AS3654

Power Management Unit with 18 Bit Audio DAC + Headphone Amplifier, DCDC Charger, 3 Buck DCDCs, 3 Boost DCDCs, 5 LDOs, Current Sinks, ADC

1   General Description

The AS3654 is a highly integrated solution for power supply generation and monitoring, battery management including charging. It is controlled via a serial control interface and integrates all necessary system specific functions such as clock, reset and interrupt generation, voltage and temperature monitoring.
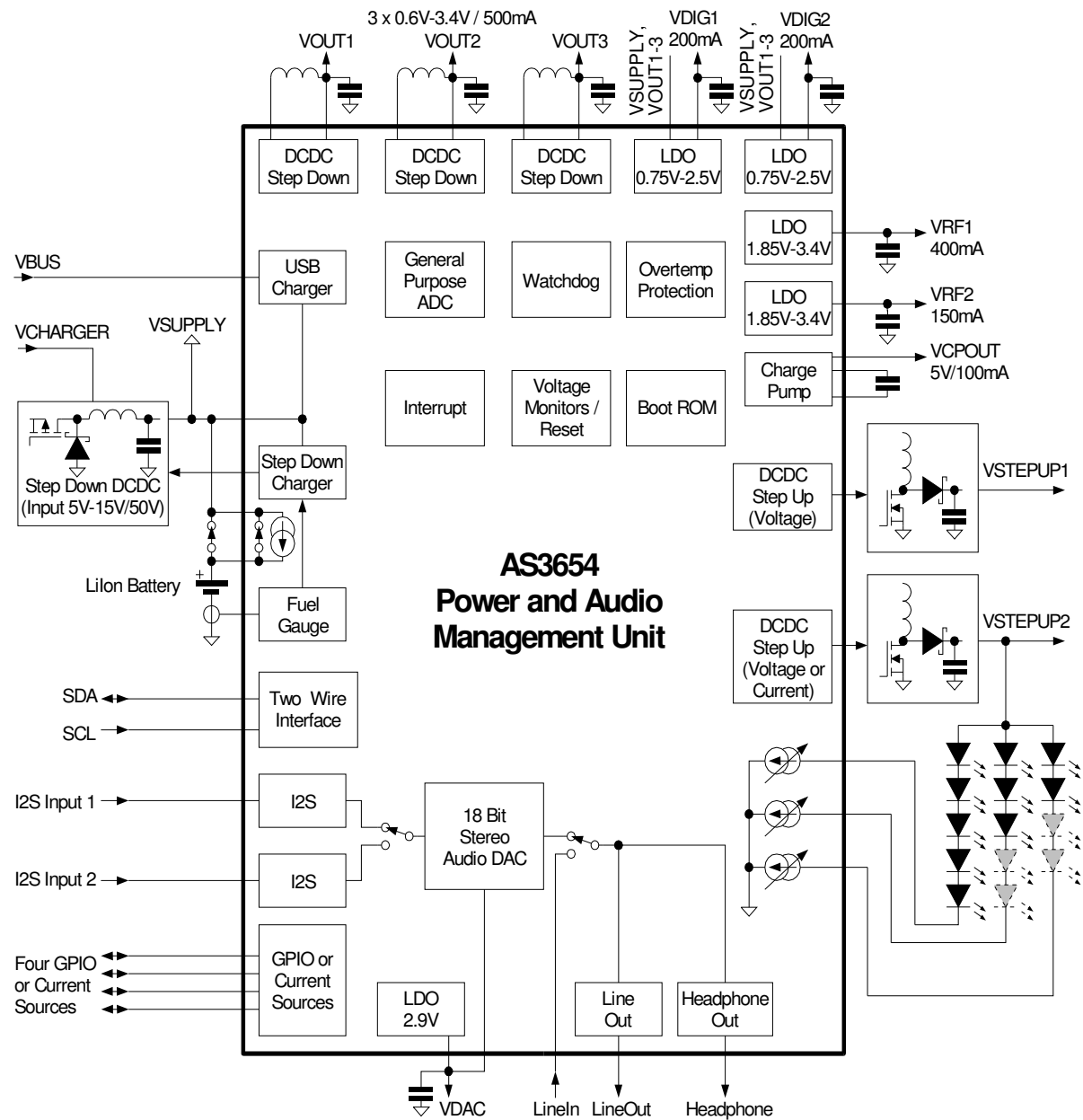
2   Key Features

- System Control
    - Serial Control Interface
    - On/Off Control Module
    - Reset Generation for system controller
    - Programmable Interrupt Controller
    - Watchdog
    - Low power off mode ($9\mu A$; 2.5V LDO on)

- Supply Voltage Generation
    - 1 RF Programmable Low Noise LDOs (400mA)
    - 1 RF Programmable Low Noise LDOs (150mA)2 RF Programmable Low Noise LDOs (150mA)
    - 2 Programmable Digital Low Power LDOs (200mA)
    - 2 General Purpose PWM DC/DC step up converter with two programmable current sinks (e.g. for white led)
    - 3 General Purpose high efficiency DC/DC step down converter
    - 1 Low noise charge pump with 5V output voltage
    - 1 Ultra Low Power 2.5V LDO (always on)

- Current sinks
    - 4 programmable(6-bit) from 0.625 to 40mA optional useable as GPIOs
    - 3 programmable high voltage (15V) (6-bit) from 0.625 to 40mA
    - internal PWM generator

- 10-bit Successive Approximation ADC

    - $40\mu s$ conversation time

- Battery Management
    - Full featured chemistry independent step down charger with included Gas Gauge and Current limitation
    - $0.2 \, \Omega$ Battery switch for start-up during trickle charging
    - Integrated USB charger up to 400mA

- Power Management Features
    - Wide Battery Supply Range 3.0…5.5V
    - On-Chip Bandgap Tuning for High Accuracy ($\pm1\%$)
    - Current protection
    - Thermal Protection with internal temperature sensor

- Audio
    - 18 Bit Audio DAC
    - Two Digital Audio Inputs (I2S interface)
    - 2.9V low Noise LDO for Audio DAC
    - Headphone Amplifier Output with GND separation
    - GND Buffer for Headphone Amplifier
    - Line/ Headphone output with GND separation

- Programmable System clock
    - 1.6 MHz to 2.3 MHz with 100 kHz steps

- Package
    - BGA100 9x9mm, 0.8mm pitch

3   Application

- Power Management Unit
- 1 Cell Li+ or 3 Cell NiMH powered devices
- Car battery powered systems with and without internal battery

4   Block Diagram

Figure 1 – AS3654 Block Diagram

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