Complete 3 V GSM/DCS1800 Codec

AD7015

FEATURES

+2.7 V to +5.5 V Supply Voltage
Baseband Codec
  Baseband Serial Port (BSPORT)
  Differential IRx, QRx, ITx and QTx
  Transmit Channel
    On-Chip Burst Store
    On-Chip GMSK Modulator
    Two 10-Bit D/A Converters
    Analog Reconstruction Filters
    On-Chip Offset Calibration
    Power-Down Mode
  Receive Channel
    Two 15-Bit Sigma-Delta A/D Converters
    FIR Digital Filters
    62 dB SNR and THD
    Twos Complement Coding
    On-Chip Offset Calibration
    Power-Down Mode
Auxiliary D/A Converters
Auxiliary A/D Converter
Auxiliary Serial Port (ASPORT)
On-Chip Ramp-Up/Ramp-Down Envelope RAM
Voiceband Codec
  Complete Linear Coded Codec
  16-Bit Sigma-Delta A/D Converter
  16-Bit Sigma-Delta D/A Converter
  On-Chip Antialiasing and Anti-Imaging Filters
  8 kHz Sampling Rate
  Twos Complement Coding
  62.5 dB SNR and THD
  Programmable Gain on DAC and ADC
  Voiceband Serial Port (VSPORT)
  Full DAI Support
  Power-Down Mode
On-Chip Voltage References
Low Power
Multiple 3 V/5 V Operating Modes
80-Pin TQFP

APPLICATIONS

GSM
DCS1800

GENERAL DESCRIPTION

The AD7015 is a monolithic 3 V/5 V CMOS combined voiceband codec/baseband codec for use in GSM mobile telephones. The chip performs all the data conversion functions needed in a GSM mobile cellular system and DCS1800 networks.

The baseband codec is a complete low power, two-channel, input/output port with signal conditioning. This section is utilized as a baseband digitization subsystem performing signal conversion between the DSP and the IF/RF sections in the Pan-European telephone system (GSM) and DCS1800 networks.

The transmit path consists of an on-board ROM, containing all the code necessary for performing Gaussian Minimum Shift Keying (GMSK) and two high accuracy, fast DACs with output reconstruction filters. The receive path is composed of two high performance sigma-delta ADCs with digital filtering. A common bandgap reference feeds the ADCs and signal DACs. The baseband functions of the AD7015 can be accessed via the baseband serial port (BSPORT) or the auxiliary serial port (ASPORT).

The voiceband codec is a complete analog front-end for high performance voiceband and DSP applications. The voiceband codec's linear-coded DAC and ADC maintain wide dynamic range throughout the transfer function while maintaining far superior SNR and THD in comparison to traditional μ-law and A-law codecs. It includes on-chip antialiasing and anti-imaging filters, 16-bit ADC, 16-bit DAC and programmable gain amplifiers. A serial I/O port (VSPORT) allows easy interfacing to industry standard DSP processors. Data transfers between the DSP and the AD7015 are 16 bits wide. The AD7015 VSPORT also supports the GSM Digital Audio Interface (DAI) standard where 13-bit transfers are used. The voiceband codec can be controlled using any of the three SPORTs.

Three control DACs are included for such functions as AFC, AGC and RF power control signals. A three channel ADC completes the available auxiliary converter functions. The auxiliary functions can be accessed via the auxiliary port (ASPORT) or the baseband port (BSPORT).

As it is a necessity for all GSM and DCS1800 mobile systems to use the lowest power possible, the device has power-down or sleep options for all sections. By setting appropriate bits in the on-chip control registers, power consumption can be reduced to a minimum.

The AD7015 is housed in an 80-pin TQFP.

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