ATS2853 Product Brief

Version: 1.0

2020-08-10

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Contents

Revision History

Date	Revision	Description
2020-08-10	1.0	First Release

Introduction

Overview

The ATS2853 is a highly integrated single-chip Bluetooth audio device. It can act as Bluetooth portable stereo speakers, Bluetooth soundbar, Bluetooth dongle, and so on.
The ATS2853 integrates the high-performance transceiver, rich features baseband processor and Bluetooth audio profile. It meets Bluetooth V5.0 and compliant with V4.2/2.1+EDR, and supports dual mode (BR/EDR + Low Energy Controllers). The links in BR/EDR and LE can be active simultaneously.
ATS2853 supports decoding Bluetooth A2DP audio and loading sound effects simultaneously, support Bluetooth handfree calls with dual MIC AEC and noise reduction.
The ATS2853 integrates a complete set of power management circuits, flexible memory configuration, Matrix LED controller for UI display and rich interfaces, such as SD/SDIO/SPI/USB2.0 FS/UART/TWI/PWM/IR /I2S TX&RX and so on. The architecture is fully programmable with any application. It also has the minimum package and the most compact BOM.

Application Diagram

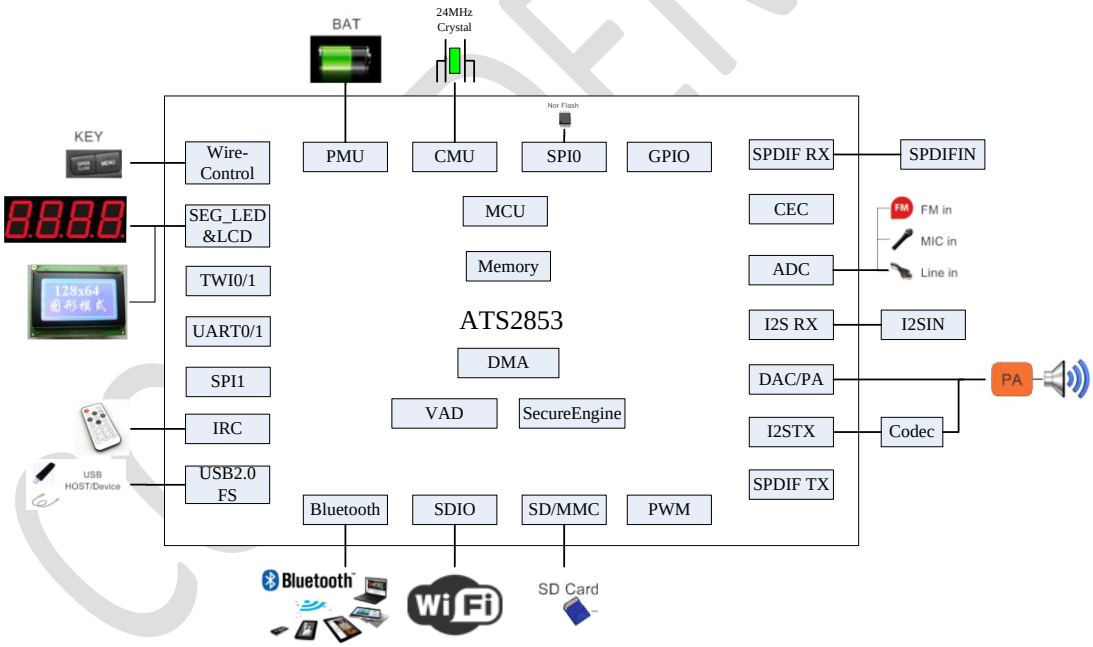


Figure 1-1 ATS2853 Application Diagram

Features

System

- 32bit RISC processor Core, up to 240MHz.
- Internal 203KB RAM for data and program storage
- Internal 2MByte Nor flash
- Support 24MHz OSC with on-chip PLL
- Internal 32KHz RC oscillator
- 8-channel ordinary DMA, support for transmission in burst 8 mode
- Fully configurable PEQ, up to 20 segments
- Support for echo cancellation and noise reduction
- Support for packet loss concealment
- Support USB/SDCard/Uart firmware upgrade
- Support FFT/FIR/IIR hardware computing units
- Support AES-128/192/256 Encrypt and Decrypt in ECB/CTR/CBC/CBC-CTS mode
- Support hardware TRNG used to produce random bits
- Support CRC-16/32

Bluetooth

- Support Bluetooth5.0，compatible with Bluetooth4.2/4.2 LE/4.0/2.1 + EDR system
- Max transmitting output power: 8dBm
- Bluetooth receiving sensitivity: -93dBm@GFSK, -92dBm@π/4 DQPSK, -87dBm@8DPSK modulation
- Compatible with AVRCP Profile V1.6
- Compatible with A2DP Profile V1.3
- Compatible with HFP Profile V1.7
- Support for SBC & AAC Bluetooth audio transmission format
- Support for mSBC broadband speech coding
- Supports all packet types in basic rate and enhanced data rate
- Supports SCO/eSCO link
- Supports Secure Simple Pairing
- Supports Low Power Mode (Sniff / Sniff Sub-rating / Hold / Park)
- Bluetooth Dual Mode support: Simultaneous LE and BR / EDR
- Supports multiple Low Energy states
- Fast AGC control to improve receiving dynamic range
- Supports AFH to dynamically detect channel quality to improve transmission quality
- Supports Power/Enhanced Power Control
- LE Data Packet Length Extension
- Extended Scanner Filter Policies
- LE 2M PHY
- LE Extended Advertising
- LE Periodic Advertising
- Channel Selection Algorithm #2

Audio

- Built-in stereo 24-bit input sigma-delta DACs, SNR (A-Weighting)>=100dB, THD+N <= -85dB@0dBFS output amplitude
- DAC supports sample rate of 8k/11.025k /12k/16k/22.05k/24k/32k/44.1k/48k/88.2k/96k Hz
- Build in stereo 20mW PA (Power Amplifier) for headphone. PA output supports traditional mode & direct-drive mode (for earphone)
- Support differential audio output for speaker PA
- Built-in stereo 24-bit input sigma-delta ADC, SNR(A-Weighting)>=98dB, THD+N <= -89dB
- ADC supports sample rate of 8k/11.025k /12k/16k/22.05k/24k/32k/44.1k/48k/88.2k/96k Hz
- All input Support Single-Ended or differential input.
- Support 3 pairs input 0/1/2; each pair can be formed as mix or differential input.
- Support 2 DMIC input;
- I2S TX&RX support master and slave mode separately, and support sample rate of 192k/96k/48k/44.1k/32k/24k/22.05k/16k/12k/11.025k/8k
- Support SPDIF TX , SPDIF RX and CEC
- Support Voice Active Trigger

Display

- 7/8pin Segment Matrix LED
- 5com 8seg LED
- Support 1/3Bias, 3COM、4 COM , maximum 9SEG SEG_LCD Driver
- Support LCD with 8bit CPU Interface

Power Management

- Support Li-Ion battery power supply with battery insert wake up.
- Support power on button & reset button.
- Standby power SVCC.
- Integrated DC-DC buck converters output VD15 from BAT.
- Linear regulators outputs VCC, SVCC, AVCC.
- Standby current 20uA (typical).
- One 10-bit A/D converter for system monitor and wire-control, 12 channels can be externally used by user. The ADC sample rate can support 2/4/8KHz per channel.
- 2*WIO which can used for ADC key or waking up IC to running mode from deep sleep mode.
- 2 *External wakeup signals which can used for waking up IC to running mode from light sleep mode.

Physical Interfaces

- Maximum 2*SD/MMC/eMMC card interface
- USB2.0 FS host or device, support 3 IN endpoint and 2 OUT endpoint except endpoint0
- Maximum 2*UART support master or slave mode with RTS/CTS hardware flow control
- Maximum 2*TWI supports master or slave mode
- 1*SPI interface controller for external use.
- Support 24 Programmable GPIO interfaces, and 10 analog IOs can also be config as GPIOs.
- All 24 Programmable GPIOs can be SIRQs
- Maximum 9*PWM output integrated
- 1* infrared remote control RX

Applications

- Portable stereo speakers
- Bluetooth car audio unit
- Bluetooth soundbar
- Bluetooth transceiver

Package

- QFN-48, 6mm*6mm*0.75mm

Pin Assignment

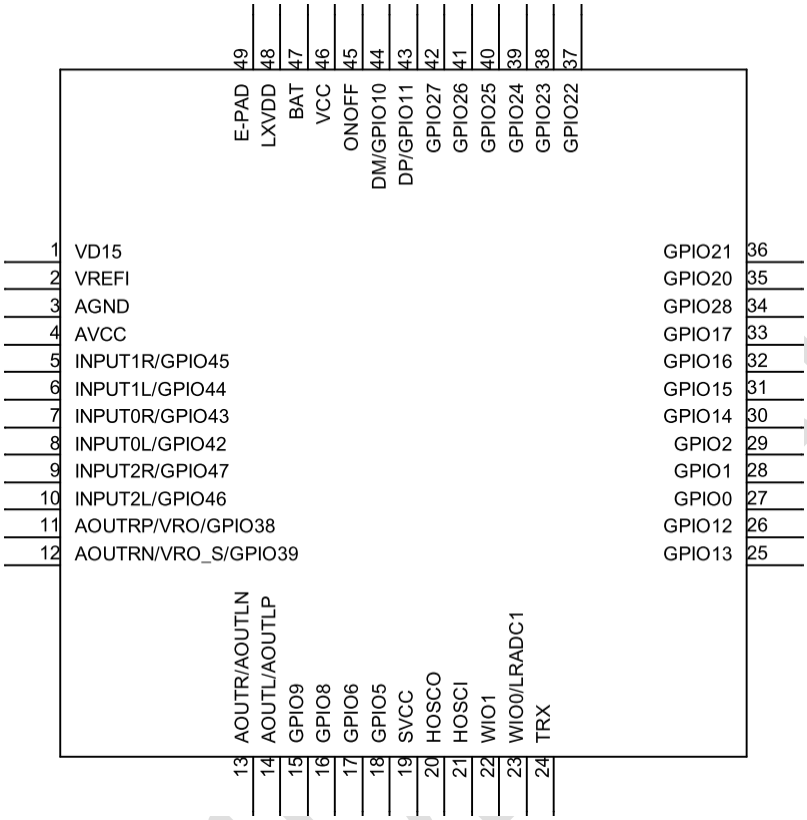
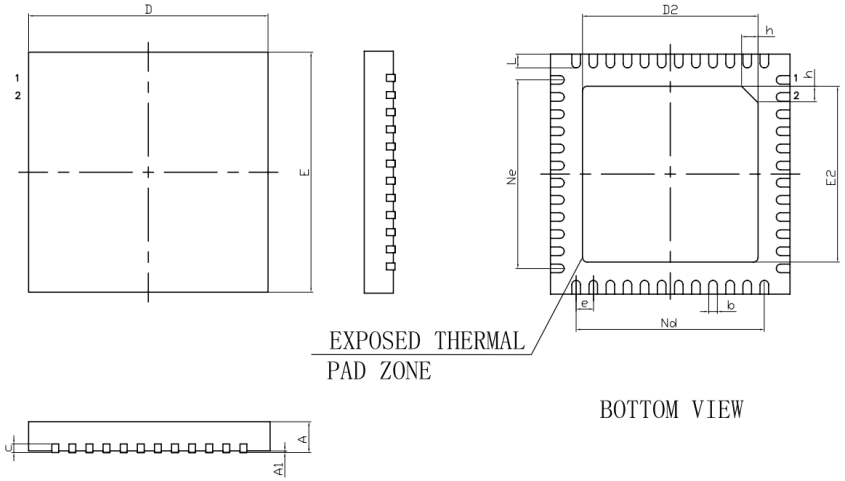


Figure 1-2 ATS2853 Pin Assignment

Package and Drawings



SYMBOL	MILLIMETER			
	MIN	NOM	MAX	
A	0.70	0.75	0.80	
A1	—	0.02	0.05	
b	0.15	0.20	0.25	1
c	0.18	0.20	0.23	
D	5.90	6.00	6.10	
D2	4.10	4.20	4.30	2
e	0.40BSC			
Ne	4.40BSC			
Nd	4.40BSC			
E	5.90	6.00	6.10	
E2	4.10	4.20	4.30	2
L	0.35	0.40	0.45	
h	0.30	0.35	0.40	
L/F载体尺寸 (MIL)	177*177			

Figure 1-3 ATS2853 Package and Dimension

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