AS3992

UHF RFID Single Chip Reader EPC Class1 Gen2 Compatible

1 General Description

The AS3992 UHF Gen2 Reader chip is an integrated analog front-end and provides protocol handling for ISO180006c/b 900MHz RFID reader systems. Equipped with multiple built-in programming options, the device is suitable for a wide range of UHF RFID applications.

The AS3992 is pin to pin and firmware compatible with the previous AS3990/91 IC's. It offers improved receive sensitivity to -86dB, programmable Rx Dense Reader Mode (DRM) filters on chip and pre-distortion. Fully scalable, the AS3992 is ideal for longer range and higher power applications.

Offering DRM filtering on chip, combined with improved sensitivity and pre-distortion allows the AS3992 to be the only true world wide shippable IC. The reader configuration is achieved through setting control registers allowing fine tuning of different reader parameters.

Parallel or serial interface can be selected for communication between the host system (MCU) and the reader IC. When hardware coders and decoders are used for transmission and reception, data is transferred via 24 bytes FIFO register. In case of direct transmission or reception, coders and decoders are bypassed and the host system can service the analog front end in real time.

The transmitter generates 20dBm output power into 50Ω load and is capable of ASK or PR-ASK modulation. The integrated supply voltage regulators ensure supply rejection of the complete reader system.

The transmission system comprises low level data coding. Automatic generation of FrameSync, Preamble, and CRC is supported.

The receiver system allows AM and PM demodulation. The receiver also comprises automatic gain control option (patent pending) and selectable gain and signal bandwidth to cover a range of input link frequency and bit rate options. The signal strength of AM and PM modulation is measured and can be accessed in RSSI register. The receiver output is selectable between digitized sub-carrier signal and any of integrated sub-carrier decoders. Selected decoders deliver bit stream and data clock as outputs.

The receiver system also comprises framing system. This system performs the CRC check and organizes the data in bytes. Framed data is accessible to the host system through a 24 byte FIFO register.

To support external MCU and other circuitry a 3.3V regulated supply and clock outputs are available. The regulated supply has 20mA current capability.

The AS3992 is available in a 64-pin QFN (9mm x 9mm), ensuring the smallest possible footprint.

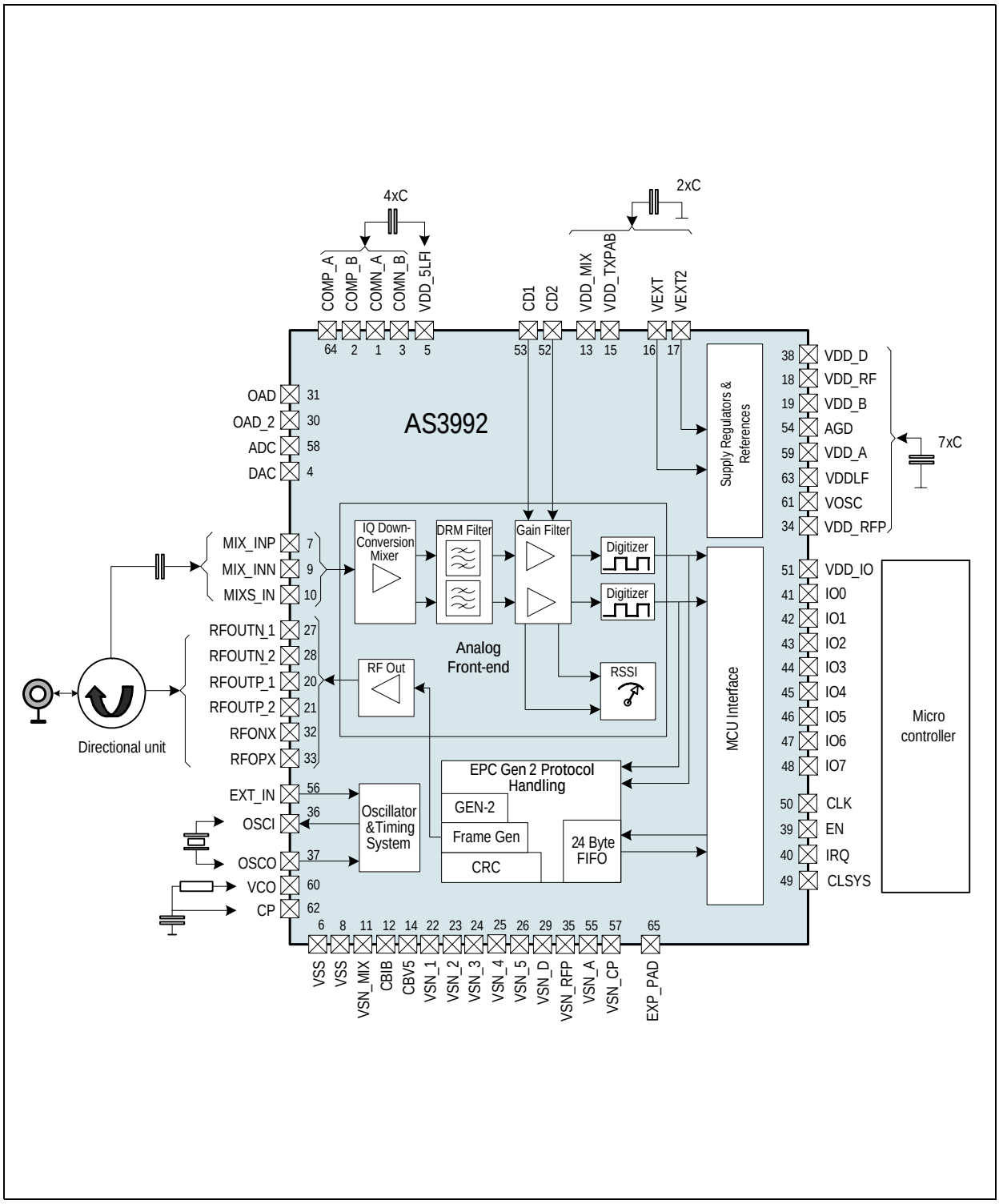
2 Key Features

- ISO18000-6C (EPC Gen2) full protocol support
- ISO18000-6A,B compatibility in direct mode
- Programmable Dense Reader Mode filters on chip allowing a true World Wide Shippable device
- Improved receive sensitivity to -86dBm
- On chip pre-distortion meaning improved external PA efficiency
- Integrated low level transmission coding, Integrated low level decoders
- Integrated data framing, Integrated CRC checking
- Parallel 8-bit or serial 4-pin SPI interface to MCU using 24 bytes FIFO
- Voltage range for communication to MCU between 1.8V and 5.5V
- Can be powered by USB with no need for step conversion from 4.1 to 5.5 Volt
- Selectable clock output for MCU
- Integrated supply voltage regulator (20mA), which can be used to supply MCU and other external circuitry
- Integrated supply voltage regulator for the RF output stage, providing rejection to supply noise
- Internal power amplifier (20dBm) for short range applications
- Modulator using ASK or PR-ASK modulation
- Adjustable ASK modulation index
- AM & PM demodulation ensuring no “communication holes” with automatic I/Q selection
- Selectable reception gain, Reception automatic gain control
- AD converter for measuring TX power using external RF power detector
- DA converter for controlling external power amplifier
- Frequency hopping support
- On-board VCO and PLL covering complete RFID frequency range 840MHz to 960MHz
- Oscillator using 20MHz crystal
- Power down, standby and active mode available

3 Applications

The device is an ideal solution for UHF RFID reader systems and hand-held UHF RFID readers.

Figure 1. AS3992 Block Diagram



4 Ordering Information

The devices are available as the standard products shown in Table 1.

Table 1. Ordering Information

Ordering Code	Description	Delivery Form[1]	Package
AS3992-BQFP	Internal DRM compatible VCO, pre-distortion	Tape and Reel in dry pack	64-pin QFN (9mm x 9mm)

1. Dry Pack sensitivity Level =3 according to IPC/JEDEC J-STD-033A.

Note: All products are RoHS compliant and Pb-free.
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