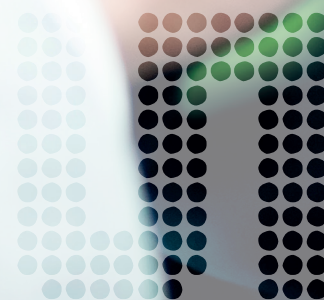


Capacitive Presence Sensing

ams.com



Presence Detection using capacitive Sensing

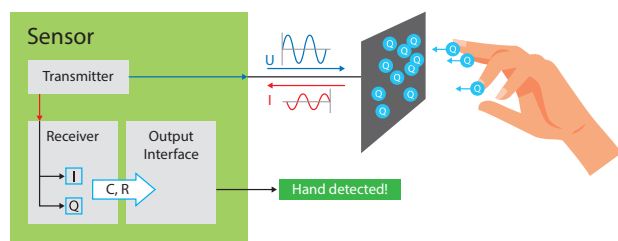
- Enabler for reliable driver monitoring systems
- High resolution
- Ultra low power consumption
- Reliable, automotive qualified products

**Sensing
is life.**

General Description

ams, a global leader in capacitive sensing has introduced a reliable and precise human presence sensor. The capacitive sensor measures the impedance that originates between a target (conducting plate) and a human being. This high precision performance sensor also supports a multitude of diagnosis features, which meet standard functional safety requirements. The capacitive sensing IC is specifically designed to work under high electromagnetic disturbances (EMC) such as the operation of mobile phones in the car. The robust EMC design allows customers to create demanding safety-critical applications.

Function Principle



The sensor has a transmitter and receiver block. The transmitter supplies the load (e.g.: a capacitor consisting of a conducting plate and a human hand) with an alternating voltage signal. The sensor captures the reactive load current. The current response is converted to a voltage and then I/Q-demodulated. After filtering and conversion, the outcome is the impedance of the load (capacitive and resistive information). This means that the closer the human hand gets to the conduction plate, the higher the measured capacity.

This allows detection, not only in ideal situations, but also for cases where environmental changes (e.g. wet hand, gloves, ...) have added a parallel resistive component along with a change in the capacitance.

Benefits

- Touchless, wear-free technology
- Non-mechanical detection - recognition of parasitic resistance
- Low EMI
- Capacitive accuracy
- Best-in-class resolution over wide frequency range and in high frequency domain
- Ultra low power consumption
- Wide capacitive dynamic range
- Active Shielding

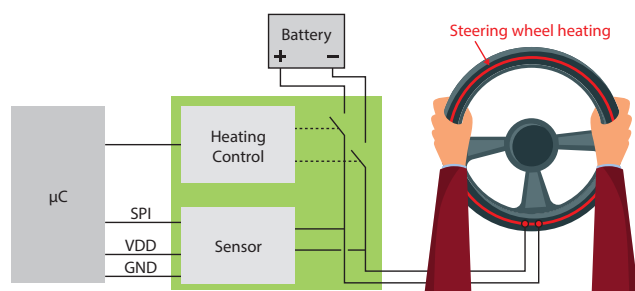
Applications

- Autonomous driving applications e.g. Hands-on steering wheel detection
- Detection of any human presence inside a vehicle, e.g. seat occupancy detection
- Detection of any human presence exterior of vehicles e.g. Automatic trunk opener (Trunk opens automatically and touchless by detection of human foot near the sensor only)

Related Products

- AS8579 – capacitive sensing

Application: Hands-on detection integrated into heating



The future are vehicles with the ability of autonomous driving. In this case, there are several driver-monitoring features necessary.

One typical application for autonomous driving is detection of human hands on the steering wheel, where ams capacitive presence sensor fits in perfectly. The heating plates can also be used for sensing capacity (impedance) between Steering wheel and human hand.

In case of sensing the impedance, it is not that easy to fool the system, e.g.: fooling system by putting an object (water bottle) on the steering wheel