

Ultra-miniature wireless implantable pressure sensor platform for medical applications

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Smart systems integrate more and more miniaturized sensors to interact with their environment. Pressure measurement is a key parameter for many systems among medical devices. Physiological pressure needs indeed to be carefully monitored to control and treat patient health disorders. Nevertheless most medical systems have their own performance specifications and integration requirements depending on the location in the body (e.g. artery, retina, intracranial, etc..) and in the fluid from which the pressure must be taken out from (e.g. blood, saline, spinal fluid or others). However they feature some common typical requirements such as:

- Biocompatible package linked to the system and the physiological part
- Specific small form factor
- Low power consumption or wireless powering
- Wireless data transmission in a large number of cases
- Very low drift in long term implantation

In order to address these needs Tronics Microsystems has developed an ultra-miniature capacitive absolute pressure sensor platform, based on:

- titanium hermetic casing adapted to long term implantation
- customizable ultra-miniature capacitive MEMS transducer (pressure range, sensitivity, etc)
- small form factor 16 bits ASIC converter featuring an integrated temperature sensor and EPROM for storing non linearity and temperature compensation coefficients and accurate calibration
- optional wireless or wired data transmission (SPIE, I2C,...) and powering



Ultra-miniature pressure sensor platform

The pressure sensor platform provides high resolution and linear measurements (both at 10^{-4} FS). The integrated temperature measurement allows a compensation of the self-heating of the electronic inside the package. The titanium package allows in-vivo long term implantation (10-15 years) and has been developed for achieving high accuracy, low drift and high resolution.

Tronics customizes this platform using specific customers' requirements and application constraints. Customers' benefit from a fully adapted product at lower NRE fees and reduced development risks with typical implementation programmes taking 6 to 12 months.