

Brief Description

The ZSSC3122 is a CMOS integrated circuit for accurate capacitance-to-digital conversion and sensor-specific correction of capacitive sensor signals. Digital compensation of sensor offset, sensitivity, and temperature drift is accomplished via an internal digital signal processor running a correction algorithm with calibration coefficients stored in a non-volatile EEPROM.

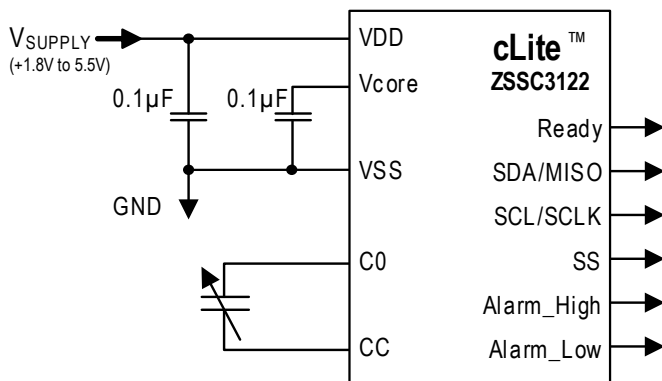
The ZSSC3122 is configurable for capacitive sensors with capacitances up to 10pF and a sensitivity of 125aF/LSB. It is compatible with both single capacitive sensors (both terminals must be accessible) and differential capacitive sensors. Measured and corrected sensor values can be output as I2C, SPI, PDM, or alarms.

The I2C interface can be used for a simple PC-controlled calibration procedure to program a set of calibration coefficients into an on-chip EEPROM. The calibrated ZSSC3122 and a specific sensor are mated digitally: fast, precise, and without the cost overhead of trimming by external devices or laser.

Available Support

- ZSSC3122 SSC Evaluation Kit available: SSC Evaluation Board, samples, software, documentation.
- Support for industrial mass calibration available.
- Quick circuit customization option for large production volumes.

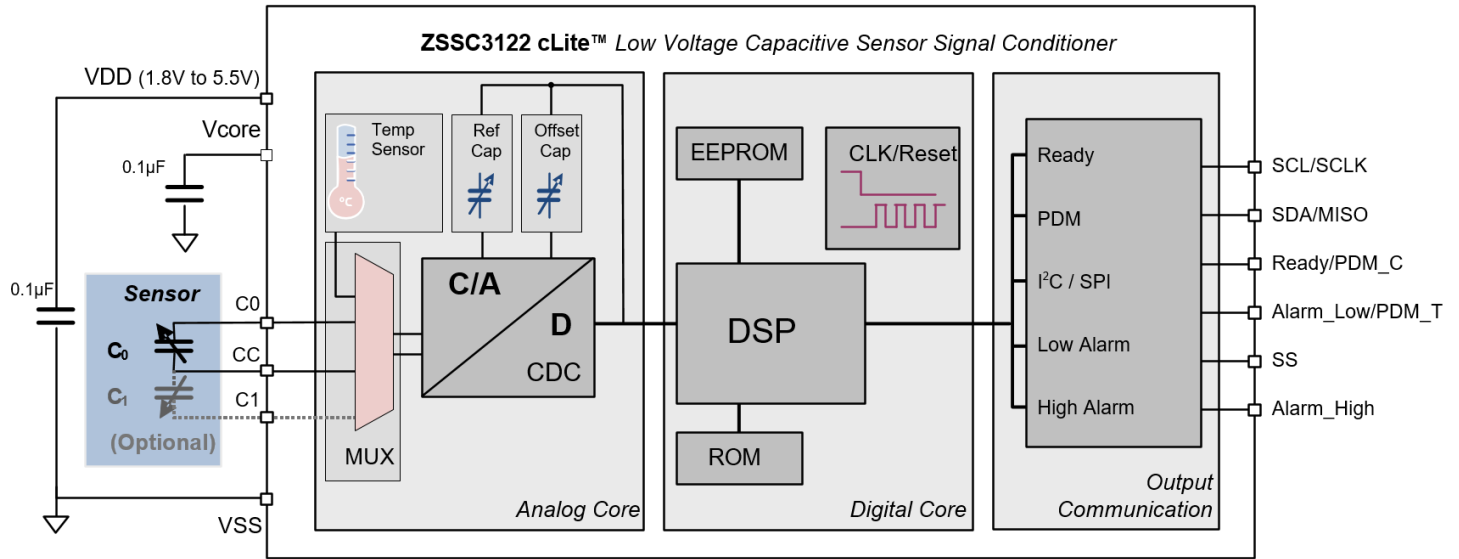
Application Circuit: Digital Output, Alarms



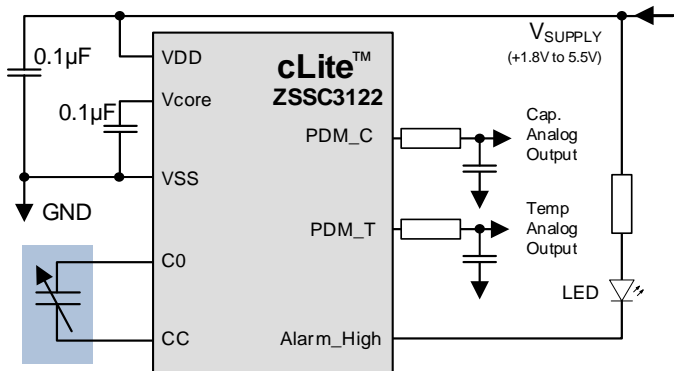
Features

- Maximum target input capacitance: 10pF
- Sampling rates as fast as 0.7ms at 8-bit resolution; 1.6ms at 10-bit; 5.0ms at 12-bit; 18.5ms at 14-bit
- Digital compensation of sensor: piece-wise 1st and 2nd order sensor compensation or up to 3rd order single-region sensor compensation
- Digital compensation of 1st and 2nd order temperature gain and offset drift
- Internal temperature compensation reference (no external components)
- Programmable capacitance span and offset
- Layout customized for die-die bonding with sensor for low-cost, high-density chip-on-board assembly
- Accuracy as high as ±0.25% FSO@ -20 to 125°C, 3V, 5V, V_{supply} ±10% (see data sheet section 1.3 for restrictions)
- Minimized calibration costs: no laser trimming, one-pass calibration using a digital interface
- Excellent for low-power battery applications
- Two interface options
 - I2C or SPI interface—easy connection to a microcontroller
 - PDM outputs (Filtered Analog Ratiometric) for both capacitance and temperature
- Up to two alarms that can act as full push-pull or open-drain switches
- Supply voltage: 1.8 to 5.5V
- Typical current consumption 650µA down to 60µA depending on configuration
- Typical Sleep Mode current: ≤ 1µA at 85°C
- Operation temperature: -20°C to +125°C
- Die or TSSOP14 package

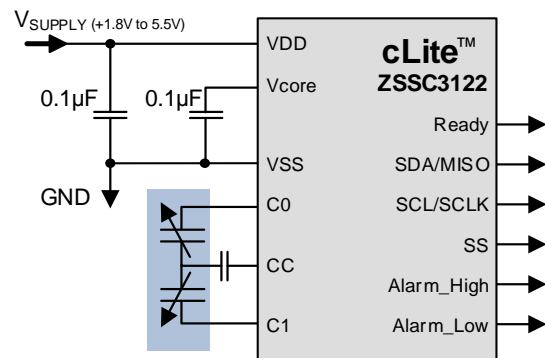
ZSSC3122 Block Diagram



Application: Analog Output



Application: Differential Capacitance Input



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