

PE5004 Capacitive Sensor Matrix Control IC

The PE5004 opens new opportunities for capacitive based sensor arrays, setting milestones in performance, power consumption and cost per sensor node. It is not only capable of scanning large sensor arrays in very short time and high resolution, but also consuming unrivaled low power.

Description

The PE5004 is a high precision capacitive sensing circuit which uses amplitude modulation for very fast stimulating and reading of capacitive sensor arrays. A number of up to 100 sensors per chip can be selected by user. By implementing a controllable sinusoidal generator with a wide range of frequencies and amplitude the spectrum of suitable sensor capacitance is significantly increased for a large range of applications. The implemented DAC with variable reference voltages guaranties proper function over varying environmental conditions and provides digital controlled self calibrating capability. For low power operation a sleep mode with ultra low standby current and programmable wake-up intervals is implemented. By means of a multi-master I²C Interface several detector circuits can be controlled by one MCU.

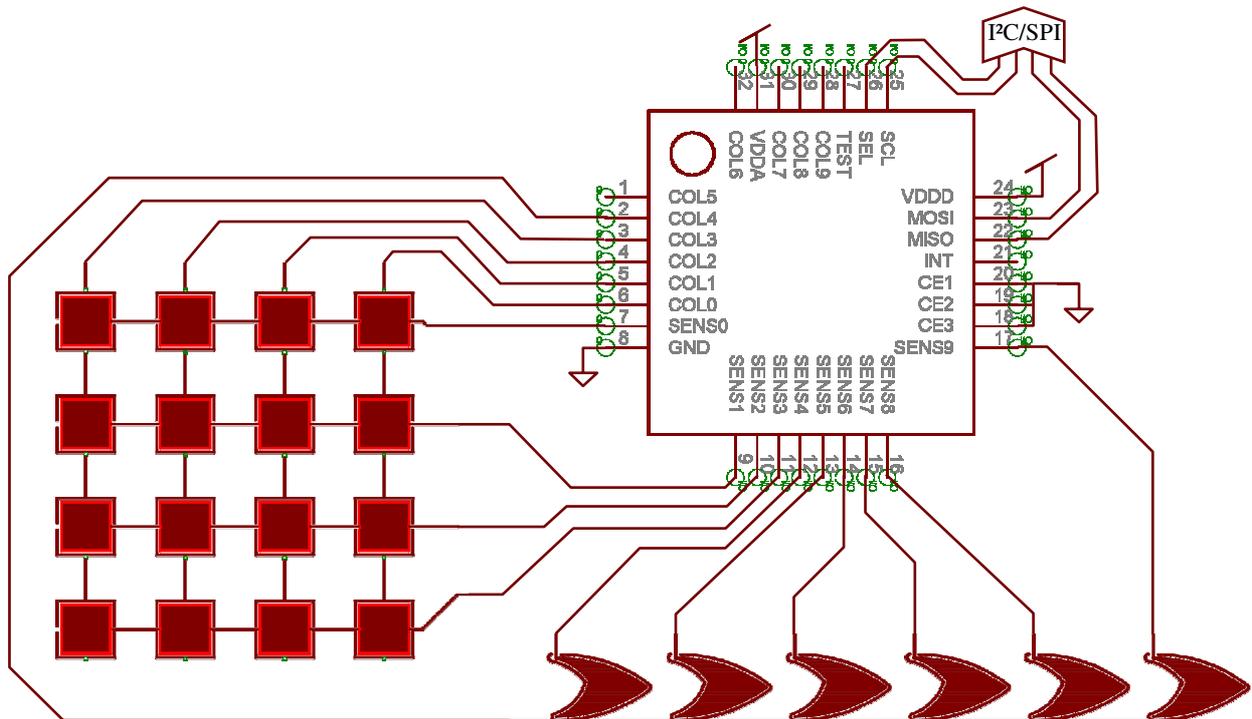


Figure1: application example PE5004 with a 4 x 4 capacitive button array and 6 button slider

Features

- large amount of capacitive sensors usable
- high flexibility with wide range of supported sensor capacitance
- very fast acquisition time of 15ms for 100 sensors
- very high Resolution of 10bit for each sensor
- Low operating current : < 3mA for 100Sensors at 10ms cycle
< 5 μ A for 10 Sensors at 1s cycle
- sleep mode with programmable wake up intervals
- no need for grounding of scanned object
- highly sensitivity in face of large parasitic capacitances
- very robust on noise
- self calibrating and temperature drift compensated
- multiple chips controllable with one μ C

Applications

- capacitive touch screens
- capacitive sensor arrays
- capacitive keypads and keyboards
- finger/palm print scanner
- capacitive switches, buttons, slider
- capacitive fluid control
- size/weight dependent inventory control

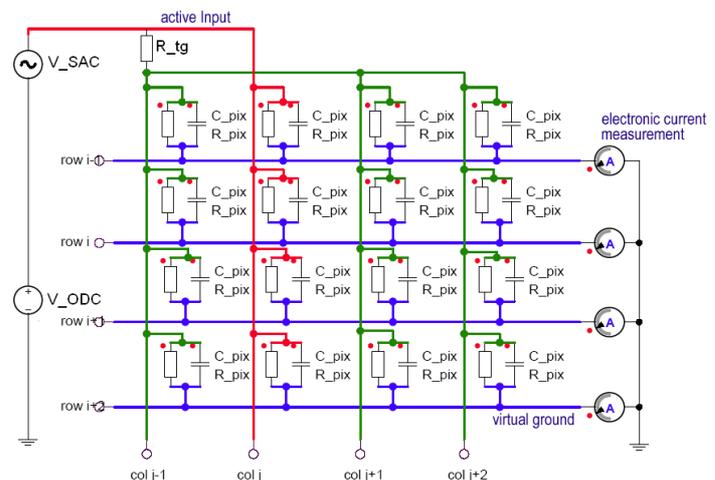


Figure2: equivalent circuit of a sensor element and measuring circuit

Parameters

• supply voltage	3.3V
• operating temperature	-40..80 °C
• operating current	< 3mA
• standby current	< 5 μ A
• sensor capacitance	0.5..50pF, up to 100 sensor nodes
• acquisition time	< 150 μ s/sensor
• resolution	10bit
• interface	I ² C / SPI compatible

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