

RAA2S4704

Multi Channel Impedance Measurement IC

Description

The RAA2S4704 is a member of Renesas' family of mixed signal sensor ICs that measure impedance. Capacitance and conductance information can be calculated based on the acquired I/Q data. The IC features a wide frequency range and various configurable parameters of the Analog Front End (AFE).

A configurable measurement scheme of the attached sensors enables fastest possible measurement rate depending on the connected sensor/source. Measurement is started triggered on request for a defined set of configuration.

Acquired I/Q data can be read via SPI Interface.

The RAA2S4704 electromagnetic compliance is tested according to IEC 161967-4 (conducted emission), IEC 62132-4 (conducted immunity) and IEC 61967-8 (radiated emission) standards. All sensor inputs are short circuit protected and can handle over-voltage up to 18V for SIO pins (subject to conditions, see Absolute maximum ratings table).

Applications

- Hands off detection (HOD)
- Capacitive sensing and impedance measurement

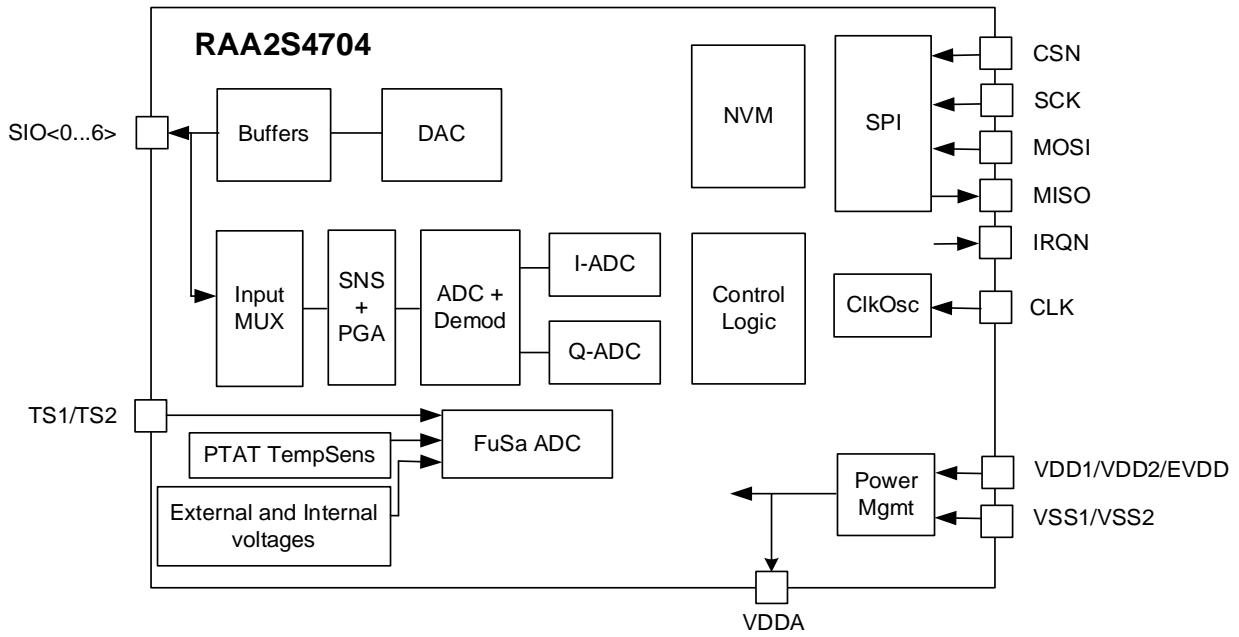
Available Support

- Evaluation kit and supporting documents
- Application Notes, Functional Description documents
- Sample code for SW support

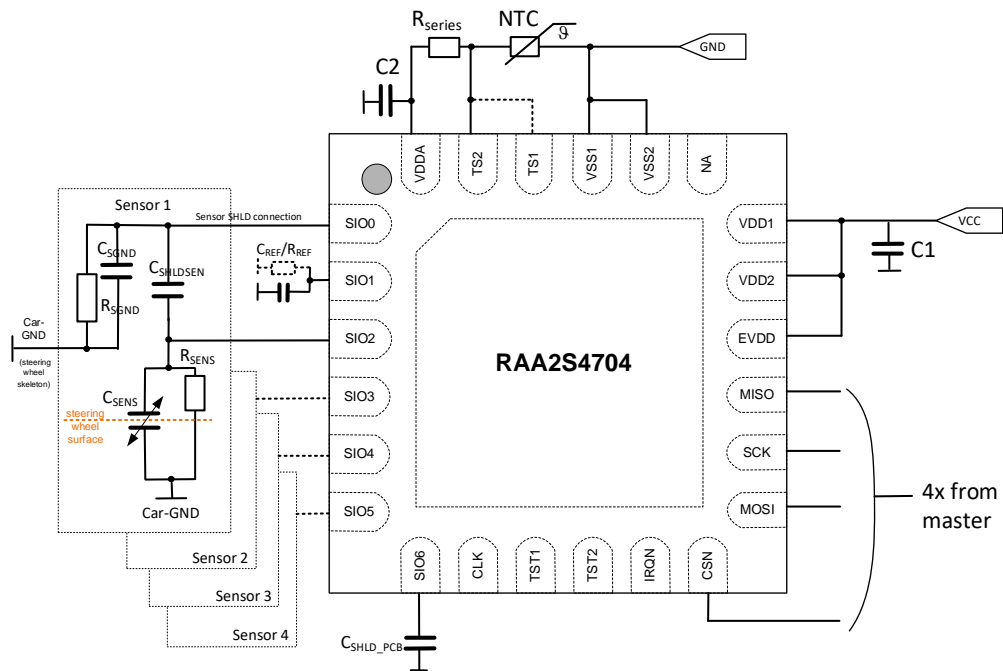
Features

- AEC-Q100 qualified QFN24 package (4x4mm)
- Provides data for impedance calculation (data proportional to in-phase and quadrature phase components of impedance) for up to seven measurement channels (SIO)
- All seven channels are equivalent, maximum three channels can be activated at the same time. For example, one channel is used for measuring the impedance (DUT or reference impedance) and up to two channels as shield
- Fast measurement rate with minimum 0.4ms conversion time per channel
- Adjustable measurement frequency between 50kHz and 150kHz
- Internal and external temperature sensor
- Up to 16 flexible adjustable measurement schemes:
SIO input, gain, driver strength, averaging and non-harmonic excitation frequency
- Scalable measurement ranges up to 3200pF
- High linearity: up to $\pm 1.5\%$ FS
- Sensitivity without averaging up to 5fF/LSB
- Supports 3.3V and 5V supply, power saving mode
- Supports heating and sensing on the same foil
- 18V over-voltage robust input channels
- Development process compliant with ISO26262 ASIL B
- Background processed data acquisition for self-supervision and sensor diagnostics
- Internal oscillator with external clock input option
- NVM for IC calibration and traceability data
- Ambient temperature range between -40°C and 105°C

Generic Block Diagram



Application Circuit Example



Ordering Information

Part Number	Description and Package	MSL Rating	Carrier Type	Temperature
RAA2S4704B3HNP#JAE	AEC-Q100 qualified QFN24 package, 4mm x 4mm	1	Tape and Reel	-40°C to 105°C