MTCH102/105/108

2, 5 and 8-Channel Proximity/Touch Controller Product Brief

Description

The Microchip mTouch® MTCH102/105/108 Proximity/Touch Controller with simple digital output provides an easy way to add proximity and/or touch detection to any application. This device family implements capacitive sensors with active guarding capability. The sensitivity and power mode can be configured through the MTSA and MTPM pins. The MTCH102/105/108 devices also use an advanced optimization algorithm to actively suppress noise from the signal to achieve reliable proximity/touch detection.

Features

- Capacitive Proximity and Touch Detection System:
  - High Signal to Noise Ratio (SNR)
  - Adjustable sensitivity with compensation for different sensor sizes
  - Multi-stage Active noise suppression filters
  - Automatic environmental compensation
  - Support for wide range of sensor shape and size
- Simple I/O Interface with existing System
- Smart Scan Scheduling
- Threshold Hysteresis
- Flexible Low-Power mode
- Brown-Out Protection
- Operating Voltage Range: 2.05V to 3.6V
- Operating Temperature: -40°C to +85°C

Application

- Light Switch
- Portable Device Enabler
- White Goods and Appliance
- Office Equipment and Toys
- Display and Keypad Back-Lighting Activation

TABLE 1: MTCH10X FAMILY TYPES

Device	Data Sheet Index	Sensor Input	Active Guard	Digital Output
MTCH101	**(A)**	1	N	1
MTCH102	**(B)**	2(1)	Y(1)	2
MTCH105	**(B)**	5(1)	Y(1)	5
MTCH108	**(B)**	8(1)	Y(1)	8

Note 1: One of the sensor inputs can be configured as active guard output.

Data Sheet Index: (Unshaded devices are described in this document.)

A: DS-40001664 MTCH101 Single-Channel Proximity Detector

B: Future Release MTCH102/105/108 Dual-Channel Proximity/Touch Controller

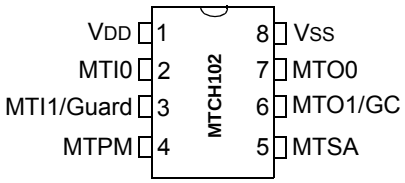
Note: For other small form-factor package availability and marking information, please visit **http://www.microchip.com/packaging** or contact your local sales office.

TABLE 2: PACKAGES

Packages	MSOP	TSSOP	SSOP	UDFN	QFN
MTCH102	X			X	
MTCH105		X			X
MTCH108			X		X

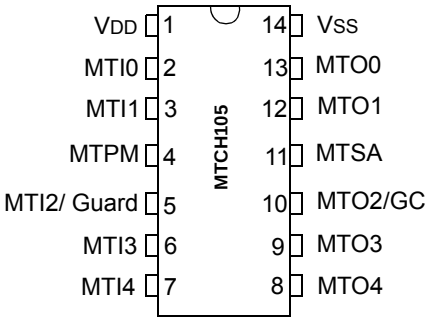
PIN DIAGRAMS

FIGURE 1: 8-LEAD SOIC, DFN



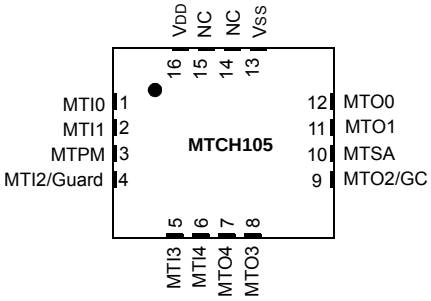
Note: See Table 3 for the pin allocation table.

FIGURE 2: 14-LEAD SOIC



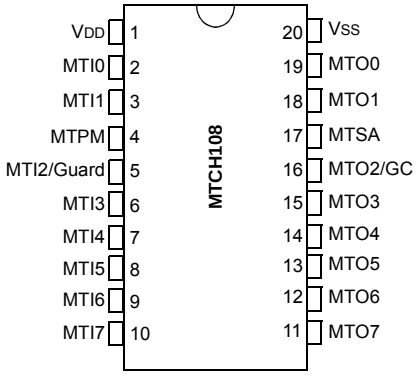
Note: See Table 4 for the pin allocation table.

FIGURE 3: 16-LEAD QFN



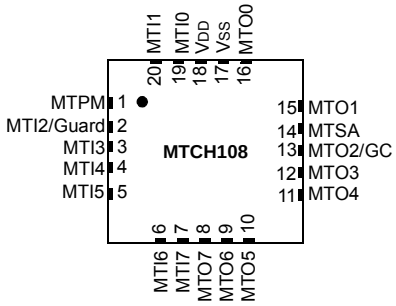
Note: See Table 4 for the pin allocation table.

FIGURE 4: 20-LEAD TSSOP



Note: See Table 5 for the pin allocation table.

FIGURE 5: 20-LEAD QFN



Note: See Table 5 for the pin allocation table.

PIN ALLOCATION TABLES

TABLE 3: 8-PIN DESCRIPTION (MTCH102)

Name	8-Lead SOIC and DFN	Description
VDD	1	Power Supply Input
MTI0	2	Proximity/Touch Sensor 0 Input
MTI1/Guard	3	Proximity/Touch Sensor 1 Input/Active Guard
MTPM	4	Low-Power Mode Select
MTSA	5	Sensitivity Adjust Input
MTO1/GC	6	MTI1 Detect Output (Active-Low)/Guard Control
MTO0	7	MTI0 Detect Output (Active-Low)
VSS	8	Ground

TABLE 4: 14-,16-PIN DESCRIPTION (MTCH105)

Name	14-Lead SOIC	16-Lead QFN	Description
VDD	1	16	Power Supply Input
MTI0	2	1	Proximity/Touch Sensor 0 Input
MTI1	3	2	Proximity/Touch Sensor 1 Input
MTPM	4	3	Low-Power Mode Select
MTI2/Guard	5	4	Proximity/Touch Sensor 2 Input/Active Guard
MTI3	6	5	Proximity/Touch Sensor 3 Input
MTI4	7	6	Proximity/Touch Sensor 4 Input
MTO4	8	7	MTI4 Detect Output (Active-Low)
MTO3	9	8	MTI3 Detect Output (Active-Low)
MTO2/GC	10	9	MTI2 Detect Output (Active-Low) /Guard Control
MTSA	11	10	Sensitivity Adjust Input
MTO1	12	11	MTI1 Detect Output (Active-Low)
MTO0	13	12	MTI0 Detect Output (Active-Low)
VSS	14	13	Ground

TABLE 5: 20-PIN DESCRIPTION (MTCH108)

Name	20-Lead TSSOP	20-Lead QFN	Description
VDD	1	18	Power Supply Input
MTI0	2	19	Proximity/Touch Sensor 0 Input
MTI1	3	20	Proximity/Touch Sensor 1 Input
MTPM	4	1	Low-Power Mode Select
MTI2/Guard	5	2	Proximity/Touch Sensor 2 Input/Active Guard
MTI3	6	3	Proximity/Touch Sensor 3 Input
MTI4	7	4	Proximity/Touch Sensor 4 Input
MTI5	8	5	Proximity/Touch Sensor 5 Input
MTI6	9	6	Proximity/Touch Sensor 6 Input
MTI7	10	7	Proximity/Touch Sensor 7 Input
MTO7	11	8	MTI7 Detect Output (Active-Low)
MTO6	12	9	MTI6 Detect Output (Active-Low)
MTO5	13	10	MTI5 Detect Output (Active-Low)
MTO4	14	11	MTI4 Detect Output (Active-Low)
MTO3	15	12	MTI3 Detect Output (Active-Low)
MTO2/GC	16	13	MTI2 Detect Output (Active-Low)/Guard Control
MTSA	17	14	Sensitivity Adjust Input
MTO1	18	15	MTI1 Detect Output (Active-Low)
MTO0	19	16	MTI0 Detect Output (Active-Low)
VSS	20	17	Ground

PIN DESCRIPTION

MTIx

Connect the sensor to this input. An additional resistor of at least 4.7 kΩ is recommended for high-frequency noise immunity.

GUARD

The waveform on the Guard pin will shield or guard MTIx's sensor from the effect of nearby noise sources or power planes if the guard trace surrounds MTIx's trace and sensor. The Guard pin will be driven in phase with MTIx to minimize the voltage difference between the two pins.

MTOx

The MTOx pin is an open-drain output, which reports the proximity/touch state of MTIx. A pull-up resistor is required, and it will pull the line low when proximity/touch is detected, and release the line when proximity/touch is released.

GC

By grounding the GC pin, the active guard signal will be enabled on the Guard pin.

MTSA

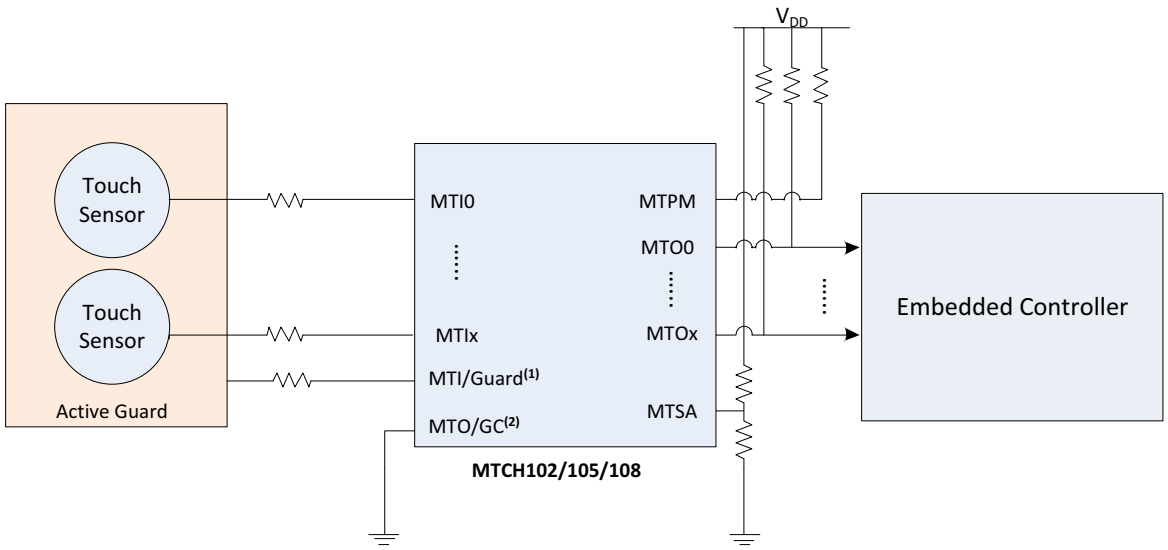
The voltage will determine the sensitivity. VDD voltage will give the lowest sensitivity while GND voltage will give the highest. A linear voltage sensitivity is implemented between VDD and GND. A resistor ladder is used to adjust the sensitivity.

MTPM

By grounding the MTPM pin, the MTCH102/105/108 will be in Low-Power mode, thus having a slower response time. When the MTPM pin is at VDD, the power consumption will be higher with a faster response time.

TYPICAL CIRCUIT

FIGURE 6: SYSTEM DIAGRAM FOR MTCH10X



Note 1: MTI1/Guard for MTCH102 and MTI2/Guard for MTCH105/108.
2: MTO1/GC for MTCH102 and MTO2/GC for MTCH105/108.

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