ad semiconductor   New TOUCH CAP MODULE®

1-Ch Touch Sensor Module

SPECIFICATION V0.3
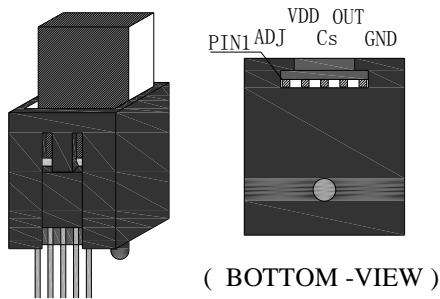
1 General Specification

1.1 General Features

■ 1-Channel capacitive touch sensor module (원 채널 정전 용량형 터치 센서 모듈)
■ Low power consumption (저 소비 전력)
■ Adjustable three step sensitivity (최적화된 3 단계 감도 조정)
■ Open-drain output (출력 단 : 오픈 드레인)
■ Internal power on reset (내부 파워
■ Embedded common and normal noise elimination circuit
■ Simple and useful module package without bracket
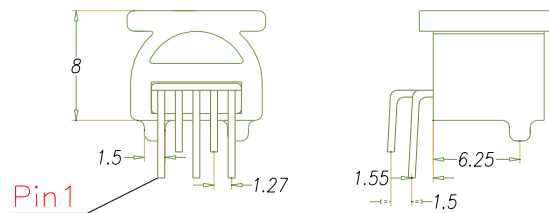■ RoHS compliant 5SDIP-M^{TM} module package

1.2 Application

■ Home appliance human interface switch
■ Mechanical switch replacement
■ Human interface for toys & interactive games
■ Sealed control panels, keypads

1.3 Package (5DIP-M^{TM})

Fabric Type

Silicon Type

VDD OUT
PIN1 ADJ   Cs   GND

(BOTTOM -VIEW)

8

1.5

1.27

Pin1

1.55

6.25

1.5

1.4 *Pin Description (5DIP-M^{TM})*

PIN Number	Name	I/O	Description	Protection
1	ADJ	Analog Input/output	Sensitivity selection input [Note1]	VDD/GND
2	VDD	Power	Power (2.5V ~ 5.0V)	GND
3	Cs	Analog input	Capacitive sensor input	VDD/GND
4	OUT	Digital Output	Output (Open drain)	VDD/GND
5	GND	Ground	Supply ground	VDD

Note 1: Refer to chapter 3.2 ADJ implementation for sensitivity selection.

2 Electrical Characteristics

2.1 Absolute Maximum Ratings

Supply voltage	5.5 V
Maximum voltage on any pin	VDD+0.3 V
Maximum current on any PAD	10mA
Continuous power Dissipation	100mW
Storage temperature	−20 ~ 85℃
Operating temperature	−10 ~ 75℃

2.2 Electrical Characteristics

- V_{DD}=3.3V (Unless otherwise noted), T_A = 25℃

| Characteristics	Symbol	Test Condition	Min	Typ	Max	Units
Operating supply voltage	V_{DD}		2.5	3.3	5.0	V
Power on reset voltage	Vres		1.5			V
Current consumption	I_{DD}	V_{DD}= 3.3V	–	25	40	μA
		V_{DD}= 5.0V	–	40	70	
Output maximum sink current	I_{OUT}	T_A = 25℃	–	–	4.0	mA
Internal reset criterion V_{DD} voltage	V_{DD_RST}	T_A = 25℃	–	–	$0.3 \cdot V_{DD}$	V
Minimum detectable capacitance variation	ΔC_S		0.2	–	–	pF
Output impedance (open drain)	Zo	$\Delta C_S > 0.2pF$	–	12	–	Ω
		$\Delta C_S < 0.2pF$	–	30M	–	
Self calibration time after V_{DD} setting	T_{CAL}		–	200	–	ms
Maximum supply voltage rising time	T_{R_VDD}		–	–	100	ms
Recommended ADJ resistor value	R_{ADJ}		–	2	–	MΩ

3 Application Notes

3.1 Apllication Example
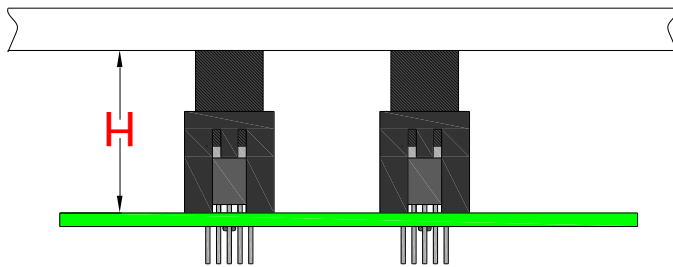
Side and 3D view of two channel application example of
ADMxxxxN TouchCap®

Module Name	ADM1907N
Total Height	19.2 mm
Gasket Height (Out of module)	7.2 mm
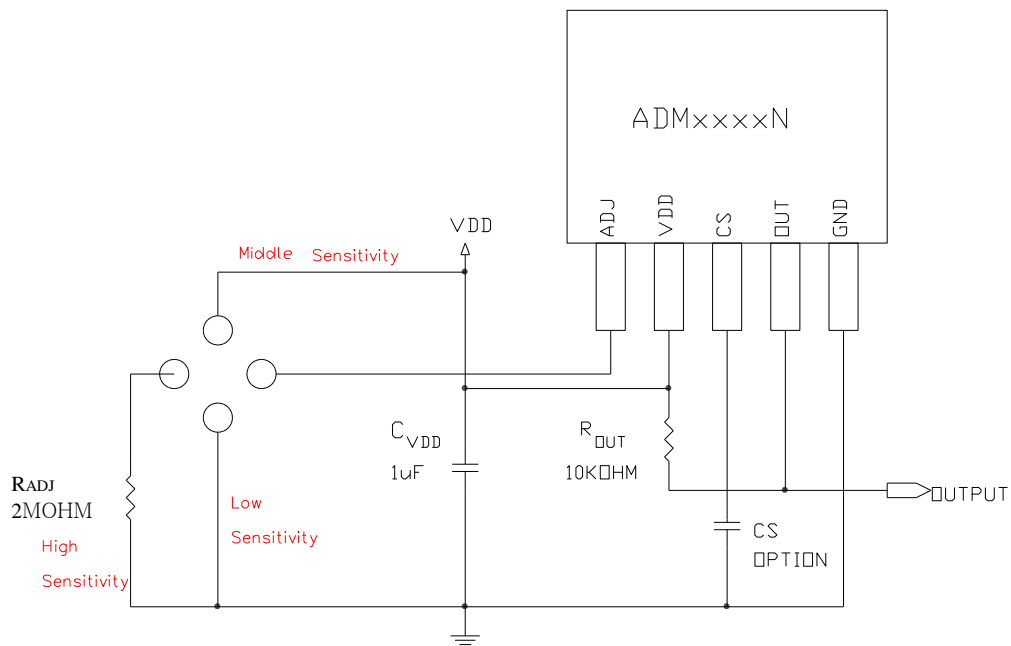
Application circuit example of 5DIP TouchCap®

3.2 Sensitivity Selection

Function of ADJ pin of new TouchCap® is the selection of sensitivity without any additional external component except using R_{ADJ} case (has high sensitivity). ADJ implementation for sensitivity selection is informed as below chart.

Fabric Type Model	ADJ Connection	Using R_{ADJ} Connection	Connected to VDD	Connected to GND
	Sensitivity	high	middle	Low
ADM1503N	Proper thickness (Poly-arbonate)	11mm	7 mm	5mm
ADM1705N		11mm	7 mm	5mm
ADM1907N		11mm	7 mm	5mm

silicon Type Model	ADJ Connection	Using R_{ADJ} Connection	Connected to VDD	Connected to GND
	Sensitivity	high	middle	Low
ADM0801	Proper thickness (Poly-arbonate)	9mm	6 mm	3mm
ADM1101		9mm	6 mm	3mm

Note 2: Above proper thickness is reliable but it can be changed by insulator material and application.

3.3 Application Notes

➕ VDD periodic voltage ripples over **50mV** or the ripple frequency which is lower than 10 kHz can cause wrong sensitivity calibration. To prevent above problem, power (VDD, GND) line of new Touch Cap® should be separated from the other circuit. Especially the LED driver power line or digital switching circuit power line should be certainly treated to be separated from that of new Touch Cap®.
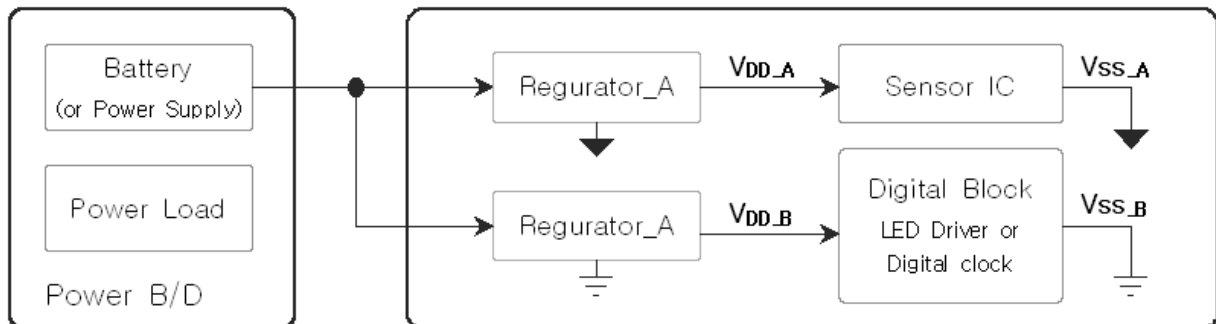
Recommended power line separation of new Touch Cap®

- A big inductance may be appeared when the connection line between main board and display board is too long. In that case, higher voltage ripple could be generated by above inductance.
- The capacitor which is between VDD and GND is an obligation. It should be placed as close as possible from new Touch Cap®.
- new Touch Cap® is reset by internal reset circuit. VDD voltage rising time should be shorter than 100msec for proper operation.
- When VDD voltage power on/off, VDD voltage must be dropped under 1.5V.
- The sensitivity can be adjusted through a connection of ADJ pin. (Refer to chapter 3.2)
- To prevent interference between modules, link all ADJ pin and connect a resistor (R_{ADJ}, 2M) between ADJ pin to GND.
- new Touch Cap® OUT port has an open drain structure. The pull-up resistor should therefore be needed as above application example circuit.
- The empty space of PCB must be filled with GND pattern to strengthen GND pattern and to prevent external noise that causes interference with the sensing frequency.
- Front insulator cover must be fastened well on sense gasket of new Touch Cap® in order to protect invalid sensitivity calibration.

4   PACKAGE DESCRIPTION
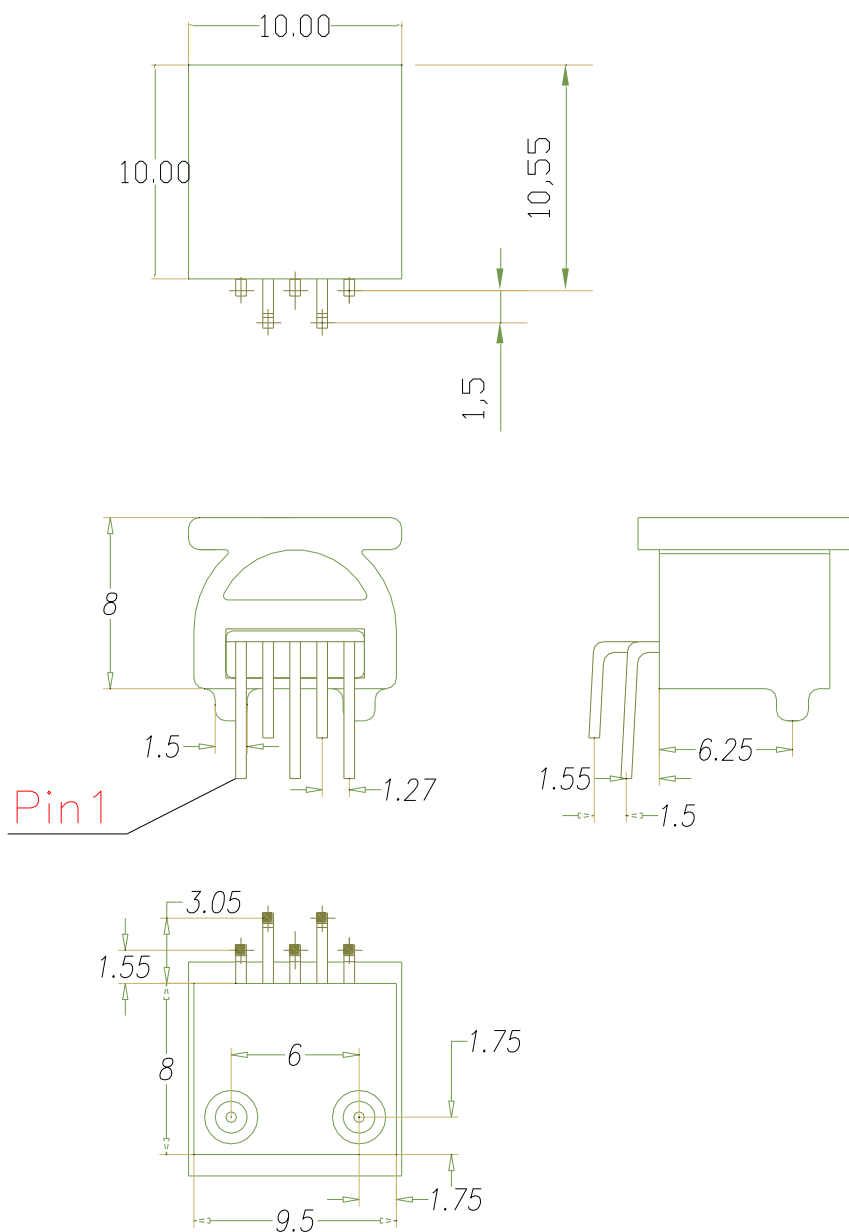
4.1   Fabric Type Mechanical Drawing

UNIT [mm]
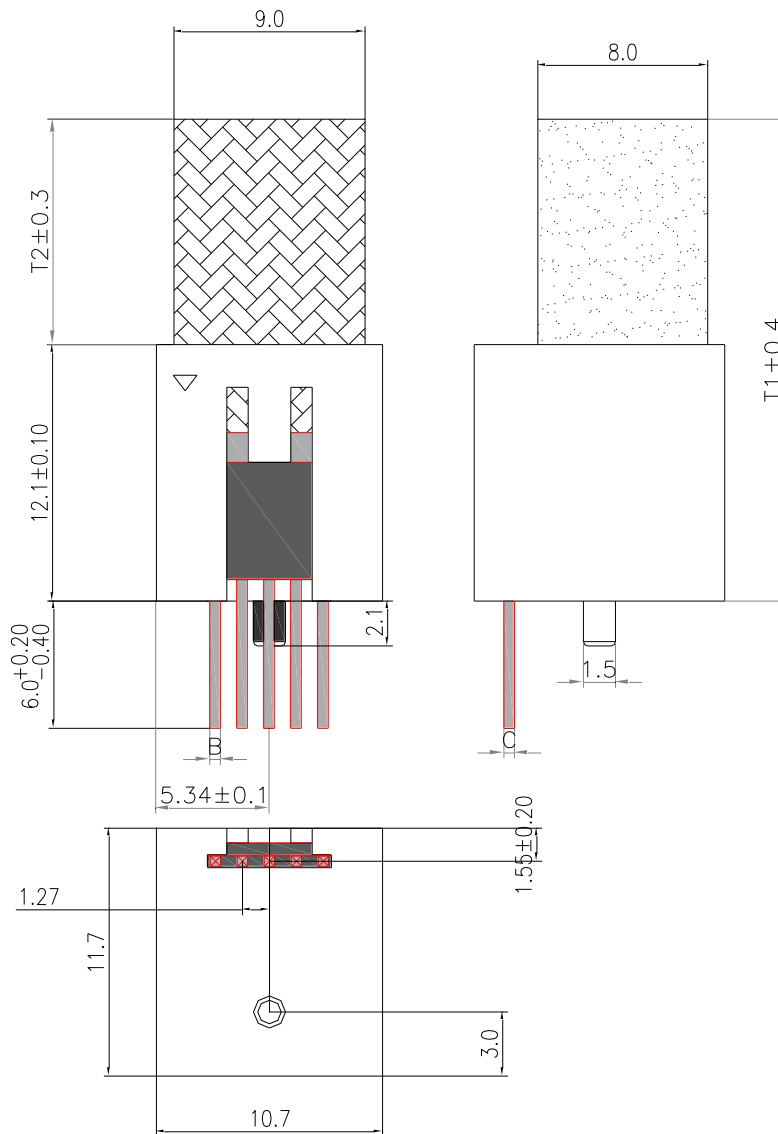
ORDER CODE	MODEL	Gasket height (t)	Tol.
224TAT1907	ADM1907N	7	±0.4
225TAT1705	ADM1705N	5	±0.4
226TAT1503	ADM1503N	3	±0.4

4.2 Silicon Type Mechanical Drawing

1) ADM0801

UNIT [mm]

2) ADM1101

UNIT [mm]
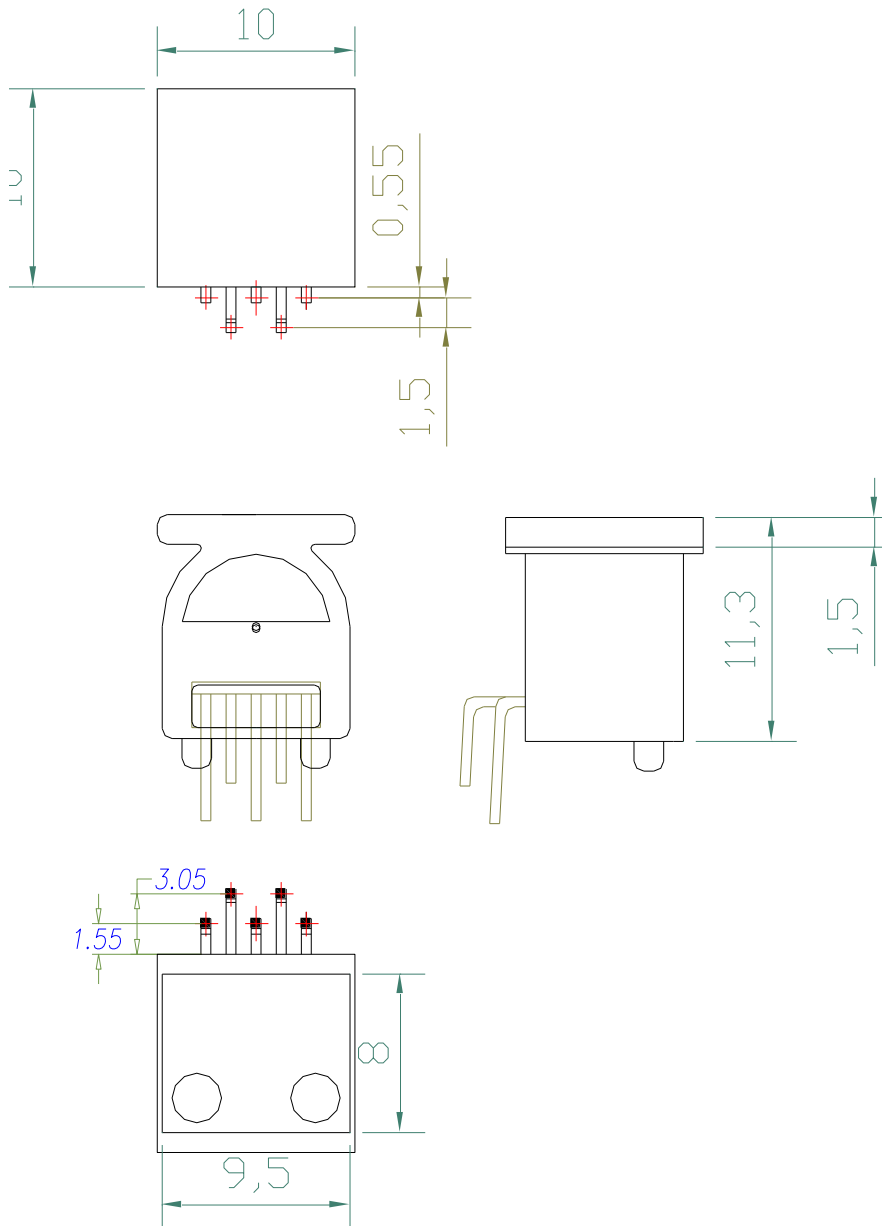
ORDER CODE	MODEL	height (t)	Tol.
227TAT08	ADM0801	8mm	±0.3
229TAT11	ADM1101	11mm	±0.3

5. Datasheet Revision History

REV 0.0 Mar.05.09'

1) New release

REV 0.1 June .05.09'

1) Order Code update
2) ADM0801 /1101 model update

REV 0.2 AUG .13.09'

1) Changed to NEW Order code

REV 0.3 Sept .14.09'

1) Power on reset voltage update

NOTES:

LIFE SUPPORT POLICY