GT927

10-point SOC touch solution for MID

Rev. 01 ——2012.11.09

Contents

1. Overview

Based on Goodix 3rd generation Projected-Capacitive touch technology, GT927 has a sensing network with 31 driving channels and 17 sensing channels, built-in analog amplifier circuit, digital operation module and high-performance MPU, transfer the touch information through I^2C.

GT927 can support for 10 touches in fast response time and low consumption, which is very suitable for Tablet and netbook.

2. Features

- ✧ Goodix narrow band sensing technology with auto frequency hopping
  - ➢ LCD noise resist
  - ➢ Support OGS direct bonding on LCM
  - ➢ Charger noise resist
  - ➢ RF noise resist
  - ➢ Proximity sensing supporting
- ✧ Built-in circuit and high performance MPU
  - ➢ Touch report rate: 100Hz
  - ➢ Touch point output in coordinates type
  - ➢ Supporting for fixed touch-key function
  - ➢ Unified firmware version for different Touch-panel size
- ✧ Touch-panel sensor requirement
  - ➢ Supporting size: 7”~8”
  - ➢ SITO without shielding available
  - ➢ OGS without shielding available
  - ➢ Channel suspending available
  - ➢ Supporting for both ITO glass and ITO Film
  - ➢ Cover lens thickness requirement:
    0.55mm≦Glass≦2mm, 0.5mm≦PMMA≦1.2mm
- ✧ Environmental applicable performance
  - ➢ Initialized automatic calibration
  - ➢ Automatic temperature drift compensation
  - ➢ Operating temperature: -20℃~+85℃, humidity: ≦95%RH
  - ➢ Storage temperature: -40℃~+125℃, humidity: ≦95%RH
- ✧ Communication interface
  - ➢ Standard I2C communication protocol
  - ➢ Working in I2C Slave mode
  - ➢ Interface electrical level: 1.8V~3.3V
- ✧ Wake-up time

- Green mode: <48ms
- Sleep mode: <200ms
- Initialization: <200ms

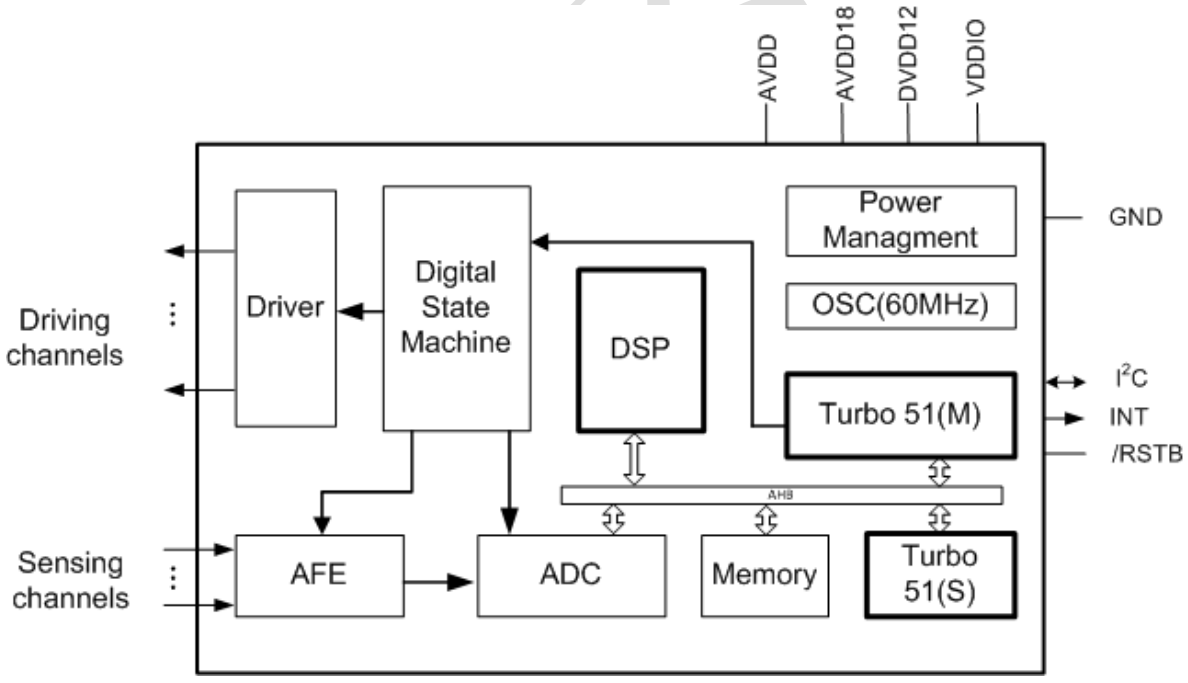
✧ Power supply:
- Single power: 2.8V~3.3V

✧ Power ripple:
- Vpp≦50mV

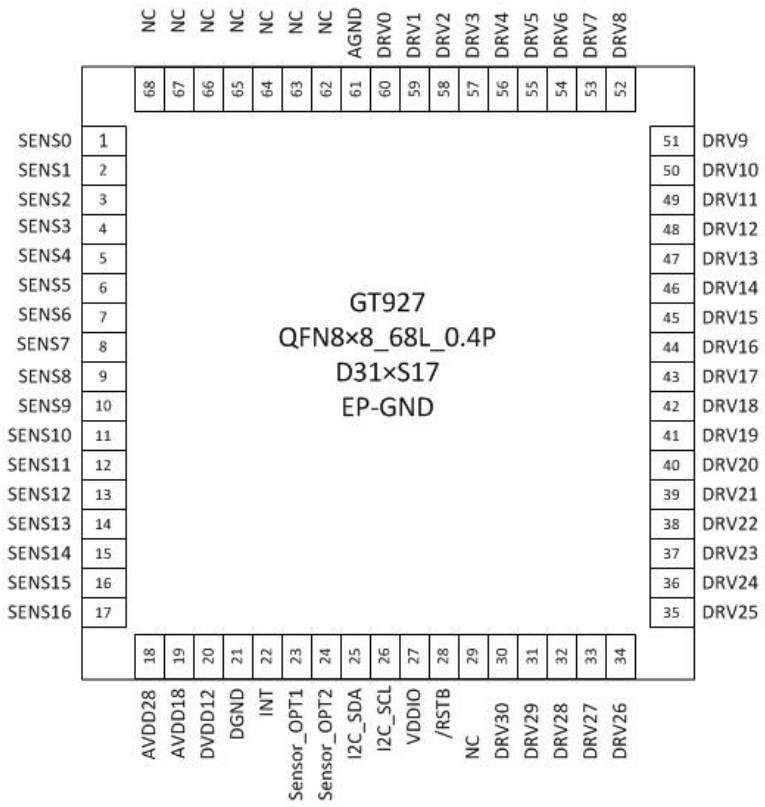
✧ Packaging:
- 68 pins，8mm*8mm QFN

✧ Development supporting tools
- Touch-panel module's performance analysis tool
- Supporting the configuration information for different touch-panel module
- Q/C tools for mass production
- Developing guide & reference code supporting

3. Block Diagram



4. Pin Description



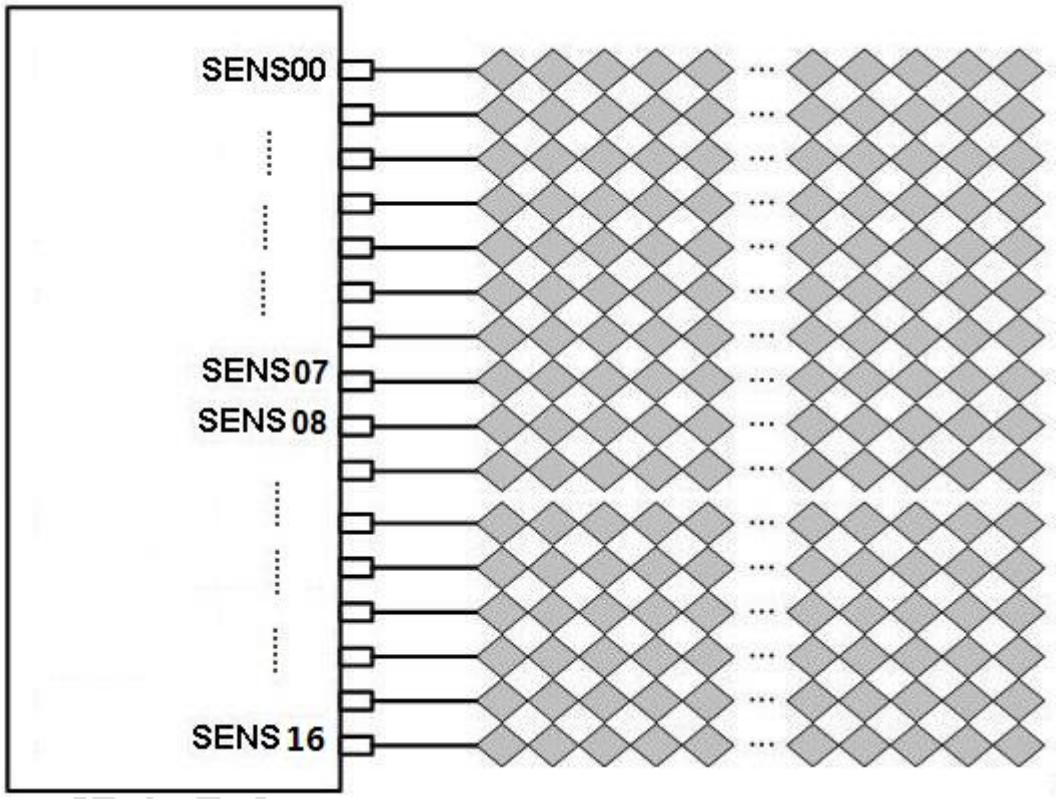
Pin No.	Name	Description	Remark
1~17	SENS0~SENS16	Sensing channels	
18	AVDD28	Analog VDD 2.8V	2.2uF to GND
19	AVDD18	Analog VDD 1.8V	2.2uF to GND
20	DVDD12	Digital VDD 1.2V	2.2uF to GND
21	DGND	Digital ground	
22	INT	Interrupt	
23	Sensor_OPT1	Sensor option pin1	
24	Sensor_OPT2	Sensor option pin2	External pull-up
25	I2C_SDA	I^2C_data	
26	I2C_SCL	I^2C_clock	
27	VDDIO	VDD of GPIO	
28	RSTB	Reset	10K ohm external pull-up
29	NC	Floating	
30~60	DRV30~DRV0	Driving channels	
61	AGND	Analog ground	
62~68	NC	Floating	

5. Sensor Development

5.1. Arrangement of Sensing Channels

GT927 has 17 sensing pins: SENS0~SENS16, which are directly connected with ITO sensors. Please reference to the GT927 schematics or contact to Goodix FAE engineer to arrange the channel sequence.

- A: Layout all the ITO races on the same side, connected in the sequence from 0 to 16 or 16 to 0:



5.2. Arrangement of Driving Channels

GT927 has 31 driving channels in total, which are directly connected with 31 ITO sensors. Please reference to the GT927 schematics or contact to Goodix FAE engineer to arrange the channel sequence.

After the layout of driving channels, relevant registers of GT927 shall be configured to ensure logic position relations consistent with physical position relations of driving channels.

5.3. Design Specification of ITO Sensor

DITO

Parameter	Range
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

SITO

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

In the course of actual 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.

5.4. Touch Keys

GT927 can support 4 separated touch keys. There are two ways to design these touch keys:

a) Carried out by ITO sensor: These keys shall be on the same channel. Touch keys are carried out by one driving channel with different sensing channels. Which channel is used for touch key, and key position will be determined with configuration information.

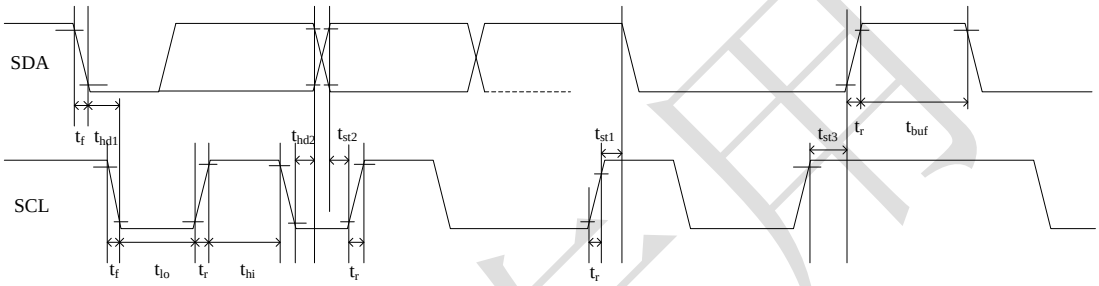
b) Carried out by FPC: When using FPC to design touch keys, please note that the driving channel used for touch keys should not be applied on the

screen.

6. I²C Communication

6.1. I²C Communication

GT927 provides standard I²C communication interface for communication of SCL and SDA with master. In the system, GT927 is always used in slave mode, all communications are initiated by master, and the communication 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

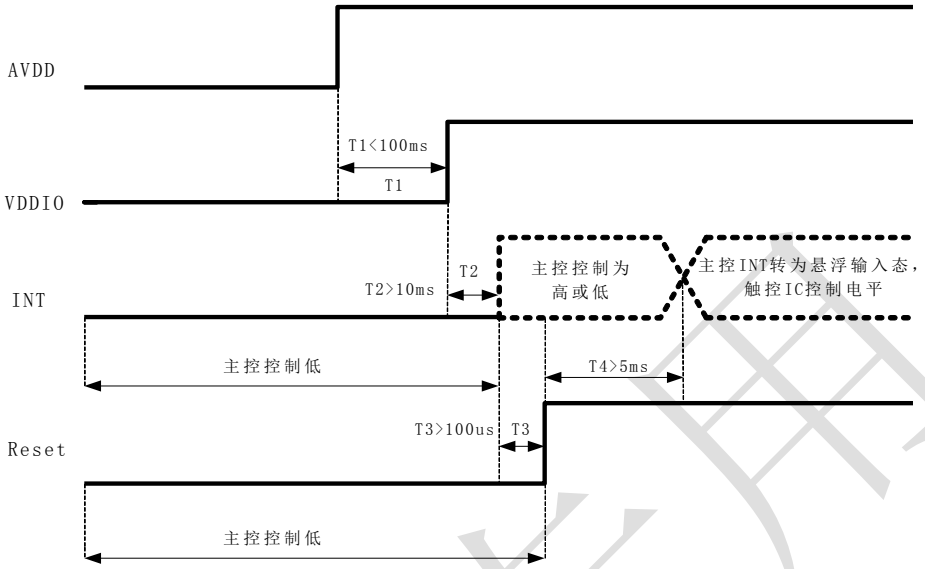
Parameter	Symbol	MIN.	Max.	Unit
SCL low period	T_{lo}	0.9	0.9	us
SCL high period	T_{hi}	0.8	0.8	us
SCL setup time for START condition	t_{st1}	0.4	0.4	us
SCL setup time for STOP condition	t_{st3}	0.4	0.4	us
SCL hold time for START condition	t_{hd1}	0.3	0.3	us
SDA setup time	t_{st2}	0.4	0.4	us
SDA hold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

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

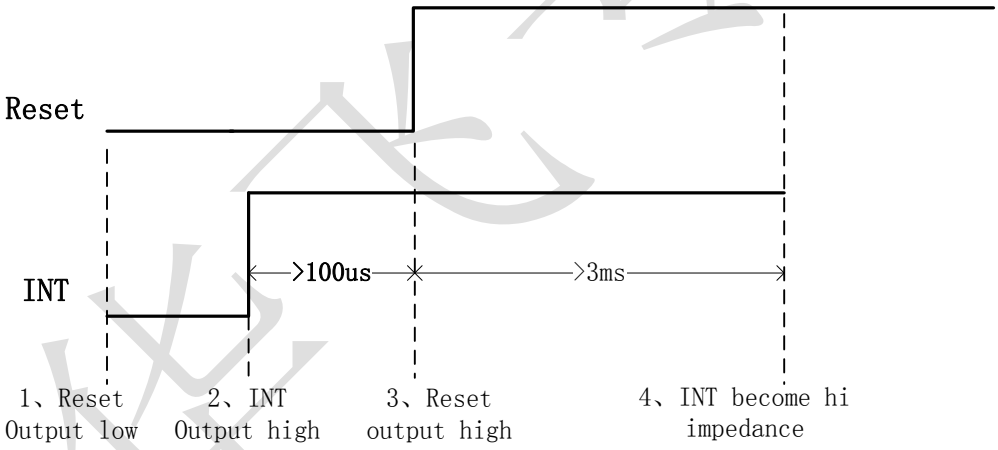
Parameter	Symbol	MIN	Max	Unit
SCL low period	T_{lo}	0.9	0.9	us
SCL high period	T_{hi}	0.8	0.8	us
SCL setup time for START condition	t_{st1}	0.4	0.4	us
SCL setup time for STOP condition	t_{st3}	0.4	0.4	us
SCL hold time for START condition	t_{hd1}	0.3	0.3	us
SDA setup time	t_{st2}	0.4	0.4	us
SDA hold time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

GT927 has 2 sets of slave address 0xBA/0xBB or 0x28/29. Master can control Reset & INT pin to configure the slave address in power on initial state like following:

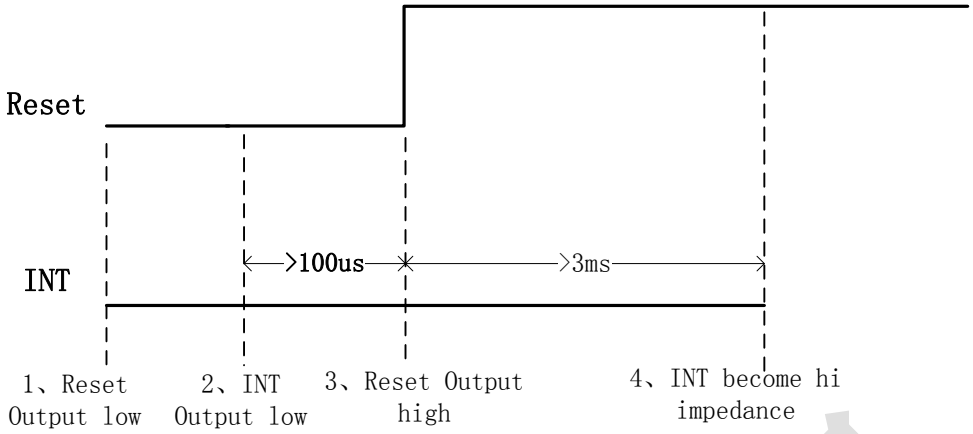
Power on Diagram:



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)

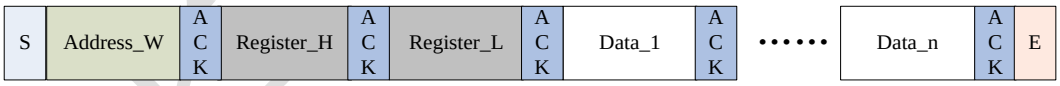
Communication is always initiated by master, A high-to-low transition of SDA with SCL high is a start condition.

All addresses words are serially transmitted to and from on bus in 8-bit words. GT927 sends a “0” to acknowledge when the address word is 0xBA/BB. This happens during the ninth clock cycle. If the slave address is not matched, GT927 will stay in idle state.

The data words are serially transmitted to and from in 9-bit words: 8-bit data + 1-bit ACK or NACK sent by GT927. Data changes during SCL high periods.

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

b) Write Operations to GT927 (ex: slave address is 0xBA/0xBB)



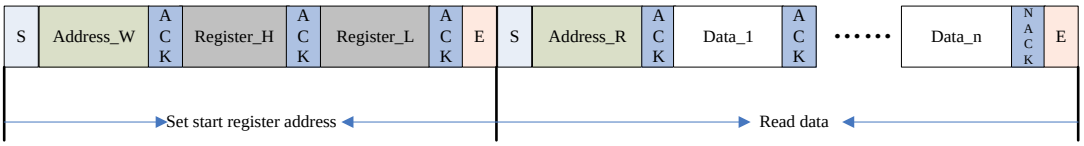
Write Operations

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

After receiving ACK from GT927, master sends out register address word in 16-bit, and then the data word in 8-bit, which is going to be wrote into GT927.

GT927’s address pointer will be automatically added 1 after write operation, so master can sequential write in one operation. When operation finished, master stop the communication.

c) Read Operations to GT927 (ex: slave address is 0xBA/0xBB)



Read operation

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

After receiving ACK from GT927, master sends out register address word in 16-bit, to set GT927's address pointer. After receiving ACK, master sends out a start signal once again, start the read operation with command: 0xBB, and read data word from GT927 in 8-bit.

GT927 also supports sequential read operation, and the default setting is sequential read mode. Master shall send out ACK when receiving successfully in every data word, master sends NACK after getting all the data required, then sends stop signal to finish the communication.

6.2. Register Information of GT927

a) Real Time Order (Write Only)

Addr	Name	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
0x8040	Command	0：read status of coordinate 1：D-value 2：software reset 3: benchmark update 4: benchmark calibration 5: screen off							
0x8041	LED_Control	Control word under control of touch key LED light.							
0x8042	Proximity_En	Proximity switch							

b) Configuration Information (R/W)

Addr	name	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
0x8047	Config_Version	Version number of the configuration document							
0x8048	X Output Max_L	Max value of X axis							
0x8049	X Output Max_H								
0x804A	Y Output Max_L	Max value of Y axis							
0x804B	Y Output Max_H								
0x804C	Touch Number	Reserved				Touch number：1~5			
0x804D	Module_Switch1	Reserved		Stretch_rank		X2Y	Sito	INT trigger method	
0x804E	Module_switch2	Reserved							Touch_Key
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)
0x8053	S_Touch_Level	Threshold of touch grow out of nothing			
0x8054	S_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	Parameter of speed limit			
0x805A	Y_Speed_Limit				
0x805B	Space	Blank area of boarder-top			Blank area of Boarder-bottom
0x805C		Blank area of boarder-left			Blank area of Boarder-right
0x805D	NC	Reserved			
0x805E	NC	Reserved			
0x805F	NC	Reserved			
0x8060	NC	Reserved			
0x8061	NC	Reserved			
0x8062	Drv_GroupA_Num	All_Driving	Reserved	Driver_Group_A_number	
0x8063	Drv_GroupB_Num	Reserved	D_Freq	Driver_Group_B_number	
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)			
0x806A	Pannel_Sensor_TimeH				
0x806B	Pannel_Tx_Gain	reserved		Pannel_Drv_output_R, 4 gears	Pannel_DAC_Gain
0x806C	Pannel_Rx_Gain	Pannel_PGA_C	Pannel_PGA_R	Pannel_Rx_Vcmi	Pannel_PGA_Gain
0x806D	Pannel_Dump_Shift	Reserved			Magnification coefficient of original value (The Nth power of 2)
0x806E	Drv_Frame_Control	Reserved	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	Undefined (invalid when stylus_priority=0)		
0x8075	Stylus_Touch_Level	Undefined (invalid when stylus_priority=0)		
0x8076	Stylus_Leave_Level	Undefined (invalid when stylus_priority=0)		
0x8077	Stylus_Control	Pen mode escape time out period (Unit: Sec)		
0x8078	NC	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_Tims	Detect_Stay_Times	Detect_Confirm_Times	
0x807D	Hopping_Flag	Hop_En	Reserved	Detect_Time_Out
0x807E	Hopping_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_BitF	Frequency hopping segment band 5 central frequency (for driver A/B)		

	reqL		
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	Reserved	Reserved
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_Freq_Factor	Frequency multification of proximity sensing channel.	
0x80A7	Proximity_BitFreqL	Base frequency of proximity sensing channel.	
0x80A8	Proximity_BitFreqH		
0x80A9	Proximity_Sensor_TimeL	Time interval between proximity adjacent driving signal	
0x80AA	Proximity_Sensor_TimeH		
0x80AB	Proximity_Tx_Gain	Driving gain of proximity	

0x80AC	Proximity_Rx_Gain	Driving gain of proximity	
0x80AD	Proximity_Dump_Shift	Reserved	Magnification coefficient of proximity original value （The Nth power of 2）
0x80AE	NC	Reserved	
0x80AF	NC	Reserved	
0x80B0	NC	Reserved	
0x80B1	NC	Reserved	
0x80B2	NC	Reserved	
0x80B3	NC	Reserved	
0x80B4	NC	Reserved	
0x80B5	NC	Reserved	
0x80B6	NC	Reserved	
0x80B7~ 0x80C4	Sensor_CH0~ Sensor_CH13	Corresponding channel no. of ITO Sensor	
0x80C5~ 0x80D4	NC	Reserved	
0x80D5~ 0x80EA	Driver_CH0~ Driver_CH21	Corresponding channel no. of ITO Driver0	
0x80EB~ 0x80FE	NC	Reserved	
0x80FF	Config_Chksum	Check of configuration information	
0x8100	Config_Fresh	Updated configuration (by master control)	

c) Coordinates Information

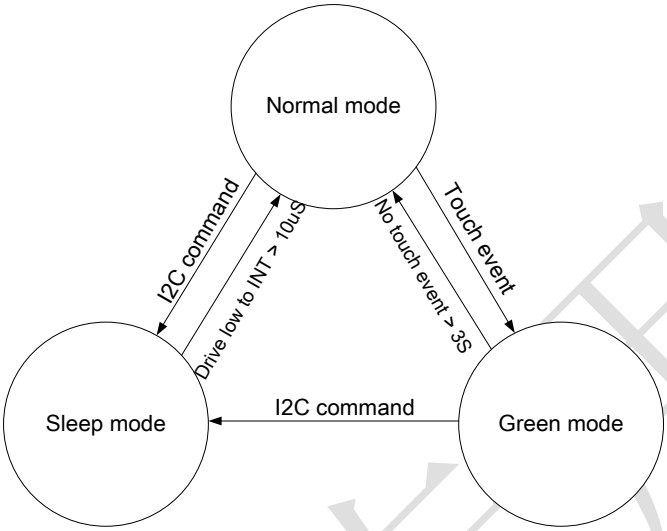
Addr	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
0x8140	Product ID(Lowest Byte,ASCII 码 6）							
0x8141	Product ID(Third Byte,ASCII 码 0）							
0x8142	Product ID(Second Byte,ASCII 码 0）							
0x8143	Product ID(Highest Byte,ASCII 码,如 9）							
0x8144	Firmware version(byte1)(LowByte)							
0x8145	Firmware version(byte2)(HighByte)							
0x8146	x coordinate resolution (low byte)（current output resolution）							
0x8147	x coordinate resolution (high byte)							
0x8148	y coordinate resolution (low byte)							
0x8149	y coordinate resolution (high byte)							
0x814A	Vendor_id(current module choice information)							
0x814B	Reserved							
0x814C	gesture type(reserved)							
0x814D	gesture value(reserved)							
0x814E	buffer status	large detect	Proximity Valid	HaveKey	number of touch points			

0x814F	track id
0x8150	point 1 x coordinate (low byte)
0x8151	point 1 x coordinate (high byte)
0x8152	point 1 y coordinate (low byte)
0x8153	point 1 y coordinate (high byte)
0x8154	Point 1 size (low byte)
0x8155	point 1 size (high byte)
0x8156	Reserved
0x8157	track id
0x8158	point 2 x coordinate (low byte)
0x8159	point 2 x coordinate (high byte)
0x815A	point 2 y coordinate (low byte)
0x815B	point 2 y coordinate (high byte)
0x815C	point 2 size (low byte)
0x815D	point 2 size (high byte)
0x815E	Reserved
0x815F	track id
0x8160	point 3 x coordinate (low byte)
0x8161	point 3 x coordinate (high byte)
0x8162	point 3 y coordinate (low byte)
0x8163	point 3 y coordinate (high byte)
0x8164	point 3 size (low byte)
0x8165	point 3 size (high byte)
0x8166	Reserved
0x8167	track id
0x8168	point 4 x coordinate (low byte)
0x8169	point 4 x coordinate (high byte)
0x816A	point 4 y coordinate (low byte)
0x816B	point 4 y coordinate (high byte)
0x816C	point 4 size (low byte)
0x816D	point 4 size (high byte)
0x816E	Reserved
0x816F	track id
0x8170	point 5 x coordinate (low byte)
0x8171	point 5 x coordinate (high byte)
0x8172	point 5 y coordinate (low byte)
0x8173	point 5 y coordinate (high byte)
0x8174	point 5 size (low byte)
0x8175	point 5 size (high byte)
0x8176	Reserved
0x8177	Track id
0x8178	point 6 x coordinate (low byte)

0x8179	point 6 x coordinate (high byte)
0x817A	point 6 y coordinate (low byte)
0x817B	point 6 y coordinate (high byte)
0x817C	point 6 size (low byte)
0x817D	point 6 size (high byte)
0x817E	Reserved
0x817F	Track id
0x8180	point 7 x coordinate (low byte)
0x8181	point 7 x coordinate (high byte)
0x8182	point 7 y coordinate (low byte)
0x8183	point 7 y coordinate (high byte)
0x8184	point 7 size (low byte)
0x8185	point 7 size (high byte)
0x8186	Reserved
0x8187	Track id
0x8188	point 8 x coordinate (low byte)
0x8189	point 8 x coordinate (high byte)
0x818A	point 8 y coordinate (low byte)
0x818B	point 8 y coordinate (high byte)
0x818C	point 8 size (low byte)
0x818D	point 8 size (high byte)
0x818E	Reserved
0x818F	Track id
0x8190	point 9 x coordinate (low byte)
0x8191	point 9 x coordinate (high byte)
0x8192	point 9 y coordinate (low byte)
0x8193	point 9 y coordinate (high byte)
0x8194	point 9 size (low byte)
0x8195	point 9 size (high byte)
0x8196	Reserved
0x8197	Track id
0x8198	point 10 x coordinate (low byte)
0x8199	point 10 x coordinate (high byte)
0x819A	point 10 y coordinate (low byte)
0x819B	point 10 y coordinate (high byte)
0x819C	point 10 size (low byte)
0x819D	point 10 size (high byte)
0x819E	Reserved
0x819F	keyvaule

7. Function Mode

7.1. Working Mode



a) Normal Mode

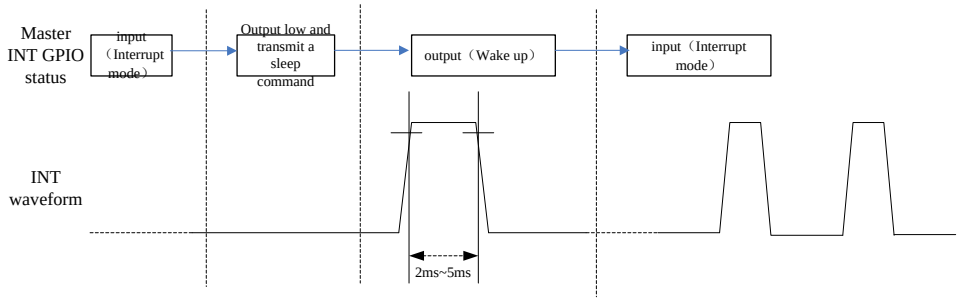
When GT927 is in Normal mode, touch scanning period is about 7ms ~ 10ms depending on the setting of tuning. The chip will automatically enter into Green mode if no touch is detected within 0~15s depending on setting and the step is 1s..

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 GT927 to enter Sleep mode through I2C command (before the command, please drive low to INT pin). Drive high to the INT pin of GT927 2~5ms will make GT927 return back to normal mode.



7.2. Pulse Calling

GT927 will inform master to read coordinate information only when touch information changes. Pin “INT” will outputs a high-to-low (or low-to-high, low level, high level etc, set by configuration information) signal to inform master.

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 GT927 be in Sleep mode through I^2C command. When GT927 is needed to return to normal mode, just set “SHUTDN” as “1”. GT927 will be in Normal mode automatically when exiting Sleep mode.

7.4. Proximity Function

GT927 has the function of proximity, this function is turned on when user touched the top part, or when there’s large area press to the screen, GT927 will inform CPU to turn off LCD, and enter touch detect status at the same time. When users leave the screen, GT927 will inform CPU to turn on LCD, and exit the status of touch detecting. When conversation is finished or users press the power key, CPU will inform GT927 to exit the status of touch detecting. It is suggested to cooperate with G-sensor, to optimize the user experience.

7.5. Parameter Frozen Function

GT927 support the function of Parameter frozen. When parameter is obtained, parameter can be settled in GT927 through Goodix test tool. If parameter has been frozen, GT927 will be only communicating with master control, it will not receive the configuration from master control. Please refer to relevant application guidance for detailed method of parameter frozen.

7.6. Frequency Hopping Function

GT927 has very good anti-interference basis, when the driver spectrum of GT927 overlaid with peak frequency spectrum of interference signal, it can be switch to another frequency by self-adaption frequency hopping mechanism, to avoid interference. Better performance can be achieved if it is cooperated with master control, switchover the charging status.

7.7. Automatic Calibration

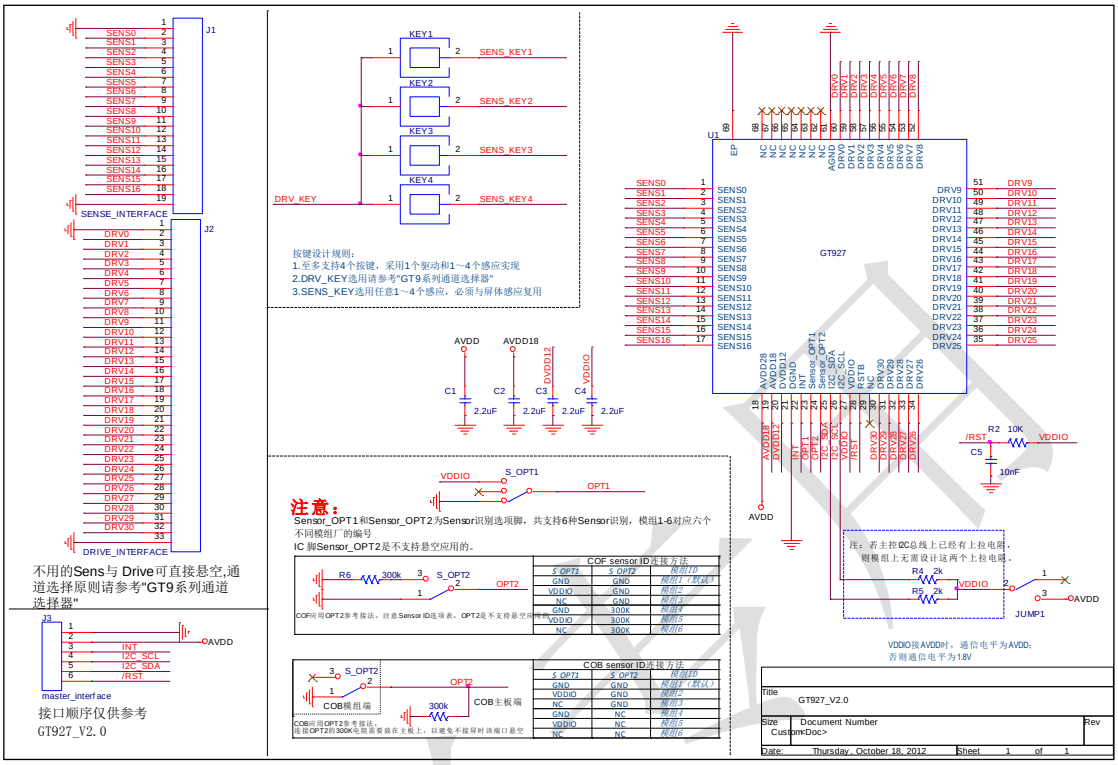
a) Initialization Calibration

Different temperature, humidity and physical space structure will affect the sensor's parameter. According to environmental situation GT927 will update the touch detecting reference 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 parameter. GT927 calculates and analyzes historical data, and compare to the current data variation. Base on this, the detecting reference will be modified automatically.

8. Reference Circuit Diagram



Reference Circuit Diagram of GT927

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 Electrical Parameter (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	VDDIO+0.3	V
Input voltage on analog I/O	0	3.47	v
Operating temperature	-40	85	℃
Storage temperature	-40	125	℃
Welding temperature (10s)		+300	℃
ESD protective voltage（HB Model）		2	KV

9.2 Operating Characteristic (Temperature 25℃, AVDD=2.8V)

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

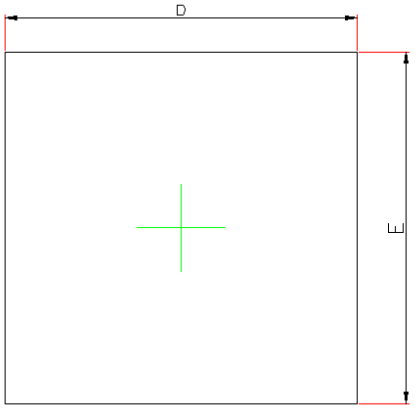
9.3 AC Characteristic (Temperature 25℃, AVDD=2.8V)

Parameter	Min	Typical value	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

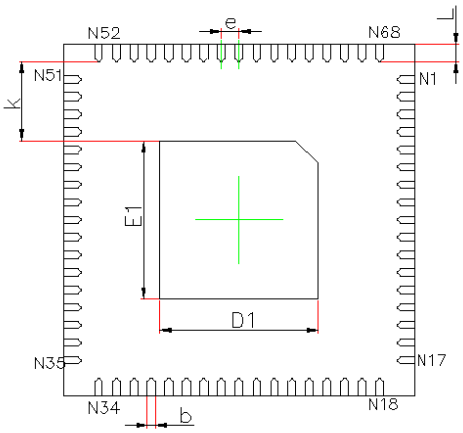
9.4 DC Characteristic (Temperature 25℃, VDD=2.8V)

Parameter	Min	Typical value	Max	Unit
Operating current (Normal mode)		13	15	mA
Operating current (Green mode)		4.58		mA
Operating current (Sleep mode)		200		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

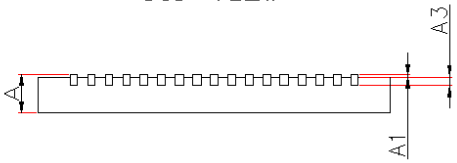
10. Packaging Information



TOP VIEW



BOTTOM VIEW



SIDE VIEW

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A3	0.203REF.		0.008REF.	
D	7.924	8.076	0.312	0.318
E	7.924	8.076	0.312	0.318
D1	3.500	3.700	0.138	0.146
E1	3.500	3.700	0.138	0.146
k	0.200MIN.		0.008MIN.	
b	0.150	0.250	0.006	0.010
e	0.400TYP.		0.016TYP.	
L	0.324	0.476	0.013	0.019

11. Document History Record

Version	Date	Description of change
Rev. draft	2012-7-24	Draft version
Rev. 01	201-11-09	1. Added register information, power on diagram, reference circuit diagram 2. Modified product packaging information, electricity characteristics

12. Contact information

Shenzhen Goodix Technology Co., Ltd.

Address: Floor 13, Phase B, TengFei Industrial Building, FuTian Free Trade Zone, ShenZhen, 518000

TEL：+86-755-33338828 FAX：+86-755-33338788

www.goodix.com