World Leader in Capacitive Proximity Sensing

An Intro to Azoteq

Azoteq is the world leader in intelligent switch, capacitive proximity and touch solutions for next generation user interfaces. We offer solutions for LED lighting, capacitive proximity and touch switches, non-ITO LCD touch screen displays, 3D touch screens and ultra-robust capacitive touch through metal applications. Azoteq has over 20 IC products in production.

Azoteq is a fabless semiconductor company founded by Dr. Frederick Bruwer in 1998. The company initially developed the LightSense(TM) range of products that enabled intelligent control for LED flashlights and headlamps. In 2004 the company decided to focus on the emerging touch and proximity markets and developed a range of products based its intellectual property.

Since 2004 Azoteq was the first to integrate the reference capacitor on chip in a touch controller, first to incorporate on chip calibration, first to combine a single electrode for capacitive proximity and touch sensing, first to incorporate on chip RF detection and first to enable capacitive sensing through a top metal deformation plate.

Articles

To enable next generation capacitive user interfaces and intelligent switch applications for users to interact naturally with products through capacitive proximity and touch

Sensitivity Breakthrough in Capacitive Proximity Sensing

Azoteq's ProxSense® can sense down to 20 atto Farads and with a Signal-to-Noise ratio of 1000:1

The latest generation of Azoteq's proximity and touch controllers can sense capacitive changes as small as 20 atto Farads. The sensitivity allows reliable proximity detection of over 300 mm or 12 inches on practical electrodes. One atto Farad (10^{-18} Farads) is 1 million times smaller than one pico Farad (10^{-12} Farads). Typical competitive devices can detect changes of 0.1 to 1 pico Farads.

Azoteq combined these breakthrough levels of sensitivity, industry leading (~1000:1) SNR and RF immunity into cost effective capacitive controllers. These benefits relax the common design constraints normally imposed on designers and the automatic tuning algorithm ensures that no calibration is required in manufacturing.

Azoteq's Mission

To add new capabilities that allows our customers to differentiate their products.

To deliver the highest quality products on time.

To always exceed customer's expectations.

Azoteq will be releasing a next generation family of controllers during the first and second quarters of 2012 based on the ProxSense® technology.

"Azoteq's industry leading sensitivity and robustness open numerous applications such as intelligent user guidance even before physical contact is made in cost sensitive capacitive sensing applications", said Frederick Bruwer, CEO of Azoteq.

Designing Capacitive Touch Systems

The user interface of personal electronics has become critical to the success of products. And capacitive touch sensing has become the most popular user interface technology.

Designers face challenges like electromagnetic susceptibility, parasitic capacitance, enclosure effects, variety of overlay materials and demands on low power consumption. Electrode tuning simplifies the design and improves signal to noise ratio (SNR) and reliability.

A touch controller with auto tuning maximizes sensitivity, greatly reducing the conventional constraints on PCB layout, limits to overlay thicknesses & materials and negating the need for calibration during manufacture.

The advantages of automatic antenna tuning

· Compensation for parasitic capacitances

· Higher signal-to-noise (SNR)

· Large degree of freedom in PCB layout and materials due to high SNR

· Adjustable sensitivity

· Calibration free manufacturing

· Higher EMI immunity

· Lower EMI radiation

· Proximity detection from the same touch electrode

About ProxSense®

ProxSense® provides proximity & touch sensor controllers for a wide range of applications. The simplest and easiest to use are the single channel controllers for proximity and touch sensing.

Applications include find-in-the-dark and on/off switches for lights, appliances, office equipment and many more.

The multi-channel self capacitance family allows sensing of 2 to 16 channels and the multi-channel projected family from 2 to 8 channels.

These devices can be used for switches, keypads, sliders and scroll wheels. Applications include TVs, kitchen appliances, office equipment, industrial controls and medical equipment.

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This allows designers to use thick overlay materials up to 50 mm or more, unusual overlay materials such as wood and touch buttons in extremely small spaces. With ProxSense® a touch key is easily realized with mere edge plating on a PCB. Proximity detection is natively offered on all touch key controllers, opening up possibilities for a more intuitive user interfaces such as wake-up from standby, to pre-emptive menu selection and automatic backlight illumination.

ProxSense® was developed and patented from the ground up using novel analogue design techniques for ultra-sensitive capacitive measurements. The result is a proximity and touch controller that can sense changes of 20 atto farads in projected capacitance mode and 200 atto farads in self capacitance mode. In contrast with common perception, Azoteq has proven that long range can reliably be achieved with projected capacitance. R&D in novel micro-electronic designs allows for this ground breaking sensitivity, whilst maintaining industry leading ESD immunity and low current consumption.
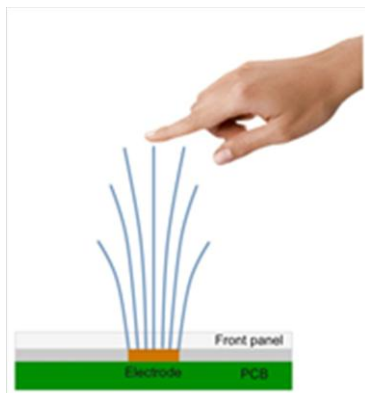
Front panel
Electrode   PCB

"Azoteq's industry leading sensitivity and robustness open numerous applications such as intelligent user guidance even before physical contact is made in cost sensitive capacitive sensing applications", said Frederick Bruwer, CEO of Azoteq.

 "ProxSense® is also ideal for battery applications since consumption is less than 10 micro amperes while sensing proximity" he added.Azoteq will be releasing a next generation family of controllers during the first and second quarters of 2012 based on the ProxSense® technology.

Device Features

- 2,3,9 & 12 Channels
- Self- and Projected capacitance modes
- Proximity & Touch on each channel
- Distributed Proximity channel formed by multiple keys
- On-chip hardware compensation for sensitivity reducing objects
- I^2C interface
- Automatic tuning to optimum sensitivity
- Supply Voltage 1.8V to 3.6V
- Multiple Low Power Modes
- Internal voltage regulator and reference capacitor
- Large proximity detection range
- Automatic drift compensation
- MSOP-10 and QFN-16 3x3 packages

Tips on how to increase proximity range

Trying to incorporate proximity into your project or device? We have a couple of tips that just might help you.

One great thing about Azoteq's wide range of ProxSense® products is that the touch and proximity sensor can share the same electrode, thus saving room on your PCB.

Some ways to extend your proximity range are:

- Large electrode (i.e. 100 x 50 mm copper fill on your PCB)

- Long wires or traces running down the side of your board

- Conductive tape or paint

Keep in mind that the larger your sensor electrode, the more sensitive your touch sensor will be. Please adjust your touch threshold accordingly!

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