GT911

5-point SOC Touch Solution for Phone

Rev. 01 ——2013.01.08

Contents

1. Overview

Based on Goodix 3rd generation Projected-Capacitive touch technology, GT911 has a sensing network with 26 driving channels and 14 sensing channels, built-in analog amplifier circuit, digital operation module and high-performance MPU, transfer the touch information through I^2C.

GT911 can support for 5 touch points in fast response time and low consumption, which is very suitable for mobile phone.

2. Features

- ✧ Built-in circuit and high performance MPU
  - ➢ Touch report rate: 100Hz
  - ➢ 5 point touch, Touch point output in coordinates type
  - ➢ Unified firmware version for different Touch-panel size
  - ➢ Single power supply**,** Built in 1.8V LDO
  - ➢ Flash craft, support online burning
- ✧ Touch screen sensor
  - ➢ Channel: 26(driving)*14(sensing)
  - ➢ Support size: 7”~8”
  - ➢ Support for ITO Glass
  - ➢ OGS/SITO without shielding layer available
  - ➢ Cover lens thickness requirement: 0.7mm ≦ glass ≦ 2mm, 0.5mm≦PET ≦1.2mm
  - ➢ Built in frequency hopping
- ✧ Environmental applicable performance
  - ➢ Initialized automatic calibration
  - ➢ Automatic temperature drift compensation
  - ➢ Operating temperature: -40℃~+85℃, humidity: ≦95%RH
  - ➢ Storage temperature: -60℃~+125℃, humidity: ≦95%RH
- ✧ Communication interface
  - ➢ Standard I^2C communication protocol
  - ➢ Working in I^2C Slave mode
  - ➢ Support 1.8V~3.3V interface level
- ✧ Wake-up time
  - ➢ From Green mode: <48ms
  - ➢ From Sleep mode: <200ms

- Initialization: <200ms

✧ Power supply:

- Single power: 2.8V~3.3V

✧ Power ripple:

- Vpp≦50mV

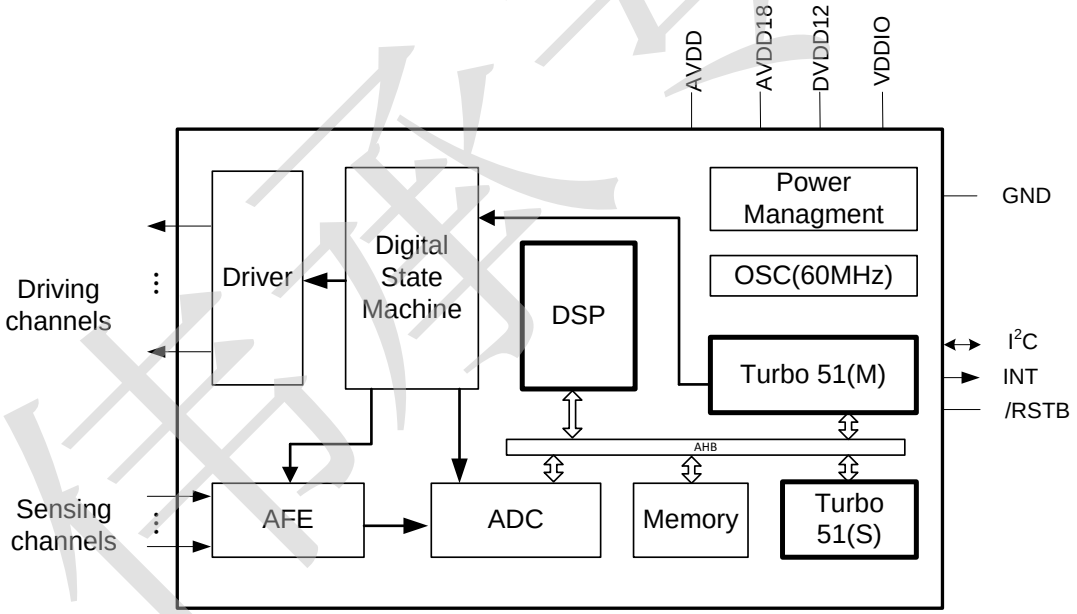
✧ Packaging:

- GT911: 52pins，6mm*6mm QFN_0.4P

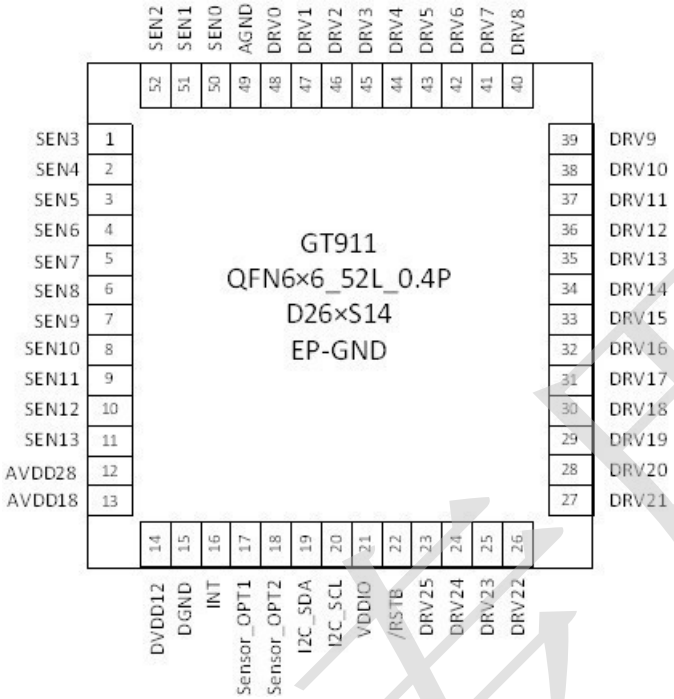
✧ Development supporting tools

- Touch-panel module's performance analysis tool
- Parameter detector & configuration capture of touch panel
- Q/C tools for mass production
- Developing guide & reference code supporting

3. Chip Diagram



4. Pin Definition



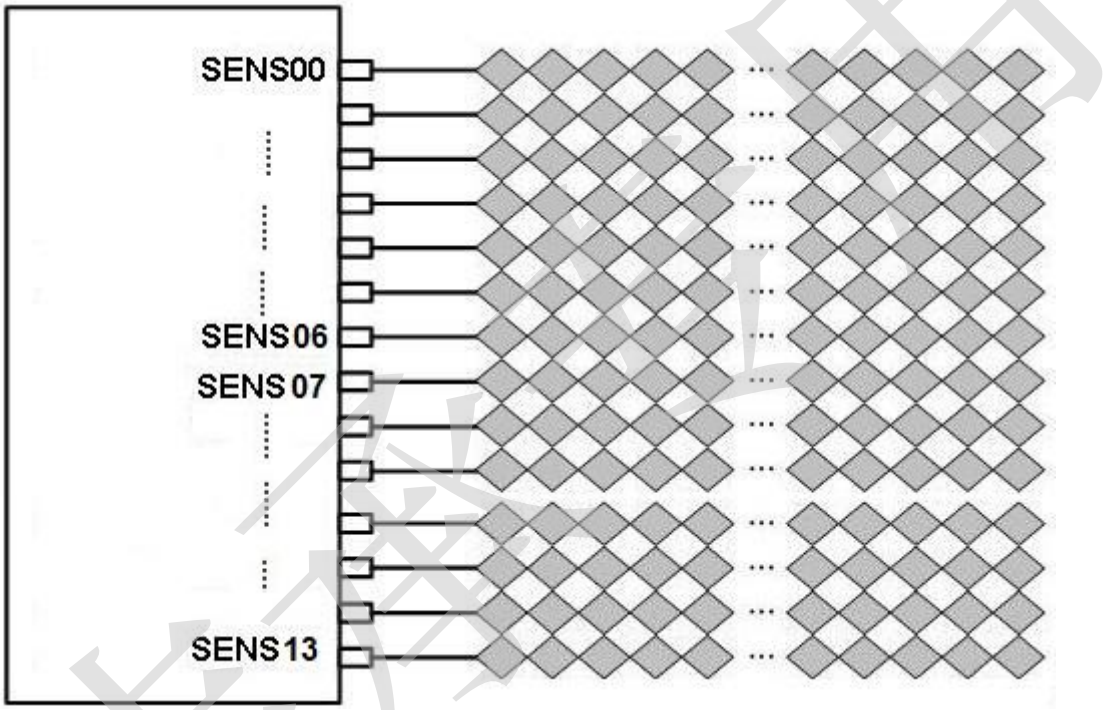
Pin No.	Name	Description	Remark
1~11	SEN3~SEN13	Sensing channels	
12	AVDD28	Analog VDD 2.8V	2.2uF to GND
13	AVDD18		2.2uF to GND
14	DVDD12		2.2uF to GND
15	DGND	Digital ground	
16	INT	Interrupt	
17	Sensor_OPT1	Sensor option pin1	
18	Sensor_OPT2	Sensor option pin2	External pull-down res.
19	I^2C_SDA	I^2C_data	
20	I^2C_SCL	I^2C_clock	
21	VDDIO	VDD of GPIO	2.2uF to GND 1. floating: 1.8V 2. to AVDD: AVDD
22	/RSTB	Reset	external pull-up, low valid
23~48	DRV25~DRV0	Driving channels	
49	AGND	Analog ground	
50~52	SEN0~SEN2	Sensing channels	

5. Sensor Development

5.1. Arrangement of Sensing Channels

GT911 has 14 sensing pins: SEN0~SEN13, which are directly connected to ITO sensors. Please use “Channel Selector” to select channel & arrange the channel sequence when ITO channel is less than detection channel of the chip.

- example: Layout all the ITO races on the same side, connected in the sequence from 0 to 13 or 13 to 0:



5.2. Arrangement of Driving Channels

GT911 has 26 driving channels in total, which are directly connected with 26 ITO sensors. Please use “Channel Selector” to select channel & arrange the channel sequence when ITO channel is less than detection channel of the chip.

After the layout of driving channels, relevant registers of GT911 shall be configured to ensure logic position relations consistent with physical position relations of driving channels.

5.3. Design Specification of ITO Sensor

DITO

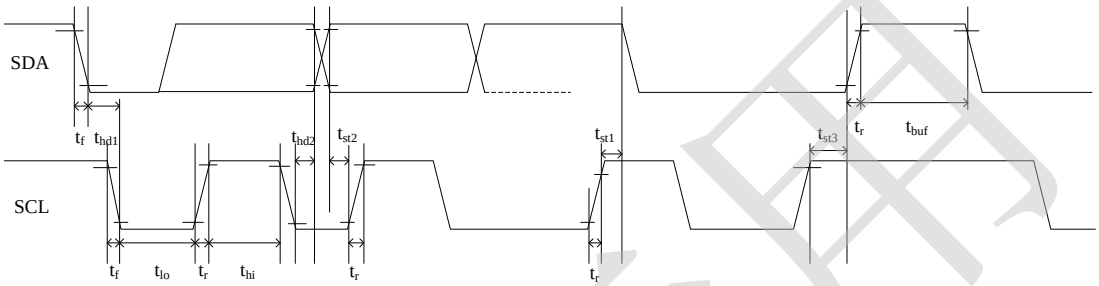
	GT911
Impedance of driving channel race	≦3KΩ
Impedance of driving channel	≦10KΩ
Impedance of sensing channel race	≦10KΩ
Impedance of sensing channel	≦40KΩ
Capacitor of node	≦4pF
Constant of sensing channel RC	≦6us. Typ.=3.6us

In the course of actual TP module production, driving channels and sensing channels are made with ITO or other invisible conductive material, and the volatility of impedance is relatively small. When the channel races are used with metallic material, some races may be oxidized and their impedance will become larger due to process control or other reasons, the impedance will be different; when the wires are used with ITO materials, though the races in all channels will be maintained consistent by virtue of matching length and width in design, there still be some difference. In order to guarantee data consistency and evenness in the whole panel, the wiring impedance shall meet the requirements as above table.

6. I²C Communication

6.1. I²C Communication

GT911 provides standard I²C interface for communication. In the system, GT911 always works in slave mode, all communications are initiated by master, and the baud rate can be up to 400K bps. The definition of I²C timing is as following:



Test condition1: 1.8V communication interface, 400Kbps, pull up resistor is 2K ohm

Parameter	Symbol	MIN.	Max.	Unit
SCL low period	t_{lo}	0.9	-	us
SCL high period	t_{hi}	0.8	-	us
SCL setup time for START condition	t_{st1}	0.4	-	us
SCL setup time for STOP condition	t_{st3}	0.4	-	us
SCL hold time for START condition	t_{hd1}	0.3	-	us
SDA setup time	t_{st2}	0.4	-	us
SDA hold time	t_{hd2}	0.4	-	us

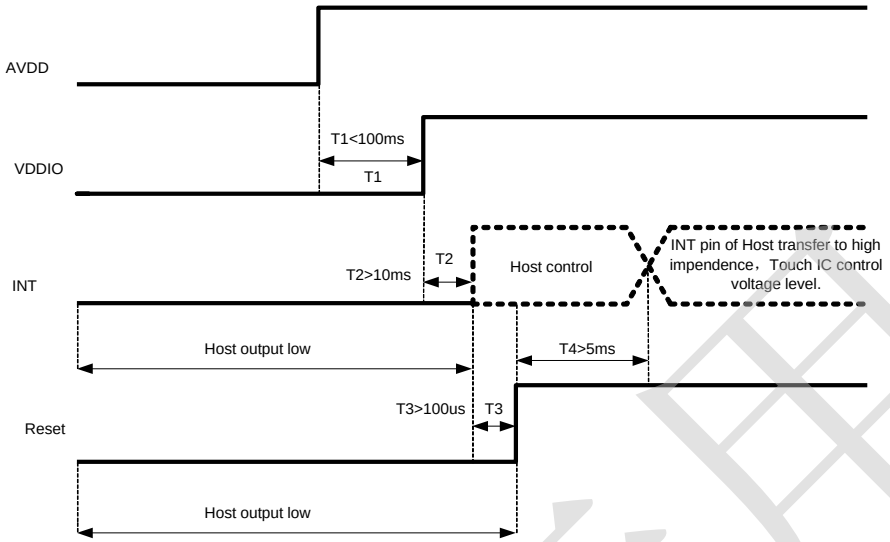
Test condition2: 3.3V communication interface, 400Kbps, pull up resistor is 2K ohm

Parameter	Symbol	MIN.	Max.	Unit
SCL low period	t_{lo}	0.9	-	us
SCL high period	t_{hi}	0.8	-	us
SCL setup time for START condition	t_{st1}	0.4	-	us
SCL setup time for STOP condition	t_{st3}	0.4	-	us
SCL hold time for START condition	t_{hd1}	0.3	-	us
SDA setup time	t_{st2}	0.4	-	us
SDA hold time	t_{hd2}	0.4	-	us

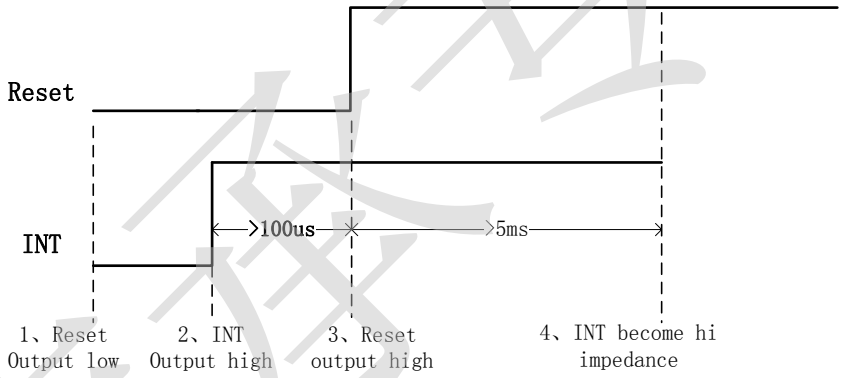
GT911 has 2 sets of slave address 0xBA/0xBB & 0x28/29. Master can control Reset & INT pin to configure the slave address in power on initial state like

following:

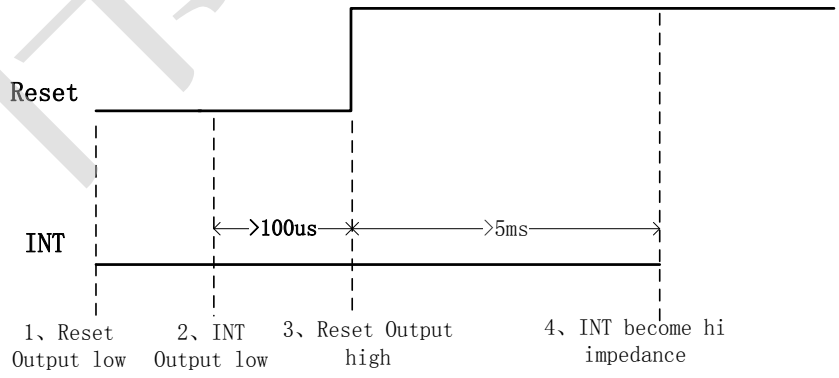
Power on diagram:



Timing of setting slave address to 0x28/0x29:



Timing of setting slave address to 0xBA/0xBB:



a) Data Transmission

(ex: slave address is 0xBA/0xBB)

Communication is always initiated by master, A high-to-low transition of SDA with SCL high is a start condition.

All addressing signal are serially transmitted to and from on bus in 8-bit word. GT911 sends a “0” to acknowledge when the addressing word is 0xBA/BB (or 0x28/0x29). This happens during the ninth clock cycle. If the slave address is not matched, GT911 will stay in idle state.

The data words are serially transmitted to and from in 9-bit formation: 8-bit data + 1-bit ACK or NACK sent by GT911. Data changes during SCL low periods & keeps valid during SCL high.

A low-to-high transition of SDA with SCL high is a stop condition.

b) Write Data to GT911

(ex: slave address is 0xBA/0xBB)

Write operations

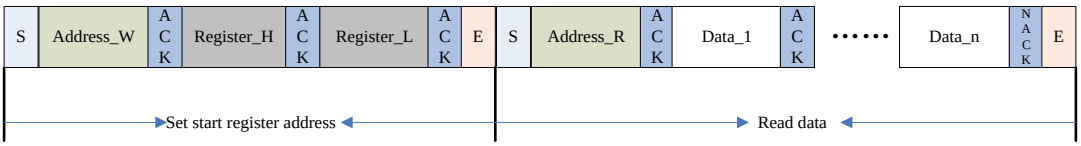
Please check the above figure, master start the communication first, and then sends device address 0XBA preparing for a write operation.

After receiving ACK from GT911, master sends out 16-bit register address, and then the data word in 8-bit, which is going to be wrote into GT911.

The address pointer of GT911 will automatically increase one after one byte writing, so master can sequentially write in one operation. When operation finished, master stop the communication.

c) Read Data from GT911

(ex: slave address is 0xBA/0xBB)



Read operations

Please check the above figure, master start the communication first, and then sends device address 0xBA for a write operation.

After receiving ACK from GT911, master sends out 16-bit register address, to set the address pointer of GT911. After receiving ACK, master produce start signal once again & send device address 0xBB , then read data word from GT911 in 8-bit.

GT911 also supports sequential read operation, and the default setting is sequential read mode. Master shall send out ACK after every byte reading successfully but NACK after the last one. Then sends stop signal to finish the communication.

6.2. Register Information of GT911

a) Real Time Order

(Write Only)

Addr	Name	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
0x8040	Command	0：read coordinate 1：read diff data or raw data 2：software reset3:baseline update 4: baseline calibration 5: screen off 3&4 are still internal test							

b) Configuration Information

(R/W)

	Config Data	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
0x8047	Config_ Version	Version of the configuration							
0x8048	X Output Max (Low Byte)	Resolution of X axis							
0x8049	X Output Max (High Byte)								
0x804A	Y Output Max (Low Byte)	Resolution of Y axis							
0x804B	Y Output Max (High Byte)								
0x804C	Touch Number	Reserved				Touch number：1~5			
0x804D	Module_ Switch1	Reserved		Stretch_rank		X2Y	Reserved	INT trigger method 00：rising edge trigger 01：falling edge trigger	

						02：low level enquiry 03：high level enquiry
0x804E	Module_ switch2	Reserved				
0x804F	Shake_Count	Reserved				Finger shake count
0x8050	Filter	First_Filter	Normal_Filter (filtering value of original coordinate window, coefficiency is 1)			
0x8051	Large_Touch	Number of touch in large area				
0x8052	Noise_ Reduction	Reserved				Value of noise elimination (coefficient is 1, 0~15)
0x8053	Screen_ Touch_Level	Threshold of touch grow out of nothing				
0x8054	Screen_ Leave_Level	Threshold of touch grow out of nothing				
0x8055	Low_Power_ Control	Reserved				Time to low power consumption (0~15s)
0x8056	Refresh_Rate	Reserved				Coordinate report rate (Cycle: 5+N ms)
0x8057	x_threshold	Reserved				
0x8058	y_threshold					
0x8059	X_Speed_Limit	Reserved				
0x805A	Y_Speed_Limit					
0x805B	Space	Blank area of boarder-top (coefficient is 32)				Blank area of Boarder-bottom (coefficient is 32)
0x805C		Blank area of boarder-left (coefficient is 32)				Blank area of Boarder-right (coefficient is 32)
0x805D	Stretch_Rate	Reserved				Level of weak stretch (Stretch X/16 Pitch) （beta version is valid，published version is not）
0x805E	Stretch_R0	Interval 1 coefficient				
0x805F	Stretch_R1	Interval 2 coefficient				
0x8060	Stretch_R2	Interval 3 coefficient				
0x8061	Stretch_RM	All intervals base number				
0x8062	Drv_GroupA_ Num	All_Driving	Reserved	Driver_Group_A_number		
0x8063	Drv_GroupB_	Reserved		Driver_Group_B_number		

	Num		
0x8064	Sensor_Num	Sensor_Group_B_Number	Sensor_Group_A_Number
0x8065	FreqA_factor	Driver frequency double frequency coefficient of Driver group A GroupA_Frequence = Multiplier factor * baseband	
0x8066	FreqB_factor	Driver frequency double frequency coefficient of Driver group B GroupB_Frequence = Multiplier factor * baseband	
0x8067	Pannel_ BitFreqL	Baseband of Driver group A\B (1526HZ<baseband<14600Hz)	
0x8068	Pannel_ BitFreqH		
0x8069	Pannel_Sensor _TimeL	Time interval of the neibouring two driving signal (Unit: us), Reserved.	
0x806A	Pannel_Sensor _TimeH		
0x806B	Pannel_Tx_ Gain	Reserved	Pannel_Drv_outp ut_R 4 gears Pannel_DAC_Gain 0:Gain maximum 7: Gain minimum
0x806C	Pannel_Rx_ Gain	Pann el_PG A_C Pannel_PGA_R	Pannel_Rx_Vcmi (4 gears) Pannel_PGA_Gain (8 gears)
0x806D	Pannel_Dump_ Shift	Reserved	Magnification coefficient of original value (The Nth power of 2)
0x806E	Drv_Frame_ Control	Reser ved SubFrame_DrvNum	Repeat_Num
0x806F	NC	Reserved	
0x8070	NC	Reserved	
0x8071	NC	Reserved	
0x8072	Stylus_Tx_ Gain	Undefined (invalid when stylus_priority=0)	
0x8073	Stylus_Rx_ Gain	Undefined (invalid when stylus_priority=0)	
0x8074	Stylus_Dump_ Shift	Magnification coefficient of original value (The Nth power of 2), Reserved	
0x8075	Stylus_Driver_T ouch_Level	Stylus effective threshold (driving), Reserved	
0x8076	Stylus_Sensor_ Touch_Level	Stylus effective threshold (sensing), Reserved	
0x8077	Stylus_ Control	Pen mode escape time out period (Unit: Sec)	
0x8078	Base_reduce	S-Style improve quantity	Reserved
0x8079	NC	Reserved	

0x807A	Freq_Hopping_Start	Frequency hopping start frequency (Unit: 2KHz, 50 means 100KHz)		
0x807B	Freq_Hopping_End	Frequency hopping stop frequency (Unit: 2KHz, 150 means 300KHz)		
0x807C	Noise_Detect_Times	Detect_Stay_Times	Detect_Confirm_Times	
0x807D	Hopping_Flag	Hopping_En	Reserved	Detect_Time_Out
0x807E	Hoppging_Threshold	Large_Noise_Threshold		Hopping_Hit_Threshold
0x807F	Noise_Threshold	Threshold of noise level		
0x8080	NC	Reserved		
0x8081	NC	Reserved		
0x8082	Hopping_seg1_BitFreqL	Frequency hopping segment band 1 central frequency (for driver A/B)		
0x8083	Hopping_seg1_BitFreqH			
0x8084	Hopping_seg1_Factor	Frequency hopping segment 1 central frequency coefficient		
0x8085	Hopping_seg2_BitFreqL	Frequency hopping segment band 2 central frequency (for driver A/B)		
0x8086	Hopping_seg2_BitFreqH			
0x8087	Hopping_seg2_Factor	Frequency hopping segment 2 central frequency coefficient		
0x8088	Hopping_seg3_BitFreqL	Frequency hopping segment band 3 central frequency (for driver A/B)		
0x8089	Hopping_seg3_BitFreqH			
0x808A	Hopping_seg3_Factor	Frequency hopping segment 3 central frequency coefficient		
0x808B	Hopping_seg4_BitFreqL	Frequency hopping segment band 4 central frequency (for driver A/B)		
0x808C	Hopping_seg4_			

	BitFreqH		
0x808D	Hopping_seg4_Factor	Frequency hopping segment 4 central frequency coefficient	
0x808E	Hopping_seg5_BitFreqL	Frequency hopping segment band 5 central frequency (for driver A/B)	
0x808F	Hopping_seg5_BitFreqH		
0x8090	Hopping_seg5_Factor	Frequency hopping segment 5 central frequency coefficient	
0x8091	NC	Reserved	
0x8092	NC	Reserved	
0x8093	Key 1	Key 1 Position: 0-255 valid (0 means no touch, it means independent touch key when 4 of the keys are 8 multiples	
0x8094	Key 2	Key 2 position	
0x8095	Key 3	Key 3 position	
0x8096	Key 4	Key 4 position	
0x8097	Key_Area	Time limit for long press(1~16 s)	Touch valid interval setting: 0-15 valid
0x8098	Key_Touch_Level	Key threshold of touch key	
0x8099	Key_Leave_Level	Key threshold of touch key	
0x809A	Key_Sens	KeySens_1(sensitivity coefficient of key 1, same below)	KeySens_2
0x809B	Key_Sens	KeySens_3	KeySens_4
0x809C	Key_Restrain	Finger from screen left after inhibition of key time(Unit:100ms,0 means 600ms)	The independent button pro key inhibition parameters
0x809D	NC	Reserved	
0x809E	NC	Reserved	
0x809F	NC	Reserved	
0x80A0	NC	Reserved	
0x80A1	NC	Reserved	
0x80A2	Proximity_Drv_Select	Drv_Start_Ch (start channel of driving direction)	Drv_End_Ch (End channel)
0x80A3	Proximity_Sens_Select	Sens_Start_Ch (start channel of sensing direction)	Sens_End_Ch (End channel)
0x80A4	Proximity_Touch_Level	Proximity effective threshold value	
0x80A5	Proximity_Leave_Level	Proximity ineffective threshold value	

0x80A6	Proximity_Sample_Add_Times	Frequency multification of proximity sensing channel.
0x80A7	Proximity_Sample_Dec_ValL	Sample value minus this value (16 bit), and accumulate, low byte.
0x80A8	Proximity_Sample_Dec_ValH	Sample value minus this value (16 bit), and accumulate, high byte.
0x80A9	Proximity_Leave_Shake_Count	exit proximity jitter count
0x80AA	Self_Cap_Tx_gain	self-capacitance sends gains
0x80AB	Self_Cap_Rx_gain	self-capacitance receive gains
0x80AC	Self_Cap_Dump_Shift	Magnification coefficient of original value of self-capacitance (The Nth power of 2)
0x80AD	SCap_Diff_Up_Level_Drv	Self capacitance suppress floating rising threshold (driving direction)
0x80AE	Scap_Merge_Touch_Level_Drv	Self-capacitance Touch Level (driving direction)
0x80AF	SCap_Pulse_TimeL	Self-capacitance sampling time (low byte)
0x80B0	SCap_Pulse_TimeH	Self-capacitance sampling time (high byte)
0x80B1	SCap_Diff_Up_Level_Sen	Self capacitance suppress floating rising threshold (sensing direction)
0x80B2	Scap_Merge_Touch_Level_Sen	Self-capacitance Touch Level (sensing direction)
0x80B3	NC	Reserved
0x80B4	NC	Reserved
0x80B5	NC	Reserved
0x80B6	NC	Reserved
0x80B7 ~ 0x80C4	Sensor_CH0~ Sensor_CH13	ITO Sensor corresponding chip channel number
0x80C5 ~ 0x80D4	NC	Reserved
0x80D5 ~ 0x80EE	Driver_CH0~ Driver_CH25	ITO Driver corresponding chip channel number
0x80EF ~	NC	Reserved

0x80FE		
0x80FF	Config_Chksum	configuration information verify (the complement number of total byte from 0x8047 to 0x80FE)
0x8100	Config_Fresh	signal of updated configuration (the host writes)

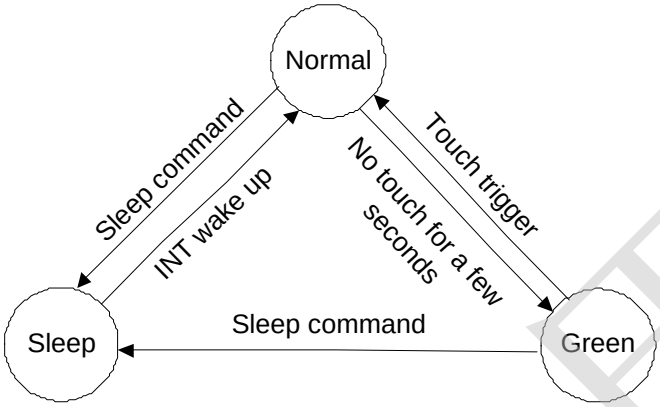
c) Coordinates Information

Addr	Access	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
0x8140	R	Product ID (first byte，ASCII)							
0x8141	R	Product ID (second byte，ASCII)							
0x8142	R	Product ID (third byte，ASCII)							
0x8143	R	Product ID (forth byte，ASCII)							
0x8144	R	Firmware version (HEX.low byte)							
0x8145	R	Firmware version (HEX.high byte)							
0x8146	R	x coordinate resolution (low byte)							
0x8147	R	x coordinate resolution (high byte)							
0x8148	R	y coordinate resolution (low byte)							
0x8149	R	y coordinate resolution (high byte)							
0x814A	R	Vendor_id (current module option information)							
0x814B	R	Reserved							
0x814C	R	Reserved							
0x814D	R	Reserved							
0x814E	R/W	buffer status	large detect	Reserved		number of touch points			
0x814F	R	track id							
0x8150	R	point 1 x coordinate (low byte)							
0x8151	R	point 1 x coordinate (high byte)							
0x8152	R	point 1 y coordinate (low byte)							
0x8153	R	point 1 y coordinate (high byte)							
0x8154	R	Point 1 size (low byte)							
0x8155	R	point 1 size (high byte)							
0x8156	R	Reserved							
0x8157	R	track id							
0x8158	R	point 2 x coordinate (low byte)							
0x8159	R	point 2 x coordinate (high byte)							
0x815A	R	point 2 y coordinate (low byte)							
0x815B	R	point 2 y coordinate (high byte)							
0x815C	R	point 2 size (low byte)							
0x815D	R	point 2 size (high byte)							
0x815E	R	Reserved							

0x815F	R	track id
0x8160	R	point 3 x coordinate (low byte)
0x8161	R	point 3 x coordinate (high byte)
0x8162	R	point 3 y coordinate (low byte)
0x8163	R	point 3 y coordinate (high byte)
0x8164	R	point 3 size (low byte)
0x8165	R	point 3 size (high byte)
0x8166	R	Reserved
0x8167	R	track id
0x8168	R	point 4 x coordinate (low byte)
0x8169	R	point 4 x coordinate (high byte)
0x816A	R	point 4 y coordinate (low byte)
0x816B	R	point 4 y coordinate (high byte)
0x816C	R	point 4 size (low byte)
0x816D	R	point 4 size (high byte)
0x816E	R	Reserved
0x816F	R	track id
0x8170	R	point 5 x coordinate (low byte)
0x8171	R	point 5 x coordinate (high byte)
0x8172	R	point 5 y coordinate (low byte)
0x8173	R	point 5 y coordinate (high byte)
0x8174	R	point 5 size (low byte)
0x8175	R	point 5 size (high byte)
0x8176	R	Reserved
0x8177	R	Reserved

7. Function Mode

7.1. Working Mode



a) Normal Mode

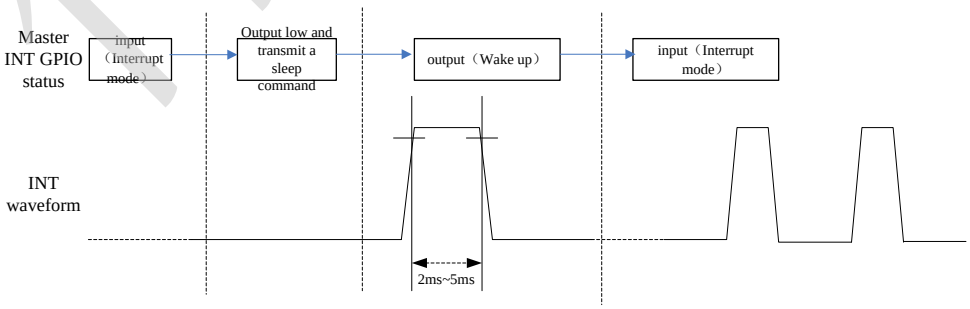
When GT911 is in Normal mode, touch scanning period is about 7ms ~ 10ms depending on the setting. The chip will automatically enter into Green mode if no touch for short time within 0~15s depending on setting and the step is 1s.

b) Green Mode

In Green mode, the touch scanning cycle is fixed as 40ms. It will automatically enter into Normal mode if any touch is detected.

c) Sleep Mode

For a lower consumption, Master can ask GT911 to enter Sleep mode through I2C command (before the command, please drive low to INT pin). Drive high to the INT pin of GT911 2~5ms will make GT911 return back to normal mode.



7.2. Pulse Calling

GT911 will inform master to read coordinate information only when touch event happen, in order to lighten the burden of master CPU. The master CPU will set trigger mode by register 'INT'. "0" means rising edge trigger, in this mode GT911 will output an rising edge hopping in INT, to inform CPU; "1" means falling edge trigger.

7.3. Sleep Mode

When the display is turned off or in any circumstance that operation of touch panel is not necessary, master can set GT911 be in Sleep mode through I2C command. The master can wake up GT911 by outputting high to INT pin & keeping 2-5ms..

7.4. Parameter Frozen Function

GT911 support the function of Parameter frozen. When parameter is obtained, parameter can be settled in GT911 through Goodix test tool. If parameter has been frozen, GT911 will not receive the configuration with lower version from master.

7.5. Frequency Hopping Function

GT911 has very strong anti-interference hardware, when the driver spectrum of GT911 overlaid with spectrum of noise signal, it can be switch to another frequency by self-adaption frequency hopping mechanism, to avoid interference.

7.6. Automatic Calibration

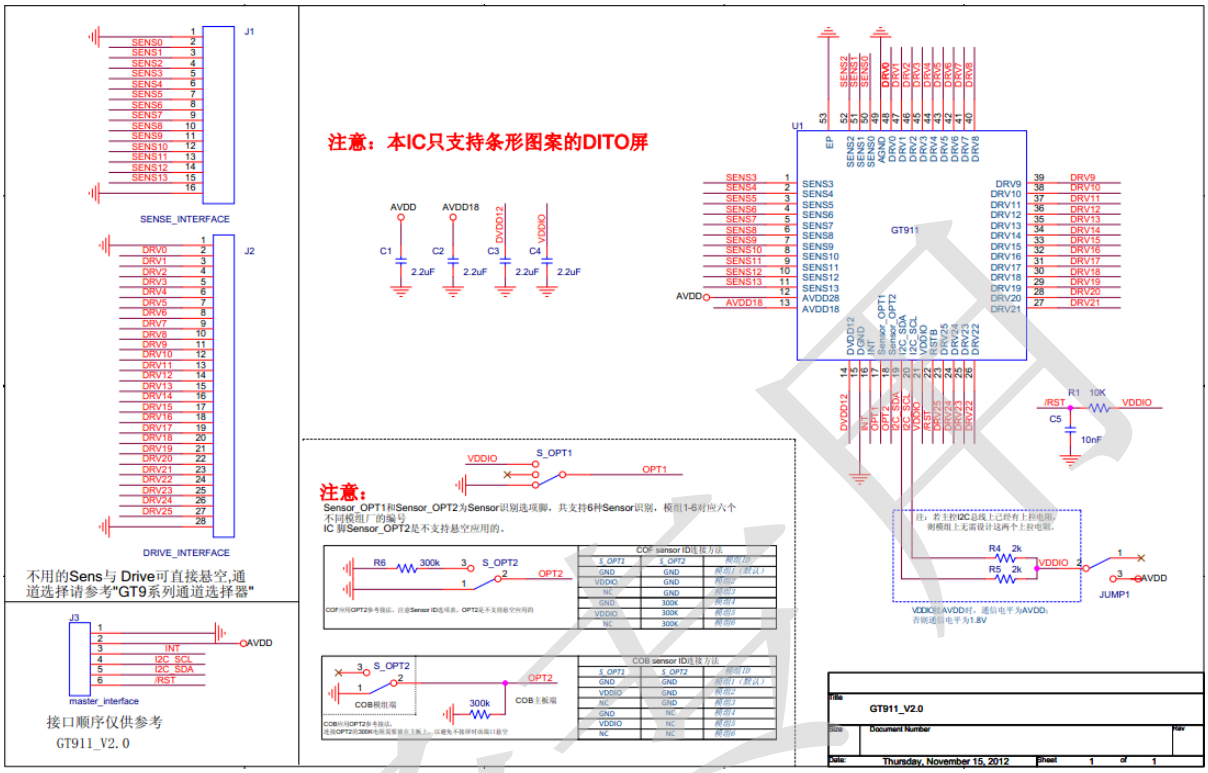
a) Initialization Calibration

Different temperature, humidity and physical structure will affect the sensor's baseline. According to environmental situation GT911 will update the baseline automatically in initialized 200ms.

b) Automatic Temperature Drift

Slow change of temperature, humidity or dust and other environmental factors will also affect the sensor's baseline. GT911 calculates and analyzes historical data, and compare to the current data variation. Base on this, the baseline will be calibration automatically.

8. Reference Circuit Diagram



Reference Circuit Diagram of GT911

Notes:

1. This circuit only shows basic applications, and may be modified according to actual conditions.
2. The capacitor should be used material of X7R.

9. Electrical Characteristics

9.1. Absolute Operation Rating

(Temperature 25℃)

Parameter	Min.	Max.	Unit
Analog power AVDD28 (refer to AGND)	2.66	3.47	V
VDDIO (REF: DGND)	1.7	3.47	V
Input voltage on Digital I/O	0	3.47	V
Input voltage on Analog I/O	0	3.47	V
Operating temperature	-40	85	℃
Storage temperature	-60	125	℃
Welding temperature (10s)		300	℃
ESD protective voltage（HB Model）		±2	KV

9.2. Operating Characteristic

Parameter	Min.	Typical	Max.	Unit
Analog power AVDD28	2.8	-	3.3	V
VDDIO	1.8	-	3.3	V
Operating temperature	-20	25	85	℃

9.3. AC Characteristic

(Temperature 25℃, AVDD=2.8V)

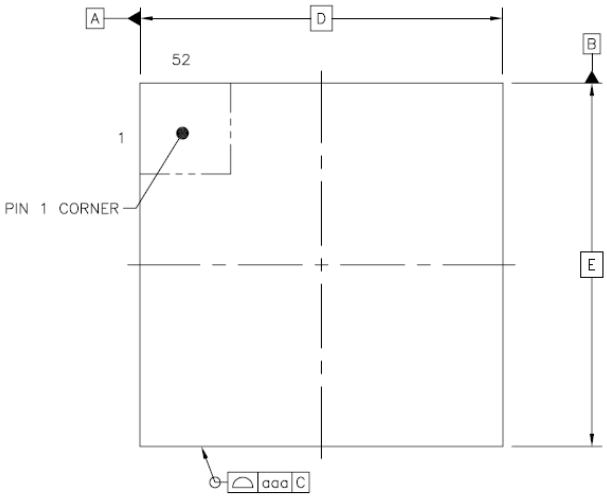
Parameter	Min.	Typical	Max.	Unit
OSC oscillation frequency	59	60	61	MHz
I/O output rise time	-	-	0.5	ns
I/O output fall time	-	-	0.5	ns

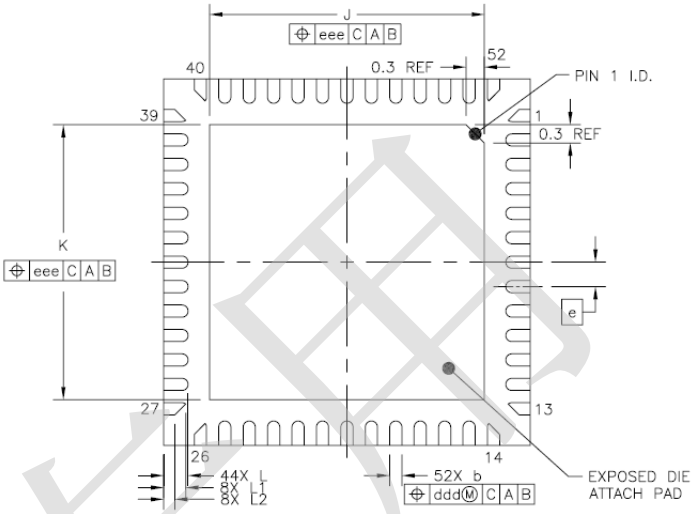
9.4. DC Characteristic

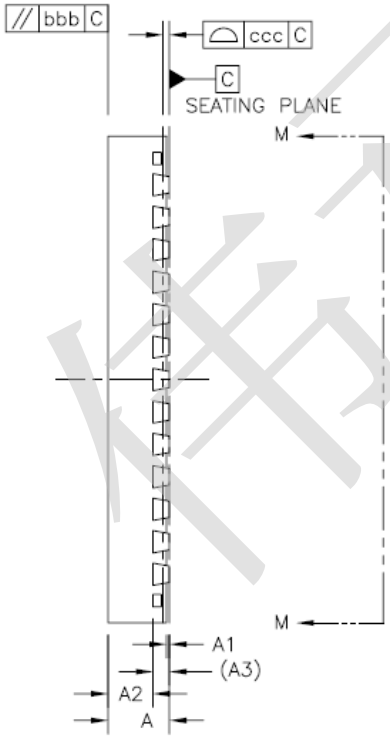
(Temperature 25℃, VDD=2.8V)

Parameter	MIN.	Typical	Max.	Unit
Operating current (Normal mode)		6.2		mA
Operating current (Green mode)		3.3		mA
Operating current (Sleep mode)	70	-	120	uA
Input voltage in low level(VDDIO=1.8V)	-0.3	0	0.45	V
Input voltage in high level(VDDIO=1.8V)	1.35	1.8	2.1	V

10. Package







SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.7	0.75	0.8
A1	0	0.035	0.05
A2	---	0.55	0.57
A3		0.203 REF	
b	0.15	0.2	0.25
D		6 BSC	
E		6 BSC	
e		0.4 BSC	
J	4.4	4.5	4.6
K	4.4	4.5	4.6
L	0.35	0.4	0.45
L1	0.31	0.36	0.41
L2	0.13	0.18	0.23
aaa		0.1	
bbb		0.1	
ccc		0.08	
ddd		0.07	
eee		0.1	

*** Controlling Dimension：MM**

11. Document History Record

Version	Date	Description of change
Rev. 00	2012-12-27	Draft version
Rev. 01	2013-01-08	Modified register list Add Filter function description in configuration information Delete touch key and proximity sensing function description

12. Contact Information

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