Wireless & RF Solutions

High Performance Analog ICs
Linear Technology offers some of the highest performance RF and signal chain solutions for wireless and cellular infrastructure. These products support worldwide standards including, LTE, WiMAX, GSM, W-CDMA, TD-SCDMA, CDMA, and CDMA2000. Other wireless systems include broadband microwave data links, secure communications, satellite receivers, broadband wireless access, wireless broadcast systems, RFID readers and cable infrastructure.

Product Offerings

- High Linearity Active Mixers
- Direct Conversion I/Q Modulators
- High Dynamic Range Direct Conversion I/Q Demodulators
- Low Distortion IF Amplifiers/ADC Drivers
- Variable Gain Amplifiers
- Complete, Integrated RF-to-Digital Receivers
- Frequency Synthesizer/VCO
- High Speed A/D Converters up to 16-Bit Resolution
- High Sampling Rate A/D Converters up to 250Msps
- Serial High Speed A/D Converters
- High Accuracy RMS RF Detectors
- High Dynamic Range Log Detectors
- High Frequency Schottky Peak Detectors
- Active Filters

This guide is organized by application and specific radio architecture to facilitate ease of finding the right product for the job. Most products are available with a demo board to facilitate quick and easy evaluation. Data sheets and additional product information is available at www.linear.com.

Linear Technology Stands Behind

- Product Reliability
- Highest Quality (0.1 FIT Rate)
- Superior Performance and Value
- Reliable Delivery
- Unparalleled Service

We are committed to innovation, enhanced performance and features that bring outstanding value to your end products.
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GSM / EDGE / CDMA / CDMA2000 / W-CDMA / TD-SCDMA / SDR / LTE / WiMAX BASE STATIONS

MIMO Multicarrier High IF Sampling Receiver

Part No. | Features | Op Freq. | IIP3 | NF | Conv. Gain | LO Drive | LO Leakage | VCC | ICC
---|---|---|---|---|---|---|---|---|---
LTC®5569 | Dual Wideband | 0.3–4.0GHz | 26.7dBm | 11.7dB | 2.0dB | 0dBm | -50dBm | 3.0V–3.5V | 180mA
LTC5591 | Dual High Gain | 1.3–2.3GHz | 26.0dBm | 9.9dB | 8.2dB | 0dBm | -30dBm | 3.1V–3.5V | 380mA
LTC5540 | High Gain | 0.6–1.3GHz | 25.9dBm | 9.9dB | 7.9dB | 0dBm | -30dBm | 3.1V–3.5V | 193mA
LTC5541 | High Gain | 1.3–2.3GHz | 26.4dBm | 9.6dB | 7.8dB | 0dBm | -32dBm | 3.1V–3.5V | 192mA
LTC5542 | High Gain | 1.6–2.7GHz | 26.8dBm | 9.9dB | 8.0dB | 0dBm | -32dBm | 3.1V–3.5V | 190mA
LTC5543 | High Gain | 2.3–4.0GHz | 24.5dBm | 10.2dB | 8.4dB | 0dBm | -28dBm | 3.1V–3.5V | 201mA
LTC5547 | Low Power, Wideband | 0.4–3.8GHz | 24.7dBm | 11.7dB | 2.9dB | -3dBm | -45dBm | 2.9V–3.9V | 81.6mA
LT®5547 | Integrated Xformer | 0.4–3.7GHz | 23.5dBm | 12.5dB | 2.3dB | -3dBm | -44dBm | 4.5V–5.25V | 78mA

Part No. | Gain | 90dB SFDR Ø | 84dB SFDR Ø | 72dB SFDR Ø | NF | Supply Voltage | Supply Current | Features
---|---|---|---|---|---|---|---|---
LTC6400-8 | 8 | 60MHz | 120MHz | 180MHz | 6.2dB | 2.85V–3.5V | 85mA | Fixed Gain
LTC6420-20 | 20dB | 45MHz | 75MHz | 140MHz | 6.2dB | 2.85V–3.5V | 160mA | Dual Matched
LT5544 | 2 to 18dB | – | 50MHz | 7200MHz | 10dB | 5V | 110mA | Digital VGA 0.125dB Steps
LTC6412 | -14 to 17dB | – | – | 280MHz | 10dB | 3.3V | 110mA | Analog VGA

Part No. | # Channels | Resolution | Sample Rate | Full Power Bandwidth | SNR | SFDR | $V_{CC}$ | Power | Package
---|---|---|---|---|---|---|---|---|---
LTC2209 | 1 | 16-Bit | 160Mmps | 700MHz | 77.1dB | 100dB | 3.3V | 1450mW | 9x9 QFN
LTC2185 | 2 | 16-Bit | 125Mmps | 550MHz | 76.8dB | 90dB | 1.8V | 370mW | 9x9 QFN
LTC2157-14 | 2 | 14-Bit | 250Mmps | 1250MHz | 70.0dB | 90dB | 1.8V | 650mW | 9x9 QFN
LTC2145-14 | 2 | 14-Bit | 125Mmps | 750MHz | 73.1dB | 90dB | 1.8V | 189mW | 9x9 QFN
### µModule® Receiver Subsystems

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Integrated Components</th>
<th>RF Range (GHz)</th>
<th>Intermediate Frequency (MHz)</th>
<th>Signal Bandwidth (MHz)</th>
<th>Gain (dB)</th>
<th>Supply Voltage (V)</th>
<th>Power (Typ) (W)</th>
<th>Package</th>
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</thead>
<tbody>
<tr>
<td>LTM9001-AA</td>
<td>16-Bit IF/ Baseband Receiver</td>
<td>ADC - ADC Driver - RF Mixer</td>
<td>162.5</td>
<td>50 (BPF)</td>
<td>20</td>
<td>3.3</td>
<td>1.65</td>
<td>11.25 x 11.25 LGA</td>
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<tr>
<td>LTM9001-AD</td>
<td>16-Bit IF/ Baseband Receiver</td>
<td>16-Bit, 130Mps</td>
<td>70</td>
<td>25 (BPF)</td>
<td>14</td>
<td>3.3</td>
<td>1.65</td>
<td>11.25 x 11.25 LGA</td>
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<tr>
<td>LTM9002-AA</td>
<td>Dual 14-Bit IF/ Baseband Receiver</td>
<td>Dual 14-Bit IF/ Baseband Receiver</td>
<td>170</td>
<td>170 (LPF)</td>
<td>26</td>
<td>3.0</td>
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<td>15 x 11.25 LGA</td>
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<tr>
<td>LTM9005-AA</td>
<td>14-Bit IF Sampling Receiver</td>
<td>14-Bit, 125Mps</td>
<td>140</td>
<td>16</td>
<td>20 Variable</td>
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<td>1.32</td>
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<td>LTM9005-AB</td>
<td>16-Bit IF Sampling Receiver</td>
<td>14-Bit, 125Mps</td>
<td>140</td>
<td>20</td>
<td>20 Variable</td>
<td>3.3</td>
<td>1.65</td>
<td>22 x 15 LGA</td>
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### Table Title

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<tr>
<th>Part No.</th>
<th>Features</th>
<th>Freq. Range</th>
<th>Closed-Loop Phase Noise</th>
<th>Spurious Products</th>
<th>VCC</th>
<th>Icc</th>
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<tbody>
<tr>
<td>LTC6946-1</td>
<td>Integer-N, PLL + VCO</td>
<td>0.373-3.74GHz</td>
<td>–100dBc</td>
<td>–103dBc</td>
<td>3.3V/5V</td>
<td>143mA</td>
</tr>
<tr>
<td>LTC6946-2</td>
<td>Integer-N, PLL + VCO</td>
<td>0.513-4.91GHz</td>
<td>–100dBc</td>
<td>–103dBc</td>
<td>3.3V/5V</td>
<td>143mA</td>
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<tr>
<td>LTC6946-3</td>
<td>Integer-N, PLL + VCO</td>
<td>0.640-5.79GHz</td>
<td>–94dBc</td>
<td>–103dBc</td>
<td>3.3V/5V</td>
<td>143mA</td>
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### Direct Conversion Receiver

![Direct Conversion Receiver Diagram]

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<th>Direct Demodulator</th>
<th>Part No.</th>
<th>Op Freq.</th>
<th>BB Freq.</th>
<th>IIP3</th>
<th>NF</th>
<th>P1dB</th>
<th>Ampl. Match</th>
<th>Phase Match</th>
<th>VCC</th>
<th>ICC</th>
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<tbody>
<tr>
<td>LT5575</td>
<td>0.8–2.7GHz</td>
<td>DC - 490MHz</td>
<td>28dBm</td>
<td>12.8dB</td>
<td>13.2dBm</td>
<td>0.03dB</td>
<td>0.5°</td>
<td>4.5V–5.25V</td>
<td>132mA</td>
<td></td>
</tr>
<tr>
<td>LT5517</td>
<td>40–900MHz</td>
<td>DC - 130MHz</td>
<td>23.5dBm</td>
<td>9dB</td>
<td>10dBm</td>
<td>0.03dB</td>
<td>0.7°</td>
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<tr>
<th>IF Amplifier</th>
<th>Part No.</th>
<th>Gain</th>
<th>90dB SFDR @</th>
<th>84dB SFDR @</th>
<th>72dB SFDR @</th>
<th>Noise</th>
<th>Supply Voltage</th>
<th>Supply Current</th>
<th>Features</th>
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<tbody>
<tr>
<td>LTC6421-20</td>
<td>20dB</td>
<td>–</td>
<td>–</td>
<td>110MHz</td>
<td>6.2dB</td>
<td>2.85V–3.5V</td>
<td>40mA</td>
<td>Matched Dual</td>
<td></td>
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<tr>
<td>LTC6420-20</td>
<td>20dB</td>
<td>40MHz</td>
<td>80MHz</td>
<td>140MHz</td>
<td>6.2dB</td>
<td>2.85V–3.5V</td>
<td>80mA</td>
<td>Matched Dual</td>
<td></td>
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<tr>
<td>LTC6401</td>
<td>8, 14, 20, 26dB</td>
<td>40MHz</td>
<td>90MHz</td>
<td>135MHz</td>
<td>6.1dB</td>
<td>2.85V–3.5V</td>
<td>45mA</td>
<td>Fixed Gain</td>
<td></td>
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<tr>
<td>LTC6409</td>
<td>Resistor Set</td>
<td>100MHz</td>
<td>105MHz</td>
<td>120MHz</td>
<td>6.9dB</td>
<td>2.70V–5.25V</td>
<td>52mA</td>
<td>DC Coupled</td>
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<thead>
<tr>
<th>Filter</th>
<th>Part No.</th>
<th>Function</th>
<th>Order</th>
<th>Cutoff Freq.</th>
<th>SNR</th>
<th>HD2</th>
<th>HD3</th>
<th>Noise</th>
<th>VCC</th>
<th>ICC</th>
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</thead>
<tbody>
<tr>
<td>LTC6604-2.5 / 5 / 10 / 15</td>
<td>Dual Lowpass</td>
<td>4th</td>
<td>2.5, 5, 10, 15MHz</td>
<td>82dB</td>
<td>-93dBc</td>
<td>-96dBc</td>
<td>4.5V/μp</td>
<td>3V, 5V, ±5V</td>
<td>68mA</td>
<td></td>
</tr>
<tr>
<td>LTC6605-7 / 10 / 14</td>
<td>Dual Lowpass</td>
<td>2nd</td>
<td>7, 10, 14MHz</td>
<td>83dB</td>
<td>-90dBc</td>
<td>-106dBc</td>
<td>4.0V/μp</td>
<td>2.7V, 5.25V</td>
<td>66mA</td>
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<table>
<thead>
<tr>
<th>ADC</th>
<th>Part No.</th>
<th># Channels</th>
<th>Resolution</th>
<th>Sample Rate</th>
<th>Full Power Bandwidth</th>
<th>SNR</th>
<th>SFDR</th>
<th>VCC</th>
<th>Power</th>
<th>Package</th>
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<tbody>
<tr>
<td>LTC2145-14</td>
<td>2</td>
<td>14-Bit</td>
<td>125Mps</td>
<td>750MHz</td>
<td>73.1dB</td>
<td>90dB</td>
<td>1.8V</td>
<td>189mW</td>
<td>9x9 QFN</td>
<td></td>
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<tr>
<td>LTC2268-14</td>
<td>2</td>
<td>14-Bit</td>
<td>125Mps</td>
<td>800MHz</td>
<td>73.1dB</td>
<td>88dB</td>
<td>1.8V</td>
<td>299mW</td>
<td>6x6 QFN</td>
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Note 1: Serial LVDS Outputs
### μModule Receiver Subsystems

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Integrated Components</th>
<th>RF Range (GHz)</th>
<th>Intermediate Frequency (MHz)</th>
<th>Signal Bandwidth (MHz)</th>
<th>Supply Voltage (V)</th>
<th>Power (Typ) (W)</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>LTC6946-1</td>
<td>Integer-N, PLL + VCO</td>
<td>0.373-3.74GHz</td>
<td>–100dBc</td>
<td>–140dBc</td>
<td>–156dBc</td>
<td>–158dBc</td>
<td>–103dBc</td>
<td>3.3V/5V</td>
</tr>
<tr>
<td>LTC6946-2</td>
<td>Integer-N, PLL + VCO</td>
<td>0.513-4.91GHz</td>
<td>–100dBc</td>
<td>–132dBc</td>
<td>–152dBc</td>
<td>–158dBc</td>
<td>–103dBc</td>
<td>3.3V/5V</td>
</tr>
<tr>
<td>LTC6946-3</td>
<td>Integer-N, PLL + VCO</td>
<td>0.640-5.79GHz</td>
<td>–94dBc</td>
<td>–140dBc</td>
<td>–156dBc</td>
<td>–158dBc</td>
<td>–103dBc</td>
<td>3.3V/5V</td>
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### μModule Receiver Subsystems

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>ADC</th>
<th>ADC Driver</th>
<th>RF Mixer</th>
<th>RF Range (GHz)</th>
<th>Supply Voltage (V)</th>
<th>Power (Typ) (W)</th>
<th>Package</th>
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</thead>
<tbody>
<tr>
<td>LTM9002-AA</td>
<td>Dual 14-Bit IF/ Baseband Receiver</td>
<td>Dual</td>
<td>–</td>
<td>–</td>
<td>170</td>
<td>3.0</td>
<td>1.3</td>
<td>15×11.25 LGA</td>
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<tr>
<td>LTM9004-AA</td>
<td>14-Bit Direct Conversion Receiver</td>
<td>Dual</td>
<td>I/Q Demodulator</td>
<td>0.8 to 2.7 DC (1.92 LPF)</td>
<td>5 &amp; 3.0</td>
<td>1.83 22×15 LGA</td>
<td></td>
<td></td>
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<tr>
<td>LTM9004-AB</td>
<td>14-Bit Direct Conversion Receiver</td>
<td>Dual</td>
<td>I/Q Demodulator</td>
<td>0.8 to 2.7 DC (4.42 LPF)</td>
<td>10 &amp; 3.0</td>
<td>1.83 22×15 LGA</td>
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<tr>
<td>LTM9004-AC</td>
<td>14-Bit Direct Conversion Receiver</td>
<td>Dual</td>
<td>I/Q Demodulator</td>
<td>0.8 to 2.7 DC (8.42 LPF)</td>
<td>20 &amp; 3.0</td>
<td>1.83 22×15 LGA</td>
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<tr>
<td>LTM9004-AD</td>
<td>14-Bit Direct Conversion Receiver</td>
<td>Dual</td>
<td>I/Q Demodulator</td>
<td>0.8 to 2.7 DC (20 LPF)</td>
<td>40 &amp; 3.0</td>
<td>1.83 22×15 LGA</td>
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### PLL/VCO

<table>
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<tr>
<th>Part No.</th>
<th>Features</th>
<th>Freq. Range</th>
<th>Closed-Loop Phase Noise</th>
<th>Spurious Products</th>
<th>Vcc</th>
<th>Icc</th>
</tr>
</thead>
<tbody>
<tr>
<td>LTC6946-1</td>
<td>Integer-N, PLL + VCO</td>
<td>0.373-3.74GHz</td>
<td>–100dBc</td>
<td>–140dBc</td>
<td>–156dBc</td>
<td>–158dBc</td>
</tr>
<tr>
<td>LTC6946-2</td>
<td>Integer-N, PLL + VCO</td>
<td>0.513-4.91GHz</td>
<td>–100dBc</td>
<td>–132dBc</td>
<td>–152dBc</td>
<td>–158dBc</td>
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<tr>
<td>LTC6946-3</td>
<td>Integer-N, PLL + VCO</td>
<td>0.640-5.79GHz</td>
<td>–94dBc</td>
<td>–140dBc</td>
<td>–156dBc</td>
<td>–158dBc</td>
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**GSM / EDGE / PHS / TDMA BASE STATIONS**

**Superheterodyne Receiver**

![Diagram of Superheterodyne Receiver]

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Function</th>
<th>Op Freq.</th>
<th>IIP3</th>
<th>NF</th>
<th>Conv. Gain</th>
<th>LO Drive</th>
<th>LO Leakage</th>
<th>VCC</th>
<th>ICC</th>
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<tbody>
<tr>
<td>LTC5540/41/42/43</td>
<td>High Linearity</td>
<td>0.6–4.0GHz</td>
<td>26.4dBm</td>
<td>9.6dB</td>
<td>7.8dB</td>
<td>0dB</td>
<td>-32dBm</td>
<td>3.1V–3.5V</td>
<td>192mA</td>
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<tr>
<td>LT5557</td>
<td>Wideband Low Power</td>
<td>0.4–3.8GHz</td>
<td>24.7dBm</td>
<td>11.7dB</td>
<td>2.9dB</td>
<td>-3dB</td>
<td>-45dBm</td>
<td>2.9V–3.9V</td>
<td>81.6mA</td>
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<td>LT5527</td>
<td>Integrated Xformer</td>
<td>0.4–3.7GHz</td>
<td>23.5dBm</td>
<td>12.5dB</td>
<td>2.3dB</td>
<td>-3dB</td>
<td>-44dBm</td>
<td>4.5V–5.25V</td>
<td>78mA</td>
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<td>LT5522</td>
<td>Single-Ended</td>
<td>0.4–2.7GHz</td>
<td>25dBm</td>
<td>12.5dB</td>
<td>-0.1dB</td>
<td>-5dB</td>
<td>-50dBm</td>
<td>4.5V–5.25V</td>
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**Downconverting Mixer**

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<th>Conv. Gain</th>
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<td>Low Freq.</td>
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<td>-60dBm</td>
<td>4.5V–5.25V</td>
<td>57mA</td>
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<td>LT5526</td>
<td>Low Power</td>
<td>100kHz–2GHz</td>
<td>15.2dB</td>
<td>12.7dB</td>
<td>0.6dB</td>
<td>-5dB</td>
<td>-65dBm</td>
<td>3V–5.5V</td>
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<td>LT5560</td>
<td>Very Low Power</td>
<td>DC–4GHz</td>
<td>9.6dB</td>
<td>8.8dB</td>
<td>2.7dB</td>
<td>-2dB</td>
<td>-44dBm</td>
<td>2.7V–5.25V</td>
<td>10mA</td>
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**Log Amp**

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<td>LT5537</td>
<td>IF RSSI</td>
<td>0.1–1GHz</td>
<td>90dB</td>
<td>-80 to 10dBm</td>
<td>±1.5dB</td>
<td>4.5V–5.9V</td>
<td>13mA</td>
<td>3x2 QFN</td>
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**Filter**

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<thead>
<tr>
<th>Part No.</th>
<th>Function</th>
<th>Order</th>
<th>Cutoff. Freq.</th>
<th>SNR</th>
<th>HD2</th>
<th>HD3</th>
<th>Ripple</th>
<th>VCC</th>
<th>Icc</th>
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<tbody>
<tr>
<td>LT6600-2.5/5/10/15/20</td>
<td>Lowpass</td>
<td>4th</td>
<td>2.5, 5, 10, 15, 20MHz</td>
<td>86dB</td>
<td>-95dBc</td>
<td>-88dBc</td>
<td>0.5dB</td>
<td>3V, 5V, ±5V</td>
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<tr>
<td>LTC6602</td>
<td>Dual Prog. LP/HP</td>
<td>5th/4th</td>
<td>42-900kHz</td>
<td>–</td>
<td>-81dBc</td>
<td>-81dBc</td>
<td>&lt; 0.5dB</td>
<td>2.7V–3.6V</td>
<td>105mA</td>
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**ADC**

<table>
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<tr>
<th>Part No.</th>
<th># Channels</th>
<th>Resolution</th>
<th>Sample Rate</th>
<th>Full Power Bandwidth</th>
<th>SNR</th>
<th>SFDR</th>
<th>VCC</th>
<th>Power</th>
<th>Package</th>
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<tbody>
<tr>
<td>LTC2217</td>
<td>1</td>
<td>16-Bit</td>
<td>105Msps</td>
<td>400MHz</td>
<td>81.2dB</td>
<td>100dB</td>
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<td>1190mW</td>
<td>9x9 QFN</td>
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<tr>
<td>LTC2208</td>
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<td>130Msps</td>
<td>700MHz</td>
<td>77.7dB</td>
<td>100dB</td>
<td>3.3V</td>
<td>1250mW</td>
<td>9x9 QFN</td>
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<tr>
<td>LTC2274</td>
<td>1</td>
<td>16-Bit</td>
<td>105Msps</td>
<td>700MHz</td>
<td>77.6dB</td>
<td>100dB</td>
<td>3.3V</td>
<td>1300mW</td>
<td>6x6 QFN</td>
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<tr>
<td>LTC2164</td>
<td>1</td>
<td>16-Bit</td>
<td>105Msps</td>
<td>750MHz</td>
<td>76.7dB</td>
<td>90dB</td>
<td>1.8V</td>
<td>163mW</td>
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**μModule Receiver Subsystems**

<table>
<thead>
<tr>
<th>Part No.</th>
<th># Channels</th>
<th>Resolution</th>
<th>Sample Rate</th>
<th>Input Frequency</th>
<th>Effective Gain</th>
<th>SNR</th>
<th>SFDR</th>
<th>VCC</th>
<th>Package</th>
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<tbody>
<tr>
<td>LTM9001-AA</td>
<td>1</td>
<td>16-Bit</td>
<td>130Msps</td>
<td>162.5MHz ±25MHz</td>
<td>20dB</td>
<td>72dB</td>
<td>82dB</td>
<td>3.3V</td>
<td>11.25×11.25 LGA</td>
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Multicarrier Transmitter with Linearization Receiver

---

**Upconverting Mixer**

- Part No.: LT5579
  - Function: WiMAX, w/ Integ. Xformer
  - Op Freq.: 1.5–3.8GHz
  - IP3: 27dBm
  - NF: 9.2dB
  - Conv. Gain: 1.8dB
  - LO Drive: -1dBm
  - LO Leakage: -39dBm
  - VCC: 3.15V–3.6V
  - ICC: 226mA

- Part No.: LT5578
  - Function: Wideband
  - Op Freq.: 0.4–2.7GHz
  - IP3: 24.3dBm
  - NF: 10.5dB
  - Conv. Gain: -0.7dB
  - LO Drive: -1dBm
  - LO Leakage: -46dBm
  - VCC: 3.1V–3.5V
  - ICC: 152mA

- Part No.: LT5521
  - Function: Wideband Low Power
  - Op Freq.: 0.01–3.7GHz
  - IP3: 24.2dBm
  - NF: 12.5dB
  - Conv. Gain: -0.5dB
  - LO Drive: -5dBm
  - LO Leakage: -42dBm
  - VCC: 3.15V–5.25V
  - ICC: 82mA

**Downconverting Mixer**

- Part No.: LTC5540/41/42/43
  - Function: Hi Linearity, High Gain
  - Op Freq.: 0.6–4GHz
  - IP3: 26.4dBm
  - NF: 9.6dB
  - Conv. Gain: 7.8dB
  - LO Drive: 0dBm
  - LO Leakage: -32dBm
  - VCC: 3.1V–3.5V
  - ICC: 192mA

- Part No.: LT5557
  - Function: Wideband Low Power
  - Op Freq.: 0.4–3.8GHz
  - IP3: 24.7dBm
  - NF: 11.7dB
  - Conv. Gain: 2.9dB
  - LO Drive: -3dBm
  - LO Leakage: -45dBm
  - VCC: 2.9V–3.9V
  - ICC: 81.6mA

- Part No.: LT5527
  - Function: Single-End Inputs
  - Op Freq.: 0.4–3.7GHz
  - IP3: 23.5dBm
  - NF: 12.5dB
  - Conv. Gain: 2.3dB
  - LO Drive: -3dBm
  - LO Leakage: -44dBm
  - VCC: 4.5V–5.25V
  - ICC: 78mA

**RF Detector**

- Part No.: LTC5582
  - Function: RMS Power Detector
  - Op Freq.: 40MHz–10GHz
  - Dynamic Range: 57dB
  - IIP3: -56–1dBm
  - NF: ±0.2dB
  - VCC: 3.1V–3.5V
  - ICC: 41.6mA
  - Package: 3x3 DFN

- Part No.: LTC5583
  - Function: Dual RMS Detector
  - Op Freq.: 40MHz–6GHz
  - IP3: -58–2dBm
  - NF: ±0.2dB
  - VCC: 3.1V–3.5V
  - ICC: 90.1mA
  - Package: 4x4 QFN

- Part No.: LT5581
  - Function: RMS Detector
  - Op Freq.: 10MHz–6GHz
  - Dynamic Range: 40dB
  - IIP3: -34–6dBm
  - NF: ±1dB
  - VCC: 2.7V–5.25V
  - ICC: 1.4mA
  - Package: 3x2 DFN

- Part No.: LT5587
  - Function: RMS + ADC
  - Op Freq.: 10MHz–6GHz
  - Dynamic Range: 40dB
  - IIP3: -34–6dBm
  - NF: ±1dB
  - VCC: 2.7V–3.6V
  - ICC: 3mA
  - Package: 3x3 DFN

**Amplifier/ADC Driver**

- Part No.: LTC6400
  - Gain: 8, 14, 20, 26dB
  - 90dB SFDR @ 84dB
  - 72dB SFDR @ 120MHz
  - Noise: 6.2dB
  - Supply Voltage: 6.25V
  - Power: 85mA
  - Package: Fixed Gain

- Part No.: LT5554
  - Gain: 2dB–18dB, Prog. 1/8dB Step
  - 90dB SFDR @ 84dB
  - 72dB SFDR @ 200MHz
  - Noise: 10.3dB
  - Supply Voltage: 4.75V
  - Power: 100mA
  - Package: Digital Gain Control

**ADC**

- Part No.: LTC2152-14
  - # Channels: 1
  - Resolution: 14-Bit
  - Sample Rate: 250Mmps
  - Full Power Bandwidth: 1250MHz
  - SNR: 70.0dB
  - SFDR: 90dB
  - VCC: 1.8V
  - Power: 340mW
  - Package: 6x6 QFN

- Part No.: LTC2152-12
  - # Channels: 1
  - Resolution: 12-Bit
  - Sample Rate: 250Mmps
  - Full Power Bandwidth: 1250MHz
  - SNR: 68.5dB
  - SFDR: 90dB
  - VCC: 1.8V
  - Power: 331mW
  - Package: 6x6 QFN

**μModule Receiver Subsystems**

- Part No.: LTC6946
  - Features: Integer-N, PLL + VCO
  - Freq. Range: 373–1740MHz
  - SFDR @ 100kHz: -100dBc
  - SFDR @ 1MHz: -140dBc
  - SFDR @ 10MHz: -156dBc
  - SFDR @ 40MHz: -158dBc
  - VCC: 3.3V–5V
  - ICC: 143mA

- Part No.: LTC6946
  - Features: Integer-N, PLL + VCO
  - Freq. Range: 513–2100MHz
  - SFDR @ 100kHz: -100dBc
  - SFDR @ 1MHz: -132dBc
  - SFDR @ 10MHz: -158dBc
  - SFDR @ 40MHz: -158dBc
  - VCC: 3.3V–5V
  - ICC: 143mA

- Part No.: LTC6946
  - Features: Integer-N, PLL + VCO
  - Freq. Range: 640–5790MHz
  - SFDR @ 100kHz: -94dBc
  - SFDR @ 1MHz: -140dBc
  - SFDR @ 10MHz: -156dBc
  - SFDR @ 40MHz: -158dBc
  - VCC: 3.3V–5V
  - ICC: 143mA
## GSM / EDGE / CDMA / CDMA2000 / W-CDMA / TD-SCDMA / UMTS / SDR / LTE / WIMAX BASE STATIONS

### Direct Modulator Transmitter (Multicarrier) with Linearization Receiver

![Diagram of Direct Modulator Transmitter and Linearization Receiver](direct_modulator_diagram.png)

### Parts List

<table>
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<tr>
<th></th>
<th></th>
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<tbody>
<tr>
<td>LTC5588-1</td>
<td>0.2–6GHz</td>
<td>31dBm</td>
<td>-160.6dBmHz</td>
<td>-2.5dB</td>
<td>-76dBc</td>
<td>-39.6dBm</td>
<td>-56.6dBc</td>
<td>3.15V–3.45V</td>
<td>303mA</td>
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<tr>
<td>LT5572</td>
<td>1.5–2.5GHz</td>
<td>21.6dBm</td>
<td>-158.6dBmHz</td>
<td>-2.5dB</td>
<td>-67.7dBc</td>
<td>-39.4dBm</td>
<td>-41.2dBc</td>
<td>4.5V–5.25V</td>
<td>120mA</td>
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<tr>
<td>LT5571</td>
<td>0.62–1.1GHz</td>
<td>21.7dBm</td>
<td>-159dBmHz</td>
<td>-4.2dB</td>
<td>-70dBc</td>
<td>-42dBm</td>
<td>-53dBc</td>
<td>4.5V–5.25V</td>
<td>97mA</td>
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<thead>
<tr>
<th>Part No.</th>
<th>Op Freq.</th>
<th>BB Freq.</th>
<th>IIP3</th>
<th>NF</th>
<th>Conv. Gain</th>
<th>Ampl. Match</th>
<th>Phase Match</th>
<th>VCC (±5V)</th>
<th>ICC (mA)</th>
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<tbody>
<tr>
<td>LTC6420-20</td>
<td>20dB</td>
<td>40MHz</td>
<td>80MHz</td>
<td>140MHz</td>
<td>6.2dB</td>
<td>3dB</td>
<td>0.03dB</td>
<td>3.1V–3.5V</td>
<td>80mA</td>
</tr>
<tr>
<td>LT6400</td>
<td>8, 14, 20, 26dB</td>
<td>60MHz</td>
<td>120MHz</td>
<td>180MHz</td>
<td>6.2dB</td>
<td>3dB</td>
<td>0.03dB</td>
<td>3.1V–3.5V</td>
<td>85mA</td>
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<tr>
<td>LT6409</td>
<td>Resistor Set</td>
<td>100MHz</td>
<td>100MHz</td>
<td>120MHz</td>
<td>6.0dB</td>
<td>3dB</td>
<td>0.03dB</td>
<td>3.1V–3.5V</td>
<td>52mA</td>
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### ADCs

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<th>Part No.</th>
<th># Channels</th>
<th>Resolution</th>
<th>Sample Rate</th>
<th>Full Power Bandwidth</th>
<th>SNR</th>
<th>SDR</th>
<th>VCC (±5V)</th>
<th>Power</th>
<th>Package</th>
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<tbody>
<tr>
<td>LTC2145-14</td>
<td>2</td>
<td>14-Bit</td>
<td>125Mmps</td>
<td>750MHz</td>
<td>73.1dB</td>
<td>90dB</td>
<td>1.8V</td>
<td>189mW</td>
<td>9x9 GFN</td>
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<tr>
<td>LTC2185</td>
<td>2</td>
<td>16-Bit</td>
<td>125Mmps</td>
<td>555MHz</td>
<td>76.8dB</td>
<td>90dB</td>
<td>1.8V</td>
<td>370mW</td>
<td>9x9 GFN</td>
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</table>
### Wireless Picocell Repeater

![Diagram of Wireless Picocell Repeater]

### Part No. | Function | Op Freq. | IIP3 | NF | Conv. Gain | LO Drive | LO Leakage | VCC | ICC
<table>
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<tbody>
<tr>
<td><strong>Downconverting Mixer</strong></td>
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<tr>
<td>LT6557</td>
<td>Wideband Low Power</td>
<td>0.4–3.8GHz</td>
<td>24.7dBm</td>
<td>11.7dB</td>
<td>2.9dB</td>
<td>-3dBm</td>
<td>-45dBm</td>
<td>2.9V–3.9V</td>
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<tr>
<td>LT5527</td>
<td>Single-Ended Inputs</td>
<td>0.4–3.7GHz</td>
<td>23.5dBm</td>
<td>12.5dB</td>
<td>2.3dB</td>
<td>-3dBm</td>
<td>-44dBm</td>
<td>4.5V–5.25V</td>
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<td>LT5522</td>
<td>Single-Ended Inputs</td>
<td>0.4–2.7GHz</td>
<td>25dBm</td>
<td>12.5dB</td>
<td>-0.1dB</td>
<td>-5dBm</td>
<td>-50dBm</td>
<td>4.5V–5.25V</td>
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<tr>
<td><strong>Upconverting Mixer</strong></td>
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<tr>
<td>LT5579</td>
<td>WiMAX, w/ Integ. Xformer</td>
<td>1.5–3.8GHz</td>
<td>27.3dBm</td>
<td>9.2dB</td>
<td>2.6dB</td>
<td>-1dBm</td>
<td>-35dBm</td>
<td>3.15V–3.6V</td>
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<tr>
<td>LT5521</td>
<td>Wideband</td>
<td>0.01–3.7GHz</td>
<td>24.0dBm</td>
<td>12.5dB</td>
<td>-0.5dB</td>
<td>-5dBm</td>
<td>-42dBm</td>
<td>3.15V–5.25V</td>
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<tr>
<td>LT5578</td>
<td>Integrated Xformer</td>
<td>0.4–2.7GHz</td>
<td>24.3dBm</td>
<td>8.6dB</td>
<td>-0.7dB</td>
<td>-1dBm</td>
<td>-46dBm</td>
<td>3.1–3.5V</td>
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<td><strong>IF Amplifier</strong></td>
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<td>LTC6401</td>
<td>8, 14, 20, 26dB</td>
<td>40MHz</td>
<td>90dBm</td>
<td>6.1dB</td>
<td>2.85V–3.5V</td>
<td>45mA</td>
<td>Fixed Gain</td>
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<tr>
<td>LT5514</td>
<td>Digital VGA (1.5dB Steps)</td>
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<td>120MHz</td>
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<td>4.75V–5.25V</td>
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<td>10.5dB–33dB</td>
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<td>LTC6412</td>
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<td>120MHz</td>
<td>10dB</td>
<td>3.3V</td>
<td>110mA</td>
<td>Analog VGA</td>
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<td><strong>RF Detector</strong></td>
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<td>LT5538</td>
<td>Log Detector</td>
<td>40MHz–3.8GHz</td>
<td>75dB</td>
<td>-75–+5dB</td>
<td>±1dB</td>
<td>3.0V–5.25V</td>
<td>20mA</td>
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<td>LT5534</td>
<td>Log Detector</td>
<td>50MHz–3GHz</td>
<td>60dB</td>
<td>-63–+2dB</td>
<td>±0.5dB</td>
<td>2.7V–5.25V</td>
<td>7mA</td>
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<tr>
<td>LTC5582</td>
<td>RMS Power Detector</td>
<td>40MHz–10GHz</td>
<td>57dB</td>
<td>-56–+1dB</td>
<td>±0.2dB</td>
<td>3.1V–3.5V</td>
<td>41.6mA</td>
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<tr>
<td>LTC5583</td>
<td>Dual RMS Detector</td>
<td>40MHz–6GHz</td>
<td>60dB</td>
<td>-58–+2dB</td>
<td>±0.2dB</td>
<td>3.1V–3.5V</td>
<td>90.1mA</td>
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<td>LT5581</td>
<td>RMS, Low Power</td>
<td>10MHz–6GHz</td>
<td>40dB</td>
<td>-34–+6dB</td>
<td>±1dB</td>
<td>2.7V–5.25V</td>
<td>1.4mA</td>
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<td>LTC5587</td>
<td>RMS + ADC</td>
<td>10MHz–6GHz</td>
<td>40dB</td>
<td>-34–+6dB</td>
<td>±1dB</td>
<td>2.7V–3.6V</td>
<td>3mA</td>
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<td><strong>PLL/VCO</strong></td>
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<tr>
<td>LTC6946-1</td>
<td>Integer-N, PLL + VCO</td>
<td>0.373–3.74GHz</td>
<td>–100dBc</td>
<td>–140dBc</td>
<td>–156dBc</td>
<td>–158dBc</td>
<td>–103dBc</td>
<td>3.3V/5V</td>
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<td>Integer-N, PLL + VCO</td>
<td>0.513–4.910GHz</td>
<td>–100dBc</td>
<td>–132dBc</td>
<td>–152dBc</td>
<td>–158dBc</td>
<td>–103dBc</td>
<td>3.3V/5V</td>
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<td>LTC6946-3</td>
<td>Integer-N, PLL + VCO</td>
<td>0.640–5.790GHz</td>
<td>–94dBc</td>
<td>–140dBc</td>
<td>–156dBc</td>
<td>–158dBc</td>
<td>–103dBc</td>
<td>3.3V/5V</td>
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## Satellite, Set-Top Box and GPS Receivers

### Linear Wireless & RF Solutions

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<thead>
<tr>
<th>Part No.</th>
<th>Function</th>
<th>Op Freq.</th>
<th>IIP3</th>
<th>NF</th>
<th>Conv. Gain</th>
<th>LO Drive</th>
<th>LO Leakage</th>
<th>VCC</th>
<th>ICC</th>
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<tbody>
<tr>
<td>LTC6403</td>
<td>R-Set</td>
<td>40-900MHz</td>
<td>23.5dBm</td>
<td>12.5dB</td>
<td>6dB</td>
<td>-3dBm</td>
<td>-44dBm</td>
<td>4.5V–5.25V</td>
<td>78mA</td>
</tr>
<tr>
<td>LTC6404</td>
<td>R-Set</td>
<td>40-900MHz</td>
<td>23.5dBm</td>
<td>12.5dB</td>
<td>6dB</td>
<td>-3dBm</td>
<td>-44dBm</td>
<td>4.5V–5.25V</td>
<td>78mA</td>
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<tr>
<td>LTC6409</td>
<td>R-Set</td>
<td>40-900MHz</td>
<td>23.5dBm</td>
<td>12.5dB</td>
<td>6dB</td>
<td>-3dBm</td>
<td>-44dBm</td>
<td>4.5V–5.25V</td>
<td>78mA</td>
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### Downconverting Mixer

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Function</th>
<th>Op Freq.</th>
<th>BB Freq.</th>
<th>IIP3</th>
<th>NF</th>
<th>Conv. Gain</th>
<th>Ampl. / -90° Match</th>
<th>VCC</th>
<th>ICC</th>
</tr>
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<tbody>
<tr>
<td>LT6517</td>
<td>High Dynamic Range</td>
<td>40-900MHz</td>
<td>DC - 100MHz</td>
<td>23.5dBm</td>
<td>12.5dB</td>
<td>6dB</td>
<td>0.03dB / 0.7°</td>
<td>4.5V–5.25V</td>
<td>90mA</td>
</tr>
<tr>
<td>LT6546</td>
<td>Low Power / VGA</td>
<td>40-500MHz</td>
<td>DC - 100MHz</td>
<td>23.5dBm</td>
<td>12.5dB</td>
<td>6dB</td>
<td>0.03dB / 0.7°</td>
<td>4.5V–5.25V</td>
<td>90mA</td>
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### IF Demodulator

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Gain</th>
<th>Op Freq.</th>
<th>90dB SFDR @ 84dB SFDR @ 72dB SFDR @</th>
<th>Noise</th>
<th>Supply Voltage</th>
<th>Supply Current</th>
<th>Features</th>
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<tbody>
<tr>
<td>LT6403</td>
<td>R-Set</td>
<td>4MHz</td>
<td>DC - 100MHz</td>
<td>23.5dBm</td>
<td>12.5dB</td>
<td>6dB</td>
<td>0.03dB / 0.7°</td>
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<tr>
<td>LT6404</td>
<td>R-Set</td>
<td>22MHz</td>
<td>DC - 100MHz</td>
<td>23.5dBm</td>
<td>12.5dB</td>
<td>6dB</td>
<td>0.03dB / 0.7°</td>
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<tr>
<td>LT6409</td>
<td>R-Set</td>
<td>100MHz</td>
<td>DC - 100MHz</td>
<td>23.5dBm</td>
<td>12.5dB</td>
<td>6dB</td>
<td>0.03dB / 0.7°</td>
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### IF Amplifier

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<tr>
<th>Part No.</th>
<th>Function</th>
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<th>Cutoff Freq.</th>
<th>SNR</th>
<th>HD2</th>
<th>HD3</th>
<th>Ripple</th>
<th>VCC</th>
<th>ICC</th>
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<tr>
<td>LT6602</td>
<td>Dual Prog. LP / HP</td>
<td>5th / 4th</td>
<td>42 kHz–900kHz</td>
<td>–</td>
<td>&lt; -81dBc</td>
<td>&lt; -81dBc</td>
<td>&lt; 0.5dB</td>
<td>2.7V–3.6V</td>
<td>105mA</td>
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<tr>
<td>LT6604</td>
<td>Dual Config. LP</td>
<td>2nd</td>
<td>2.5, 5, 10, 15MHz</td>
<td>82dB</td>
<td>-90dBc</td>
<td>-90dBc</td>
<td>&gt; 0.5dB</td>
<td>3V, 5V, ±5V</td>
<td>31mA</td>
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### Filter

<table>
<thead>
<tr>
<th>Part No.</th>
<th># Channels</th>
<th>Resolution</th>
<th>Sample Rate</th>
<th>Full Power Bandwidth</th>
<th>SNR</th>
<th>SFDR</th>
<th>VCC</th>
<th>Power</th>
<th>Package</th>
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<tbody>
<tr>
<td>LTC2263-14</td>
<td>2</td>
<td>14-Bit</td>
<td>25Mbps</td>
<td>800MHz</td>
<td>73.7dB</td>
<td>90dB</td>
<td>18V</td>
<td>94mW</td>
<td>6x6 QFN</td>
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<tr>
<td>LTC2265-12</td>
<td>2</td>
<td>12-Bit</td>
<td>65Mbps</td>
<td>800MHz</td>
<td>71dB</td>
<td>90dB</td>
<td>18V</td>
<td>167mW</td>
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<tr>
<td>LTC2172-12</td>
<td>4</td>
<td>12-Bit</td>
<td>65Mbps</td>
<td>800MHz</td>
<td>71dB</td>
<td>90dB</td>
<td>18V</td>
<td>306mW</td>
<td>7x8 QFN</td>
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</table>

### ADC

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Features</th>
<th>Freq. Range</th>
<th>Closed-Loop Phase Noise</th>
<th>Spurious Products</th>
<th>VCC</th>
<th>ICC</th>
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</thead>
<tbody>
<tr>
<td>LTC6946-1</td>
<td>Integer-N, PLL + VCO</td>
<td>0.373-3.74GHz</td>
<td>-100dBc</td>
<td>-140dBc</td>
<td>-156dBc</td>
<td>-158dBc</td>
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<tr>
<td>LTC6946-2</td>
<td>Integer-N, PLL + VCO</td>
<td>0.513-4.91GHz</td>
<td>-100dBc</td>
<td>-132dBc</td>
<td>-152dBc</td>
<td>-158dBc</td>
</tr>
<tr>
<td>LTC6946-3</td>
<td>Integer-N, PLL + VCO</td>
<td>0.640-5.79GHz</td>
<td>-94dBc</td>
<td>-140dBc</td>
<td>-156dBc</td>
<td>-158dBc</td>
</tr>
</tbody>
</table>

Note 1: Serial LVDS Outputs
Cable / Video-On-Demand Infrastructure

**Part No.** | **Op Freq.** | **IIP3** | **NF** | **Conv. Gain** | **LO Drive** | **LO Leakage** | **VCC** | **ICC**
---|---|---|---|---|---|---|---|---
LT5521 | 0.01–3.7GHz | 24.2dBm | 12.5dB | -0.5dB | -5dBm | -42dBm | 3.15V–5.25V | 82mA
LT5579 | 1.5–3.8GHz | 29dBm | 9.2dB | -0.1dB | -1dBm | -39dBm | 3.15V–3.6V | 226mA
LT5522 | 0.6–2.7GHz | 25dBm | 13.9dB | -0.1dB | -5dBm | -50dBm | 4.5V–5.25V | 56mA

**Part No.** | **Op Freq.** | **IIP3** | **NF** | **Conv. Gain** | **LO Drive** | **LO Leakage** | **VCC** | **ICC**
---|---|---|---|---|---|---|---|---
LT6411 | 0, 6dB | – | 10MHz | 40MHz | 24.8dB | 4.5V–12.5V | 16mA | Selectable Gain
LTC6405 | R-Set | 22MHz | 30MHz | 44MHz | 14.4dB | 2.7V–5.25V | 18mA | RR In, V_{in}=5V
LTC6406 | R-Set | 22MHz | 30MHz | 44MHz | 14.1dB | 2.7V–3.5V | 18mA | RR In, V_{in}=3V
LT5554 | Digital VGA, 2dB–10dB | – | 200MHz | 200MHz | 10.3dB | 4.75V–5.25V | 190mA | Low Noise

**Part No.** | **Function** | **Op Freq.** | **Dynamic Range** | **Detect Range** | **Accuracy** | **VCC** | **ICC** | **Features**
---|---|---|---|---|---|---|---|---
LT5534 | Log-Linear | 50MHz–30GHz | 60dB | -63–-2dBm | ±0.5dB | 2.7V–5.25V | 7mA | 2x2 SC70
LT5537 | Log-Linear | LF - 1GHz | 83dB | -80–0dBm | ±1dB | 2.7V–5.25V | 13.5mA | 3x2 DFN
LT5581 | RMS | 10MHz–6GHz | 40dB | -35–-5dBm | ±1dB | 2.7V–5.25V | 1.4mA | 3x2 DFN
LTC5587 | RMS + ADC | 10MHz–6GHz | 40dB | -35–-5dBm | ±1dB | 2.7V–3.6V | 3mA | 3x3 DFN
LTC5582 | RMS | 40MHz–10GHz | 57dB | -56–-1dBm | ±0.5dB | 3.1V–3.9V | 42mA | 3x3 DFN

**Part No.** | **# Channels** | **Resolution** | **Sample Rate** | **Full Power Bandwidth** | **SNR** | **SFDR** | **VCC** | **Power** | **Package**
---|---|---|---|---|---|---|---|---|---
LTC2157-14 | 2 | 14-Bit | 250Mps | 1250MHz | 70dB | 90dB | 1.8V | 650mW | 9x9 QFN
LTC2261-14 | 1 | 14-Bit | 125Mps | 800MHz | 73.4dB | 85dB | 1.8V | 127mW | 6x6 QFN
LTC2152-14 | 1 | 14-Bit | 250Mps | 1250MHz | 70dB | 90dB | 1.8V | 331mW | 6x6 QFN
### Wireless Microphone and Other Low Power, High Performance FM Receivers

#### 2nd Downconverting Mixer
- **Part No.:** LTC2265-12
- **Function:** PLL/VCO
- **Op Freq.:** 1kHz–3GHz
- **IIP3:** 21dBm
- **NF:** 11dB
- **Conv. Gain:** 0dB
- **LO Drive:** -10dBm
- **LO Leakage:** -60dBm
- **VCC:** 1.8V
- **Power:** 4.5V–5.25V
- **Package:** 6x6 QFN

#### ADC
- **Part No.:** LTC2205
- **Function:** ADC
- **Op Freq.:** DC - 4GHz
- **IIP3:** 9.7dBm
- **NF:** 10.1dB
- **Conv. Gain:** 2.6dB
- **LO Drive:** 2dBm
- **LO Leakage:** -5dBm
- **VCC:** 3.3V
- **Power:** 103mW
- **Package:** 7x7 QFN

#### ADC
- **Part No.:** LTC2205
- **Function:** ADC
- **Op Freq.:** DC - 4GHz
- **IIP3:** 10.1dBm
- **NF:** 10.1dB
- **Conv. Gain:** 2.7dB
- **LO Drive:** -2dBm
- **LO Leakage:** -52dBm
- **VCC:** 2.7V
- **Power:** 2.7V–5.3V
- **Package:** 7x7 QFN

#### Part No. | # Channels | Resolution | Sample Rate | Full Power Bandwidth | SNR | SFDR | VCC | Power | Package
---|---|---|---|---|---|---|---|---|---
LTC2205 | 1 | 16-Bit | 65Msps | 700MHz | 79dB | 100dB | 3.3V | 610mW | 7x7 QFN
LTC2258-12 | 1 | 12-Bit | 65Msps | 800MHz | 71.1dB | 88dB | 1.8V | 79mW | 6x6 QFN
LTC2265-12 | 2 | 12-Bit | 65Msps | 800MHz | 71dB | 90dB | 1.8V | 167mW | 6x6 QFN

Note 1: Serial LVDS Outputs

### Part No. | Function | Op Freq. | IIP3 | NF | Conv. Gain | LO Drive | LO Leakage | VCC | Power | Package
---|---|---|---|---|---|---|---|---|---|---
LTC6946-1 | Very Low Power | DC - 4GHz | 10.1dB | 10.5dB | 2.7dB | -2dBm | -50dBm | 2.7V–5.3V | 10mA | 7x7 QFN
LTC6946-2 | Low Power | DC - 4GHz | 10.1dB | 10.5dB | 2.7dB | -2dBm | -50dBm | 2.7V–5.3V | 10mA | 7x7 QFN
LTC6946-3 | High Linearity | DC - 4GHz | 10.1dB | 10.5dB | 2.7dB | -2dBm | -50dBm | 2.7V–5.3V | 10mA | 7x7 QFN

#### Part No. | Features | Freq. Range | Freq. Range | Closed-Loop Phase Noise | Spurious Products | VCC | Power | Package
---|---|---|---|---|---|---|---|---
LTC6946-1 | Integer-N, PLL + VCO | 0.373-3.740GHz | 0.373-3.740GHz | 10kHz | 100dBc | -140dBc | -156dBc | -158dBc | -103dBc | 3.3V | 143mA
LTC6946-2 | Integer-N, PLL + VCO | 0.513-4.910GHz | 0.513-4.910GHz | 10kHz | 100dBc | -132dBc | -152dBc | -158dBc | -103dBc | 3.3V | 143mA
LTC6946-3 | Integer-N, PLL + VCO | 0.640-5.790GHz | 0.640-5.790GHz | 10kHz | 94dBc | -140dBc | -156dBc | -158dBc | -103dBc | 3.3V | 143mA

**Note:** Serial LVDS Outputs

---

**Legend:**
- **LNA:** Low Noise Amplifier
- **Mixer:** 1st Downconverting
- **Mixer:** 2nd Downconverting
- **FM Demodulator:** Audio Out
- **PLL:** Phase Locked Loop
- **VCO:** Voltage Controlled Oscillator
- **LO Drive:** Local Oscillator Drive
- **LO Leakage:** Local Oscillator Leakage
- **Conv. Gain:** Conversion Gain
- **SNR:** Signal to Noise Ratio
- **SFDR:** Spurious Free Dynamic Range
- **VCC:** Supply Voltage
- **Power:** Power Consumption
- **Package:** Package Type

---

**Table:**
- **1st Downconverting Mixer:**
  - **Part No.:** LTC2205
  - **Function:** Integer-N, PLL + VCO
  - **Freq. Range:** 0.373-3.740GHz
  - **Closed-Loop Phase Noise:**
    - 10kHz: -100dBc
    - 1MHz: -140dBc
    - 10MHz: -156dBc
    - 40MHz: -158dBc
  - **Spurious Products:**
    - 103dBc
  - **VCC:** 3.3V
  - **Power:** 143mA
  - **Package:** 7x7 QFN

- **Part No.:** LTC6946-2
  - **Function:** Integer-N, PLL + VCO
  - **Freq. Range:** 0.513-4.910GHz
  - **Closed-Loop Phase Noise:**
    - 10kHz: -100dBc
    - 1MHz: -132dBc
    - 10MHz: -152dBc
    - 40MHz: -158dBc
  - **Spurious Products:**
    - 103dBc
  - **VCC:** 3.3V
  - **Power:** 143mA
  - **Package:** 7x7 QFN

- **Part No.:** LTC6946-3
  - **Function:** Integer-N, PLL + VCO
  - **Freq. Range:** 0.640-5.790GHz
  - **Closed-Loop Phase Noise:**
    - 10kHz: -94dBc
    - 1MHz: -140dBc
    - 10MHz: -156dBc
    - 40MHz: -158dBc
  - **Spurious Products:**
    - 103dBc
  - **VCC:** 3.3V
  - **Power:** 143mA
  - **Package:** 7x7 QFN

---

**Diagram:**
- **LNA:** Low Noise Amplifier
- **Mixer:** 1st Downconverting
- **Mixer:** 2nd Downconverting
- **FM Demodulator:** Audio Out
- **PLL:** Phase Locked Loop
- **VCO:** Voltage Controlled Oscillator
- **LO Drive:** Local Oscillator Drive
- **LO Leakage:** Local Oscillator Leakage
- **Conv. Gain:** Conversion Gain
- **SNR:** Signal to Noise Ratio
- **SFDR:** Spurious Free Dynamic Range
- **VCC:** Supply Voltage
- **Power:** Power Consumption
- **Package:** Package Type

---

**Legend:**
- **LNA:** Low Noise Amplifier
- **Mixer:** 1st Downconverting
- **Mixer:** 2nd Downconverting
- **FM Demodulator:** Audio Out
- **PLL:** Phase Locked Loop
- **VCO:** Voltage Controlled Oscillator
- **LO Drive:** Local Oscillator Drive
- **LO Leakage:** Local Oscillator Leakage
- **Conv. Gain:** Conversion Gain
- **SNR:** Signal to Noise Ratio
- **SFDR:** Spurious Free Dynamic Range
- **VCC:** Supply Voltage
- **Power:** Power Consumption
- **Package:** Package Type
# Microwave Data Link / Fixed Wireless Access

## Up Mixer

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Op Freq.</th>
<th>OIP3</th>
<th>Conv. Gain</th>
<th>LO Leakage</th>
<th>Output Noise Floor</th>
<th>VCC</th>
<th>ICC</th>
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<tbody>
<tr>
<td>LT5579</td>
<td>1.5–3.8GHz</td>
<td>27.3dBm</td>
<td>2.6dB</td>
<td>-35dBm</td>
<td>-159dBm/Hz</td>
<td>3.15V–3.6V</td>
<td>226mA</td>
</tr>
<tr>
<td>LT5578</td>
<td>0.4–2.7GHz</td>
<td>24.3dBm</td>
<td>-0.7dB</td>
<td>-46dBm</td>
<td>-158dBm/Hz</td>
<td>3.1V–3.5V</td>
<td>152mA</td>
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## Down Mixer

<table>
<thead>
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<th>Part No.</th>
<th>Op Freq.</th>
<th>OIP3</th>
<th>Conv. Gain</th>
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<th>P1dB</th>
<th>VCC</th>
<th>ICC</th>
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<tbody>
<tr>
<td>LTC5543</td>
<td>2.3–4GHz</td>
<td>25.6dBm</td>
<td>7.1dB</td>
<td>11.6dBm</td>
<td>13.9dBm</td>
<td>3.1V–3.5V</td>
<td>201mA</td>
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<td>LT5557</td>
<td>0.4–3.8GHz</td>
<td>24.7dBm</td>
<td>2.9dB</td>
<td>11.7dBm</td>
<td>8.8dBm</td>
<td>2.9V–3.9V</td>
<td>82mA</td>
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## I/Q Demod

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<thead>
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<th>Part No.</th>
<th>Op Freq.</th>
<th>IIP3</th>
<th>Conv. Gain</th>
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<th>I/Q Phase Error</th>
<th>I/Q Ampl. Error</th>
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<tbody>
<tr>
<td>LT5517</td>
<td>40–900MHz</td>
<td>24dBm</td>
<td>3.3dB</td>
<td>9dB</td>
<td>0.7º</td>
<td>0.03dB</td>
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<tr>
<td>LT5575</td>
<td>0.8–2.7GHz</td>
<td>22.6dBm</td>
<td>4.2dB</td>
<td>12.7dB</td>
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<td>0.01dB</td>
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## I/Q Mod

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<th>Carrier Leakage</th>
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<tbody>
<tr>
<td>LTC5598</td>
<td>5–1600MHz</td>
<td>26dBm</td>
<td>-2.1dB</td>
<td>-160.9dBm/Hz</td>
<td>55.0dBc</td>
<td>-51.0dBm</td>
</tr>
<tr>
<td>LTC5588-1</td>
<td>0.2–6GHz</td>
<td>31dBm</td>
<td>0.2dB</td>
<td>-160.6dBm/Hz</td>
<td>56.6dBc</td>
<td>-39.6dBm</td>
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## Amp

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Features</th>
<th>OIP3</th>
<th>NF</th>
<th>Gain Range</th>
<th>VCC</th>
<th>ICC</th>
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<tbody>
<tr>
<td>LTC6400/20</td>
<td>Single/Dual</td>
<td>36dBm</td>
<td>6.2dB</td>
<td>8, 14, 20, 26dB</td>
<td>2.85V–3.5V</td>
<td>85mA</td>
</tr>
<tr>
<td>LTC6412</td>
<td>Analog VGA</td>
<td>35dBm</td>
<td>10dB</td>
<td>-14 to 17dB</td>
<td>3.3V</td>
<td>110mA</td>
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<tr>
<td>LTC6409</td>
<td>DC Capable</td>
<td>48dBm</td>
<td>6.9dB</td>
<td>Resistor Set</td>
<td>2.7V–5.25V</td>
<td>52mA</td>
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## ADC

<table>
<thead>
<tr>
<th>Part No.</th>
<th># Channels</th>
<th>Resolution</th>
<th>Sample Rate</th>
<th>Full Power Bandwidth</th>
<th>SNR</th>
<th>SFDR</th>
<th>VCC</th>
<th>Power</th>
<th>Package</th>
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</thead>
<tbody>
<tr>
<td>LTC2283</td>
<td>2</td>
<td>12-Bit</td>
<td>125Mbps</td>
<td>640MHz</td>
<td>70.2dB</td>
<td>88dB</td>
<td>3V</td>
<td>790mW</td>
<td>9x9 QFN</td>
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## PLL/VCO

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Features</th>
<th>Freq. Range</th>
<th>Closed-Loop Phase Noise</th>
<th>Spurious Products</th>
<th>VCC</th>
<th>ICC</th>
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</thead>
<tbody>
<tr>
<td>LTC6946-1</td>
<td>Integer-N, PLL + VCO</td>
<td>0.373-3.7GHz</td>
<td>−100dBc, −140dBc, −156dBc, −158dBc</td>
<td>−103dBc</td>
<td>3.3V/5V</td>
<td>143mA</td>
</tr>
<tr>
<td>LTC6946-2</td>
<td>Integer-N, PLL + VCO</td>
<td>0.513-4.91GHz</td>
<td>−100dBc, −132dBc, −152dBc, −158dBc</td>
<td>−103dBc</td>
<td>3.3V/5V</td>
<td>143mA</td>
</tr>
<tr>
<td>LTC6946-3</td>
<td>Integer-N, PLL + VCO</td>
<td>0.640-5.79GHz</td>
<td>−94dBc, −140dBc, −156dBc, −158dBc</td>
<td>−103dBc</td>
<td>3.3V/5V</td>
<td>143mA</td>
</tr>
</tbody>
</table>
Tiny General Purpose SAR ADC Family

Linear offers a comprehensive family of 12-, 14- and 16-bit general purpose ADCs that feature a combination of speed, low power and small package size, measuring 1, 2, 6 or 8 input channels. Our LTC236x SAR ADC family is a 12-bit resolution, pin- and software-compatible family, with optimized sampling performance and lowest power for measuring the output of RF and RMS Detectors.

LTC2366 12-Bit, 3Msps Tiny SAR ADC Features:
- Low Noise: 72dB SNR
- Low Power Dissipation: 7.2mW
- Single Supply 2.35V to 3.6V Operation
- No Data Latency
- Sleep Mode with 1nA Typical Supply Current
- Dedicated External REF Pin on 8-Lead TSOT
- Dedicated Output Supply Pin on 8-Lead TSOT
- SPI/ Microwire Compatible Serial I/O
- Guaranteed Operation from −40°C to 125°C
- 6- and 8-Lead TSOT-23 Packages

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Resolution</th>
<th>Channels</th>
<th>Sample Rate</th>
<th>Power @ Max Sample Rate</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>LTC2360</td>
<td>12-Bit</td>
<td>1</td>
<td>100ksps</td>
<td>1.5mW</td>
<td>TSOT23-6/8</td>
</tr>
<tr>
<td>LTC2361</td>
<td>12-Bit</td>
<td>1</td>
<td>250ksps</td>
<td>2.2mW</td>
<td>TSOT23-6/8</td>
</tr>
<tr>
<td>LTC2362</td>
<td>12-Bit</td>
<td>1</td>
<td>500ksps</td>
<td>3.3mW</td>
<td>TSOT23-6/8</td>
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<tr>
<td>LTC2365</td>
<td>12-Bit</td>
<td>1</td>
<td>1Msps</td>
<td>6mW</td>
<td>TSOT23-6/8</td>
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<tr>
<td>LTC2366</td>
<td>12-Bit</td>
<td>1</td>
<td>3Msps</td>
<td>7.8mW</td>
<td>TSOT23-6/8</td>
</tr>
</tbody>
</table>

18-/16-Bit 250ksps to 2Msps High Performance SAR ADC Family

The LTC2379-18 leads a pin-compatible family of no-latency SAR ADCs featuring unrivaled 101dB SNR at 18 bits and 96dB SNR at 16 bits from 250ksps to 2Msps. Explicit Busy and Chain pins, along with a user-friendly SPI interface, simplify digital timing. A unique digital gain compression feature eliminates the need for a negative ADC driver supply while preserving the full resolution of the ADC, dramatically lowering the total power consumption of the signal chain.

LTC2379-18: 18-Bit 1.6Msps SAR ADC Features:
- 1.6Msps Throughput Rate
- 101.2dB SNR (Typ) at fIN=2kHz
- ±2LSB INL (Max), ±0.9LSB DNL (Max)
- 120dB THD (Typ) at fIN=2kHz
- Low Power: 18mW at 1.6Msps, 18μW at 1.6ksps
- Power Down Mode: 2.25μW
- Fully Differential Input Range ±VREF
- Digital Gain Compression Eliminates Negative Rails
- −40°C to 125°C Guaranteed Temperature Range
- 16-Pin MSOP and 4mm x 3mm DFN Packages

<table>
<thead>
<tr>
<th></th>
<th>250ksps</th>
<th>500ksps</th>
<th>1Msps</th>
<th>1.6Msps</th>
<th>2Msps</th>
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<tbody>
<tr>
<td>18-Bit 101dB SNR</td>
<td>LTC2376-18</td>
<td>LTC2377-18</td>
<td>LTC2378-18</td>
<td>LTC2379-18</td>
<td></td>
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<tr>
<td>16-Bit 96dB SNR</td>
<td>LTC2376-16</td>
<td>LTC2377-16</td>
<td>LTC2378-16</td>
<td>LTC2380-16</td>
<td></td>
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<tr>
<td>Power Consumption</td>
<td>3.4mW</td>
<td>6.75mW</td>
<td>13.5mW</td>
<td>19mW</td>
<td>19mW</td>
</tr>
</tbody>
</table>
Ultra-Tiny 12-/10-/8-Bit DACs with 10ppm/°C Internal Reference

The LTC263x DAC family includes singles, duals, quads and octals with ordering options for 12-/10-/8-bit resolution, internal 1.25V or 2.048V, 10ppm/°C typical reference, SPI or I^2C interface and power-on reset to zero-, mid-scale, or hi-z.

LTC2632 Dual DAC Features:
- Integrated Precision Reference:
  - 2.5V Full-Scale 10ppm/°C (LTC2632-L)
  - 4.096V Full-Scale 10ppm/°C (LTC2632-H)
- Maximum INL Error: ±1LSB (LTC2632A-12)
- Guaranteed Operation from −40°C to 125°C
- Low Noise: 0.7 mVp-p, 0.1Hz to 200kHz
- Guaranteed Monotonic Over Temperature
- Selectable Internal or External Reference
- 2.7V to 5.5V Supply Range
- Power-On Reset to Zero- or Mid-Scale Options
- SPI Interface

<table>
<thead>
<tr>
<th>Resolution</th>
<th>Single</th>
<th>Dual</th>
<th>Quad</th>
<th>Octal</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-Bit</td>
<td>LTC2630-12</td>
<td>LTC2631-12</td>
<td>LTC2632-12</td>
<td>LTC2633-12</td>
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<tr>
<td>10-Bit</td>
<td>LTC2630-10</td>
<td>LTC2631-10</td>
<td>LTC2632-10</td>
<td>LTC2633-10</td>
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<tr>
<td>8-Bit</td>
<td>LTC2630-8</td>
<td>LTC2631-8</td>
<td>LTC2632-8</td>
<td>LTC2633-8</td>
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<tr>
<td>Package</td>
<td>SC70-6</td>
<td>TSOT23-8</td>
<td>TSOT23-8</td>
<td>TSOT23-8</td>
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</tbody>
</table>

16-/14-/12-Bit Single, Dual, Quad, Octal DAC Family

For system calibration of offset and gain, Linear Technology’s LTC2600 and LTC2656 family of data converters are ideal. The LTC2656 family of quad and octal DACs integrates a precision 1.25V or 2.048V reference that achieves 10ppm/°C maximum temperature coefficient.

LTC2656 Family Features:
- Internal Precision Reference
  - 2.5V Full-Scale (LTC2656-L)
  - 4.096V Full-Scale (LTC2656-H)
- Maximum INL Error: ±4LSB at 16 Bits
- Guaranteed 16-Bit Monotonic Over Temperature
- Selectable Internal or External Reference
- 2.7V to 5.5V Supply Range
- Ultralow Crosstalk Between DACs (<1nV/s)
- −40°C to 85°C Temperature Range
- Power-On Reset to Zero- or Mid-Scale
- SPI or I^2C Interfaces

<table>
<thead>
<tr>
<th>Resolution</th>
<th>Reference</th>
<th>Single</th>
<th>Dual</th>
<th>Quad</th>
<th>Octal</th>
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<tr>
<td>16-Bit</td>
<td>External</td>
<td>LTC2601</td>
<td>LTC2606</td>
<td>LTC2604</td>
<td>LTC2609</td>
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<td></td>
<td>Internal</td>
<td>LTC2602</td>
<td>LTC2607</td>
<td>LTC2605</td>
<td>LTC2606</td>
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<tr>
<td>14-Bit</td>
<td>External</td>
<td>LTC2611</td>
<td>LTC2616</td>
<td>LTC2614</td>
<td>LTC2619</td>
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<tr>
<td></td>
<td>Internal</td>
<td>LTC2612</td>
<td>LTC2617</td>
<td>LTC2610</td>
<td>LTC2615</td>
</tr>
<tr>
<td>12-Bit</td>
<td>External</td>
<td>LTC2621</td>
<td>LTC2626</td>
<td>LTC2624</td>
<td>LTC2629</td>
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<tr>
<td></td>
<td>Internal</td>
<td>LTC2622</td>
<td>LTC2627</td>
<td>LTC2625</td>
<td>LTC2630</td>
</tr>
</tbody>
</table>
### High Speed Amplifiers

#### LGAs
- **LT5554**
  - **Part No.**: LT5554
  - **Gain**: 2dB–18dB
  - **Op Freq.**: LF
  - **Features**: Low Switch, Digitally Controlled
- **LT5514**
  - **Part No.**: LT5514
  - **Gain**: 10.5dB–33dB
  - **Op Freq.**: LF
  - **Features**: Digitally Controlled Gain
- **LT5524**
  - **Part No.**: LT5524
  - **Gain**: 4.5dB–27dB
  - **Op Freq.**: LF
  - **Features**: Digitally Controlled Gain
- **LTC6412**
  - **Part No.**: LTC6412
  - **Gain**: -14dB–17dB
  - **Op Freq.**: LF
  - **Features**: Analog Controlled Gain

#### RF Gain Block
- **LTC6420-20 Demo Board**

#### High Speed Differential Amplifiers/ADC Drivers
- **LT1994**
  - **Part No.**: LT1994
  - **Gain**: 1.5MHz
  - **Op Freq.**: 2MHz
  - **Features**: Wide V Range
- **LT6600**
  - **Part No.**: LT6600
  - **Gain**: <1MHz
  - **Op Freq.**: 2MHz
  - **Features**: 4th order filter
- **LTC6403**
  - **Part No.**: LTC6403
  - **Gain**: 4MHz
  - **Op Freq.**: 6.5MHz
  - **Features**: Low Power
- **LTC6404-1/-2/-4**
  - **Part No.**: LTC6404-1/-2/-4
  - **Gain**: 7MHz
  - **Op Freq.**: 11MHz
  - **Features**: Low Noise
- **LTC6411**
  - **Part No.**: LTC6411
  - **Gain**: 12MHz
  - **Op Freq.**: 10MHz
  - **Features**: Selectable Gain
- **LTC6402**
  - **Part No.**: LTC6402
  - **Gain**: 22MHz
  - **Op Freq.**: 40MHz
  - **Features**: Fixed Gain
- **LTC6401**
  - **Part No.**: LTC6401
  - **Gain**: 8, 14, 20, 26dB
  - **Op Freq.**: 40MHz
  - **Features**: Fixed Gain
- **LTC6400**
  - **Part No.**: LTC6400
  - **Gain**: 8, 14, 20, 26dB
  - **Op Freq.**: 60MHz
  - **Features**: Fixed Gain
- **LTC6420**
  - **Part No.**: LTC6420
  - **Gain**: 8, 14, 20, 26dB
  - **Op Freq.**: 80MHz
  - **Features**: Fixed Gain
- **LTC6409**
  - **Part No.**: LTC6409
  - **Gain**: 90MHz
  - **Op Freq.**: 100MHz
  - **Features**: Fixed Gain

### RF Gain Block
- **LTC6410-6**
  - **Part No.**: LTC6410-6
  - **Gain**: 6dB
  - **Op Freq.**: 1.4GHz
  - **Features**: RF Gain Block

### VGAs
- **LT5554**
  - **Part No.**: LT5554
  - **Gain**: 2dB–18dB
  - **Op Freq.**: LF
  - **Features**: Low Switch Noise, Digitally Controlled
- **LT5514**
  - **Part No.**: LT5514
  - **Gain**: 10.5dB–33dB
  - **Op Freq.**: LF
  - **Features**: Digitally Controlled Gain
- **LT5524**
  - **Part No.**: LT5524
  - **Gain**: 4.5dB–27dB
  - **Op Freq.**: LF
  - **Features**: Digitally Controlled Gain
- **LTC6412**
  - **Part No.**: LTC6412
  - **Gain**: -14dB–17dB
  - **Op Freq.**: LF
  - **Features**: Analog Controlled Gain

### High Speed Low Noise Op Amps
- **LT6200-10**
  - **Part No.**: LT6200-10
  - **Gain**: 1/4MHz
  - **Op Freq.**: 450V/µs
  - **Features**: S6/S8
- **LT6230-10**
  - **Part No.**: LT6230-10
  - **Gain**: 1/4MHz
  - **Op Freq.**: 115V/µs
  - **Features**: S6
- **LT6230-5**
  - **Part No.**: LT6230-5
  - **Gain**: 1/2MHz
  - **Op Freq.**: 72V/µs
  - **Features**: S6/S8
- **LT1818/9**
  - **Part No.**: LT1818/9
  - **Gain**: 1/2MHz
  - **Op Freq.**: 65V/µs
  - **Features**: S6/S8/MS8
- **LT6209/10**
  - **Part No.**: LT6209/10
  - **Gain**: 1/2MHz
  - **Op Freq.**: 85V/µs
  - **Features**: S6/S8/MS8
- **LT6200/1**
  - **Part No.**: LT6200/1
  - **Gain**: 1/2MHz
  - **Op Freq.**: 85V/µs
  - **Features**: S6/S8/MS8
- **LT6202/3/4**
  - **Part No.**: LT6202/3/4
  - **Gain**: 1/2MHz
  - **Op Freq.**: 85V/µs
  - **Features**: S6/S8/MS8

### High Speed Amplifiers
- **Part No.**
  - **Gain**: 90dB SFDR @ 90dB SFDR @ 72dB SFDR @ Noise
  - **Op Freq.**: Supply Voltage
  - **Supply Current**: Features
### High Speed Comparators

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>LT1719</td>
<td>Single</td>
<td>4.2ns</td>
<td>70MHz</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>2.7V–10.5V</td>
<td>4.2mA</td>
<td>S8</td>
</tr>
<tr>
<td>LT1711</td>
<td>Single</td>
<td>4.5ns</td>
<td>100MHz</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>2.4V–12V</td>
<td>10mA</td>
<td>MS8</td>
</tr>
<tr>
<td>LT1394</td>
<td>Single</td>
<td>7ns</td>
<td>100MHz</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>4.5V–12V</td>
<td>8.5mA</td>
<td>MS8/S8</td>
</tr>
<tr>
<td>LT1713</td>
<td>Single</td>
<td>7ns</td>
<td>65MHz</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>2.4V–12V</td>
<td>4mA</td>
<td>MS8</td>
</tr>
<tr>
<td>LT1016</td>
<td>Single</td>
<td>9ns</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>4.5V–5V</td>
<td>35mA</td>
<td>S8/N8</td>
</tr>
<tr>
<td>LT1715</td>
<td>Dual</td>
<td>4ns</td>
<td>150MHz</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>2.7V–12V</td>
<td>7.5mA</td>
<td>MS10</td>
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<td>Dual</td>
<td>4.5ns</td>
<td>100MHz</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>2.4V–12V</td>
<td>10mA</td>
<td>GN16</td>
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<td>LT1720</td>
<td>Dual</td>
<td>4.5ns</td>
<td>70MHz</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>2.7V–6V</td>
<td>4mA</td>
<td>MS8/S8/DD</td>
</tr>
<tr>
<td>LT1714</td>
<td>Dual</td>
<td>7ns</td>
<td>65MHz</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>2.4V–12V</td>
<td>4mA</td>
<td>GN16</td>
</tr>
<tr>
<td>LT1721</td>
<td>Quad</td>
<td>4.5ns</td>
<td>70MHz</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>2.7V–6V</td>
<td>4mA</td>
<td>S16/GN16</td>
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</table>

### Precision Series-Type References for High Speed ADCs

<table>
<thead>
<tr>
<th>Ref. Family</th>
<th>Output Voltages (*)</th>
<th>Max Temp Range</th>
<th>Accuracy Max 25°C</th>
<th>TempCo Max 25°C</th>
<th>Packages</th>
<th>Max Quiescent Current</th>
<th>Typ P-P Noise 0.1–10Hz</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precision Series-Type References for High Speed ADCs</td>
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<tr>
<td>LT1461</td>
<td>2.5V, 3.3V, 4.096V, 5V</td>
<td>-40°C–125°C</td>
<td>0.04%</td>
<td>3ppm/°C</td>
<td>SO-8</td>
<td>50µA</td>
<td>20µV</td>
<td>Low Dropout, Includes SHDN Pin</td>
</tr>
<tr>
<td>LT1790</td>
<td>1.25V, 2.048V, 2.5V, 3V, 3.3V, 4.096V, 5V</td>
<td>-40°C–85°C</td>
<td>0.05%</td>
<td>10ppm/°C</td>
<td>SOT-23-6</td>
<td>60µA</td>
<td>10µV</td>
<td>Low Dropout, SOT-23 Package</td>
</tr>
<tr>
<td>LT1019</td>
<td>2.5V, 4.5V, 5V, 10V</td>
<td>-40°C–85°C</td>
<td>0.05%</td>
<td>5ppm/°C</td>
<td>DIP-8, SO-8</td>
<td>1.0mA</td>
<td>6.25µV</td>
<td>Tight Tolerance, Low TC</td>
</tr>
<tr>
<td>LT1460</td>
<td>2.5V, 5V, 10V</td>
<td>-40°C–85°C</td>
<td>0.075%</td>
<td>10ppm/°C</td>
<td>DIP-8, SO-8, MSOP-8, TO-92</td>
<td>130µA</td>
<td>10µV</td>
<td>Output Cap Optional</td>
</tr>
<tr>
<td>LT1460xxS3</td>
<td>2.5V, 3.3V, 5V, 10V</td>
<td>-40°C–85°C</td>
<td>0.20%</td>
<td>20ppm/°C</td>
<td>SOT-23-6</td>
<td>130µA</td>
<td>10µV</td>
<td>Output Cap Optional, SOT-23 Package</td>
</tr>
<tr>
<td>LT6652</td>
<td>1.25V, 2.048V, 2.5V, 3V, 3.3V, 4.096V, 5V</td>
<td>-40°C–125°C</td>
<td>0.05%</td>
<td>5ppm/°C</td>
<td>MSOP-8</td>
<td>560µA</td>
<td>3µV</td>
<td>Source &amp; Sink 5mA</td>
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<tr>
<td>LTC6655</td>
<td>1.25V, 2.048V, 2.5V, 3V, 3.3V, 4.096V, 5V</td>
<td>-40°C–125°C</td>
<td>0.025%</td>
<td>2ppm/°C</td>
<td>MSOP-8</td>
<td>7mA</td>
<td>0.6µV</td>
<td>Ultra Low Noise, High Precision</td>
</tr>
<tr>
<td>LT6654</td>
<td>1.25V, 2.048V, 2.5V, 3V, 3.3V, 4.096V, 5V</td>
<td>-55°C–125°C</td>
<td>0.05%</td>
<td>10ppm/°C</td>
<td>SOT-23-6</td>
<td>600µA</td>
<td>3.8µV</td>
<td>Low Dropout, SOT-23 Package Wide Temperature Range</td>
</tr>
</tbody>
</table>

* Bold indicates most commonly used value for ADC Interface
# Mixers

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Features</th>
<th>Frequency</th>
<th>IIP3</th>
<th>NF</th>
<th>Conversion</th>
<th>Gain</th>
<th>LO Drive</th>
<th>LO-RF Isolation</th>
<th>V&lt;sub&gt;cc&lt;/sub&gt;</th>
<th>I&lt;sub&gt;cc&lt;/sub&gt;</th>
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<tbody>
<tr>
<td><strong>Downconverting Mixers</strong></td>
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<tr>
<td>LTC5590</td>
<td>Dual High Gain</td>
<td>0.6–1.7GHz</td>
<td>+26dBm</td>
<td>9.7dB</td>
<td>8.7dB</td>
<td>0dBm</td>
<td>&lt;-36dBm</td>
<td>3.1V–3.5V</td>
<td>370mA</td>
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<tr>
<td>LTC5591</td>
<td>Dual High Gain</td>
<td>1.3–2.3GHz</td>
<td>+26.2dBm</td>
<td>9.9dB</td>
<td>8.5dB</td>
<td>0dBm</td>
<td>&lt;-30dBm</td>
<td>3.1V–3.5V</td>
<td>380mA</td>
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<tr>
<td>LTC5592</td>
<td>Dual High Gain</td>
<td>1.6–2.7GHz</td>
<td>+27.3dBm</td>
<td>9.8dB</td>
<td>8.3dB</td>
<td>0dBm</td>
<td>&lt;-34dBm</td>
<td>3.1V–3.5V</td>
<td>401mA</td>
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<tr>
<td>LTC5569</td>
<td>Dual Wideband</td>
<td>0.3–4GHz</td>
<td>+26.7dBm</td>
<td>11.7dB</td>
<td>2dB</td>
<td>0dBm</td>
<td>-50dBm</td>
<td>3.0V–3.6V</td>
<td>180mA</td>
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<tr>
<td>LT5557</td>
<td>Wideband with Integrated Transformers</td>
<td>0.4–3.8GHz</td>
<td>+24.7dBm</td>
<td>11.7dB</td>
<td>2.9dB</td>
<td>-3dBm</td>
<td>42dBc</td>
<td>2.9V–3.9V</td>
<td>81.6mA</td>
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<tr>
<td>LT5527</td>
<td>Integrated Transformers, Low Spurious Distortion</td>
<td>0.4–3.7GHz</td>
<td>+23.5dBm</td>
<td>12.5dB</td>
<td>2.3dB</td>
<td>-3dBm</td>
<td>41dBc</td>
<td>4.5V–5.25V</td>
<td>78mA</td>
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<td>LT5522</td>
<td>Integrated Transformer, 1GHz if BN</td>
<td>0.4–2.7GHz</td>
<td>+21.5dBm</td>
<td>13.9dB</td>
<td>-0.1dB</td>
<td>-5dBm</td>
<td>45dBc</td>
<td>4.5V–5.25V</td>
<td>66mA</td>
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<tr>
<td>LT5525</td>
<td>Integrated Transformer, Low Power</td>
<td>0.8–2.5GHz</td>
<td>+18dBm</td>
<td>15dB</td>
<td>-1.7dB</td>
<td>-5dBm</td>
<td>38dBc</td>
<td>3.0V–5.3V</td>
<td>28mA</td>
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<tr>
<td>LT5512</td>
<td>Wideband, Low Frequency Op.</td>
<td>DC–3GHz</td>
<td>+17dBm</td>
<td>14dB</td>
<td>1dB</td>
<td>-10dBm</td>
<td>43dBc</td>
<td>4.5V–5.25V</td>
<td>57mA</td>
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<td>LT5526</td>
<td>Low Power</td>
<td>DC–2GHz</td>
<td>+14.1dBm</td>
<td>13.7dB</td>
<td>0.4dB</td>
<td>-5dBm</td>
<td>50dBc</td>
<td>3.0V–5.3V</td>
<td>28mA</td>
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<tr>
<td>LT5560</td>
<td>Very Low Power, Low Cost</td>
<td>DC–4GHz</td>
<td>+9.7dBm</td>
<td>10.1dB</td>
<td>2.6dB</td>
<td>-20dBm</td>
<td>55dBc</td>
<td>2.7V–5.3V</td>
<td>10mA</td>
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<td>LT5500</td>
<td>Low Voltage, Low Power LNA + Mixer</td>
<td>1.8–2.7GHz</td>
<td>-2.5dBm</td>
<td>4dB</td>
<td>5dB</td>
<td>-10dBm</td>
<td>37dBc</td>
<td>1.8V–5.25V</td>
<td>23mA</td>
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<td><strong>Upconverting Mixers</strong></td>
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<td>LT5579</td>
<td>WiMAX Optimized w/ Integrated Transformer</td>
<td>1500–3800MHz</td>
<td>+29dBm</td>
<td>8.2dB</td>
<td>1.8dB</td>
<td>-1dBm</td>
<td>-39dBm</td>
<td>3.15V–3.6V</td>
<td>226mA</td>
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<td>LT5578</td>
<td>Wideband with Integrated RF Transformer</td>
<td>400–2.7GHz</td>
<td>+24.3dBm</td>
<td>10.5dB</td>
<td>-0.7dB</td>
<td>-1dBm</td>
<td>-46dBm</td>
<td>3.1V–3.5V</td>
<td>152mA</td>
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<td>LT5521</td>
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<td>+24.2dBm</td>
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<td>LT5519</td>
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<td>LT5520</td>
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<td>+15.9dBm</td>
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<td>-5dBm</td>
<td>-41dBm</td>
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<td>LT5511</td>
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<td>+17dBm</td>
<td>15dB</td>
<td>0dB</td>
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<td>Very Low Power, Low Cost</td>
<td>0.01–4000MHz</td>
<td>+9.0dBm</td>
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<td>2.4dB</td>
<td>-2dBm</td>
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<td>2.7V–5.3V</td>
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## Direct Conversion I-Q Modulators and Demodulators

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<th>Part No.</th>
<th>Features</th>
<th>Frequency</th>
<th>OIP3</th>
<th>Noise Floor</th>
<th>Image Suppress</th>
<th>LO Suppress</th>
<th>VCC</th>
<th>ICC</th>
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<td>LTC5588-1</td>
<td>Ultrahigh OIP3</td>
<td>0.2–6GHz</td>
<td>31dB</td>
<td>-160.0dBm/Hz</td>
<td>-56.6dBc</td>
<td>-39.6dBc</td>
<td>3.15V–3.45V</td>
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<td>LT5528</td>
<td>R(<em>{\text{L}})=500, V(</em>{\text{sat}})=0.53V</td>
<td>5–1600MHz</td>
<td>25.5dB</td>
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<td>-55dBc</td>
<td>-51dBc</td>
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<td>LT5572</td>
<td>High Output, High R(_{\text{L}})</td>
<td>1.5–2.5GHz</td>
<td>21.6dB</td>
<td>-158.6dBm/Hz</td>
<td>-41.2dBc</td>
<td>-39.4dBc</td>
<td>4.9V–5.25V</td>
<td>120mA</td>
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<tr>
<td>LT5528</td>
<td>R(<em>{\text{L}})=500, V(</em>{\text{sat}})=0.53V</td>
<td>1.5–2.4GHz</td>
<td>21.8dB</td>
<td>-159.3dBm/Hz</td>
<td>-45dBc</td>
<td>-42dBc</td>
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<td>125mA</td>
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<td>LT518</td>
<td>R(<em>{\text{L}})=3kΩ, V(</em>{\text{sat}})=2.1V</td>
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<td>-158.2dBm/Hz</td>
<td>-40dBc</td>
<td>-49dBc</td>
<td>4.9V–5.25V</td>
<td>128mA</td>
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<td>LT5571</td>
<td>Low Power, R(<em>{\text{L}})=90k, V(</em>{\text{sat}})=0.5V</td>
<td>1.5–2.4GHz</td>
<td>22.8dB</td>
<td>-158.2dBm/Hz</td>
<td>-40dBc</td>
<td>-49dBc</td>
<td>4.9V–5.25V</td>
<td>128mA</td>
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<td>LT5518</td>
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<td>0.6–1.1GHz</td>
<td>20dB</td>
<td>-142dBm/Hz</td>
<td>-34dBc</td>
<td>-32dBc</td>
<td>1.8V–5.25V</td>
<td>11.9mA</td>
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<td>LT5575</td>
<td>Integrated Transformers</td>
<td>800–2700MHz</td>
<td>+28dBm</td>
<td>+13.3dBm</td>
<td>12.6dB</td>
<td>3dB</td>
<td>0.03dB</td>
<td>0.5°</td>
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<td>LT5516</td>
<td>1GHz Direct Conversion Demodulator</td>
<td>800–1500MHz</td>
<td>+21.5dBm</td>
<td>+9dBm</td>
<td>12.8dB</td>
<td>4.3dB</td>
<td>0.2dB</td>
<td>1°</td>
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<td>LT5517</td>
<td>2 x LO Input</td>
<td>40–900MHz</td>
<td>+21dBm</td>
<td>+10dBm</td>
<td>12.4dB</td>
<td>3.3dB</td>
<td>0.03dB</td>
<td>0.7°</td>
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<td>LT5515</td>
<td>20GHz Direct Conversion Demodulator</td>
<td>1500–2500MHz</td>
<td>+20dBm</td>
<td>+9dBm</td>
<td>16.8dB</td>
<td>-0.7dB</td>
<td>0.3dB</td>
<td>1°</td>
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<tr>
<td>LT5506</td>
<td>Integrated VGA + 8.8MHz I/Q BW</td>
<td>40–500MHz</td>
<td>-0.5dBm</td>
<td>-11.5dBm</td>
<td>6.8dB</td>
<td>0.9 to 59dB</td>
<td>0.2dB</td>
<td>0.6°</td>
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<tr>
<td>LT5546</td>
<td>Integrated VGA + 17MHz I/Q BW</td>
<td>40–500MHz</td>
<td>-1dBm</td>
<td>-10dBm</td>
<td>7.8dB</td>
<td>1.6 to 56dB</td>
<td>0.14dB</td>
<td>0.6°</td>
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<td>LT5502</td>
<td>IF Limiter + RSSI</td>
<td>70–400MHz</td>
<td>–</td>
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<td>4dB</td>
<td>–</td>
<td>0.1dB</td>
<td>0.6°</td>
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### Frequency Synthesizers

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<tr>
<th>Part No.</th>
<th>Features</th>
<th>Freq. Range</th>
<th>Closed-Loop Phase Noise</th>
<th>VCC</th>
<th>ICC</th>
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<td>10kHz</td>
<td>1MHz</td>
<td>40MHz</td>
<td>Spurious Products</td>
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<tr>
<td>LT6946-1</td>
<td>Integer-N, PLL + VCO</td>
<td>0.373–3.740GHz</td>
<td>-100dBc</td>
<td>-140dBc</td>
<td>-156dBc</td>
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<tr>
<td>LT6946-2</td>
<td>Integer-N, PLL + VCO</td>
<td>0.513–4.910GHz</td>
<td>-100dBc</td>
<td>-132dBc</td>
<td>-152dBc</td>
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<tr>
<td>LT6946-3</td>
<td>Integer-N, PLL + VCO</td>
<td>0.640–5.790GHz</td>
<td>-94dBc</td>
<td>-140dBc</td>
<td>-156dBc</td>
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### RF Power Detectors

<table>
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<tr>
<th>Part No.</th>
<th>Features</th>
<th>Operating Frequency</th>
<th>Dynamic Range</th>
<th>Min Detect</th>
<th>Max Detect</th>
<th>Typical Accuracy</th>
<th>V&lt;sub&gt;CC&lt;/sub&gt;</th>
<th>I&lt;sub&gt;CC&lt;/sub&gt;</th>
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<tr>
<td><strong>RMS Detectors</strong></td>
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<tr>
<td>LTC5583</td>
<td>Dual, High Accuracy</td>
<td>40–6000MHz</td>
<td>60dB</td>
<td>-58dBm</td>
<td>+2dBm</td>
<td>±0.2dB</td>
<td>3.1V–3.5V</td>
<td>90.1mA</td>
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<td>LTC5582</td>
<td>High Dynamic Range Single-Ended</td>
<td>40MHz–10GHz</td>
<td>57dB</td>
<td>-56dBm</td>
<td>+1dBm</td>
<td>±0.2dB</td>
<td>3.1V–3.5V</td>
<td>41.6mA</td>
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<td>LT5570</td>
<td>Fast, Accurate Power Measurement of High Crest-Factor Signals</td>
<td>40–2700MHz</td>
<td>51dB</td>
<td>-38dBm</td>
<td>+13dBm</td>
<td>±0.3dB</td>
<td>3.1V–3.5V</td>
<td>26.5mA</td>
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<tr>
<td>LT5581</td>
<td>High Dynamic Range Low Power</td>
<td>10–6000MHz</td>
<td>40dB</td>
<td>-34dBm</td>
<td>+6dBm</td>
<td>±1dB</td>
<td>2.7V–5.25V</td>
<td>1.4mA</td>
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<td>LTC5587</td>
<td>RMS Detector w/Integrated 12-Bit ADC</td>
<td>10–6000MHz</td>
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<td>-34dBm</td>
<td>+6dBm</td>
<td>±1dB</td>
<td>2.7V–5.25V</td>
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<td><strong>Logarithmic Detectors</strong></td>
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<td>LT5537</td>
<td>Log Linear Detector</td>
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<td>-76dBm</td>
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<td>6MHz</td>
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<td>LT5504</td>
<td>Log Linear Detector / Receiver</td>
<td>800–2700MHz</td>
<td>80dB</td>
<td>-80dBm</td>
<td>+2dBm</td>
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<td>2MHz</td>
<td>2.7V–5.25V</td>
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<td>LT5538</td>
<td>Broadband Detector</td>
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<td>+5dBm</td>
<td>±0.8dB</td>
<td>2MHz</td>
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<td>LT5534</td>
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<td>-63dBm</td>
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<td>30MHz</td>
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<td>LTC5564</td>
<td>Ultrafast 7ns Schottky Detector w/ Comparator</td>
<td>600MHz–15GHz</td>
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<td>-24dBm</td>
<td>+16dBm</td>
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<td>2.7V–5.25V</td>
<td>44mA</td>
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<td>LTC5507</td>
<td>Low Frequency Detect</td>
<td>0.1–1000MHz</td>
<td>46dB</td>
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<td>0.55mA</td>
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<td>LTC5505-1</td>
<td>Low Cost, High Signal Level</td>
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<td>+18dBm</td>
<td>4MHz</td>
<td>2.7V–5.25V</td>
<td>0.5mA</td>
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<td>LT5508</td>
<td>7GHz, w/ Shutdown</td>
<td>300–7000MHz</td>
<td>44dB</td>
<td>-32dBm</td>
<td>+12dBm</td>
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<td>2.7V–5.25V</td>
<td>0.55mA</td>
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<td>LT5505-2</td>
<td>Low Cost</td>
<td>300–3500MHz</td>
<td>44dB</td>
<td>-32dBm</td>
<td>+12dBm</td>
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<td>0.5mA</td>
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<td>LTC5532ES6</td>
<td>7 GHz Precision w/ Gain + V&lt;sub&gt;OS&lt;/sub&gt; Adj</td>
<td>300–7000MHz</td>
<td>42dB</td>
<td>-32dBm</td>
<td>+10dBm</td>
<td>2MHz</td>
<td>2.7V–5.25V</td>
<td>0.5mA</td>
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<td>LTC5532EDC</td>
<td>12 GHz, w/ Gain + V&lt;sub&gt;OS&lt;/sub&gt; Adj</td>
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<td>42dB</td>
<td>-32dBm</td>
<td>+10dBm</td>
<td>2MHz</td>
<td>2.7V–5.25V</td>
<td>0.5mA</td>
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<td>LT5581</td>
<td>7 GHz Precision w/ Shutdown, V&lt;sub&gt;OS&lt;/sub&gt; Adj</td>
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<td>42dB</td>
<td>-32dBm</td>
<td>+10dBm</td>
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<td>2.7V–5.25V</td>
<td>0.5mA</td>
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<td>LT5535</td>
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<td>2mA</td>
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<td>LT5536</td>
<td>Detector + Fast Comparator</td>
<td>600–7000MHz</td>
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<td>LT5509</td>
<td>High Resolution for Portable</td>
<td>300–3000MHz</td>
<td>36dB</td>
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High Speed ADC Portfolio

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<th>10Mbps</th>
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<th>125Mbps to 150Mbps</th>
<th>160Mbps to 185Mbps</th>
<th>210Mbps</th>
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</table>

**Parallel**
- 1.8V Lowest Power, Single & Dual ADCs, CMOS/DDR, CMOS/DDR LVDS
- 3.3V High SNR/SFDR ADCs, CMOS/LVDS
- 2.5V ADCs, CMOS/LVDS
- 1.8V High IF Undersampling Single & Dual ADCs, DDR LVDS
- 3V ADCs, CMOS
- 3V Dual ADCs, CMOS

**Serial**
- 3.3V JESD204 2-Wire Serial ADCs
- 1.8V Dual ADCs, Serial LVDS
- 1.8V Dual ADCs, Serial LVDS
- 1.8V Quad ADCs, Serial LVDS
- 1.8V Octal ADCs, Serial LVDS
14-/12-Bit 25Msps to 150Msps Single ADC Family with Parallel Outputs

<table>
<thead>
<tr>
<th></th>
<th>25Msps</th>
<th>40Msps</th>
<th>65Msps</th>
<th>80Msps</th>
<th>105Msps</th>
<th>125Msps</th>
<th>150Msps</th>
</tr>
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<td><strong>14-Bit</strong></td>
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<td>73.2dB SNR</td>
<td>2256-14</td>
<td>2257-14</td>
<td>2258-14</td>
<td>2259-14</td>
<td>2260-14</td>
<td>2261-14</td>
<td>2262-14</td>
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<td><strong>12-Bit</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>70.6dB SNR</td>
<td>2256-12</td>
<td>2257-12</td>
<td>2258-12</td>
<td>2259-12</td>
<td>2260-12</td>
<td>2261-12</td>
<td>2262-12</td>
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<tr>
<td><strong>Power Consumption</strong></td>
<td>35mW</td>
<td>49mW</td>
<td>81mW</td>
<td>89mW</td>
<td>106mW</td>
<td>127mW</td>
<td>149mW</td>
</tr>
</tbody>
</table>

Features:
- Pin-Compatible Family of 14-/12-Bit, 25Msps to 150Msps ADCs
- Single 1.8V Supply
- Flexible Digital Interface: CMOS, DDR CMOS or DDR LVDS
- Selectable Input Ranges: 1V_{pp} to 2V_{pp}
- 800MHz Full-Power Bandwidth S/H
- Optional Data Output Randomizer
- Alternate Bit Polarity Mode
- Optional Clock Duty Cycle Stabilizer
- Shutdown and Nap Modes
- Serial SPI Port for Configuration
- Easy Evaluation Using PScope™ Analysis Software

Digital Output Randomizer Reduces Digital Feedback

LTC2261-14, 125Msps, A_{in} = 70MHz, –65dBFS Averaged 128k Point FFTs
14-Bit/12-Bit 25Msps to 125Msps Quad/Dual ADC Family with Serial LVDS Outputs

<table>
<thead>
<tr>
<th></th>
<th>25Msps</th>
<th>40Msps</th>
<th>65Msps</th>
<th>80Msps</th>
<th>105Msps</th>
<th>125Msps</th>
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<tr>
<td><strong>14-Bit</strong></td>
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<tr>
<td></td>
<td>2170-14</td>
<td>2171-14</td>
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<td>2173-14</td>
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<tr>
<td><strong>12-Bit</strong></td>
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<tr>
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<td>2265-12</td>
<td>2266-12</td>
<td>2267-12</td>
<td>2268-12</td>
</tr>
</tbody>
</table>

**Power Consumption**
- 40mW/Ch
- 50mW/Ch
- 80mW/Ch
- 95mW/Ch
- 110mW/Ch
- 140mW/Ch

**Features:**
- Quad/Dual-Channel Simultaneous Sampling ADCs (LTC2175/LTC2268)
- 73.1dB SNR (14-Bit Resolution)
- 88dB SFDR
- Single 1.8V Analog & Digital Supplies
- Serial LVDS Outputs
- Selectable Input Ranges: 1V_{p-p} to 2V_{p-p}
- 800MHz Full-Power Bandwidth S/H
- Optional Data Output Randomizer
- Optional Clock Duty Cycle Stabilizer
- 1mW Sleep and 50mW Nap Modes
- Serial SPI Port for Configuration
- Pin-Compatible 14-Bit and 12-Bit Versions
- 52-Pin (7mm x 8mm) QFN Package (Quad Versions)
- 40-Pin (6mm x 6mm) QFN Package (Dual Versions)
- Easy Evaluation Using PScope Analysis Software

**Quad ADCs with Low Power Consumption**

The LTC2175 quad high speed ADC family achieves one-third the power consumption of alternate solutions without compromising AC performance. Operating from a low 1.8V supply, the 14-bit, 125Msps LTC2175 dissipates 140mW/channel while maintaining 73.1dB SNR and 88dB SFDR at baseband. Digital outputs can be configured as single lane (<65Msps) or dual lane serial LVDS to minimize FPGA pin count.
### 16-Bit 25Msps to 125Msps Single/Dual ADC Family

<table>
<thead>
<tr>
<th></th>
<th>25Msps</th>
<th>40Msps</th>
<th>65Msps</th>
<th>80Msps</th>
<th>105Msps</th>
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<td>2161</td>
<td>2162</td>
<td>2163</td>
<td>2164</td>
<td>2165</td>
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<tr>
<td><strong>Dual Channel</strong></td>
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<td>2194</td>
<td>2195</td>
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<tr>
<td><strong>Power Consumption</strong></td>
<td>40mW/Ch</td>
<td>50mW/Ch</td>
<td>80mW/Ch</td>
<td>100mW/Ch</td>
<td>155mW/Ch</td>
<td>185mW/Ch</td>
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</table>

**Features:**

- 16-Bit, 25Msps to 125Msps ADCs
- 76.8dB SNR, 90dB SFDR
- Single 1.8V Supply
- Flexible Digital Interfaces:
  - LTC2185/LTC2165: CMOS, DDR CMOS or DDR LVDS Outputs
  - LTC2195: Serial LVDS
- Selectable Input Ranges: 1V<sub>P-P</sub> to 2V<sub>P-P</sub>
- 550MHz Full-Power Bandwidth S/H
- Optional Data Output Randomizer
- Optional Clock Duty Cycle Stabilizer
- Shutdown and Nap Modes
- Serial SPI Port for Configuration
- Easy Evaluation Using PScope Analysis Software

**Flexible Digital Outputs**

- **Full Rate CMOS**
  - LTC2185/LTC2165
  - 16 Data Lines/Ch

- **DDR CMOS**
  - LTC2185/LTC2165
  - 8 Data Lines/Ch

- **DDR LVDS**
  - LTC2185/LTC2165
  - 16 Data Lines/Ch

- **Serial LVDS**
  - LTC2195
  - SPI Programmable Output Current, Optional Output Termination
  - 4 Lanes/Ch: 20 Data Lines
  - 2 Lanes/Ch: 12 Data Lines
  - 1 Lane/Ch: 8 Data Lines
16-Bit/14-Bit/12-Bit 25Msps to 125Msps Dual ADC Family with Parallel Outputs

<table>
<thead>
<tr>
<th></th>
<th>25Msps</th>
<th>40Msps</th>
<th>65Msps</th>
<th>80Msps</th>
<th>105Msps</th>
<th>125Msps</th>
</tr>
</thead>
</table>
| **16-Bit**
| 76.8dB SNR | 2180   | 2181   | 2182   | 2183   | 2184    | 2185    |
| **Power Consumption** | 39mW/Ch | 58mW/Ch | 80mW/Ch | 100mW/Ch | 154mW/Ch | 185mW/Ch |
| **14-Bit**
| 73.2dB SNR | 2140-14 | 2141-14 | 2142-14 | 2143-14 | 2144-14 | 2145-14 |
| **Power Consumption** | 24mW/Ch | 33mW/Ch | 46mW/Ch | 55mW/Ch | 75mW/Ch | 95mW/Ch |
| **12-Bit**
| 70.6dB SNR | 2140-12 | 2141-12 | 2142-12 | 2143-12 | 2144-12 | 2145-12 |
| **Power Consumption** | 24mW/Ch | 33mW/Ch | 46mW/Ch | 55mW/Ch | 75mW/Ch | 95mW/Ch |

Features:
- Pin-Compatible Family of 16-/14-/12-Bit, 25Msps to 125Msps Dual ADCs
- 76.8dB SNR, 90dB SFDR at 16-Bit
- Single 1.8V Supply
- Flexible Digital Interface: CMOS, DDR CMOS or DDR LVDS
- Selectable Input Ranges: $1V_{pp}$ to $2V_{pp}$
- 750MHz Full-Power Bandwidth S/H
- Optional Data Output Randomizer
- Optional Clock Duty Cycle Stabilizer
- Shutdown and Nap Modes
- Serial SPI Port for Configuration
- Easy Evaluation Using PScope Analysis Software

Clean Performance, Very Low Power

LTC2145-14: Integral Nonlinearity (INL)

LTC2145-14: 64k Point FFT, $f_N = 5$MHz
-1dBFS, 125Msps
14-Bit 80Msps to 125Msps Octal ADC Family with Serial LVDS Outputs

The LTM9011-14 is part of a family of 14-bit, 80Msps, 105Msps and 125Msps octal ADCs that provide excellent AC performance and low power in a small form factor. The BGA μModule packaging allows the integration of bypass capacitance and provides a flow-through pinout, reducing the required board area for routing data I/O lines and simplifying layout.

Features:
- 8-Channel Simultaneous Sampling ADC Family
- 125Msps/105Msps/80Msps Versions
- 73.1dB SNR, 88dB SFDR
- Low Power: 140mW/113mW/94mW per Channel
- Single 1.8V Supply
- Serial LVDS Outputs: 1 or 2 Bits per Channel
- Selectable Input Ranges: 1V_{p-p} to 2V_{p-p}
- 800MHz Full-Power Bandwidth S/H
- Shutdown and Nap Modes
- Internal Bypass Capacitance, No External Components
- 140-Pin (11.25mm × 9mm) BGA Package
- Easy Evaluation Using PScope Analysis Software
14-Bit/12-Bit 170Msps to 310Msps Single/Dual ADC Family with DDR LVDS Outputs

High Undersampling Performance to 900MHz

The LTC2153 and LTC2158 are a family of single and dual, high IF sampling 12-/14-bit, 170Msps to 310Msps ADCs that maintain excellent SFDR performance at input frequencies up to 900MHz. These ADCs have been specifically designed to meet the needs of today’s communications systems, where high undersampling capability saves cost by eliminating downconversion stages.

Features:
- 1.8V Single-Supply Operation
- DDR LVDS Outputs
- Easy-to-Drive 1.5V_p-p Input Range
- 1.25GHz Full-Power Bandwidth S/H
- Optional Clock Duty Cycle Stabilizer
- Low Power Sleep and Nap Modes
- Serial SPI Port for Configuration
- Easy Evaluation Using PScope Analysis Software

<table>
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<tr>
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<th>170Msps</th>
<th>210Msps</th>
<th>250Msps</th>
<th>310Msps</th>
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<td>14-Bit 70dB SNR</td>
<td>2155-14</td>
<td>2156-14</td>
<td>2157-14</td>
<td>2158-14</td>
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<td>12-Bit 68.6dB SNR</td>
<td>2150-14</td>
<td>2151-14</td>
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<td>2153-14</td>
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<td>Power Consumption</td>
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<td>308mW/Ch</td>
<td>325mW/Ch</td>
<td>362mW/Ch</td>
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1.8V Single ADCs, DDR LVDS Outputs
1.8V Dual ADCs, DDR LVDS Outputs
16-Bit 10Msps to 160Msps Single ADC Family with Parallel Outputs

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<th>10Msps</th>
<th>25Msps</th>
<th>40Msps</th>
<th>65Msps</th>
<th>80Msps</th>
<th>105Msps</th>
<th>130Msps</th>
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<td>2208</td>
<td>2209</td>
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<tr>
<td></td>
<td>81.6dB, 140mW</td>
<td>81.6dB, 220mW</td>
<td>79.1dB, 480mW</td>
<td>79dB, 610mW</td>
<td>77.9dB, 725mW</td>
<td>77.9dB, 900mW</td>
<td>77.7dB, 1250mW</td>
<td>77.1dB, 1450mW</td>
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<tr>
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<td>2215</td>
<td>2216</td>
<td>2217</td>
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<td>2220</td>
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<td>81.3dB, 970mW</td>
<td>81.2dB, 1190mW</td>
<td>81.1dB, 1400mW</td>
<td>80.9dB, 1600mW</td>
<td>80.7dB, 1800mW</td>
<td>80.5dB, 2000mW</td>
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<td>77.5dB, 990mW</td>
<td>77.5dB, 1100mW</td>
<td>77.6dB, 1300mW</td>
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</tbody>
</table>

6 x 6 QFN 3.3V JESD204 2-Wire Serial ADCs
7 x 7 QFN 3.3V High SNR/SFDR ADCs, CMOS
9 x 9 QFN 3.3V High SNR/SFDR ADCs, CMOS/LVDS

High SNR/SFDR Performance 16-Bit ADCs

The LTC2209 high performance family of 16-bit ADCs is designed for the most demanding wideband, low noise, signal acquisition applications. This ADC family addresses the key requirements for maximizing performance of high sensitivity receivers and data acquisition systems. Exceptional SFDR performance of 100dBc, combined with SNR of up to 81.6dB, enable the ADCs to resolve low level signals in the presence of large interferers and blockers.

The LTC2209 family uses innovative ADC technology for digital receivers by incorporating two unique features that simplify receiver design and improve system performance. The first is an internal transparent dither circuit that improves the ADCs spurious free dynamic range response well beyond 100dBc for low level input signals. The second feature is a digital output randomizer that dramatically reduces unwanted tones caused by digital feedback. All ADCs excluding LTC2215, LTC2216 and LTC2217 feature a programmable gain amplifier (PGA) front end that eases the ADC driver output power requirements when driving the lower input range of 1.5Vp-p for improved distortion performance. The LTC2274 series offers a high speed, 2-wire serial interface for interfacing to the SerDes port offered on most FPGAs.

Features:
- Highest SNR
- 100dBc SFDR
- Single 3.3V supply
- Internal Transparent Dither
- Data Output Randomizer

High SFDR Performance of LTC2209 Demonstrated by PScope Analysis Software
LTM9001: 16-Bit IF/Baseband μModule Receiver

Features:
- 16-Bit High Speed ADC
- Up to 300MHz IF Range
- 75dB SNR, 83dB SFDR (LTM9001-AD)
- Low Noise, Low Distortion Amplifiers
  Fixed Gain: 8dB, 14dB, 20dB or 26dB
  50Ω, 200Ω or 400Ω Input Impedance
- Integrated Passive Components
  Anti-Alias Filter
  Supply and Reference Bypass Capacitance
- No External Components Required
- Selectable LVDS or CMOS Outputs
- Optional Data Output Randomizer
- Optional Internal Dither
- 11.25mm x 11.25mm LGA Package

<table>
<thead>
<tr>
<th>Amplifier IF Range</th>
<th>Amplifier Input Impedance</th>
<th>Amplifier Gain</th>
<th>Filter</th>
<th>ADC Sample Rate</th>
<th>ADC Resolution</th>
<th>Output</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>300MHz</td>
<td>200Ω</td>
<td>20dB</td>
<td>162.5MHz BPF, 50MHz BW</td>
<td>130Mops</td>
<td>16-Bit</td>
<td>LVDS/CMOS</td>
<td>LTM9001-AA</td>
</tr>
<tr>
<td>300MHz</td>
<td>200Ω</td>
<td>14dB</td>
<td>70MHz BPF, 25MHz BW</td>
<td>130Mops</td>
<td>16-Bit</td>
<td>LVDS/CMOS</td>
<td>LTM9001-AD</td>
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<td>300MHz</td>
<td>400Ω</td>
<td>8dB</td>
<td>DC-300MHz LPF</td>
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<td>16-Bit</td>
<td>LVDS/CMOS</td>
<td>LTM9001-BA</td>
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<tr>
<td>300MHz</td>
<td>400Ω</td>
<td>8dB</td>
<td>DC-10MHz LPF</td>
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<td>16-Bit</td>
<td>CMOS</td>
<td>LTM9001-GA</td>
</tr>
</tbody>
</table>
LTM9002: 14-Bit, 125Msps Dual-Channel IF/ Baseband μModule Receiver

**Features:**

- Integrated Dual 14-Bit, High Speed ADC, Passive Filters and Fixed Gain Differential Amplifiers
- Up to 300MHz IF Range
  - Lowpass and Bandpass Filter Versions
- Integrated Low Noise, Low Distortion Amplifiers
  - Fixed Gain: 8dB, 14dB, 20dB or 26dB
  - 50Ω, 200Ω or 400Ω Input Impedance
- Integrated Bypass Capacitance, No External Components Required
- 66dB SNR Up to 140MHz Input (LTM9002-AA)
- 76dB SFDR Up to 140MHz Input (LTM9002-AA)
- Auxiliary 12-Bit DACs for Gain Adjustment
- Clock Duty Cycle Stabilizer
- Single 3V to 3.3V Supply
- Low Power: 1.3W (665mW/ch.)
- Shutdown and Nap Modes
- 15mm x 11.25mm LGA Package

### Dual Channel IF Receiver

<table>
<thead>
<tr>
<th>Amplifier IF Range</th>
<th>Amplifier Input Impedance</th>
<th>Amplifier Gain</th>
<th>Filter</th>
<th>ADC Sample Rate</th>
<th>ADC Resolution</th>
<th>Auxiliary DAC</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>300MHz</td>
<td>500</td>
<td>26dB</td>
<td>170MHz LPF</td>
<td>125Msps</td>
<td>14-Bit</td>
<td>12-Bit, SPI</td>
<td>LTM9002-AA</td>
</tr>
<tr>
<td>140MHz</td>
<td>200Ω (Channel A)</td>
<td>20dB (Channel A)</td>
<td>25MHz LPF</td>
<td>65Msps</td>
<td>12-Bit</td>
<td>–</td>
<td>LTM9002-LA</td>
</tr>
</tbody>
</table>

LTM9003: 12-Bit, 250Msps Digital Predistortion μModule Receiver

**Features:**

- Fully Integrated Receiver Subsystem for Digital Predistortion Applications
- Downconverting Mixer with Wide RF Frequency Range: 400MHz to 3.8GHz
- 125MHz Wide Bandpass Filter, <0.5dB Passband Ripple
- Low Power ADC with Up to 12-Bit Resolution, 250Msps Sample Rate
- –145.5dBm/Hz Input Noise Floor, 25.8dBm IIP3
- 1.5W Total Power Consumption
- 50Ω Single-Ended RF and LO Ports
- Internal Bypass Capacitance, No External Components
- ADC Clock Duty Cycle Stabilizer
- 11.25mm x 15mm LGA Package
RF-to-Digital μModule Receivers

The LTM9004 (Direct Conversion) and LTM9005 (IF Sampling) μModule receivers offer unprecedented integration for more compact, low power designs and dramatically faster time-to-market. Integrating the RF, signal filtering, gain stages and high speed ADCs, these receivers eliminate time-consuming design, layout and component sourcing associated with high performance communication systems. With no performance compromise, they enable dense, multichannel macrocells or compact remote radio heads.

Features:

- Fully Integrated RF-to-Digital Receivers
- 14-Bit, 125Mps Low Power ADC
- Direct Conversion Architecture (LTM9004)
  - 700MHz to 2.7GHz RF Input Range
  - I/Q Demodulation & Dual ADC
  - 5V & 3V Supplies, 1.8W Total
- IF-Sampling Architecture (LTM9005)
  - 400MHz to 3.8GHz RF Input Range
  - 20MHz SAW Filter, 140MHz IF
  - 3.3V Supply, 1.3W Total
- 22mm × 15mm LGA Package
µModule Receiver Features

- Ease of Use, Faster Time-to-Market
- Eliminates Most Challenges of Driving High Speed ADCs
- Integrates Key Components
- Simplifies Layout without Sacrificing Performance
- Provides System-Level Testing
- Dramatically Smaller and Simpler than Discrete Implementations
- Proven Linear Technology Quality, Reliability and Service
- ECCN 5A991 — No Export License Required

Semi-Custom Options

The LTM900x family is available in semi-custom options, subject to business approval. Changes are limited to filter configurations and the ADC speed and resolution where pin-compatible alternatives are available. Contact Linear Technology for details.
PScope Data Collection and Analysis Software Tool

The PScope tool is Linear Technology's high speed ADC evaluation software. Using this powerful software tool, engineers can evaluate the performance of Linear Technology's high speed ADC and signal chain receiver family. For a simple program it performs complicated calculations in seconds. PScope software allows engineers to evaluate the signal-to-noise ratio (SNR), spurious free dynamic range (SFDR), total harmonic distortion (THD), as well as other key parameters of high speed ADCs quickly and easily. PScope can also perform more complicated calculations such as intermodulation distortion from a 2-tone test, or adjacent channel power ratios (ACPR) from a spread spectrum signal with the click of a button. It also supports multiple channel ADCs such as the LTM9011, allowing the measurement of eight ADC channels simultaneously.

Screenshot of PScope Data Collection and Analysis Software