ICs

# Audio & Video

## CONTENTS

# Audio Amplifiers

## Speaker Amplifiers

### Portable Amplifier 1.9W+1.9W Stereo Speaker Amplifier

| Part No. | Supply Voltage (V) | Power Dissipation (W) | Quiescent Current (mA) | Standby Current (μA) | Voltage Gain (dB) | Output Power (W) | Distortion (%) | Output Noise Voltage (μVrms) | Package |
|---|---|---|---|---|---|---|---|---|---|
| BD7836EFV | 4.5 to 5.5 | 1.0 | 5 | 0.1 | 6/10/15.6/21.6 | 1.9 ($V_{DD}$=5V, 4Ω, THD+N=1%) | 0.1 | 16 | HTSSOP-B20 |

### Portable Amplifiers 1.1W to 1.5W Monaural Speaker Amplifiers

| Part No. | Supply Voltage (V) | Power Dissipation (W) | Quiescent Current (mA) | Standby Current (μA) | Voltage Gain (dB) | Output Power($R_L$=8Ω, THD=10%) | | Distortion (%) | Output Noise Voltage (dBV) | Package |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | $V_{CC}$=3.6V | $V_{CC}$=5.0V | | | |
| BH7824FVM | 2.4 to 5.5 | 470 | 3.5 | 0 | 0 to 20 | 0.60W | 1.1W | 0.07 | −94 | MSOP8 |
| BH7826FVM | 2.6 to 5.5 | 470 | 3.5 | 0 | 0 to 20 | 0.60W | 1.1W | 0.2 | −94 | MSOP8 |
| BD7830NUV | 2.4 to 5.5 | 530 | 3.2 | 0 | 0 to 20 | 0.77W | 1.5W | 0.1 | −100 | VSON008V2030 |

### Portable Amplifiers Analog Input Monaural Class-D Speaker Amplifiers

| Part No. | Supply Voltage (V) | Power Dissipation (W) | Quiescent Current (mA) | Voltage Gain (dB) | Output Power (W) | | Distortion (%) | Output Noise Voltage (μVrms) | ALC Circuit | Package (mm) |
|---|---|---|---|---|---|---|---|---|---|---|
| BD5460GUL | 2.5 to 5.5 | 0.69 | 2.0 ($V_{DD}$=3.6V) | 6 | 2.5 ($V_{DD}$=5V, $R_L$=4Ω THD+N=10%) | 0.85 ($V_{DD}$=3.6V, $R_L$=8Ω THD+N=10%) | 0.3 ($V_{DD}$=3.6V) | 30 | — | VCSP50L1 (1.6×1.6) |
| BD5461GUL | 2.5 to 5.5 | 0.69 | 2.0 ($V_{DD}$=3.6V) | 12 | 2.5 ($V_{DD}$=5V, $R_L$=4Ω THD+N=10%) | 0.85 ($V_{DD}$=3.6V, $R_L$=8Ω THD+N=10%) | 0.3 ($V_{DD}$=3.6V) | 40 | — | VCSP50L1 (1.6×1.6) |
| BD27400GUL | 2.5 to 5.5 | 0.69 | 2.9 ($V_{DD}$=3.6V) | External Variable | 2.5 ($V_{DD}$=5V, $R_L$=4Ω THD+N=10%) | 0.85 ($V_{DD}$=3.6V, $R_L$=8Ω THD+N=10%) | 0.3 ($V_{DD}$=3.6V) | 40 | — | VCSP50L1 (1.5×1.5) |
| BD5632NUX | 2.5 to 5.5 | 0.52 | 2.7 ($V_{DD}$=3.6V) | 6 | 2.5 ($V_{DD}$=5V, $R_L$=4Ω THD+N=10%) | 0.85 ($V_{DD}$=3.6V, $R_L$=8Ω THD+N=10%) | 0.1 ($V_{DD}$=3.6V) | 40 | — | VSON008X2030 |
| BD5634NUX | 2.5 to 5.5 | 0.52 | 2.7 ($V_{DD}$=3.6V) | 12 | 2.5 ($V_{DD}$=5V, $R_L$=4Ω THD+N=10%) | 0.85 ($V_{DD}$=3.6V, $R_L$=8Ω THD+N=10%) | 0.1 ($V_{DD}$=3.6V) | 40 | — | VSON008X2030 |
| BD5638NUX | 2.5 to 5.5 | 0.52 | 2.7 ($V_{DD}$=3.6V) | 18 | 2.5 ($V_{DD}$=5V, $R_L$=4Ω THD+N=10%) | 0.85 ($V_{DD}$=3.6V, $R_L$=8Ω THD+N=10%) | 0.1 ($V_{DD}$=3.6V) | 40 | — | VSON008X2030 |
| BD5465GUL | 2.5 to 5.5 | 0.69 | 3.3 ($V_{DD}$=3.6V) | 12 | 0.6 ($V_{DD}$=3.6 to 5.5V) | | 0.1 ($V_{DD}$=3.6V) | 40 | ✓ | VCSP50L1 (1.8×1.8) |
| BD5466GUL | 2.5 to 5.5 | 0.69 | 3.0 ($V_{DD}$=3.6V) | 18 | 1.5 ($V_{DD}$=5V, $R_L$=4Ω THD+N≦1%) | 0.5 ($V_{DD}$=3.6V, $R_L$=8Ω THD+N≦1%) | 0.1 ($V_{DD}$=3.6V) | 40 | ✓ | VCSP50L1 (1.7×1.7) |
| BD5467GUL | 2.5 to 5.5 | 0.69 | 3.0 ($V_{DD}$=3.6V) | 13 | 1.5 ($V_{DD}$=5V, $R_L$=4Ω THD+N≦1%) | 0.5 ($V_{DD}$=3.6V, $R_L$=8Ω THD+N≦1%) | 0.1 ($V_{DD}$=3.6V) | 40 | ✓ | VCSP50L1 (1.7×1.7) |
| BD5468GUL | 2.5 to 5.5 | 0.69 | 3.0 ($V_{DD}$=3.6V) | 13 | 1.5 ($V_{DD}$=5V, $R_L$=4Ω THD+N≦1%) | 0.5 ($V_{DD}$=3.6V, $R_L$=8Ω THD+N≦1%) | 0.1 ($V_{DD}$=3.6V) | 40 | ✓ | VCSP50L1 (1.7×1.7) |
| BD5469GUL | 2.5 to 5.5 | 0.69 | 3.0($V_{DD}$=3.6V) | 13 | 0.88 ($V_{DD}$=4.2V, $R_L$=8Ω THD+N≦1%) | 0.64 ($V_{DD}$=3.6V, $R_L$=8Ω THD+N≦1%) | 0.1 ($V_{DD}$=3.6V) | 40 | ✓ | VCSP50L1 (1.7×1.7) |

### Portable Amplifier Analog Input Stereo Class-D Speaker Amplifier

| Part No. | Supply Voltage (V) | Power Dissipation (W) | Quiescent Current (mA) | Voltage Gain (dB) | Output Power (W) | | Distortion (%) | Output Noise Voltage (μVrms) | Max. LDO Current (mA) | Package |
|---|---|---|---|---|---|---|---|---|---|---|
| BD28412MUV | 4.5 to 13 | 3.26 | 16 ($V_{CC}$=11V) | 20/26/32/36 | 18 ($V_{CC}$=12V, $R_L$=4Ω THD+N=10%, PBTL) | 9 ($V_{CC}$=12V, $R_L$=8Ω THD+N=10%) | 0.03 ($V_{CC}$=11V) | 100 | — | VQFN032V5050 |

### Mid/High-Power Amplifiers Class-D Speaker Amplifiers for Digital Input with Built-in DSP

| Part No. | Supply Voltage (V) | Power Dissipation (W) | Quiescent Current (mA) | Output Power (W) | | Distortion (%) | Output Noise Voltage (μVrms) | DSP | | | | | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Volume | DC Cut HPF | Hard Clipper | Parametric EQ | DRC | |
| New BM28723MUV | 10 to 24 | 4.56 (4-layer board) | 45 ($V_{CC}$=18V) | 10 ($V_{CC}$=13V $R_L$=8Ω) | 17 ($V_{CC}$=18V $R_L$=8Ω) | 0.08 | 150 | ✓ | ✓ | ✓ | ✓ (12 Band) | ✓ (3 Band) | VQFN032V5050 |
| BM28720MUV | 10 to 24 | 4.56 (4-layer board) | 45 ($V_{CC}$=18V) | 10 ($V_{CC}$=13V $R_L$=8Ω) | 20 ($V_{CC}$=18V $R_L$=8Ω) | 0.07 | 80 | ✓ | ✓ | ✓ | ✓ (12 Band) | ✓ (3 Band) | VQFN032V5050 |

## Mid/High-Power Amplifier Class-D Speaker Amplifier for Digital Input

| Part No. | Supply Voltage (V) | Power Dissipation (W) | Quiescent Current (mA) | Output Power (W) | | Distortion (%) | Output Noise Voltage (μVrms) | Power Limiter Function | Package |
|---|---|---|---|---|---|---|---|---|---|
| BD28623MUV | 8.5 to 24 | 4.56 (4-layer board) 3.26 (2-layer board) | 40 (VCC=18V) | — | 15 (VCC=16V RL=8Ω) | 0.08 | 150 | ✓ (GAIN) | VQFN024V4040 |

## Mid/High-Power Amplifiers Analog Input/BTL Output Class-D Speaker Amplifiers

| Part No. | Supply Voltage (V) | Power Dissipation (W) | Quiescent Current (mA) | Voltage Gain (dB) | Output Power (W) | | Distortion (%) | Output Noise Voltage (μVrms) | Power Limiter Function | Package |
|---|---|---|---|---|---|---|---|---|---|---|
| BD5424EFS | 10 to 18 | 4.5 (4-layer board) 2.0 (2-layer board) | 30 (VCC=12V) | 28 | 10 (VCC=12V RL=8Ω) | 20 (VCC=17V RL=8Ω) | 0.1 | 80 | ✓ (Power Limitter) | HTSSOP-A44 |
| BD5423AEFS | 10 to 16.5 | 4.5 (4-layer board) 2.0 (2-layer board) | 25 (VCC=12V) | 28 | 10 (VCC=12V RL=8Ω) | 17 (VCC=12V RL=4Ω) | 0.1 | 80 | ✓ (Power Limitter) | HTSSOP-A44 |
| BD5426EFS | 10 to 16.5 | 4.5 (4-layer board) 2.0 (2-layer board) | 25 (VCC=12V) | 28 | 9 (VCC=12V RL=8Ω) | 10 (VCC=13V RL=8Ω) | 0.1 | 80 | ✓ (Power Limitter) | HTSSOP-A44 |
| BD5413EFV | 6 to 10.5 | 2.8 (4-layer board) 1.1 (2-layer board) | 12 (VCC=9V) | 30 | 4 (VCC=9V RL=8Ω) | 5 (VCC=9V RL=6Ω) | 0.2 | 90 | — | HTSSOP-B24 |

## Mid/High-Power Amplifier 5W+5W Stereo Speaker Amplifier

| Part No. | Supply Voltage (V) | Power Dissipation (W) | Quiescent Current (mA) | Standby Current (μA) | Output Power(W) [VCC=12V, RL=3Ω] | Closed Loop Voltage Gain (dB) | Output Noise Voltage (mVrms) | Distortion (%) | Ripple Rejection (dB) | Package |
|---|---|---|---|---|---|---|---|---|---|---|
| BA5417 | 6 to 15 | 15 | 22 | 0 | 5 | 45 | 0.3 | 0.1 | 55 | HSIP15 |

# Headphone Amplifiers

## Ultra-Compact Coupling Capacitorless Headphone Amplifiers

| Part No. | Supply Voltage (V) | Quiescent Current (mA) | Gain (V/V) | Maximum Output Power (mW) | Distortion (%) | Output Noise Voltage (μVrms) | Ripple Rejection (dB) | Note | Package (mm) |
|---|---|---|---|---|---|---|---|---|---|
| BD88200GUL | 2.4 to 5.5 | 2 | Variable Gain with external resistor | 80 (VDD=3.3V, RL=16Ω) | 0.006 (VDD=3.3V, RL=16Ω) | 10 | −80 (f=217Hz) | Virtual ground based | VCSP50L2 (2.1×2.1) |
| BD88210GUL | 2.4 to 5.5 | 2 | −1.0 | 80 (VDD=3.3V, RL=16Ω) | 0.006 (VDD=3.3V, RL=16Ω) | 10 | −80 (f=217Hz) | Virtual ground based | VCSP50L2 (2.1×2.1) |
| BD88215GUL | 2.4 to 5.5 | 2 | −1.5 | 80 (VDD=3.3V, RL=16Ω) | 0.006 (VDD=3.3V, RL=16Ω) | 10 | −80 (f=217Hz) | Virtual ground based | VCSP50L2 (2.1×2.1) |
| BD88220GUL | 2.4 to 5.5 | 2 | −1.0 | 80 (VDD=3.3V, RL=16Ω) | 0.006 (VDD=3.3V, RL=16Ω) | 10 | −80 (f=217Hz) | Virtual ground based | VCSP50L2 (2.1×2.1) |
| BD88400GUL | 2.4 to 5.5 | 2 | Variable Gain with external resistor | 80 (VDD=3.3V, RL=16Ω) | 0.006 (VDD=3.3V, RL=16Ω) | 10 | −80 (f=217Hz) | Ground based | VCSP50L2 (2.1×2.1) |
| BD88400FJ | 2.4 to 5.5 | 2 | Variable Gain with external resistor | 80 (VDD=3.3V, RL=16Ω) | 0.006 (VDD=3.3V, RL=16Ω) | 10 | −80 (f=217Hz) | Ground based | SOP-J14 |
| BD88410GUL | 2.4 to 5.5 | 2 | −1.0 | 80 (VDD=3.3V, RL=16Ω) | 0.006 (VDD=3.3V, RL=16Ω) | 10 | −80 (f=217Hz) | Ground based | VCSP50L2 (2.1×2.1) |
| BD88415GUL | 2.4 to 5.5 | 2 | −1.5 | 80 (VDD=3.3V, RL=16Ω) | 0.006 (VDD=3.3V, RL=16Ω) | 10 | −80 (f=217Hz) | Ground based | VCSP50L2 (2.1×2.1) |
| BD88420GUL | 2.4 to 5.5 | 2 | −2.0 | 80 (VDD=3.3V, RL=16Ω) | 0.006 (VDD=3.3V, RL=16Ω) | 10 | −80 (f=217Hz) | Ground based | VCSP50L2 (2.1×2.1) |

## Headphone Amplifier Designed for 0.93V Low Voltage Operation

| Part No. | Supply Voltage (V) | Quiescent Current (mA) | Maximum Output Power (mW) | | Distortion (%) | | Output Noise Voltage (μVrms) | Package |
|---|---|---|---|---|---|---|---|---|
| | | | Single-ended(16Ω) | BTL(8Ω) | Single-ended(16Ω) | BTL(8Ω) | | |
| BU7150NUV | 0.93 to 3.5 (Ta=0°C or more) | 1.0 | 14 (VDD=1.5V) | 85 (VDD=1.5V) | 0.1(Po=5mW) | 0.2(Po=25mW) | 10 | VSON010V3030 |

## Standard Headphone Amplifiers

| Part No. | Supply Voltage (V) | Quiescent Current (mA) | Voltage Gain (dB) | Maximum Output Power(mW) RL=16Ω | Distortion (%) | Ripple Rejection (dB) | Package |
|---|---|---|---|---|---|---|---|
| BH3544F | 2.8 to 6.5 | 7.0 | 6 | 62 | 0.02 | 57 | SOP8 |
| BH3547F | 4.5 to 6.5 | 3.7 | 6 | 77 | 0.05 | 57 | SOP8 |
| BH3548F | 4.0 to 5.5 | 6.5 | 6 | 62 (120@RL=8Ω) | 0.02 | 57 | SOP8 |

## Others

### Audio Subsystems

| Part No. | Supply Voltage (V) | Power Dissipation (mW) | Quiescent Current (mA) | Standby Current (μA) | SP Amp. | | | HP Amp. | | | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Voltage Gain (dB) | Distortion (%) | Output Power(W) Vcc=5V | Voltage Gain (dB) | Distortion (%) | HP AMP/Maximum Output Voltage (dBV) Vcc=3.3V | |
| BH7881EFV | 3.3 to 5.5 | 1100 | 18 | 0 | 11(SE)/ 17(BTL) | 0.04 | 2 | 5.5 | 0.02 | 1.4 | HTSSOP-B24 |
| BH7884EFV | 3.0 to 5.5 | 1100 | 9 | 0.2 | 12(SE)/ 18.2(BTL) | 0.1 | 1 | 5.6 | 0.03 | 1.0 | HTSSOP-B24 |

### Line Amplifier (OP Amplifier)

| Part No. | Supply Voltage (V) | Circuit Current (mA) | Open Loop Gain (dB) | Input | CMRR (dB) | Supply Voltage Rejection Ratio (dB) | Commom-mode Input Voltage Range(V) Vcc=8V | Offset Voltage (mV) | Offset Current (nA) | Input Bias Current (nA) | Distortion (%) | Channel Separation (dB) | Gain Bandwidth Product (MHz) | Slew Rate (V/μs) | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BA3131FS | 6.0 to 16.0 | 4.9 | 110 | 3 | 72 | 90 | 6 | 0.5 | 5 | 50 | 0.003 | 115 | 2.6 | 1.2 | SSOP-A20 |

### Line Amplifiers (Output Coupling Capacitor-less Line Amplifier)

| Part No. | Supply Voltage (V) | Circuit Current (mA) | Channel | Voltage Gain (dB) | Maximum Output Voltage (Vrms) | Distortion (%) | Output Noise Voltage (μVrms) | Channel Separation (dB) | Ripple Rejection (dB) | Charge Pump | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BD8876FV | 3.0 to 5.5 | 3.2 | 2 | 6 or 9 | 3.5 | 0.0025 | 8 | 80 | 65 | ✓ | SSOP-B14 |
| BD8878FV | 3.0 to 5.5 | 3.2 | 2 | 6.7 | 3 | 0.0025 | 10 | 65 | 65 | ✓ | SSOP-B14 |

### Line Amplifiers (Preamps with Built-in ALC)

| Part No. | Supply Voltage (V) | Circuit Current (mA) | Open Loop Gain (dB) | Distortion (%) | Input Resistance (Ω) | Maximum Output Voltage (Vrms) | Equivalent Input Noise Voltage (μVrms) | ALC Range (dB) | Channel Balance (dB) | Channel Separation (dB) | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BA3308F | 4.5 to 14.0 | 3.5 | 80 | 0.1 | 25 | 1.2 | 1.0 | 45 | 0 | 75 | SOP14 |
| BA3308FV | 4.5 to 14.0 | 3.5 | 80 | 0.1 | 25 | 1.2 | 1.0 | 45 | 0 | 75 | SSOP-B14 |

### Isolation Amplifiers

| Part No. | Supply Voltage (V) | Operating Temperature (°C) | Circuit | Circuit Current (mA) | Voltage Gain (dB) | CMRR (dB) | Common-mode Input Voltage Range(V) Vcc=8V | THD (%) | Output Noise Voltage (μVrms) | Channel Separation (dB) | Slew Rate (V/μs) | Input Resistance (kΩ) | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BA3121F | 4.0 to 18.0 | −30 to +85 | 2 | 9.0 | −0.04 | 57 | 3.75 | 0.002 | 3.5 | 82 | 2.0 | 55 | SOP8 |
| BA3123F | 4.0 to 18.0 | −40 to +85 | 2 | 9.0 | −0.04 | 57 | 3.75 | 0.002 | 3.5 | 82 | 2.0 | 55 | SOP8 |

# Audio Processors

## Analog Audio Processors

### 6ch/8ch Sound Processors with Built-in Micro-step Volume

| Part No. | Supply Voltage (V) | Circuit Current (mA) | Output Noise Voltage (μVrms) | Distortion (%) | Selector | Main Volume | | Zone Volume | | Tone Control | Serial Control | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Channel (ch) | | Channel (ch) | | | |
| BD34704KS2 | ±6.5 to ±7.5 | ±32 | 1.2 | 0.0004 | 18 | +32 to −95dB 0.5dB/Step | 8 | +7.5 to −91.5dB 0.5dB/Step | 2 | — | 2 Wire | SQFP-T80C |
| BD34705KS2 | ±6.5 to ±7.5 | ±32 | 1.2 | 0.0004 | 12 | +32 to −95dB 0.5dB/Step | 8 | +6 to −16dB 1dB/Step −16 to −56dB 2dB/Step | 2 | — | 2 Wire | SQFP-T64 |
| BD34701KS2 | ±6.5 to ±7.5 | ±22 | 1.5 | 0.0004 | 8 | +32 to −95dB 0.5dB/Step | 8 | — | — | — | 2 Wire | SQFP-T52 |
| BD3471KS2 | ±6.5 to ±7.5 | ±30 | 1.5 | 0.0004 | 12 | +24 to −95dB 0.5dB/Step | 8 | — | — | — | 2 Wire | SQFP-T80C |
| BD3473KS2 | ±6.5 to ±7.5 | ±30 | 1.5 | 0.0004 | 12 | +24 to −95dB 0.5dB/Step | 8 | — | — | Bass, Treble | 2 Wire | SQFP-T80C |
| BD3474KS2 | ±6.5 to ±7.5 | ±30 | 1.5 | 0.0004 | 12 | +32 to −95dB 0.5dB/Step | 8 | — | — | Bass, Treble | 2 Wire | SQFP-T80C |

### 2ch/4ch/6ch Sound Processors

| Part No. | Supply Voltage (V) | Circuit Current (mA) | Output Noise Voltage (μVrms) | Distortion (%) | Selector | Main Volume | | Zone Volume | | Tone Control | Serial Control | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Channel (ch) | | Channel (ch) | | | |
| BD34700FV | ±6.5 to ±7.5 | ±22 | 1.5 | 0.0004 | — | +32 to −95dB 0.5dB/Step | 4 | — | — | — | 2 Wire | SSOP-B40 |
| ☆BD34710FV | ±6.5 to ±7.5 | ±22 | 1.5 | 0.0004 | 3 | +32 to −95dB 0.5dB/Step | 6 | — | — | — | 2 Wire | SSOP-B40 |
| BD3812F | ±5.0 to ±7.3 | ±2 | 1.2 | 0.0050 | — | 0,6 to 18dB 2dB/Step 0 to −103dB 1dB/Step | 2 | — | — | — | 2 Wire | SOP14 |
| BD3814FV | ±5.0 to ±7.3 | ±7 | 1.0 | 0.001 | — | 0 to −95dB 1dB/Step | 6 | — | — | Bass, Treble | 2 Wire | SSOP-B40 |

☆ : Under Development

## 6ch Sound Processors

| Part No. | Supply Voltage (V) | Circuit Current (mA) | Output Noise Voltage (μVrms) | Distortion (%) | Selector | Input Gain | Output Gain | Volume | Number of Volume | Tone Control | Bass Boost | Serial Control | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BD3811K1 | ±5.0 to ±7.3 | ±15 | 2.0 | 0.005 | 8 | 0,6dB | 0,6 to 18dB 2dB/Step | 0 to −103dB 1dB/Step | 6 | Bass, Treble | ✓ | 2 Wire | QFP80 |
| BD3818KS | ±5.0 to ±7.4 | ±28 | 1.0 | 0.002 | 5 | 0,3,6,9dB | — | 0 to −95dB 1dB/Step | 6 | Bass, Treble | (Dynamic) | 2 Wire | SQFP80 |

## 7ch Sound Processors

| Part No. | Supply Voltage (V) | Current Consumption (mA) | Output Noise Voltage (μVrms) | Distortion (%) | Selector | Input Gain | Output Gain | Volume | Number of Volume | Tone Control | Serial Control | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BD3816K1 | ±5.0 to ±7.3 | ±24 | 1.2 | 0.001 | 7 | 0 to 7dB 1dB/Step | 0 to 17dB 1dB/Step | 0 to −95dB 1dB/Step | 7 | Bass, Treble | 2 Wire | QFP80 |
| BD3817KS | ±5.0 to ±7.3 | ±24 | 1.2 | 0.001 | 10 | 0 to 7dB 1dB/Step | 0 to 17dB 1dB/Step | 0 to −95dB 1dB/Step | 7 | Bass, Treble | 2 Wire | SQFP100 |

## 6ch/9ch Stereo Input Selector ICs Maximum Input Voltage : 4.2V

| Part No. | Supply Voltage (V) | Current Consumption (mA) | Output Noise Voltage (μVrms) | Distortion (%) | Selector | Serial Control | Package |
|---|---|---|---|---|---|---|---|
| BD3843FS | ±4.0 to ±7.3 | ±3 | 1.0 | 0.004 | 6 | 2 Wire | SSOP-A24 |
| BD3841FS | ±5.0 to ±7.3 | ±3 | 1.0 | 0.004 | 9 | 2 Wire | SSOP-A32 |

## Sound Processors with Built-in 2-band Equalizer

| Part No. | Supply Voltage (V) | Current Consumption (mA) | Selector | | Input Gain (dB) | Volume (dB) | Fader | | Parametric EQ | Loudness | LPF for Sub Woofer | Option | Serial Control | Output Noise Voltage (μVrms) | Distortion (%) | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Single | Diff. | | | (dB) | Output | | | | | | | | |
| BD37503FV | 7 to 9.5 | 20 | 3 | 1 | 0 to +20 | 0 to −36, −∞ | 0 to −63, −∞ | 4 | — | ✓* | — | Anti-aliasing Filter* | I²C BUS | 5.8 | 0.001 | SSOP-B20 |
| BD37511FS | 7 to 9.5 | 15 | 3 | 0 | 0 to +20 | 0 to −40 | 0 to −62, −∞ | 4 | — | — | — | — | I²C BUS | 6 | 0.005 | SSOP-A20 |
| BD37512FS | 7 to 9.5 | 15 | 3 | 1 | 0 to +20 | 0 to −40 | 0 to −62, −∞ | 4 | — | — | — | — | I²C BUS | 6 | 0.005 | SSOP-A20 |
| BD37513FS | 7 to 9.5 | 38 | 3 | 1 | 0 to +20 | +15 to −79, −∞ | 0 to −79, −∞ | 4 | — | ✓ | — | — | I²C BUS | 3.8 | 0.001 | SSOP-A20 |
| BD37514FS | 7 to 9.5 | 38 | 3 | 1 | 0 to +20 | +15 to −79, −∞ | 0 to −79, −∞ | 5 | ✓ | ✓ | — | — | I²C BUS | 3.8 | 0.001 | SSOP-A20 |
| BD37515FS | 7 to 9.5 | 38 | 3 | 1 | 0 to +20 | +15 to −79, −∞ | +15 to −79, −∞ | 5 | ✓ | ✓ | ✓ | — | I²C BUS | 3.8 | 0.001 | SSOP-A20 |
| BD37521FS | 7 to 9.5 | 38 | 3 | 1 | 0 to +20 | +15 to −79, −∞ | 0 to −79, −∞ | 4 | — | EXT | — | — | I²C BUS | 3.8 | 0.001 | SSOP-A24 |
| BD37522FS | 7 to 9.5 | 38 | 4 | 1 | 0 to +20 | +15 to −79, −∞ | 0 to −79, −∞ | 4 | ✓ | ✓ | — | — | I²C BUS | 3.8 | 0.001 | SSOP-A24 |
| BD37523FS | 7 to 9.5 | 38 | 4 | 1 | 0 to +20 | +15 to −79, −∞ | +15 to −79, −∞ | 5 | ✓ | ✓ | ✓ | — | I²C BUS | 3.8 | 0.001 | SSOP-A24 |
| BD3870FS | 4.5 to 9.5 | 8 | 3 | — | 0/6/12/18 | 0 to −87, −∞ | — | 2 | EXT | — | — | Surround | 2 Wire | 4.5 | 0.01 | SSOP-A24 |
| BD3871FS | 4.5 to 9.5 | 8 | 3 | — | 24/26/28 | 0 to −87, −∞ | — | 2 | EXT | — | — | Surround | 2 Wire | 40 (Gv=24dB) | 0.01 | SSOP-A24 |
| BD3872FS | 4.5 to 9.5 | 8 | 5 | — | 0/5/10/19/ 23/26/28 | 0 to −87, −∞ | — | 2 | EXT | — | — | Surround | 2 Wire | 4.5 | 0.01 | SSOP-A32 |
| BD3873FS | 4.5 to 9.5 | 8 | 3 | — | 18/21/24/27 | 0 to −87, −∞ | — | 2 | EXT | — | — | Surround | 2 Wire | 40 (Gv=24dB) | 0.01 | SSOP-A24 |
| BD3490FV | 4.75 to 9.5 | 7 | 4 | — | 0/2/4/6/ 8/12/16/20 | 0 to −87 (2ch Independent control), −∞ | — | 2 | EXT | — | — | Bass Boost, Surround | I²C BUS | 5 | 0.002 | SSOP-B28 |
| BD3491FS | 4.75 to 9.5 | 7 | 6 | — | 0/2/4/6/ 8/12/16/20 | 0 to −87 (2ch Independent control), −∞ | — | 2 | EXT | — | — | Bass Boost, Surround | I²C BUS | 5 | 0.002 | SSOP-A32 |

Sound Processors with Built-in 2-band Equalizer : Built-in Bass and Treble control *Loudness and Anti-aliasing Filter can be used exclusively. EXT : Set by external components

Sound Processors with Built-in 2-band Equalizer : BD37511FS and BD37512FS are all function-compatible. BD37513FS, BD37514FS and BD37515FS are all function-compatible. BD37522FS and BD37523FS are all function-compatible.

## Analog Audio Processors

### Sound Processors with Built-in 3-band Equalizer

| Part No. | Supply Voltage (V) | Current Consumption (mA) | Selector | | Input Gain (dB) | Volume (dB) | Fader | | Parametric EQ | Loudness | LPF/HPF for Sub Woofer | Mixing | | Level Meter | Option | Serial Control | Output Noise Voltage (μVrms) | Distortion (%) | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Single | Diff. | | | (dB) | Outputs | | | | | ATT | | | | | | |
| BD37524FS | 7.0 to 9.5 | 38 | 4 | 1 | 0 to +20 | +15 to −79, −∞ | +15 to −79, −∞ | 6 | ✓ | ✓ | LPF | — | — | ✓ | — | I²C BUS | 3.8 | 0.001 | SSOP-A24 |
| BD37531FV | 7.0 to 9.5 | 38 | 2/3/5 | 3/2/1 | 0 to +20 | +15 to −79, −∞ | +15 to −79, −∞ | 6 | ✓ | ✓ | — | — | — | — | — | I²C BUS | 3.8 | 0.001 | SSOP-B28 |
| BD37532FV | 7.0 to 9.5 | 38 | 2/3/5 | 3/2/1 | 0 to +20 | +15 to −79, −∞ | +15 to −79, −∞ | 6 | ✓ | ✓ | LPF | — | — | — | — | I²C BUS | 3.8 | 0.001 | SSOP-B28 |
| BD37533FV | 7.0 to 9.5 | 38 | 2/3/5 | 3/2/1 | 0 to +20 | +15 to −79, −∞ | +15 to −79, −∞ | 6 | ✓ | ✓ | LPF | ✓ | ✓ | — | — | I²C BUS | 3.8 | 0.001 | SSOP-B28 |
| BD37534FV | 7.0 to 9.5 | 38 | 2/3/5 | 3/2/1 | 0 to +20 | +15 to −79, −∞ | +15 to −79, −∞ | 6 | ✓ | ✓ | LPF | ✓ | ✓ | ✓ | — | I²C BUS | 3.8 | 0.001 | SSOP-B28 |
| BD37541FS | 7.0 to 9.5 | 38 | 2/3/5 | 3/2/1 | 0 to +20 | +15 to −79, −∞ | 0 to −79, −∞ | 6 | ✓ | EXT | — | ✓ | — | — | — | I²C BUS | 3.8 | 0.001 | SSOP-B28 |
| BD37542FS | 7.0 to 9.5 | 38 | 2/3/5 | 3/2/1 | 0 to +20 | +15 to −79, −∞ | +15 to −79, −∞ | 6 | ✓ | EXT | LPF | ✓ | ✓ | — | — | I²C BUS | 3.8 | 0.001 | SSOP-A32 |
| BD37543FS | 7.0 to 9.5 | 38 | 2/3/5 | 3/2/1 | 0 to +20 | +15 to −79, −∞ | +15 to −79, −∞ | 6 | ✓ | EXT | LPF + HPF | ✓ | ✓ | ✓ | — | I²C BUS | 3.8 | 0.001 | SSOP-A32 |
| BD37544FS | 7.0 to 9.5 | 38 | 1/3/4 | 3/2/1 | 0 to +20 | +15 to −79, −∞ | +15 to −79, −∞ | 6 | ✓ | — | LPF + HPF | ✓ | ✓ | — | Super Bass | I²C BUS | 3.8 | 0.001 | SSOP-A32 |
| BD37545FS | 7.0 to 9.5 | 38 | 2/3/5 | 3/2/1 | 0 to +20 | +15 to −79, −∞ | +15 to −79, −∞ | 6 | ✓ | — | LPF + HPF | ✓ | ✓ | ✓ | External I/O | I²C BUS | 3.8 | 0.001 | SSOP-A32 |
| BD37033FV-M | 7.0 to 9.5 | 31 | 3/5 | 2/1 | 0 to +16 | +15 to −79, −∞ | +15 to −79, −∞ | 6 | ✓ | ✓ | LPF | ✓ | ✓ | ✓ | — | I²C BUS | 5.5 | 0.002 | SSOP-B28 |
| BD37034FV-M | 7.0 to 9.5 VccL to 13 | 36 | 3/5 | 2/1 | 0 to +16 | +15 to −79, −∞ | +15 to −79, −∞ | 6 | ✓ | ✓ | LPF + HPF | ✓ | ✓ | ✓ | High Voltage Output | I²C BUS | 6 | 0.002 | SSOP-B28 |
| BD3883FS | 6.5 to 9.5 | 8 | 5 | — | 0/6/12/16/ 20/23/26/29 | 0 to −87, −∞ | 0/−10 | 2 | EXT | — | — | — | — | — | Surround | 2 Wire | 4 | 0.01 | SSOP-A32 |
| BD3403FV | 6.5 to 9.5 | 16 | 5 | — | 0 to +26 (2dB/Step) | 0 to −30 (2dB/Step) | 0 to −59, −∞ | 2 | EXT | — | — | — | — | — | Surround | 2 Wire | 8 | 0.02 | SSOP-B40 |

### General-Purpose Electronic Volume with Built-in Advanced Switch

| Part No. | Supply Voltage (V) | Current Consumption (mA) | Selector | | Input Gain (dB) | Fader Volume (dB) | Outputs | Mixing | | Post Filter | High-Voltage Output (dB) | Serial Control | Output Noise Voltage (μVrms) | Distortion (%) | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Single | Diff. | | | | Channel (ch) | ATT (dB) | | | | | | |
| BD3464FV | 7.0 to 9.5 | 25 | — | — | — | +23 to −79,−∞ (1dB/Step) | 4 | — | — | — | — | I²C BUS | 1.9 | 0.0004 | SSOP-B20 |
| BD3465FV | 7.0 to 9.5 | 25 | — | — | — | +23 to −79,−∞ (1dB/Step) | 4 | 3 | +0 to −64,−∞ (8dB/Step) | — | — | I²C BUS | 1.9 | 0.0004 | SSOP-B20 |
| BD3460FS | 7.0 to 9.5 | 25 | — | — | — | +23 to −79,−∞ (1dB/Step) | 6 | — | — | — | — | I²C BUS | 1.9 | 0.0004 | SSOP-A24 |
| BD3461FS | 7.0 to 9.5 | 25 | — | — | — | +23 to −79,−∞ (1dB/Step) | 6 | 3 | +0 to −64,−∞ (8dB/Step) | — | — | I²C BUS | 1.9 | 0.0004 | SSOP-A24 |
| BD34602FS-M | 7.0 to 9.5 | 35 | — | — | — | +23 to −79,−∞ (1dB/Step) | 6 | 3 | +0 to −79,−∞ (1dB/Step) | — | — | I²C BUS | 1.3 | 0.0004 | SSOP-A24 |
| BD37067FV-M | 7.0 to 9.5 | 37 | 2/3/4/5 | 4/3/2/1 | +23 to −15 (1dB/Step) | +23 to −79,−∞ (1dB/Step) | 6 | 1 | — | ✓ | — | I²C BUS | 8 | 0.003 | SSOP-B40 |
| BD37068FV-M | 7.0 to 9.5 VccL to 17.8 | 30/7 | 1/2/3/4/5 | 5/4/3/2/1 | +23 to −15 (1dB/Step) | +23 to −79,−∞ (1dB/Step) | 6 | 1 | — | ✓ | 0/8.3 | I²C BUS | 23 (High-Voltage Mode) | 0.003 | SSOP-B40 |
| BD37069FV-M | 7.0 to 9.5 VccL to 17.8 | 30/7 | 2/3/4/5 | 4/3/2/1 | +23 to −15 (1dB/Step) | +23 to −79,−∞ (1dB/Step) | 6 | 1 | — | ✓ | 2/4.6/8.3 | I²C BUS | 23 (High-Voltage Mode) | 0.003 | SSOP-B40 |

### 6ch Electronic Volume for 5.1ch Car Theater System

| Part No. | Supply Voltage (V) | Current Consumption (mA) | Input Selector | | Input Gain (dB) | 5.1ch Volume (dB) | Monaural Volume (dB) | Output Gain (dB) | Mix Car Navi. Cell Phones | Output for Spectrum Analyzer | Serial Control | Output Noise Voltage (μVrms) | Distortion (%) | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Single Input | Monaural Differential Amplifier Input | | | | | | | | | | |
| BD3433K | ±7.0 to ±9.5 | 12 | 5.1ch×2 | 1 | 0,6,12 (Each F,R) | +23 to −79, −∞ (1dB/step) | +15 to −63, −∞ (1dB/step) | 0,+2.5(A) 0,−4.5(B) | ✓ | ✓ | 3 Wire | 3 | 0.001 | QFP44 |

Sound Processors with Built-in 3-band Equalize : EXT : Set by external components

### Single Power Supply Sound Processors with Built-in Pre Amplifier for Tape Recording and Playback

| Part No. | Supply Voltage (V) | Current Consumption (mA) | Selector | Input Gain (dB) | Volume (dB) | Tone Control | Dynamic Bass | Surround | REC/ PB Amp. | Vocal Cut | Output for Spectrum Analyzer | Serial Control | Output Noise Voltage (μVrms) | Max. Output (Vrms) | Distortion (%) | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BD3401KS2 | 8.0 to 9.5 | 35 | 5 | −5/0/3.5 | 0 to −76/−∞ (2/4/Step) | Bass, Middle, Treble | ✓ | ✓ | ✓ | ✓ | ✓ | 2 Wire | 3 | 2.5 | 0.005 | SQFP-T64 |
| BD3402KS2 | 8.0 to 9.5 | 28 | 5 | −5/0/3.5 | 0 to −76/−∞ (2/4/Step) | Bass, Treble | — | — | ✓ | — | — | 2 Wire | 2.5 | 2.5 | 0.005 | SQFP-T64 |

### Bandpass Filter ICs for Spectrum Analyzer Display

| Part No. | Supply Voltage (V) | Current Consumption (mA) | Band | Input Mix Amplifier | REC Level Display | Standard Output(V) | Maximum Output (V) | BPF Center Frequency (Hz) | Package |
|---|---|---|---|---|---|---|---|---|---|
| BA3835F | 4.5 to 6.5 | 8.5 | 5 | ✓ | — | 1.35 | 4.8 | 105,340,1k, 3.4k,10.5k | SOP18 |
| BA3834F | 4.5 to 6.5 | 10.0 | 7 | ✓ | — | 1.35 | 4.8 | 68,170,420,1k, 2.4k,5.9k,14.4k | SOP18 |

Sound Processors with Built-in 3-band Equalizer : BD37531FV, BD37532FV, BD37533FV and BD37534FV are pin-compatible.
BD37541FS, BD37542FS and BD37543FS are pin-compatible. BD37033FV-M and BD37034FV-M are pin-compatible.
General-Purpose Electronic Volume with Built-in Advanced Switch : BD3460FS, BD3461FS and BD34602FS-M are pin-compatible. BD3464FS and BD3465FS are pin-compatible. BD37067FV-M and BD37068FV-M are pin-compatible.

## AUDIO SoCs

### Audio 1Chip System ICs

| Part No. | Supply Voltage (V) | USB I/F | SD I/F | CD DSP | SDRAM | Quad SPI I/F | SPI I/F | I²C I/F | UART I/F | Digital Audio I/F | GPIO (Dedicated pins) | Operating Temperature (°C) | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| New BM94715EKU | HVcc 3.0 to 3.6<br>LVcc 1.45 to 1.65 | USB2.0 Dual Role Full Speed (Host/Device) (1ch) | SDIO | 3Beam Method | 16Mbit Stack | 1ch | Master 1ch<br>Slave 1ch | Master<br>Slave 2ch | HS UART 2ch | I²S IN 2ch 2 series,<br>I²S OUT 2ch 1 series | 77<br>(16) | −40 to +85 | HTQFP128UA |
| New BM94803AEKU | HVcc 3.0 to 3.6<br>LVcc 1.45 to 1.65 | USB2.0 Dual Role High Speed (Host/Device) (1ch) | SDIO | 3Beam Method | 16Mbit Stack | 1ch | Master 1ch<br>Slave 1ch | Master<br>Slave 2ch | HS UART 2ch | I²S IN 2ch 2 series,<br>I²S OUT 2ch 1 series | 77<br>(13) | −40 to +85 | HTQFP128UA |

## Media Decoders

### AAC/WMA/MP3/WAV + SD Memory Card + CD-ROM

| Part No. | Supply Voltage (V) | USB | SD | iPod | Serial I/F | Display Information | MP3 | WMA | AAC | CD-ROM Mode | CD-ROM File System | MP3 Recording Format | File Search | Audio Output | | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | Analog | Digital | |
| BU94605AKV | 3.0 to 3.6 | USB2.0 Full Speed | MMC SD<br>miniSD<br>microSD<br>SDHC | — | I²C BUS | Folder number, File number, Play time, Folder name, File name, TAG(Artist, Album, Title) | MPEG1,2,2.5 LAYER1,2,3 | WMA9 Standard | MPEG4 AAC-LC | Mode1, Mode2, form1/2, Romeo, Joliet | ISO9660 Level1,2 | — | Search during the playback | Line | I²S S/PDIF | VQFP80 |

### AAC/WMA/MP3/WAV + SD Memory Card + iPod + CD-ROM

| Part No. | Supply Voltage (V) | USB | SD | iPod | Serial I/F | Display Information | MP3 | WMA | AAC | CD-ROM Mode | CD-ROM File System | MP3 Recording Format | File Search | Audio Output | | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | Analog | Digital | |
| BU94607AKV | 3.0 to 3.6 | USB2.0 Full Speed | MMC SD<br>miniSD<br>microSD<br>SDHC | iPod touch-<br>iPhone-<br>iPad | I²C BUS | Folder number, File number, Play time, Folder name, File name, TAG(Artist, Album, Title) | MPEG1,2,2.5 LAYER1,2,3 | WMA9 Standard | MPEG4 AAC-LC | Mode1, Mode2, form1/2, Romeo, Joliet | ISO9660 Level1,2 | — | Search during the playback | Line | I²S S/PDIF | VQFP80 |

### AAC/WMA/MP3/WAV + SD Memory Card + CD-ROM + MP3 Record

| Part No. | Supply Voltage (V) | USB | SD | iPod | Serial I/F | Display Information | MP3 | WMA | AAC | CD-ROM Mode | CD-ROM File System | MP3 Recording Format | File Search | Audio Output | | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | Analog | Digital | |
| BU94702AKV | 3.0 to 3.6 | USB2.0 Full Speed | MMC SD<br>miniSD<br>microSD<br>SDHC | — | I²C BUS | Folder number, File number, Play time, Folder name, File name, TAG(Artist, Album, Title) | MPEG1,2,2.5 LAYER1,2,3 | WMA9 Standard | MPEG4 AAC-LC | Mode1, Mode2, form1/2, Romeo, Joliet | ISO9660 Level1,2 | MPEG1 Layer3 Sample Rate : 32,44.1,48kHz Bit Rate : 32,64,128, 192,256,320kHz | Search during the playback | Line | I²S S/PDIF | VQFP80 |

### AAC/WMA/MP3/WAV + SD Memory Card + iPod + CD-ROM + MP3 Record

| Part No. | Supply Voltage (V) | USB | SD | iPod | Serial I/F | Display Information | MP3 | WMA | AAC | CD-ROM Mode | CD-ROM File System | MP3 Recording Format | File Search | Audio Output | | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | Analog | Digital | |
| BU94705AKV | 3.0 to 3.6 | USB2.0 Full Speed | MMC SD<br>miniSD<br>microSD<br>SDHC | iPod touch-<br>iPhone-<br>iPad | I²C BUS | Folder number, File number, Play time, Folder name, File name, TAG(Artist, Album, Title) | MPEG1,2,2.5 LAYER1,2,3 | WMA9 Standard | MPEG4 AAC-LC | Mode1, Mode2, form1/2, Romeo, Joliet | ISO9660 Level1,2 | MPEG1 Layer3 Sample Rate : 32,44.1,48kHz Bit Rate : 32,64,128, 192,256,320kHz | Search during the playback | Line | I²S S/PDIF | VQFP80 |

Media Decoders : iPod, iPad and iPhone are registered trademarks of Apple Inc. in the U.S. and other countries.

Media Decoders: It is necessary to get 'Made for iPod/iPhone/iPad license' for introducing BU94607AKV, BU94705AKV.

# Video Amplifiers

## Composite Video Amplifiers

### Ultra-compact(WL-CSP) Output Capacitor-less 1ch Video Drivers

| Part No. | Supply Voltage (V) | Circuit Current (mA) | Amplifier Gain (dB) | Freq. Chara.1 (dB) | Freq. Chara.2 (dB) | Input Type | LPF | Mute (Standby) (μA) | Output Capa-less | Max. Output Level ($V_{P-P}$) | Video Out -> In Change Mode | Package (mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BH76906GU | 2.5 to 3.45 | 15 | 6 | −0.2 (4.5MHz) | −26 (18MHz) | Bias (150kΩ) | 8th order 4.5MHz | 0 | ✓ | 5.2 | — | VCSP85H1 (1.6×1.6),H=1.0 Max. |
| BH76909GU | 2.5 to 3.45 | 15 | 9 | −0.2 (4.5MHz) | −26 (18MHz) | Bias (150kΩ) | 8th order 4.5MHz | 0 | ✓ | 5.2 | — | VCSP85H1 (1.6×1.6),H=1.0 Max. |
| BH76912GU | 2.5 to 3.45 | 15 | 12 | −0.2 (4.5MHz) | −26 (18MHz) | Bias (150kΩ) | 8th order 4.5MHz | 0 | ✓ | 5.2 | — | VCSP85H1 (1.6×1.6),H=1.0 Max. |
| BH76916GU | 2.5 to 3.45 | 15 | 16.5 | −0.2 (4.5MHz) | −26 (18MHz) | Bias (150kΩ) | 8th order 4.5MHz | 0 | ✓ | 5.2 | — | VCSP85H1 (1.6×1.6),H=1.0 Max. |
| BH76706GU | 2.5 to 3.45 | 15 | 6 | −0.2 (4.5MHz) | −28 (18MHz) | Bias (150kΩ) | 8th order 4.5MHz | 0 | ✓ | 5.2 | ✓ | VCSP85H1 (1.6×1.6),H=1.0 Max. |

### Output Capacitor-less 1ch Video Drivers

| Part No. | Supply Voltage (V) | Circuit Current (mA) | Amplifier Gain (dB) | Freq. Chara.1 (dB) | Freq. Chara.2 (dB) | Input Type | LPF | Mute (Standby) (μA) | Output Capa-less | Max. Output Level ($V_{P-P}$) | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BH76806FVM | 2.5 to 3.45 | 16 | 6 | −0.45 (4.5MHz) | −51 (23.5MHz) | Bias (150kΩ) | 8th order 4.5MHz | 0 | ✓ | 5.2 | MSOP8 |
| BH76809FVM | 2.5 to 3.45 | 16 | 9 | −0.45 (4.5MHz) | −51 (23.5MHz) | Bias (150kΩ) | 8th order 4.5MHz | 0 | ✓ | 5.2 | MSOP8 |
| BH76812FVM | 2.5 to 3.45 | 15 | 12 | −0.45 (4.5MHz) | −51 (23.5MHz) | Bias (150kΩ) | 8th order 4.5MHz | 0 | ✓ | 5.2 | MSOP8 |
| BH76816FVM | 2.5 to 3.45 | 15 | 16.5 | −0.45 (4.5MHz) | −51 (23.5MHz) | Bias (150kΩ) | 8th order 4.5MHz | 0 | ✓ | 5.2 | MSOP8 |

### Compact Low Current 1ch Video Drivers

| Part No. | Supply Voltage (V) | Circuit Current (mA) | Amplifier Gain (dB) | Freq. Chara.1 (dB) | Freq. Chara.2 (dB) | Input Type | LPF | Mute (Standby) (μA) | Output Capa-less | Max. Output Level ($V_{P-P}$) | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BH76106HFV | 2.6 to 5.5 | 7 | 6 | 0.1 (4.5MHz) | −45 (19MHz) | Clamp | 8th order 4.5MHz | 0 | ✓ | 2.6 | HVSOF6 |
| BH76109HFV | 2.6 to 5.5 | 7 | 9 | 0.1 (4.5MHz) | −45 (19MHz) | Clamp | 8th order 4.5MHz | 0 | ✓ | 2.6 | HVSOF6 |
| BH76112HFV | 2.6 to 5.5 | 7 | 12 | 0.1 (4.5MHz) | −45 (19MHz) | Clamp | 8th order 4.5MHz | 0 | ✓ | 2.6 | HVSOF6 |
| BH76206HFV | 2.6 to 5.5 | 8 | 6 | −0.3 (6MHz) | −40 (27MHz) | Clamp | 8th order 6MHz | 0 | ✓ | 2.6 | HVSOF6 |

### 1ch Video Drivers Built-in Video Switch

| Part No. | Supply Voltage (V) | Circuit Current (mA) | Amplifier Gain (dB) | Freq. Chara. (dB) | Switchers | Input Type | Video Driver | Mute | Output Capa-less | Max. Output Level($V_{P-P}$) | | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | $V_{CC}$=3V | $V_{CC}$=5V | |
| BH76330FVM | 2.8 to 5.5 | 10 | 6 | 0 (10MHz) | 3 input 1 output | Clamp | ✓ | ✓ (Standby) | ✓ | 2.7 | 4.6 | MSOP8 |
| BH76331FVM | 2.8 to 5.5 | 10 | 6 | 0 (10MHz) | 3 input 1 output | Bias | ✓ | ✓ (Standby) | — | 2.8 | 4.6 | MSOP8 |
| BH76360FV | 2.8 to 5.5 | 12 | 6 | 0 (10MHz) | 6 input 1 output | Clamp | ✓ | ✓ (Standby) | ✓ | 2.7 | 4.6 | SSOP-B16 |
| BH76361FV | 2.8 to 5.5 | 12 | 6 | 0 (10MHz) | 6 input 1 output | Bias | ✓ | ✓ (Standby) | — | 2.8 | 4.6 | SSOP-B16 |

## Video Switches

### 1ch Video Switch(Wide Band-width)

| Part No. | Supply Voltage (V) | Circuit Current (mA) | Amplifier Gain (dB) | Freq. Chara. (dB) | Switchers | Input Type | Video Driver | Mute | Crosstalk (dB) | Max. Output Level($V_{P-P}$) | | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | $V_{CC}$=3V | $V_{CC}$=5V | |
| BH76332FVM | 2.8 to 5.5 | 9 | 0 | 0 (30MHz) | 3 input 1 output | Clamp | — | ✓ (Standby) | −65 (4.43MHz) | 1.8 | 3.8 | MSOP8 |
| BH76333FVM | 2.8 to 5.5 | 8 | 0 | 0 (30MHz) | 3 input 1 output | Bias | — | ✓ (Standby) | −65 (4.43MHz) | 1.9 | 3.4 | MSOP8 |
| BH76362FV | 2.8 to 5.5 | 11 | 0 | 0 (30MHz) | 6 input 1 output | Clamp | — | ✓ (Standby) | −65 (4.43MHz) | 1.8 | 3.8 | SSOP-B16 |
| BH76363FV | 2.8 to 5.5 | 11 | 0 | 0 (30MHz) | 6 input 1 output | Bias | — | ✓ (Standby) | −65 (4.43MHz) | 1.9 | 3.4 | SSOP-B16 |

### Video and Audio Signal Switches

| Part No. | Supply Voltage (V) | Video Circuit Current (mA) | Audio Circuit Current (mA) | Video Freq. Chara 1 (dB) | Video Freq. Chara 2 (dB) | Video Amp. Gain (dB) | Audio Freq. Chara 1 (dB) | Audio Freq. Chara 2 (dB) | Audio Amp. Gain (dB) | Residual Noise (μVrms) | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BH7649KS2 | 7.5 to 9.5 | 34 | 23 | 0 (6.75MHz) | −30 (27MHz) | −3/−6/0/ +3/+6 | −0.5 (24kHz) | −26 (96kHz) | −6/0 | 20 | SQFP-T52 |

## Other

### Isolation Amplifier

| Part No. | Supply Voltage (V) | Circuit Current (mA) | Amplifier Gain (dB) | Freq. Chara. (dB) | Channel | Input Type | Video Driver | Input Impedance (kΩ) | CMRR (dB) | Max. Output Level ($V_{P-P}$) | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BH7673G | 4.5 to 5.5 | 4.8 | 0 | 0 (10MHz) | 1 | Bias | — | 150 | 60 | 3.8 | SSOP5 |

# Audio Converters

## Audio Codec

### Audio Codec

| Part No. | Supply Voltage (V) | ADC | DAC | Microphone Input | Speaker Output | | Headphone Output | Filter | | ALC | Package | Automotive Grade AEC-Q100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Channel/bit | Channel/bit | | Type | Monaural/ Stereo | | EQ | Notch | | | |
| BU26154MUV | HVDD 2.7 to 5.5<br>LVDD 2.7 to 3.6 | 1ch/24bit | 2ch/24bit | 1 | AB/D | Monaural | Stereo | ✓ | ✓ | ✓ | VQFN040V6060 | Preparing |
| BU26156RFS | HVDD 2.7 to 5.5<br>LVDD 2.7 to 3.6 | 2ch/24bit | 2ch/24bit | 2 | AB/D | Stereo | Stereo | ✓ | ✓ | ✓ | HTSSOP-A44R | Preparing |

# Image Correction

### Image Correction ICs for Panel

| Part No. | Supply Voltage(V) | | | Image Data Size | Control I/F | Input/Output Digital I/F | Image Adjustment | PWM Output | LVDS Transmitter | Package | Automotive Grade AEC-Q100 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | VDD Core | VDD I/O | VDD LVDS | | | | | | | | |
| BU1573KV | 1.4 to 1.6 | 2.7 to 3.6 | — | Supports up to WVGA+ (864×480) | I²C BUS | 18bitRGB Interface BUS Interface | — | ✓ | — | VQFP64 | Preparing |
| BU1523KV | 1.65 to 1.95 | 3.0 to 3.6 | 3.0 to 3.6 | Supports up to WVGA+ (864×480) | I²C BUS | 24bitRGB Interface 8bit YUV=4 : 2 : 2 ITU-R BT.656 | ✓ | — | ✓ | VQFP100 | Preparing |

### Video Encoders Built-in Image Correction

| Part No. | Supply Voltage(V) | | | Image Data Size | Control I/F | Input/Output Digital I/F | Fog Reduction | Video Encoder | Package | Automotive Grade AEC-Q100 |
|---|---|---|---|---|---|---|---|---|---|---|
| | VDD Core | VDD I/O | AVDD | | | | | | | |
| BU6521KV | 1.4 to 1.6 | 2.7 to 3.6 | 2.7 to 3.6 | ITU-R BT.656 | I²C BUS Serial EEPROM Interface | 8bit YUV=4 : 2 : 2 ITU-R BT.656 | ✓ | ✓ | VQFP48C | YES |

# Video LSIs

## Video Decoder

(LAPIS Semiconductor products)

### CVBS/S-video

| Part No. | Supply Voltage (V) | Input(Analog) | | Output (LVTTL) | Pixel Frequency | Crystal Oscillator Supported | Feature | Operating Temperature (°C) | Package | Halogen Free Support*1 | Automotive Grade*2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Terminal | Type | | | | | | | | |
| ML86101A | 3.3/1.5 | CVBS×4 or CVBS×2+S-video×1 or S-video×2 | NTSC PAL SECAM | ITU-R BT.656 YCbCr 8bit | 12.2727MHz, 13.5MHz, 14.3181MHz, 14.75MHz | ✓ | Simple, small | −40 to +85 | TQFP48 | ✓ | YES |
| ML86V7668A | 3.3/2.5 | CVBS×4 or CVBS×1+ S-video×3 | NTSC PAL SECAM | ITU-R BT.656 YCbCr 8/16bit RGB 18bit | 12.2727MHz, 13.5MHz | — | RGB output | −40 to +85 | TQFP100 | ✓ | YES |

### CVBS/S-video/Component/RGB

| Part No. | Supply Voltage (V) | Input(Analog) | | Output (LVTTL) | Pixel Frequency | Crystal Oscillator Supported | Feature | Operating Temperature (°C) | Package | Halogen Free Support*1 | Automotive Grade*2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ML86V7675 | 3.3/1.5 | CVBS×4 +(Comp or S-video)×1 +Comp×1 | NTSC PAL SECAM | ITU-R BT.656 YCbCr 8bit | 7.9930MHz to 33.333MHz | ✓ | WVGA, EGA analog RGB supported | −40 to +85 | TQFP64 | ✓ | YES |

*1 : A check mark of halogen free support means that we will be able to ship out the halogen free products. For details, please inquire to the sales.
*2 : Please inquire to the sales for AEC-Q100.

## Video Encoder

(LAPIS Semiconductor products)

### CVBS

| Part No. | Supply Voltage (V) | Input(LVTTL) | Output(Analog) | | Pixel Frequency | Crystal Oscillator Supported | Feature | Operating Temperature (°C) | Package | Halogen Free Support*1 | Automotive Grade*2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Terminal | Type | | | | | | | |
| ML86V76580 | 3.3/1.8 | ITU-R BT.656 YCbCr 8bit | CVBS | NTSC PAL | 12.2727MHz, 13.5MHz, 14.3181MHz, 14.75MHz | — | 75Ω drive | −40 to +85 | TQFP48 | ✓ | YES |
| | | | | | | | | | WCSP25 | ✓ | — |
| New ML86640 | 3.3 | ITU-R BT.656 YCbCr 8/16/24bit RGB 24bit | CVBS | NTSC PAL | 13.5MHz, 27MHz, 54MHz | — | 75Ω drive P/I conversion | −40 to +105 | TQFP48 | ✓ | YES |

### CVBS/S-video/Component/RGB

| Part No. | Supply Voltage (V) | Input(LVTTL) | Output(Analog) | | Pixel Frequency | Crystal Oscillator Supported | Feature | Operating Temperature (°C) | Package | Halogen Free Support*1 | Automotive Grade*2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Terminal | Type | | | | | | | |
| ML86V7655 | 3.3/2.5 | ITU-R BT.656 YCbCr 8/16/24bit RGB 24bit | CVBS S-video Component | NTSC PAL | 12.2727MHz, 13.5MHz, 14.3181MHz, 14.75MHz, 18MHz | — | I/P, P/I conversion | −40 to +85 | TQFP100 | ✓ | YES |

*1 : A check mark of halogen free support means that we will be able to ship out the halogen free products. For details, please inquire to the sales.
*2 : Please inquire to the sales for AEC-Q100.

## Video Interface

(LAPIS Semiconductor products)

### LVTTL/LVDS/MIPI Video Interface

| Part No. | Supply Voltage (V) | Input (LVTTL/LVDS/MIPI) | Output (LVTTL/LVDS/MIPI) | Feature | Operating Temperature (°C) | Package | Halogen Free Support*1 | Automotive Grade*2 |
|---|---|---|---|---|---|---|---|---|
| ML86790 | 1.8 to 3.3<br>1.5 | MIPI-CSI2(2Lane) YUV422-8bit 650Mbps/Lane Max. | MIPI-CSI2(2Lane) YUV422-8bit 650Mbps/Lane Max. YCbCr 16bit 81MHz(typ.) | MIPI-CSI2 receiver/transmitter, MIPI to LVTTL translate | −20 to +85 | WCSP63 | ✓ | — |
| ☆ML86795 | 1.8 to 3.3<br>1.5 | ITU-R BT.656 Single/Dual LVDS 4ch (RGB 18/24bit) MIPI-CSI2 (RGB565/888, YUV422-8bit) 1Gbps/Lane Max. | ITU-R BT.656 YCbCr 16bit Single/Dual LVDS 4ch (RGB 18/24bit) MIPI-CSI2 (RGB565/888, YUV422-8bit) 1Gbps/Lane Max. | LVTTL/LVDS/MIPI-CSI2 I/F LVTTL/LVDS/MIPI to LVTTL/LVDS/MIPI translate MIPI Virtual Channel | −40 to +105 | WQFN64 | ✓ | YES |

*1 : A check mark of halogen free support means that we will be able to ship out the halogen free products. For details, please inquire to the sales.
*2 : Please inquire to the sales for AEC-Q100.
☆ : Under Development

## Display Controller Series for Small to Medium-Sized TFT LCD

(LAPIS Semiconductor products)

### T-CON, Video Decoder Included

| Part No. | Supply Voltage (V) | Input(Analog) Terminal | Input(Analog) Type | Input (LVTTL/LVDS/MIPI) | Output (LVTTL/LVDS/MIPI) | Resolution | OSD | MCU | Feature | Operating Temperature (°C) | Package | Halogen Free Support*1 | Automotive Grade*2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ML86V8201 | 3.3/1.5 | CVBS×2 or S-video×1 | NTSC PAL SECAM | ITU-R BT.656 YCbCr 8/16/24bit RGB 18/24bit | ITU-R BT.656 YCbCr 8bit RGB 18/24bit | QVGA to WVGA | Line | — | Rear camera function Image quality adjustment | −40 to +85 | TQFP100 | ✓ | YES |
| ML86203 | 3.3/1.5 | CVBS×1 | NTSC PAL | ITU-R BT.656 YCbCr 8/16/24bit RGB 18/24bit | ITU-R BT.656 YCbCr 8bit LVDS 4ch (RGB 18/24bit) | VGA to WXGA | — | — | Rear camera function WXGA panel support Image quality adjustment | −40 to +85 | TQFP80 | ✓ | YES |
| ML86207 | 3.3/1.5 | CVBS×2 | NTSC PAL | ITU-R BT.656 YCbCr 8/16/24bit RGB 18/24bit + LVDS 4ch (RGB 18/24bit) | ITU-R BT.656 YCbCr 8bit RGB 18/24bit LVDS 4ch (RGB 18/24bit) | VGA to WXGA | Text Line | — | LVTTL/LVDS I/F Digital video input×2 WXGA panel support Rear camera function Image quarity adjustment OSD function | −40 to +85 | TQFP100 | ✓ | YES |
| ML86287 | 3.3/1.5 | CVBS×2 | NTSC PAL | ITU-R BT.656 YCbCr 8/16/24bit RGB 18/24bit + LVDS 4ch (RGB 18/24bit) | ITU-R BT.656 YCbCr 8bit RGB 18/24bit LVDS 4ch (RGB 18/24bit) | VGA to WXGA | Text Line | — | LVTTL/LVDS I/F Digital video input×2 WXGA panel support Rear camera function Picture in Picture Image quality adjustment OSD, ROM-OSD function | −40 to +85 | TQFP128 | ✓ | YES |
| ☆ML86209 | 3.3/1.5 | CVBS single×2 or differential×1 | NTSC PAL | ITU-R BT.656 ITU-R BT.1120 like YCbCr 8/16bit Single/Dual LVDS 4ch (RGB 18/24bit) MIPI-CSI2 (RGB 565/888, YUV422-8bit) 1Gbps/Lane Max. | ITU-R BT.656 or MIPI-CSI2 (RGB565/888, YUV422-8bit) 1Gbps/Lane Max. + Single/Dual LVDS 4ch (RGB 18/24bit) | VGA to Full HD | Text Line | — | LVTTL/LVDS/MIPI-CSI2 I/F Digital video input×4 Full HD panel support Rear camera function Image quality adjustment OSD, ROM-OSD function | −40 to +85 | TQFP128 | ✓ | YES |
| ☆ML86289 | 3.3/1.5 | CVBS single×2 or differential×1 | NTSC PAL | ITU-R BT.656 ITU-R BT.1120 like YCbCr 8/16bit Single/Dual LVDS 4ch (RGB 18/24bit) MIPI-CSI2 (RGB 565/888, YUV422-8bit) 1Gbps/Lane Max. | ITU-R BT.656 or MIPI-CSI2 (RGB565/888, YUV422-8bit) 1Gbps/Lane Max. + Single/Dual LVDS 4ch (RGB 18/24bit) | VGA to Full HD | Text Line | — | LVTTL/LVDS/MIPI-CSI2 I/F Digital video input×4 Full HD panel support Rear camera function Picture in Picture Image quality adjustment OSD, ROM-OSD function | −40 to +85 | TQFP128 | ✓ | YES |
| ML86V8202C | 3.3/1.8 | CVBS×2 +(Comp or S-video)×1 +Comp×1 | NTSC PAL SECAM | ITU-R BT.656 YCbCr 8/16/24bit RGB 18/24bit | ITU-R BT.656 style YCbCr 8/16/24bit RGB 18/24bit | QVGA to WVGA | — | — | Component video support Image quality adjustment | −40 to +85 | TQFP100 | ✓ | YES |
| ML86V8207 | 3.3/2.5 | CVBS×4 or CVBS×3 +(Comp or S-video)×1 or CVBS×2+S-video×1 +(Comp or S-video)×1 | NTSC PAL SECAM | ITU-R BT.656 YCbCr 8/16/24bit RGB 18/24bit | RGB 18/24bit | QVGA to WVGA | Text Line | — | OSD function | −40 to +85 | LQFP144 | ✓ | YES |
| ML86240 | 3.3/1.5 | CVBS×4 or CVBS×2 +(Comp or S-video)×1 +Comp×1 | NTSC PAL SECAM | ITU-R BT.656 YCbCr 8/16/24bit RGB 18/24bit 2ch | ITU-R BT.656 YCbCr 8bit RGB 18/24bit | QVGA to WVGA | Text Line | — | Component video support Digital video input×2 Rear camera function Image quality adjustment OSD function | −40 to +85 | BGA144 | — | YES |
| New ML86241 | 3.3/1.5 (1.8) | CVBS×4 or CVBS×2 +(Comp or S-video)×1 +Comp×1 | NTSC PAL SECAM | ITU-R BT.656 YCbCr 8/16/24bit RGB 18/24bit + LVDS 4ch (RGB 18/24bit) | ITU-R BT.656 YCbCr 8/16bit + RGB 18/24bit YCbCr 16bit LVDS 4ch (RGB 18/24bit) | QVGA to WXGA | Text Line | — | Component video support LVTTL/LVDS I/F Digital video input×2 WXGA panel support Rear camera function Image quality adjustment OSD, ROM-OSD function | −40 to +85 | BGA144 | — | YES |

### TCON, Image Adjustment Functions Included

| Part No. | Supply Voltage (V) | Input(Analog) Terminal | Input(Analog) Type | Input (LVTTL) | Output (LVTTL) | Resolution | OSD | MCU | Feature | Operating Temperature (°C) | Package | Halogen Free Support*1 | Automotive Grade*2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ML86V8101 | 3.3 | — | — | RGB 18bit | RGB 18bit | QVGA to QHD | — | — | Image quality adjustment function | −40 to +85 | TQFP64 | ✓ | YES |
| ML86V8102 | 3.3 | — | — | RGB 18/24bit | RGB 18/24bit | QVGA to QHD | — | — | RGB 24 bits supported Image quality adjustment function | −40 to +85 | TQFP80 | ✓ | YES |
| ☆ML86173 | 3.3/1.5 | — | — | ITU-R BT.656 YCbCr 8/10bit RGB 18/24bit Single/Dual LVDS 4ch (RGB 18/24bit) | Single/Dual LVDS 4ch (RGB 18/24bit) | WVGA to H 2880(Max.) V 1080(Max.) (Pixel rate 160MHz Max.) | Text | — | LVTTL/LVDS I/F H 2880(Max.)/V 1080(Max.) (Pixel rate 160MHz Max.) Image quality adjustment OSD function ROM OSD function (30windows, 2layers) Frequency conversion function | −40 to +85 | TQFP100 | ✓ | YES |

### Video Decoder, 8051MCU Included

| Part No. | Supply Voltage (V) | Input(Analog) Terminal | Input(Analog) Type | Input (LVTTL/LVDS/MIPI) | Output (LVTTL/LVDS/MIPI) | Resolution | OSD | MCU | Feature | Operating Temperature (°C) | Package | Halogen Free Support*1 | Automotive Grade*2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ML86V8401 | 3.3/1.8 | CVBS×3 or CVBS×2 +S-video×1 | NTSC PAL SECAM | ITU-R BT.656 YCbCr 8/16bit RGB 18/24bit | ITU-R BT.656 RGB 18/24bit | QVGA to WVGA | Text | 8051 (8bit) | System control MCU installed | −40 to +85 | TQFP100 | — | YES |

*1 : A check mark of halogen free support means that we will be able to ship out the halogen free products. For details, please inquire to the sales.
*2 : Please inquire to the sales for AEC-Q100.

☆ : Under Development