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# LDS6003

## PureTouch™ Capacitance Touch IC

The LDS6003 PureTouch™ controller empowers system designers to create streamlined, attractive, and reliable product designs, enabling the replacement of mechanical controls with capacitive touch buttons, sliders, and scroll wheels.

### LDS6003 Features

#### Versatile, accurate capacitance-to-digital converter (CDC)

- 500 kHz sigma-delta CDC
- 6 capacitance sensor input channels
- 2 ms update rate per active sensor

#### Integrated, automatic calibration algorithms

- Environmental compensation
- On-chip RAM to store calibration data

#### Integrated touch preference modes

- Strongest single touch
- Strongest two touches
- Unrestricted (all) touches

#### Ultra-low touch sensor power consumption\*

- Operating mode (typical): <math><150\ \mu\text{W}</math> ( $V_{DD1}=1.8\text{V}</math>)$
- Shutdown mode (typical): <math><1\ \mu\text{W}</math> ( $V_{DD1}=1.8\text{V}</math>)$

#### Flexible interface options

- SPI-compatible serial I/F
- I<sup>2</sup>C-compatible serial I/F
- Separate  $V_{DDIO}$  level for serial interface
- GPIO and Interrupt Output

\* Excludes I/F and voltage dependent  $V_{DDIO}$  current

## Description

The LDS6003 is a programmable capacitance-to-digital converter (CDC) designed for use with capacitive sensor arrays implementing touch-based input controls including sliders, scroll wheels, and buttons. Featuring 6 sensor inputs, the LDS6003 provides the flexibility to implement multiple touch inputs using a single controller.

The capacitive sensor inputs are directed through an integrated switch matrix to a 500 kHz sigma-delta CDC which senses changes in the external sensor array. When a sufficiently large change in capacitance occurs, a sensor activation is registered and the host processor is notified.

On-chip calibration logic continuously monitors the environment and automatically adjusts on-and-off threshold levels to prevent false sensor activation. The LDS6003 is offered with both SPI-compatible and I<sup>2</sup>C-compatible interfaces (active interface selected by I/F select pin) and features a general-purpose input/output (GPIO) and interrupt output for additional communication with the host processor.

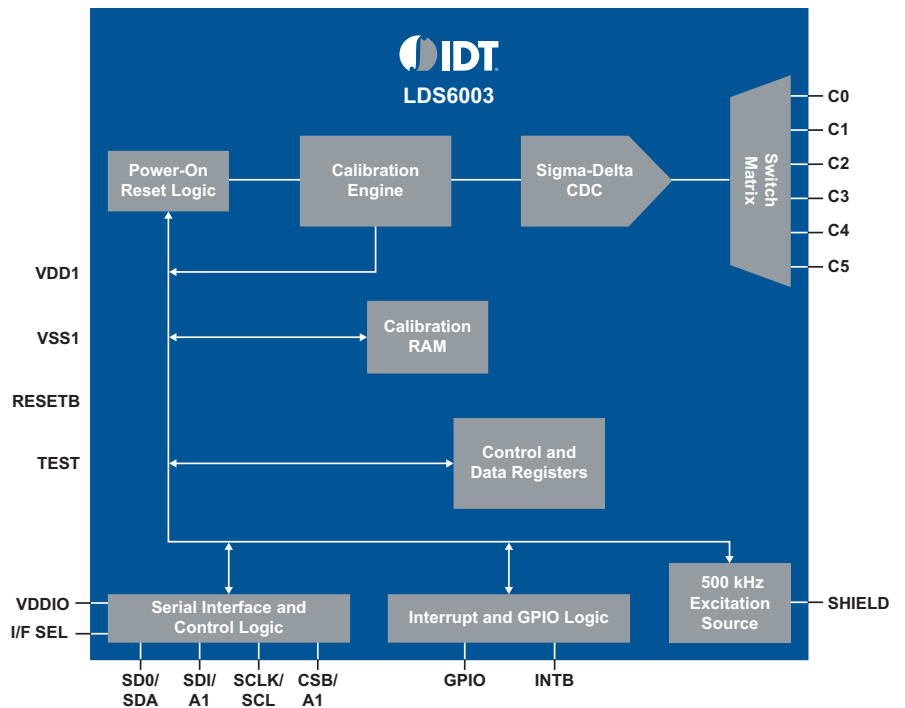


Figure 1. LDS6003 block diagram

### Flexible package options:

- 28 pin 4mm x 4mm QFN, 0.8mm max height
- 28 pin 5.3mm x 10.2mm SSOP, 1.83mm max height

### Power supply range:

- Touch supply (VDD1): 1.65V - 1.95V
- $V_{DDIO}=1.65V - 3.6V$

### Applications:

- Mobile handsets and smartphones
- Personal music and media players (MP3/MP4)
- Gaming devices
- Remote controls
- Television, audio/video
- Set-top boxes
- Multi-function printers
- Enterprise telephony

## Ideal solution for portable applications

The LDS6003 is optimized for minimal power consumption, with touch sensor circuits operating from a 1.8V supply voltage. In full power mode, sensor conversion and calibration occur continuously, minimizing the time between touch event and touch detection. With its ultra-low touch sensor power consumption of <150 uW (typical), the LDS6003 may be operated continuously in full power mode, even when battery life is of premium importance. The low power architecture of the IDT PureTouch™ solutions eliminates the need for introduced latency periods that can cause noticeable delays and degrade the user experience.

When touch inputs are not required to be active, the LDS6003 may be put into standby mode, reducing typical power consumption below 1 uW.

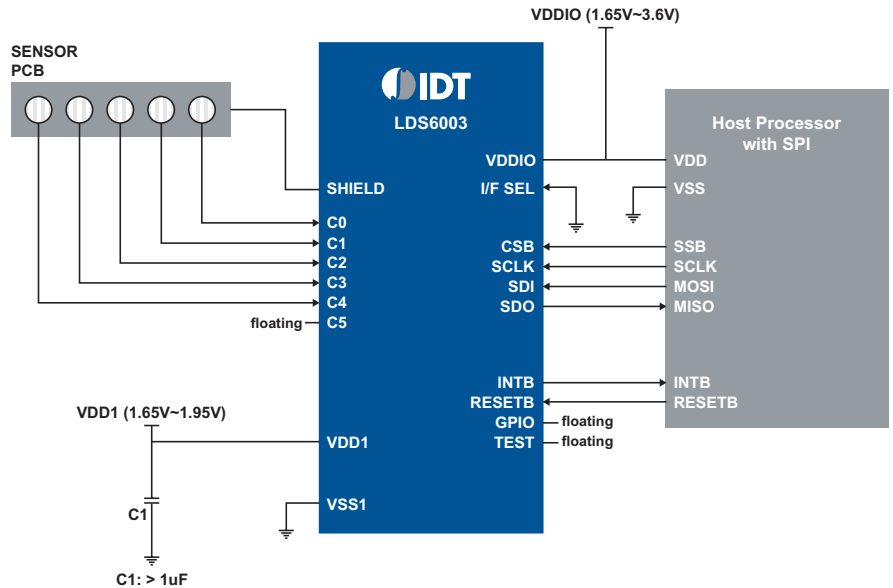


Figure 2. LDS6003 application diagram

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