Proximity Switch

By means of PE5010

SERMA PRODUCTIVITY ENGINEERING

Introduction

The PE5010 is an integrated circuit to measure capacitive sensors. Typical examples are pressure or acceleration MEMS sensors.

This application note deals with the acquisition of proximity switch keypad signals. A printed circuit board keypad can be designed as a static capacitance. If a finger is close to the keypad, a change of the capacitance value will occur. This change can be detected by PE5010.

For more detailed information about the PE5010 please refer to the corresponding datasheet.

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1 Revision History

Version	Date	Changes	Page
Initial Version 1.0	10/2010		

2 Keypad Layout

The following six different keypad layouts have been tested under different conditions.

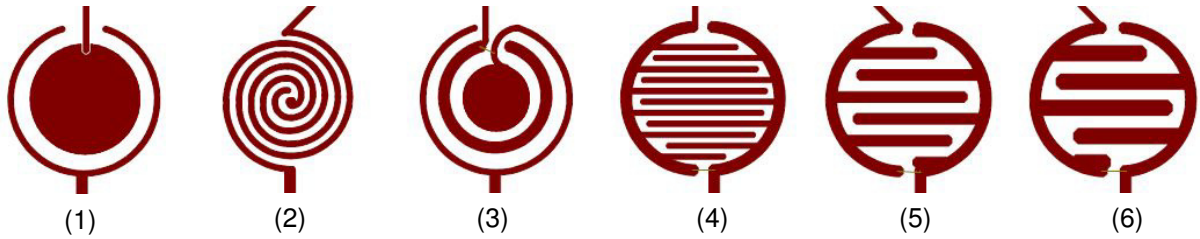

Figure 1 - Overview of tested keypads

All keypads were built without cover, with a plastic panel cover (thickness 1.6mm) and a glass plate cover (thickness 4mm) on the top of the PCB layouts. They were tested by moving the finger close to the surface of the keypad cover.

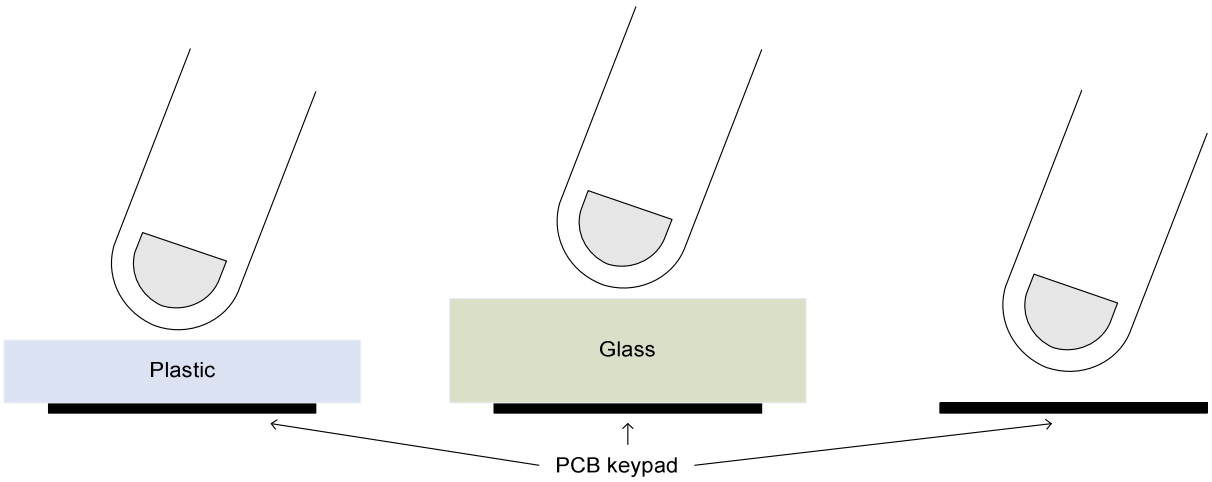

Figure 2 - Test modes

All tests were made at room temperature. Good results were achieved with the layouts 1 and 5. The best behavior was reached with keypad layout no. 6 which is recommended for touch applications.

3 Application

Up to four keypads can be connected to the PE5010 – two at each channel. Both channels can be measured independent of each other, whilst the two keypads at a single channel will be measured in differential mode and cannot be used as multitouch keys.

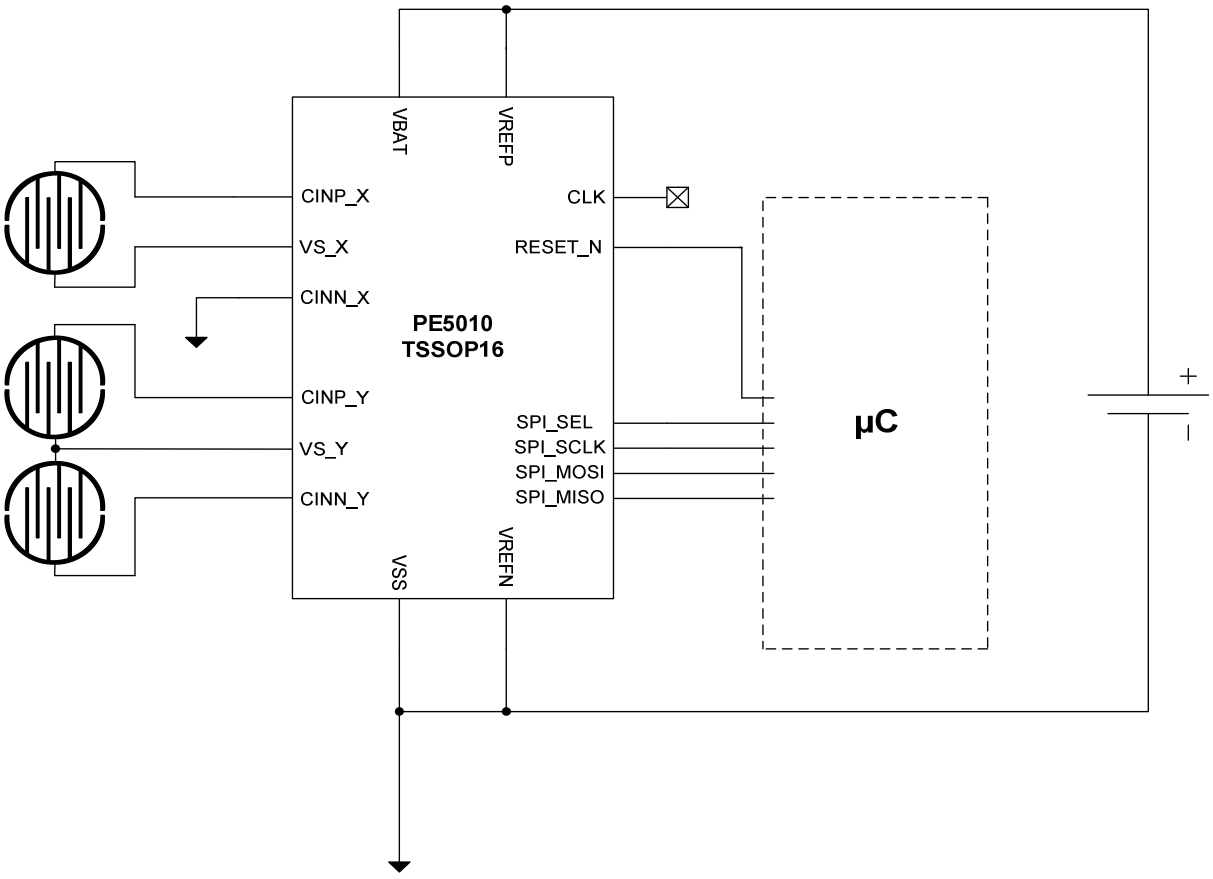

Figure 3 - Application example

Figure ***3*** shows one possible application with one keypad at channel X and two keypads at channel Y. A microcontroller with SPI is necessary to control the PE5010 and read the measured values. For further detailed information please refer to the datasheet of PE5010 and the application note “How to connect a sensor to the PE5010”.

4 Conclusion

The PE5010 integrated circuit can be used with any microcontroller featuring SPI. It is suited for contactless keypad applications. Two keypads can be used simultaneously (channels are multiplexed). Up to four keypads are possible, while only one keypad on a channel is usable at the same time. The switches can be covered with a plastic panel or glass plate.

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