

MC33975

Multiple Switch Detection Interface with Suppressed Wake-up and 32 mA Wetting Current

Applications

- Automotive systems
- Industrial control systems
- Process control systems
- Security systems
- Systems requiring switch status verification for safety, operation, or process control purposes

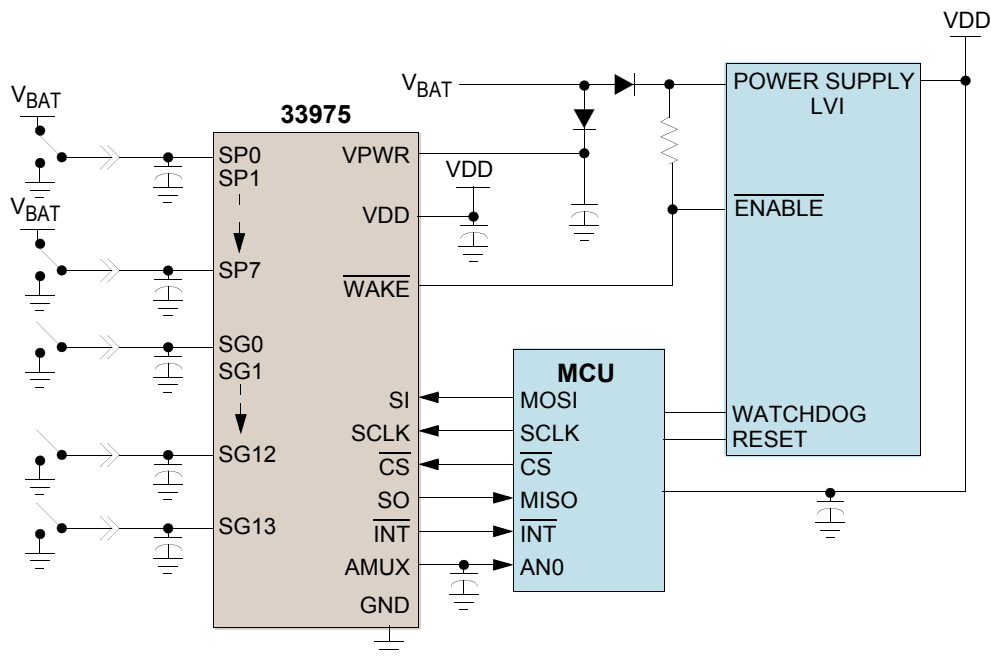
Overview

Freescale offers Multiple Switch Detection Interface Devices. The MC33975 Multiple Switch Detection Interface with Suppressed Wake-up is designed to detect the closing and opening of up to 22 switch contacts. The switch status, either open or closed, is transferred to the microprocessor unit (MCU) through a serial peripheral interface (SPI). The device also features a 22-to-1 analog multiplexer for reading inputs as analog.

The MC33975 has two modes of operation, Normal and Sleep. Normal mode allows programming of the device and supplies switch contacts with pull-up or pull-down current as it monitors switch change of state. The Sleep mode provides low quiescent current, which makes the MC33975 ideal for automotive and industrial products requiring low sleep state currents.

Improvements are a programmable interrupt timer for Sleep mode that can be disabled, switch detection currents of 32 and 4.0 mA for switch-to-ground inputs, and an interrupt bit that can be reset.

MC33975 Simplified Application Diagram



Performance	Typical Values
Inputs	8 programmable, 14 switch-to-ground
Switch Voltage Range	
33975	-14 V to V_{PWR} , 38 V max
33975A	-14 V to V_{PWR} , 40 V max
Operating Voltage	5.5 – 28 V (V_{PWR})
Contact Wetting Current	4.0 or 32 mA
Quiescent Current:	
V_{PWR}	< 70 μ A
V_{DD}	< 10 μ A
Control	SPI
Operating Temperature	-40 °C $\leq T_A \leq$ 125 °C

Features

- Designed to operate $5.5\text{ V} \leq V_{PWR} \leq 28\text{ V}$
- Switch input voltage range -14 V to V_{PWR} , 40 V max
- Interfaces directly to microprocessor using 3.3/5.0 V SPI protocol
- Selectable wake-up on change of state
- Selectable wetting current (32 mA or 4.0 mA for switch-to-ground inputs)
- 8 Programmable Inputs (switches to battery or ground)
- 14 Switch-to-ground inputs
- V_{PWR} standby current 100 μA typical, V_{DD} standby current 20 μA typical
- Pb-free 32-terminal suffix EK
- Additional devices available for comparison in the Analog Product Selector Guide, SG1002 and Automotive Product Selector Guide, SG187

Customer Benefits

- Optimized switch OPEN/CLOSE status verification of multiple switches with changes immediately reported to the MCU
- Programmable levels of verification performance
- Simple interfacing to industry-standard 3.3/5.0 V MCUs having SPI
- Surface mounted device requiring minimal PC board space and few components, enhancing application reliability and lower costs
- Simple system power conservation solution providing a WAKE output with which the MCU power supply can be enabled when MCU activation is required
- Increased wetting current
- Increased operating voltage
- Multiple 33975 devices in a module system

Questions

- Do you need to confirm the status of multiple switches in your system?
- Do you need to verify a switch is connected to V_{BAT} or Ground?
- Do you need a switch verification device capable of analog voltage multiplex readout of sensing inputs?
- Do you need a switch verification device that is also capable of controlling small LEDs as well as FET transistors?
- Do you need a switch verification device programmed and controlled via the SPI?
- Do you need a switch monitoring device that “sleeps” so long as switches do not change status and alerts the MCU when a switch state changes?

Ordering Information

Device	Temperature Range	Package
MC33975TEK/R2	-40 to 125 °C	32 SOICW-EP
MC33975ATEK/R2	-40 to 125 °C	32 SOICW-EP

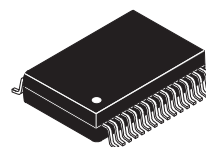
Evaluation Board

KIT33975AEWEVBE	Evaluation board
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Documentation

MC33975	Data sheet order number
SG1002	Analog Product Selector Guide
SG 187	Automotive Product Selector Guide

32 SOICW - EP



98ASA10556D
0.65 mm Pitch
7.5 x 11.0 mm Body

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