



World Leader in Capacitive Proximity Sensing



Azoteq Introduces the IQS229 Capacitive Proximity and Touch Controller with Movement Detect

Azoteq introduces three new low cost capacitive proximity controllers

Azoteq on December 3rd, 2013 announced the release to market of the IQS227, IQS228 and IQS229. The IQS229 is the first capacitive proximity controller specifically designed for SAR compliance in mobile devices (IEC 62209-2, FCC KDB 616217).

The IQS229 incorporates a unique movement detector, which can be used in applications where proximity or touch detection is required for prolonged periods.

The IQS227 and IQS228 are new versions of the popular single channel IQS127 and IQS128 controllers. The IQS227/228 offer several improvements such as a lower operating voltage, lower power consumption, and more configurable options.

"The IQS229 is the first device to offer a solution to meet the latest FCC SAR (specific absorption rate) requirements for cell phones and tablets to reduce RF power when the device is in close contact to a human." said Kobus Marnebeck, VP of Marketing.

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Azoteq enables next generation user interfaces for users to interact naturally with products through capacitive proximity and touch

Implementing a Capacitive Swipe-Switch

Switches have been around since the start of electricity and to envision a world without switches seems almost senseless. Switching on and off is yet simple, but remains an integral component in all electronic circuitry.

The limitation of conventional tactile or electromechanical switches however, has increased the necessity and desirability of an electronic counterpart. The mechanical failure and relatively high cost of tactile switches are only two of the factors fuelling their abolition. With modern processing speeds that allow sampling periods in the nanosecond range, the switching transients or "bounce" of conventional switches do become an issue and a limiting factor.

Electronic switches such as capacitive touch sensors are becoming the technology of choice for modern applications. The requirement for invariable functioning of capacitive sensors is imperative. Sophisticated product specifications require better sensitivity, higher levels of safety, improved immunity against aqueous substances and ultra-low power consumption, especially for portable and battery operated devices.

Complete Application Note available [here](#).



The IQS229EV03 allows for easy evaluation of the IC

Advantages of using a Capacitive Switch



The advantages of capacitive switches over mechanical switches include:

- Simplified manufacturing
- Waterproof - no holes have to be made for the switch.
- No mechanical wear and tear (no moving parts).
- More intelligence - better user interfaces can be designed.

Prolonged detection with capacitive proximity sensors: A guide

By Riaan du Toit

The following guide provides a review of the types of proximity sensors for prolonged detection, followed by a look at capacitive sensing design specifically for occupancy-type solutions. A variety of algorithms will be evaluated to help select the most effective response for a specific application.

A brief overview of sensor types:

Infrared sensing

Infrared sensors are based on the reflection and the absence of infrared light. Advantages include directed sensing with a narrow field of influence and they are robust, especially against the effects of environmental drift. Disadvantages, however, include their expense, high power consumption, the inclusion of an aperture for light transmission and reception, and they are less effective when used on materials that absorb or scatter infrared light.

Accelerometer monitoring

Accelerometers are multi-purpose sensors that may be used to detect human interaction. They have the ability to sense acceleration in three dimensions, as well as orientation in relation to gravitational pull.

Advantages are that they are often already included in many multi-purpose digital devices, and they can be placed anywhere on a device.

Disadvantages are that area-specific sensing is not possible, and they are non-directional, only movement based.

Capacitive sensing

Capacitive sensing proximity solutions are

based on human or object interference with electrostatic fields. Most capacitive sensors compensate for larger, static system capacitance and focus on accurately measuring small capacitive differences. The ability to measure small differences is the key element of non-touch proximity detection.

Advantages are that there are ultra low-power options available, they provide area-specific sensing (slightly directional with electrode design), environmental shifts may cause favorable triggers, they are low cost. Disadvantages include temperature-dependent internal capacitors and environment-specific calibration at power-on.

Capacitive sensing sensitivity: Self- vs. mutual capacitance

There are two types of capacitive sensing technologies: mutual capacitance and self-capacitance. Although mutual capacitance is less dependent on a common reference (signal ground), the effects of a varying reference cannot be ignored. Some effects of this technology deem self-capacitance a safer option, especially with reference to area-restricted custom electrode designs. This article will focus on self-capacitance solutions in discussions on sensitivity.

Obtaining sensitivity

Capacitive sensing uses either the charge transfer method, a relaxation oscillator circuit in which variance in capacitance is translated into variance in frequency, or a fixed frequency AC signal, where the variance in capacitance is translated into voltage differences using a fixed known capacitor and an unknown capacitor.

The full article is available on [EDN](#).

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"The unique movement detector prevents the output from clearing when the tablet or phone is held for long periods," said Kobus Marneweck, VP of Marketing.

The IQS229 movement detector can also be used in many other applications such as headphones, wearable devices and medical devices to detect when the device is being used and power down when not in use.

Features:

- IQS229 - SAR compliance according to IEC 62209-2 standard and FCC KDB 616217 - D04 SAR
- IQS228 - DYCAL Intelligent Hysteresis
- IQS229 - Movement detector
- Internal Capacitor Implementation
- Automatic Electrode Tuning Implementation
- Supply voltage: 1.8V to 3.6V
- Minimal external components
- User programmable (OTP) functions
- I/O Sink or Source selection
- Time-out for stuck key detection
- Proximity and Touch sensitivity
- Touch: 6 mm plastic, 10 mm glass
- SAR Proximity: 2.5 cm
- IQS227, 228 - 6 pin TSOT23-6
- IQS229 – DFN-10

Pricing and Availability

The IQS227 will be priced at \$0.21, the IQS228 at \$0.23 and IQS229 at \$0.27 all in quantities of 1000. For orders of greater than 1M the IQS227 is priced at \$0.11.

Samples and production are available now. More information can be obtained here:

[IQS227](#)

[IQS228](#)

[IQS229](#)

[Full Press Release Available here.](#)



Applications

- Handheld detection for Tablet PC's
- On-ear detection for mobile phones
- Human Interface Devices
- Proximity Detection Enabled Backlighting
- Touch and proximity without host controller
- Wearable devices
- White goods and appliances

Happy Holidays!

Azoteq has released a many new ICs and evaluation kits in 2013 such as the IQS229, IQS333, and IQS550 Touch Screen kits and plan to continue to bring you innovative solutions in 2014!

With the holidays here and the New Year approaching, everyone here at Azoteq wishes that you and your family have a *safe and joyful holiday!*



Looking forward to helping you in 2014!

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