SiS9223

Projected Capacitive

Touch-Screen Micro Processor

Data sheet

Rev. 1.0
December 03, 2012

Revision History

Date	Rev	Description
December 03, 2012	1.0	Officially Release

Contents

Figures

Tables

1 General Description

With accumulated PC-based chipset experiences and innovative technologies, SiS has delivered the best performance platforms and recognized as a top Stable Image Chipset Solution provider over the past decades. To further catch ride with the popularity of touch-screen devices launching, SiS9223 was developed to provide an optimal touch screen solution to OEM and ODM vendors for the new generation platform applications.

SiS9223, a 32bit RISC touch-screen panel processor with the 12bits Analog-to-Digital Converter (12bits ADC) provides 28 pins TX and 16 pins RX sensing lines for projected capacitive touch sensor. SiS9223 provides I2C interface for communicating with host system. An embedded UART port is designed for further debugging and specific R&D applications. Implemented Watchdog Timer and Event Timer serve add-on-value functions for flexibility and creativity. Besides, Power on Demand technology design effectively reduces power-consumption to meet environmental protection requirements. More than that, GPIO feature ensures expandability on both H/W and S/W applications. Taking advantage of above features, SiS9223 enables designers to create new usage model of touch-screen products.

The embedded 12-bit ADC feature allows users to experience an operating environment of high resolution and high sampling rate. This extraordinary design is just right for those user-oriented vendors to deliver real-time and seamless playback. The high speed MCU with a filtering management algorithm implements to manage vivid gestures for enabling more direct and natural interaction in your applications. To effective filter out the unexpected coupling noise by hand/fingers operation on LCD/LED panel, SiS9223 has implemented a unique know-how based on the perfect architecture of its H/W, firmware and embedded filters. With its advanced technology algorithm, it can automatically adjusting and compensating the sensing methodology to ensure the good touch quality, sensitivity and response-time under various changing humidity, temperature and other environmental factors.

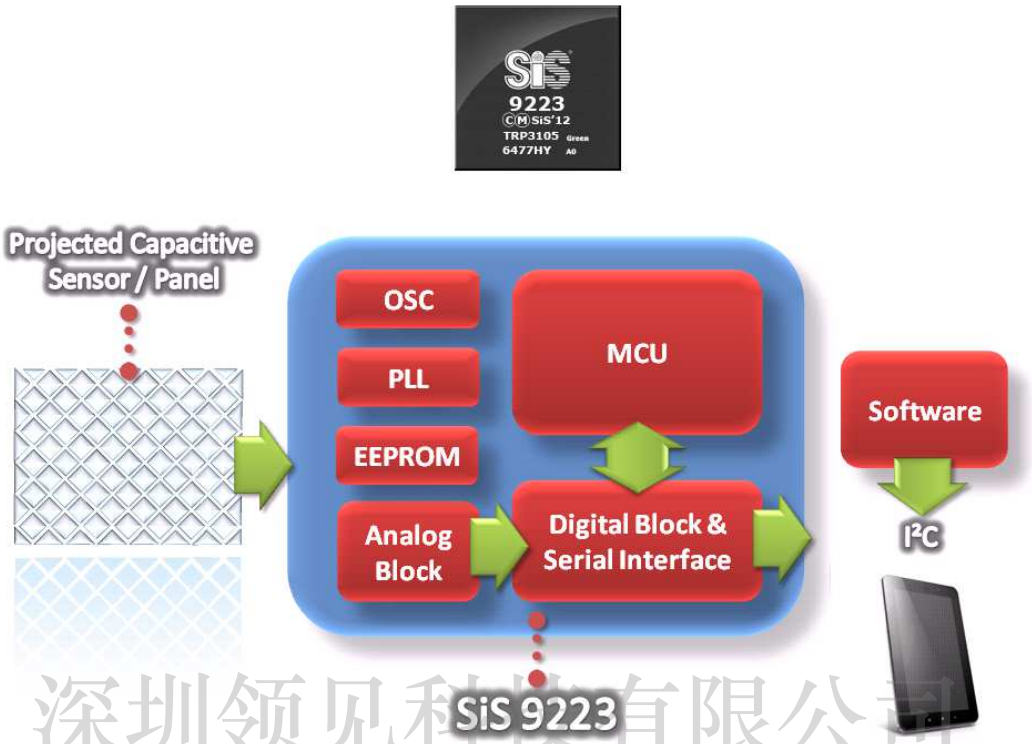


Figure 1 SiS9223 System Diagram

2 Features

■ High Performance RISC Processor

- Embedded high performance 32-bit processor.
- Supports frequency scaling up to 96MHz system clock
- 16K Byte instruction cache
- 24K Byte Data SRAM.
- Supports Interrupt controller
- Support WatchDog timer
- Support Event Timers
- Embedded 64KB Flash ROM
- Internal 12MHz clock

■ Serial Peripheral Interface Master/Slave Controller

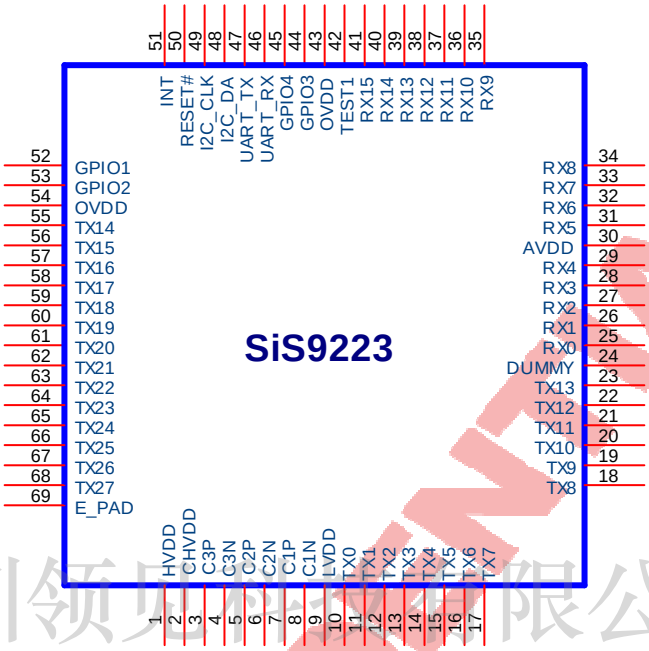
- Support I2C Master/Slave interface
- Support UART port
- Up to 4 GPIO channel

■ Analog System

- Support up to 16RX and 28TX sensing pads.
- Dual 12 bits resolution Analog-to-Digital Converter.
- Support dynamic Power On Demand scheme for power saving at full loading, idle and sleep mode.

■ 68 Pins QFN Green Package

3 Pin Assignment



4 Pin Description

4.1 ADC interface

Pin Name	Pin Attr	Description
TX0	Out	Sense signal output pin
TX1	Out	Sense signal output pin
TX2	Out	Sense signal output pin
TX3	Out	Sense signal output pin
TX4	Out	Sense signal output pin
TX5	Out	Sense signal output pin
TX6	Out	Sense signal output pin
TX7	Out	Sense signal output pin
TX8	Out	Sense signal output pin
TX9	Out	Sense signal output pin
TX10	Out	Sense signal output pin
TX11	Out	Sense signal output pin
TX12	Out	Sense signal output pin
TX13	Out	Sense signal output pin
TX14	Out	Sense signal output pin
TX15	Out	Sense signal output pin
TX16	Out	Sense signal output pin
TX17	Out	Sense signal output pin
TX18	Out	Sense signal output pin
TX19	Out	Sense signal output pin
TX20	Out	Sense signal output pin
TX21	Out	Sense signal output pin
TX22	Out	Sense signal output pin
TX23	Out	Sense signal output pin
TX24	Out	Sense signal output pin
TX25	Out	Sense signal output pin
TX26	Out	Sense signal output pin
TX27	Out	Sense signal output pin
RX0	In	Sense signal input pin
RX1	In	Sense signal input pin
RX2	In	Sense signal input pin
RX3	In	Sense signal input pin
RX4	In	Sense signal input pin
RX5	In	Sense signal input pin
RX6	In	Sense signal input pin
RX7	In	Sense signal input pin
RX8	In	Sense signal input pin
RX9	In	Sense signal input pin
RX10	In	Sense signal input pin
RX11	In	Sense signal input pin
RX12	In	Sense signal input pin
RX13	In	Sense signal input pin
RX14	In	Sense signal input pin
RX15	In	Sense signal input pin

4.2 Pin Description

Pin Name	Pin Attr	Description
INT	Out	Interrupt pin sending request to HOST
RESET#	In	Low active power on reset signal
Test1	PWR	Connect to external capacitor is required
DUMMY	-	Isolate In/Out sense signals
C1P	PWR	Connect to external capacitor
C1N	PWR	Connect to external capacitor
C2P	PWR	Connect to external capacitor
C2N	PWR	Connect to external capacitor
C3P	PWR	Connect to external capacitor
C3N	PWR	Connect to external capacitor
HVDD	PWR	Connect to external capacitor
CHVDD	PWR	Connect to external capacitor

4.3 I2C Interface

Pin Name	Pin Attr	Description
I2C_CLK	In/Out	I2C serial clock input/output
I2C_DA	In/Out	I2C serial data input/output

4.4 GPIO Interface

Pin Name	Pin Attr	Description
GPIO1	In/Out	General purpose input/output port
GPIO2	In/Out	General purpose input/output port
GPIO3	In/Out	General purpose input/output port
GPIO4	In/Out	General purpose input/output port

4.5 UART Interface

Pin Name	Pin Attr	Description
UART_RX	In	Incoming Data from a master
UART_TX	Out	Outgoing Data to a slave

4.6 Power and Ground Signals

Name	Volt	Power Plane	Type Attr
OVDD	3.3V	MAIN	Digital
LVDD	3.3V	MAIN	Analog
AVDD	3.3V	MAIN	Analog

5 Electrical Characteristics

5.1 Absolute Maximum Ratings

Table 1 shows SIS9223 stress ratings only. Extended exposure to the maximum ratings might degrade device reliability. Although SIS9223 has protective circuitry to resist damage from electrostatic discharge (ESD), precautions should always be taken to avoid high voltage or electric field.

Table 1 Absolute Maximum Ratings

Symbol	Parameter	Min	Max	Unit	Notes
Tstorage	Storage Temperature	-40	90	℃	
Ta	Ambient Operating Temperature	-20	85	℃	
OVDD, AVDD LVDD	3.3V Supply Voltage	-0.3	3.6	V	

5.2 DC Characteristics

OVDD=3.3V+/-5%, AVDD=3.3V+/-5%, LVDD=3.3V+/-5%

GND=0V,

Table 2 DC Characteristics of I/O Interface

Symbol	Parameter	Min	Max	Unit	Notes
VIH_TTL	TTL Input High Voltage	2	OVDD+0.3	V	1
VIL_TTL	TTL Input Low Voltage	-0.3	0.8	V	1
VOH_TTL	TTL Output High Voltage	0.9* OVDD		V	1
VOL_TTL	TTL Output Low Voltage		0.45	V	1
IOH_TTL	TTL Output High Current	-4		mA	1
IOL_TTL	TTL Output Low Voltage		4	mA	1

NOTES:

1. Parameter applies to following pins:
   GPIO[3:0], I2C_*, UART_*, INT and RESET#.

5.3 Packing Information

Table 3 Packing Info.

Not take off the seal (Al Bag)			Take off the seal (Al Bag)		
Preserved conditions		Storage life	General Preserved conditions		Storage life
Temperature	Humidity		Temperature	Humidity	
(℃)	(%RH)		(℃)	(%RH)	
0 ~ 40 ℃	＜ 90%RH	12 Months	25 ± 5 ℃	＜ 60%RH	168 Hours

6 Mechanical Dimension

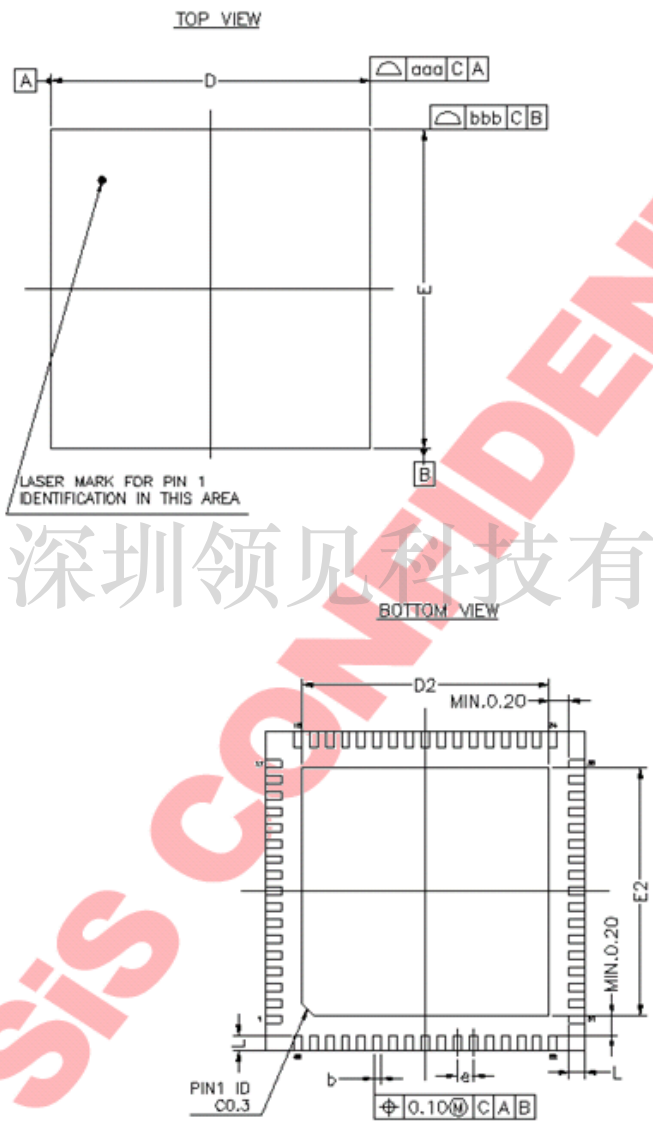


Table 4 Package Dimension

* CONTROLLING DIMENSION : MM

SYMBOL	MILLIMETER			INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.80	0.85	0.90	0.031	0.033	0.035
A1	0.00	0.035	0.05	0.00	0.001	0.002
A2	---	0.65	0.67	---	0.026	0.026
A3	0.203 REF.			0.008 REF.		
b	0.15	0.20	0.25	0.006	0.008	0.010
D	7.90	8.00	8.05	0.311	0.315	0.317
D2	6.10	6.20	6.30	0.240	0.244	0.248
E	7.90	8.00	8.05	0.311	0.315	0.317
E2	6.10	6.20	6.30	0.240	0.244	0.248
L	0.35	0.40	0.45	0.014	0.016	0.018
e	0.40 bsc			0.016 bsc		
TOLERANCES OF FORM AND POSITION						
aaa	0.10			0.004		
bbb	0.10			0.004		
ccc	0.05			0.002		

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