

High-Speed ADC Family Achieves Low Power With High Performance

A new family of high-speed analog-digital converters allows designers to obtain exactly the right level of performance and power consumption for their specific applications

A new family of high-speed analog-to-digital converters (ADCs) from Linear Technology combines outstanding AC performance with extremely low power, supporting the effective

design of wireless and cable communications systems. The new LTC2220 family includes ADCs ranging from 10 Msps up to 170 Msps at 12-bit and 10-bit resolution, as well as 14-bit converters up to 80 Msps.

This new ADC family complements the company's existing LTC1750 family of 5 V ADCs with maximum AC performance. The LTC2220 family of 3.3 V converters features significantly lower power than competing devices without sacrificing AC performance. These low power ADCs excel at undersampling, making them well suited for communications applications such as WCDMA cellular basestation transceivers, digital predistortion

power amplifier linearization, and cable modem termination systems. Other important applications include high definition television (HDTV) and medical imaging systems.

First Product: 12-Bit, 135Msps ADC

The LTC2224, a 12-bit 135 Msps ADC, exemplifies the performance of the entire family. At just 630 mW, in a 7 × 7mm QFN package, it has the lowest power at this speed, is almost half the size of its nearest competitor, yet achieves over 67 dB SNR up to 170 MHz input. Further, the system footprint is reduced because few external bypasses are needed. The device is ideal for low power base station designs and optimized for undersampling. The LTC2224 features a 775 MHz bandwidth and achieves 77 dB SFDR up to 250 MHz input. Pin-compatible versions at sample rates of 105 Msps and 80 Msps feature even lower power. Pin-compatible 10-bit versions at each speed are also in full production. Figure 1 shows the functional block diagram and SFDR plot for the LTC2224.

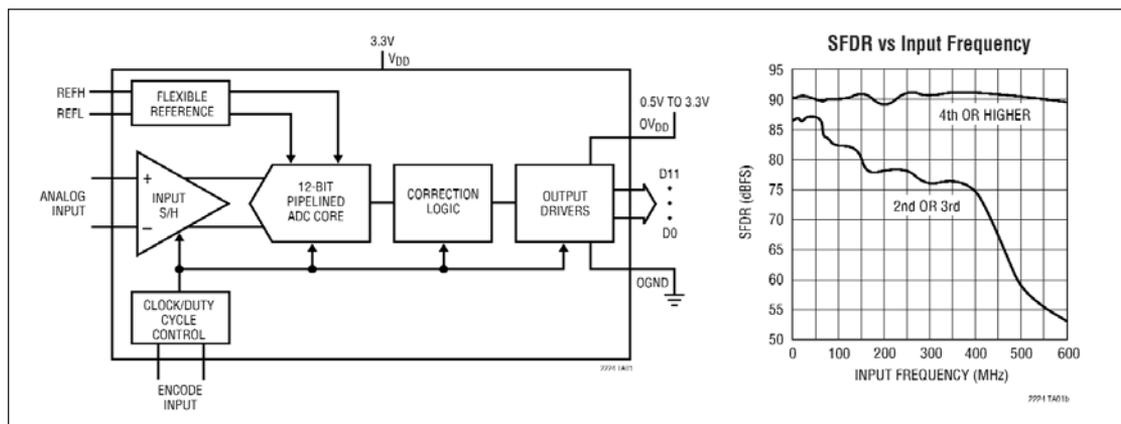


Figure 1 · Functional block diagram (left) and SFDR plot (right) for the LTC2224.

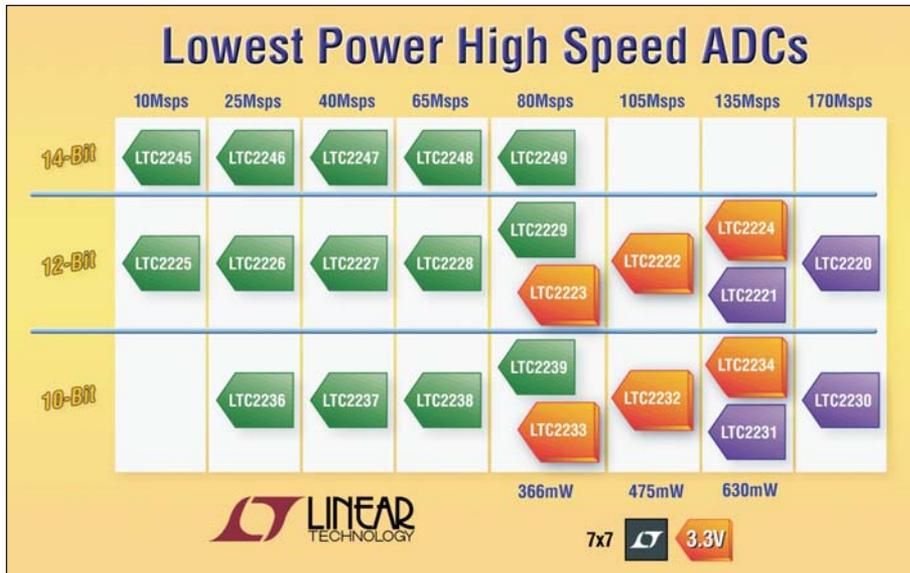


Figure 2 · The range of speed and resolution for the LT2220 family of ADCs.

The entire LTC2220 ADC family, which includes 24 devices, will be introduced by the fourth calendar quarter of 2004. The diagram in Figure 2 provides an overview of the entire LTC2220 family. A summary of key features is provided in Table 1.

Advantages of the LTC2220 ADC Family

Having an family of devices with a wide range of performance capabilities and power consumption enables

flexible designs. For example a product line may include models with differing input requirements. The ability to incorporate pin-compatible parts into the same footprint eliminates the need for different boards and manufacturing processes. Another advantage is the ability to upgrade a design to higher performance with little or no re-design.

With an extremely wide analog bandwidth, these devices permit undersampling for direct digitizing of

LTC2220 Family Features	
·	Sample Rate: 135 Msps / 105 Msps / 80 Msps
·	68 dB SNR up to 140 MHz Input
·	80 dB SFDR up to 170 MHz Input
·	775 MHz Full Power Bandwidth S/H
·	Tiny Board Footprint
·	Single 3.3 V Supply
·	Low Power Dissipation: 630 mW / 475 mW / 366 mW
·	Selectable Input Ranges: ± 0.5 V or ± 1 V
·	No Missing Codes
·	Optional Clock Duty Cycle Stabilizer
·	Shutdown and Nap Modes
·	Data Ready Output Clock
·	Pin-Compatible Family Members:
	135 Msps: LTC2224 (12-Bit), LTC2234 (10-Bit)
	105 Msps: LTC2222 (12-Bit), LTC2232 (10-Bit)
	80 Msps: LTC2223 (12-Bit), LTC2233 (10-Bit)

Table 1 · Summary of features for the LTC2220 family.

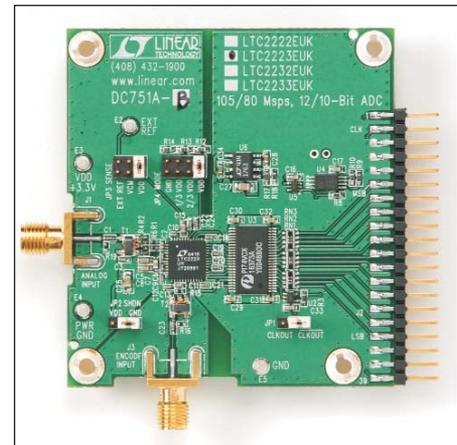


Figure 3 · Evaluation boards are available for the LTC2220 family.

signals up to 800 MHz—for example, high enough to directly sample digital TV broadcast signals.

At high frequencies and high sampling rates, good circuit design is paramount. Linear’s conservative specifications help by leaving some “headroom” to allow for critical circuit variables such as timing.

Application Support

Linear Technology is well-known for its excellent application support, which extends to the new LTC2220 family. Evaluation boards (Figure 3) are available for the new ADC family, including these valuable features included in all of Linear’s evaluation boards—a convenient USB interface and an on-board EEPROM that tells the operating software which device is being controlled.

Summary

The new family of ADCs offers the combination of low power and high performance that is essential for today’s demanding signal processing applications.

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