GT9110

single chip10Point capacitive touch chip

Rev.02—2012year09moon11day

==== ==Disclai ner ======

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content

1.Overview

GT9110is a new generation of single-chip designed for tablet PCs10Point capacitive touch solution, up to 42drive channels and301 sensing channel for the high precision of the tablettouch.

GT9110can be recognized at the same time10The real-time accurate position, movement trajectory and touch area of each touch point. And according to the needs of the main control, the touch information of the corresponding points can be read.

2.Features

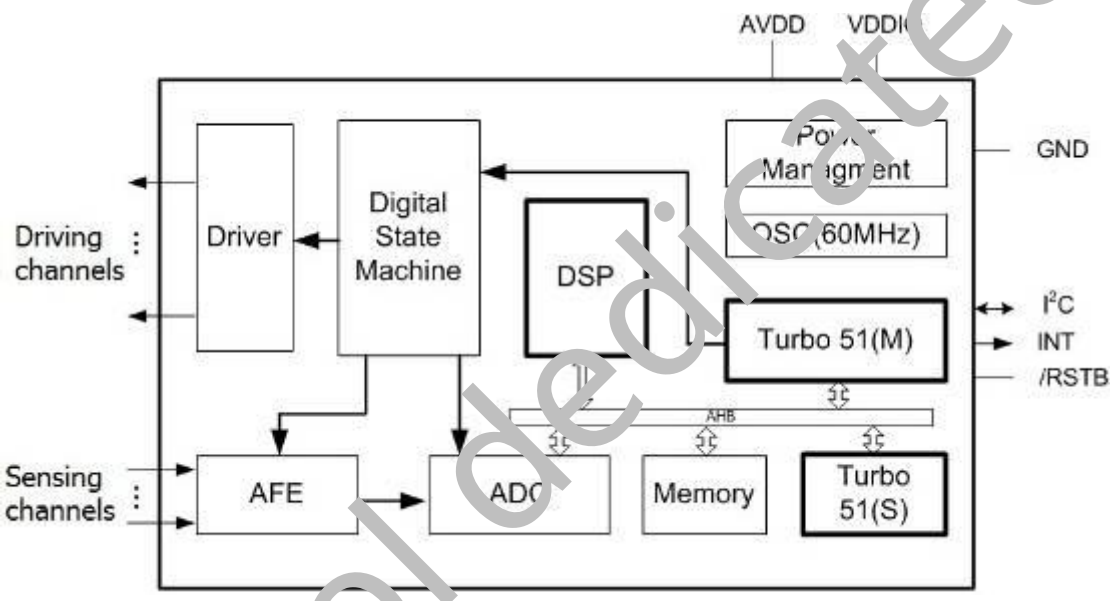
- Built-in capacitance detection circuit and high performanceMPU
    - Touch scan frequency:100Hz
    - Real-time output of touch point coordinates
    - Unified software version for capacitive screens of various sizes
    - Single power supply, built-in1.8V LDOs
    - FlashProcess, support online programming
- Capacitive screen sensor
    - Detection channel:42(drive channel)*30(sensing channel)
    - Capacitive screen size range:7"~12.1"
    - supportFPCKey design
    - Also supportsITOglass andITO Film
    - Cover LensThickness Support:0.7mm≦Glass≦2mm /0.5mm≦Acrylic≦0.9mm
    - Built-in frequency hopping function, supportOGSfull fit
- Environmental adaptability
    - Initialize auto-calibration
    - Automatic temperature drift compensation
    - Operating temperature:-20°C~+85°C, humidity: ≦95%RH
    - Storage temperature:-60°C~+125°C, humidity: ≦95%RH
- Communication Interface

    standardI_2CCommunication Interface
    - Slave working mode
    - support1.8V~3.3Vinterface level
- Response time
    - Green mode: <48ms
    - Sleep mode: <200ms
    - Initialization: <200ms
- voltage:

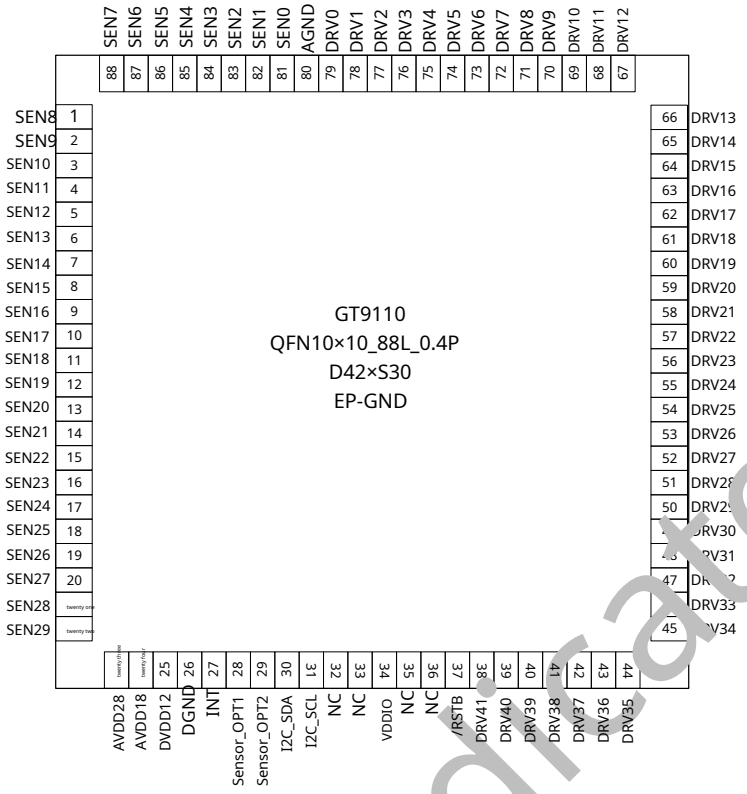
- Single power supply:2.8V~3.3V

- Power Ripple:
  - Vpp≦50mV
- Package:88 pins,10mm*10mm QFN
- Application Development Support Tools
  - Touch screen module parameter detection and automatic generation of configuration parameters
  - Touch screen module performance comprehensive test tool
  - Module mass production test tool
  - Main control software development reference driver code and documentation guidance

3.Chip schematic



4.Pin Definition



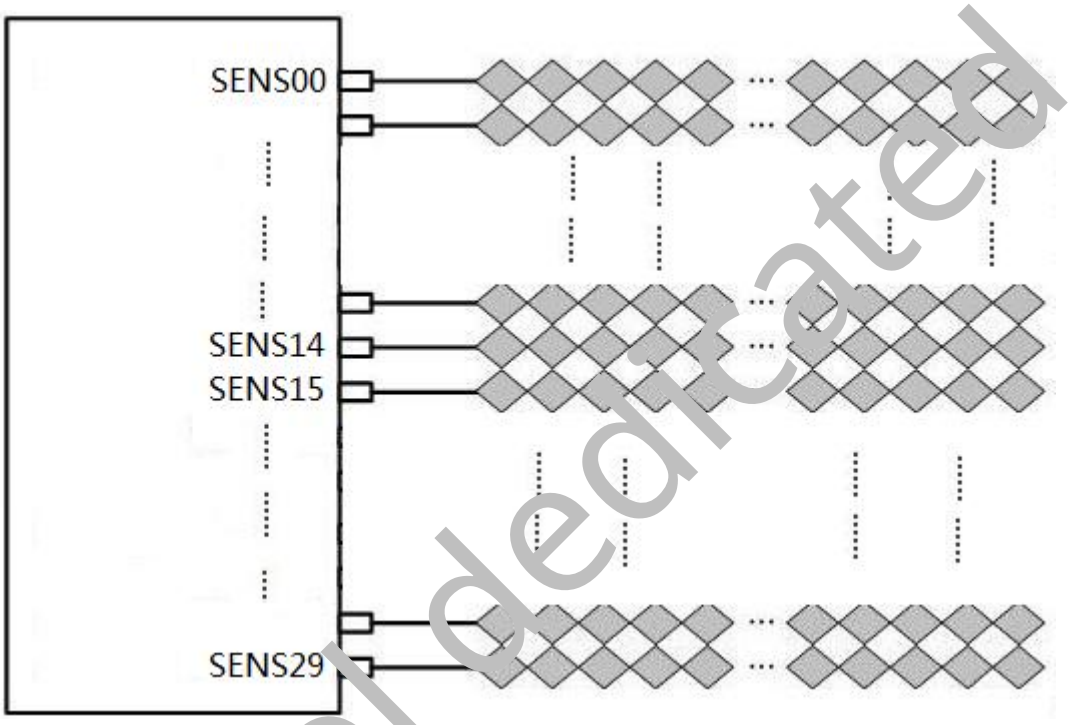
pin number.	name	Function description	Remark
1~22	SENS8~SENS29	Touch analog signal input	
twenty three	AVDD28	Analog Power Positive	catch2.2uFFilter capacitor
twenty four	AVDD18		catch2.2uFFilter capacitor
25	DVDD12		catch2.2uFFilter capacitor
26	DGND	digital signal ground	
27	INT	interrupt signal	Edge-triggered registers can be set
28	Sensor_OPT1	Module identification port	
29	Sensor_OPT2	Module identification port (optional)	External pull-down required
30	I2C_SDA	I2Cdata signal	
31	I2C_SCL	I2Cclock signal	
32~33	NC		
34	VDDIO	GPIOlevel control	catch2.2uFFilter capacitor Dangling:1.8V catchAVDD:AVDD
35~36	NC		
37	/RSTB	System reset pin	external10KPull up, pull down to reset
38~79	DRV41~DRV0	drive signal output	
80	AGND	analog power ground	
81~88	SEN0~SEN7	Touch analog signal input	

5.Sensor Design

5.1.Sensing channel arrangement

SENS0~SENS29Yes30A capacitance detection input channel, directly connected to the touch screen module30induction ITO channel is connected. Induction on the moduleITOThe channels are connected to the chip'sSENS0 toSENS30. likeITOThere are fewer channels than chip detection channels, and the remaining channels on the chip can be directly suspended.

-Example of Arrangement: InductionITOThe channels are connected to the chip in sequenceSENS0toSENS29



5.2.Drive channel arrangement

DRV0~DRV41Yes42A capacitance detection drive signal output channel, directly connected to the touch screen module42 indivualITOdrive channel is connected. The drive lines can be arranged at will. After the arrangement is determined, it needs to be configured GT9110The relevant registers of the chip are used to ensure that the logical position relationship of each drive channel is consistent with the physical position relationship, so that the output coordinates match the physical coordinates.

SensorFor more detailed rules of design, please refer to the specificlayoutguide.

6.Sensor Design Parameter Requirements

DITO

	GT9110
Drive Channel Trace Impedance	≦3KΩ
Drive channel impedance	≦10KΩ
Sense Channel Trace Impedance	≦10KΩ
Sensing channel impedance	≦60KΩ
node capacitance	≦4pF
Induction channelRCconstant	≦6us. Typ.=3.6us

SITO

	GT9110
Drive Channel Trace Impedance	≦3KΩ
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Sensing channel impedance	≦10KΩ
node capacitance	≦4pF
Induction channelRCconstant	≦6us. Typ.=3.6us

When the channel wiring adopts metal wiring, due to process control and other reasons, some of the wiring will be oxidized and the impedance will increase, resulting in differences in the wiring of each channel.ITOWhen routing materials, although the design will try to match the length and width to make the routing of each channel consistent, there will still be differences to varying degrees. In order to ensure the consistency and uniformity of data on the entire screen, it is necessary to control the impedance of the traces to meet the requirements in the above table.

In addition, when the drive trace and the sense trace are adjacent and parallel, a ground wire needs to be inserted between the two, and the width of the ground trace is at least twice the width of the channel trace, and the minimum width should not be less than 0.2mm.

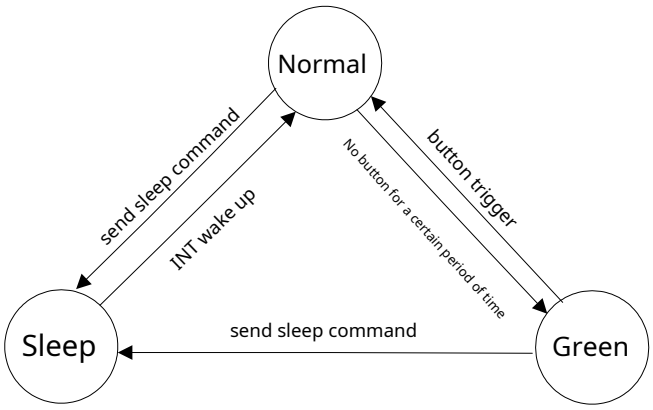
6.1.touch key design

GT9110support4There are two ways to realize the touch button:

- SensorExpansion method: The drive channel is used as the button common terminal, and a drive channel is connected to4root induction4 button. The drive channel used as a key cannot be multiplexed with the driver on the screen, but the sensing channel used as a key must be multiplexed with the driver on the screen;
- FPCDesign method: take out a separate drive channel and4bar sensing channel formation4buttons,4 The sensing channels are multiplexed with the screen body.FPCofsensorThe pattern needs to be specially designed.

7. I2Ccommunication

7.1.Operating mode



a) Normal mode

GT9110existNormal mode, the fastest coordinate refresh cycle is7ms-10ms(depending on the setting of the configuration information, the step length of the controllable period of the configuration information is1ms).

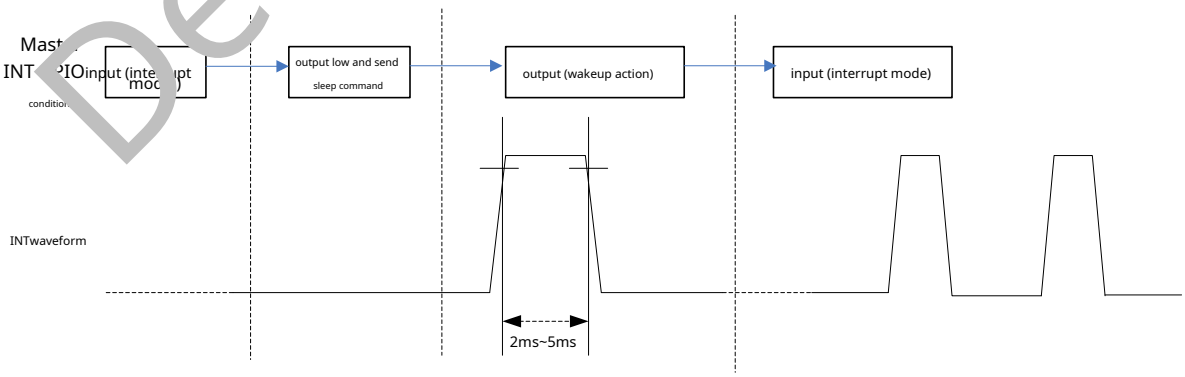
Normal modeIn the state, no touch event occurs for a period of time,GT9110will automatically transfer in Green mode, to reduce power consumption.GT9110No touch automatic entryGreen modeThe time can be set through configuration information, the range is0~255s, step by1s.

b) Green mode

existGreen modeDown,GT9110The scan period is fixed at40ms, if a touch action is detected, it will automatically enterNormal mode.

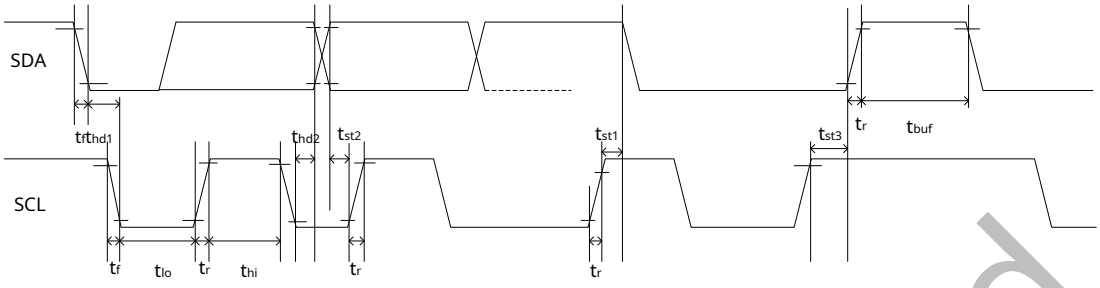
c) Sleep mode

hostCPUpass throughI2Ccommand to makeGT9110EnterSleep mode(need to first INTpin output low level) when neededGT9110quitSleep mode, the host outputs a high level toINTFeet (nost hits highINTfoot2~5ms), after waking upGT9110will enter Normal mode.



7.2.I2Ccommunication

GT9110provide standardI2Ccommunication interface, bySCLandSDAwith the LordCPUto communicate. in the systemGT9110 Always act as a slave device, all communication is from the masterCPUinitiated, the recommended communication speed is 400Kbpsor below. its supportedI2CThe hardware circuit support timing is as follows:



Test Conditions1:1.8VCommunication Interface,400KHzCommunication speed, pull-up resistor2K

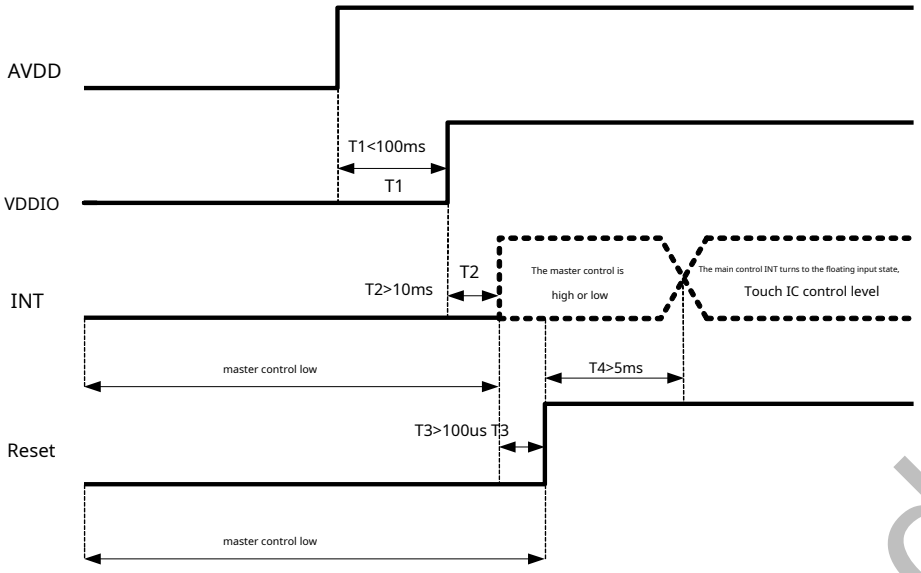
Parameter	Symbol	MIN.	Max.	Unit
SCL low period	t_{lo}	0.9	0.9	us
SCL high period	t_{hi}	0.8	0.8	us
SCL setup time for START condition	t_{st1}	0.4	0.4	us
SCL setup time for STOP condition	t_{st3}	0.4	0.4	us
SCL hold time for START condition	t_{hd1}	0.3	0.3	us
SDA setup time	t_{st2}	0.4	0.4	us
SDA hold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

Test Conditions2:3.3VCommunication Interface,400KHzCommunication speed, pull-up resistor2K

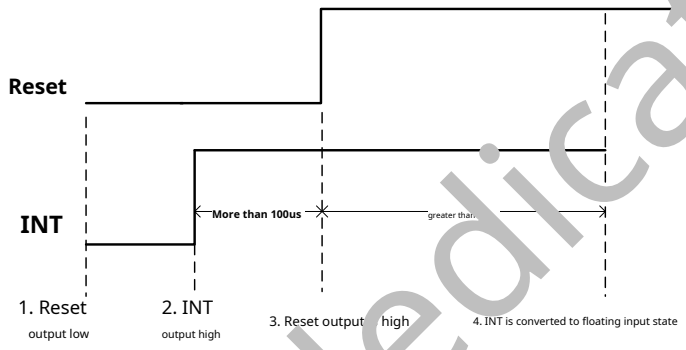
Parameter	Symbol	MIN	Max	Unit
SCL low period	t_{lo}	0.9	0.9	us
SCL high period	t_{hi}	0.8	0.8	us
SCL setup time for START condition	t_{st1}	0.4	0.4	us
SCL setup time for STOP condition	t_{st3}	0.4	0.4	us
SCL hold time for START condition	t_{hd1}	0.3	0.3	us
SDA setup time	t_{st2}	0.4	0.4	us
SDA hold time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

GT9110ofI2CThere are two sets of slave device addresses, which are0xBA/0xBBand0x28/0x29. The master controls during power-on initializationResetandINTThe setting method and timing diagram are as follows:

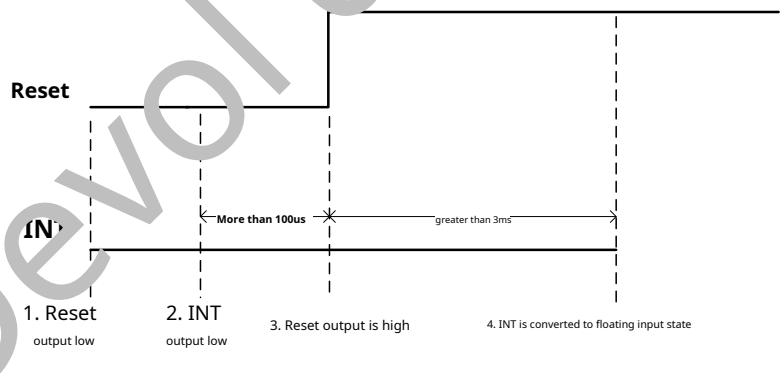
Power-on sequence diagram:



set address to0x28/0x29timing:



set address to0xBA/0xBBtiming:



a)Data transfer (with the device address as0xBA/0xBBexample)

Communication is always by the mainCPUInitiate, the valid initiating signal is: inSCLkeep as "1"hour, SDA Happened by "1"arrive"0"jump. The address information or data stream is transmitted after the start signal.

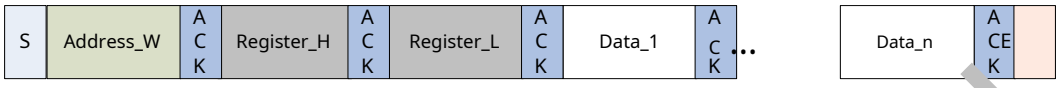
All connections inI_2CThe slave devices on the bus must detect the data sent after the start signal on the bus.8bit address information and respond correctly. When receiving address information that matches itself,GT9110in the9clock cycles, theSDAChange it to the output port, and place the "0", as

response signal. If you receive address information that does not match your0XBAor 0XBB, GT9110will remain idle.

SDAdata on the mouth9clock cycle serial transmission9Bit data:8Bit significant data+1 acknowledgment signal sent by the receiverACKor non-response signalNACK. data transfer in SCL for"1"valid when.

When the communication is completed, by the masterCPUSend a stop signal. The stop signal is whenSCL for"1" hour,SDAStatus by "0"arrive"1"jump.

b)rightGT9110Write operation (with the device address as0xBA/0xBBexample)



Write Operation Timing Diagram

Main picture aboveCPUrightGT9110Flowchart of the write operation performed. First LordCPUGenerate a start signal, then send address information and read and write bit information"0"Indicates a write operation:0XBA.

After receiving the response, the masterCPUsend register16bit address, followed by 8Bit data content to be written to the register.

GT9110The address pointer of the register is automatically incremented after a write operation.1, so when the mainCPUWhen it is necessary to write operations to registers with consecutive addresses, they can be continuously written in one write operation. The write operation is complete, the masterCPUSend a stop signal to end the current write operation.

c)rightGT9110Read operation (with the device address as0xBA/0xBBexample)

Read operation flow chart

Main picture aboveCPUright GT9110Th flow chart of the read operation performed. First LordCPUGenerate a start signal, then send device address information and read and write bit information"0"Indicates a write operation:0XBA.

After receiving the response, the masterCPUsend the first register16Bit address information to set the register address to read. After receiving the response, the masterCPUResend the start signal once, and send the read operation:0XBB. After receiving the response, the masterCPUStart reading data.

GT9110It is to support continuous read operations, and the default is to read data continuously. hostCPUevery time you receive a Byte After the data, a response signal needs to be sent to indicate successful reception. After receiving the last requiredByte After the data, the mainCPUSend "No Reply Signal"NACK", and then send a stop signal to end the communication.

7.3. GT9110register information

a)real-time commands (Write Only)

Addr	Name	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
0x8040	Command	0: read coordinate status1: difference original value2: software reset							

		3: benchmark update4: Reference calibration5:Close the screen (send other invalid)
0x8041	LED_Control	touch buttonledLights up the control word in controlled mode
0x8042	Proximity_En	Proximity sensor switch

b)configuration information (R/W)

Addr	name	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
0x8047	Config_Version	The version number of the configuration file							
0x8048	X Output Max_L	XCoordinate output maximum							
0x8049	X Output Max_H								
0x804A	Y Output Max_L	YCoordinate output maximum							
0x804B	Y Output Max_H								
0x804C	Touch Number	Reserved				The upper limit of the number of output contacts:1~5			
0x804D	Module_Switch1	Reserved		Stretch_rank		X2Y	Sito	INTTrigger method	
0x804E	Module_switch2	Reserved							Touch_Key
0x804F	Shake_Count	Reserved				Number of finger presses releases to debounce			
0x8050	Filter	First_Filter		Normal_Filter(The original coordinate window filter value, the coefficient is1)					
0x8051	Large_Touch	The number of touch points in a large area							
0x8052	Noise_Reduction	Reserved				Noise reduction value factor is1)			
0x8053	S_Touch_Level	On-screen touch point threshold from scratch							
0x8054	S_Leave_Level	The threshold from presence to absence of touch points on the screen							
0x8055	Low_Power_Control	Reserved				into the low-power time (0~15s)			
0x8056	Refresh_Rate	Reserved				Coordinate reporting rate (period is5+N ms)			
0x8057	x_threshold	reserved							
0x8058	y_threshold								
0x8059	X_Speed_Limit	Speed limit parameter							
0x805A	Y_Speed_Limit								
0x805B	Space	blank space on top border				Blank space for bottom border			
0x805C		blank space on the left border				blank space on the right border			
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	drive groupAThe driving frequency multiplication factor ofGroupA_Frequence =Multiplication factor* Fundamental frequency							
0x8066	FreqB_factor	drive groupBThe driving frequency multiplication factor ofGroupB_Frequence =Multiplication factor* Fundamental frequency							
0x8067	Pannel_BitFreqL	drive groupA,Bthe fundamental frequency (1526HZ<fundamental frequency<14600Hz)							
0x8068	Pannel_BitFreqH								
0x8069	Pannel_Sensor_TimeL	The time interval between two adjacent drive signal outputs (withusunits)							
0x806A	Pannel_Sensor_TimeH								
0x806B	Pannel_Tx_Gain	reserved				Pannel_Drv_output_R,4gear adjustable		Pannel_DAC_Gain	
0x806C	Pannel_Rx_Gain	Pannel_PGA_C		Pannel_PGA_R		Pannel_Rx_Vcmi		Pannel_PGA_Gain	
0x806D	Pannel_Dump_Shift	Reserved				The original value amplification factor (2ofNpower)			
0x806E	Drv_Frame_Control	Reserved		SubFrame_DrvNum				Repeat_Num	
0x806F	NC	Reserved							
0x8070	NC	Reserved							
0x8071	NC	Reserved							
0x8072	Stylus_Tx_Gain	not yet defined (whenstylus_priority=0invalid)							
0x8073	Stylus_Rx_Gain	not yet defined (whenstylus_priority=0invalid)							
0x8074	Stylus_Dump_Shift	not yet defined (whenstylus_priority=0invalid)							
0x8075	Stylus_Touch_Level	not yet defined (whenstylus_priority=0invalid)							
0x8076	Stylus_Leave_Level	not yet defined (whenstylus_priority=0invalid)							

0x8077	Stylus_Control	Pen timeout exit time (in seconds)		
0x8078	NC	Reserved		
0x8079	NC	Reserved		
0x807A	Freq_Hopping_Start	The start frequency of the frequency hopping range (in2KHzunits, such as50Express100KHz)		
0x807B	Freq_Hopping_End	The end frequency of the frequency hopping range (in2KHzunits, such as150Express300KHz)		
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 for judging interference		
0x8080	NC	Reserved		
0x8081	NC	Reserved		
0x8082	Hopping_seg1_BitFreqL	Frequency hopping detection interval frequency band1Center point fundamental frequency (for driveA,B)		
0x8083	Hopping_seg1_BitFreqH			
0x8084	Hopping_seg1_Factor	Frequency hopping detection interval frequency band1Center point multiplier (for driveA,driveBconverted on this basis)		
0x8085	Hopping_seg2_BitFreqL	Frequency hopping detection interval frequency band2Center point fundamental frequency (for driveA,B)		
0x8086	Hopping_seg2_BitFreqH			
0x8087	Hopping_seg2_Factor	Frequency hopping detection interval frequency band2Center point multiplier (for driveA,driveBconverted on this basis)		
0x8088	Hopping_seg3_BitFreqL	Frequency hopping detection interval frequency band3Center point fundamental frequency (for driveA,B)		
0x8089	Hopping_seg3_BitFreqH			
0x808A	Hopping_seg3_Factor	Frequency hopping detection interval frequency band3Center point multiplier (for driveA,driveBconverted on this basis)		
0x808B	Hopping_seg4_BitFreqL	Frequency hopping detection interval frequency band4Center point fundamental frequency (for driveA,B)		
0x808C	Hopping_seg4_BitFreqH			
0x808D	Hopping_seg4_Factor	Frequency hopping detection interval frequency band4Center point multiplier (for driveA,driveBconverted on this basis)		
0x808E	Hopping_seg5_BitFreqL	Frequency hopping detection interval frequency band5Center point fundamental frequency (for driveA,B)		
0x808F	Hopping_seg5_BitFreqH			
0x8090	Hopping_seg5_Factor	Frequency hopping detection interval frequency band5Center point multiplier (for driveA,driveBconverted on this basis)		
0x8091	NC	Reserved		
0x8092	NC	Reserved		
0x8093	Key 1	Key location:0-255valid (with0means no button,4key positions are8expressed as independent when multiples of button, clear0other partsrawdata, the same below)		
0x8094	Key 2	Key 2Location		
0x8095	Key	Key 3Location		
0x8096	Key	Key 4Location		
0x8097	Key_Area	Long press to update the time (1~16 s)	Button valid interval setting (one-sided):0-15efficient	
0x8098	Key_Touch_Level	Touch key key threshold		
0x8099	Key_Leave_Level	Touch key release threshold		
0x809A	Key_Sens	KeySens_1(button1Sensitivity coefficient, the same below)	KeySens_2	
0x809B	Key_Sens	KeySens_3	KeySens_4	
0x809C	Key_Restrain	Reserved	Independent key and adjacent key suppression parameters (when the current maximum value exceeds over the maximumKey_Restrain/16time do not output keys), recommended settings7±2	
0x809D	NC	Reserved		
0x809E	NC	Reserved		
0x809F	NC	Reserved		
0x80A0	NC	Reserved		
0x80A1	NC	Reserved		
0x80A2	Proximity_Drv_Sele	Drv_Start_Ch(Drive direction start channel)		Drv_End_Ch

	ct		(end channel, for start channel add this value)
0x80A3	Proximity_Sens_Select	Sens_Start_Ch(Induction direction start channel)	Sens_End_Ch (end channel, add this for the starting channel value)
0x80A4	Proximity_Touch_Level	Proximity sensing effective threshold	
0x80A5	Proximity_Leave_Level	Proximity Invalid Threshold	
0x80A6	Proximity_Freq_Factor	Proximity Sensing Channel Multiplier	
0x80A7	Proximity_BitFreqL	Proximity Sensing Channel Fundamental Frequency	
0x80A8	Proximity_BitFreqH		
0x80A9	Proximity_Sensor_TimeL	Proximity sensing adjacent two drive signal output time interval (withusunits)	
0x80AA	Proximity_Sensor_TimeH		
0x80AB	Proximity_Tx_Gain	Proximity Sensing Drive Gain	
0x80AC	Proximity_Rx_Gain	Proximity Receiver Gain	
0x80AD	Proximity_Dump_Slift	Reserved	Proximity se... raw val... amplification factor (2ofN ...power)
0x80AE	NC	Reserved	
0x80AF	NC	Reserved	
0x80B0	NC	Reserved	
0x80B1	NC	Res...rved	
0x80B2	NC	Res...rved	
0x80B3	NC	Rese...ed	
0x80B4	NC	R...erved	
0x80B5	NC	Rese...ved	
0x80B6	NC	...served	
0x80B7~ 0x80C4	Sensor_CH0~ Sensor_CH13	...SensorCorresponding chip channel number	
0x80C5~ 0x80D4	NC	Reserved	
0x80D5~ 0x80EA	Driver_CH0~ Driver_CH21	ITO Driver0Corresponding chip channel number	
0x80EB~ 0x80FE	NC	Reserved	
0x80FF	Config_Chksum	Configuration information verification	
0x8100	Config_Fresh	Configuration updated flag (flag written by master)	

c)Coordinate information

Addr	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
0x8...	Product ID (Lowest Byte, ASCIIcode6)							
0x...	Product ID(Third Byte,ASCIIcode0)							
0x814...	Product ID(Second Byte,ASCIIcode0)							
0x8143	Product ID (Highest Byte, ASCIIcode, such as9)							
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 mod option 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

7.4.Interrupt trigger method

to effectively reduce theCPUburden,GT9110The master is notified only when the output information changesCPU Read coordinate information. Depend onINTPort output pulse signal. hostCPUcan be accessed via the relevant register bits "INT"to set the trigger method. set to "0"Indicates that the rising edge is triggered, that is, when there is a user operation,GT9110 Will be atINTPort output rising edge transition, notificationCPU; set to "1"Indicates falling edge trigger.

7.5.Automatic calibration

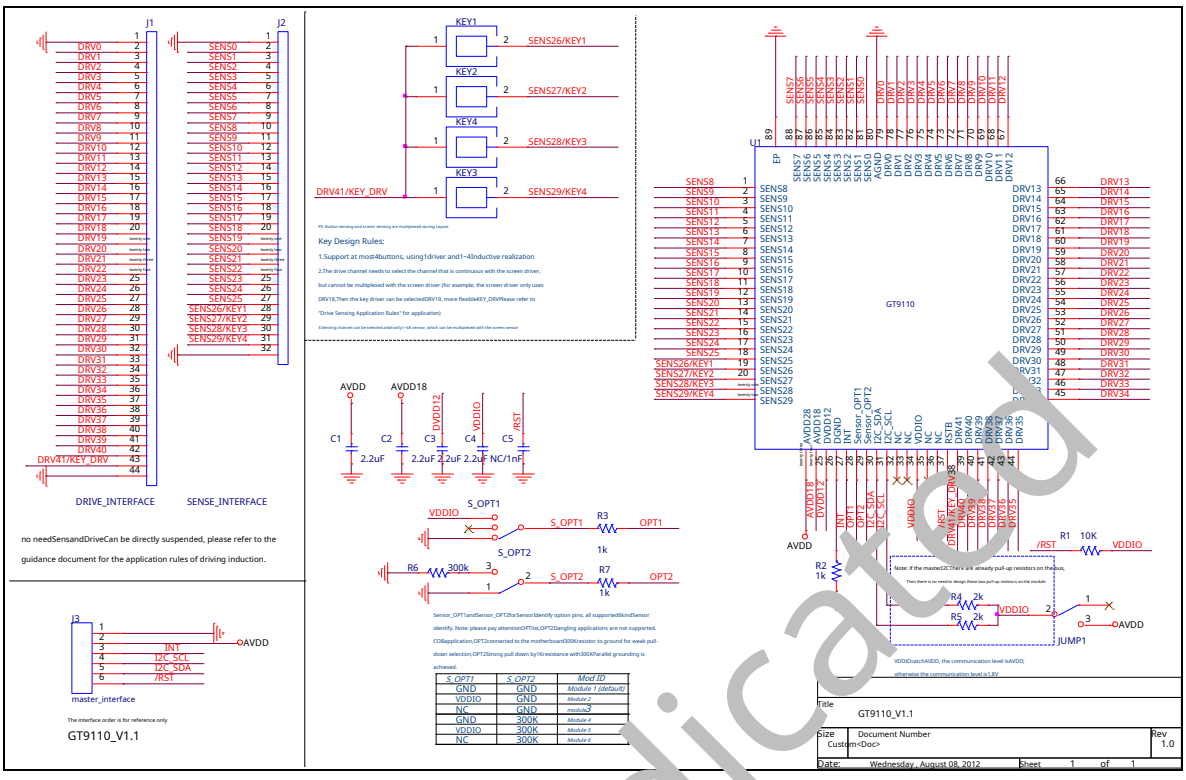
a)Initialize calibration

Different temperature, humidity and physical space structure will affect the reference value of capacitive sensor in idle state.GT9110will be initialized200msAutomatically obtain new detection benchmarks according to environmental conditions. Complete the initialization of touch screen detection.

b)Automatic temperature drift compensation

Slow changes in environmental factors such as temperature, humidity or dust can also affect the baseline value of a capacitive sensor at idle.GT9110Real-time detection of changes in data at various points, and statistical analysis of historical data to correct detection benchmarks. Thereby, the influence of environmental changes on the detection of the touch screen is reduced.

8.Reference circuit diagram



GT9110Refer to the applica on circuit gram

Note:

1, This circuit only represents the basic application mode, and ome circu are actually or according to the needs of the application environment.

Adjustment.

2, capacitors are recommendedX7R materia

9.Electrical Characteristics

9.1.Limit electrical parameters

(Ambient temperature is25°C)

parameter	minimum	maximum value	unit
analog powerAVDD28(refer toAGND)	2.66	3.47	V
VDDIO(refer toDGND)	1.7	3.47	V
numberI/Owithstand voltage	0	3.47	V
simulationI/Owithstand voltage	0	3.47	V
range of working temperature	- 40	85	°C
Storage temperature range	- 40	125	°C
Soldering temperature (10seconds)		300	°C
ESDprotection voltage (HB Model)	-	2	KV

9.2.Recommended working conditions

(Ambient temperature is25°C,AVDD=2.8V)

parameter	minimum	Typical value	maximum value	unit
AVDD28	2.8	-	3.3	V
VDDIO	1.8	-	3.3	V
Operating temperature	- 20	25	85	°C

9.3.ACcharacteristic

(Ambient temperature is25°C,AVDD=2.8V,VDDIO=1.8V)

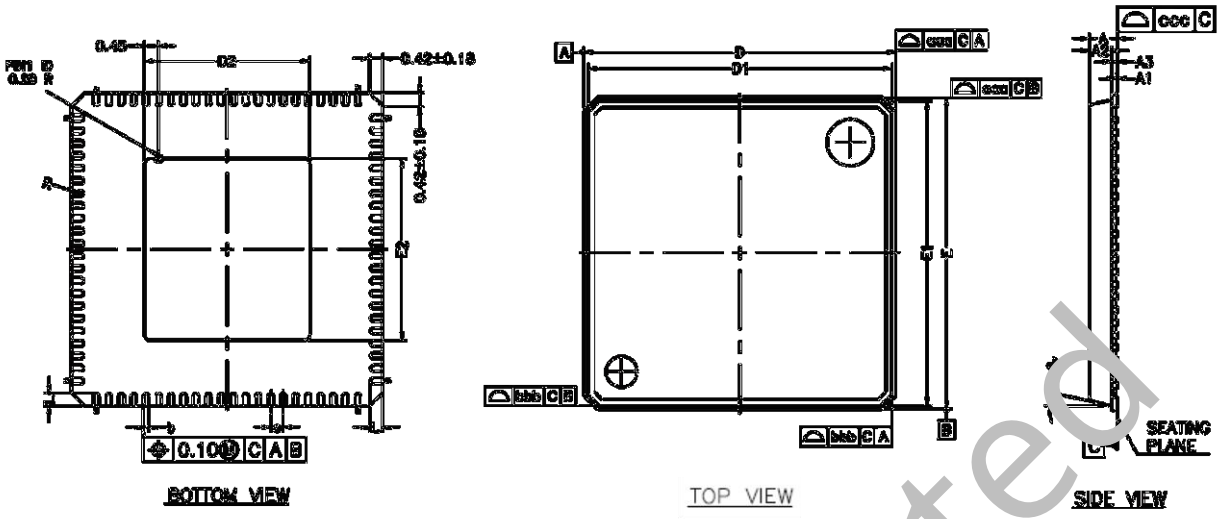
parameter	minimum	Typical value	maximum value	unit
OSCOscillation frequency	59	60	61	MHz
I/OOutput low-to-high transition time	-	-	0.5	ns
I/OOutput high-to-low transition time	-	-	0.5	ns

9.4.DCcharacteristics

(Ambient temperature is25°C,AVDD=2.8V,VDDIO=1.8V)

parameter	minimum	Typical value	maximum value	unit
Normal modeWorking current	-	6.2	7.2	mA
Green modeWorking current	500	-	-	uA
Sleep modeWorking current	-	60	-	uA
The digital input is a low level voltage value	- 0.3	0	0.45	V
The digital input is a high level voltage value	1.35	1.8	2.1	V

10.Product packaging



* CONTROLLING DIMENSION : MM

SYMBOL	MILLIMETER			INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	---	---	0.90	---	---	0.035
A1	0.00	0.01	0.05	0.00	0.0004	0.002
A2	---	0.65	0.70	---	0.026	0.028
A3		0.20 REF.			0.008 REF.	
b	0.15	0.20	0.25	0.006	0.008	0.010
D		10.00 bsc			0.394 bsc	
D1		9.75 bsc			0.384 bsc	
D2	5.15	5.30	5.45	0.203	0.209	0.215
E		10.00 bsc			0.394 bsc	
E1		9.75 bsc			0.384 bsc	
E2	5.65	5.80	5.95	0.222	0.228	0.234
L	0.30	0.40	0.50	0.012	0.016	0.020
e		0.40 bsc			0.016 bsc	
θ1	0°	---	12°	0°	---	12°
R	0.065	---	---	0.003	---	---
TOLERANCES OF FORM AND POSITION						
aaa		0.10			0.004	
bbb		0.10			0.004	
ccc		0.05			0.002	

11.Version record

Version	date	Revise
Rev.01	2012-08-04	pre-release
Rev.02	2012-09-11	Add power-on sequence diagram

12.Contact information

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