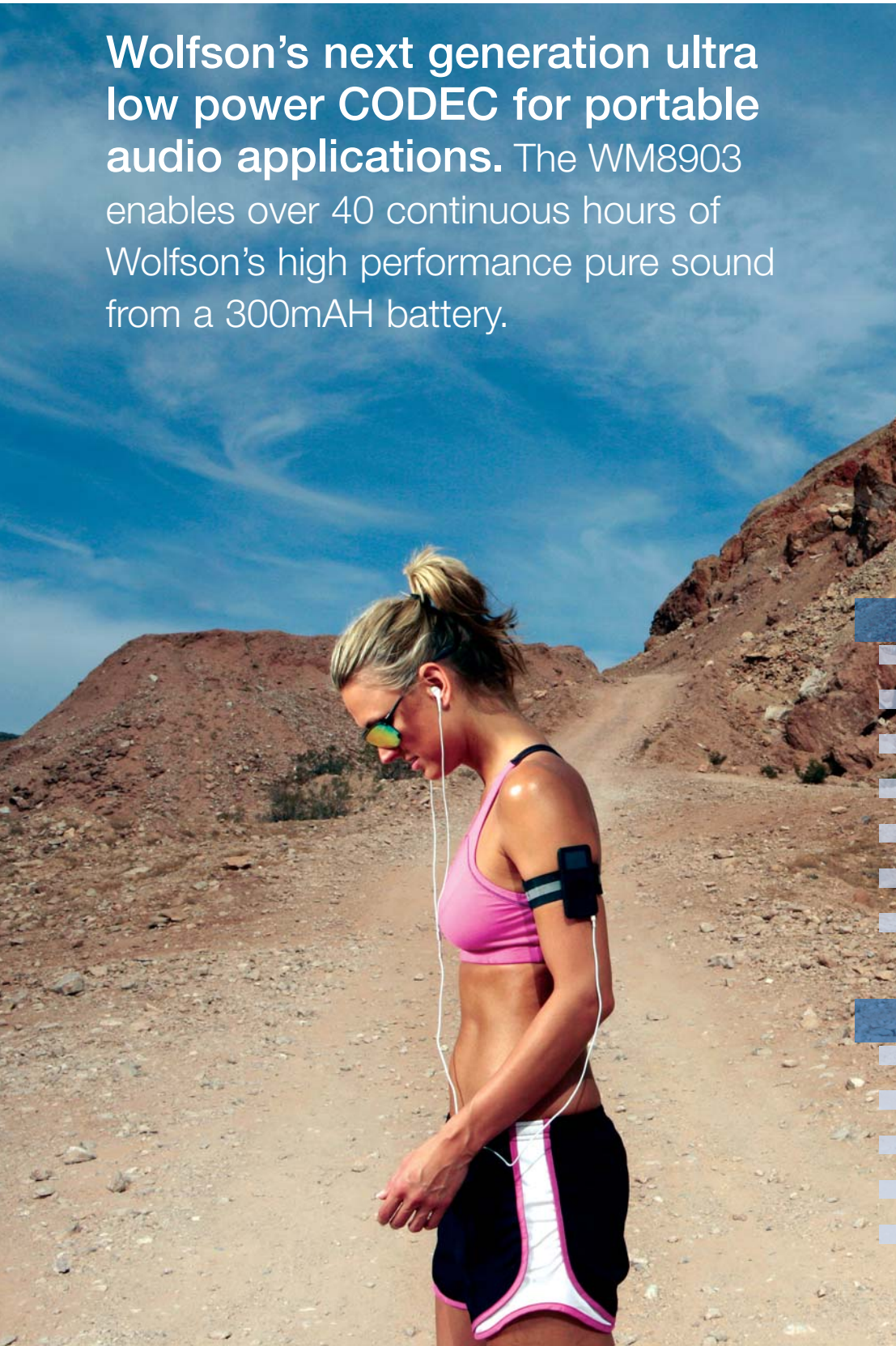


## WM8903

**Wolfson's next generation ultra low power CODEC for portable audio applications.** The WM8903 enables over 40 continuous hours of Wolfson's high performance pure sound from a 300mAH battery.



### BENEFITS SUMMARY

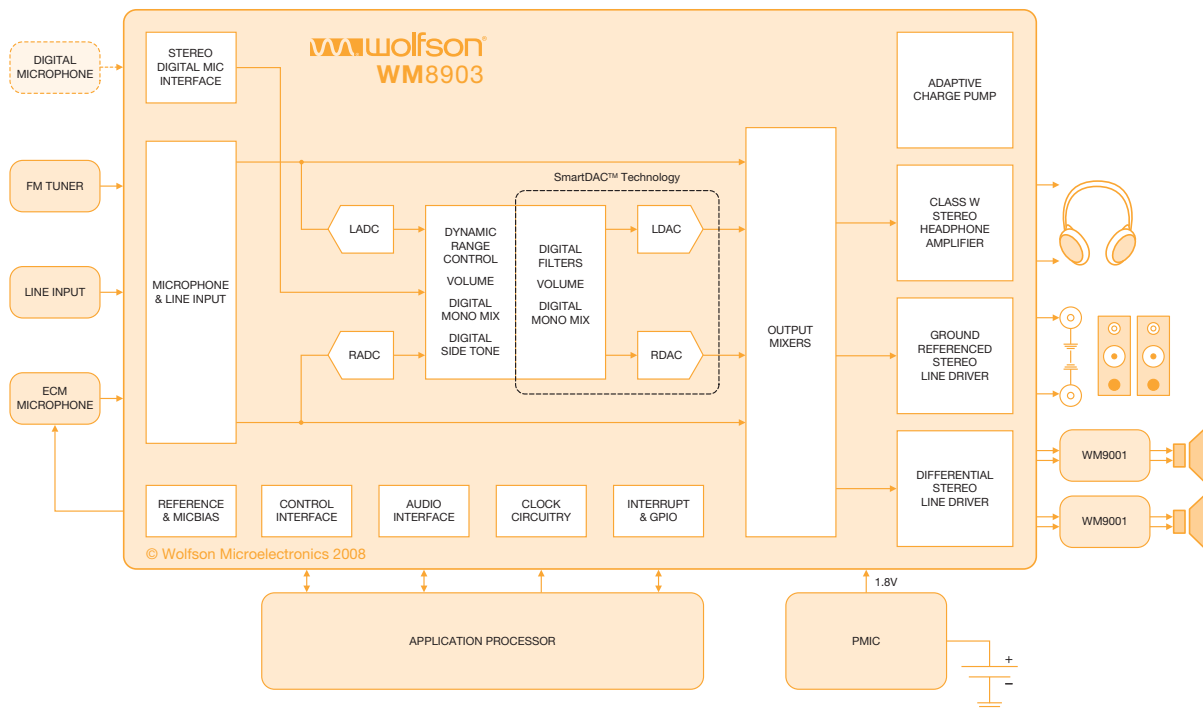
- Hi-Fi audio performance
- Longer battery life
- Reduced system cost
- Enables smaller and thinner products
- Supports diverse application designs
- Flexible system design
- Seamless connectivity

### TARGET APPLICATIONS

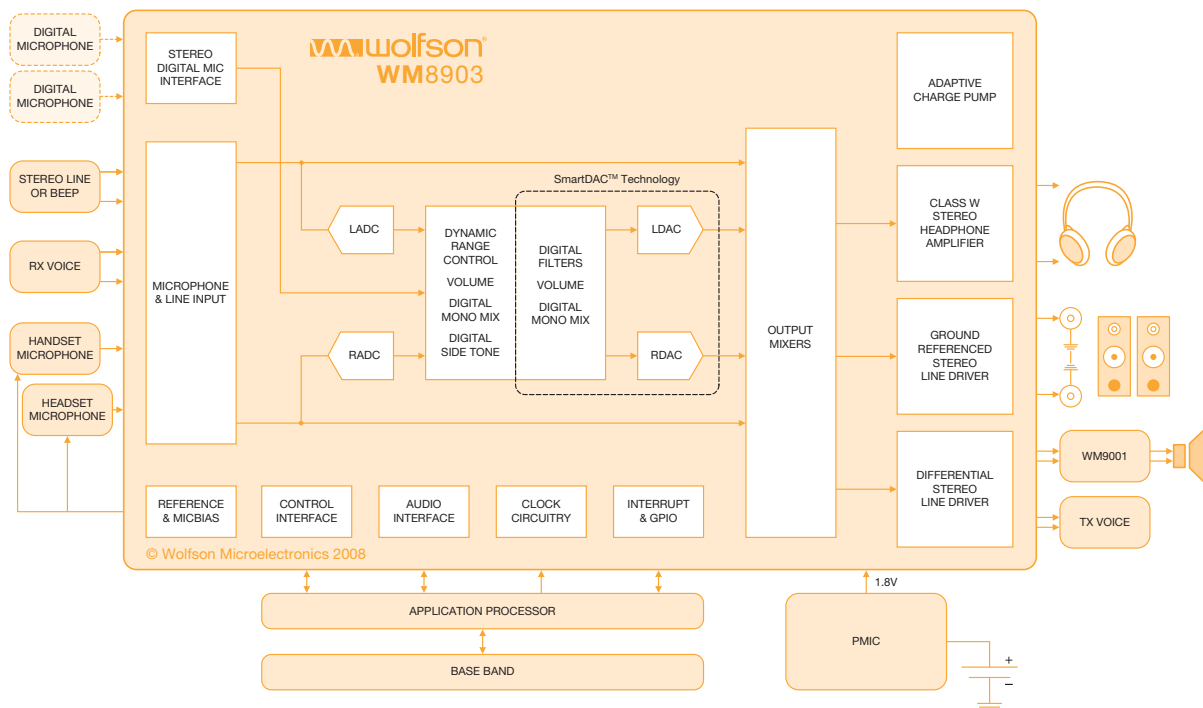
- PMP / MP3 players
- Multimedia handsets
- Handheld gaming
- Digital video cameras
- Voice recorders

## Wolfson AudioPlus™ ultra low power audio CODEC

### WM8903 IN A TYPICAL PMP APPLICATION



### WM8903 IN A TYPICAL MOBILE HANDSET APPLICATION



# WM8903

## PRODUCT BENEFITS

Wolfson's SmartDAC™ technology uses a unique capacitor switching architecture and allows the system designer to select optimum power consumption versus audio performance.

Choosing a capless ground referenced headphone driver used to mean compromising on power consumption, board area or audio quality. With the WM8903 Class W Adaptive Dual Drive headphone driver you no longer have to compromise.

Wolfson's Class W headphone amplifier technology tracks the actual music signal level and uses an adaptive dual drive charge pump to optimise power dissipation.

Wolfson SilentSwitch™ technology minimises audible pops and clicks. It integrates an output clamp which holds the headphone output at ground during system power up, an integrated sequencer to simplify register programming, and a DC servo controls DC offset in the signal path.

Incorporates an advanced dynamic range controller (DRC) to optimise record sound quality and a "quick release" impulse noise filter to improve the intelligibility of recorded sound in the presence of loud impulse noises.

WM8903 forms the core of distributed ultra low power audio subsystems; seamlessly connecting to digital and analogue microphones, line inputs, FM tuners, cellular baseband ICs, WM9001 Class AB/D speaker drivers, headphones and line outputs.

## PRODUCT DETAILS

**The WM8903 is the first device in a new family of ultra low power audio devices. It is designed to take the audio playback time of today's multimedia portable devices to a whole new level.**

### EXTENDING BATTERY LIFE AND PLAYBACK TIME

Low voltage digital signal processing, leading edge ultra low power DAC design and a highly efficient, adaptive charge pump which powers the audio output stages at optimal efficiency bring significant extensions to playback time. The WM8903 can operate from a common 1.8V supply for both analogue and digital power rails. An inherently high PSRR, helps to reduce the BOM and PCB area by powering the device from a common 1.8V digital supply and eliminating a dedicated audio regulator. For optimal power consumption the digital power supply can operate at 1.2V to maximise play back time.

### IMPROVING SYSTEM DESIGN

Truly capless headphone amplifier output stages are enabled by an innovative DC Servo architecture. This references the headphone output stage to ground, with minimal DC offsets which have traditionally caused power-up and mute/un-mute audio artefacts such as 'pops and clicks'. An integrated register write sequencer with programmable delay times brings additional control for optimal device configuration, which is critical in minimising these artefacts.

### ENHANCING THE LISTENING EXPERIENCE

Engineered to sound better; the WM8903 aims to enhance the consumer's listening experience by minimising audible pops and clicks and improving the bass response during audio playback. During recording, WM8903 minimises unwanted sounds such as wind, localised mechanical noise and drastic changes in ambient noise through the implementation of integrated dynamic range control, anti-clipping mechanisms and advanced digital filtering.

### FLEXIBILITY

A high degree of flexibility offers the system designer the option to use digital output microphones thanks to an integrated digital microphone interface that compliments six highly configurable analogue inputs for stereo microphone recording as well as connection to a variety of analogue audio sources; eg FM radio transmitter IC. Additional audio outputs allow seamless connection with WM9001 Class D speaker amplifiers in portable media platforms, which require speakers as well as headphone operation.

### SAVING SPACE AND COSTS

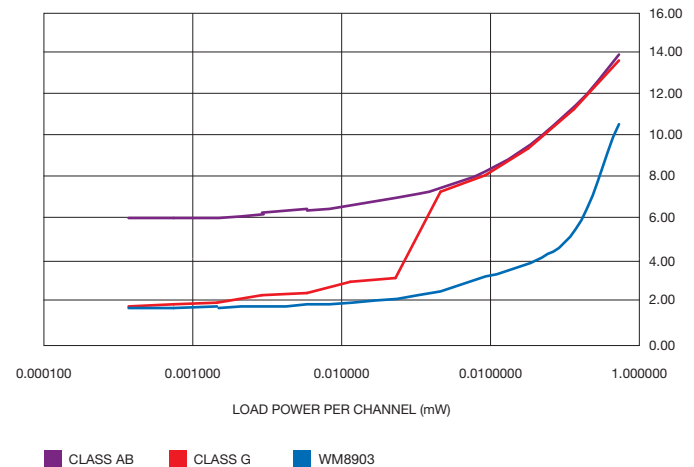
WM8903 comes in a small, ultra slim, low profile 5x5x0.55mm 40-pin QFN package. It requires a minimal number of external passive components, making the WM8903 ideal for space constrained portable applications, while reducing the bill of materials for the audio subsystem. The system designer selecting the WM8903 can choose to increase battery lifetime or reduce the battery size and cost.

## PRODUCT FEATURES

- 4.4mW quiescent power consumption in DAC to headphone
- 16mW stereo headphone output drivers
- DAC SNR = 96dB, THD+N = 82dB
- ADC SNR = 93dB, THD+N = 80dB
- +/- 1mV maximum DC offset at audio outputs
- Fully programmable control interface write sequencer
- Stereo digital microphone interface
- 3 x stereo 0.6V rms analogue inputs
- Stereo 1V rms line outputs
- Stereo 1V rms differential line outputs
- 4 fully independent mixers for driving output stages
- Digital signal side-tone mixing
- Ultra slim 5x5x0.55mm QFN40 package
- Supply voltages AVDD = 1.8V, DVDD = 1.2 – 1.8V
- 3MHz, 12MHz and 24MHz input clock frequencies supported
- PSRR of 60dB @ 1kHz

## WM8903 HEADPHONE AMPLIFIER POWER DISSIPATION

CLASS AB, CLASS G AND WM8903 COMPARISON  
TEST SIGNAL = IEC268-5 (FILTERED PINK NOISE)



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