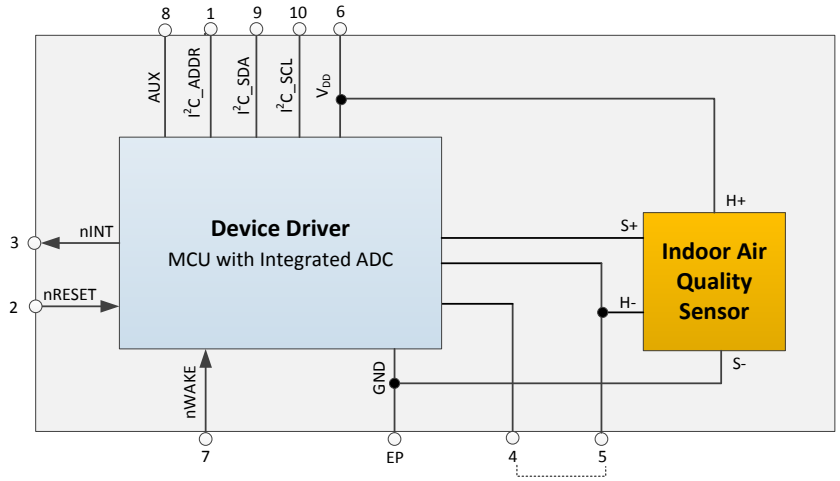
CCS811B Product Brief

Ultra-low power digital gas sensor for monitoring indoor air quality

The CCS811 is an ultra-low power digital gas sensor solution which integrates a metal oxide (MOX) gas sensor for monitoring indoor air quality (IAQ) including Carbon Monoxide (CO) and a wide range of Volatile Organic Compounds (VOCs) with a microcontroller unit (MCU), a Analog-to-Digital converter (ADC), and an I²C interface.



CCS811 Block Diagram

CCS811 is based on Cambridge CMOS sensors unique Micro-hotplate technology enables a highly reliable solution for gas sensors, very fast cycle times and a significant reduction in average power consumption vs. traditional MOX gas sensors.

The integrated MCU manages the sensor drive modes, ADC measurements and raw sensor data measured while detecting VOCs. The I²C digital interface significantly simplifies the hardware and software design, enabling a faster time to market.

CCS811 supports intelligent detection algorithms to process raw sensor measurements to represent equivalent CO_2 (eCO_2) levels or TVOC measurement in real world environments, where the main cause of VOCs is from humans.

CCS811 supports multiple measurement modes that have been optimised for low-power consumption during an active sensor measurement and idle mode extending battery life in portable applications.

CCS811 is available in a 10 lead 2.7 x 4.0mm, 0.6mm pitch LGA package.

Features

- IAQ Gas sensor
- Integrated MCU with ADC
- I²C digital interface
- Optimised low-power modes
- Compact 2.7x4.0 mm LGA package
- Proven technology platform

Benefits

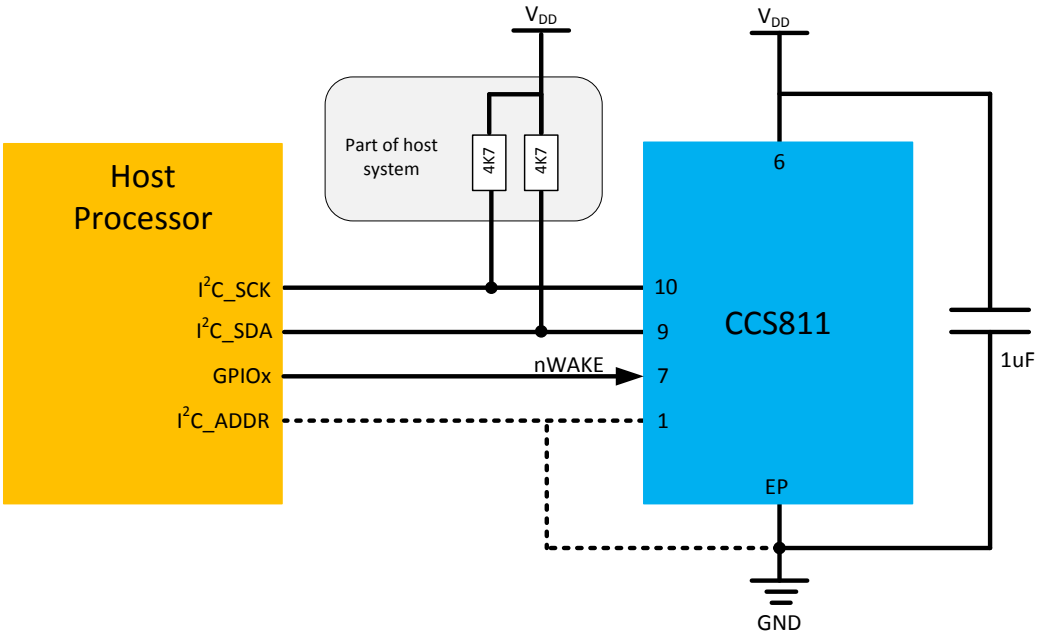
- On-board processing to reduce requirement on host processor
- Fast time-to-market
- Extended battery life
- Reduced component count
- Suitable for small form factor designs
- Highly reliable solution

Applications

- IAQ monitoring for Smartphones, accessories and connected home devices

Recommended application circuit

The recommended application circuit for CCS811 is shown below:



Notes:

1. Pull-up resistors for I²C SCK and I²C SDA assumed will be part of host system

Host system software requirements

1. The minimum level of driver support that a host system needs is read and write I²C transactions where the nWAKE pin is asserted at least 25us before the transaction and kept asserted throughout

    - I²C Write transactions of 1-N data bytes
    - I²C Read transactions of 1-N data bytes

2. An Interrupt handler is also recommended to tell the application code that the device has asserted an interrupt