

FEATURES

- 60 MHz grade available (AD9928BBCZ-60)
- Registers similar to [AD9920A](#) and [AD9990](#)
- Timing generator with 18-channel V-driver
- Serial data output with reduced range LVDS interface
- 1.8 V dual AFE core
- Internal LDO regulators for compatibility with 3 V systems
- Correlated double sampler (CDS) with -3 dB, 0 dB, $+3$ dB, and $+6$ dB gain
- 6 dB to 42 dB, 10-bit variable gain amplifier (VGA)
- 14-bit, 40 MHz analog-to-digital converter (ADC)
- Black level clamp with variable level control
- Precision Timing* core with ~ 390 ps resolution at 40 MHz
- On-chip 3 V horizontal and RG drivers
- General-purpose outputs (GPOs) for shutter support
- On-chip driver for external crystal
- 128-ball CSP_BGA package, 9 mm \times 9 mm, 0.65 mm pitch

APPLICATIONS

- High speed digital imaging
- Surveillance cameras
- Industrial cameras

GENERAL DESCRIPTION

The [AD9928](#) is a highly integrated CCD signal processor for digital still-image camera applications. It includes a dual analog front end with analog-to-digital conversion, combined with a full-function, programmable timing generator and an 18-channel vertical driver (V-driver) for a 2-channel output CCD. The timing generator is capable of supporting up to 24 vertical clock signals internally, and the on-chip V-driver supports up to 18 high voltage outputs. A *Precision Timing*[®] core allows adjustment of high speed clocks with approximately 390 ps resolution at 40 MHz operation. The [AD9928](#) also contains seven general-purpose outputs, which can be used for shutter and system functions.

Each analog front end includes black level clamping, CDS, VGA, and a 14-bit ADC. The timing generator provides all the necessary CCD clocks: RG, H-clocks, V-clocks, sensor gate pulses, substrate clock, and substrate bias control.

The [AD9928](#) is specified over an operating temperature range of -25°C to $+85^{\circ}\text{C}$.

FUNCTIONAL BLOCK DIAGRAM

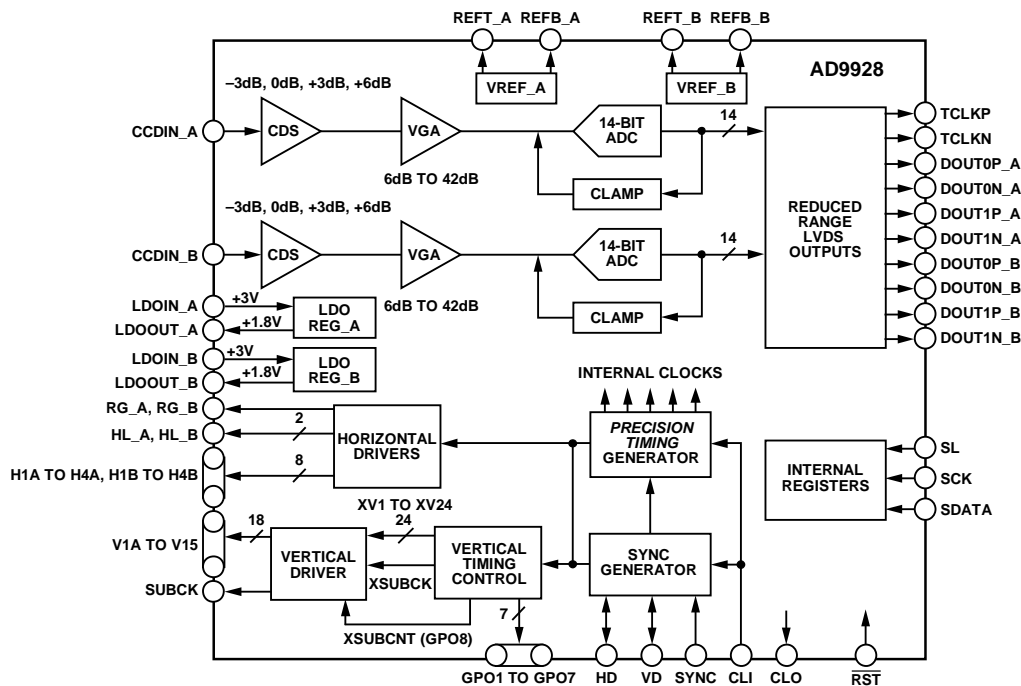


Figure 1.

For more information on the [AD9928](#), email Analog Devices, Inc., at afe.ccd@analog.com.

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