Octal Ultrasound AFE with JESD204B

Preliminary Technical Data

AD9675

FEATURES

8 channels of LNA, VGA, AAF, ADC, and digital RF decimator
- **Low power: 150 mW per channel, TGC mode, 40 MSPS; 65mW per channel, CW mode; <30mW at power-up**
- **10 mm × 10 mm, 144-ball CSP-BGA**
- **TGC channel input-referred noise: 0.8 nV/√Hz, max gain**
- **Flexible power-down modes**
- **Fast recovery from low power standby mode: <2 µs**
- **Overload recovery: <10 ns**

Low noise preamplifier (LNA)
- **Input-referred noise: 0.78 nV/√Hz, gain = 21.6 dB**
- **Programmable gain: 15.6 dB/17.9 dB/21.6 dB**
- **0.1 dB compression: 1000 mV p-p/750 mV p-p/450 mV p-p**
- **Flexible active input impedance matching**

Variable gain amplifier (VGA)
- **Attenuator range: 45dB, Linear-in-dB gain control**
- **Postamp gain (PGA): 21 dB/24 dB/27 dB/30 dB**

Antialiasing filter (AAF)
- **Programmable second-order LPF from 8 MHz to 18 MHz or 13.5MHz to 30MHz and HPF**

Analog-to-digital converter (ADC)
- **SNR: 75dB, 14 bits up to 125 MSPS**

JESD204B Subclass 0 coded serial digital outputs

CW mode harmonic rejection I/Q demodulator
- **Individual programmable phase rotation**
- **Output dynamic range per channel: >160 dBc/√Hz**
- **Output-referred SNR: 156 dBc/√Hz, 1 kHz offset, −3dBFS**

RF digital high-pass filter and decimation by 2

GENERAL DESCRIPTION

The AD9675 is designed for low cost, low power, small size, and ease of use for medical ultrasound. It contains eight channels of a variable gain amplifier (VGA) with a low noise preamplifier (LNA), a CW harmonic rejection I/Q demodulator with programmable phase rotation, an anti-aliasing filter (AAF), an analog-to-digital converter (ADC), a digital high-pass filter and an RF decimation by 2.

Each channel features a maximum gain of up to 52 dB, a fully differential signal path, and an active input preamplifier termination. The channel is optimized for high dynamic performance and low power in applications where a small package size is critical.

The LNA has a single-ended-to-differential gain that is selectable through the SPI. Assuming a 15 MHz noise bandwidth (NBW) and a 21.6 dB LNA gain, the LNA input SNR is 94 dB. In CW Doppler mode, each LNA output drives an I/Q demodulator that has independently programmable phase rotation with 16 phase settings.

Power-down of individual channels is supported to increase battery life for portable applications. Standby mode allows quick power-up for power cycling. In CW Doppler operation, the VGA, AAF, and ADC are powered down. The ADC contains several features designed to maximize flexibility and minimize system cost, such as a programmable clock, data alignment, and programmable digital test pattern generation. The digital test patterns include built-in fixed patterns, built-in pseudo random patterns, and custom user-defined test patterns entered via the serial port interface.

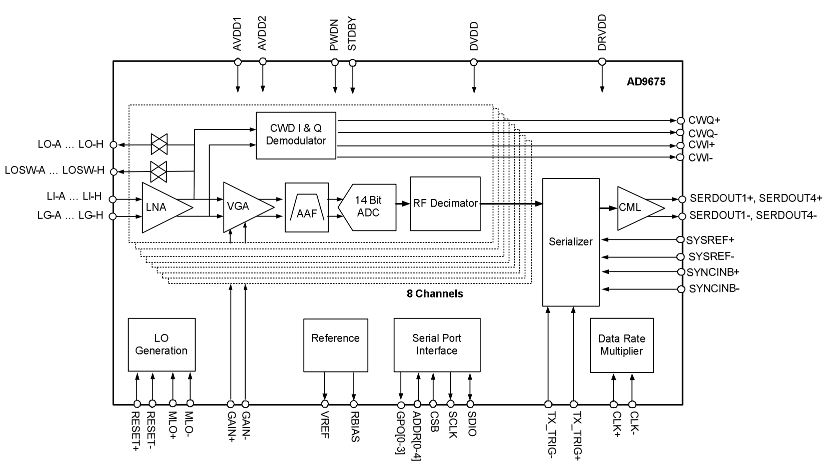

Figure 1.

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NOTES

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