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AS3518

Stereo Audio Codec with enhanced System Power Management

1 General Description

The AS3518 is a low power stereo audio codec and is designed for Portable Digital Audio Applications. It allows playback and recording in CD quality. It has a variety of audio inputs and outputs to directly connect electret microphones, 16 Ω /32 Ω headsets and auxiliary signal sources via a 10-channel mixer. It consumes less than 20mW in playback mode.

Further the device offers advanced power management functions. All necessary ICs and peripherals in a Digital Audio Player are supplied by the AS3518. The different regulated supply voltages are programmable via the serial control interface. AS3518 also contains a Li-Io battery charger. The single supply voltage may vary from 1.0V to 5.5V.

The AS3518 has an on-chip, phase locked loop (PLL) which generates the needed internal CODEC master clock. I2S Frame and shift-clock has to be applied from the processor for playback and recording. Further the AS3518 has an independent 32kHz real time clock (RTC) on chip which allows a complete power down of the system CPU.

2 Key Features

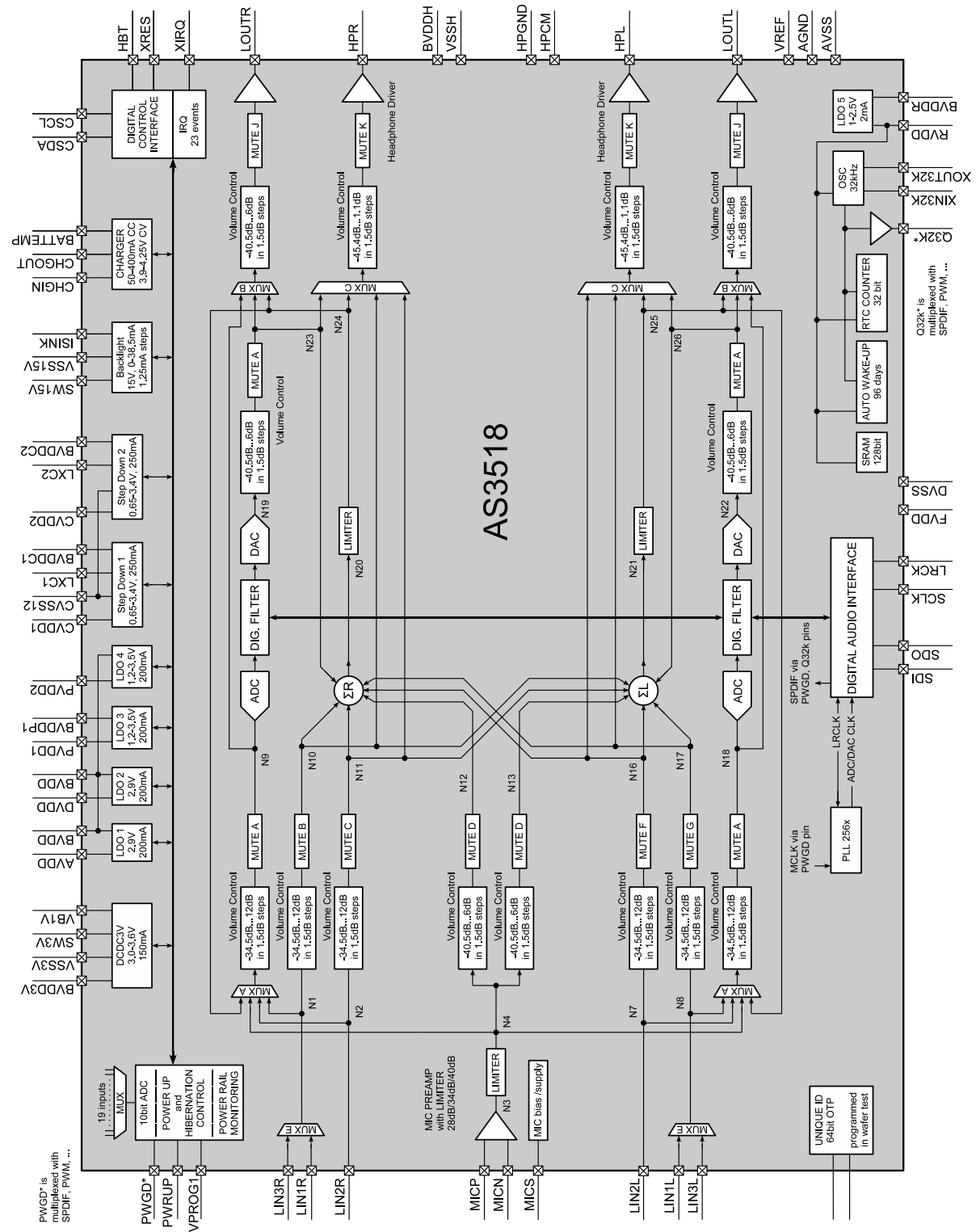
- Multi-bit Sigma Delta Converters
 - DAC: 18bit with 94dB SNR ('A' weighted)
 - ADC: 20bit with 90dB SNR ('A' weighted)
 - Sampling Frequency: 8-48kHz
- 1 Microphone Input
 - 3 gain pre-setting (28dB/34dB/40dB) and AGC
 - 32 gain steps @ 1.5dB and MUTE
 - supply for electret microphone
 - microphone detection
 - remote control by switch
- 3 Line Inputs
 - volume control via serial interface
 - 32 steps @ 1.5dB and MUTE
 - stereo or 2x mono or mono differential
- Audio Mixer
 - 8 channel input/output mixer with AGC
 - mixes line inputs and microphones with DAC
 - left and right channels independent
- Line Output
 - volume control via serial interface
 - 32 steps @ 1.5dB and MUTE
 - 1Vp @ 10k Ω
 - Stereo 2*5mW @ 16 Ω
 - Mono differential 10mW @ 32 Ω (earpiece)
- High Efficiency Headphone Amplifier
 - volume control via serial interface
 - 32 steps @ 1.5dB and MUTE
 - 2x60mW @ 16 Ω driver capability
 - headphone and over-current detection
 - phantom ground eliminates large capacitors
- Power Management
 - step down for CPU core (0.65V-3.4V, 250mA)
 - step down for peripheral (0.65V-3.4V, 250mA)
 - step up for backlight (15V (25V), 38mA), dimming, voltage control mode
 - LDO for AFE analog supply (2.9V, 200mA)
 - LDO for AFE digital supply (2.9V, 200mA)
 - LDO for peripherals (1.2V-3.5V, 200mA)
 - LDO for peripherals e.g. USB (1.2V-3.5V, 200mA)
 - power supply supervision
 - hibernation modes
 - 5sec and 10sec emergency shut-down
- Battery Charger
 - automatic trickle charge (50mA)
 - prog. constant current charging (50-460mA)
 - prog. constant voltage charging (3.9V-4.25V)
 - current limitation for USB mode
- Real Time Clock
 - ultra low power 32kHz oscillator
 - 32bit RTC sec counter, 96 days auto wake-up
 - selectable alarm (seconds or minutes)
 - 128bit free SRAM for random settings
 - 32kHz clock output to peripheral
 - voltage generation
 - <1uA total power consumption
- General Purpose ADC
 - 10bit resolution
 - 21 inputs analog multiplexer
- Interfaces
 - I²S digital audio interface and SPDIF
 - 2 wire serial control interface
 - reset pin, watchdog, power good pin
 - PWM output
 - 64bit unique ID (OTP)
 - 23 different interrupts
- Package CTBGA64 [7.0x7.0x1.1mm] 0.8mm pitch

3 Application

Portable Digital Audio Player and Recorder
PDA, Smartphone

4 Block Diagram

Figure 1 AS3518 Block Diagram



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