High Speed Amplifiers

Texas Instruments

High Speed Amplifiers
Selection Tree

Voltage Feedback

Low power IQ≤5mA
OPA2835 56MHz; 1-,2-ch
OPA2889 115MHz; 2-ch
LMH6618 140MHz; 1-, 2-ch
LM6171 160MHz; 1-,2-ch
THS4081 175MHz; 1-,2-ch
OPA2836 205MHz; 1-, 2-ch
OPA890 260MHz; 1-,2-ch

Low noise Vn≤2nV/√Hz
THS4031100MHz; 1-,2-ch
THS4021350MHz; 1-,2-ch
OPA843 500MHz; 1-ch
OPA846 (G>7V/V) 500MHz; 1-ch
OPA847 (G>12V/V) 600MHz; 1-ch
LMH6629 900 MHz; 1-ch

High slew rate >1000V/µs
THS4271 390MHz; 1-ch
OPA698 450MHz; 1-ch
OPA690 500MHz; 1-ch
LMH6609 900MHz; 1-ch
LMH6629 900MHz; 1-ch

High voltage 30V
THS4031 100MHz; 1-,2-ch
LM6171 160MHz; 1-,2-ch
THS4081 175MHz; 1-,2-ch
THS4061 180MHz; 1-,2-ch
LM7121 235MHz; 1-ch
THS4021 350MHz; 1-,2-ch

Current Feedback

Low power IQ≤5mA
OPA683 200MHz; 1-, 2-ch
OPA684 210MHz; 1-,2-,3-,4-ch
OPA691 280MHz; 1-,2-,3-ch
LMH6723 370MHz; 1-ch

Low noise Vn≤2nV/√Hz
OPA691 280MHz; 1-,2-,3-ch
LMH6714 400MHz; 1-,2-ch
THS3001 420MHz; 1-ch
OPA695 1700MHz; 1-,2-,3-ch
LMH6702 1700MHz; 1-ch
THS3201 1800MHz; 1-ch

High slew rate >1000V/µs
THS3091 235MHz; 1-ch
OPA691 280MHz; 1-,2-,3-ch
OPA694 1500MHz; 1-,2-ch
OPA695 1700MHz; 1,2,3-ch
THS3201 1800MHz; 1-ch

High voltage 30V
LM6181 100MHz, 1-ch
THS3091 235MHz; 1-ch
THS3061 300MHz; 1-,2-ch
THS3001 420MHz; 1-ch

Rail-to-Rail

Low power IQ≤5mA
OPA835 56MHz; 1-,2-ch
THS4281 95MHz; 1-ch
LMH6642 130MHz; 1-ch
LMH6618 140MHZ; 1-,2-ch
OPA836 205MHz; 1-,2-ch
OPA830 310MHz; 1,2,4-ch

High slew rate >900V/µs
THS4221 230MHz; 1-ch

Voltage Limiting Amps

OPA699 260MHz; 1-ch
OPA698 (G>4V/V) 450MHz; 1-ch
LMH6553 900MHz; 1-ch

JFET

Unity Gain Stable
LMH6601 250MHz; 1-ch
OPA656 500MHz; 1-ch
OPA659 650MHz; 1-ch

Low noise Vn≤6nV/√Hz
THS4601 180MHz; 1-ch
OPA657 (G>7V/V) 350MHz; 1-ch

High slew rate ≥2000V/µs
OPA653 500MHz; 1-ch
OPA659 650MHz; 1-ch

High voltage 30V
THS4601 180MHz; 1-ch
THS4631 325MHz; 1-ch

High Speed Amplifiers
Selection Tree

Fully Differential

Low power IQ≤5mA
THS4531 36MHz; 1-ch
THS4521 145MHz; 1-,2-,4-ch

Low noise Vn≤2nV/√Hz
THS4131 150MHz; 1-ch
THS4511 1600MHz; 1-ch
THS4509 2000MHz; 1-ch
THS770006 2400MHz; 1-ch
LMH6554 2800MHz; 1-ch

High slew rate >2000V/µs
THS4511 1600MHz; 1-ch
THS4509 2000MHz; 1-ch
THS770006 2400MHz; 1-ch
LMH6554 2800MHz; 1-ch

High voltage
THS4131 150MHz; 1-ch

Variable Gain Amps

VCA820 150MHz; 1-ch
PGA870 650MHz; 1-ch
VCA821 710MHz; 1-ch
LMH6517 1200MHz, 2-ch
LMH6521 1200MHz; 2-ch
LMH6522 1400MHz; 4-ch

Programmable Diff Amps

LMH6881/2 1600MHz; 1-,2-ch

Video Filter Amplifiers

SD
OPA360 1-ch SD
THS7314 3-ch SD
THS7374 4-ch SD
THS7310 2-ch SD

HD
THS7316 3-ch HD
THS7373 1-ch SD+3-ch HD
THS7365 3-ch SD+3-ch HD
THS7371 1-ch SD+3-ch HD
THS7372 1-ch SD+3-ch HD

Full HD
THS7364 3-ch SD+3-ch SD/ED/HD/Full HD
THS7368 3-ch SD+3-ch SD/ED/HD/Full HD

High gain >4V/V
THS7360 3-ch SD+3-ch SD/ED/HD/Full HD
THS7315 3-ch SD
THS7375 4-ch SD
THS7320 3-ch ED

Low power IQ≤4mA
THS7319 3-ch ED
THS7318 3-ch ED/SD

Projector
THS7327 3-ch RGBHV
THS7347 3-ch RGBHV

DSL/Power Line

Low power IQ≤10mA
THS6184 (±2V) 50MHz; 4-ch
THS6226 (+12V) 125MHz; 2-ch
OPA2684 (±6V) 210MHz; 2-ch
OPA2613 (±6V) 230MHz; 2-ch

Low noise Vn≤3nV/√Hz
THS6204 150MHz, 2-ch
OPA2613 230MHz; 2-ch
OPA2674 250MHz; 2-ch
OPA2822 400MHz; 2-ch

High current drive IO>500mA
THS6132 80MHz, 2-ch
THS6182 100MHz; 2-ch
OPA2674 250MHz; 2-ch
OPA2670 420MHz; 2-ch
OPA2673 600MHz; 2-ch

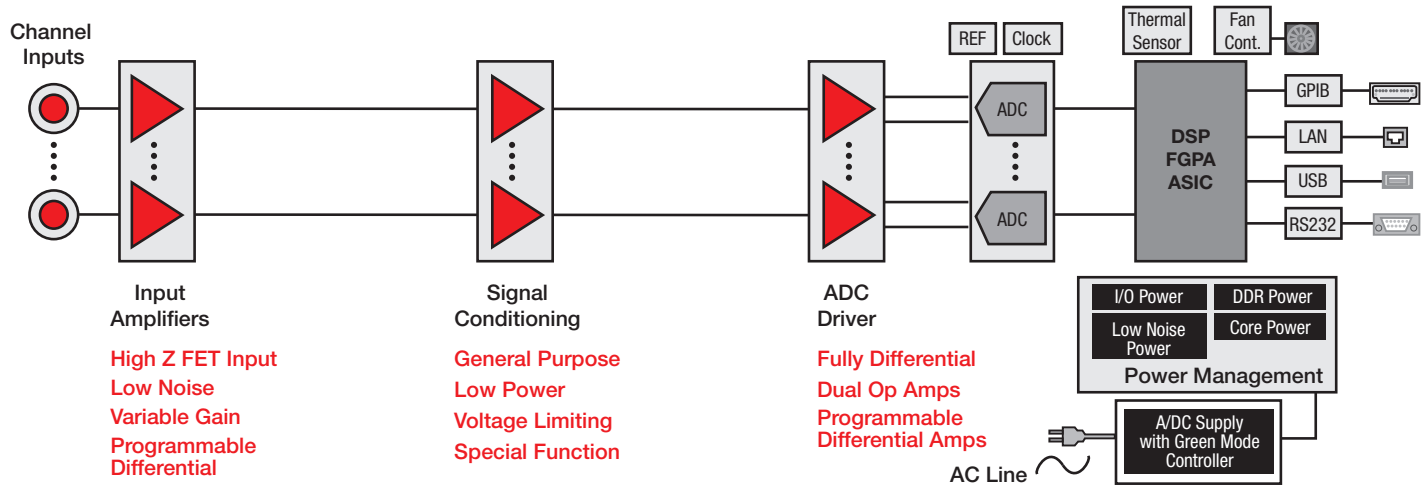
Buffers/Comparators

Buffers
LMH6321 110MHz; 1-ch; open loop
LMH6559 1750MHz; 1-ch; closed loop

Comparators
LMH7322/24 700ps Tprop; 2-,4-ch
LMH7220 2.9ns Tprop; 1-ch
LMV7219 7ns Tprop; 1-ch

High Speed Amplifiers
Data Acquisition: Receive Signal Chain

END EQUIPMENTS: Oscilloscope, Data Acquisition Cards, Digitizers, Portable Instruments



Input Amplifiers

Device	Supply (V)	IS (mA)	Bandwidth (MHz)	Slew Rate (V/µs)	Input Noise (nV/√Hz)	Distortion (dBc)	Features
High Z FET Input Amp							
LMH6601	2.4 to 5.5	9.6	250	275	7	–61 (10MHz)	Single supply 2.4 V MOSFET, 250 MHz for video
THS4631	30	11.5	325	900	7	–76 (5MHz)	Fast slew rate, high voltage
OPA656	10	16	500	290	7	–74 (5MHz)	Ultra high dynamic range
OPA659	12	33.5	575	2550	8.9	–78 (10MHz)	Ultra high dynamic range for high impedance buffering
Low Noise Amp							
THS4021	30	11	350	470	1.5	–77 (1MHz)	High linearity, exceptional performance at high gain ≥10
OPA847	10	18.9	600	3900	0.85	–105 (5MHz)	Very low distortion, stable down to gains as low as 12 V
LMH6629	2.7 to 5.5	18.2	900	1600	0.69	–90 (1MHz)	Industry's lowest noise, low distortion, ultra high speed
Variable Gain Amp							
VCA820	10	34	150	1700	8.2	>40dB	Large gain adjust range and precision, minimized harmonic distortion
LMH6505	10	16	150	1500	4.4	>40dB	Wideband, low power, linear in dB
VCA821	10	34	710	2500	6	>40dB	Wide bandwidth, high flexibility
Programmable Differential Amp							
LMH6881	5	100	2400	—	9.7 dB NF	–65 (200MHz)	Programmable gain, excellent noise figure and distortion performance over entire gain range
LMH6882	5	200	2400	—	9.7 dB NF	–65 (200MHz)	Dual, programmable gain, accurate channel-channel gain/phase matching

High Speed Amplifiers
Data Acquisition: Receive Signal Chain

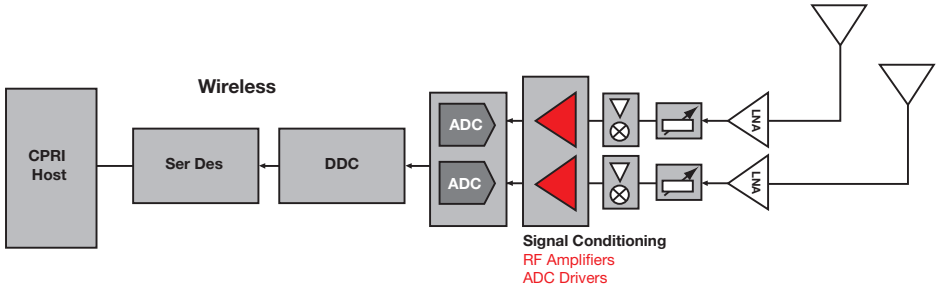
Signal Conditioning Amplifiers

General Purpose							
Device	**Supply (V)**	**IS (mA)**	**Bandwidth (MHz)**	**Slew Rate (V/µs)**	**Input Noise (nV/√Hz)**	**Distortion (dBc)**	**Features**
LM7121	4.5 to 11	5.3	50	1300	17	–64 (1MHz)	Unlimited cap load in SOT23
THS4031	30	11	100	100	1.6	–96 (1MHz)	Ultra low noise and distortion, great for buffering SE A/D converters
OPA695	10	12.9	1400	4300	1.8	–78 (10MHz)	Exceptional slew rate and noise performance
THS4271	15	28	1400	1000	3.0	–92 (30MHz)	Low noise and distortion, high slew rate, and unity gain stability
LMH6702	10	12.5	1700	3100	1.8	–63 (60MHz)	Ultra low noise distortion, wideband CFB
THS4304	5	18	3000	830	2.4	–95 (10MHz)	Good DC accuracy, high dynamic range
Special Function							
OPA861	10	5.4	80	900	2.4	–57 (5MHz)	Low power, wideband transconductance amp
LMH6732	10	11.7	110	1800	2.8	–105 (5MHz)	Exceptional performance over adjustable supply current, fast enable/ disable feature
LMH6321	15	16.5	110	2900	2.8	–68 (1MHz)	Adjustable current limit, high capacitance load drive
BUF602	10	5.8	1000	8000	4.8	–76 (5MHz)	Wide bandwidth, high slew rate unity gain buffer
Low Power							
Device	**Supply (V)**	**IS (mA)**	**Bandwidth (MHz)**	**Slew Rate (V/µs)**	**Input Noise (nV/√Hz)**	**Features**	
OPA835	2.5 to 5.5	0.25	56	160	9.3	Unprecedented dynamic performance to power ratio, rail-to-rail O/P	
THS4281	15	0.75	90	35	12.5	Very low power, unity gain VFB, RRIO	
LMH6642/3/4	2.7 to 12.8	2.7	130	130	17	Low power, high output current, low distortion	
OPA836	2.5 to 5.5	1	205	560	4.6	Excellent dynamic performance to power ratio, rail-to-rail O/P	
OPA684	10	1.7	210	820	3.7	Super high performance, low power, wideband CFB, 100V/V gain with 80MHz BW	
Voltage Limiting							
OPA698	10	16.6	250	1100	5.6	Best voltage limiting function with fast recovery, unity gain stable VFB	
LMH6553	4.5 to 12	37	900	2300	1.2	Fully differential amplifier and limiting function with very fast recovery time	
OPA699	10	16.6	1000	1400	4.1	Best voltage limiting function with fast recovery, min gain = 6 V/V	

ADC Drivers

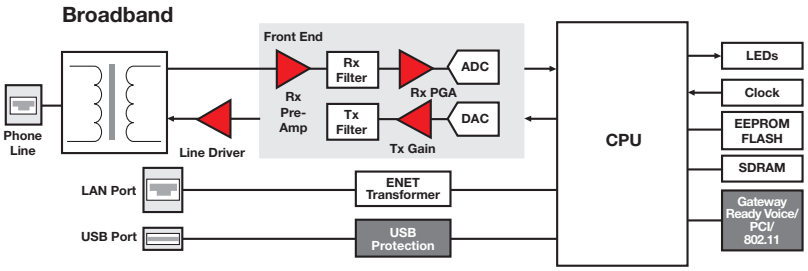
High-Performance Pipeline ADC Drivers							
Device	**Supply (V)**	**IS (mA)**	**Bandwidth (MHz)**	**Slew Rate (V/µs)**	**Input Noise (nV/√Hz)**	**Distortion (dBc)**	**Features**
PGA870	5	143	650	2900	13dB NF	–108 (50MHz)	High bandwidth, low distortion, low noise 14 bit ADC driver
THS770012	5	115	900	3300	1.3	–90 (10MHz)	10 to 13dB selectable gain, 14/16 bit ADC driver
LMH6521	5	245	1200	—	7.3dB NF	–84 (200MHz)	Excellent high frequency distortion, accurate channel-channel gain/phase matching
LMH6522	5	121.25	1400	—	8.5dB NF	–88 (100MHz)	Excellent distortion, accurate channel-channel gain/phase matching
THS4509	5	37.7	1900	6600	1.9	–75 (100MHz)	Wideband, low noise, low distortion
LMH6882	5	200	2400	—	9.7 dB NF	–65 (200MHz)	Dual, programmable gain, accurate channel-channel gain/phase matching
LMH6881	5	100	2400	—	9.7 dB NF	–65 (200MHz)	Programmable gain, excellent noise figure and distortion performance over entire gain range
LMH6554	5	60	2800	6200	0.9	–96 (75MHz)	High accuracy over wideband, low distortion, low noise
Low-Power Delta-Sigma/SAR ADC Drivers							
OPA2835	2.5 to 5.5	0.25	56	160	9.3	–133 (10kHz)	Unprecedented dynamic performance to power ratio, rail-to-rail O/P
THS4521	3 to 5	1.1	145	490	4.6	–133 (10kHz)	Fully differential architecture, very low power rail-to-rail O/P
THS4131	30	16	150	51	1.3	–100 (250kHz)	Ultra low noise with excellent harmonic distortion

High Speed Amplifiers
Communications



Wireless Signal Conditioning Amplifiers/IF

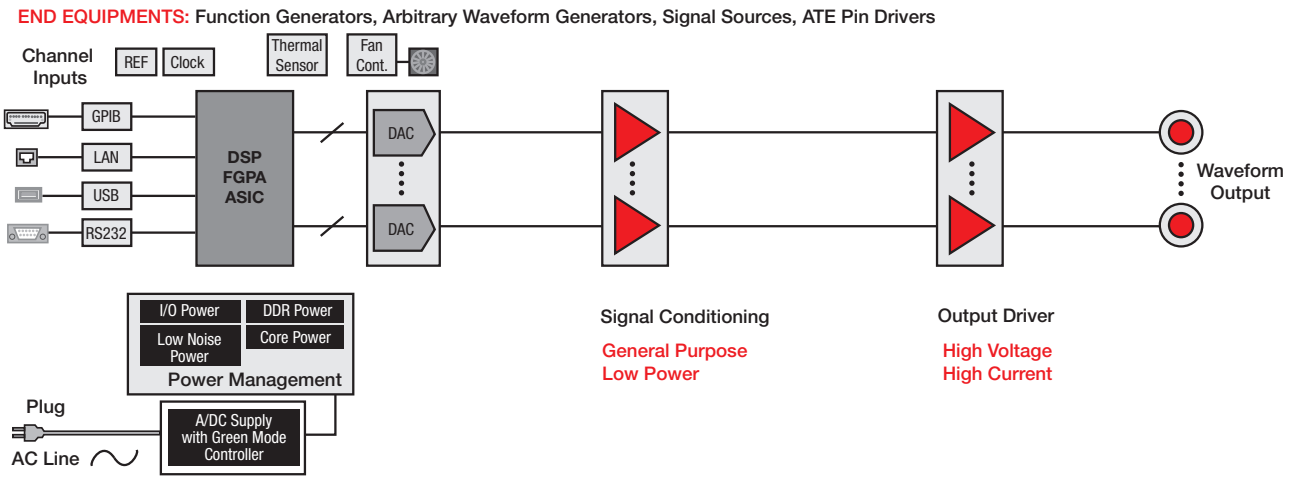
RF/IF Amplifiers							
Device	**Supply (V)**	**IS (mA)**	**Bandwidth (MHz)**	**OIP3 (dBm)**	**Noise Figure (dB)**	**Gain (dB)**	**Features**
THS9000/1	3 to 5	100	50 - 400	36	4.5	16	Cascadable amplifier optimized for high IF frequency
ADC Drivers							
Device	**Supply (V)**	**IS (mA)**	**Bandwidth (MHz)**	**Slew Rate (V/µs)**	**Input Noise (nV/√Hz)**	**Distortion (dBc)**	**Features**
PGA870	5	143	650	2900	13dB NF	–108 (50MHz)	High bandwidth, low distortion, low noise 14 bit ADC driver
THS770012	5	115	900	3300	1.3	–90 (10MHz)	10 to 13dB selectable gain, 14/16 bit ADC driver
LMH6521	5	122.5	1200	48.5	7.3dB NF	–84 (200MHz)	Excellent distortion, accurate channel-channel gain/phase matching
LMH6522	5	121.25	1400	49	8.5dB NF	–88 (100MHz)	Excellent distortion, accurate channel-channel gain/phase matching
THS4511	5	39.2	1600	4900	2.0	–72 (70MHz)	Exceptional slew rate and distortion performance
THS4509	5	37.7	1900	6600	1.9	–75 (100MHz)	Wideband, low noise, low distortion
THS770006	5	115	2400	3100	1.7	–87 (10MHz)	+6dB fixed gain, high linearity 14/16 bit ADC driver
LMH6881	5	100	2400	—	9.7 dB NF	–65 (200MHz)	Programmable gain, excellent noise figure and distortion performance over entire gain range
LMH6882	5	200	2400	—	9.7 dB NF	–65 (200MHz)	Dual, programmable gain, accurate channel-channel gain/phase matching



Wired DSL/Power Line Drivers

Class AB							
Device	**Supply (V)**	**IOUT (mA)**	**Bandwidth (MHz)**	**Slew Rate (V/µs)**	**Input Noise (nV/√Hz)**	**Distortion (dBc)**	**Features**
THS6204	24	416	150	3800	2.5	70dB MTPR with +20.5dBm G.993.2—Profile 8b	Fully differential architecture, minimal quiescent current with high linearity
OPA2670	12	700	420	5000	6.3	–71 (10MHz)	Fully differential architecture, excellent drive capability combined with low distortion
Class G/H							
THS6132	±5 to ±15	500	80	300	3.5	–74 MTPR	High efficiency class G ADSL line driver, low power
THS6226	12	383	125	1500	6.3	70dB with +19.8dBm G.993.2—Profile 8b	Industry's first class H VDSL driver, single solution covering all DSL profiles, low power consumption
PLC							
OPA2674	12	500	250	2000	2	–82 (5MHz)	Excellent noise performance with drive current of 500mA
OPA2673	12	700	600	3000	2.4	–80 (10MHz)	Drive capability of 700mA combined with low noise and low distortion

High Speed Amplifiers
Selection Tree



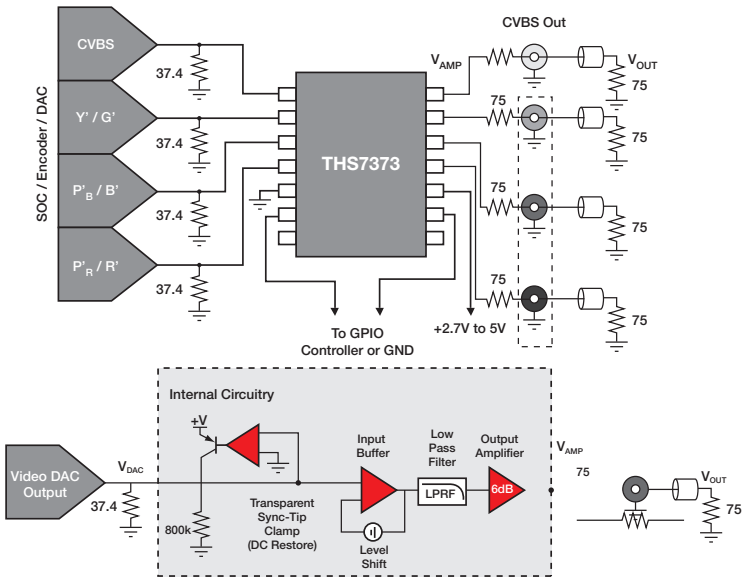
Signal Conditioning Amplifiers

General Purpose							
Devices	**Supply (V)**	**IS (mA)**	**Bandwidth (MHz)**	**Slew Rate (V/µs)**	**Input Noise (nV/√Hz)**	**Distortion (dBc)**	**Features**
THS4031	30	11	100	100	1.6	–96 (1MHz)	Wide O/P swing, great for buffering A/D converters
THS4021	30	11	350	470	1.5	–77 (1MHz)	High linearity, exceptional performance at high gain ≥10
OPA695	10	12.9	1400	4300	1.8	–78 (10MHz)	Exceptional slew rate and noise performance
THS4271	15	28	1400	1000	3.0	–92 (30MHz)	Unmatched combination of low-noise, high slew rate, wide bandwidth, low distortion, and unity gain stability
THS4304	5	18	3000	830	2.4	–95 (10MHz)	Excellent DC accuracy, high dynamic range
Low Power							
Devices	**Supply (V)**	**IS (mA)**	**Bandwidth (MHz)**	**Slew Rate (V/µs)**	**Input Noise (nV/√Hz)**	**Features**	
OPA835/2835	2.5 to 5.5	0.25	56	160	9.3	Unprecedented dynamic performance to power ratio	
THS4281	15	0.75	90	35	12.5	Very low power, unity gain VFB, RRIO	
OPA2889	10	0.46	115	250	8.4	Very low power combined with high dynamic range	
THS4521	3 to 5	1.1	145	490	4.6	Fully differential architecture with rail-to-rail O/P SAR and delta-sigma ADC drivers	
OPA836/2836	2.5 to 5.5	1	205	560	4.6	Excellent dynamic performance to power ratio, rail-to-rail O/P	
OPA684	10	1.7	210	820	3.7	Super high performance, low power, wideband CFB	
LMH6723	4.5 to 12	1	370	600	4.3	Unity gain stable, large signal bandwidth and slew rate 100% tested	

High Voltage, High Current Drivers

High Voltage							
Devices	**Supply (V)**	**IS (mA)**	**Bandwidth (MHz)**	**Slew Rate (V/µs)**	**Input Noise (nV/√Hz)**	**Distortion (dBc)**	**Features**
LM6181	30	10	100	2000	4	–50 (10MHz)	Guaranteed BW and slew rate, low differential gain and phase error
LM6171	30	4.5	160	3600	12	–66 (1MHz)	Low supply current, high slew rate, low distortion
THS3091	30	11	210	7300	2	–69 (10MHz)	Low noise CFB with high O/P drive of 250mA
THS3001	30	10	420	6500	1.6	–80 (10MHz)	Super fast slew rate combined with low distortion and O/P drive of 100mA
High Current							
LM7372	30	9.5	220	3000	14	–80 (1MHz)	Output current of 150mA, high slew rate, greater dynamic range
OPA2674	12	19.2	250	2000	2	–82 (5MHz)	Excellent noise performance with drive of 500mA
OPA2670	12	30	420	5000	3.6	–71 (10MHz)	High O/P current of 700mA
OPA2673	12	32	600	3000	2.4	–80 (10MHz)	Drive capability of 700mA combined with low noise and low distortion

High Speed Amplifiers
Video



Consumer Video

SD				
Device	**Supply (V)**	**Total IS (mA)**	**Gain (dB)**	**Number of Channels**
OPA360	2.5 to 3.6	6	6	1-ch SD
THS7314	2.85 to 5.5	16	6	3-ch SD
THS7374	2.85 to 5.5	10	6	4-ch SD
THS7310	2.6 to 5.5	12	6	2-ch SD
HD				
THS7316	2.85 to 5.5	18.3	6	3-ch HD
THS7373	2.6 to 5.5	16.2	6	1-ch SD + 3-ch HD
THS7365	2.6 to 5.5	20.7	6	3-ch SD + 3-ch HD
THS7371	2.85 to 5.5	20.5	6	1-ch SD + 3-ch HD
THS7372	2.7 to 5.0	23.4	6	1-ch SD + 3-ch HD
Full HD				
THS7364	2.7 to 5	23.4	6	3-ch SD + 3-ch FULL HD
THS7368	2.6 to 5.5	23.4	6	3-ch SD + 3-ch SD/ED/HD/FULL HD
High Gain				
THS7360	2.6 to 5.5	24.5	15, 13	3-ch SD + 3-ch SD/ED/HD/FULL HD
THS7375	2.85 to 5.5	14	15	4-ch SD
THS7315	2.85 to 5.5	15.6	14.3	3-ch SD
Low Power				
THS7318	2.85 to 5.5	3.5	6	3-ch ED/SD
THS7319	2.85 to 5.5	3.4	6	3-ch ED
THS7320	2.6 to 5	3.5	12	3-ch ED

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