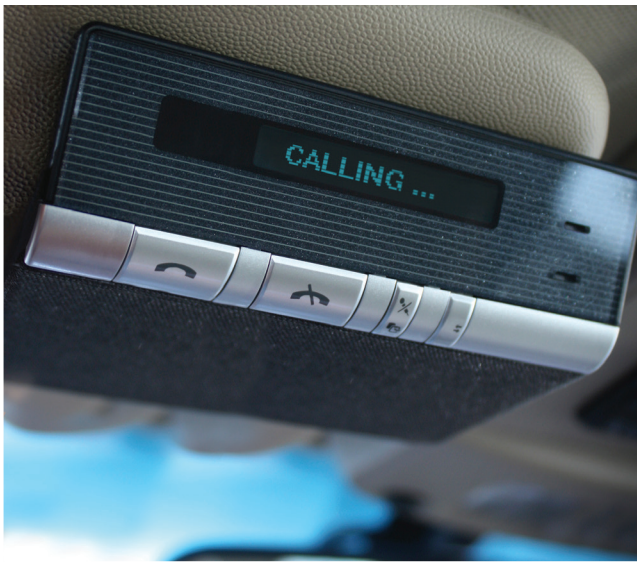
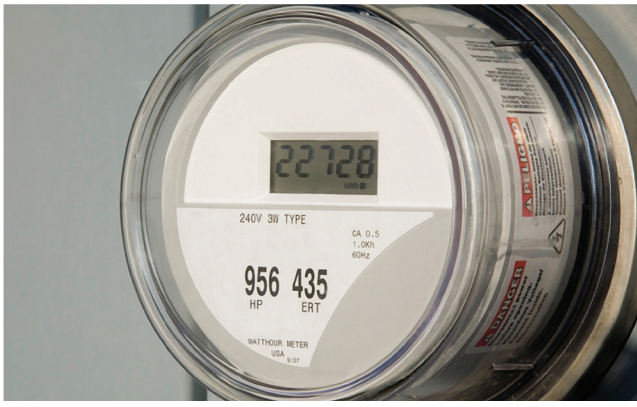


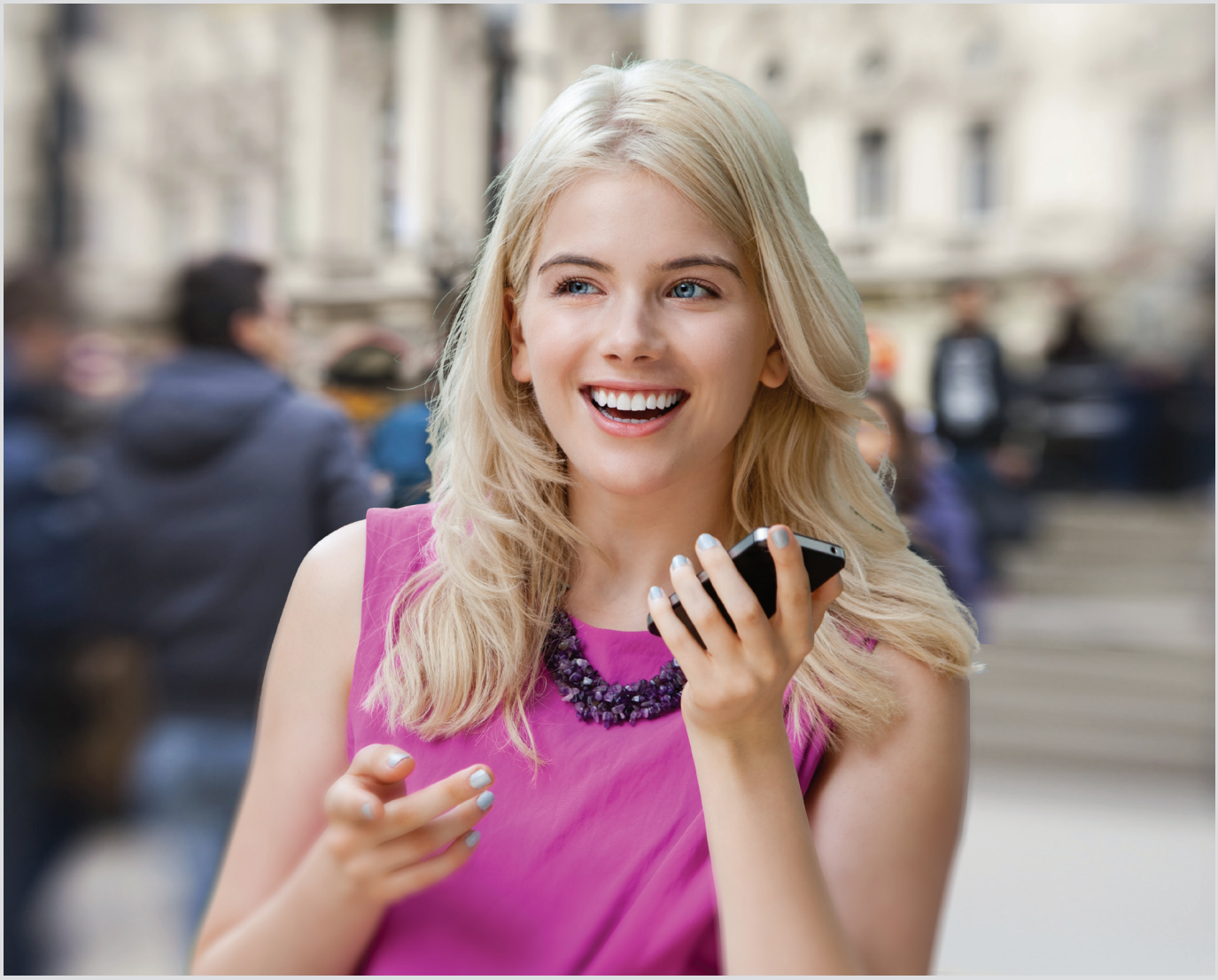




# Product Summary Guide

*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.


Audio 2

Energy, Geophysical/Seismic 18

Industrial, Communication 22


CIRRUS LOGIC®

## 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 Cancelation

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 |
|---|---|---|---|---|---|
| **CS485xx** | **High performance, cost-effective 32-bit Audio DSP for consumer and automotive multichannel decoding and post processing applications.** | | | | |
| CS48520 | Single 32-bit | 4-channel audio PP1 | 150 MHz (300 M MAC/Sec) | 0 to 70 °C | 48 QFP |
| CS48540 | Single 32-bit | 8-channel audio PP1 | 150 MHz (600 M MAC/Sec) | 0 to 70 °C | 48 QFP |
| | | | 150 MHz (300 M MAC/Sec) | –40 to 85 °C | |
| CS48560 | Single 32-bit | 8-channel audio PP1 | 150 MHz (300 M MAC/Sec) | 0 to 70 °C | 48 QFP |
| | | | 150 MHz (300 M MAC/Sec) | –40 to 85 °C | |
| **CS4953xx** | **Single chip multistandard surround sound decoder targeted for playback from analog & S/PDIF sources.** | | | | |
| CS495314 | Dual 32-bit | (DD, DDEX, DTS, DTSES, DTS96, AAC) + PP2 | 150 MHz (600 M MAC/Sec) | 0 to 70 °C | 128 LQFP |
| | | | 131 MHz (600 M MAC/Sec) | –40 to 85 °C | |
| **CS4970xx** | **Single chip multistandard surround sound decoder targeted for playback from HD DVD™, Blu-ray Disc® players, and all analog, S/PDIF and HDMI® sources.** | | | | |
| CS497014 | Dual 32-bit | (DD+, DTHD, DD, DDEX, AAC) + PP2 | 150 MHz (600 M MAC/Sec) | 0 to 70 °C | 128 LQFP |
| | | | 131 MHz (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 (600 M MAC/Sec) | 0 to 70 °C | 128 LQFP |
| | | | 131 MHz (600 M MAC/Sec) | –40 to 85 °C | |
| **CS48Lxx** | **Ultra low power voice and Audio DSP subsystem.** | | | | |
| CS48L10 | Single 32-bit | MP3, WMA, AAC | 1.0 V 80 MHz | 0 to 70 °C | 24 QFN 20 WLCSP |
| | | | 1.2 V 130 MHz | 0 to 70 °C | |
| | | | 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 | | |
| **WM00xx** | **Ultra low power voice and Audio DSP subsystem targeted for: mini-systems, DVD receivers, soundbars, car audio, DTVs.** | | | | |
| 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 | $I^2S$ | 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 |
| WM8950 | 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 $V_{RMS}$ 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 | 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 | 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 ($V_{RMS}$) | 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<br>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 ($V_{RMS}$) | 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 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 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 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 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 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 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 Differential | VA = 1.8 to 3.6 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 Differential | VA = 1.8 to 3.6 VD = 1.4 to 3.6 | Differential MIC inputs, HP/speaker amps, PLL | 48 QFN 55 BGA |
| WM8758 | 2 / 2 | 100 | –86 | 92.5 | –75 | 48 | Differential | VA = 2.5 to 3.6 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 Pseudo-Differential | VA = 1.71 to 2 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 Differential | VA = 1.71 to 2 VD = 0.95 to 3.6 | ReTune™ Mobile parametric EQ, dynamic range controller, DMIC interface, HP amp, FLL | 32 QFN 36 WLCSP |
| WM8958 | 4 / 2 | 100 | –83 | 94 | –84 | 96 | Single-ended Differential | VA = 1.71 to 5.5 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 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 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 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 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 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 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 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 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 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 Differential | VA = 2.2 to 3.3 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 Differential | VA = 1.7 to 5.5 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 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 $V_{RMS}$ 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 $V_{RMS}$ 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 WLCSP |
| 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 |
| NEW | 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 |
| NEW | 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 |
| NEW | 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 |
| NEW | 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 |
| NEW | 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 |
| NEW | 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 |
| NEW | 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, I²S and I²C 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 Cancelation

| 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) 87 / –67 (ANC On) | Speaker: 2.7 to 3.6 Digital: 1.71 to 1.89 | up to 20 | 300 to 2500 | Single-ended/ Differential | Handset receiver speaker driver with ambient noise cancelation | 25 WLCSP |
| WM2002 | Stereo, single-ended or differential | 45 mW per channel into a 16 ohm load 22 mW per channel into a 32 ohm load | 92 / –80 (ANC Off) 83 / –81 (ANC On) | 1.5 V AAA battery using internal boost: 0.9 to 1.6 2.5 V direct supply: 2.0 to 3.3 | up to 30 | 40 to 4000 | Single-ended/ Differential | Low power, stereo headphone driver with ambient noise cancelation | 48 QFN |
| WM2200 | 2 x differential, 1 x PDM | 60 mW, 16 ohm BTL | 100 / –71 (ANC Off) 100 / –71 (ANC On) | Analog: 1.71 to 1.89 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 cancelation | 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 VD = 3.3 | +22 dB gain / –96 dB attenuation, 0.25 dB step | 48 LQFP |
| CS3310 | 2 | 116 | –100 | Single-ended | VA = ±5 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 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 VL = 3.3 or 5 | 28 SOIC 28 TSSOP |
| CS8416 | 192 | — | 1 | ✓ | ✓ | ✓ | — | VA = 3.3 VD = 3.3 VL = 3.3 or 5 | 28 SOIC 28 TSSOP 28 QFN |
| CS8420 | 96 | 1 | 1 | ✓ | ✓ | ✓ | ✓ | VA = 5 VD = 5 | 28 SOIC |
| CS8421 | 192 | — | — | — | — | — | ✓ | VD = 2.5 VL = 3.3 or 5 | 20 TSSOP 20 QFN |
| CS8422 | 192 | — | 1 | ✓ | ✓ | ✓ | ✓ | VA = 3.3 VL = 1.8 to 5 | 32 QFN |
| CS8427 | 96 | 1 | 1 | ✓ | ✓ | ✓ | — | VA = 5 VL = 3.3 or 5 | 28 SOIC 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 LVDS 16-bit 5 pair CMOS 10-bit | Serial | 3.3 V | | 3-channel high speed CCD/ CIS ADC | 56 QFN package 8 mm x 8 mm |
| WM8233 | 16 | 70 | 12-bit | 8 | LVDS 10-bit 5 pair LVDS 16-bit 5 pair CMOS 10-bit | Serial | 3.3 V | | 6-channel high speed CCD/ CIS ADC | 56 QFN package 8 mm x 8 mm |
| WM8234 | 16 | 70 | 12-bit | 8 | LVDS 10-bit 5 pair LVDS 16-bit 5 pair CMOS 10-bit | Serial | 3.3 V | | 6-channel high speed CCD/ CIS ADC | 56 QFN package 7 mm x 7 mm |
| WM8235 | 16 | 70 | 12-bit | 8 | LVDS 10-bit 5 pair LVDS 16-bit 5 pair CMOS 10-bit | Serial | 3.3 V | | 9-channel high speed CCD/ CIS ADC | 56 QFN package 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® Transport and Audio Network Processor ICs

| Family | Description | CobraNet® Part Numbers | Audio Channels over Ethernet | Serial Input/Serial Output Ports | Ethernet Interface | IC Package |
|---|---|---|---|---|---|---|
| **CS1810xx 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 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 CS496112* | 8 | Quad synchronous, capable of supplying up to 8 full-duplex channels at 48 and/or up to 96 kHz sample rates. | | |
| | | CS181022 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 | $I_{RMS}$ Accuracy | SNR (dB) | Serial Comm | Digital Outputs | $V_{REF}$ 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 $f_{SW}$ [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 $V_{p-p}$ diff | 24 SSOP |
| CS3302A | Hydrophone amplifier | — | — | –118 | 25 | 5 $V_{p-p}$ diff | 24 SSOP |
| CS5373A | DS modulator | 24 | 124 | –118 | 25 | 5 $V_{p-p}$ diff | 28 SSOP |
| | D/A converter | 24 | 114 | –116 | 40 | 5 $V_{p-p}$ 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 $V_{p-p}$ diff | 24 SSOP |
| CS3302A | Hydrophone amplifier | — | — | –118 | 25 | 5 $V_{p-p}$ diff | 24 SSOP |
| CS4373A | D/A converter | 24 | 114 | –116 | 10 | 5 $V_{p-p}$ diff | 28 SSOP |
| CS5371A | Single DS modulator | 24 | 124 | –118 | 25 | 5 $V_{p-p}$ diff | 24 SSOP |
| CS5372A | Dual DS modulator | 24 | 124 | –118 | 25 | 5 $V_{p-p}$ diff | 24 SSOP |
| CS5374 | Dual hydrophone amplifier & DS modulator | 24 | 124 | –118 | 32.5 | 5 $V_{p-p}$ 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; Buck-boost | 100 – 120 V | < 25 W | 1 | > 0.9 | < 5% | 0% | ✓ | 16eSOIC |
| NEW | CS1610A | ✓ | Flyback; Buck-boost | 100 – 120 V | < 25 W | 1 | > 0.9 | < 5% | 0% | ✓ | 16eSOIC |
| | CS1611 | ✓ | Flyback; Buck-boost | 220 – 240 V | < 25 W | 1 | > 0.9 | < 5% | 0% | ✓ | 16eSOIC |
| NEW | CS1611A | ✓ | Flyback; Buck-boost | 220 – 240 V | < 25 W | 1 | > 0.9 | < 5% | 0% | ✓ | 16eSOIC |
| | CS1612 | ✓ | Buck; Tapped-buck | 100 – 120 V | < 25 W | 1 | > 0.9 | < 5% | 0% | ✓ | 16eSOIC |
| NEW | CS1612A | ✓ | Buck; Tapped-buck | 100 – 120 V | < 25 W | 1 | > 0.9 | < 5% | 0% | ✓ | 16eSOIC |
| | CS1613 | ✓ | Buck; Tapped-buck | 220 – 240 V | < 25 W | 1 | > 0.9 | < 5% | 0% | ✓ | 16eSOIC |
| NEW | CS1613A | ✓ | Buck; Tapped-buck | 220 – 240 V | < 25 W | 1 | > 0.9 | < 5% | 0% | ✓ | 16eSOIC |
| | CS1630 | ✓ | Flyback; Buck-boost; Buck; Tapped-buck | 100 – 120 V | < 25 W | 2 | > 0.9 | < 5% | 0% | ✓ | 16eSOIC |
| | CS1631 | ✓ | Flyback; Buck-boost; Buck; Tapped-buck | 220 – 240 V | < 25 W | 2 | > 0.9 | < 5% | 0% | ✓ | 16eSOIC |
| NEW | CS1615 | ✓ | Flyback; Buck-boost | 100 – 120 V | < 25 W | 1 | > 0.9 | < 5% | 0% | ✓ | 16eSOIC |
| NEW | CS1615A | ✓ | Flyback; Buck-boost | 100 – 120 V | < 12 W | 1 | > 0.9 | < 5% | 0% | ✓ | 16eSOIC |
| NEW | CS1616 | ✓ | Flyback; Buck-boost | 220 – 240 V | < 25 W | 1 | > 0.9 | < 5% | 0% | ✓ | 16eSOIC |
| NEW | CS1616A | ✓ | Flyback; 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 MULTIPORT LINE INTERFACE UNITS

CS61584A
CS61880
CS61884

### Echo Canceler

CS6422

### Ethernet

CS8900A
CS8952

# Amplifiers

| Part Number | Device | Supply Voltage (V) | Supply Current (mA) | $V_{OS}$ (µV) Max | $V_{OS}$ Drift (µV/°C) | $e_{NOISE}$ (nV/ √Hz) | $A_{OL}$ 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 (±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 | ±0.0015% | NMC | 1 | 35 | 20 SSOP |
| CS5531 | 16 | 7 – 3840 | ±0.0015% | NMC | 2 | 35 | 20 SSOP |
| CS5532 | 24 | 7 – 3840 | ±0.0015% | NMC | 2 | 35 | 20 SSOP |
| CS5533 | 16 | 7 – 3840 | ±0.0015% | NMC | 4 | 35 | 24 SSOP |
| CS5534 | 24 | 7 – 3840 | ±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 (±LSB) | Number of Channels | Power Consumption (mW) | Package |
|---|---|---|---|---|---|---|---|
| CS5560 | 24 | 50 | ±5 ppm | 0.1 | 1, Differential | 90 | 24 SSOP |
| CS5566 | 24 | 5 | ±5 ppm | 0.1 | 1, Differential | 20 | 24 SSOP |
| CS5571 | 16 | 100 | ±8 ppm | 0.1 | 1, Single-ended | 85 | 24 SSOP |
| CS5581 | 16 | 200 | ±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

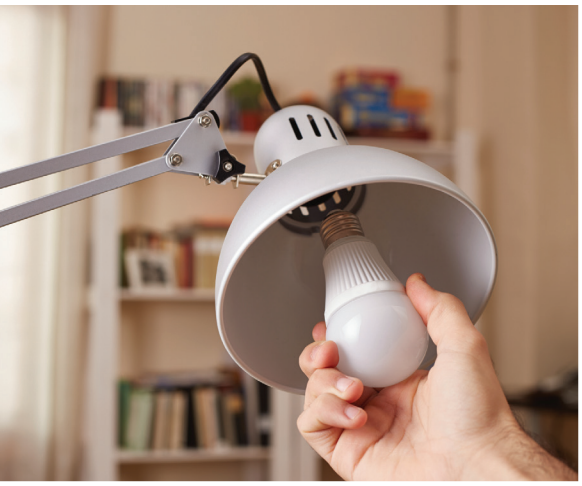
| Part | Media Supported | Digital Interface | Number of Channels | Power Supply | Package |
|---|---|---|---|---|---|
| CS8900A | 10BASE-T | ISA and general purpose parallel | 1 | 5 V, 3.3 V | 100 LQFP |
| CS8952 | 10BASE-T, 100BASE-X and NRZ (optical) | MII | 1 | 5 V with support of 3.3 V digital I/O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

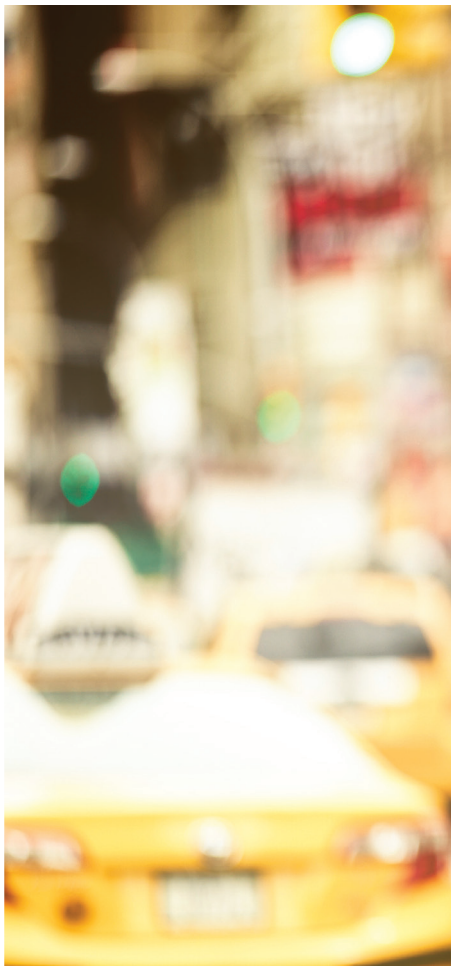
# Product Number Index


CS35L00 . . . . . 14
CS35L01 . . . . . 14
CS35L03 . . . . . 14
CS35L32 . . . . . 14
CS42L51 . . . . . 8
CS42L52 . . . . . 8
CS42L55 . . . . . 8
CS42L56 . . . . . 8
CS42L73 . . . . . 8
CS43L21 . . . . . 6
CS43L22 . . . . . 7
CS48L10 . . . . . 4
CS48L11 . . . . . 4
CS48LV12 . . . . . 6
CS48LV13 . . . . . 6
CS53L21 . . . . . 5
CS53L30 . . . . . 5
CS1501 . . . . . 18, 19
CS1601 . . . . . 18, 19
CS1601H . . . . . 19
CS1610 . . . . . 21
CS1610A . . . . . 21
CS1611 . . . . . 21
CS1611A . . . . . 21
CS1612 . . . . . 21
CS1612A . . . . . 21
CS1613 . . . . . 21
CS1613A . . . . . 21
CS1615 . . . . . 21
CS1615A . . . . . 21
CS1616 . . . . . 21
CS1616A . . . . . 21
CS1630 . . . . . 21
CS1631 . . . . . 21
CS2000 . . . . . 16
CS2100 . . . . . 16
CS2200 . . . . . 16
CS2300 . . . . . 16
CS3002 . . . . . 23
CS3003 . . . . . 23
CS3004 . . . . . 23
CS3013 . . . . . 23
CS3014 . . . . . 23
CS3301A . . . . . 20
CS3302A . . . . . 20
CS4202 . . . . . 12
CS4205 . . . . . 12
CS4207 . . . . . 12
CS4234 . . . . . 11
CS4244 . . . . . 11
CS4245 . . . . . 10
CS4265 . . . . . 10
CS4270 . . . . . 10
CS4271 . . . . . 10
CS4272 . . . . . 10
CS4299 . . . . . 12
CS4334/35/38/39 . . . . . 6
CS4340 . . . . . 6
CS4340A . . . . . 6
CS4344/45/48 . . . . . 6
CS4349 . . . . . 6
CS4350 . . . . . 6
CS4351 . . . . . 6
CS4352 . . . . . 6
CS4353 . . . . . 6
CS4354 . . . . . 6
CS4360 . . . . . 6
CS4361 . . . . . 6
CS4362A/82A . . . . . 6
CS4364/84 . . . . . 6
CS4365/85 . . . . . 6
CS4373A . . . . . 20
CS4385A . . . . . 6
CS4392 . . . . . 6
CS4398 . . . . . 6
CS5340 . . . . . 5
CS5341 . . . . . 5
CS5342 . . . . . 5
CS5343 . . . . . 5
CS5344 . . . . . 5
CS5346 . . . . . 5
CS5351 . . . . . 5
CS5361 . . . . . 5
CS5364 . . . . . 5
CS5366 . . . . . 5
CS5368 . . . . . 5
CS5371A . . . . . 20
CS5372A . . . . . 20
CS5373A . . . . . 20
CS5374 . . . . . 20
CS5376A . . . . . 20
CS5378 . . . . . 20
CS5381 . . . . . 5
CS5451A . . . . . 19
CS5463 . . . . . 19
CS5464 . . . . . 19
CS5467 . . . . . 19
CS5480 . . . . . 19
CS5484 . . . . . 19
CS5490 . . . . . 19
CS5505 . . . . . 23
CS5506 . . . . . 23
CS5507 . . . . . 23
CS5508 . . . . . 23
CS5509 . . . . . 23
CS5510 . . . . . 23
CS5511 . . . . . 23
CS5512 . . . . . 23
CS5513 . . . . . 23
CS5521 . . . . . 24
CS5522 . . . . . 24
CS5523 . . . . . 24
CS5524 . . . . . 24
CS5525 . . . . . 24
CS5526 . . . . . 24
CS5528 . . . . . 24
CS5529 . . . . . 23
CS5530 . . . . . 24
CS5531 . . . . . 24
CS5532 . . . . . 24
CS5533 . . . . . 24
CS5534 . . . . . 24
CS5550 . . . . . 24
CS5560 . . . . . 24
CS5566 . . . . . 24
CS5571 . . . . . 24
CS5581 . . . . . 24
CS6422 . . . . . 25
CS8406 . . . . . 15
CS8416 . . . . . 15
CS8420 . . . . . 15
CS8421 . . . . . 15
CS8422 . . . . . 15
CS8427 . . . . . 15
CS8900A . . . . . 25
CS8952 . . . . . 25
CS42416/26 . . . . . 11
CS42418/28 . . . . . 11
CS42432 . . . . . 11
CS42435 . . . . . 11
CS42436/38 . . . . . 11
CS42448 . . . . . 11
CS42516/26 . . . . . 11
CS42518/28 . . . . . 11
CS42888 . . . . . 11
CS47024 . . . . . 8
CS47028 . . . . . 8
CS47048 . . . . . 8
CS48520 . . . . . 4
CS48540 . . . . . 4
CS48560 . . . . . 4
CS61584A . . . . . 24
CS61880 . . . . . 24
CS61884 . . . . . 24
CS181002 . . . . . 17
CS181012 . . . . . 17
CS181022 . . . . . 17
CS495314 . . . . . 4
CS496102 . . . . . 17
CS496112 . . . . . 17
CS496122 . . . . . 17
CS497014 . . . . . 4
CS497024 . . . . . 4
EP9301 . . . . . 23
EP9302 . . . . . 23
EP9307 . . . . . 23
EP9312 . . . . . 23
EP9315 . . . . . 23
NAS ARM 9 . . . . . 23
WM0010 . . . . . 4
WM0011 . . . . . 4
WM1811 . . . . . 9
WM1824 . . . . . 7
WM2000 . . . . . 15
WM2002 . . . . . 15
WM2200 . . . . . 15
WM5102 . . . . . 8
WM5102S . . . . . 8
WM7120 . . . . . 13
WM7121 . . . . . 13
WM7121D . . . . . 13
WM7121E . . . . . 13
WM7121P . . . . . 13
WM7121PE . . . . . 13
WM7132 . . . . . 13
WM7132D . . . . . 13
WM7132E . . . . . 13
WM7132P . . . . . 13
WM7132PE . . . . . 13
WM7133L . . . . . 13
WM7137 . . . . . 13
WM7137E . . . . . 13

# Product Number Index


WM7210 . . . . . 14
WM7210E . . . . . 14
WM7211 . . . . . 14
WM7211E . . . . . 14
WM7216 . . . . . 14
WM7216E . . . . . 14
WM7220 . . . . . 14
WM7220E . . . . . 14
WM7230 . . . . . 14
WM7230E . . . . . 14
WM7231 . . . . . 14
WM7231E . . . . . 14
WM7236 . . . . . 14
WM7236E . . . . . 14
WM7331 . . . . . 13
WM7331E . . . . . 13
WM8152 . . . . . 16
WM8196 . . . . . 16
WM8199 . . . . . 16
WM8213 . . . . . 16
WM8214 . . . . . 16
WM8215 . . . . . 16
WM8224 . . . . . 16
WM8232 . . . . . 16
WM8233 . . . . . 16
WM8234 . . . . . 16
WM8235 . . . . . 16
WM8253 . . . . . 16
WM8255 . . . . . 16
WM8259 . . . . . 16
WM8501 . . . . . 7
WM8510 . . . . . 10
WM8521 . . . . . 7
WM8523 . . . . . 7
WM8524 . . . . . 7
WM8533 . . . . . 7
WM8569 . . . . . 10
WM8580 . . . . . 11
WM8581 . . . . . 11
WM8594 . . . . . 11
WM8595 . . . . . 11
WM8711BL . . . . . 7
WM8711L . . . . . 7
WM8716 . . . . . 7
WM8718 . . . . . 7
WM8725 . . . . . 7
WM8726 . . . . . 7
WM8727 . . . . . 7
WM8728 . . . . . 7
WM8731 . . . . . 9
WM8734 . . . . . 9
WM8737 . . . . . 5
WM8738 . . . . . 5
WM8740 . . . . . 7
WM8741 . . . . . 7
WM8742 . . . . . 7
WM8750 . . . . . 9
WM8753 . . . . . 9
WM8758 . . . . . 9
WM8761 . . . . . 7
WM8762 . . . . . 7
WM8766 . . . . . 7
WM8768 . . . . . 7
WM8770 . . . . . 11
WM8775 . . . . . 5
WM8776 . . . . . 10
WM8778 . . . . . 10
WM8781 . . . . . 5
WM8782 . . . . . 5
WM8783 . . . . . 5
WM8786 . . . . . 5
WM8804 . . . . . 15
WM8805 . . . . . 15
WM8850 . . . . . 12
WM8860 . . . . . 12
WM8903 . . . . . 9
WM8904 . . . . . 9
WM8912 . . . . . 7
WM8918 . . . . . 7
WM8940 . . . . . 10
WM8941 . . . . . 12
WM8944 . . . . . 12
WM8945 . . . . . 12
WM8946 . . . . . 9, 12
WM8948 . . . . . 9, 12
WM8950 . . . . . 5
WM8952 . . . . . 5
WM8953 . . . . . 5
WM8955 . . . . . 8
WM8956 . . . . . 8
WM8958 . . . . . 9
WM8960 . . . . . 9
WM8962 . . . . . 9
WM8962B . . . . . 9
WM8973 . . . . . 9
WM8974 . . . . . 10
WM8976 . . . . . 9
WM8978 . . . . . 9
WM8980 . . . . . 9, 12
WM8983 . . . . . 9
WM8985 . . . . . 9
WM8988 . . . . . 9
WM8993 . . . . . 9
WM8994 . . . . . 9
WM8996 . . . . . 9
WM8998 . . . . . 8
WM9010 . . . . . 14
WM9081 . . . . . 14
WM9082 . . . . . 14
WM9094 . . . . . 14
WM9705 . . . . . 12
WM9707 . . . . . 12
WM9712 . . . . . 12
WM9713 . . . . . 12
WM9714 . . . . . 12
WM9715 . . . . . 12





CIRRUS LOGIC®


**CORPORATE HEADQUARTERS**
800 West Sixth Street
Austin, Texas 78701
United States

T +1 512-851-4000
Fax +1 512-851-4977
Toll Free +1 800-888-5016

www.cirrus.com


AUG2014-CORP

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Cirrus Logic:

WM7137IMSE/RV WM7137IMS/RV

LifeElectronics
Живое партнерство

**ООО «ЛайфЭлектроникс»** **“LifeElectronics” LLC**

*ИНН 7805602321 КПП 780501001 Р/С 40702810122510004610 ФАКБ "АБСОЛЮТ БАНК" (ЗАО) в г.Санкт-Петербурге К/С 30101810900000000703 БИК 044030703*

*Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.*

*С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров*

*Мы предлагаем:*

- *Конкурентоспособные цены и скидки постоянным клиентам.*
- *Специальные условия для постоянных клиентов.*
- *Подбор аналогов.*
- *Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.*

- *Приемлемые сроки поставки, возможна ускоренная поставка.*
- *Доставку товара в любую точку России и стран СНГ.*
- *Комплексную поставку.*
- *Работу по проектам и поставку образцов.*
- *Формирование склада под заказчика.*

- *Сертификаты соответствия на поставляемую продукцию (по желанию клиента).*
- *Тестирование поставляемой продукции.*
- *Поставку компонентов, требующих военную и космическую приемку.*
- *Входной контроль качества.*
- *Наличие сертификата ISO.*

*В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.*

*Конструкторский отдел помогает осуществить:*

- *Регистрацию проекта у производителя компонентов.*
- *Техническую поддержку проекта.*
- *Защиту от снятия компонента с производства.*
- *Оценку стоимости проекта по компонентам.*
- *Изготовление тестовой платы монтаж и пусконаладочные работы.*

*Тел: +7 (812) 336 43 04 (многоканальный)*
*Email: org@lifeelectronics.ru*

***www.lifeelectronics.ru***