

ICNT8725 Capacitive Touch IC Specifications For Phone

ICNT8725

Model No : ICNT8725

Document Version : V0.2

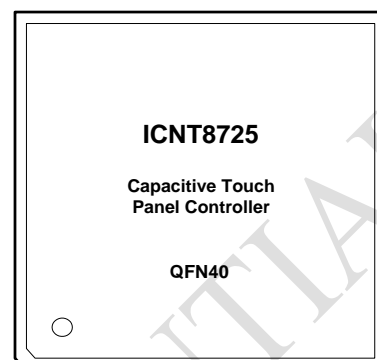
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Features

- ✧ Mutual capacitive technology
- ✧ Support Glass/Film DITO and SITO, OGS
- ✧ Support Single-Layer Multi-Touch Glass & Film ITO sensor
- ✧ Support I²C interfaces to communicate with host processor
- ✧ Built-in MCU and DSP, 4KB of data SRAM
- ✧ True multi-touch with up to 10 points
- ✧ 3 operating modes
 - Active
 - Gesture
 - Hibernate
- ✧ Support I²C wake and GPIO wake
- ✧ Operating voltage 2.8 to 3.3V
- ✧ Supports 1.8V/3.3V digital IOVCC
- ✧ I²C interface (up to 400kbps)
- ✧ User-Programmable scan sequences
- ✧ Programmable capacitance resolution
- ✧ Large dynamic range of ADC
- ✧ Insensitive to environment variations and touch variations
- ✧ Auto calibration
- ✧ Auto Frequency-Hopping



1、Description

ICNT8725 is the low power, general purpose capacitive controller with a built-in 32bit MCU, the high performance ADC and digital filters. By using the mutual capacitance technique, ICNT8725 support true multi-touch capability. The ICNT8725 have user-friendly input functions, which can be applied on many portable devices, especially for tablets.

2、Typical Application

ICNT8725 accommodates a wide range of applications with a multi-touch sensing device.

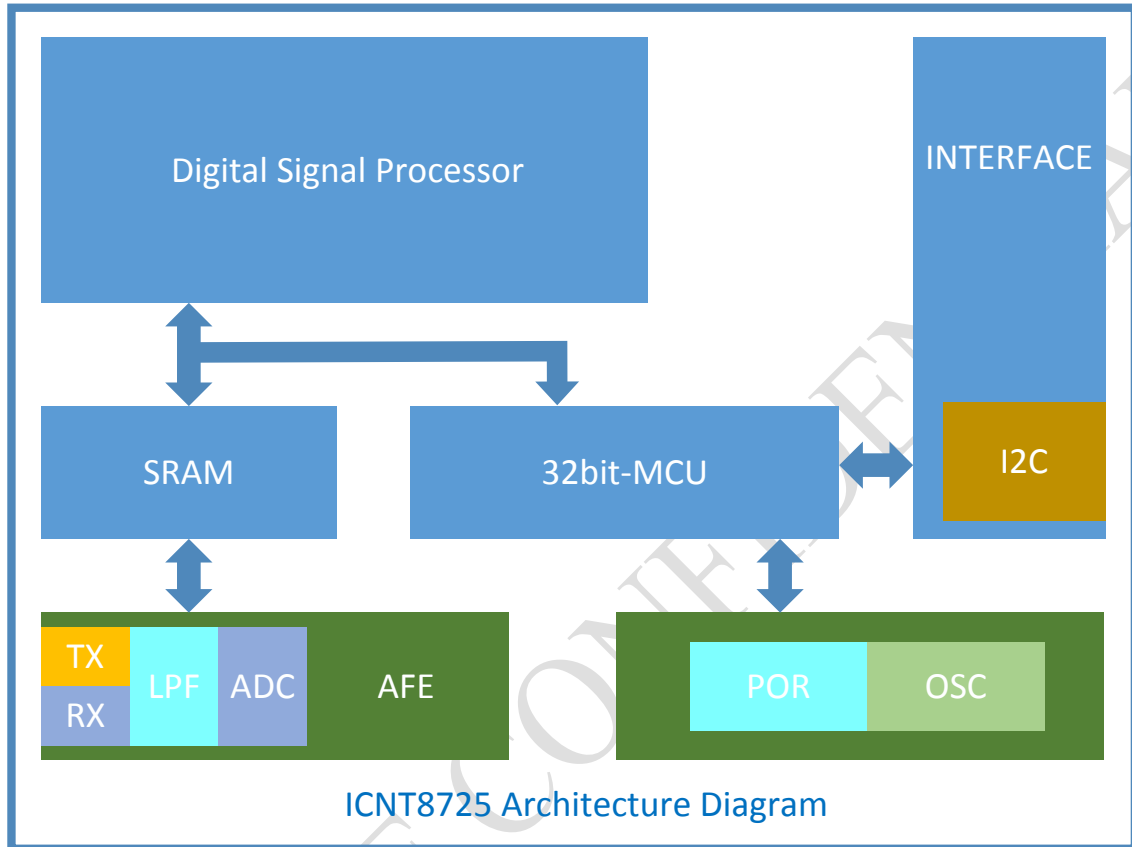
- Mobile phones, smart phones
- Portable MP3 and MP4 media players
- Digital cameras
- Game consoles
- Navigation systems
- Information kiosks
- Keyboard, keypad, mouse, remote control
- House appliances
- Home entertainment devices

ICNT8725 support 4.5"~7.0" touch panel, users may find out their target IC from the specs listed as follows.

Model Name	Channels		Package			Touch Panel Size
	TX	RX	Type	Pin	Size	
ICNT8725	18	12	QFN	40	5*5	4.5" ~ 5.5"(Phone)
						6.0" ~ 7.0"(Tablets)

3、Functional Description

3.1、Block Diagram



ICNT8725 can be divided into the following functional blocks:

- Touch Panel Interface
 - The channel signal is converted by ADC to the digital signal
- Data Memory
 - Touch panel data buffer
- MCU
 - 32-bit MCU core with 4KB data SRAM
- Watch Dog Timer
 - To guarantee the robustness of the chip
- Voltage Regulator
 - To generate voltage for internal module from the input VDDA supply
- External Interface
 - I²C: interface for system control and data transfer
 - INT/WAKE: interrupt signal to inform the host processor that touch data is ready or wakeup request for the host to change ICNT8725 from hibernate to active mode
 - /RST: external signal to reset the chip, active low

3.2、Serial Interface(I²C)

The I²C operation is the single byte mode. Under single byte mode, MCU will enter interrupt service routine by every byte transaction.

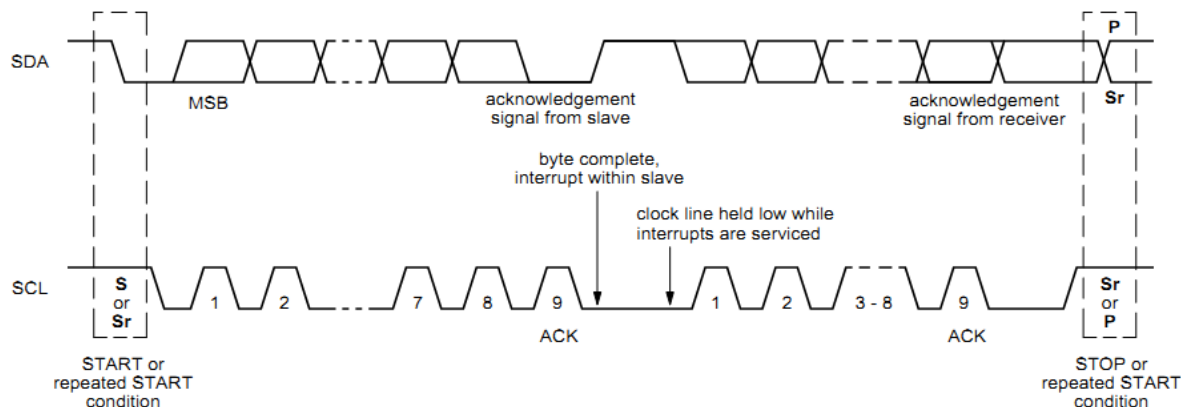


Figure 3-1 I²C Signal Description

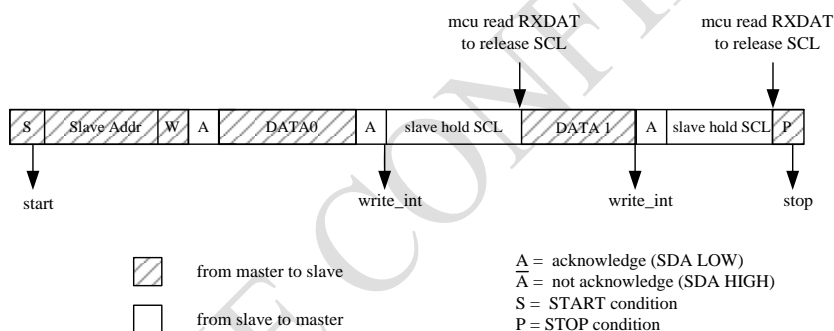


Figure 3-2 I²C single byte write operation

Figure 3-2above illustrates the single byte write transaction scenario. The I²C start / stop interrupt occurs at the start and stop stage to notify MCU the protocol status. And there will be a write interrupt to notify MCU after I²C master writes each byte to slave. Before MCU read RXDAT, the SCL will be held automatically.

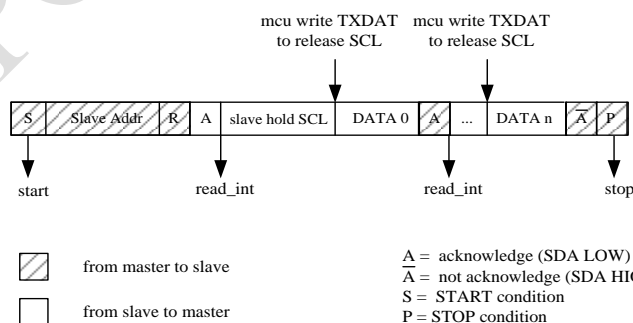


Figure 3-3 I²C single byte read operation

Figure 3-3above illustrates the single byte read transaction scenario. The I²C start / stop interrupt occurs at the start and stop stage to notify MCU the protocol status. And there will be a read interrupt to notify MCU before I²C master fetches expected data from slave. Before MCU writes TXDAT, the SCL will be held automatically. The last NAK before stop will not trigger read interrupt.

Parameter	Description	Min	Max	Unit
F _{SCL}	SCL clock frequency		400	kHz
T _{LOW}	Low period of SCL clock	1.3		μs
T _{HIGH}	High period of SCL clock	0.6		μs
T _{SU_STA}	Set-up time for a repeated start	0.6		μs
T _{HD_STA}	Hold time (repeated) start condition.	0.6		μs
T _{SU_DAT}	Data set-up time	0.1		μs
T _{HD_DAT}	Data hold time	0.6	0.9	μs
T _R	Rise time of SDA and SCL		300	ns
T _F	Fall time of SDA and SCL		300	ns
T _{SU_STO}	Set-up time for stop condition	0.6		μs
T _{BUF}	Bus free time between a stop and start	1.3		μs

Table 3-1 AC Characteristics of the I²C interface

4、Electrical Specifications

4.1、Absolute Maximum Ratings

Parameter	Description	Min	Typ	Max	Unit	Notes
T _A	Ambient temperature with power applied	-40		85	°C	Recommend -25°C~85°C
T _{STG}	Storage temperature	-55		150	°C	
VDDA - VSSA	Power Supply Voltage	-0.3		3.3	V	
ESD	Electrostatic discharge voltage of whole chip	2			kV	HBM

Notes

1.If used beyond the absolute maximum ratings, ICNT8725 may be permanently damaged. It is strongly recommended that the device be used within the electrical characteristics in normal operations. If exposed to the condition not within the electrical characteristics, it may affect the reliability of the device.

2.Make sure VDDA(high)≥VSSA (low)

4.2、DC Electrical Characteristics

Parameter	Description	Min	Typ	Max	Unit
V _{IL}	Digital input low voltage	-0.3		0.3*IOVCC	V
V _{IH}	Digital input high voltage	0.7*IOVCC		IOVCC	V
V _{OL}	Digital low output voltage			0.3*IOVCC	V
V _{OH}	Digital high output voltage	0.7*IOVCC			V
I _{IL}	Input leakage		1		nA
I _{ACT}	Active mode current		8.8		mA
I _{GES}	Gesture mode current		580		μA
I _{HIB}	Hibernate mode current		110		μA
C _{IN}	Capacitive load on pins as input	0.5	1.7	5	pF
C _{OUT}	Capacitive load on pins as output	0.5	1.7	5	pF
C _c	Capacitor of note			4	pF

4.3、AC Electrical Characteristics

AC characteristics of oscillators

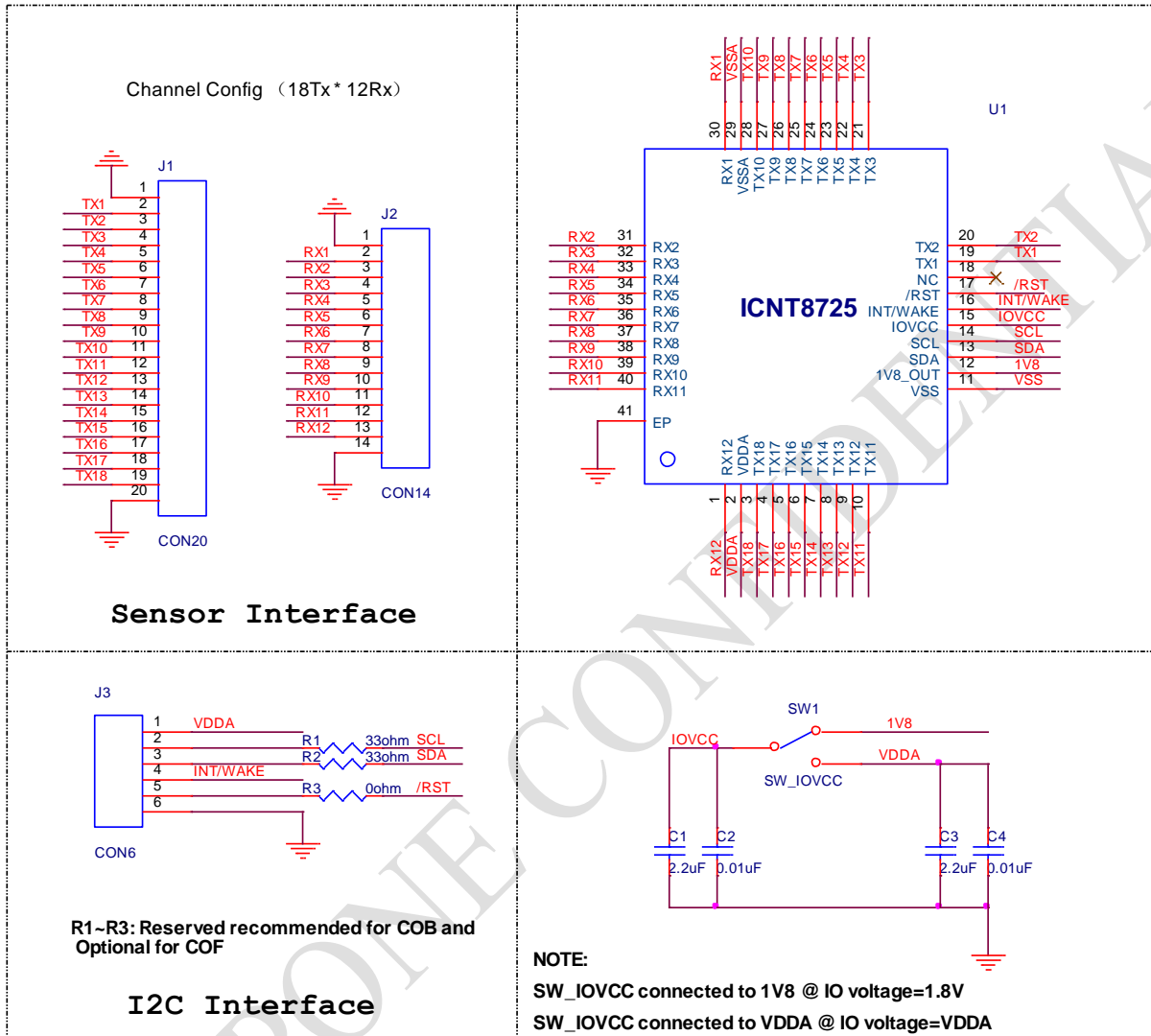
Parameter	Description	Min	Typ	Max	Unit
F _{OSC1}	Frequency of oscillator1		30		MHz

AC characteristics of interface

Parameter	Description	Min	Typ	Max	Unit
F _{TX}	Frequency of TX acceptable clock	30		500	kHz

4.4、Circuit diagram

ICNT8725

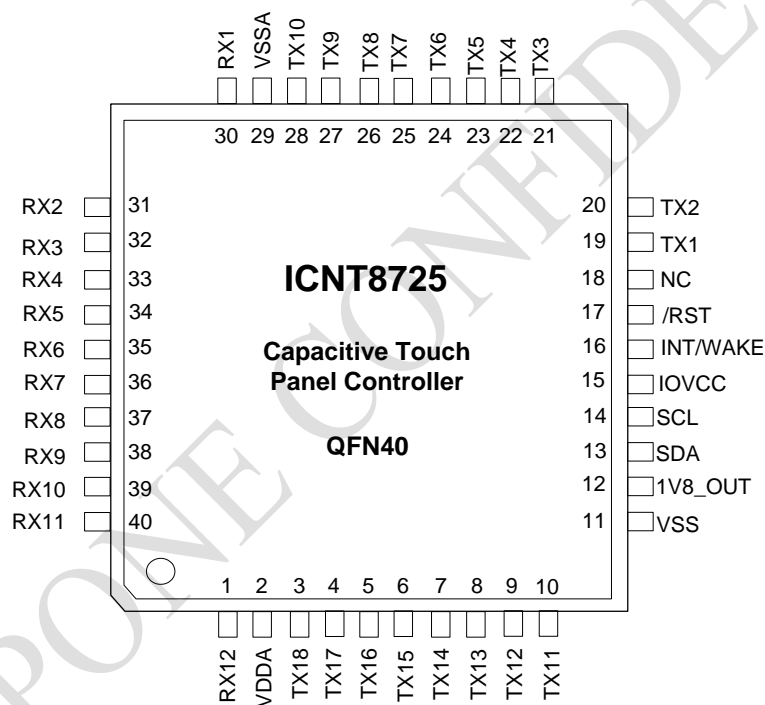


ICNT8725 I²C Interface

5、PIN DESCRIPTION

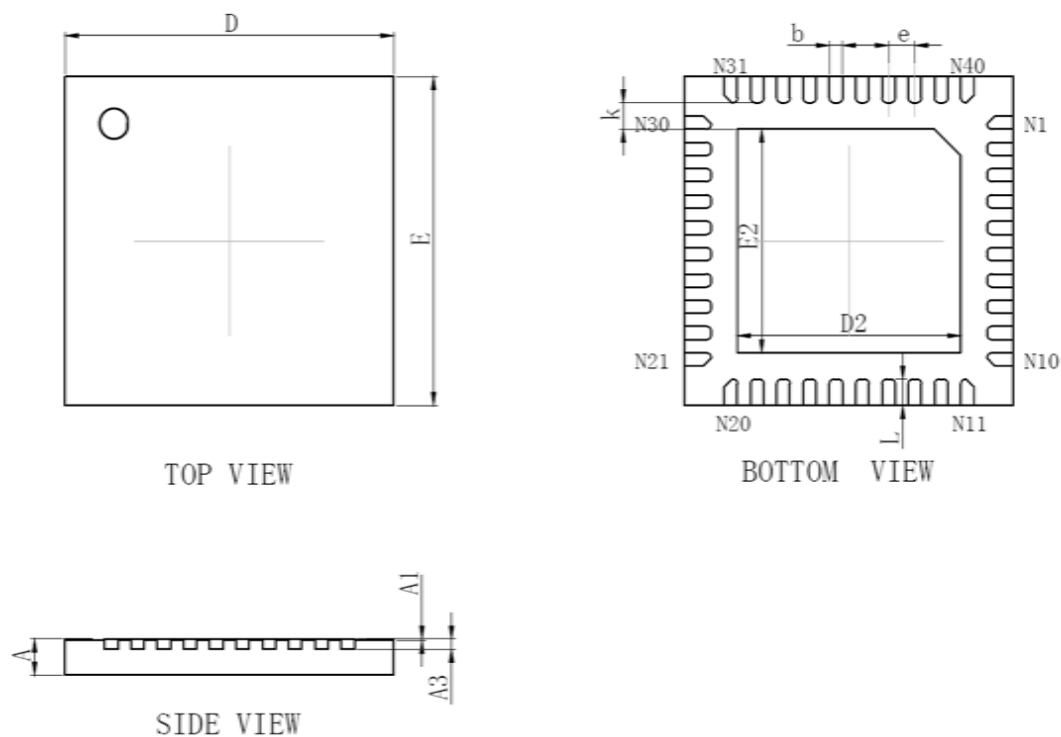
Pin Name	Pin Num	Type	Description
RX12	1	I	Receiver input pins
VDDA	2	PWR	Analog power supply
TX18	3	O	Transmit output pin
TX17	4	O	Transmit output pin
TX16	5	O	Transmit output pin
TX15	6	O	Transmit output pin
TX14	7	O	Transmit output pin
TX13	8	O	Transmit output pin
TX12	9	O	Transmit output pin
TX11	10	O	Transmit output pin
VSS	11	PWR	Analog ground
1V8_OUT	12	O	1.8V voltage
SDA	13	I/O	I ² C data input and output
SCL	14	I	I ² C clock input
IOVCC	15	PWR	IO power supply
INT/WAKE	16	I/O	External interrupt to the host or Wakeup request from the host
/RST	17	I	External Reset, active low
NC	18		Not connected
TX1	19	O	Transmit output pin
TX2	20	O	Transmit output pin
TX3	21	O	Transmit output pin
TX4	22	O	Transmit output pin
TX5	23	O	Transmit output pin
TX6	24	O	Transmit output pin
TX7	25	O	Transmit output pin
TX8	26	O	Transmit output pin
TX9	27	O	Transmit output pin
TX10	28	O	Transmit output pin
VSSA	29	PWR	Analog ground
RX1	30	I	Receiver input pins
RX2	31	I	Receiver input pins
RX3	32	I	Receiver input pins

RX4	33	I	Receiver input pins
RX5	34	I	Receiver input pins
RX6	35	I	Receiver input pins
RX7	36	I	Receiver input pins
RX8	37	I	Receiver input pins
RX9	38	I	Receiver input pins
RX10	39	I	Receiver input pins
RX11	40	I	Receiver input pins



6、Package Outline

QFN-5x5-40L



Symbol	Dimension in mm			Dimension in inch		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.500	0.600	0.700	0.020	0.024	0.027
A1	0.000	0.020	0.050	0.000	0.001	0.002
A3	0.152 REF.			0.006 REF.		
b	0.150	0.200	0.250	0.006	0.008	0.010
D	4.924	5.000	5.076	0.194	0.197	0.200
E	4.924	5.000	5.076	0.194	0.197	0.200
D2	3.30	3.40	3.50	0.130	0.134	0.138
E2	3.30	3.40	3.50	0.130	0.134	0.138
e	0.40 TYP.			0.016 TYP.		
L	0.35	0.40	0.45	0.014	0.016	0.018
k	0.20	---	---	0.008	---	---

7、Important Notice

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Revision History

Version	Revisions	Date	Modified by
0.1	1. First draft.	2015-12-25	
0.2	1.Update the QFN-5X5-40L package dimension.	2016-04-01	