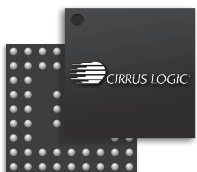




# Product Summary Guide



*Signal Processing Components*

## Cirrus Logic Product Summary Guide

# First choice in signal processing components





Cirrus Logic is a premier supplier of high-precision analog and digital signal processing components and is a world leader in the design of innovative custom, semi-custom and general-market ICs for the portable audio market. The company also leverages its world-class mixed-signal technology expertise to develop high-precision ICs for industrial applications, such as seismic and digital utility meters.



|                             |    |
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| Audio                       | 2  |
| Energy, Geophysical/Seismic | 18 |
| Industrial, Communication   | 22 |

## Innovation Leadership in Audio ICs

# Audio Components

Cirrus Logic's analog and mixed-signal audio converter technologies and audio processors are featured in the most recognized consumer, professional and automotive entertainment applications. Cirrus Logic is a world leader in audio solutions for portable audio, offering complete end-to-end solutions from the microphone to the speaker. In consumer and automotive entertainment systems, Cirrus Logic products drive innovation in popular applications such as home theater systems, docking stations, Bluetooth speakers, headphones and gaming devices. The company's reputation for superior-fidelity audio converters has driven success in professional audio applications as well including digital mixing consoles, multitrack digital recorders and effects processors. The combination of Cirrus Logic's best-in-class audio components, along with our sophisticated SoundClear™ voice-processing technology, provides a compelling value proposition for our customers.

### Audio DSPs

CS48520  
CS48540  
CS48560  
CS495314  
CS497014  
CS48L10  
CS48L11  
WM0010  
WM0011

### Audio A/D Converters

CS5343  
CS5344  
CS5340  
CS5341  
CS5342  
CS5346  
CS5351  
CS5361  
CS5364  
CS5366  
CS5368  
CS5381  
CS53L21

**CS53L30**

**NEW**

WM8950  
WM8952  
WM8775  
WM8738  
WM8781  
WM8782  
WM8786

WM8737  
WM8783  
WM8953

### Audio D/A Converters

CS4334/35/38/39  
CS4344/45/48  
CS4349  
CS4350  
CS4351  
CS4352  
CS4353  
CS4354  
CS4360  
CS4361  
CS4362A/82A  
CS4364/84  
CS4365/85  
CS4385A  
CS4392  
CS4398  
CS43L21  
CS43L22  
WM8761  
WM8766  
WM8768  
WM1824  
WM8501  
WM8521  
WM8523  
WM8524  
WM8533  
WM8716

WM8718  
WM8725  
WM8726  
WM8727  
WM8728  
WM8740  
WM8741  
WM8742  
WM8762  
WM8711BL  
WM8711L  
WM8912  
WM8918  
WM8955  
WM8956

### Smart Codecs

CS47024  
CS47028  
CS47048  
WM5102

**WM5102S**

**NEW**

**WM8998**

**NEW**

### Portable Codecs

CS42L51  
CS42L52  
CS42L55  
CS42L56  
CS42L73  
WM1811  
WM8946  
WM8948

WM8980  
WM8731  
WM8734  
WM8750  
WM8753  
WM8758  
WM8903  
WM8904  
WM8958  
WM8960  
WM8962  
WM8962B  
WM8973  
WM8976  
WM8978  
WM8983  
WM8985  
WM8988  
WM8993  
WM8994  
WM8996

### Mono/ Stereo Codecs

CS4245  
CS4265  
CS4270  
CS4271  
CS4272  
WM8569  
WM8776  
WM8778  
WM8510  
WM8940  
WM8974

### Multichannel Codecs

CS42416/26  
CS42418/28  
CS42432  
CS42435  
CS42436/38  
CS4244  
CS4234  
CS42448  
CS42516/26  
CS42518/28  
CS42888  
WM8580  
WM8581  
WM8594  
WM8595  
WM8770

### AC '97 and HD Audio Codecs

CS4202  
CS4205  
CS4299  
CS4207  
WM9707  
WM9714  
WM8850  
WM8860

### Voice Processors

**CS48LV12** NEW  
**CS48LV13** NEW

### Stereo Low Power Codec with Touchscreen Controller

WM9705  
WM9712  
WM9713  
WM9715

### Low Power Codec with Integrated Video Buffer

WM8941  
WM8944  
WM8945  
WM8946  
WM8948  
WM8980

### MEMS Microphones: Analog Silicon Microphone

WM7120  
WM7121D  
WM7121  
WM7121E

**WM7121P** NEW  
**WM7121PE** NEW  
**WM7133L** NEW

WM7132  
WM7132E  
WM7132D

**WM7132P** NEW  
**WM7132PE** NEW  
**WM7137** NEW  
**WM7137E** NEW  
**WM7331** NEW  
**WM7331E** NEW

### MEMS Microphones: Digital Silicon Microphone

WM7210  
WM7210E  
WM7211  
WM7211E  
WM7220  
WM7220E  
WM7230  
WM7230E  
WM7231  
WM7231E

**WM7236** NEW  
**WM7236E** NEW  
**WM7216** NEW  
**WM7216E** NEW

### Audio Amplifiers

CS35L00  
CS35L01  
CS35L03

**CS35L32** NEW

WM9010  
WM9081  
WM9082  
WM9094

### Ambient Noise Cancellation

WM2000  
WM2002  
WM2200

### Volume Control

CS3308  
CS3310  
CS3318

### Interfaces and Sample Rate Converters

CS8406  
CS8416  
CS8420  
CS8421  
CS8422  
CS8427  
WM8804  
WM8805

### Clock Generation and Jitter Reduction

CS2000  
CS2100  
CS2200  
CS2300

### Imaging A/D Converters

WM8152  
WM8196  
WM8199  
WM8213  
WM8214  
WM8215  
WM8224  
WM8232  
WM8233  
WM8234  
WM8235  
WM8253  
WM8255  
WM8259

### CobraNet® Transport and Audio Network Processor ICs

CS1810xx  
CS4961xx

# Audio DSPs

| Part Number                                                                                                                                                  | Processor         | Key Features & Firmware                                         | DSP Core Speed             | Operating Range | Package  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------------------------------------------------|----------------------------|-----------------|----------|
| <b>CS485xx</b>                                                                                                                                               |                   |                                                                 |                            |                 |          |
| <b>High performance, cost-effective 32-bit Audio DSP for consumer and automotive multichannel decoding and post processing applications.</b>                 |                   |                                                                 |                            |                 |          |
| CS48520                                                                                                                                                      | Single 32-bit     | 4-channel audio PP1                                             | 150 MHz<br>(300 M MAC/Sec) | 0 to 70 °C      | 48 QFP   |
| CS48540                                                                                                                                                      | Single 32-bit     | 8-channel audio PP1                                             | 150 MHz<br>(600 M MAC/Sec) | 0 to 70 °C      | 48 QFP   |
|                                                                                                                                                              |                   |                                                                 | 150 MHz<br>(300 M MAC/Sec) | -40 to 85 °C    |          |
| CS48560                                                                                                                                                      | Single 32-bit     | 8-channel audio PP1                                             | 150 MHz<br>(300 M MAC/Sec) | 0 to 70 °C      | 48 QFP   |
|                                                                                                                                                              |                   |                                                                 | 150 MHz<br>(300 M MAC/Sec) | -40 to 85 °C    |          |
| <b>CS4953xx</b>                                                                                                                                              |                   |                                                                 |                            |                 |          |
| <b>Single chip multistandard surround sound decoder targeted for playback from analog &amp; S/PDIF sources.</b>                                              |                   |                                                                 |                            |                 |          |
| CS495314                                                                                                                                                     | Dual 32-bit       | (DD, DDEX, DTS, DTSES, DTS96, AAC) + PP2                        | 150 MHz<br>(600 M MAC/Sec) | 0 to 70 °C      | 128 LQFP |
|                                                                                                                                                              |                   |                                                                 | 131 MHz<br>(600 M MAC/Sec) | -40 to 85 °C    |          |
| <b>CS4970xx</b>                                                                                                                                              |                   |                                                                 |                            |                 |          |
| <b>Single chip multistandard surround sound decoder targeted for playback from HD DVD™, Blu-ray Disc® players, and all analog, S/PDIF and HDMI® sources.</b> |                   |                                                                 |                            |                 |          |
| CS497014                                                                                                                                                     | Dual 32-bit       | (DD+, DTHD, DD, DDEX, AAC) + PP2                                | 150 MHz<br>(600 M MAC/Sec) | 0 to 70 °C      | 128 LQFP |
|                                                                                                                                                              |                   |                                                                 | 131 MHz<br>(600 M MAC/Sec) | -40 to 85 °C    |          |
| CS497024                                                                                                                                                     | Dual 32-bit       | (DTS, DTS-ES, DTS96/24, DTS-HD, DD+, DTHD, DD, DDEX, AAC) + PP2 | 150 MHz<br>(600 M MAC/Sec) | 0 to 70 °C      | 128 LQFP |
|                                                                                                                                                              |                   |                                                                 | 131 MHz<br>(600 M MAC/Sec) | -40 to 85 °C    |          |
| <b>CS48Lxx</b>                                                                                                                                               |                   |                                                                 |                            |                 |          |
| <b>Ultra low power voice and Audio DSP subsystem.</b>                                                                                                        |                   |                                                                 |                            |                 |          |
| CS48L10                                                                                                                                                      | Single 32-bit     | MP3, WMA, AAC                                                   | 1.0 V 80 MHz               | 0 to 70 °C      | 24 QFN   |
|                                                                                                                                                              |                   |                                                                 | 1.2 V 130 MHz              | 0 to 70 °C      | 20 WLCSP |
|                                                                                                                                                              |                   |                                                                 | 1.0 V 80 MHz               | -40 to 85 °C    |          |
|                                                                                                                                                              |                   |                                                                 | 1.2 V 130 MHz              | -40 to 85 °C    |          |
|                                                                                                                                                              |                   |                                                                 | 1.0 V 80 MHz               | -40 to 105 °C   |          |
|                                                                                                                                                              |                   |                                                                 | 1.2 V 130 MHz              | -40 to 105 °C   |          |
| CS48L11                                                                                                                                                      | Single 32-bit     | MP3, WMA, AAC, AC3, OH, PL2                                     | 1.0 V 80 MHz               | 0 to 70 °C      | 24 QFN   |
|                                                                                                                                                              |                   |                                                                 | 1.2 V 150 MHz              |                 |          |
|                                                                                                                                                              |                   |                                                                 | 1.0 V 80 MHz               | -40 to 85 °C    |          |
|                                                                                                                                                              |                   |                                                                 | 1.2 V 150 MHz              |                 |          |
|                                                                                                                                                              |                   |                                                                 | 1.0 V 80 MHz               | -40 to 105 °C   |          |
|                                                                                                                                                              |                   |                                                                 | 1.2 V 150 MHz              |                 |          |
| <b>WM00xx</b>                                                                                                                                                |                   |                                                                 |                            |                 |          |
| <b>Ultra low power voice and Audio DSP subsystem targeted for: mini-systems, DVD receivers, soundbars, car audio, DTVs.</b>                                  |                   |                                                                 |                            |                 |          |
| WM0010                                                                                                                                                       | Tensilica HiFi 2  | Embedded system software with RTOS                              | 208 MHz                    | -40 to 85 °C    | 42 WLCSP |
| WM0011                                                                                                                                                       | Tensilica HiFi EP | Embedded system software with RTOS                              | 260 MHz                    | -40 to 85 °C    | 49 WLCSP |

# Audio A/D Converters

| Part Number | Channels | Resolution (bits) | Dynamic Range (dB) | THD+N (dB) | Sample Rate (kHz) | Analog Inputs                | Power Supply (V)                                      | Comments                                                    | Package             |
|-------------|----------|-------------------|--------------------|------------|-------------------|------------------------------|-------------------------------------------------------|-------------------------------------------------------------|---------------------|
| CS5340      | 2        | 24                | 101                | -94        | 192               | Single-ended                 | VA = 3.3 or 5<br>VD = 3.3 or 5<br>VL = 1.8 to 5       | Pin compatible with CS5341                                  | 16 TSSOP            |
| CS5341      | 2        | 24                | 105                | -98        | 192               | Single-ended                 | VA = 3.3 or 5<br>VD = 3.3 or 5<br>VL = 1.8 to 5       | Pin compatible with CS5340                                  | 16 TSSOP            |
| CS5342      | 2        | 24                | 105                | -98        | 192               | Single-ended                 | VA = 3.3 or 5<br>VD = 3.3 or 5<br>VL = 2.5 to 5       | 384*Fs MCLK                                                 | 16 TSSOP            |
| CS5343      | 2        | 24                | 98                 | -92        | 96                | Single-ended                 | VA = 3.3 or 5                                         | I <sup>2</sup> S                                            | 10 TSSOP            |
| CS5344      | 2        | 24                | 98                 | -92        | 96                | Single-ended                 | VA = 3.3 or 5                                         | LJ                                                          | 10 TSSOP            |
| CS5346      | 6        | 24                | 103                | -95        | 192               | Single-ended                 | VA = 5<br>VD = 3.3<br>VL = 3.3 to 5                   | 6:1 input MUX, PGA, MIC pre-amp, high input impedance       | 48 LQFP             |
| CS5351      | 2        | 24                | 108                | -98        | 192               | Single-ended                 | VA = 5<br>VD = 3.3 or 5<br>VL = 2.5 to 5              | Functionally compatible with CS5361                         | 24 SOIC<br>24 TSSOP |
| CS5361      | 2        | 24                | 114                | -105       | 192               | Differential                 | VA = 5<br>VD = 3.3 or 5<br>VL = 2.5 to 5              | Pin compatible with CS5381                                  | 24 SOIC<br>24 TSSOP |
| CS5364      | 4        | 24                | 114                | -105       | 192               | Differential                 | VA = 5<br>VD = 3.3 or 5<br>VLS/VLC = 1.8 to 5         | TDM interface, on-chip oscillator                           | 48 LQFP             |
| CS5366      | 6        | 24                | 114                | -105       | 192               | Differential                 | VA = 5<br>VD = 3.3 or 5<br>VLS/VLC = 1.8 to 5         | TDM interface, on-chip oscillator                           | 48 LQFP             |
| CS5368      | 8        | 24                | 114                | -105       | 192               | Differential                 | VA = 5<br>VD = 3.3 or 5<br>VLS/VLC = 1.8 to 5         | TDM interface, on-chip oscillator                           | 48 LQFP             |
| CS5381      | 2        | 24                | 120                | -110       | 192               | Differential                 | VA = 5<br>VD = 3.3 or 5<br>VL = 2.5 to 5              | Flagship performance                                        | 24 SOIC<br>24 TSSOP |
| CS53L21     | 2        | 24                | 98                 | -88        | 96                | Single-ended                 | VA = 1.8 to 2.5<br>VD = 1.8 to 2.5<br>VL = 1.8 to 3.3 | ADC MUX, PGA, MIC pre-amp                                   | 32 QFN              |
| NEW CS53L30 | 4        | 24                | 91                 | -84        | 8 – 48            | Single-ended<br>Differential | VP = 3 to 5<br>VA = 1.8                               | TDM interface, <2.5 mW, mono analog MIC record, 4x MIC-bias | 30 WLCSP<br>32 QFN  |
|             | 1        | 24                | 90                 | -80        | 8 – 48            | Single-ended<br>Differential | VA = 2.7 to 3.6<br>VD = 1.7 to 3.6                    | EQ, DSP filters, PGA, Master/Slave, PLL                     | 24 QFN              |
| WM8952      | 1        | 24                | 94                 | -80        | 8 – 48            | Single-ended<br>Differential | VA = 2.5 to 3.6<br>VD = 1.71 to 3.6                   | HPF, DSP filters, PGA, Master/Slave, PLL                    | 28 WLCSP            |
| WM8775      | 8        | 24                | 102                | -90        | 32 – 96           | Differential                 | VA = 2.7 to 5.5<br>VD = 2.7 to 3.6                    | ALC 2.0 V <sub>RMS</sub> inputs, 2/3-wire SW control        | 28 SSOP             |
| WM8738      | 2        | 24                | 90                 | -87        | 96                | Single-ended                 | VA = 3 to 5.5<br>VD = 3 to 3.6                        | Master/Slave, HW control                                    | 14 SOIC             |
| WM8781      | 2        | 24                | 102                | -90        | 192               | Single-ended                 | VA = 2.7 to 5.5<br>VD = 2.7 to 3.6                    | Master/Slave, HW control                                    | 20 SSOP             |
| WM8782      | 2        | 24                | 102                | -90        | 192               | Single-ended                 | VA = 2.7 to 5.5<br>VD = 2.7 to 3.6                    | Master/Slave, HW control                                    | 20 SSOP             |
| WM8786      | 2        | 24                | 111                | -102       | 192               | Differential                 | VA = 4.5 to 5.5<br>VD = 2.7 to 3.6                    | Master/Slave, HW control                                    | 20 SSOP             |
| WM8737      | 2        | 24                | 97                 | -86        | 16 – 96           | Single-ended                 | VA = 1.8 to 3.6<br>VD = 1.42 to 3.6                   | ALC, PGA, Master/Slave                                      | 32 QFN              |
| WM8783      | 2        | 24                | 95                 | -83        | 8 – 96            | Single-ended                 | VA = 3 to 3.6<br>VD = 3 to 3.6                        | PGA                                                         | 8 SOIC              |
| WM8953      | 2        | 24                | 94                 | -82        | 8 – 48            | Differential                 | VA = 2.7 to 3.6<br>VD = 1.71 to 3.6                   | Boost stages for each PGA, TDM interface, Master/Slave, PLL | 42 WLCSP            |

# Voice Processors

| Part Number | Processor | Voice Bands     | Speech Algorithms     | Playback Algorithms                                                | Speed (MIPS)                                              | Operating Range | I/O Voltage                 | Package                           |
|-------------|-----------|-----------------|-----------------------|--------------------------------------------------------------------|-----------------------------------------------------------|-----------------|-----------------------------|-----------------------------------|
| NEW         | CS48LV12  | 32-Bit Dual MAC | Narrow, HD Voice/Wide | None                                                               | Cirrus Logic (included)                                   | 130             | 0 to 70 °C<br>-40 to 105 °C | 1.8 – 3.3 V<br>20 WLCSP<br>24 QFN |
|             | CS48LV13  | 32-Bit Dual MAC | Narrow, HD Voice/Wide | ASR Enhanced (included), VAD (included), TrulyHandsfree (optional) | Cirrus Logic (included), Dolby (optional), DTS (optional) | 130             | 0 to 70 °C<br>-40 to 155 °C | 1.8 – 3.3 V<br>20 WLCSP<br>24 QFN |

# Audio D/A Converters

| Part Number     | Channels | Resolution (bits) | Dynamic Range (dB) | THD+N (dB) | Sample Rate (kHz) | Analog Outputs            | Power Supply (V)                                                               | Output Level (V <sub>RMS</sub> ) | Comments                                                                                   | Package  |
|-----------------|----------|-------------------|--------------------|------------|-------------------|---------------------------|--------------------------------------------------------------------------------|----------------------------------|--------------------------------------------------------------------------------------------|----------|
| CS4334/35/38/39 | 2        | 24                | 96                 | -88        | 96                | Single-ended              | VA = 5                                                                         | 1.2                              | Entry-level stereo DAC                                                                     | 8 SOIC   |
| CS4344/45/48    | 2        | 24                | 105                | -90        | 192               | Single-ended              | VA = 3.3 or 5                                                                  | 1.1                              | Upgrade for CS4340 and CS4340A                                                             | 10 TSSOP |
| CS4349          | 2        | 24                | 101                | -91        | 192               | Single-ended              | VA = 3.3 or 5                                                                  | 1                                | Volume control                                                                             | 24 TSSOP |
| CS4350          | 2        | 24                | 109                | -91        | 192               | Single-ended Differential | VA = 3.3 or 5<br>VLC = 3.3 to 5<br>VLS = 1.5 to 5                              | 2                                | Integrated PLL, TDM interface                                                              | 24 TSSOP |
| CS4351          | 2        | 24                | 112                | -100       | 192               | Single-ended              | VA = 9 or 12<br>VD = 3.3<br>VL = 1.8 to 3                                      | 2                                | Line-level driver                                                                          | 20 TSSOP |
| CS4352          | 2        | 24                | 106                | -93        | 192               | Single-ended              | VA = 9 or 12<br>VD = 3.3<br>VL = 1.5 to 5                                      | 2                                | Line-level driver                                                                          | 20 TSSOP |
| CS4353          | 2        | 24                | 106                | -93        | 192               | Single-ended              | VA = 3.3<br>VCP = 3.3<br>VL = 0.9 to 3.3                                       | 2                                | Ground-centered line-level outputs                                                         | 24 QFN   |
| CS4354          | 2        | 24                | 101                | -86        | 192               | Single-ended              | VA/VD = 5.0<br>VL = 1.5 to 5.0                                                 | 2                                | Line-level driver                                                                          | 14 SOIC  |
| CS4360          | 6        | 24                | 102                | -91        | 192               | Single-ended              | VA = 3.3 or 5<br>VD = 3.3 or 5<br>VL = 1.8 to 5                                | 1.1                              | Entry-level DAC                                                                            | 28 TSSOP |
| CS4361          | 6        | 24                | 105                | -95        | 192               | Single-ended              | VA = 5<br>VL = 1.8 to 5                                                        | 1.1                              | Entry-level DAC                                                                            | 20 TSSOP |
| CS4362A/82A     | 6/8      | 24                | 114                | -100       | 192               | Differential              | VA = 5<br>VD = 2.5<br>VL = 1.8 to 5                                            | 2.3                              | DSD                                                                                        | 48 LQFP  |
| CS4364/84       | 6/8      | 24                | 103                | -88        | 192               | Single-ended              | VA = 5<br>VD = 2.5<br>VL = 1.8 to 5                                            | 1.1                              | DSD, footprint compatible with CS4365/85                                                   | 48 LQFP  |
| CS4365/85       | 6/8      | 24                | 114                | -100       | 192               | Differential              | VA = 5<br>VD = 2.5<br>VL = 1.8 to 5                                            | 2.5                              | DSD, TDM interface                                                                         | 48 LQFP  |
| CS4385A         | 8        | 24                | 114                | -100       | 192               | Differential              | VA = 5<br>VD = 2.5<br>VL = 1.8 to 5                                            | 2.3                              | DSD, TDM interface. Access to TDM through hardware mode with a wider range of TDM timings. | 48 LQFP  |
| CS4392          | 2        | 24                | 114                | -100       | 192               | Differential              | VA = 5<br>VL = 1.8 to 5                                                        | 1.7                              | DSD, selectable digital filters, pin compatible with CS4391A                               | 20 TSSOP |
| CS4398          | 2        | 24                | 120                | -107       | 192               | Differential              | VA = 5<br>VD = 3.3 or 5<br>VL = 1.8 to 5                                       | 2.3                              | Flagship DAC, DSD processor, selectable D-filter                                           | 28 TSSOP |
| CS43L21         | 2        | 24                | 98                 | -86        | 96                | Single-ended              | VA = 1.8 to 2.5<br>VD = 1.8 to 2.5<br>VL = 1.8 to 3.3                          | 1.3                              | HP amp, volume control                                                                     | 32 QFN   |
| CS43L22         | 2        | 24                | 98                 | -88        | 96                | Single-ended              | VA = 1.65 to 2.83<br>VD = 1.65 to 2.83<br>VP = 2.37 to 5.35<br>VL = 1.8 to 3.3 | 1.3                              | HP amp, Class-D speaker amp                                                                | 40 QFN   |



# Audio D/A Converters *(continued)*

| Part Number | Channels | Resolution (bits) | Dynamic Range (dB) | THD+N (dB) | Sample Rate (kHz) | Analog Outputs | Power Supply (V)                                           | Output Level (V <sub>RMS</sub> ) | Comments                                                                    | Package           |
|-------------|----------|-------------------|--------------------|------------|-------------------|----------------|------------------------------------------------------------|----------------------------------|-----------------------------------------------------------------------------|-------------------|
| WM8761      | 2        | 24                | 100                | -90        | 192               | Single-ended   | VA = 2.7 to 5.5<br>VD = 2.7 to 5.5                         | 1                                | HW control                                                                  | 14 SOIC           |
| WM8766      | 6        | 24                | 103                | -90        | 192               | Single-ended   | VA = 2.7 to 5.5<br>VD = 2.7 to 3.6                         | 1                                | Digital volume control, HW and 3-wire SW control                            | 28 SSOP           |
| WM8768      | 8        | 24                | 103                | -90        | 192               | Single-ended   | VA = 2.7 to 5.5<br>VD = 2.7 to 3.6                         | 1                                | Digital volume control, HW and 3-wire SW control                            | 28 SSOP           |
| WM1824      | 2        | 24                | 106                | -88        | 192               | Single-ended   | VA = 2.97 to 3.63<br>VD = 1.62 to 3.63                     | 2.1                              | HW control                                                                  | 24 QFN            |
| WM8501      | 2        | 24                | 100                | -88        | 192               | Single-ended   | VA = 4.5 to 5.5<br>VD = 2.7 to 5.5                         | 1.7                              | HW control                                                                  | 14 SOIC           |
| WM8521      | 2        | 24                | 98                 | -81        | 192               | Single-ended   | VA = 8.2 to 13.2<br>VD = 2.7 to 3.6                        | 2                                | HW control                                                                  | 14 SOIC           |
| WM8523      | 2        | 24                | 106                | -93        | 192               | Single-ended   | VA = 3 to 3.6<br>VD = 3 to 3.6                             | 2                                | Digital volume control, HW and 2/3-wire SW control                          | 20 TSSOP          |
| WM8524      | 2        | 24                | 106                | -93        | 192               | Single-ended   | VA = 3 to 3.6<br>VD = 3 to 3.6                             | 2.1                              | HW control                                                                  | 16 TSSOP          |
| WM8533      | 2        | 24                | 106                | -89        | 192               | Single-ended   | VA = 2.97 to 3.63 (Typ 3.3)<br>VD = 1.62 to 3.63 (Typ 1.8) | 2.1                              | HW and 2/3-wire SW control                                                  | 20 WLCSP          |
| WM8716      | 2        | 24                | 112                | -97        | 192               | Single-ended   | VA = 3 to 5.5<br>VD = 3 to 5.5                             | 1.1                              | Selectable digital filter response, HW and 3-wire SW control                | 28 SSOP           |
| WM8718      | 2        | 24                | 111                | -100       | 192               | Differential   | VA = 3 to 5.5<br>VD = 3 to 5.5                             | 2                                | Digital volume control, 3-wire SW control                                   | 20 SSOP           |
| WM8725      | 2        | 24                | 99                 | -80        | 8 – 96            | Single-ended   | VA = 2.7 to 5.5<br>VD = 2.7 to 5.5                         | 1                                | HW control                                                                  | 14 SOIC           |
| WM8726      | 2        | 24                | 100                | -88        | 192               | Single-ended   | VA = 2.7 to 5.5<br>VD = 2.7 to 5.5                         | 1.1                              | HW control                                                                  | 14 SOIC           |
| WM8727      | 2        | 24                | 98                 | -84        | 192               | Single-ended   | VA = 2.7 to 5.5<br>VD = 2.7 to 5.5                         | 1.2                              | HW control                                                                  | 8 SOIC            |
| WM8728      | 2        | 24                | 106                | -97        | 192               | Single-ended   | VA = 3 to 5.5<br>VD = 3 to 5.5                             | 1.1                              | Digital volume control, HW and 2/3-wire SW control                          | 20 SSOP           |
| WM8740      | 2        | 24                | 120                | -104       | 192               | Differential   | VA = 3 to 5.5<br>VD = 3 to 5.5                             | 2                                | Selectable digital filter response, HW and 3-wire SW control                | 28 SSOP           |
| WM8741      | 2        | 24                | 128                | -100       | 192               | Differential   | VA = 4.5 to 5.5<br>VD = 3 to 3.6                           | 2                                | Selectable advanced digital filter responses, HW and 2/3-wire SW control    | 28 SSOP           |
| WM8742      | 2        | 24                | 126                | -100       | 192               | Differential   | VA = 4.5 to 5.5<br>VD = 3 to 3.6                           | 2                                | Selectable advanced digital filter responses, HW and 2/3-wire SW control    | 28 SSOP           |
| WM8762      | 2        | 24                | 98                 | -84        | 192               | Single-ended   | VA = 2.7 to 5.5<br>VD = 2.7 to 5.5                         | 1.2                              | HW control                                                                  | 8 SOIC            |
| WM8711BL    | 2        | 24                | 90                 | -86        | 8 – 96            | Single-ended   | VA = 1.8 to 3.6<br>VD = 1.42 to 3.6                        | 1                                | Output volume and mute control, HP driver, Line-in to mixer, OSC            | 24 QFN            |
| WM8711L     | 2        | 24                | 90                 | -86        | 8 – 96            | Single-ended   | VA = 1.8 to 3.6<br>VD = 1.42 to 3.6                        | 1                                | Output volume and mute control, HP driver, Line-in to mixer, OSC            | 28 SSOP<br>28 QFN |
| WM8912      | 2        | 24                | 96                 | -86        | 8 – 96            | Single-ended   | VA = 1.7 to 2<br>VD = 1 to 3.6                             | 1                                | DRC, ReTune™ Mobile, control write sequencer, HP driver, FLL                | 32 QFN            |
| WM8918      | 2        | 24                | 96                 | -86        | 8 – 96            | Single-ended   | VA = 1.71 to 2.0<br>VD = 1.42 to 3.6                       | 1                                | 5 band EQ, DRC, digital MIC interface, HP driver, FLL                       | 32 QFN            |
| WM8955      | 2        | 24                | 98                 | -86        | 8 – 96            | Single-ended   | VA = 1.8 to 3.6<br>VD = 1.42 to 3.6                        | 1                                | Tone control and bass boost, HP driver, Line-in to mixer, PLL               | 28 QFN<br>32 QFN  |
| WM8956      | 2        | 24                | 99                 | -84        | 8 – 96            | Single-ended   | VA = 2.7 to 5.5<br>VD = 1.71 to 3.6                        | 1                                | Direct battery connection, HP driver, Speaker driver, Line-in to mixer, PLL | 32 QFN            |

# Smart Codecs

| Part Number | DACs / ADCs | DAC Dynamic Range (dB) | DAC THD+N (dB) | ADC Dynamic Range (dB) | ADC THD+N (dB) | Sample Rate (kHz) | Analog I/O                   | Power Supply (V)                     | DSP and Other Features                                                                                                                                                                                         | Package   |
|-------------|-------------|------------------------|----------------|------------------------|----------------|-------------------|------------------------------|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| CS47024     | 4 / 2       | 108                    | -98            | 105                    | -98            | 96                | Differential                 | VA = 3.3<br>VD = 1.8                 | Single 32-bit DSP core, 150 MIPS, 5:1 MUX on ADC, clock PLL, 2ch hardware SRC, S/PDIF Tx                                                                                                                       | 100 LQFP  |
| CS47028     | 8 / 2       | 108                    | -98            | 105                    | -98            | 96                | Differential                 | VA = 3.3<br>VD = 1.8                 | Single 32-bit DSP core, 150 MIPS, 5:1 MUX on ADC, clock PLL, 8ch hardware SRC, S/PDIF Rx/Tx                                                                                                                    | 100 LQFP  |
| CS47048     | 8 / 4       | 108                    | -98            | 105                    | -98            | 96                | Differential                 | VA = 3.3<br>VD = 1.8                 | Single 32-bit DSP core, 150 MIPS, 5:1 MUX on one 2ch ADC, clock PLL, 8ch hardware SRC, S/PDIF Rx/Tx                                                                                                            | 100 LQFP  |
| WM5102      | 7 / 6       | 112                    | -89            | 96                     | -88            | 192               | Single-ended<br>Differential | VA = 1.7 to 5.5<br>VD = 1.14 to 1.9  | Tx noise reduction, AEC, Rx speech clarity, Dynamic range control, parametric EQ, DSP filters, ASRC, haptic control signal generator, SLIMbus interface, 3x digital audio interface, HP/speaker amps, dual FLL | 137 WLCSP |
| NEW WM5102S | 7 / 6       | 120                    | -89            | 96                     | -88            | 192               | Single-ended<br>Differential | VA = 1.7 to 5.5<br>VD = 1.14 to 1.9  | Master Hi-Fi, Dynamic range control, parametric EQ, DSP filters, ASRC, haptic control signal generator, SLIMbus interface, 3x digital audio interface, HP/speaker amps, dual FLL                               | 137 WLCSP |
| WM8998      | 7 / 3       | 122                    | -89            | 96                     | -88            | 192               | Single-ended<br>Differential | VA = 1.7 to 5.5<br>VD = 1.14 to 3.74 | Wind noise reduction, Dynamic range control, Parametric EQ, DSP filters, ASRC, SLIMbus interface, 3x digital audio interface, dual FLL                                                                         | 117 WLCSP |

# Portable Codecs

| Part Number | DACs / ADCs | DAC Dynamic Range (dB) | DAC THD+N (dB) | ADC Dynamic Range (dB) | ADC THD+N (dB) | Sample Rate (kHz) | Analog I/O                   | Power Supply (V)                                                                                      | Comments                                                                                                                | Package            |
|-------------|-------------|------------------------|----------------|------------------------|----------------|-------------------|------------------------------|-------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|--------------------|
| CS42L51     | 2 / 2       | 98                     | -86            | 96                     | -88            | 96                | Single-ended                 | VA = 1.8 to 2.5<br>VD = 1.8 to 2.5<br>VL = 1.8 to 3.3                                                 | 3:1 MUX, PGA, MIC pre-amp, HP amp                                                                                       | 32 QFN             |
| CS42L52     | 2 / 2       | 98                     | -86            | 98                     | -88            | 96                | Single-ended                 | VA = 1.65 to 2.83<br>VD = 1.65 to 2.83<br>VP = 2.37 to 5.35<br>VL = 1.8 to 3.3                        | 4:1 MUX, PGA, MIC, pre-amp, HP/speaker amps                                                                             | 40 QFN             |
| CS42L55     | 2 / 2       | 99                     | -86            | 95                     | -87            | 48                | Pseudo-Differential          | VA = 1.65 to 2.71<br>VD = 1.65 to 2.71<br>VCP = 1.65 to 2.73<br>VL = 1.65 to 3.47                     | 2:1 MUX, PGA, Class-H HP amp                                                                                            | 36 QFN             |
| CS42L56     | 2 / 2       | 99                     | -86            | 95                     | -87            | 48                | Pseudo-Differential          | VA = 1.62 to 2.75<br>VD = 1.62 to 2.75<br>VCP = 1.62 to 2.75<br>VL = 1.62 to 3.63                     | 2:1 MUX, PGA, Class-H HP amp                                                                                            | 40 QFN             |
| CS42L73     | 4 / 2       | 97                     | -85            | 91                     | -85            | 48                | Pseudo-Differential          | VA = 1.66 to 1.94<br>VD = 0.85 to 1.40<br>VP = 3.0 to 5.25<br>VCP = 1.66 to 1.94<br>VL = 1.66 to 1.94 | Class-H HP amp, Class A/B speaker amp, 3x asynchronous serial ports                                                     | 60 WLCSP<br>65 BGA |
| WM1811      | 2 / 2       | 100                    | -83            | 94                     | -84            | 96                | Single-ended<br>Differential | VA = 1.71 to 5.5<br>VD = 1.0 to 3.6                                                                   | ReTune™ parametric EQ, dynamic range controller, digital noise gate, ASRC, 2x DMIC interface, HP/speaker amps, dual FLL | 80 WLCSP           |
| WM8946      | 2 / 2       | 98                     | -83            | 94                     | -83            |                   | Single-ended<br>Differential | VA = 2.4 to 3.6<br>VD = 1.71 to 3.6                                                                   | ReTune™, EQ, DSP filters, 3D, Video buffer, HP/speaker amps, FLL                                                        | 36 WLCSP           |
| WM8948      | 2 / 2       | 98                     | -83            | 94                     | -83            | 48                | Single-ended<br>Differential | VA = 2.4 to 3.6<br>VD = 1.71 to 3.6                                                                   | ReTune™, EQ, DSP filters, 3D, Video buffer, HP/speaker amps, FLL                                                        | 36 WLCSP           |
| WM8980      | 2 / 2       | 98                     | -84            | 90                     | -80            | 48                | Differential                 | VA = 2.5 to 3.6<br>VD = 1.71 to 3.6                                                                   | EQ, 3D, DSP filters, Video buffer, HP/speaker amps, FLL                                                                 | 40 QFN             |
| WM8731      | 2 / 2       | 100                    | -86            | 90                     | -84            | 96                | Single-ended                 | VA = 1.8 to 3.6<br>VD = 1.42 to 3.6                                                                   | High pass filters, MIC input, HP amp, OSC                                                                               | 28 QFN             |
| WM8734      | 2 / 2       | 100                    | -86            | 90                     | -84            | 96                | Single-ended                 | VA = 2.7 to 3.6<br>VD = 2.7 to 3.6                                                                    | High pass filters                                                                                                       | 20 SSOP            |

# Portable Codecs *(continued)*

| Part Number | DACs / ADCs | DAC Dynamic Range (dB) | DAC THD+N (dB) | ADC Dynamic Range (dB) | ADC THD+N (dB) | Sample Rate (kHz) | Analog I/O                          | Power Supply (V)                     | Comments                                                                                                             | Package            |
|-------------|-------------|------------------------|----------------|------------------------|----------------|-------------------|-------------------------------------|--------------------------------------|----------------------------------------------------------------------------------------------------------------------|--------------------|
| WM8750      | 2 / 2       | 98                     | -84            | 95                     | -82            | 96                | Single-ended<br>Differential        | VA = 1.8 to 3.6<br>VD = 1.42 to 3.6  | EQ, 3D, MIC interface ALC, HP/speaker amps                                                                           | 32 QFN             |
| WM8753      | 3 / 2       | 98                     | -84            | 95                     | -82            | 96                | Single-ended<br>Differential        | VA = 1.8 to 3.6<br>VD = 1.4 to 3.6   | Differential MIC inputs, HP/speaker amps, PLL                                                                        | 48 QFN<br>55 BGA   |
| WM8758      | 2 / 2       | 100                    | -86            | 92.5                   | -75            | 48                | Differential                        | VA = 2.5 to 3.6<br>VD = 1.71 to 3.6  | 3D, EQ, DSP filters, HP amp, PLL                                                                                     | 32 QFN             |
| WM8903      | 2 / 2       | 96                     | -86            | 93                     | -80            | 48                | Single-ended<br>Pseudo-Differential | VA = 1.71 to 2<br>VD = 1.14 to 1.89  | Dynamic range control, digital sidetone, Digital microphone interface, HP amp                                        | 40 QFN             |
| WM8904      | 2 / 2       | 96                     | -86            | 92                     | -80            | 96                | Single-ended<br>Differential        | VA = 1.71 to 2<br>VD = 0.95 to 3.6   | ReTune™ Mobile parametric EQ, dynamic range controller, DMIC interface, HP amp, FLL                                  | 32 QFN<br>36 WLCSP |
| WM8958      | 4 / 2       | 100                    | -83            | 94                     | -84            | 96                | Single-ended<br>Differential        | VA = 1.71 to 5.5<br>VD = 1.0 to 3.6  | ReTune™ Mobile, MBC, parametric EQ, dynamic range controller, ASRC, 4x DMIC interface, HP/speaker amps, dual FLL     | 72 WLCSP           |
| WM8960      | 2 / 2       | 98                     | -84            | 95                     | -82            | 48                | Single-ended                        | VA = 2.5 to 3.6<br>VD = 1.71 to 3.6  | 3D, MIC interface ALC, HP/speaker amps, PLL                                                                          | 32 QFN             |
| WM8962      | 2 / 2       | 98                     | -79            | 94                     | -86            | 96                | Single-ended                        | VA = 1.7 to 2.0<br>VD = 1.62 to 2.0  | VSS, HD Bass, ReTune™, 3D, EQ, DRC, DMIC interface, programmable ALC & noise gate, HP/speaker amps, PLL, FLL         | 49 WLCSP           |
| WM8962B     | 2 / 2       | 98                     | -79            | 94                     | -86            | 96                | Single-ended                        | VA = 1.7 to 2.0<br>VD = 1.62 to 2.0  | VSS, HD Bass, ReTune™, 3D, EQ, DRC, DMIC interface, programmable ALC & noise gate, HP/speaker amps, PLL, FLL         | 49 WLCSP           |
| WM8973      | 2 / 2       | 98                     | -84            | 95                     | -82            | 96                | Single-ended                        | VA = 1.8 to 3.6<br>VD = 1.4 to 3.6   | EQ, 3D, MIC interface ALC, HP/speaker amps                                                                           | 32 QFN             |
| WM8976      | 2 / 1       | 98                     | -84            | 95                     | -84            | 48                | Differential                        | VA = 2.5 to 5.5<br>VD = 1.7 to 3.6   | EQ, 3D, DSP filters, MIC interface ALC, HP/speaker amps, PLL                                                         | 32 QFN             |
| WM8978      | 2 / 2       | 98                     | -84            | 95                     | -84            | 48                | Differential                        | VA = 2.5 to 5.5<br>VD = 1.7 to 3.6   | EQ, 3D, DSP filters, MIC interface ALC, HP/speaker amps, PLL                                                         | 32 QFN             |
| WM8983      | 2 / 2       | 98                     | -84            | 95                     | -84            | 48                | Differential                        | VA = 2.5 to 5.5<br>VD = 1.7 to 3.6   | EQ, 3D, DSP filters, MIC interface ALC, HP/speaker amps, PLL                                                         | 32 QFN             |
| WM8985      | 2 / 2       | 98                     | -86            | 92.5                   | -75            | 48                | Differential                        | VA = 2.5 to 3.6<br>VD = 1.71 to 3.6  | EQ, 3D, DSP filters, MIC interface ALC, HP amp, PLL                                                                  | 32 QFN             |
| WM8988      | 2 / 2       | 100                    | -90            | 93                     | -81            | 96                | Differential                        | VA = 1.8 to 3.6<br>VD = 1.42 to 3.6  | EQ, 3D, bass boost, MIC interface ALC, HP amp                                                                        | 28 COL             |
| WM8993      | 2 / 2       | 100                    | -86            | 94                     | -87            | 48                | Single-ended<br>Differential        | VA = 2.2 to 3.3<br>VD = 1.1 to 2.0   | ReTune™, parametric EQ, dynamic range controller, Active noise reduction, HP/speaker amps, FLL                       | 48 WLCSP           |
| WM8994      | 4 / 2       | 100                    | -83            | 94                     | -84            | 96                | Single-ended<br>Differential        | VA = 1.7 to 5.5<br>VD = 1.0 to 3.6   | ReTune™ Mobile, Parametric EQ, dynamic range controller, ASRC, HP/speaker amps, dual FLL                             | 72 WLCSP           |
| WM8996      | 4 / 2       | 99                     | -81            | 94                     | -81            | 48                | Differential                        | VA = 1.71 to 3.6<br>VD = 0.95 to 2.0 | ReTune™, parametric EQ, dynamic range controller, ISRC, 4x DMIC interface, 2x PDM speaker amp interface, HP amp, FLL | 54 WLCSP           |

# Mono/Stereo Codecs

| Part Number | Channels     | DAC Dynamic Range (dB) | DAC THD+N (dB) | ADC Dynamic Range (dB) | ADC THD+N (dB) | Sample Rate (kHz) | Analog I/O                           | Power Supply (V)                                | Comments                                             | Package  |
|-------------|--------------|------------------------|----------------|------------------------|----------------|-------------------|--------------------------------------|-------------------------------------------------|------------------------------------------------------|----------|
| CS4245      | 6 in, 2 out  | 104                    | -90            | 104                    | -95            | 192               | Single-ended                         | VA = 3.3 or 5<br>VD = 3.3 or 5<br>VL = 1.8 to 5 | 6:1 input MUX, MIC pre-amp, PGA                      | 48 LQFP  |
| CS4265      | 2 in, 2 out  | 104                    | -90            | 104                    | -95            | 192               | Single-ended                         | VA = 3.3 or 5<br>VD = 3.3 or 5<br>VL = 1.8 to 5 | 2:1 input MUX, MIC pre-amp, PGA, S/PDIF out          | 32 QFN   |
| CS4270      | 2 in, 2 out  | 105                    | -95            | 105                    | -95            | 192               | Single-ended                         | VA = 3.3 or 5<br>VD = 3.3 or 5<br>VL = 1.8 to 5 | Volume control, passive filters, 3.3 V operation     | 24 TSSOP |
| CS4271      | 2 in, 2 out  | 114                    | -100           | 108                    | -98            | 192               | Single-ended ADC<br>Differential DAC | VA = 5<br>VD = 3.3 or 5<br>VL = 2.5 to 5        | Volume control, on-chip oscillator                   | 28 TSSOP |
| CS4272      | 2 in, 2 out  | 114                    | -100           | 114                    | -100           | 192               | Differential                         | VA = 5<br>VD = 3.3 or 5                         | Volume control, on-chip oscillator                   | 28 TSSOP |
| WM8569      | 2 in, 2 out  | 103                    | -95            | 100                    | -80            | 192               | Single-ended                         | VA = 2.7 to 5.5<br>VD = 2.7 to 3.6              | ALC volume control, 3-wire SW control                | 28 SSOP  |
| WM8776      | 10 in, 2 out | 108                    | -97            | 102                    | -95            | 192               | Differential                         | VA = 2.7 to 5.5<br>VD = 2.7 to 3.6              | H/P amplifier ALC, 2/3-wire SW control               | 48 TQFP  |
| WM8778      | 2 in, 2 out  | 108                    | -97            | 102                    | -95            | 192               | Differential                         | VA = 2.7 to 5.5<br>VD = 2.7 to 3.6              | ALC volume control, 2/3-wire SW control              | 28 SSOP  |
| WM8510      | 1 in, 1 out  | 93                     | -84            | 90                     | -80            | 48                | Differential ADC<br>Single-ended DAC | VA = 2.5 to 5.5<br>VD = 1.71 to 3.6             | ALC volume control, DSP filters, 2/3-wire SW control | 28 SSOP  |
| WM8940      | 1 in, 1 out  | 98                     | -84            | 94                     | -80            | 48                | Differential ADC<br>Single-ended DAC | VA = 2.5 to 5.5<br>VD = 1.71 to 3.6             | ALC volume control, filters, Headphone driver, PLL   | 24 QFN   |
| WM8974      | 1 in, 1 out  | 98                     | -84            | 94                     | -83            | 48                | Differential ADC<br>Single-ended DAC | VA = 2.5 to 5.5<br>VD = 1.71 to 3.6             | ALC volume control, DSP filters, EQ, PLL             | 24 QFN   |

# Multichannel Codecs

| Part Number | Channels      | DAC Dynamic Range (dB) | DAC THD+N (dB) | ADC Dynamic Range (dB) | ADC THD+N (dB) | Sample Rate (kHz) | Analog I/O                                             | Power Supply (V)                                | Comments                                                                        | Package |
|-------------|---------------|------------------------|----------------|------------------------|----------------|-------------------|--------------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------|---------|
| CS42416/26  | 2 in, 6 out   | 110 / 114              | -100           | 114                    | -100           | 192               | Differential DACs<br>Single-ended or Differential ADCs | VA = 5<br>VD = 3.3 or 5<br>VL = 1.8 to 5        | Digital volume control                                                          | 64 LQFP |
| CS42418/28  | 2 in, 8 out   | 110 / 114              | -100           | 114                    | -100           | 192               | Differential                                           | VA = 5<br>VD = 3.3 or 5<br>VL = 1.8 to 5        | Digital volume control, PLL                                                     | 64 LQFP |
| CS42432     | 4 in, 6 out   | 108                    | -98            | 105                    | -98            | 192               | Single-ended or Differential                           | VA = 3.3 or 5<br>VD = 3.3<br>VL = 1.8 to 5      | TDM interface                                                                   | 52 MQFP |
| CS42435     | 6 in, 8 out   | 108                    | -98            | 105                    | -98            | 192               | Single-ended or Differential                           | VA = 3.3 or 5<br>VD = 3.3<br>VL = 1.8 to 5      | TDM interface                                                                   | 52 MQFP |
| CS42436/38  | 6 in, 6/8 out | 105 / 108              | -95 / -98      | 102 / 105              | -95 / -98      | 192               | Single-ended or Differential                           | VA = 3.3 or 5<br>VD = 3.3<br>VL = 1.8 to 5      | TDM interface                                                                   | 52 MQFP |
| CS4244      | 4 in, 4 out   | 108                    | -90            | 105                    | -95            | 192               | Single-ended or Differential                           | VA = 3.3 or 5<br>VL = 1.8 to 5                  | PCM and TDM interfaces                                                          | 40 QFN  |
| CS4234      | 4 in, 5 out   | 108                    | -90            | 105                    | -95            | 192               | Single-ended or Differential                           | VA = 3.3 or 5<br>VL = 1.8 to 5                  | PCM and TDM interfaces                                                          | 40 QFN  |
| CS42448     | 6 in, 8 out   | 108                    | -98            | 105                    | -98            | 192               | Single-ended or Differential                           | VA = 3.3 or 5<br>VD = 3.3 to 5<br>VL = 1.8 to 5 | PCM and TDM interfaces                                                          | 64 LQFP |
| CS42516/26  | 2 in, 6 out   | 110 / 114              | -100           | 114                    | -100           | 192               | Differential                                           | VA = 5<br>VD = 3.3 or 5<br>VL = 1.8 to 5        | S/PDIF Rx, digital volume control                                               | 64 LQFP |
| CS42518/28  | 2 in, 8 out   | 110 / 114              | -100           | 114                    | -100           | 192               | Differential                                           | VA = 5<br>VD = 3.3 or 5<br>VL = 1.8 to 5        | S/PDIF Rx, digital volume control                                               | 64 LQFP |
| CS42888     | 4 in, 8 out   | 108                    | -98            | 105                    | -98            | 192               | Single-ended or Differential                           | VA = 3.3 or 5<br>VD = 3.3 or 5<br>VL = 1.8 to 5 | PCM and TDM interfaces                                                          | 64 LQFP |
| WM8580      | 2 in, 6 out   | 103                    | -90            | 100                    | -87            | 192               | Single-ended                                           | VA = 2.7 to 5.5<br>VD = 2.7 to 3.6              | Two audio interfaces, HW and 2/3-wire SW control, PLLs                          | 48 TQFP |
| WM8581      | 2 in, 8 out   | 103                    | -90            | 100                    | -90            | 192               | Single-ended                                           | VA = 2.7 to 5.5<br>VD = 2.7 to 3.6              | Two independent audio interfaces, HW and 2/3-wire SW control, PLLs              | 48 TQFP |
| WM8594      | 10 in, 6 out  | 100                    | -87            | 96                     | -80            | 192               | Single-ended                                           | VA = 8.1 to 9.9<br>VD = 2.7 to 3.6              | 2 V <sub>RMS</sub> line drivers, headphone driver, 2/3-wire SW control          | 48 TQFP |
| WM8595      | 12 in, 4 out  | 100                    | -87            | 96                     | -80            | 192               | Single-ended                                           | VA = 8.1 to 9.9<br>VD = 2.7 to 3.63             | 2 V <sub>RMS</sub> line-level drivers, digital multiplexer, 2/3-wire SW control | 48 QFN  |
| WM8770      | 16 in, 8 out  | 106                    | -96            | 102                    | -94            | 192               | Single-ended                                           | VA = 2.7 to 5.5<br>VD = 2.7 to 3.6              | Analog and digital volume control, 3-wire SW control                            | 64 TQFP |

## AC '97 and HD Audio Codecs

| Part Number | Bus Interface | DAC SNR/THD+N (dB) | ADC SNR/THD+N (dB) | Feature                                                                             | Converters                             | Package |
|-------------|---------------|--------------------|--------------------|-------------------------------------------------------------------------------------|----------------------------------------|---------|
| CS4202      | AC '97        | 90 / -87           | 90 / -84           | S/PDIF transmitter, Headphone amplifier                                             | 20-bit stereo DAC<br>18-bit stereo ADC | 48 TQFP |
| CS4205      | AC '97        | 90 / -87           | 90 / -84           | S/PDIF transmitter, Sample-rate converter                                           | 20-bit stereo DAC<br>18-bit stereo ADC | 48 TQFP |
| CS4299      | AC '97        | 90 / -91           | 90 / -88           | S/PDIF transmitter, Sample-rate converter                                           | 20-bit stereo DAC<br>18-bit stereo ADC | 48 TQFP |
| CS4207      | HD-Audio      | 110 / -94          | 105 / -88          | S/PDIF receiver with SRC, 2 S/PDIF transmitters, MIC pre-amp, HP amp, 2 DMIC inputs | Six 192 kHz DACs<br>Four 96 kHz ADCs   | 48 QFN  |
| WM9707      | AC '97        | 95 / -90           | 90 / -85           | S/PDIF transmitter                                                                  | 18-bit stereo DAC<br>18-bit stereo ADC | 48 TQFP |
| WM9714      | AC '97        | 94 / -85           | 87 / -86           | S/PDIF transmitter                                                                  | 18-bit stereo DAC<br>18-bit stereo ADC | 48 QFN  |
| WM8850      | HD-Audio      | 108 / -96          | 105 / -95          | S/PDIF transceiver                                                                  | Six 192 kHz DACs<br>Four 96 kHz ADCs   | 48 QFN  |
| WM8860      | HD-Audio      | 108 / -96          | 105 / -95          | S/PDIF transmitter                                                                  | Four 192 kHz DACs<br>Four 96 kHz ADCs  | 48 QFN  |

## Stereo Low Power Codecs with Touchscreen Controller

| Part Number | DACs / ADCs | Headphone driver        | BTL speaker out | Control + data interface | Power Supply (V)                   | Features                  | Package           |
|-------------|-------------|-------------------------|-----------------|--------------------------|------------------------------------|---------------------------|-------------------|
| WM9705      | 2 / 2       | Yes                     | No              | AC '97                   | VA = 3.0 to 5.0<br>VD = 3.0 to 5.0 | AUX ADC, battery monitor  | 48 QFN<br>48 TQFP |
| WM9712      | 3 / 3       | Yes, 45 mW into 16 ohms | Yes, 400 mW     | AC '97                   | VA = 1.8 to 3.6<br>VD = 1.5 to 3.6 | AUX ADC, battery monitor  | 48 QFN            |
| WM9713      | 4 / 3       | Yes, 45 mW into 16 ohms | Yes, 400 mW     | AC '97 PCM, I2S          | VA = 1.8 to 3.6<br>VD = 1.8 to 3.6 | AUX ADC, battery monitor  | 48 QFN            |
| WM9715      | 3 / 3       | Yes, 45 mW into 16 ohms | Yes, 400 mW     | AC '97                   | VA = 1.8 to 3.6<br>VD = 1.5 to 3.6 | AUX, ADC, battery monitor | 48 QFN            |

## Low Power Codecs with Integrated Video Buffer

| Part Number | DACs / ADCs | DAC SNR/THD+N (dB) | ADC SNR/THD+N (dB) | Headphone driver        | Power Supply (V)                   | Features                     | Package           |
|-------------|-------------|--------------------|--------------------|-------------------------|------------------------------------|------------------------------|-------------------|
| WM8941      | 1 / 1       | 98 / -80           | 91 / -83           | Yes, 40 mW into 16 ohms | VA = 2.5 to 3.6<br>VD = 1.7 to 3.6 | AUX ADC, battery monitor     | 48 QFN<br>48 TQFP |
| WM8944      | 1 / 1       | 96 / -80           | 94 / -83           | Yes                     | VA = 2.4 to 3.6<br>VD = 1.7 to 3.6 | AUX ADC, battery monitor     | 48 QFN            |
| WM8945      | 1 / 1       | 98 / -80           | 94 / -83           | Yes                     | VA = 2.4 to 3.6<br>VD = 1.7 to 3.6 | AUX ADC, battery monitor     | 48 QFN            |
| WM8946      | 2 / 2       | 98 / -80           | 94 / -83           | Yes                     | VA = 2.4 to 3.6<br>VD = 1.7 to 3.6 | AUX, ADC, battery monitor    | 48 QFN            |
| WM8948      | 2 / 2       | 98 / -80           | 94 / -83           | Yes                     | VA = 2.4 to 3.6<br>VD = 1.7 to 3.6 | ReTune™, EQ, DSP filters, 3D | 36 WLCSF          |
| WM8980      | 2 / 2       | 98 / -84           | 95 / -80           | Yes, 40 mW into 16 ohms | VA = 2.5 to 5.5<br>VD = 1.7 to 3.6 | EQ, 3D, DSP filters, HPF     | 40 QFN            |

# MEMS Microphones: Analog Silicon Microphone

| Part    | Description                           | SNR (dB)                              | AOP at 10% THD (dB SPL) | Sensitivity (dbv/pa) | Sensitivity tolerance (dB) | Supply (V) | Supply Current VA | Package               |                       |
|---------|---------------------------------------|---------------------------------------|-------------------------|----------------------|----------------------------|------------|-------------------|-----------------------|-----------------------|
| WM7120  | Top Port Analog Silicon Microphone    | 59                                    | 130                     | -42                  | ±3                         | 1.5 to 3.7 | 160               | 3.76 x 2.95 x 1.10 mm |                       |
| WM7121D | Top Port Analog Silicon Microphone    | 62                                    | 130                     | -42                  | ±3                         | 1.5 to 3.7 | 190               | 3.76 x 2.95 x 1.10 mm |                       |
| WM7121  | Top Port Analog Silicon Microphone    | 65                                    | 127                     | -38                  | ±3                         | 1.5 to 3.7 | 190               | 3.76 x 2.95 x 1.10 mm |                       |
| WM7121E | Top Port Analog Silicon Microphone    | 65                                    | 127                     | -38                  | ±1                         | 1.5 to 3.7 | 190               | 3.76 x 2.95 x 1.10 mm |                       |
| NEW     | WM7121P                               | Top Port Analog Silicon Microphone    | 65                      | 127                  | -38                        | ±3         | 1.5 to 3.7        | 190                   | 3.76 x 2.95 x 1.10 mm |
|         | WM7121PE                              | Top Port Analog Silicon Microphone    | 65                      | 127                  | -38                        | ±1         | 1.5 to 3.7        | 190                   | 3.76 x 2.95 x 1.10 mm |
|         | WM7133L                               | Bottom Port Analog Silicon Microphone | 64.5                    | 126                  | -38                        | ±3         | 1.5 to 3.7        | 190                   | 3.35 x 2.50 x 0.98 mm |
| WM7132  | Bottom Port Analog Silicon Microphone | 65                                    | 127                     | -38                  | ±3                         | 1.5 to 3.7 | 190               | 3.76 x 3.00 x 1.10 mm |                       |
| WM7132E | Bottom Port Analog Silicon Microphone | 65                                    | 127                     | -38                  | ±1                         | 1.5 to 3.7 | 190               | 3.76 x 3.00 x 1.10 mm |                       |
| WM7132D | Bottom Port Analog Silicon Microphone | 62                                    | 120                     | -42                  | ±3                         | 1.5 to 3.7 | 190               | 3.76 x 3.00 x 1.10 mm |                       |
| NEW     | WM7132P                               | Bottom Port Analog Silicon Microphone | 65                      | 127                  | -38                        | ±3         | 1.5 to 3.7        | 190                   | 3.76 x 3.00 x 1.10 mm |
|         | WM7132PE                              | Bottom Port Analog Silicon Microphone | 65                      | 127                  | -38                        | ±1         | 1.5 to 3.7        | 190                   | 3.76 x 3.00 x 1.10 mm |
|         | WM7137                                | Bottom Port Analog Silicon Microphone | 62                      | 127                  | -38                        | ±3         | 1.5 to 3.7        | 190                   | 3.76 x 3.00 x 1.10 mm |
|         | WM7137E                               | Bottom Port Analog Silicon Microphone | 62                      | 127                  | -38                        | ±1         | 1.5 to 3.7        | 190                   | 3.76 x 3.00 x 1.10 mm |
|         | WM7331                                | Bottom Port Analog Silicon Microphone | 63                      | 124                  | -38                        | ±3         | 1.5 to 3.7        | 60                    | 2.5 x 1.6 x 0.9 mm    |
| WM7331E | Bottom Port Analog Silicon Microphone | 63                                    | 124                     | -38                  | ±1                         | 1.5 to 3.7 | 60                | 2.5 x 1.6 x 0.9 mm    |                       |

# MEMS Microphones: Digital Silicon Microphone

| Part       | Description                            | SNR (dB)                            | AOP at 10% THD (dB SPL) | Sensitivity (dbv/pa) | Sensitivity tolerance (dB) | Supply (V)  | Supply Current VA                     | Package               |
|------------|----------------------------------------|-------------------------------------|-------------------------|----------------------|----------------------------|-------------|---------------------------------------|-----------------------|
| WM7210     | Top Port Digital Silicon Microphone    | 58                                  | 120                     | -26                  | ±3                         | 1.64 to 3.7 | 735                                   | 4.0 x 3.0 x 1.0 mm    |
| WM7210E    | Top Port Digital Silicon Microphone    | 58                                  | 120                     | -26                  | ±1                         | 1.64 to 3.7 | 735                                   | 4.0 x 3.0 x 1.0 mm    |
| WM7211     | Top Port Digital Silicon Microphone    | 61                                  | 120                     | -26                  | ±3                         | 1.64 to 3.7 | 735                                   | 4.0 x 3.0 x 1.0 mm    |
| WM7211E    | Top Port Digital Silicon Microphone    | 61                                  | 120                     | -26                  | ±1                         | 1.64 to 3.7 | 735                                   | 4.0 x 3.0 x 1.0 mm    |
| WM7220     | Top Port Digital Silicon Microphone    | 58                                  | 120                     | -26                  | ±3                         | 1.64 to 3.7 | 700                                   | 4.72 x 3.76 x 1.22 mm |
| WM7220E    | Top Port Digital Silicon Microphone    | 58                                  | 120                     | -26                  | ±1                         | 1.64 to 3.7 | 700                                   | 4.72 x 3.76 x 1.22 mm |
| WM7230     | Bottom Port Digital Silicon Microphone | 61                                  | 120                     | -26                  | ±3                         | 1.64 to 3.7 | 735                                   | 4.0 x 3.0 x 1.0 mm    |
| WM7230E    | Bottom Port Digital Silicon Microphone | 61                                  | 120                     | -26                  | ±1                         | 1.64 to 3.7 | 735                                   | 4.0 x 3.0 x 1.0 mm    |
| WM7231     | Bottom Port Digital Silicon Microphone | 60                                  | 120                     | -26                  | ±3                         | 1.62 to 3.7 | 735                                   | 4.0 x 3.0 x 1.0 mm    |
| WM7231E    | Bottom Port Digital Silicon Microphone | 60                                  | 120                     | -26                  | ±1                         | 1.62 to 3.7 | 735                                   | 4.0 x 3.0 x 1.0 mm    |
| NEW WM7236 | Bottom Port Digital Silicon Microphone | 60 (Voice Mode)<br>63 (Record Mode) | 120                     | -26                  | ±3                         | 1.62 to 3.7 | 300 (Voice Mode)<br>950 (Record Mode) | 4.0 x 3.0 x 1.0 mm    |
| WM7236E    | Bottom Port Digital Silicon Microphone | 60 (Voice Mode)<br>63 (Record Mode) | 120                     | -26                  | ±1                         | 1.62 to 3.7 | 300 (Voice Mode)<br>950 (Record Mode) | 4.0 x 3.0 x 1.0 mm    |
| WM7216     | Top Port Digital Silicon Microphone    | 60 (Voice Mode)<br>63 (Record Mode) | 120                     | -26                  | ±3                         | 1.62 to 3.7 | 300 (Voice Mode)<br>950 (Record Mode) | 4.0 x 3.0 x 1.0 mm    |
| WM7216E    | Top Port Digital Silicon Microphone    | 60 (Voice Mode)<br>63 (Record Mode) | 120                     | -26                  | ±1                         | 1.62 to 3.7 | 300 (Voice Mode)<br>950 (Record Mode) | 4.0 x 3.0 x 1.0 mm    |

# Audio Amplifiers

| Part        | Input       | Channels                                                                | Output Power (W)                                      | SNR (dB) | THD+N @ 1W | Power Supply (V)                                       | Comments                                                                                                       | Package  |
|-------------|-------------|-------------------------------------------------------------------------|-------------------------------------------------------|----------|------------|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|----------|
| CS35L00     | Analog      | 1 x Mono Hybrid Class-D Speaker Driver                                  | 2.8 W into 4 ohm                                      | 98       | 0.02       | 2.5 to 5.5                                             | Selectable +6/+12 dB gain, <1 mA quiescent current                                                             | 10 DFN   |
| CS35L01     | Analog      | 1 x Mono Hybrid Class-D Speaker Driver                                  | 3 W into 4 ohm                                        | 98       | 0.02       | 2.5 to 5.5                                             | +6 dB gain, <1 mA quiescent current                                                                            | 9 WLCSP  |
| CS35L03     | Analog      | 1 x Mono Hybrid Class-D Speaker Driver                                  | 3 W into 4 ohm                                        | 98       | 0.02       | 2.5 to 5.5                                             | +12 dB gain, <1 mA quiescent current                                                                           | 9 WLCSP  |
| NEW CS35L32 | Analog      | 1 x Boosted Mono Class-D Speaker Driver                                 | 1.7 W into 8 ohm                                      | 102      | 0.02       | VP = 3.0 to 5.25<br>VA = 1.71 to 1.89                  | 5 V boost controller, Speaker current and voltage monitoring, I <sup>2</sup> S and I <sup>2</sup> C interfaces | 30 WLCSP |
| WM9010      | Analog      | 1 x Stereo Class-G Headphone Driver                                     | 34 mW into 16 ohm                                     | 104      | —          | 1.71 to 2.0                                            | —                                                                                                              | 12 WLCSP |
| WM9081      | Analog, I2S | 1 x Mono Class-AB/D Speaker Driver<br>1 x Line Out                      | 2.6 W into 4 ohm                                      | 92       | 0.03       | VP = 2.7 to 5.5<br>VA = 2.7 to 3.6<br>VD = 1.71 to 3.6 | EQ, Dynamic range control, FLL                                                                                 | 28 COL   |
| WM9082      | PDM         | 1 x Mono Class-D Speaker Driver                                         | 3 W into 4 ohm                                        | 92       | 0.03       | VP = 3.2 to 5.5<br>VD = 1.35 to 2.0                    | 48 kHz sample rate                                                                                             | 9 WLCSP  |
| WM9094      | Analog      | 1 x Mono Class-D Speaker Driver<br>1 x Stereo Class-AB Headphone Driver | 2 W into 4 ohm Speaker<br>34 mW into 16 ohm Headphone | 92       | 0.02       | VP = 2.7 to 5.5<br>VD = 1.71 to 2.0                    | Single-ended or differential stereo inputs, AGC, Mixer, Voice bypass                                           | 20 WLCSP |



# Ambient Noise Cancellation

| Part   | Output Channels                      | Output Power                                                                 | SNR/THD+N                                 | Power Supply (V)                                                                      | Ambient noise reduction (dB) | Noise cancellation bandwidth (Hz) | Input                                                               | Comments                                                                                      | Package   |
|--------|--------------------------------------|------------------------------------------------------------------------------|-------------------------------------------|---------------------------------------------------------------------------------------|------------------------------|-----------------------------------|---------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-----------|
| WM2000 | 1 x mono differential                | 80 mW, 16 ohm BTL                                                            | 94 / -70 (ANC Off)<br>87 / -67 (ANC On)   | Speaker: 2.7 to 3.6<br>Digital: 1.71 to 1.89                                          | up to 20                     | 300 to 2500                       | Single-ended/<br>Differential                                       | Handset receiver speaker driver with ambient noise cancellation                               | 25 WLCSP  |
| WM2002 | Stereo, single-ended or differential | 45 mW per channel into a 16 ohm load<br>22 mW per channel into a 32 ohm load | 92 / -80 (ANC Off)<br>83 / -81 (ANC On)   | 1.5 V AAA battery using internal boost: 0.9 to 1.6<br>2.5 V direct supply: 2.0 to 3.3 | up to 30                     | 40 to 4000                        | Single-ended/<br>Differential                                       | Low power, stereo headphone driver with ambient noise cancellation                            | 48 QFN    |
| WM2200 | 2 x differential, 1 x PDM            | 60 mW, 16 ohm BTL                                                            | 100 / -71 (ANC Off)<br>100 / -71 (ANC On) | Analog: 1.71 to 1.89<br>Digital: 0.95 to 3.6                                          | Receive path: up to 20       | 300 to 3500                       | Analog MIC - singled-ended or differential, digital MIC, line input | Handset earpiece driver with ambient noise / transmit path noise / acoustic echo cancellation | 110 WLCSP |

# Volume Control

| Part   | Channel | Dynamic Range (dB) | THD+N (dB) | Analog I/O   | Power Supply (V)          | Comments                                          | Package |
|--------|---------|--------------------|------------|--------------|---------------------------|---------------------------------------------------|---------|
| CS3308 | 8       | 123                | -112       | Single-ended | VA = ±5<br>VD = 3.3       | +22 dB gain / -96 dB attenuation, 0.25 dB step    | 48 LQFP |
| CS3310 | 2       | 116                | -100       | Single-ended | VA = ±5<br>VD = 5         | +31.5 dB gain / -95.5 dB attenuation, 0.5 dB step | 16 SOIC |
| CS3318 | 8       | 127                | -112       | Single-ended | VA = ±8 to ±9<br>VD = 3.3 | +22 dB gain / -96 dB attenuation, 0.25 dB step    | 48 LQFP |

# Interfaces and Sample-Rate Converters

| Part Number | Sample Rate (kHz) | S/PDIF, IEC-60958 Transmitter | S/PDIF, IEC-60958 Receiver | AES/EBU | EIAJ CP1201 | Host Interface | SRC | Power Supply (V)                      | Package                       |
|-------------|-------------------|-------------------------------|----------------------------|---------|-------------|----------------|-----|---------------------------------------|-------------------------------|
| CS8406      | 192               | 1                             | —                          | ✓       | ✓           | ✓              | —   | VD = 3.3 or 5<br>VL = 3.3 or 5        | 28 SOIC<br>28 TSSOP           |
| CS8416      | 192               | —                             | 1                          | ✓       | ✓           | ✓              | —   | VA = 3.3<br>VD = 3.3<br>VL = 3.3 or 5 | 28 SOIC<br>28 TSSOP<br>28 QFN |
| CS8420      | 96                | 1                             | 1                          | ✓       | ✓           | ✓              | ✓   | VA = 5<br>VD = 5                      | 28 SOIC                       |
| CS8421      | 192               | —                             | —                          | —       | —           | —              | ✓   | VD = 2.5<br>VL = 3.3 or 5             | 20 TSSOP<br>20 QFN            |
| CS8422      | 192               | —                             | 1                          | ✓       | ✓           | ✓              | ✓   | VA = 3.3<br>VL = 1.8 to 5             | 32 QFN                        |
| CS8427      | 96                | 1                             | 1                          | ✓       | ✓           | ✓              | —   | VA = 5<br>VL = 3.3 or 5               | 28 SOIC<br>28 TSSOP           |
| WM8804      | 192               | 1                             | 1                          | ✓       | —           | ✓              | —   | VD = 2.7 to 3.6                       | 20 SSOP                       |
| WM8805      | 192               | 1                             | 8                          | ✓       | —           | ✓              | —   | VD = 2.7 to 3.6                       | 28 SSOP                       |

# Clock Generation and Jitter Reduction

| Part Number | One-Time Programmable | Frequency Synth / Clock Generator | Clock Multiplier / Jitter Remover | Power Supply (V) | Input Frequency Range | Reference Frequency Range | Output Frequency Range | Package |
|-------------|-----------------------|-----------------------------------|-----------------------------------|------------------|-----------------------|---------------------------|------------------------|---------|
| CS2000      | CS2000-OTP            | ✓                                 | ✓                                 | 3.3              | 50 Hz to 30 MHz       | 8 to 75 MHz               | 6 to 75 MHz            | 10 MSOP |
| CS2100      | CS2100-OTP            | —                                 | ✓                                 | 3.3              | 50 Hz to 30 MHz       | 8 to 75 MHz               | 6 to 75 MHz            | 10 MSOP |
| CS2200      | CS2200-OTP            | ✓                                 | —                                 | 3.3              | —                     | 8 to 75 MHz               | 6 to 75 MHz            | 10 MSOP |
| CS2300      | CS2300-OTP            | —                                 | ✓                                 | 3.3              | 50 Hz to 30 MHz       | Internally generated      | 6 to 75 MHz            | 10 MSOP |

# Imaging A/D Converters

| Part   | Resolution (bits) | Speed (MSPS) | Input PGA | Offset (bits) | Output format                                           | Control interface | Supply       | Power (mW) | Description                                                                                        | Package                       |
|--------|-------------------|--------------|-----------|---------------|---------------------------------------------------------|-------------------|--------------|------------|----------------------------------------------------------------------------------------------------|-------------------------------|
| WM8152 | 16                | 12           | 8         | 8             | CMOS: 4x4                                               | Serial            | 4.8 to 5.2   | 225        | Single channel CCD/CIS ADC                                                                         | 20 SSOP                       |
| WM8196 | 16                | 12           | 8         | 8             | CMOS: 8+8 4x4                                           | Serial            | 4.8 to 5.2   | 300        | 3-channel CCD/CIS ADC                                                                              | 28 SSOP                       |
| WM8199 | 16                | 20           | 8         | 8             | CMOS: 8+8 4x4                                           | Serial            | 4.8 to 5.2   | 360        | 3-channel high speed CCD/CIS ADC                                                                   | 28 SSOP                       |
| WM8213 | 16                | 24           | 9         | 8             | CMOS: 8+8 4x4                                           | Serial            | 3.0 to 3.6   | 350        | 3-channel CCD/CIS ADC                                                                              | 28 SSOP                       |
| WM8214 | 16                | 40           | 9         | 8             | CMOS: 8+8 4x4                                           | Serial            | 3.0 to 3.6   | 390        | 3-channel high speed CCD/CIS ADC                                                                   | 28 SSOP                       |
| WM8215 | 10                | 60           | 9         | 8             | CMOS: 10-bit                                            | Serial            | 3.0 to 3.6   | 360        | 3-channel high speed CCD/CIS ADC                                                                   | 32 QFN                        |
| WM8224 | 10 & 16           | 40 & 60      | 9         | 8             | CMOS 10 (10-bit), 8+8 (16-bit)                          | Serial            | 3.0 to 3.6   | 360        | 3-channel high speed CCD/CIS ADC - Multiple Device Operation and automatic black level calibration | 32 QFN                        |
| WM8232 | 16                | 70           | 12-bit    | 8             | LVDS 10-bit 5 pair<br>LVDS 16-bit 5 pair<br>CMOS 10-bit | Serial            | 3.3 V        |            | 3-channel high speed CCD/CIS ADC                                                                   | 56 QFN package<br>8 mm x 8 mm |
| WM8233 | 16                | 70           | 12-bit    | 8             | LVDS 10-bit 5 pair<br>LVDS 16-bit 5 pair<br>CMOS 10-bit | Serial            | 3.3 V        |            | 6-channel high speed CCD/CIS ADC                                                                   | 56 QFN package<br>8 mm x 8 mm |
| WM8234 | 16                | 70           | 12-bit    | 8             | LVDS 10-bit 5 pair<br>LVDS 16-bit 5 pair<br>CMOS 10-bit | Serial            | 3.3 V        |            | 6-channel high speed CCD/CIS ADC                                                                   | 56 QFN package<br>7 mm x 7 mm |
| WM8235 | 16                | 70           | 12-bit    | 8             | LVDS 10-bit 5 pair<br>LVDS 16-bit 5 pair<br>CMOS 10-bit | Serial            | 3.3 V        |            | 9-channel high speed CCD/CIS ADC                                                                   | 56 QFN package<br>7 mm x 7 mm |
| WM8253 | 16                | 6            | 8         | 8             | CMOS: 4x4                                               | Serial            | 3.0 to 3.6   | 132        | Single channel CCD/CIS ADC                                                                         | 20 SSOP                       |
| WM8255 | 16                | 12           | 8         | 8             | CMOS: 4x4, 2x8                                          | Serial            | 3.3 to 3.75  | 250        | Single channel CCD/CIS ADC                                                                         | 28 QFN                        |
| WM8259 | 16                | 3            | 8         | 8             | CMOS: 4x4                                               | Serial            | 2.97 to 3.63 | 132        | Single channel CCD/CIS ADC                                                                         | 20 SSOP                       |

# CobraNet<sup>®</sup> Transport and Audio Network Processor ICs

| Family                | Description                                                                                                                                                                          | CobraNet <sup>®</sup><br>Part Numbers | Audio<br>Channels<br>over Ethernet | Serial Input/Serial Output Ports                                                                            | Ethernet<br>Interface                                                                  | IC Package |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------------------------------------|-------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------|
| CS1810xx<br>CS4961xx* | The CS1810xx Family contains CobraNet networked digital audio interface ICs. The CS4961xx Family provides digital audio signal processing along with the network interface function. | CS181002<br>CS496102*                 | 2                                  | One synchronous, capable of supplying up to 2 full-duplex channels at 48 and/or up to 96 kHz sample rates.  | Supports 100BASE-Tx, 100 Mbps, full duplex Ethernet, fully compliant with IEEE 802.3u. | 144 LQFP   |
|                       |                                                                                                                                                                                      | CS181012<br>CS496112*                 | 8                                  | Quad synchronous, capable of supplying up to 8 full-duplex channels at 48 and/or up to 96 kHz sample rates. |                                                                                        |            |
|                       |                                                                                                                                                                                      | CS181022<br>CS496122*                 | 16                                 | Quad synchronous, capable of supplying up to 16 full-duplex channels at 48 kHz,                             |                                                                                        |            |

\*The CS4961xx series includes a 32-bit, 120 MIPS digital signal processor for audio processing of any or all channels.

## Energy Measurement and Power Management

# Energy Solutions

For over a decade, Cirrus Logic has been a proven leader in the energy metering and monitoring market. Combining advanced Delta-Sigma technology with expert digital signal processing, Cirrus Logic offers a broad product family with superior performance to support a wide variety of application requirements.

The CS1501 and CS1601 series of digital PFC controllers intelligently solve power management challenges, allowing for smaller total solution size and better efficiency and THD across load conditions. Ideal for power supplies up to 300 W, applications include commercial lighting, digital TV, notebook adapters, desktops and servers.

Cirrus Logic has set the standard for seismic ICs — including complete data acquisition system solutions of best-in-class single-sensor and multi-sensor chipsets. Cirrus Logic's products for energy exploration applications include hydrophone and geophone amplifiers, high-fidelity Delta-Sigma modulators, and seismic digital filters plus test DAC.

Solving the challenge of dimmer compatibility in the LED lighting market is the newest conquest in energy products from Cirrus Logic. Using a unique set of digital algorithms, Cirrus Logic's product family of LED controllers have been tested to provide near 100 percent dimming compatibility with a wide variety of dimmers representing the vast majority of the installed base. Our LED controller products also help LED manufacturers improve LED color temperature quality and focus on system cost reduction

### Energy Measurement

CS5451A  
CS5463  
CS5464  
CS5467  
CS5480  
CS5484  
CS5490

### Digital Power Factor Correction

CS1501  
CS1601  
CS1601H

### Geophysical/Seismic

CS3301A  
CS3302A  
CS4373A  
CS5374  
CS5371A  
CS5372A  
CS5373A  
CS5376A  
CS5378

### LED Controllers

CS1610  
**CS1610A** **NEW**  
CS1611  
**CS1611A** **NEW**  
CS1612  
**CS1612A** **NEW**  
CS1613  
**CS1613A** **NEW**  
CS1630  
CS1631  
**CS1615** **NEW**  
**CS1615A** **NEW**  
**CS1616** **NEW**  
**CS1616A** **NEW**

# Energy Measurement

| Part    | ADC Converters | Current Sensor Options | Active Energy Accuracy         | Reactive Energy Accuracy       | I <sub>rms</sub> Accuracy      | SNR (dB) | Serial Comm | Digital Outputs            | V <sub>REF</sub> Drift (ppm/°C) | Input Voltage (V)         | Power Cons. (mW) | Package |
|---------|----------------|------------------------|--------------------------------|--------------------------------|--------------------------------|----------|-------------|----------------------------|---------------------------------|---------------------------|------------------|---------|
| CS5480  | 3              | Shunt / CT / Rogowski  | 0.1% over 4000:1 dynamic range | 0.1% over 4000:1 dynamic range | 0.1% over 1000:1 dynamic range | 80       | UART        | 3x Configurable Outputs    | 25                              | 3.3                       | 13               | 24 QFN  |
| CS5484  | 4              | Shunt / CT / Rogowski  | 0.1% over 4000:1 dynamic range | 0.1% over 4000:1 dynamic range | 0.1% over 1000:1 dynamic range | 80       | SPI / UART  | 4x Configurable Outputs    | 25                              | 3.3                       | 13               | 28 QFN  |
| CS5490  | 2              | Shunt / CT / Rogowski  | 0.1% over 4000:1 dynamic range | 0.1% over 4000:1 dynamic range | 0.1% over 1000:1 dynamic range | 80       | SPI / UART  | Single Configurable Output | 25                              | 3.3                       | 13               | 16 SOIC |
| CS5451A | 6              | Shunt / CT             | —                              | —                              | —                              | 77       | SPI         | —                          | 25                              | 3 Analog; 3 Digital       | 23               | 28 SSOP |
| CS5463  | 2              | Shunt / CT             | 0.1% over 1000:1 dynamic range | 0.2% over 1000:1 dynamic range | 0.2% over 1000:1 dynamic range | 78       | SPI         | Energy Pulses              | 40                              | 5 Analog; 3.3 / 5 Digital | 21               | 24 SSOP |
| CS5464  | 3              | Shunt / CT             | 0.1% over 1000:1 dynamic range | 0.2% over 1000:1 dynamic range | 0.2% over 1000:1 dynamic range | 78       | SPI         | Energy Pulses              | 40                              | 5 Analog; 3.3 / 5 Digital | 25               | 28 SSOP |
| CS5467  | 4              | Shunt / CT             | 0.1% over 1000:1 dynamic range | 0.2% over 1000:1 dynamic range | 0.2% over 1000:1 dynamic range | 78       | SPI         | Energy Pulses              | 40                              | 5 Analog; 3.3 / 5 Digital | 25               | 28 SSOP |

# Digital Power Factor Correction

| Part    | Max f <sub>sw</sub> [kHz] | Valley Switching | Over-current Protection | IC Supply Current [mA] | Input Voltage Range (Vac) | Target Applications                                              | Package |
|---------|---------------------------|------------------|-------------------------|------------------------|---------------------------|------------------------------------------------------------------|---------|
| CS1501  | 70                        | ✓                | ✓                       | 1.5                    | 90 to 265                 | DTV, Consumer Electronics, Server/Telecom                        | 8 SOIC  |
| CS1601  | 70                        | ✓                | ✓                       | 1.5                    | 90 to 265 or 108 to 305   | LED, HID, Fluorescent Lighting Ballasts                          | 8 SOIC  |
| CS1601H | 100                       | ✓                | ✓                       | 1.7                    | 90 to 265 or 108 to 305   | DTV, LED/HID/Fluorescent Lighting Ballasts, Consumer Electronics | 8 SOIC  |

## Geophysical/Seismic: Single Channel

| Part    | Description          | Resolution (bits) | Dynamic Range (dB) | THD (dB) | Power Consumption Per Channel (mW) | Signal Range (V)        | Package |
|---------|----------------------|-------------------|--------------------|----------|------------------------------------|-------------------------|---------|
| CS3301A | Geophone amplifier   | —                 | —                  | -121     | 27.5                               | 5 V <sub>p-p</sub> diff | 24 SSOP |
| CS3302A | Hydrophone amplifier | —                 | —                  | -118     | 25                                 | 5 V <sub>p-p</sub> diff | 24 SSOP |
| CS5373A | DS modulator         | 24                | 124                | -118     | 25                                 | 5 V <sub>p-p</sub> diff | 28 SSOP |
|         | D/A converter        | 24                | 114                | -116     | 40                                 | 5 V <sub>p-p</sub> diff |         |
| CS5378  | Filter with PLL      | —                 | —                  | —        | 16                                 | —                       | 28 SSOP |

## Geophysical/Seismic: Multichannel

| Part    | Description                              | Resolution (bits) | Dynamic Range (dB) | THD (dB) | Power Consumption Per Channel (mW) | Signal Range (V)        | Package |
|---------|------------------------------------------|-------------------|--------------------|----------|------------------------------------|-------------------------|---------|
| CS3301A | Geophone amplifier                       | —                 | —                  | -121     | 27.5                               | 5 V <sub>p-p</sub> diff | 24 SSOP |
| CS3302A | Hydrophone amplifier                     | —                 | —                  | -118     | 25                                 | 5 V <sub>p-p</sub> diff | 24 SSOP |
| CS4373A | D/A converter                            | 24                | 114                | -116     | 10                                 | 5 V <sub>p-p</sub> diff | 28 SSOP |
| CS5371A | Single DS modulator                      | 24                | 124                | -118     | 25                                 | 5 V <sub>p-p</sub> diff | 24 SSOP |
| CS5372A | Dual DS modulator                        | 24                | 124                | -118     | 25                                 | 5 V <sub>p-p</sub> diff | 24 SSOP |
| CS5374  | Dual hydrophone amplifier & DS modulator | 24                | 124                | -118     | 32.5                               | 5 V <sub>p-p</sub> diff | 48 QFN  |
| CS5376A | Quad filter                              | —                 | —                  | —        | < 10                               | —                       | 64 TQFP |

# LED Controllers

| Part               | TRIAC Dimmable | Output Stage Topology                           | Input Voltage Range | Maximum Output Power | LED Output Channels | Power Factor | Output Current Reg. | Min. Dimming Level | External Over Temp Protect | Package |
|--------------------|----------------|-------------------------------------------------|---------------------|----------------------|---------------------|--------------|---------------------|--------------------|----------------------------|---------|
| CS1610             | ✓              | Flyback;<br>Buck-boost                          | 100 – 120 V         | < 25 W               | 1                   | > 0.9        | < 5%                | 0%                 | ✓                          | 16eSOIC |
| <b>NEW</b> CS1610A | ✓              | Flyback;<br>Buck-boost                          | 100 – 120 V         | < 25 W               | 1                   | > 0.9        | < 5%                | 0%                 | ✓                          | 16eSOIC |
| CS1611             | ✓              | Flyback;<br>Buck-boost                          | 220 – 240 V         | < 25 W               | 1                   | > 0.9        | < 5%                | 0%                 | ✓                          | 16eSOIC |
| <b>NEW</b> CS1611A | ✓              | Flyback;<br>Buck-boost                          | 220 – 240 V         | < 25 W               | 1                   | > 0.9        | < 5%                | 0%                 | ✓                          | 16eSOIC |
| CS1612             | ✓              | Buck;<br>Tapped-buck                            | 100 – 120 V         | < 25 W               | 1                   | > 0.9        | < 5%                | 0%                 | ✓                          | 16eSOIC |
| <b>NEW</b> CS1612A | ✓              | Buck;<br>Tapped-buck                            | 100 – 120 V         | < 25 W               | 1                   | > 0.9        | < 5%                | 0%                 | ✓                          | 16eSOIC |
| CS1613             | ✓              | Buck;<br>Tapped-buck                            | 220 – 240 V         | < 25 W               | 1                   | > 0.9        | < 5%                | 0%                 | ✓                          | 16eSOIC |
| <b>NEW</b> CS1613A | ✓              | Buck;<br>Tapped-buck                            | 220 – 240 V         | < 25 W               | 1                   | > 0.9        | < 5%                | 0%                 | ✓                          | 16eSOIC |
| CS1630             | ✓              | Flyback;<br>Buck-boost;<br>Buck;<br>Tapped-buck | 100 – 120 V         | < 25 W               | 2                   | > 0.9        | < 5%                | 0%                 | ✓                          | 16eSOIC |
| CS1631             | ✓              | Flyback;<br>Buck-boost;<br>Buck;<br>Tapped-buck | 220 – 240 V         | < 25 W               | 2                   | > 0.9        | < 5%                | 0%                 | ✓                          | 16eSOIC |
| <b>NEW</b> CS1615  | ✓              | Flyback;<br>Buck-boost                          | 100 – 120 V         | < 25 W               | 1                   | > 0.9        | < 5%                | 0%                 | ✓                          | 16eSOIC |
| CS1615A            | ✓              | Flyback;<br>Buck-boost                          | 100 – 120 V         | < 12 W               | 1                   | > 0.9        | < 5%                | 0%                 | ✓                          | 16eSOIC |
| CS1616             | ✓              | Flyback;<br>Buck-boost                          | 220 – 240 V         | < 25 W               | 1                   | > 0.9        | < 5%                | 0%                 | ✓                          | 16eSOIC |
| CS1616A            | ✓              | Flyback;<br>Buck-boost                          | 220 – 240 V         | < 12 W               | 1                   | > 0.9        | < 5%                | 0%                 | ✓                          | 16eSOIC |

# Industrial and Communication Components

Cirrus Logic continues to maintain a design legacy for high-precision analog and mixed-signal processing ICs for industrial measurement applications — such as industrial process control, analytical instruments, and consumer utility. This design expertise is based on an advanced proprietary Delta-Sigma technology that is featured across a core group of product families including analog-to-digital converters, digital-to-analog converters, modulator and amplifier ICs, and ARM 9-based system-on-chip processors. As a pioneer in the development of world-class telecommunication ICs, Cirrus Logic also continues a lengthy tenure of providing customers with cost effective signal processing solutions.

### **Amplifiers**

CS3002  
CS3003  
CS3004  
CS3013  
CS3014

### **Embedded Processors**

#### **ARM 9 EMBEDDED PROCESSORS**

EP9301  
EP9302  
EP9307  
EP9312  
EP9315

NETWORKED ATTACHED  
STORAGE (NAS)  
REFERENCE DESIGN  
NAS ARM 9

### **Delta-Sigma A/D Converters**

CS5505  
CS5506  
CS5507  
CS5508  
CS5509  
CS5510  
CS5511  
CS5512  
CS5513  
CS5529

### **Delta-Sigma A/D Converters with Integrated Amplifiers**

CS5521  
CS5522  
CS5523  
CS5524  
CS5525  
CS5526  
CS5528  
CS5530  
CS5531  
CS5532  
CS5533  
CS5534  
CS5550

### **High Throughput Delta-Sigma A/D Converters**

CS5560  
CS5566  
CS5571  
CS5581

### **T1/E1/J1 LIUs**

SHORT HAUL MULTIPOINT LINE  
INTERFACE UNITS  
CS61584A  
CS61880  
CS61884

### **Echo Canceler**

CS6422

### **Ethernet**

CS8900A  
CS8952



## Amplifiers

| Part Number | Device | Supply Voltage (V) | Supply Current (mA) | V <sub>os</sub> (μV) Max | V <sub>os</sub> Drift (μV/°C) | e <sub>NOISE</sub> (nV/√Hz) | A <sub>OL</sub> min (dB) | Package |
|-------------|--------|--------------------|---------------------|--------------------------|-------------------------------|-----------------------------|--------------------------|---------|
| CS3002      | Dual   | 2.7 to 6.7         | 3.6                 | 10                       | 0.05                          | 6                           | 200                      | 8 SOIC  |
| CS3003      | Single | 2.7 to 5.25        | 1.0                 | 10                       | 0.05                          | 17                          | 150                      | 8 SOIC  |
| CS3004      | Dual   | 2.7 to 5.25        | 2.0                 | 10                       | 0.05                          | 17                          | 150                      | 8 SOIC  |
| CS3013      | Single | 2.7 to 5.25        | 0.5                 | 10                       | 0.05                          | 22                          | 135                      | 8 SOIC  |
| CS3014      | Dual   | 2.7 to 5.25        | 1.0                 | 10                       | 0.05                          | 22                          | 135                      | 8 SOIC  |

## ARM 9 Embedded Processors

| Part   | Processor Speed (MHz) | Cache Data/Code (K) | Ethernet MAC | PCMCIA Device | IDE/IF | USB Hosts | Display I/F | Graphics Engine | Math Crunch Engine | Touch/ADC | Package   |
|--------|-----------------------|---------------------|--------------|---------------|--------|-----------|-------------|-----------------|--------------------|-----------|-----------|
| EP9301 | 166                   | 16/16               | ✓            | —             | —      | 2         | —           | —               | —                  | 5 ADC     | 208 TQFP  |
| EP9302 | 200                   | 16/16               | ✓            | —             | —      | 2         | —           | —               | ✓                  | 5 ADC     | 208 LQFP  |
| EP9307 | 200                   | 16/16               | ✓            | —             | —      | 3         | ✓           | ✓               | ✓                  | 8-wire    | 272 TFBGA |
| EP9312 | 200                   | 16/16               | ✓            | —             | 2      | 3         | ✓           | —               | ✓                  | 8-wire    | 352 PBGA  |
| EP9315 | 200                   | 16/16               | ✓            | ✓             | 2      | 3         | ✓           | ✓               | ✓                  | 8-wire    | 352 PBGA  |

## Networked Attached Storage (NAS) Reference Design

| Reference Design | Target Device     | Development Platform | Operating System | Key Software Features                                                                                                                  |
|------------------|-------------------|----------------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| NAS ARM 9        | EP9312 and EP9315 | EDB9315A             | Linux®           | Auto-detect for easy customer set-up, network file server, print server, group and user level security and customizable user interface |

## Delta-Sigma A/D Converters

| Part Number | Resolution (bits) | Throughput (Sps) | Integral Linearity (%FS) | Differential Linearity (±LSB) | Number of Channels | Power Consumption (mW) | Package |
|-------------|-------------------|------------------|--------------------------|-------------------------------|--------------------|------------------------|---------|
| CS5505      | 16                | 20 – 100         | 0.0015%                  | 0.25                          | 4                  | 3.2                    | 24 SOIC |
| CS5506      | 20                | 20 – 100         | 7.0E-4%                  | NMC                           | 4                  | 3.2                    | 24 SOIC |
| CS5507      | 16                | 20 – 100         | 0.0015%                  | 0.25                          | 1                  | 3.2                    | 20 SOIC |
| CS5508      | 20                | 20 – 100         | 7.0E-4%                  | NMC                           | 1                  | 3.2                    | 20 SOIC |
| CS5509      | 16                | 20 – 200         | 0.0015%                  | 0.25                          | 1                  | 1.7                    | 16 SOIC |
| CS5510      | 16                | 53 – 212         | 0.0015%                  | NMC                           | 1                  | 1.4                    | 8 SOIC  |
| CS5511      | 16                | 100 (typical)    | 0.0015%                  | NMC                           | 1                  | 1.5                    | 8 SOIC  |
| CS5512      | 20                | 53 – 326         | 7.0E-4%                  | NMC                           | 1                  | 1.8                    | 8 SOIC  |
| CS5513      | 20                | 100 (typical)    | 7.0E-4%                  | NMC                           | 1                  | 1.9                    | 8 SOIC  |
| CS5529      | 16                | 1 – 303          | 0.0015%                  | NMC                           | 1                  | 2.6                    | 20 SOIC |

# Delta-Sigma A/D Converters with Integrated Amplifiers

| Part   | Resolution (bits) | Throughput (Sps) | Integral Linearity (%FS) | Differential Linearity ( $\pm$ LSB) | Number of Channels | Power Consumption (mW) | Package |
|--------|-------------------|------------------|--------------------------|-------------------------------------|--------------------|------------------------|---------|
| CS5521 | 16                | 1 – 400          | 0.0015%                  | NMC                                 | 2                  | 6                      | 20 SSOP |
| CS5522 | 24                | 1 – 606          | 7.0E-4%                  | NMC                                 | 2                  | 9                      | 20 SSOP |
| CS5523 | 16                | 1 – 400          | 0.0015%                  | NMC                                 | 4                  | 6                      | 24 SSOP |
| CS5524 | 24                | 1 – 606          | 7.0E-4%                  | NMC                                 | 4                  | 9                      | 24 SSOP |
| CS5525 | 16                | 3 – 606          | 0.0015%                  | NMC                                 | 1                  | 9.4                    | 20 SSOP |
| CS5526 | 20                | 3 – 606          | 7.0E-4%                  | NMC                                 | 1                  | 9.4                    | 20 SSOP |
| CS5528 | 24                | 1 – 606          | 7.0E-4%                  | NMC                                 | 8                  | 9                      | 24 SSOP |
| CS5530 | 24                | 7 – 3840         | $\pm$ 0.0015%            | NMC                                 | 1                  | 35                     | 20 SSOP |
| CS5531 | 16                | 7 – 3840         | $\pm$ 0.0015%            | NMC                                 | 2                  | 35                     | 20 SSOP |
| CS5532 | 24                | 7 – 3840         | $\pm$ 0.0015%            | NMC                                 | 2                  | 35                     | 20 SSOP |
| CS5533 | 16                | 7 – 3840         | $\pm$ 0.0015%            | NMC                                 | 4                  | 35                     | 24 SSOP |
| CS5534 | 24                | 7 – 3840         | $\pm$ 0.0015%            | NMC                                 | 4                  | 35                     | 24 SSOP |
| CS5550 | 24                | 2440 – 4000      | 0.01%                    | NMC                                 | 2                  | 21                     | 24 SSOP |

# High Throughput Delta-Sigma A/D Converters

| Part   | Resolution (bits) | Throughput (kSPS) | Integral Linearity (%FS) | Differential Linearity ( $\pm$ LSB) | Number of Channels | Power Consumption (mW) | Package |
|--------|-------------------|-------------------|--------------------------|-------------------------------------|--------------------|------------------------|---------|
| CS5560 | 24                | 50                | $\pm$ 5 ppm              | 0.1                                 | 1, Differential    | 90                     | 24 SSOP |
| CS5566 | 24                | 5                 | $\pm$ 5 ppm              | 0.1                                 | 1, Differential    | 20                     | 24 SSOP |
| CS5571 | 16                | 100               | $\pm$ 8 ppm              | 0.1                                 | 1, Single-ended    | 85                     | 24 SSOP |
| CS5581 | 16                | 200               | $\pm$ 8 ppm              | 0.1                                 | 1, Single-ended    | 85                     | 24 SSOP |

# Short Haul Multiport Line Interface Units

| Part     | Power Supply (V) | Control Modes | Line Coders      | Number of Channels | TBR-12 Compliant | Impedance Matching Line Driver | Arbitrary Waveform Option | Package  |
|----------|------------------|---------------|------------------|--------------------|------------------|--------------------------------|---------------------------|----------|
| CS61584A | 3.3 or 5         | Host & H/W    | AMI, B8ZS & HDB3 | 2                  | 3                | 3                              | 3                         | 64 TQFP  |
| CS61880  | 3.3              | Host & H/W    | AMI & HDB3       | 8                  | 3                | 3                              | 3                         | 144 LQFP |
| CS61884  | 3.3              | Host & H/W    | AMI, HDB3 & B8ZS | 8                  | 3                | 3                              | 3                         | 144 LQFP |

# Echo Canceler

| Part   | Media Supported                  | Digital Interface                                      | Number of Channels | Power Supply (V) | Package |
|--------|----------------------------------|--------------------------------------------------------|--------------------|------------------|---------|
| CS6422 | Analog audio (MIC and telephone) | Acoustic interface and network interface (both analog) | 2 – Full Duplex    | 5                | 20 SOIC |

# Ethernet

| Part    | Media Supported                       | Digital Interface                | Number of Channels | Power Supply                          | Package  |
|---------|---------------------------------------|----------------------------------|--------------------|---------------------------------------|----------|
| CS8900A | 10BASE-T                              | ISA and general purpose parallel | 1                  | 5 V, 3.3 V                            | 100 LQFP |
| CS8952  | 10BASE-T, 100BASE-X and NRZ (optical) | MII                              | 1                  | 5 V with support of 3.3 V digital I/O | 100 TQFP |

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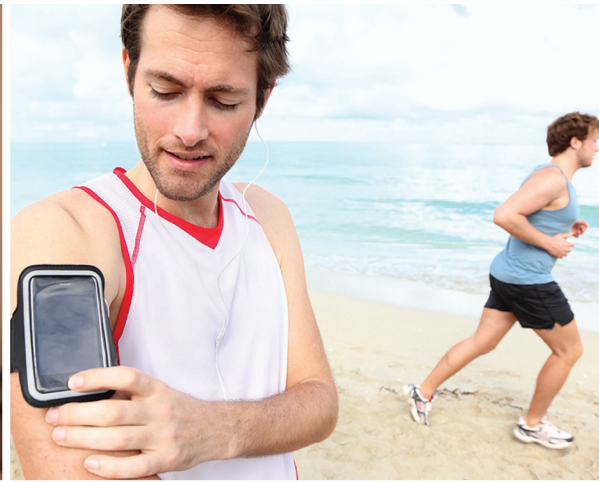
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