



VK3618I Datasheet

18-channel touch I2C output

Rev.1.2

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1 General Description

VK3618I is an 18-channel (two-group) touch detection chip, designed to replace traditional mechanical buttons, making it highly suitable for compact electronic products with demanding requirements for interference resistance and low power consumption.

The 18 touch channels are divided into two groups, each containing 9 channels. Each group corresponds to one I2C communication interface and an INT pin, where the INT pin's output level indicates whether a touch key is pressed, with valid keys marked as "1" in the corresponding data bit. The chip supports multi-key mode and a 10-second long-press reset function. Featuring specially designed internal circuitry, low standby current, and a high power supply rejection ratio, it effectively minimizes false triggering and ensures high reliability even in challenging environmental conditions. This design also contributes to achieving a waterproof, dustproof, and aesthetically sealed product panel.

2 Key Features

- Operating voltage:2.4-5.5V
- Operating current 60.0 μ A@VDD=3.0V
Standby current 16 μ A@VDD=3.0V
- Power-on reset function (POR)
- Low-voltage reset function (LVR)
- Response time approximately 45ms @VDD=3V
- The overall sensitivity is adjusted by connecting a capacitor to ground through the CS pin. The capacitance value ranges from 1 to 100nF. The larger the capacitance value, the more sensitive it is. It is not allowed not to connect a capacitor.
- Connect a small capacitor to the ground for fine-tuning the sensitivity of each touch channel to make the sensitivity of each channel consistent. The capacitance value ranges from 1 to 100pF. The larger the capacitance value, the less sensitive it is. It is most sensitive without connecting a capacitor.
- Built-in key debouncing, no need for external software to debouncing again
- There are 2 groups of touch screens, each with 9 channels. The output interfaces are 2 groups of I2C interfaces, each independently outputting 2 bytes of I2C data, with each bit corresponding to one touch key
Multi-key mode.Press and hold the key for 10 seconds to reset.
- After power-on, there is approximately 0.25 seconds of stabilization time during which all functions are disabled. Do not touch the detection point during this period
- Self-calibrate parameters according to environmental changes.
- It is relatively easy to pass the EMC test
- HBM Electrostatic 4KV-8KV(Class 3A)
- Available Packages:
SSOP28(150mil) (9.9mm x 3.9mm PP=0.635mm)

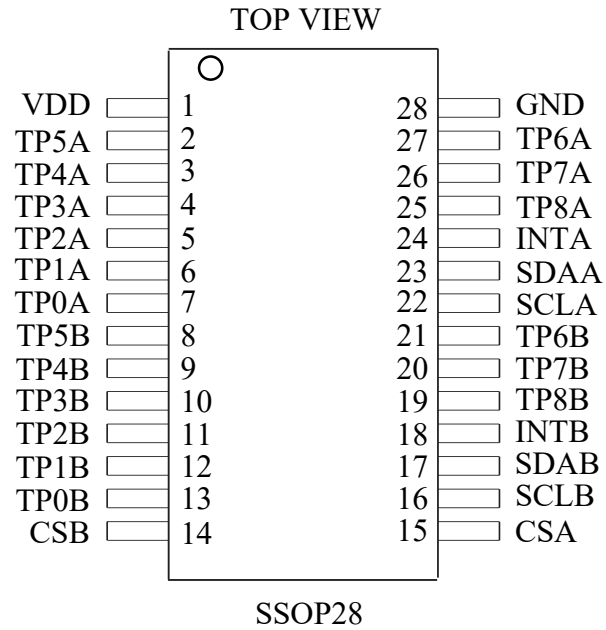
3 Product Selection

Part No.	Touch Channel	Working Voltage	Normal Mode/Standby	Output (/ Optional parameter)	Packaging
VK3601	1	2.4-5.5V	120 μ A/4 μ A(3V)	Direct CMOS output high/low level	SOT23-6
VK3602K	2	2.4-5.5V	60 μ A/8 μ A(3V)	Direct CMOS output high/low level	SOP8
VK3602XS	2	2.4-5.5V	60 μ A/8 μ A(3V)	Latch the CMOS output high/low level	SOP8
VK3603	3	2.4-5.5V	20 μ A/7 μ A(3V)	Direct CMOS output, low level effective	ESOP8
VK3604A	4	2.4-5.5V	20 μ A/7 μ A(3V)	Direct/latch high/low level multi-key/single-key CMOS/ Drain long press to keep output/ Long press for 16 seconds to reset	SOP16
VK3604B	4	2.4-5.5V	20 μ A/7 μ A(3V)	Direct/latch high/low level multi-key/single-key CMOS/ Drain long press to keep output/ Long press for 16 seconds to reset	TSSOP16
VK36E4	4	2.4-5.5V	20 μ A/6 μ A(3V)	Direct/latch high/low level multi-key/single-key CMOS/ Drain long press to keep output/ Long press for 16 seconds to reset	ESSOP10
VK36Q4	4	2.4-5.5V	20 μ A/6 μ A(3V)	Direct/latch high/low level multi-key/single-key CMOS/ Drain long press to keep output/ Long press for 16 seconds to reset	DFN10L
VK3606D	6	2.4-5.5V	20 μ A/7 μ A(3V)	Direct CMOS output, low level effective, multi-key mode, long press for 10 seconds to reset	SOP16
VK3610I	10	2.4-5.5V	45 μ A/9 μ A(3V)	I2C interface +INT pin, multi-key mode, hold for 10 seconds to reset	SOP16
VK3618I	18	2.4-5.5V	60 μ A/16 μ A(3V)	Two groups of touch correspond to I2C interface +INT pin, each group has 9 touch channels, multi-key mode, and reset after holding for 10 seconds	SSOP28

4 Ordering Information

Part No.	Packaging	Tube Qty	Tray(reel)Qty	Box Qty	Total Qty	Notes
VK3601	SOT23-6		3000/reel	30000/box	120000 PCS	
VK3602K	SOP8	100/tube		10000/box	60000 PCS	
VK3602XS	SOP8	100/tube		10000/box	60000 PCS	
VK3603	ESOP8		4000/reel	8000/box	64000 PCS	
VK3604A	SOP16	50/tube		5000/box	50000 PCS	
VK3604B	TSSOP16	100/tube		10000/box	100000 PCS	
VK36E4	ESSOP10		4000/reel	8000/box	64000 PCS	
VK36Q4	DFN10L		5000/reel		40000 PCS	
VK3606D	SOP16	50/tube		5000/box	50000 PCS	
VK3610I	SOP16	50/tube		5000/box	50000 PCS	
VK3618I	SSOP28	50/tube		5000/box	50000 PCS	

5 Package Pinout Information(SSOP28)



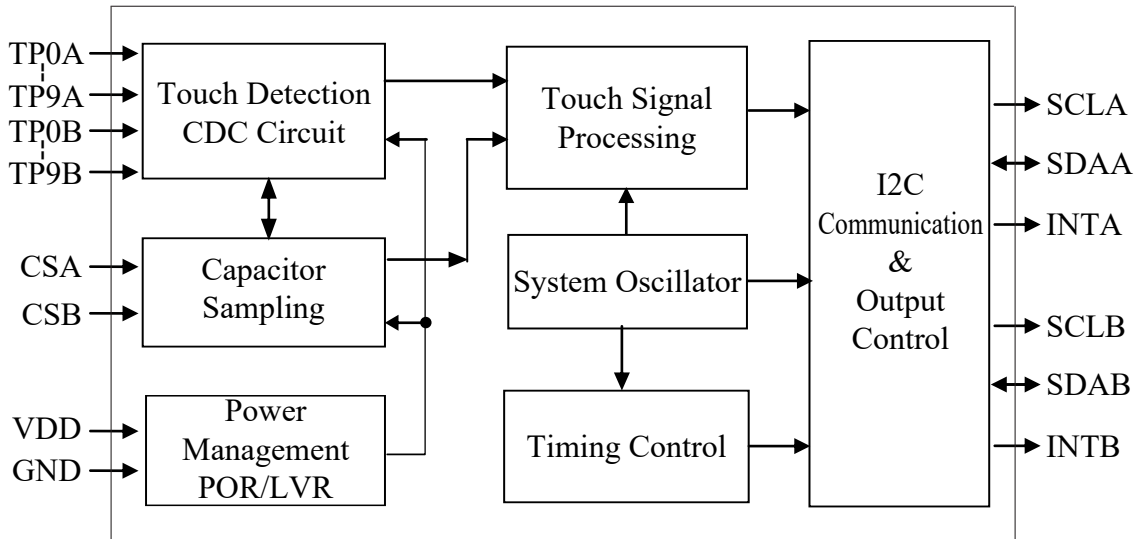
For more information: [Page 13](#)

5.1 VK3618I/SSOP28 Pin Description

No.	Name	I/O	Function Description
1	VDD	VDD	Positive power supply
2~7	TP5A~TP0A	I	Group A touch input: Connect a small capacitor to ground to fine-tune the sensitivity (1-100pF), and it is most sensitive when not connected
8~13	TP5B~TP0B	I	Group B touch input: Connect a small capacitor to ground to fine-tune the sensitivity (1-100pF), and it is most sensitive when not connected
14	CSB	I	Sensitivity adjustment of Group B, connect to the ground capacitor (1-100nF)
15	CSA	I	Sensitivity adjustment of Group A, connect to the ground capacitor (1-100nF)
16	SCLB	I	For Group B I2C serial clock pins, an external pull-up resistor is required for open-drain output
17	SDAB	I/O	For the I2C serial data input/output pins of Group B, an external pull-up resistor is required for open-drain output
18	INTB	O	For Group B touch state output and open-drain output, an external pull-up resistor needs to be connected
19-21	TP8B~TP6B	I	Group B touch input: Connect a small capacitor to ground to fine-tune the sensitivity (1-100pF), and it is most sensitive when not connected
22	SCLA	I	For Group A I2C serial clock pins, an external pull-up resistor is required for open-drain output
23	SDAA	I/O	Group A I2C serial data input/output pins, open-drain output requires an external pull-up resistor
24	INTA	O	For Group A touch state output and open-drain output, an external pull-up resistor needs to be connected
25~27	TP8A~TP6A	I	Group A touch input: Connect a small capacitor to ground to fine-tune the sensitivity (1-100pF), and it is most sensitive when not connected
28	GND	GND	Negative power supply

6 Functional Description

6.1 Block Diagram



6.2 Output Parameters

The output of VK3618I consists of 2 groups of I2C outputs and an INT interrupt pin.

The INT interrupt pin outputs the touch status. A low level is output when there is a touch, and a high level is output when there is no touch. Supports simultaneous pressing of multiple keys. Press and hold for 10 seconds to reset the chip and restore the output to the powered state.

Data format: INT+I2C data key-value, byte 1-0 (B8-B0)																				
Touch Pin	I2C data corresponds to key values								INT	Touch Pin	I2C data corresponds to key values								INT	
	B8	B7	B6	B5	B4	B3	B2	B1			B0	B8	B7	B6	B5	B4	B3	B2		B1
TP0 Touch	0	0	0	0	0	0	0	0	1	0	TP0 Release	0	0	0	0	0	0	0	0	1
TP1 Touch	0	0	0	0	0	0	0	0	1	0	TP1 Release	0	0	0	0	0	0	0	0	1
TP2 Touch	0	0	0	0	0	0	1	0	0	0	TP2 Release	0	0	0	0	0	0	0	0	1
TP3 Touch	0	0	0	0	0	1	0	0	0	0	TP3 Release	0	0	0	0	0	0	0	0	1
TP4 Touch	0	0	0	0	1	0	0	0	0	0	TP4 Release	0	0	0	0	0	0	0	0	1
TP5 Touch	0	0	0	1	0	0	0	0	0	0	TP5 Release	0	0	0	0	0	0	0	0	1
TP6 Touch	0	0	1	0	0	0	0	0	0	0	TP6 Release	0	0	0	0	0	0	0	0	1
TP7 Touch	0	1	0	0	0	0	0	0	0	0	TP7 Release	0	0	0	0	0	0	0	0	1
TP8 Touch	1	0	0	0	0	0	0	0	0	0	TP8 Release	0	0	0	0	0	0	0	0	1

Note:

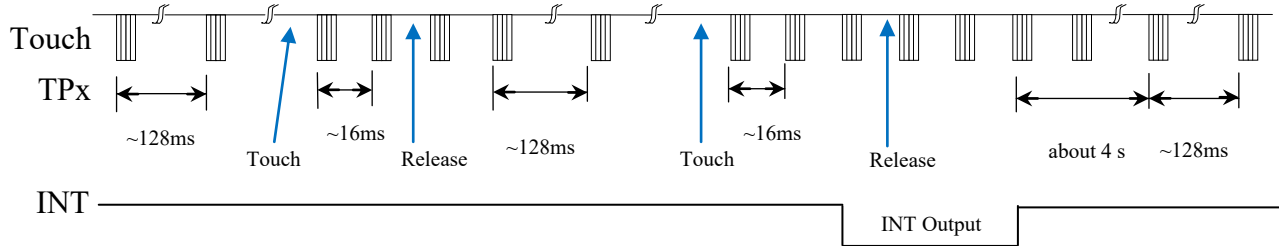
When powered on, the I2C data =0 00000000

INT output pin level =1

When multiple keys are touched simultaneously, the corresponding data bit is 1 at the same time

6.3 Working Mode

The VK3618I chip has two working modes: standby mode and normal mode. The key was touched and switched to the normal mode. The keyless touch 4S automatically enters standby mode to reduce power consumption. When VDD=5V, the INT output response is approximately 160 milliseconds in standby mode and about 48 milliseconds in working mode.



6.4 Sensitivity Adjustment

The sensitivity of VK3618I is related to the size of the touch PAD, the thickness of the shell, the size of the sensitivity capacitance, etc. The sensitivity should be adjusted according to the actual application of the product. The sensitivity can be adjusted from the following four aspects:

1. Touch the area of the PAD
Under other unchanged conditions, the larger the touch area, the more sensitive it is, but the area must be within the effective area.
2. The thickness of the shell
Under other unchanged conditions, the thinner the casing, the higher the sensitivity; the thicker the casing, the lower the sensitivity. However, the thickness must not exceed the maximum limit.
3. Adjust the capacitance value of pin CS to ground
CS adjusts the overall sensitivity, with the larger the value, the more sensitive it is. Commonly used values range from 1 to 100nF, and for some special applications, there are also those exceeding 200nF. CS capacitors should be selected with smaller temperature coefficients, such as X7R and NPO.
4. Adjust the small capacitance between the touch foot and the ground
The sensitivity is fine-tuned by touching the small capacitance of the touch foot to the ground. The larger the capacitance, the lower the sensitivity. It is most sensitive without a capacitance. Common values range from 1 to 100pF.

Shell thickness (acrylic or glass)	CS Electrical value (for reference only)
<3mm	10nF/25V
3-6mm	22nF/25V
6-10mm	47nF/25V

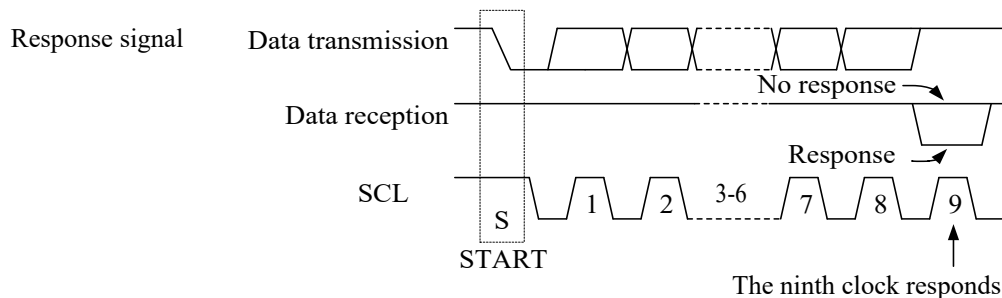
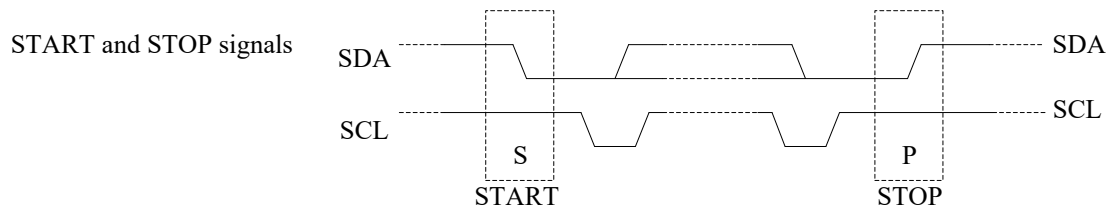
7 I2C Communication Interface

The VK3618I has 2 sets of communication interfaces, each with 2 communication pins, following the I2C protocol, with a maximum communication speed of 400kbit/S.

The SCL pin is the clock input pin, and the SDA pin is the serial data input/output pin, which requires an external pull-up resistor.

When the I2C bus is idle, both pins are at a high level. When the SCL signal is at a high level and the SDA signal changes from a high level to a low level, the operation starts or resumes. Conversely, when the SCL signal is at a high level and the SDA signal changes from a low level to a high level, the operation stops.

When the SCL signal is at a high level, the data on the SDA port is all valid and stable. Only when the SCL signal is at a low level can the level on the SDA port be changed.



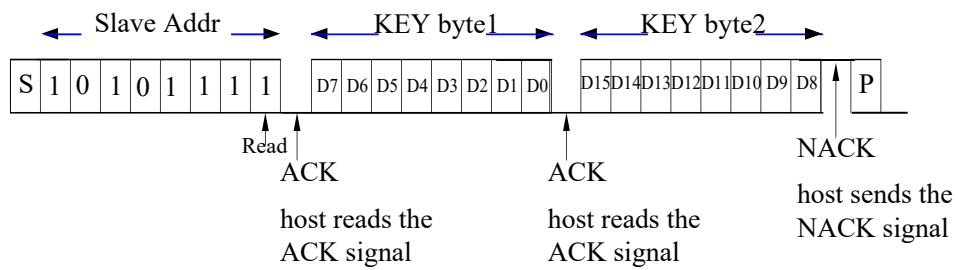
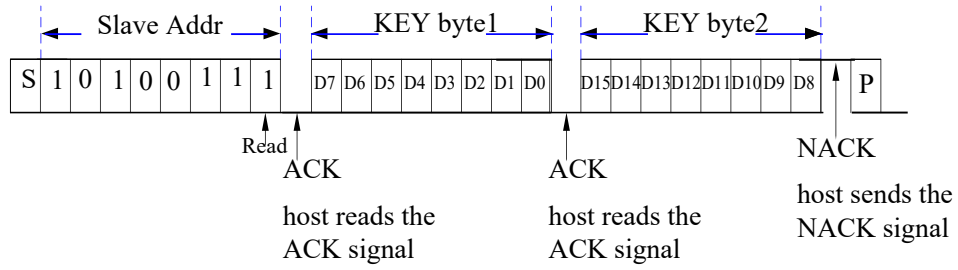
I2C A address
(0xA7)bit0=1read bit

1	0	1	0	0	1	1	1
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I2C B address
(0xAF)bit0=1read bit

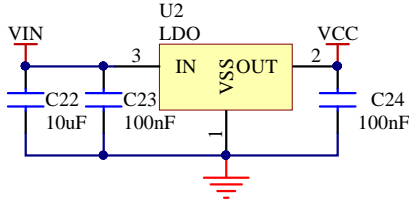
1	0	1	0	1	1	1	1
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Read a byte of key value:



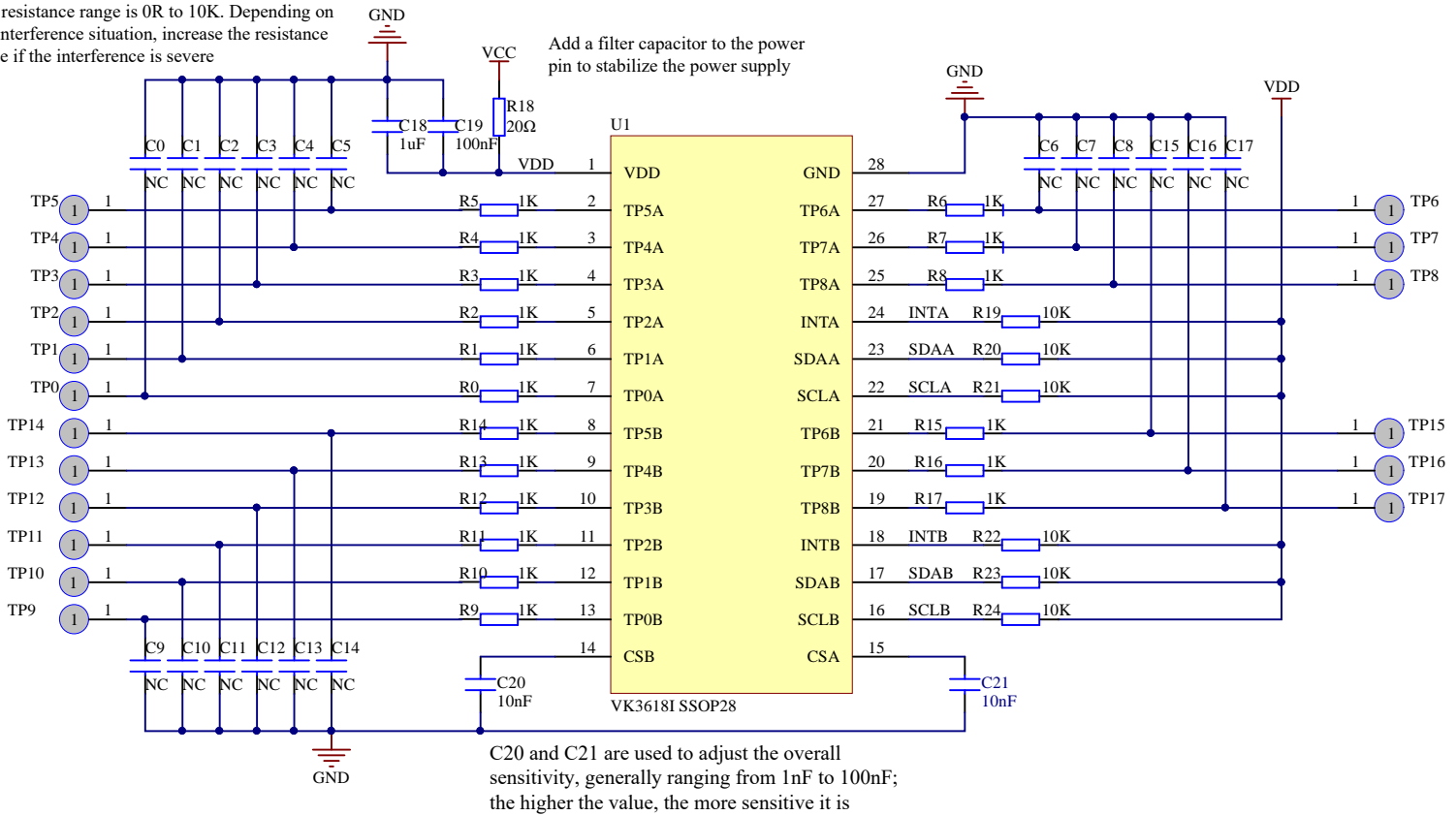
8 Application Circuits

It is recommended to use LDO for power supply



C0-C17 is used to fine-tune the sensitivity of each channel. Generally, the larger the capacitance between 0pF and 100pF, the less sensitive it is. It is most sensitive without soldering

The touch pin is connected in series with a 1K resistor to enhance anti-interference performance. Generally, a 1K resistor is connected in series. The resistance range is 0R to 10K. Depending on the interference situation, increase the resistance value if the interference is severe



9 Electrical Characteristics

Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Power Voltage	VDD	-0.3~6.0	V
Input Voltage	V _{IN}	GND-0.3~VDD+0.3	V
Storage Temperature	T _{STG}	-50~+125	°C
Operating Temperature	T _{OTG}	-40~+85	°C
Human Body Mode	ESD	4KV-8KV(Class 3A)	KV

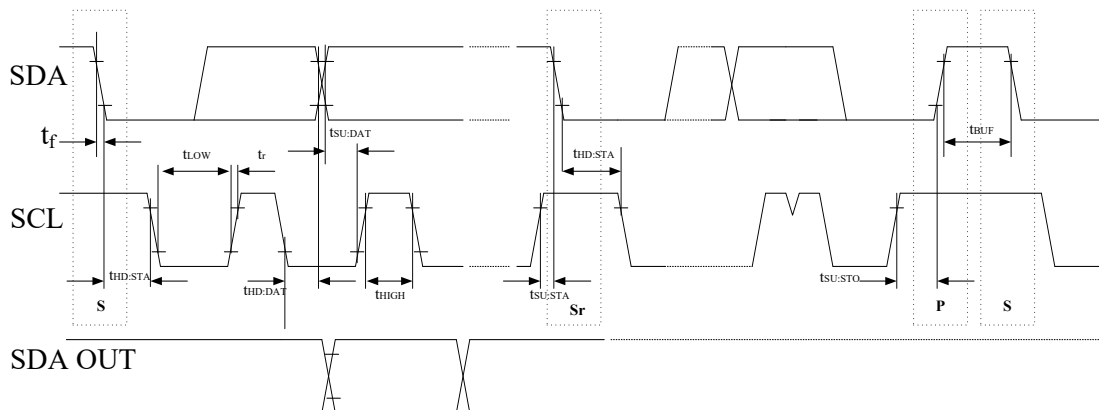
9.1 DC Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions (25 °C)	
						VDD	Conditions
Operating voltage	VDD	2.4	3.0	5.5	V	—	—
Low-voltage reset	LVR	—	2.3	—	V	—	—
Operating current	I _{OP}	—	60	100	μA	3.0V	CS=10nF
		—	120	200		5.0V	
Standby current	I _{ST}	—	16	32	μA	3.0V	CS=10nF
		—	30	60		5.0V	
Output sink current	I _{IL}	—	4	—	mA	3.0V	V _{OL} =0.6V
		—	8	—		5.0V	
Output source current	I _{OL}	—	-2	—	mA	3.0V	V _{OH} =2.6V
		—	-4	—		5.0V	V _{OH} =4.3V
Input low voltage	V _{IL}	—	—	0.3	VDD	VDD	Input low voltage
Input high voltage	V _{IH}	0.7	—	1	VDD	VDD	Input high voltage
Output response time	T _R	—	45	—	mS	3.0V	Normal mode
		—	48	—		5.0V	Normal mode
		—	150	—	mS	3.0V	Standby mode
		—	160	—		5.0V	Standby mode

9.2 AC Electrical Characteristics

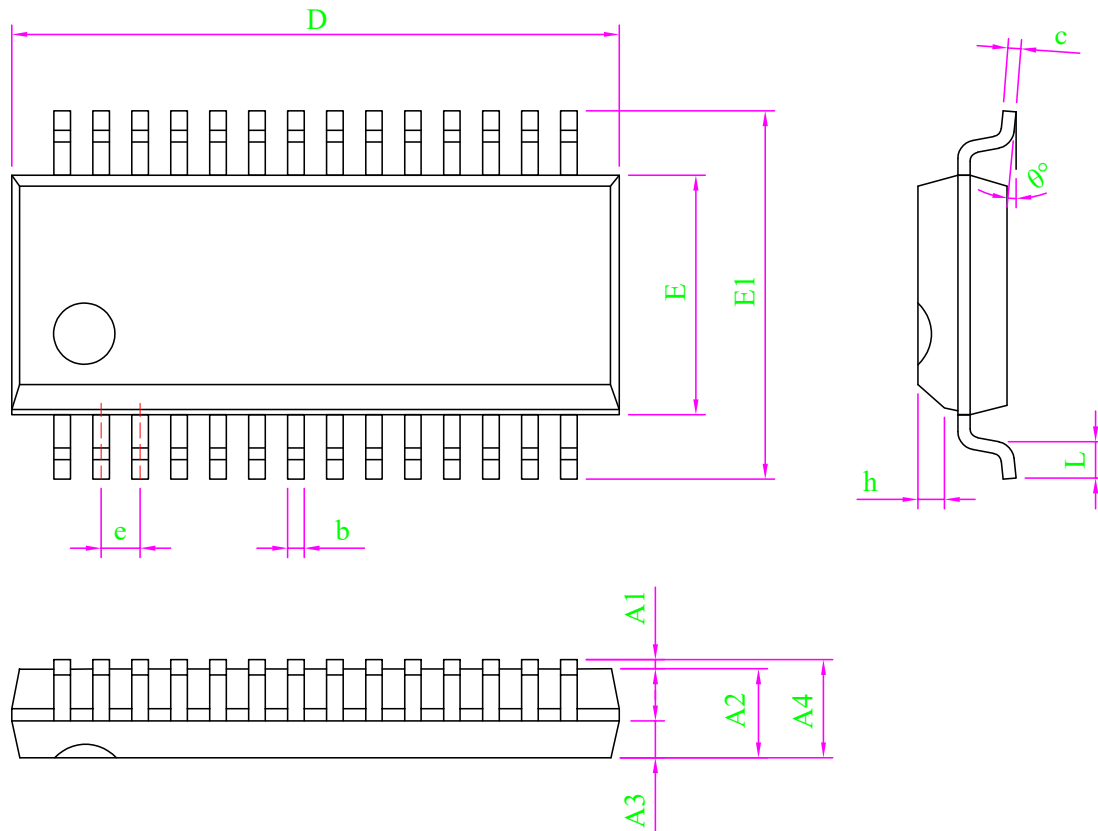
Symbol	Parameter	Min.	Max.	Unit	Test Conditions
					Conditions
f_{SCL}	Clock frequency	—	400	kHZ	—
t_{BUF}	Bus idle time	1.3	—	μs	During this period, the bus must remain idle until a new transmission begins
$t_{HD; STA}$	Start-up condition holding time	0.6	—	μs	After this period, the first clock pulse will be generated
t_{LOW}	SCL low-level time	1.3	—	μs	—
t_{HIGH}	SCL high-level time	0.6	—	μs	—
$t_{SU; STA}$	Set the time in the "Start" state	0.6	—	μs	It is only related to the repeated START signal
$t_{HD; DAT}$	Data retention time	0	—	μs	—
$t_{SU; DAT}$	Data setting time	100	—	ns	—
t_r	Rising time	—	0.3	μs	Periodic sampling
t_f	Decrease time	—	0.3	μs	Periodic sampling
$t_{SU; STO}$	Stop setting the time for the condition	0.6	—	μs	—
t_{AA}	The effective clock output time	—	0.9	μs	—
t_{SP}	Input filter time constant (SDA and SCL pins)	—	50	ns	Noise suppression time

I²C timing



10 Package Information

10.1 SSOP28(150mil) (9.9mm x 3.9mm PP=0.635mm)



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	-	-	1.75
A1	0.05	-	0.23
A2	1.35	1.45	1.55
A3	0.60	0.65	0.70
b	0.23	-	0.31
c	0.19	-	0.25
D	9.80	9.90	10.00
E	3.90	3.90	4.00
E1	5.80	6.00	6.20
e	0.635 BSC		
h	0.30	-	0.50
L	0.60	-	0.80
θ	0	-	8°

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12 Revision History

No.	Version	Date	Modify the content	Check
1	1.0	2018-08-10	Original version	YES
2	1.1	2020-02-11	Add reference circuit	YES
3	1.2	2025-12-25	Update version	YES

[1] Consult the recently published documents before starting or finishing the design.

[2] Since the release of this document , the device product status described in this document may have changed and may differ in several cases. The latest product status information can be found on the Internet at <https://www.szvinka.com/>