TLSR8253

Telink BLE 5.0 SoC with audio

Product Brief

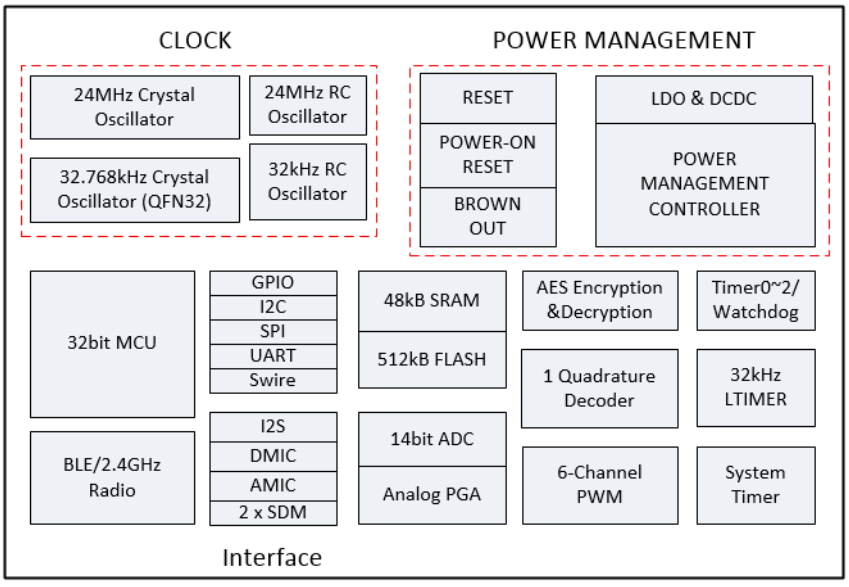
General Description

The TLSR8253 is Telink-developed Bluetooth LE SoC solution with internal Flash and audio support.

The TLSR8253 supports Bluetooth Low Energy (up to Bluetooth 5), BLE Mesh and 2.4GHz proprietary standard. It allows easy connectivity with Bluetooth Smart Ready mobile phones, tablets, laptops, which supports BLE slave and master mode operation, including broadcast, encryption, connection updates, and channel map updates.

The TLSR8253 integrates a power-balanced 32-bit MCU, BLE/2.4GHz Radio, 48kB SRAM, 512kB internal Flash, a general-purpose 14bit ADC with PGA, Analog and Digital Microphone input, stereo audio output, 6-channel PWM, one quadrature decoder (QDEC), flexible IO interfaces, and nearly all the peripherals needed for Bluetooth Low Energy application development.

The TLSR8253 has hardware OTA upgrades support and multiple boot switching, allowing convenient product feature roll outs and upgrades. The TLSR8253 also includes multi-stage power management design allowing ultra-low power operation and making it the ideal candidate for wearable and power-constraint applications.



Target Applications

- Smartphone and tablet accessories
- RF Remote Control
- Sports and fitness tracking
- Wearable devices

Key Features

- 4-byte Chip Unique ID (UID)
- 32-bit proprietary microcontroller
  - ✧ Better power-balanced performance than ARM M0
  - ✧ Instruction cache controller
  - ✧ Maximum running speed up to 48MHz
- Support BLE, BLE Mesh and 2.4GHz proprietary technologies
- BLE features
  - ✧ Bluetooth 5 support
  - ✧ Bluetooth SIG Mesh support
  - ✧ Telink proprietary Mesh support
  - ✧ Telink extended profile with audio support for voice command based searches
- Telink Proprietary BLE Mesh features
  - ✧ Support flexible mesh control, e.g. N-to-1 and N-to-M
  - ✧ Supports switch control for over 200 nodes without delay
  - ✧ Supports real time status update for over 200 nodes
  - ✧ Secure and safe control and scalable identification within network
  - ✧ 8/16 groups can be controlled at the same time
  - ✧ 128/256 nodes within mesh network
  - ✧ Configurable to more or fewer hops (e.g. 4 hops) within mesh network, single hop delay less than 15ms
  - ✧ Flexible RF channel usage with both BLE advertising channels and data channels for good anti-interference performance
- Memory architecture
  - ✧ Internal 512kB Flash
  - ✧ 48kB on-chip SRAM with up to 32kB retention
  - ✧ Flash preloaded with UID
  - ✧ Firmware protection for anti-cloning
- Flash features
  - ✧ Total 512kB (4Mbits)
  - ✧ Flexible architecture: 4kB per Sector, 64kB/32kB per block, up to 256 Bytes per programmable page
  - ✧ Write protect all or portions of memory
  - ✧ Cycle Endurance: 100,000 program/erases
  - ✧ Data Retention: typical 20-year retention
  - ✧ Multi firmware encryption methods for anti-cloning protection
- RF transceiver
  - ✧ BLE/2.4GHz RF transceiver embedded, working in worldwide 2.4GHz ISM band
  - ✧ Bluetooth 5 Compliant, 1Mbps and 2Mbps
  - ✧ 2.4GHz proprietary 1Mbps/2Mbps/250kbps/500kbps mode with Adaptive Frequency Hopping feature
  - ✧ Rx Sensitivity: -96dBm@BLE 1Mbps, -93dBm @ BLE 2Mbps mode
  - ✧ Tx output power: up to +10dBm
  - ✧ 50 Ω matched single-pin antenna input
  - ✧ RSSI monitoring with +/-1dB resolution
  - ✧ Auto acknowledgement, retransmission and flow control
- Power management
  - ✧ Power supply: 1.8V~3.6V (QFN32 package) / 2.7V~3.6V (TSSOP16 package)
  - ✧ Battery monitor for low battery voltage detection
  - ✧ Brownout detection/shutoff and Power-On-Reset
  - ✧ Multiple-power-state to optimize power consumption

- Low power consumption
  - Whole Chip RX mode: 5.3mA
  - Whole Chip TX mode: 4.8mA @ 0dBm with DCDC
  - Deep sleep with external wakeup (without SRAM retention): 0.4uA
  - Deep sleep with SRAM retention: 1uA (with 8kB SRAM retention), 1.2uA (with 16kB SRAM retention), 1.4uA (with 32kB SRAM retention)
- RTC and other timers
  - Clock source of 32.768kHz (only QFN32 package) & 24MHz Crystal and 32kHz/24MHz embedded RC oscillator
  - Three general 32-bit timers with four selectable modes in active mode
  - Watchdog timer
  - A low-frequency 32kHz timer available in low power mode
- Digital and analog interfaces
  - Up to 17/4 GPIOs depending on package option
  - DMIC (Digital Mic), Dual AMIC (Analog Mic), I2S, Stereo Audio output
  - SPI, I2C, Swire, UART with hardware flow control support
  - Up to 6 channels of differential PWM
  - IR transmitter with DMA
  - One quadrature decoder, two-phase input selectable from 5 pins
  - 6-channel (only GPIO input), 14-bit SAR ADC
  - 4-channel PGA, differential input
  - Low power comparator
- Embedded hardware AES and AES-CCM
- Embedded hardware acceleration for Elliptical curve cryptography (ECC)
- Operating temperature range:
  - ET & ES version: -40℃~+85℃
  - AT & AS version: -40℃~+125℃
- RoHS-compliant package
  - TLSR8253F512ET32/TLSR8253F512AT32, 32-pin QFN 5×5x0.75mm
  - TLSR8253F512ES16/TLSR8253F512AS16, 16-pin TSSOP16_4.96x6.4x1.2mm

Development tools

A full set of development tools for the BLE SoC are provided, which include EVB, reference design and SDK for customers to perform evaluation, quick application prototyping and firmware development.

Company Profile

Telink Semiconductor provides highly integrated radio-frequency and mixed-signal System-On-Chip (SoC) solutions for a variety of communication and control application markets including consumer electronics, medical instruments, industrial control, home automation, smart energy, and etc.

For further information on the technology, product and business term, please contact Telink Semiconductor Company.

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