The LTC®2378-20 SAR ADC achieves 20 bits of resolution with outstanding 0.5ppm INL and 104dB SNR performance with no cycle latency and sample rates up to 1Msps. The LTC2378-20 offers uncompromised performance, low power dissipation and excellent temperature stability for high precision signal chains. The 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. The LTC2378-20 family includes pin-compatible 20-/18-/16-bit SAR ADCs from 250ksps to 2Msps with serial SPI interface and explicit Busy and Chain pins that simplify digital timing.

Features

- 1Msps Throughput Rate
- ±0.5ppm INL (Typ), ±2ppm INL (Max)
- 104dB SNR (Typ) at \( f_{\text{IN}} = 2\text{kHz} \)
- –125dB THD (Typ) at \( f_{\text{IN}} = 2\text{kHz} \)
- Low Power: 21mW at 1Msps, 21μW at 1ksps
- Fully Differential Input Range ±\( V_{\text{REF}} \)
- \( V_{\text{REF}} \), Input Range from 2.5V to 5.1V
- Digital Gain Compression
- –40°C to 85°C Guaranteed Temperature Range
- 16-Pin MSOP and 4mm × 3mm DFN Packages

Complete 20-Bit/18-Bit/16-Bit Pin-Compatible SAR ADC Family

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<th>250ksps</th>
<th>500ksps</th>
<th>1Msps</th>
<th>1.6Msps</th>
<th>2Msps</th>
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<tr>
<td>20-Bit 104dB SNR</td>
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<td>18-Bit 101dB SNR</td>
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<td>16-Bit 96dB SNR</td>
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The LTC2378-20 family offers the digital gain compression (DGC) feature, which eliminates the driver amplifier’s negative supply while preserving the full resolution of the ADC. When enabled, the ADC performs a digital scaling function that maps zero-scale code from 0V to $0.1 \times V_{REF}$ and full-scale code from $V_{REF}$ to $0.9 \times V_{REF}$ allowing the amplifier to operate from a single positive supply. The elimination of the negative supply dramatically reduces the total power consumption of the signal chain and reduces component count while simplifying the design.

**Digital Gain Compression**

The LTC6362 fully differential amplifier achieves high precision on a tight power budget. The LTC6362 can drive 16-, 18- and 20-bit SAR ADCs on a single 5V, 1mA supply. The LTC6362 easily scales and shifts AC- or DC-coupled signals to the input range of the ADC. It is ideal for driving the 20-bit 1MspS LTC2378-20 SAR ADC with the digital gain compression feature. When paired with the LTC6655-4.096 for the reference, the entire signal chain solution can be powered from a single 5V supply, minimizing power consumption, reducing complexity and achieving up to 100dB of SNR.

**LTC6362 Precision, Low Power SAR ADC Driver**

Features

- 1mA Supply Current
- Single 2.8V to 5.25V Supply
- Single-Ended or Fully Differential Input
- Fully Differential Output
- 200μV Max Offset Voltage
- 260nA Max Input Bias Current
- Fast Settling: 550ns to 18-Bit, $8V_{P-P}$ Output
- Low Distortion: –116dBc at 1kHz, $8V_{P-P}$
- Rail-to-Rail Inputs and Outputs
- Low Power Shutdown: 70μA
- 8-Lead MSOP and 3mm x 3mm 8-Lead DFN Packages

The LTC6362 can drive 16-, 18- and 20-bit SAR ADCs on a single 5V, 1mA supply. The LTC6362 easily scales and shifts AC- or DC-coupled signals to the input range of the ADC. It is ideal for driving the 20-bit 1MpsS LTC2378-20 SAR ADC with the digital gain compression feature. When paired with the LTC6655-4.096 for the reference, the entire signal chain solution can be powered from a single 5V supply, minimizing power consumption, reducing complexity and achieving up to 100dB of SNR.

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