Featured
High Speed Amplifiers

Texas Instruments

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Featured Amplifiers: Focused Applications

TI's broad portfolio of high speed amplifiers delivers leading-edge performance, while enabling customers to achieve more flexible designs with low power consumption. Key features include wide bandwidth, low noise, low distortion, high slew rate, and high output current. With a unique mix of these features, TI's high speed amplifiers provide a number of benefits including increased dynamic range, enhanced accuracy, ease-of-use, exceptional signal fidelity, and excellent performance-to-power ratio.

Low Noise Amplification
(Large Gain/High Speed: GBW > 50 MHz)
Industry's lowest noise:
LMH6629 (0.68 nV/√Hz), LMH6624,
LMH6626 (1 nV/√Hz)
Unlimited cap load drive (>10 pF):
LM6171, LM6172
High slew rate (>1000 V/µs): LMH6554

Current Sensing (HV Motor Control)/Control Loop (Error Amp)
RRIO, wide V_S, no output phase reversal:
LM7301, LM6142, LM6154

MOSFET Drivers
Unlimited cap load (>10 pF):
LM6171, LM6172, LM7121, LM8261, LM8272
High output current (>150 mA):
LM7372, LM6629, OPA2674
Rail-to-rail output with low V_S:
LMH6601, LMH6611, LMH6612, OPA355

Photodiode Interface
Large bandwidth: LMH6629 (4 GHz)
Low input capacitance: LMH6622
CM voltage range to the bottom rail
(single supply): LMH6601, LMH6654, LMH6655
Low Ibias under dark current condition:
OPA657, LMH6601

Video Drivers
Large bandwidth (>400 MHz), high slew rate,
(>1500 V/µs):
LMH6702, LMH6703,
LMH6704, LMH6738,
LMH6739, LMH6551
Integrated filters:
THS7316, THS7372

Video Muxes
Large bandwidth (>400 MHz), high slew rate,
(>1500 V/µs): LMH6570, LMH6572, LMH6574

Cable Drivers
Single ended: LMH6702, LMH6703, LMH6704
Differential: LMH6552, LMH6554, THS770006
Differential high voltage (>9 V_{P-P}):
LMH6550, LMH6551

Digital Variable Gain Amplifiers (DVGAs)

Enable Higher Performance Wideband Radio Systems
LMH6521, LMH6522

The LMH6521 and LMH6522 dual- and quad-channel DVGAs provide superior linearity performance over a wide frequency range, making them an ideal solution for the most challenging multi-channel wideband wireless systems.

Key Features

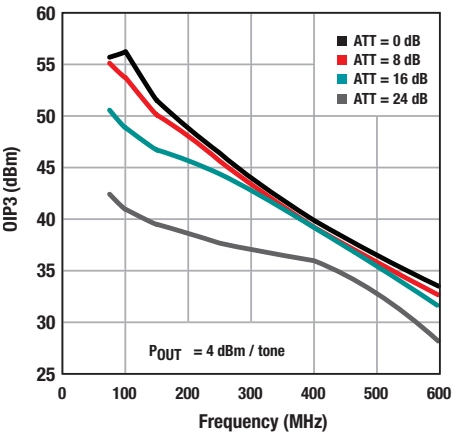
LMH6521 Dual DVGA

- Gain range: 31.5 dB, gain step size: 0.5 dB
- 3 dB bandwidth: 1200 MHz
- Gain control modes: Parallel, serial (SPI), pulse
- OIP3: 48.5 dBm @ 200 MHz
- Noise figure: 7.3 dB
- Channel-channel gain matching: ±0.04 dB

LMH6522 Quad DVGA

- Gain range: 31 dB, gain step size: 1 dB
- 3dB bandwidth: 1400 MHz
- Gain control modes: Parallel, serial (SPI)
- Noise figure: 8.5 dB
- OIP3: 49 dBm @ 200 MHz
- Channel-channel gain matching: ±0.15 dB

LMH6521 OIP3 vs Frequency



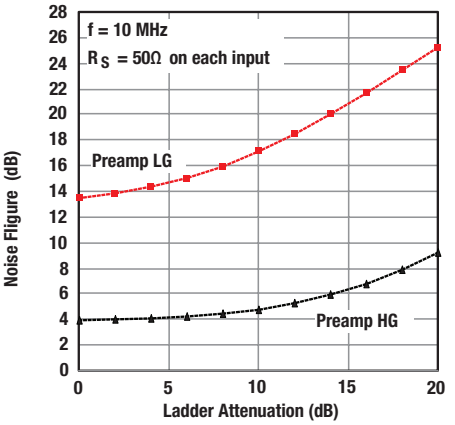
Increase System Dynamic Range in Test & Measurement Applications
LMH6518

The LMH6518 DVGA delivers excellent gain control and distortion performance with customizable features that enable precise signal acquisition and offers superior timing performance critical for real time signal measurement with additional features, including auxiliary output and overvoltage clamp.

Key Features

- Gain range: 40 dB, gain step size: 2 dB
- 3 dB bandwidth: 900 MHz
- HD2/HD3 @ 100 MHz: –50/–53 dBc
- Rise/fall time: <500 ps
- Recovery time: <5 ns
- Propagation delay variation: 100 ps
- Auxiliary output, overvoltage clamp

Noise Figure vs Gain



Select DVGA Portfolio

	LMH6514	LMH6515	LMH6518	LMH6521	LMH6522
Gain range/step (dB)	42/6	31/1	40/2	31/0.5	31/1
BW (MHz)	600	600	900	1200	1400
HD2/3 (dBc)	82/70 @ 100 MHz	80/60 @ 100 MHz	–44/–50 @ 250 MHz	–84/–83 @ 200 MHz	–78/–75 @ 200 MHz
NF (dB)	8.3	8.3	13.5	7.3	8.5
OIP3 (dBm)	34 @ 250 MHz	34 @ 250 MHz	26 @ 250 MHz	46.5 @ 250 MHz	49 @ 200 MHz

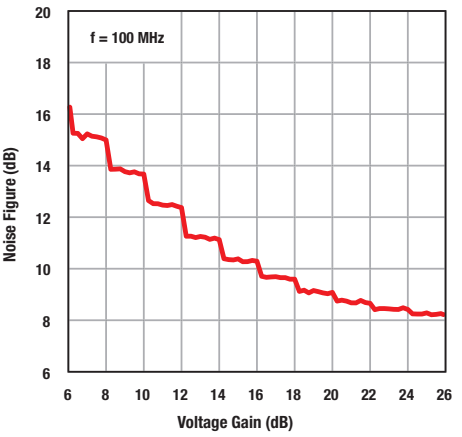
Programmable Differential Amplifiers (PDAs)

Optimized Noise and Distortion Performance Over Entire Gain Range

LMH6881, LMH6882

TI's new breed of amplifier, the programmable differential amplifier (PDA), combines the best of fully differential amplifiers (FDAs) and variable gain amplifiers (DVGAs). The LMH6881 single and LMH6882 dual PDAs provide optimized noise, distortion, and bandwidth performance over a 6 dB to 26 dB gain range, giving system designers a single device for use in many applications, such as wireless communications, military, medical and test & measurement. The LMH6882's channel gain matching of 0.2 dB and phase matching of 1.5° provide excellent image rejection for wideband zero IF and I/Q sampling applications.

LMH6882 Noise Figure vs Voltage Gain



Key Features

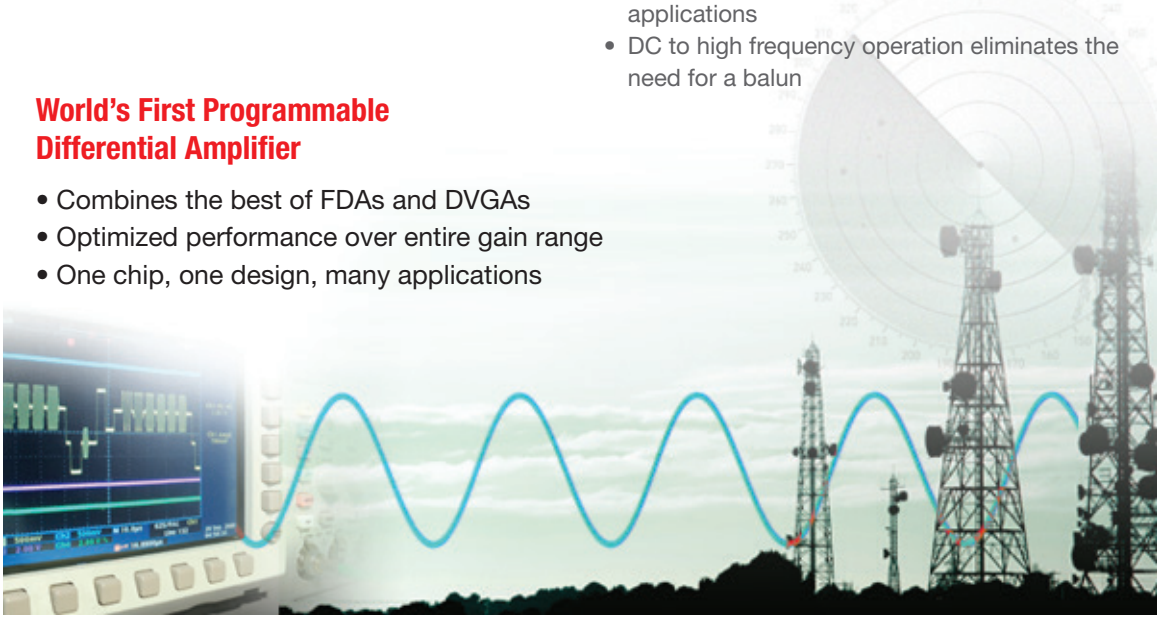
- Gain range: 20 dB, gain step size: 0.25 dB
- Gain control: SPI, parallel mode
- Bandwidth: 2.4 GHz
- Excellent noise/distortion performance over entire gain range
  - 9.7 dB noise figure
  - 44 dBm OIP3 @ 100 MHz
  - –100 dBc HD3 @ 100 MHz
- DC/AC coupling
- Single-ended-to-differential conversion

Key Benefits

- Flexible design eliminates need to tweak design for various use cases or applications with different gain settings
- No external resistors reduces BOM cost and board area and eliminates errors introduced by resistor mismatch
- Maintains high frequency distortion performance over entire gain range with minimal bandwidth variation to gain, enabling flexible systems while eliminating need for multiple amplifiers for different gain settings
- Superior image rejection makes it ideal for I/Q sampling to zero-IF/direct-conversion applications
- DC to high frequency operation eliminates the need for a balun

World's First Programmable Differential Amplifier

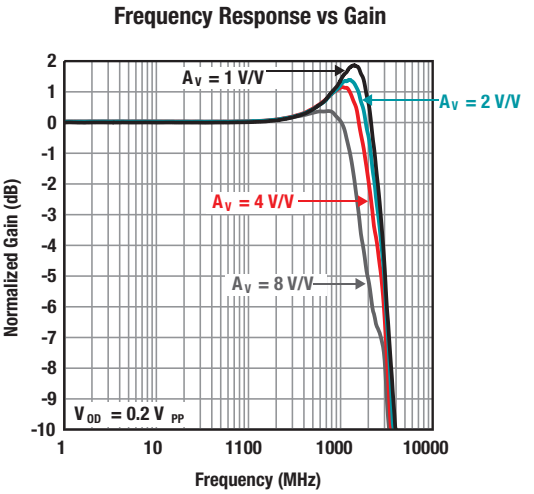
- Combines the best of FDAs and DVGAs
- Optimized performance over entire gain range
- One chip, one design, many applications



Fully Differential Amplifiers (FDAs)

High Performance High Speed Ultra Linear FDA
LMH6554

The LMH6554 wideband FDA with differential current feedback allows operations at gains greater than unity without sacrificing bandwidth or output noise. With >800 MHz 0.1 dB gain flatness, it can achieve high accuracy for wideband signal amplification. The LMH6554's low noise and high linearity enable very low output noise and low distortion performance even at high gain.

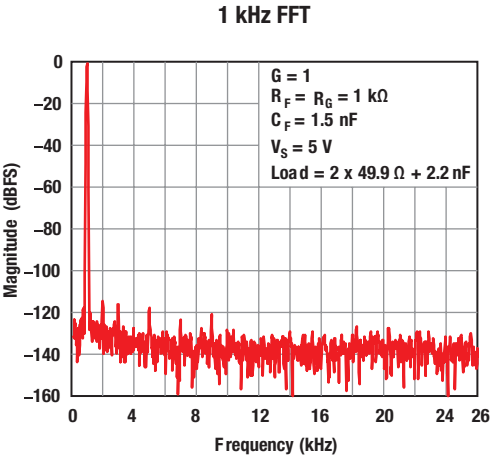


Key Features

- 3 dB bandwidth: 2.8 GHz
- OIP3 @ 150 MHz: 46.5 dBm
- HD2/HD3 @ 75 MHz: –96/–97 dBc
- Slew rate: 6200 V/µs

Enable Highest Accuracy Conversion
THS4521

The THS4521 is a negative-rail input, rail-to-rail output, fully differential amplifier operating from a single +2.7 to +5V supply. The low 1 mA/channel quiescent current and power down capability to 1 µA make it a good choice for low power applications. The output common-mode control with low offset and drift allows for DC-coupling in high-accuracy data acquisition systems.



Key Features

- Bandwidth: 150 MHz
- Slew rate: 490 V/µs
- Quiescent current: 1.14 mA/ch
- Input voltage noise: 5 nV/$\sqrt{Hz}$

Select FDA Portfolio

	LMH6550	LMH6551	LMH6552	LMH6553	LMH6554	LMH6555
BW (MHz)	400	370	1500	900	2800	1200
HD2/3 (dBc)	–78/–88 @ 20 MHz	–85/–72 @ 20 MHz	–92/–93 @ 20 MHz	–79/–90 @ 20 MHz	–102/–110 @ 20 MHz	–60/–67 @ 250 MHz
SR (V/µs)	3000	2400	3800	2300	6200	1300
Isupply (max) (mA)	24	14.5	25	33	57	150

Design Resources and References

E2E High Speed Amplifier Forum
ti.com/e2ehsa

Get more information on the high speed amplifier family of products at
ti.com/amplifiers

- Watch videos
- Find companion products
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