



偉詮電子股份有限公司
Weltrend Semiconductor, Inc.

WT5200

Touch Screen Controller

Data Sheet

REV. 0.90

May 5, 2008

The information in this document is subject to change without notice.
©Weltrend Semiconductor, Inc. All Rights Reserved.



Revision History		
Version	Content	Date
0.40	1. Release to customers	2007/11/1
0.50	1. Modify "A" parameter values in QFN Package Dimension (page 3)	2007/12/4
0.60	1. Change package type from QFN16 to TQFN16 (page 3)	2008/1/7
0.70	1. Add Ordering Information (page 1)	2008/2/25
0.80	1. Modify Ordering Information: modify quantity per reel from 2500 to 5000 (page 1)	2008/4/2
0.90	1. Add new package "WT5200-UG162WT"	2008/5/5



1. Introduction

1.1 Generation Description

WT5200 is a 4-wire resistive touch screen controller that incorporates a 12-bit single supply successive approximation (SAR) ADC.

1.2 Features

- 12 bit SAR type A/D Converter with S/H circuit
- Programmable 8- or 12-bit resolution
- Low Voltage Operation (VDD = 2.2V ~ 3.6V)
- 4-wire I/F
- 2 Auxiliary Analog Inputs
- Sampling Frequency: 125 kHz (max)
- Low Power Consumption
- Full Power-down Control
- 16-pin TQFN package

1.3 Ordering Information

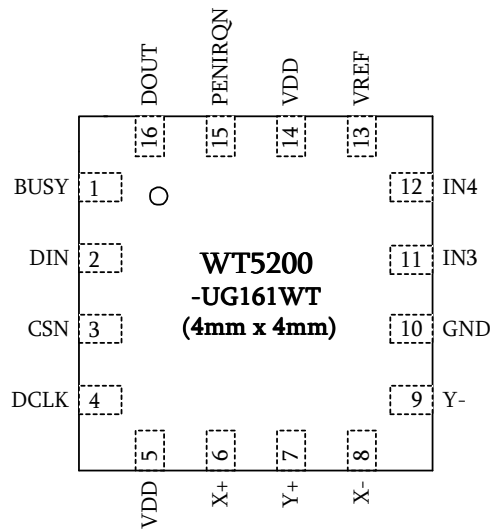
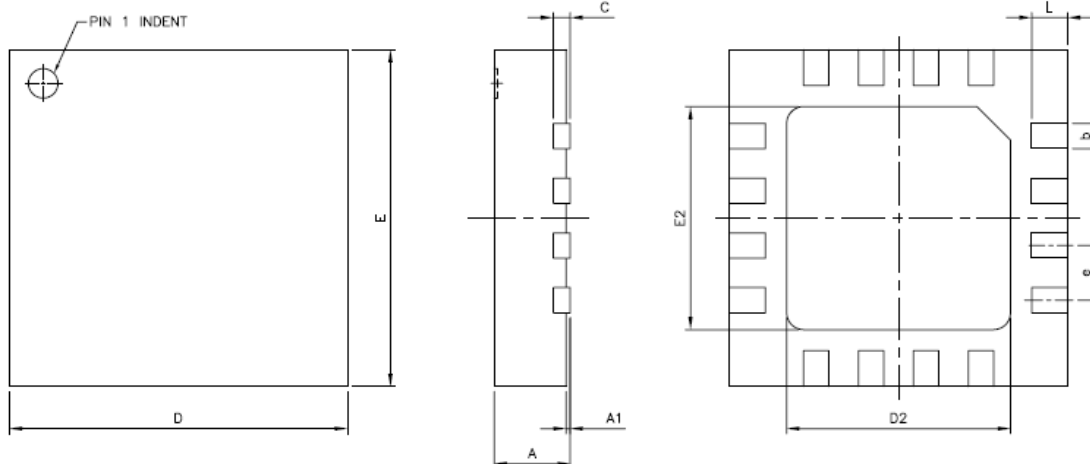
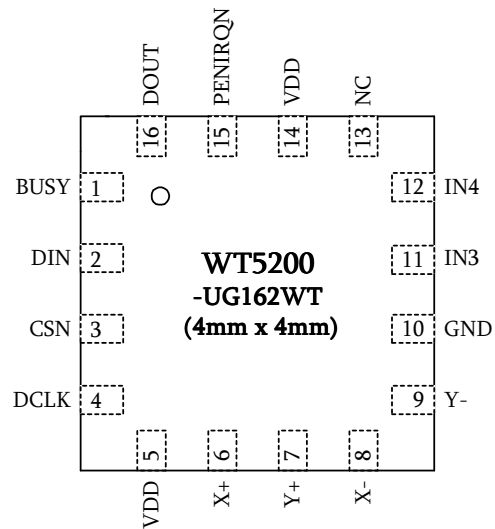
PART	PACKAGE	ORDERING NUMBER	TRANSPORT MEDIA, QUANTITY
WT5200	TQFN16	WT5200-UG161WT-0A	Tape and Reel, 5000
WT5200	TQFN16	WT5200-UG162WT-0A	Tape and Reel, 5000

2. Pin Assignment and Package Types

2.1 Description

TQFN16 UG161	TQFN16 UG162	Symbol	Pin Type	Description
5	5	VDD	P	Power Supply (2.2V ~ 3.6V)
6	6	X+	I/O	<ul style="list-style-type: none"> ■ Touch Screen X+ Plate Voltage Supply for X-axis Measurement ■ ADC Input (Channel 1) for Y-axis Measurement
7	7	Y+	I/O	<ul style="list-style-type: none"> ■ Touch Screen Y+ Plate Voltage Supply for Y-axis Measurement ■ ADC Input (Channel 2) for X-axis Measurement
8	8	X-	O	Touch Screen X- Plate Voltage Supply for X-axis Measurement
9	9	Y-	O	Touch Screen Y- Plate Voltage Supply for Y-axis Measurement
10	10	GND	P	Power Ground
11	11	IN3	I	Auxiliary Input, ADC Input Channel 3
12	12	IN4	I	Auxiliary Input, ADC Input Channel 4
13	14	VREF	I	Reference Voltage Input
14	14	VDD	P	Power Supply (2.2V ~ 3.6V)
15	15	PENIRQN	O	Pen Interrupt Output. Active low
16	16	DOUT	O	Serial Data Output. When CSN is "H", this pin is tri-state
1	1	BUSY	O	Busy Output. When CSN is "H", this pin is tri-state
2	2	DIN	I	Serial Data Input
3	3	CSN	I	Chip Select Input. Active low
4	4	DCLK	I	External Clock Input

2.2 Package Pin Configuration & Dimension (TQFN16, 4x4)

(1) UG161 Package :

(2) UG162 Package :


SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHS		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.70	0.75	0.80	0.027	0.029	0.031
A1	0.00	0.02	0.05	0.000	0.001	0.002
b	0.25	0.30	0.35	0.010	0.012	0.014
C	0.203 BSC			0.008 BSC		
D	3.85	4.00	4.15	0.152	0.157	0.163
D2	2.00	2.10	2.20	0.079	0.083	0.087
E	3.85	4.00	4.15	0.152	0.157	0.163
E2	2.00	2.10	2.20	0.079	0.083	0.087
e	0.65 BSC			0.026 BSC		
L	0.50	0.55	0.60	0.020	0.022	0.024

3. Functional Description

3.1 General

WT5200 is a 4-wire resistive touch screen controller that incorporates a 12-bit single supply successive approximation (SAR) ADC. The throughput rate could be up to 125kSPS with 2MHz clock.

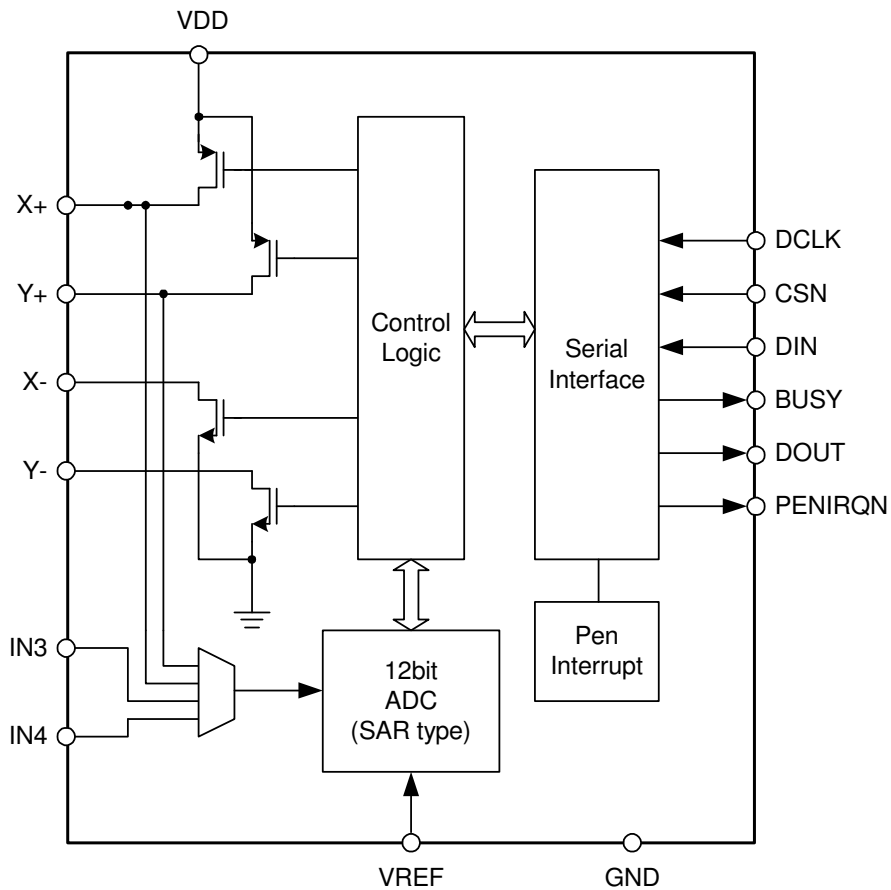


Figure 1. WT5200 Block Diagram
 (Note: for UG162-package, VREF and VDD are short together to Pin 14)

3.2 Control Register

The function of WT5200 is decided by the 8-bit control register which is fed into WT5200 from DIN pin. The register includes start bit (S), driver switches and ADC input control (A2, A1, A0), ADC resolution control (MODE), and power-down mode (PD1, PD0).

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
S	A2	A1	A0	MODE	Reserved	PD1	PD0

Table 1. Contents of Control Register

S bit: The first bit of control register and is always “H” to indicate the beginning of each data conversion.
A2, A1, A0 bits: control the configuration of driver switches and ADC input channel. Please see Table 2 for reference.

Command				ADC Input	Switch Status		Note
A2	A1	A0	Reserved		X+, X-	Y+, Y-	
0	0	1	Don't Care	X+	OFF	ON	
1	0	1		Y+	ON	OFF	
0	1	0		IN3	OFF	OFF	
1	1	0		IN4	OFF	OFF	

Table 2. Driver Switch Configuration Table

MODE bit: ADC resolution selection bit

= 0: 12-bit resolution

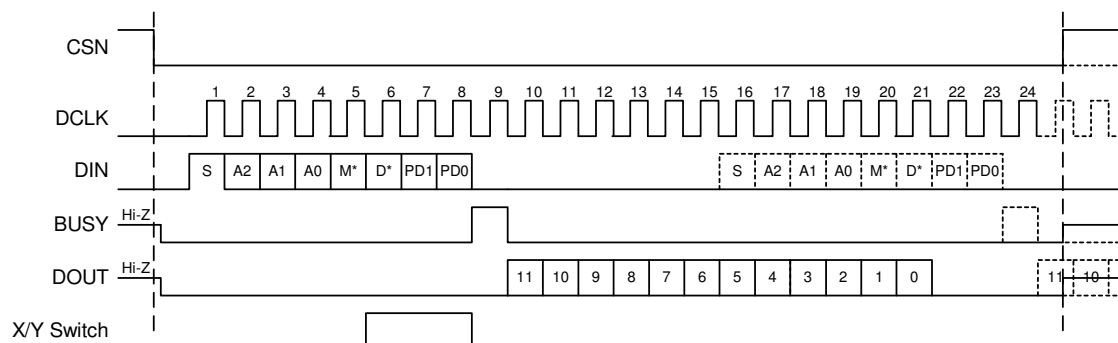
= 1: 8-bit resolution

PD1, PD0 bits: power-down and pen-interrupt control bits

PD1	PD0	PENIRQN	ADC power-down function
0	0	Enabled	ADC power-down between conversions
0	1	Disabled	ADC power-down between conversions
1	0	Enabled	ADC always power-up
1	1	Disabled	ADC always power-up

Table 3. Power-down and Pen-interrupt Selection Table

3.3 Serial Interface



*Note: M = MODE, D = Don't Care

Figure 2. Serial Interface Timing

4. Electrical Characteristics

4.1 Absolute Maximum Ratings

Parameter	Min.	Max.	Units
Ambient temperature with power applied (Ta)	-40	85	°C
Storage temperature (Tstg)	-65	150	°C

Note: The absolute maximum ratings are rated values which must not be exceeded during operation, even for an instant. Any one of the ratings must not be exceeded. If any absolute maximum rating is exceeded, a device may break down or its performance may be degraded, causing it to catch fire or explode resulting in injury to the users. Therefore, when designing products which include this device, ensure that no absolute maximum rating value will ever be exceeded.

4.2 Recommended Operating Conditions

Parameter	Min.	Typ.	Max.	Units
Power Supply (VDD)	2.2	3.3	3.6	V

4.3 Characteristics

(Ta = -40~85°C, VDD=2.7V, VREF=2.7V GND=0V, fsample=125kHz, 12-bit mode, digital inputs = GND or VDD. Typical values are at 25°C, unless otherwise noted)

Parameter	Condition	Min.	Typ.	Max.	Units
DC Accuracy					
Resolution			12		Bits
No Missing Codes			11		Bits
Offset Errors			+/-6		LSB
Gain Errors			+/-6		LSB
Switch Drivers On-resistance					
X+, Y+, X-, Y-			5		Ω
Analog Input					
Input Voltage Range		0		VREF	V
Input Capacitance				25	pF
Reference Input					
Voltage Range	(Note)	1		VDD	V
Digital Input					
VOH		0.8 VDD			V
VOL				0.3	V
VIH		0.7 VDD			V
VIL				0.5	V
Power Supply					
VDD	Specified Performance	2.7		3.6	V
	Operating Range	2.2		3.6	V
Supply Current	Power Down Mode			1	uA

Note: for UG162-package, VREF and VDD are short together to Pin 14