PRELIMINARY

Sight Sound Touch
LEADIS®

VIBETONZ® READY

PRODUCT BRIEF
LDS6010

LDS6010

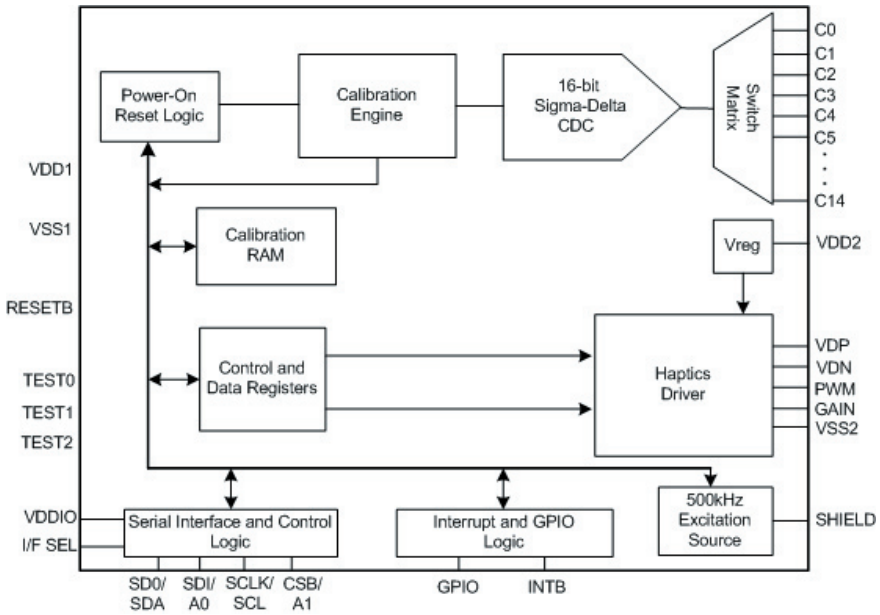
PureTouch™ Capacitance Touch IC with Integrated VibeTonz®-Ready Haptics Driver

The LDS6010 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. A built-in VibeTonz®-Ready haptics driver enables efficient integration of advanced tactile feedback without the need for a separate IC. Touch sensor inputs are directed through an integrated switch matrix to a 16-bit 500 kHz sigma-delta CDC which senses changes in the external sensor array. Featuring 15 sensor inputs, the LDS6010 provides the flexibility required to implement multiple tactile-enabled touch inputs using a single controller.

On-chip calibration logic continuously monitors the environment and automatically adjusts on-and-off threshold levels to prevent false sensor activation.

The LDS6010 is offered with both SPI-compatible and I^2C-compatible interfaces (active interface selected by I/F Toggle pin) and features a general-purpose input/output (GPIO) and interrupt output for additional communication with the host processor.

LDS6010 Block Diagram



LDS6010 Features

Versatile, Accurate Capacitance-to-Digital Converter (CDC)

- 16-bit, 500kHz sigma-delta CDC
- 15 capacitance sensor input channels
- 2ms update rate per active sensor

Full-Featured Haptics Driver

- Drives both linear and rotating actuators
- Intelligent PWM input enabling automatic standby mode
- Internal voltage regulator enables direct connection to Vbattery with no degradation in haptics effects

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

Low Power Consumption

- Operating mode (typical, haptics in standby): <150uW (VDD1=1.8V)
- Shutdown mode (typical): <1uW (VDD1=1.8V, VDD2=3.6V)

Integrated VibeTonz®-Ready Haptics Driver

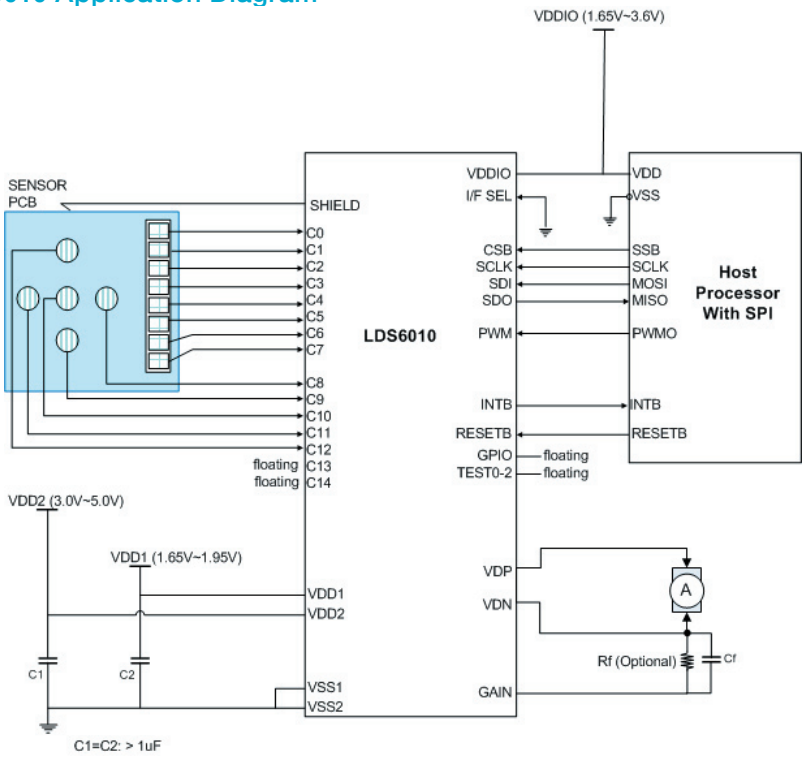
The LDS6010 features an integrated VibeTonz®-Ready haptics driver, ensuring compatibility with Immersion's VibeTonz® Platform of advanced haptics effects for enhanced gaming feedback, vibrating ringtones, and tactile confirmation for touch-based controls. Compatible with both ERM (eccentric rotating mass) and LRA (linear resonant actuator) vibration motors, the LDS6010 haptics driver supports crisp response times and a high degree of control over vibration magnitude and attenuation. An internal voltage regulator enables direct connection of the haptics driver supply to the system battery while still ensuring a consistent haptics experience across the entire battery discharge cycle.

Ideal Solution for Portable Applications

The LDS6010 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 continously, eliminating any latency between touch event and touch detection. With its ultra-low power consumption of <150uW (typical), the LDS6010 may be operated continously in full power mode, without the need for latency-ridden low power modes.

The total solution footprint is also optimized for portable applications, with the funtionality of multiple components consolidated into a single device. With integrated haptics driver functionality, the LDS6010 is a flexible solution combining the functionality of two discrete ICs into a compact 5mm x 5mm TQFN package with 0.75mm package thickness.

LDS6010 Application Diagram



Flexible Interface Options

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

Power Supply Range:

- Touch Supply (VDD1): 1.65V - 1.95V
- Haptics Supply (VDD2): 3.0V - 5.0V
- V_{DDIO}=1.65V - 3.6V

Small Footprint

- 40 pin 5mm x 5mm QFN, 0.8mm max height

Applications:

- Mobile handsets and smartphones
- Personal music and media players (MP3/MP4)
- Gaming devices
- Remote controls
- Television, A/V

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