

Proximity Capacitive Touch Sensor Controllers

MPR031/2

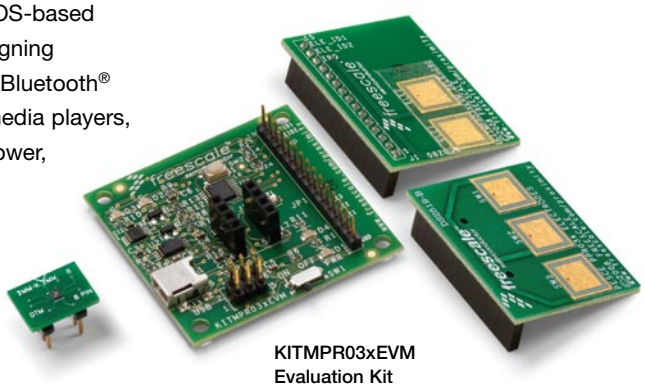
2- or 3-pad touch sensor controllers

Energy Efficient Solutions by Freescale™

Overview

Mechanical buttons and switches for touch user interfaces are becoming a thing of the past. Proximity capacitive touch sensors in simple linear or rotational sliders offer significant advantages for numerous applications. They are more convenient to use with no moving parts to wear out, more energy efficient and are more easily integrated to create an intelligent system. Freescale's MPR031 and MPR032 proximity capacitive touch sensor controllers are CMOS-based state machines that simplify designing numerous touch applications for Bluetooth® headsets, mobile phones, multimedia players, remote controls and other low-power, handheld, electronic products.

The MPR031 and MPR032 devices have several implementations to use in your design including touch pads and switch replacements. The MPR03x devices control up to three touch pads. The MPR03x can communicate via the inter-integrated circuit (I^2C) protocol and is optimized to manage two electrodes with interrupt functionality, or three electrodes with the interrupt disabled. It can accommodate a wide range of implementations due to increased sensitivity and a specialized feature set.



KITMPR03xEVM
Evaluation Kit



DEMOMPR031
Demo Board

Freescale offers a broad portfolio of proximity sensors for products ranging from appliance control panels to portable electronics. Target markets include consumer, appliance, industrial, medical and computer peripherals.

MPR031/2 Implementations

- Switch replacements
- Touch pads

Applications

- PC peripherals
- MP3 players
- Remote controls
- Mobile phones
- Lighting controls

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Features.

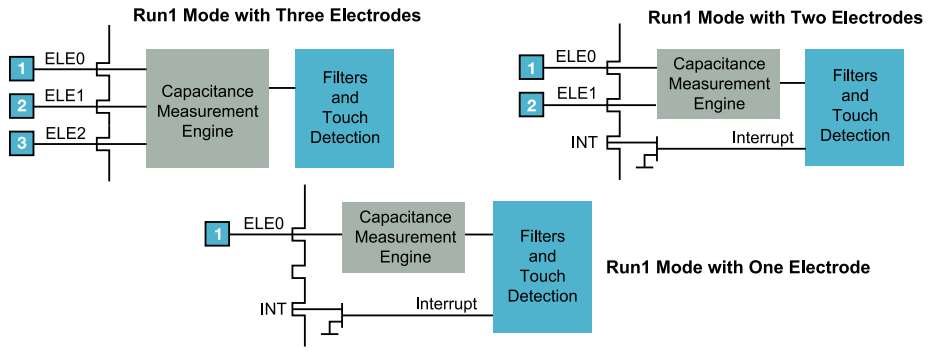
- 1.71V to 2.75V operation
- 8 µA supply current with two electrodes being monitored with 64 ms response time and IRQ enabled
- 4 µA maximum shutdown current
- Two electrodes plus IRQ
- Three electrodes and no IRQ
- Continuous independent auto-calibration for each electrode input
- Separate touch and release trip thresholds for each electrode, providing hysteresis and electrode independence
- I²C interface, with optional IRQ output to advise electrode status changes
- 2 x 2 x 0.65 mm 8-lead uDFN package
- -40°C to +85°C operating temperature range

Benefits

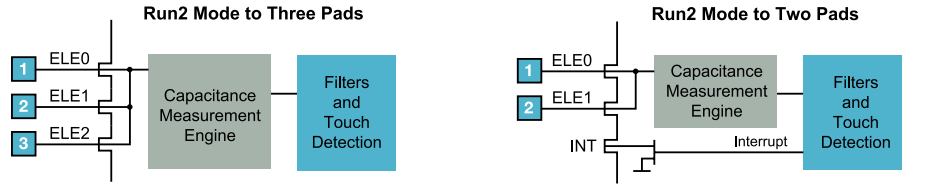
- Elimination of mechanical buttons
- Enhances reliability by eliminating mechanical wear and tear
- Electrode multiplexing
- User interface controllers that manage multiple configurations
- Gives greater flexibility to product designers
- Reduces overall system cost

Freescale is a leading provider of pressure, inertial and proximity sensors and has offered MEMS-based sensors for more than 25 years. The sensor ICs complement Freescale's broad portfolio of ZigBee® technology, microcontrollers, microprocessors, digital signal processors, analog ICs and development tools to offer system solutions to customers.

Electrode/Pad Connections in Run Mode



Electrode/Pad Connections in Detection Mode Area



Selector Guide

Part Number	Bus	Sounder	Touch Pad Array	Main Attributes
MPR031	I²C with $\overline{IRQ}$	Yes	Three pads if IRQ is not being used	Controls two electrodes with IRQ Extremely small package
MPR032	I²C with $\overline{IRQ}$	Yes	Three pads if IRQ is not being used	Ability to be the second address on the I²C bus Extremely small package

Development Tools

Part Number	Description
KITMPR031EVM	Evaluation board to demonstrate key proximity sensor features
DEMOMPR031EVM	Small, self-contained board to demonstrate key proximity sensor features

Documentation

Document Number	Title	Description
MPR031/2	MPR031/2 Data Sheet	This data sheet presents the specifications for these products

Application Notes

Document Number	Title	Description
AN3747	Pad Layout Application Note	Explains design for conductive pads
AN3583	Using Low Power Mode on the MPR083 and MPR084	Describes how to dynamically run with low power modes
AN3579	Enabling an MCU for Touch Sensing Application Note	Describes how to enable an MCU for touch sensing with a properly designed layout and a simple software module
AN3516	E-Field Keyboard Designs Application Note	This application note provides the fundamentals for designing keyboards with electric field (E-Field) devices

Learn More: For more information about Freescale products, please visit **www.freescale.com/proximity.**

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