up" receiver that allows the IC to operate in a low current (250 nA average) "sleep" mode. 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.



 Publication Number 7ZS132

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