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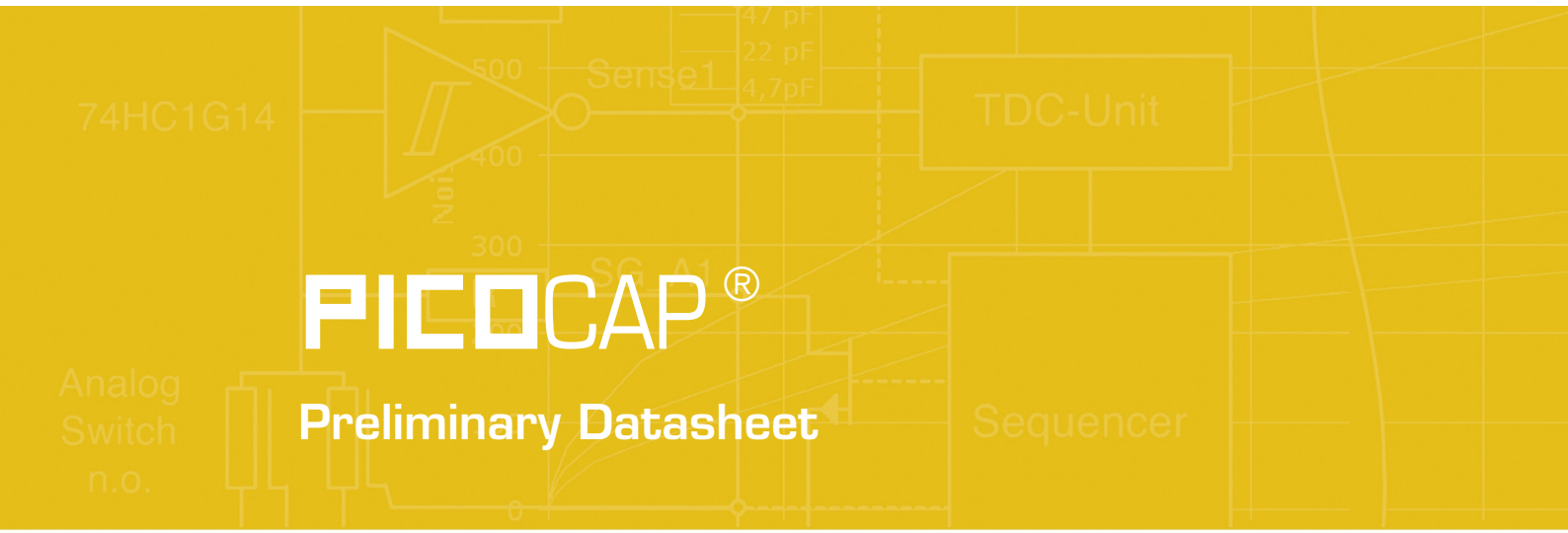

PICOCAP®

Preliminary Datasheet

PCapØ1-Touch

Very-Low-Power IC for Capacitive Touch Sensor Solutions

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Table of Content

1 System Overview

PCapØ1-Touch is a capacitive touch controller based on acam's patented PICOCAP® principle. This entirely digital IC comes with adaptive algorithms, programmed ready-to-use in OTP memory and booting within microseconds after power-up.

The device consumes very little power.

1.1 Features

- 6 capacitive touch sensors connectable
- 6 CMOS output ports that indicate touch state
- Digital measuring principle in CMOS technology
- Powerful filter functions integrated
- Asymmetric automatic drift compensation
- Simultaneous multiple key sensing
- Robustness against EMI
- Rapid response after status change (100 ms delay in average)
- Single power supply (2.1 to 3.6 V)
- Extremely low current consumption : 2 µA @ 3.0 V @ 6 Sensors

1.2 Target Applications

- Coin-cell and other battery-driven devices
- Remote Control Handsets
- Household Metering Devices
- Industrial Metering Devices
- White goods (household appliances)

1.3 Possible Enhancements

We are actively developing a different PCB layout and a modified firmware for matrix touch pads to control up to 28 touch-keys, with the same very low power consumption as above.

2 Characteristics & Specifications

2.1 Electrical Characteristics

2.1.1 Absolute Maximum Ratings

Supply voltage V_{DD}-to-GND	- 0.3 to 4.0 V
ESD rating (HBM), each pin	> 2 kV
Storage temperature T_{stg}	-55 to 150 °C
Junction temperature (T_j)	max. 125 °C
OTP Data Retention Period (for the algorithms)	10 years at 95 °C temperature

2.1.2 Recommended Or Typical Operating Conditions

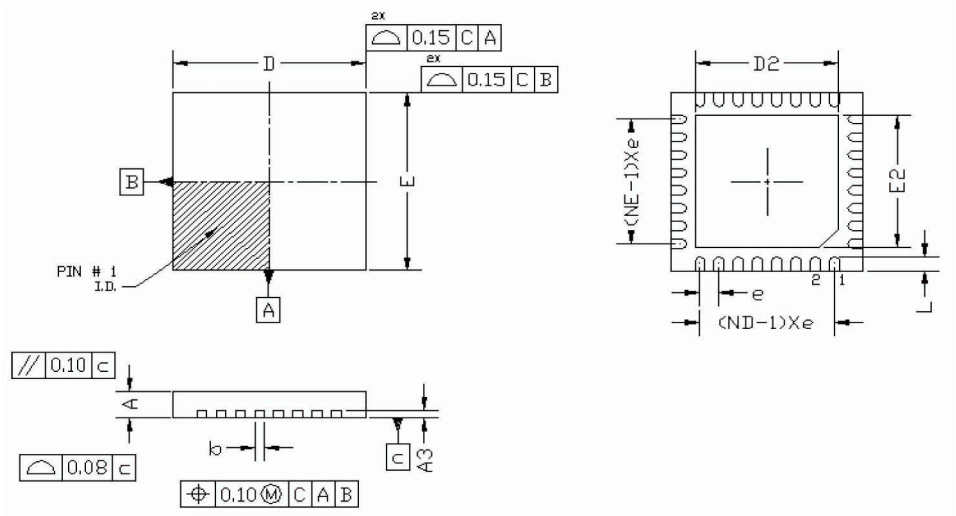
Parameter	Remarks	Min.	Typ.	Max.	Unit
Supply voltage V_{DD}		2.1		3.6	V
Operating current	at 2.1 volts and at scan speed 20 Hz per touch sensor		1.8		µA
	at 3.0 volts and at scan speed 20 Hz per touch sensor	0.9	2.0	2.5	µA
High-level output voltage	at the OUT ports	V_{DD} - 0.4 V			
Low-level output voltage				0.4 V	

2.2 Converter Characteristics

Parameter	Remarks	Min.	Typ.	Max.	Unit
tolerated touch sensor capacitance		5	10	22000	pF
scan speed per touch sensor			20		s^{-1}
switching delay			100		ms
time-out (individual for each sensor)	In case of a permanent change in capacitance		15		s
sensor protective coating thickness	glass, acrylic sheet, other polymers…		3		mm

2.3 Package Characteristics

Figure 2-1: QFN-Dimensions

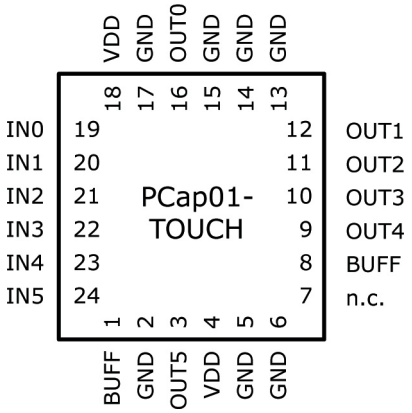


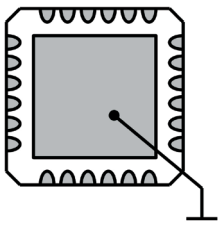
2.3.1 Mechanical

	Dimensions in mm							
Package	**D, E**	**D2, E2**	**N**	**e**	**L**	**b**	**A**	**A3**
QFN24	4.00	2.70	6	0.5	0.35	0.25	0.75/0.9	0.20

2.3.2 Pin Outline

Figure 2-2: Pin Outline





important ground connection

Note: (a) a dedicated, smaller housing with fewer pins is under study;

(b) the presently available housing is marked “PCapO1-AK” rather than “PCapO1-TOUCH”

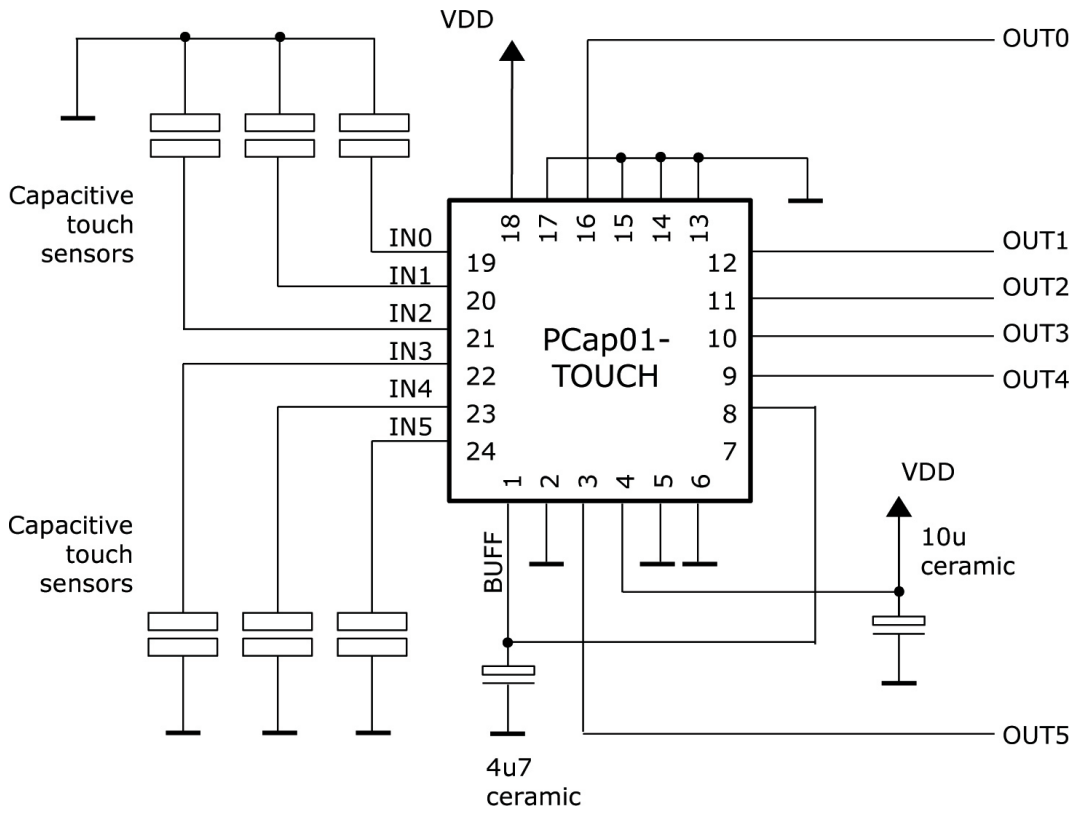
2.3.3 Pin Assignment

Mne-monic	Pin#	Remarks
BUFF	1, 8	Bypassing via a ceramic capacitor is mandatory. Bridge #1 and #8
GND	2, 5, 6, 13, 14, 15, 17 and bottom pad	It is important to ground the bottom pad (also called “thermal pad”).
IN0	19	Sensor input. Connect one electrode of each touch sensor here, all the opposite electrodes in common to GND.
IN1	20	
IN2	21	
IN3	22	
IN4	23	
IN5	24	
OUT0	16	CMOS output which indicates touch sensor state : 'low' = touched 'high' = untouched or timed-out OUT*n* corresponds to IN*n* for every *n*.
OUT1	12	
OUT2	11	
OUT3	10	
OUT4	9	
OUT5	3	
VDD	4,18	Bypassing via a ceramic capacitor is mandatory. Bridge #4 and #18

Leave unconnected pin 7 and amongst the IN and OUT ports those which remain unused.

2.3.4 Recommended Schematics

Figure 2-3: Recommened Schematics



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