

PE5004 Capacitive Sensor Signal Conditioner in a toy keyboard

A DESCRIPTION OF THE OWNER.			
PE5004ES	PESO04ES	PE5004ES	PE5004ES
HI5880.1	#15880.1	H15880.1	HIS880.1
@ 1935	@ 19595	@ 9936	@ 0535
PESO04ES	PESOD4ES	PES004ES	PE5004ES
H15880.1	HIS800.1	HIS880.1	H1580.1
@ (1936	@ 0836	(*) 0535	@ R536
PESOD4ES	PESO04ES	PE5004E5	PE5004ES
H15880.1	WIS80.1	HIS880.1	H15880.1
(1) 0535	@ 0555	@ 1935	@ 0535
PE5004ES	PE5004ES	PESO04ES	PE5004E5
HI 5880.1	HI5880.1	H15880.1	HI5680.1
@ 1935	@ 0936	@ 0536	@ 0935





PE5004 capacitive sensing Features

Features

•Suitable for two capacitive measurement styles :

- •sensing of small capacity changes in 10x10 mutual capacitance sensor arrays
- •sensing of self capacitance approximation and touch sensors
- •Controllable stimulation for wide spread of suitable sensor capacitance, layout and material
- •Highly sensitive, coatings of over 30mm for self capacitance sensors possible
- •Very low acquisition time of 15ms for 100 sensors in a matrix
- •High resolution of 10bit for each sensor
- •Sleep mode with programmable wake up intervals
- •Low operating current (< 3mA at max. speed)
- Low-Power Mode for large Sensor shapes
- •Very low standby current during sleep (1µA)
- •Programmable Number of Sensors for optimal acquisition time and current consumption
- •No need for grounding of scanned object
- •No need for sampling capacitors or external resistors
- •High sensitivity to large parasitic capacitances
- •Very robust against noise
- •Temperature drift compensation
- •Multiple sensor arrays and PE5004 chips controllable with one μ C:

up to 700 sensors through I²C, up to 2000 sensors through SPI (more possible at lower speed)



PE5004 capacitive sensing EVA5004 Evaluation Kit











Multi-touch mini synthesizer







This toy synthesizer Organ demo is as simple as this !

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DAC and amplifier board

In this application not used PE5004 on EVA5004 Kit

Cypress controller (no CapSense!)

 used 2nd PE5004 on EVA5004 board

The original EVA5004 board has just been cut (no touch button field) and reused in the application. Development environment was the software PE provides and the Cypress development suit.



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Non-overlapping 60 x 60mm²

Single buttons, different shapes, simplest works best for proximity (left)

At 105mm x 95mm 200dpi sensitivity Two layer PCB Multitouch matrix





PE5004 with single layer 4x4 matrix and 6 button slider – matrix 75x75mm², slider 130x12mm²



very accurate, high resolution slider





Touch button system:

- rugged aluminum case
- >5mm thick glass
- imprint surface structure for haptics perception
- Slider with 8 sensors
- On- and Off- switch



Ceran Cooking field button development







PE5004 capacitive sensing advantages

Advantages of the PE5004 IC

- no external components required
- very simple interfacing to any microcontroller (SPI or I²C)
- Sensor structure can be extremely simple and robust
- Low sensitivity to EM interferers (with proper sensor design)
- Cheapest system per node when fully used
- Up to 100 sensors per chip
- 10 bit resolution per node
- Very fast conversion rate
- Lowest power consumption per node
- Cascadable



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