



VK36N6D Datasheet

6-channel touch 1-on-1 output

Rev.1.2

Intellectual Property Statement:

Shenzhen Vinka Microelectronics Co., Ltd. (hereinafter referred to as “the Company”) owns legally registered intellectual property rights in both domestic and international jurisdictions. Any unauthorized use of the Company’s products or patented technologies by individuals or organizations is strictly prohibited.

The Company reserves the right to take legal action against any infringement, and to seek full compensation for damages or unlawful gains.

The Company’s name and trademarks are legally protected and may not be used or imitated without explicit written permission. No implied or express license shall be granted under any circumstances.

1 General Description

The VK36N6D has two touch buttons, which can be used to detect the touch actions of human hands on the external touch buttons. This chip has a high degree of integration and only requires a few external components to achieve the detection of touch buttons.

It provides 6 1-to-1 output pins. The power-on output level can be selected through the IO pins. There are two types available: direct output and latch output. The chip uses a special integrated circuit, which has a high power supply voltage suppression ratio. This can reduce the occurrence of key detection errors. This feature ensures that the chip maintains high reliability even in adverse environmental conditions.

This touch chip features automatic calibration function, low standby current, and resistance to voltage fluctuations. It provides a simple and effective solution for various applications involving touch keys with 1:1 direct output.

2 Key Features

- Operating voltage: 2.2-5.5V
- Standby current 10 μ A/3.0V
- Power-on reset function (POR)
- Low-voltage reset function (LVR)
- Touch output response time: 48ms in operating mode, 160ms in standby mode
- Select the high or low voltage level of the power output through the AHLB pin.
- The output consists of 6 one-to-one output ports.
- Support multi-key simultaneous touch
- Anti-fraud function, maximum output time of the effective key: 13 seconds
- Touchless operation: enters standby mode in 4 seconds
- Adjust overall sensitivity by connecting a ground capacitor to the CS pin (1-47nF)
- Each touch channel is independently connected to a small ground capacitor for fine-tuning sensitivity (0-50pF).
- The system is stable within 0.3 seconds after power-on, and no touching is allowed.
- When the power is turned on and no touch is detected, the environmental changes will automatically calibrate the reference value.
- Resistant to voltage fluctuations and has good anti-interference performance
- Model number
VK36N6DD Direct output
VK36N6DT Latched output
- Available Packages:
SOP16(150mil)(9.9mm x 3.9mm PP=1.27mm)
QFN16L(3.0mm x 3.0mm PP=0.5mm)

3 Product Selection

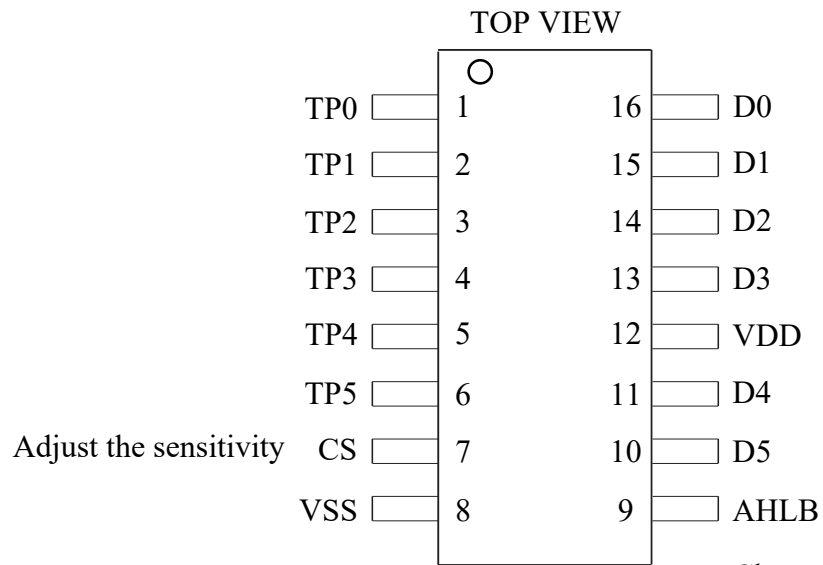
Part No.	Voltage/Standby Current	Output	Packaging
VK36N1D	2.2V-5.5V/10 μ A(3.0V)	Direct/Latch/Open Drain Output	SOT23-6
VK36N2D	2.2V-5.5V/10 μ A(3.0V)	Direct/Latch/Open Drain Output	SOP8
VK36N3D	2.2V-5.5V/10 μ A(3.0V)	Direct/Latch/Open Drain Output	SOP16/QFN16L
VK36N4D	2.2V-5.5V/10 μ A(3.0V)	Direct/Latch/Open Drain Output	SOP16/QFN16L
VK36N5D	2.2V-5.5V/10 μ A(3.0V)	Direct/Latch/Open Drain Output	SOP16/QFN16L
VK36N6D	2.2V-5.5V/10 μ A(3.0V)	Direct/Latch/Open Drain Output	SOP16/QFN16L

4 Ordering Information

Part No.	Packaging	Tube Qty	Tray(reel)Qty	Box Qty	Total Qty	Notes
VK36N1D	SOT23-6		3000/reel	30000/box	120000 PCS	
VK36N2D	SOP8	100/tube		10000/box	100000 PCS	
VK36N3D	SOP16	50/tube		5000/box	50000 PCS	
	QFN16L		3000/reel	30000/box	120000 PCS	
VK36N4D	SOP16	50/tube		5000/box	50000 PCS	
	QFN16L		3000/reel	30000/box	120000 PCS	
VK36N5D	SOP16	50/tube		5000/box	50000 PCS	
	QFN16L		3000/reel	30000/box	120000 PCS	
VK36N6D	SOP16	50/tube		5000/box	50000 PCS	
	QFN16L		3000/reel	30000/box	120000 PCS	

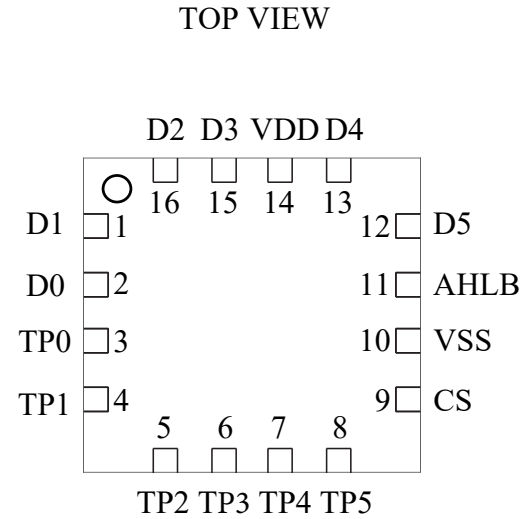
5 Package Pinout Information(SOP16/QFN16L)

Support simultaneous pressing of multiple keys, with output in 1:1 ratio.



SOP16

Choose between high-level validity or low-level validity



QFN16L

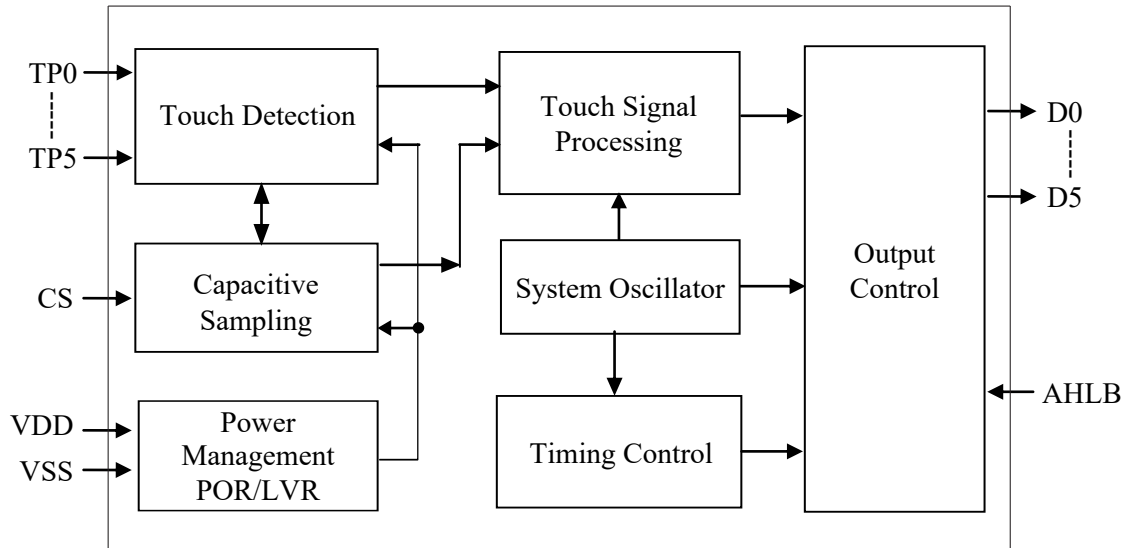
For more information: Page 11-12

5.1 VK36N6D/SOP16/QFN16L Pin Description

Pin Names		I/O	Function Description
SOP16	QFN16L		
1-TP0	3-TP0	I	Touch input. Connect a ground capacitor to fine-tune the sensitivity (1-50pF). No connection results in the highest sensitivity.
2-TP1	4-TP1	I	Touch input. Connect a ground capacitor to fine-tune the sensitivity (1-50pF). No connection results in the highest sensitivity.
3-TP2	5-TP2	I	Touch input. Connect a ground capacitor to fine-tune the sensitivity (1-50pF). No connection results in the highest sensitivity.
4-TP3	6-TP3	I	Touch input. Connect a ground capacitor to fine-tune the sensitivity (1-50pF). No connection results in the highest sensitivity.
5-TP4	7-TP4	I	Touch input. Connect a ground capacitor to fine-tune the sensitivity (1-50pF). No connection results in the highest sensitivity.
6-TP5	8-TP5	I	Touch input. Connect a ground capacitor to fine-tune the sensitivity (1-50pF). No connection results in the highest sensitivity.
7-CS	9-CS	I	Sensitivity adjustment, connecting ground capacitor (1-47nF)
8-VSS	10-VSS	VSS	Negative power supply
9-AHLB	11-AHLB	I	Select output level (must not be left floating): VDD > low level is valid, VSS - > high level is valid
10-D5	12-D5	O	Touch output
11-D4	13-D4	O	Touch output
12-VDD	14-VDD	VDD	Positive power supply
13-D3	15-D3	O	Touch output
14-D2	16-D2	O	Touch output
15-D1	1-D1	O	Touch output
16-D0	2-D0	O	Touch output

6 Functional Description

6.1 Block Diagram



6.2 Automatic Calibration

After power-on, the chip will perform initialization and obtain the first reference value. Subsequently, when there is no touch, the touch chip will automatically calibrate the reference value, enabling the reference value to dynamically change according to the external environment.

For example, this mechanism can achieve reliable touch detection when there is a temperature change or environmental noise.

6.3 Anti-Calcification Function

To minimize unintended key detection situations such as accidental contact with the sensing pad, a maximum key duration function is set within the chip. When a touch key is pressed, the internal timer starts timing. If the pressing time exceeds approximately 13 seconds, the touch chip will ignore the state of the touched key, recalibrate, obtain a new reference value, and simultaneously reset the status to the initial state upon power-on.

6.4 Resistance To Voltage Fluctuations

The chip is equipped with an anti-voltage fluctuation function, which can prevent the occurrence of touch button malfunction caused by the sudden drop in working voltage due to the large current drive from the peripheral devices.

6.5 Output Mode

The output of VK36N6D is D0 to D6, in CMOS format, and supports multiple keys. The valid output level can be selected by the state of the AHLB pin during power-on.

AHLB	Select the output of the valid level
VSS	High level is valid. Power-on output is 0.
NC	Low level is valid. Power-on output is 1.

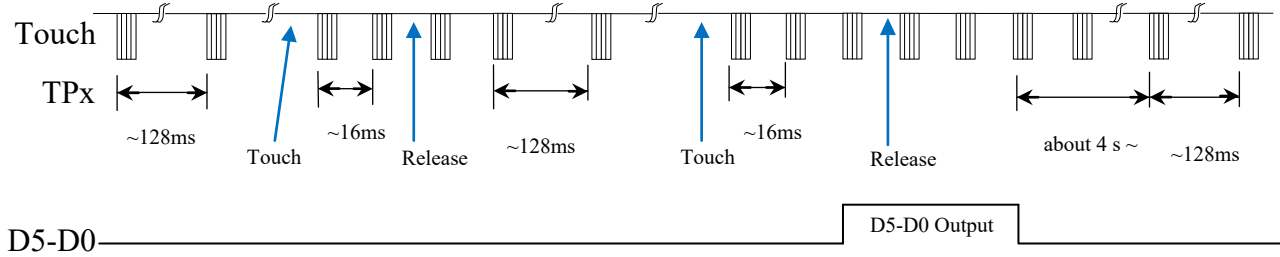
Data format: OUTFLAG + 1: 1 key-value pair.

The AHLB is floating during power-on							
Touch Pin	Output pin		OUTFLAG	Touch Pin	Output pin		OUTFLAG
	VK36N6DT	VK36N6DD			VK36N6DT	VK36N6DD	
TP0 Touch	D0=0	D0=0	0	TP0 Release	D0=0	D0=1	1
TP1 Touch	D1=0	D1=0	0	TP1 Release	D1=0	D1=1	1
TP2 Touch	D2=0	D2=0	0	TP2 Release	D2=0	D2=1	1
TP3 Touch	D3=0	D3=0	0	TP3 Release	D3=0	D3=1	1
TP4 Touch	D4=0	D4=0	0	TP4 Release	D4=0	D4=1	1
TP5 Touch	D5=0	D5=0	0	TP5 Release	D5=0	D5=1	1
Note:The output pin level upon power-on = 1							

When powered on, AHLB is connected to VSS							
Touch Pin	Output pin		OUTFLAG	Touch Pin	Output pin		OUTFLAG
	VK36N6DT	VK36N6DD			VK36N6DT	VK36N6DD	
TP0 Touch	D0=1	D0=1	1	TP0 Release	D0=1	D0=0	0
TP1 Touch	D1=1	D1=1	1	TP1 Release	D1=1	D1=0	0
TP2 Touch	D2=1	D2=1	1	TP2 Release	D2=1	D2=0	0
TP3 Touch	D3=1	D3=1	1	TP3 Release	D3=1	D3=0	0
TP4 Touch	D4=1	D4=1	1	TP4 Release	D4=1	D4=0	0
TP5 Touch	D5=1	D5=1	1	TP5 Release	D5=1	D5=0	0
Note:The output level at power-on = 0							

6.6 Working Mode

The VK36N6D chip has two working modes: standby mode and normal mode. Press the key to switch to the normal mode. When no key is touched, the 4S automatically enters the standby mode to reduce power consumption. When $VDD = 5V$, the output response of D4-D0 in the standby mode is approximately 160 milliseconds, while in the working mode it is approximately 48 milliseconds.



6.7 Sensitivity Adjustment

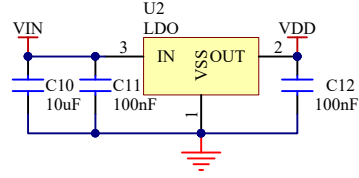
The sensitivity of VK36N6D is related to the size of the touch PAD, the thickness of the shell, the size of the sensitivity capacitance, etc. The sensitivity should be adjusted according to the actual application of the product. The sensitivity can be adjusted from the following four aspects:

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. The larger the value, the more sensitive it is. Commonly used values range from 1 to 47nF, and for some special applications, there are also values exceeding 200nF.
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 capacitor. Common values range from 1 to 50pF.

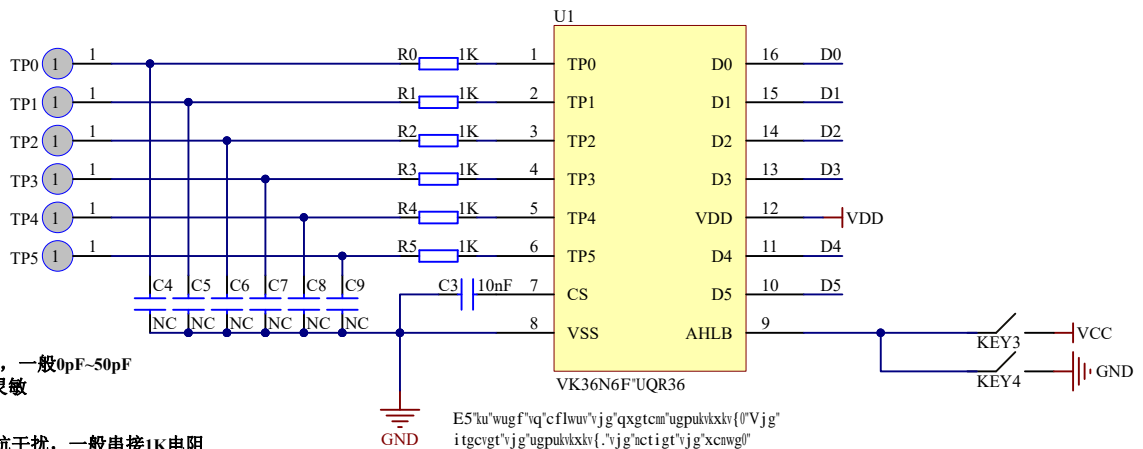
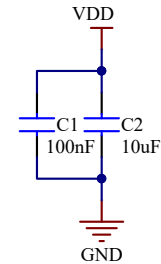
Shell thickness (acrylic or glass)	CS Electrical value (for reference only)
<3mm	6.8nF/25V
3-6mm	10nF/25V
6-10mm	22nF/25V

7 Application Circuits

It is recommended to use LDO for power supply



The power supply pin is stabilized by adding a filter capacitor.



C4-C9用于微调各通道灵敏度，一般0pF~50pF
电容越大越不灵敏，不焊最灵敏

触摸脚串接1K电阻用于提高抗干扰，一般串接1K电阻
阻值范围0R~10K.根据干扰情况，干扰严重加大电阻值

AHLB

VDD Low level is valid. Power-on output is 1.

GND High level is valid. Power-on output is 0.

8 电气特性

8.1 极限参数

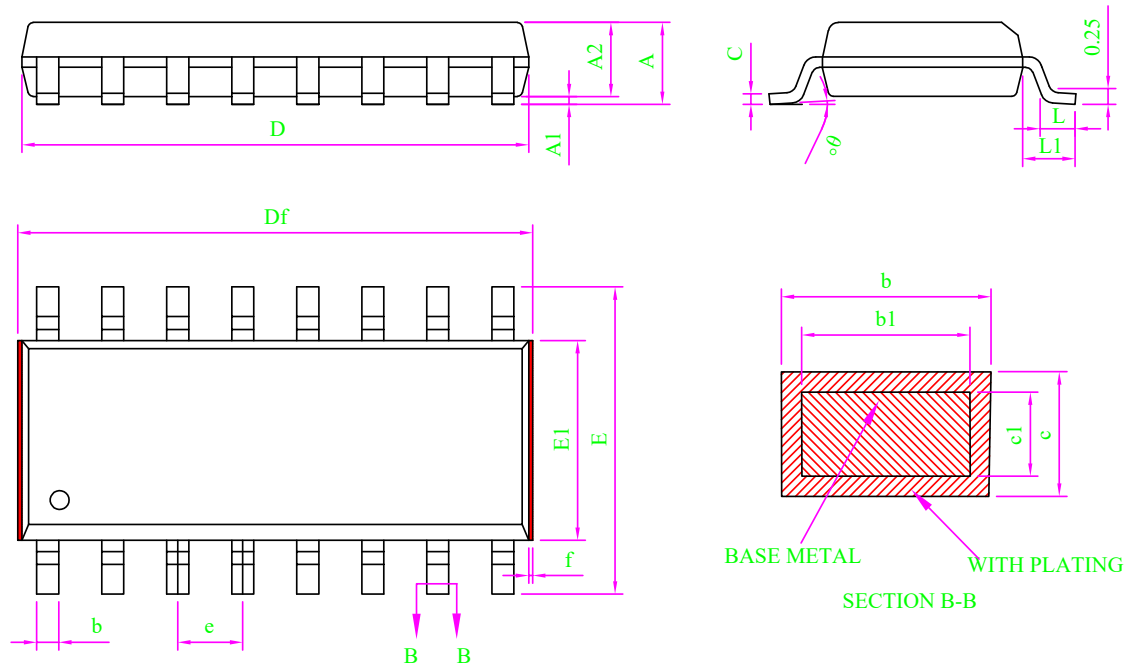
特性	符号	极限值	单位
电源电压	VDD	-0.3~6.0	V
输入电压	VIN	VSS-0.3~VDD+0.3	V
存贮温度	T _{STG}	-50~+125	°C
工作温度	T _{OTG}	-40~+85	°C
静电(HBM)	ESD	4KV-8KV(Class 3A)	KV

8.2 直流参数

名称	符号	最小值	典型值	最大值	单位	测试条件 (25 °C)	
						VDD	条件
工作电压	VDD	2.2	3.0	5.5	V	—	—
低压复位	LVR	—	2.0	2.1	V	—	—
工作电流	I _{OP}	—	1.3	—	mA	3.0V	CS=10nF
		—	2.2	—		5.0V	
待机电流	I _{ST}	—	10	—	μA	3.0V	CS=10nF
		—	33	—		5.0V	
输出灌电流	I _{IL}	—	4	—	mA	3.0V	V _{OL} =0.6V
		—	8	—		5.0V	
输出源电流	I _{OL}	—	-2	—	mA	3.0V	V _{OH} =2.6V
		—	-4	—		5.0V	V _{OH} =4.3V
输入低电压	V _{IL}	—	—	0.3	VDD	VDD	输入低电压
输入高电压	V _{IH}	0.7	—	1	VDD	VDD	输入高电压
输入上拉电阻	R _{PH}	—	150k	—	ohm	3.0V	VDD=3V
输入下拉电阻	R _{PL}	—	50k	—	ohm	3.0V	VDD=3V
输出响应时间	T _R	—	45	—	mS	3.0V	工作模式
		—	48	—		5.0V	工作模式
		—	150	—	mS	3.0V	待机模式
		—	160	—		5.0V	待机模式

9 封装信息

9.1 SOP16(9.9mm x 3.9mm PP=1.27mm)

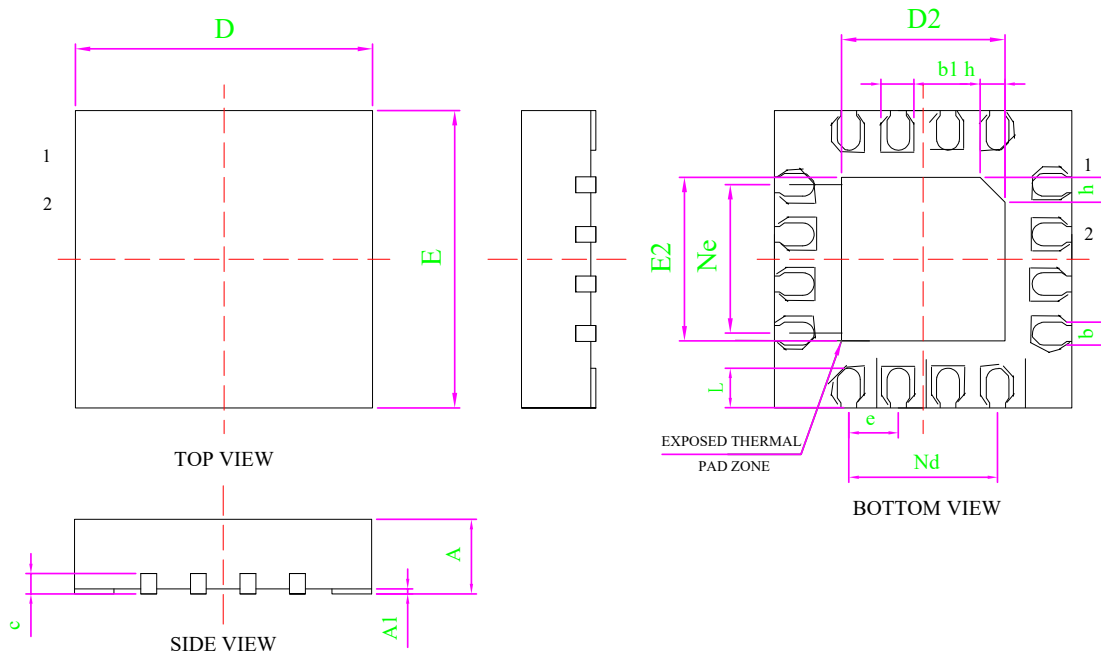


Note:

1. All dimension are in mm.
Dim D&E1 does not include plastic flash; Df includes plastic flash(f);
Flash: Plastic residual around body edge after de junk/singulation.
2. Dim b does not include dambar protrusion/intrusion.
3. Plating thickness 0.007mm-0.020mm

MILLIMETER			
SYMBOL	MIN	NOM	MAX
A	-	-	1.75
A1	0.10	0.15	0.20
A2	1.35	1.45	1.55
b	0.39	-	0.47
b1	0.38	0.41	0.43
c	0.20	-	0.25
c1	0.19	0.20	0.21
D	9.80	9.90	10.00
Df	9.90	-	10.40
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e	1.27BSC		
L	0.51	0.66	0.81
L1	0.95	1.05	1.15
θ	0	-	8°
f	0.05	-	0.20

9.2 QFN16L(3.0mm x 3.0mm PP=0.5mm)



Dimensions			
SYMBOL	MIN	NOMINAL	MAX
A	0.70	0.75	0.80
A1	0	0.02	0.05
b	0.18	0.25	0.30
b1	0.30	0.35	0.40
c	0.18	0.20	0.25
D	2.90	3.00	3.10
D2	1.55	1.65	1.75
e	0.50BSC		
Ne	1.50BSC		
Nd	1.50BSC		
E	2.90	3.00	3.10
E2	1.55	1.65	1.75
L	0.35	0.40	0.45
h	0.20	0.25	0.30
L/F 载体尺寸 (miL)	75*75		

10 免责声明

保修和责任 —— 本文档中的信息是正确可靠的，但我公司对于这些信息的准确性和完整性不作任何保证。对于此类信息的使用后果不负任何责任。在任何情况下，深圳市永嘉微电科技有限公司(以下简称本公司)不会承担任何间接、意外发生、惩罚性的相关性的损害赔偿，不管这些损害赔偿是基于侵权（包括疏忽）、保修、违约合同或是其他法律理论。

变更的权利 —— 本公司有权在任何时间对此文件发布的信息做出任何改动。更改过的文件将会取代之前所有公布的信息。您可随时查看我们的官网：

<https://www.szvinka.com/>

适用性 —— 本公司的产品并非是为那些用于对生命和安全有重大关系的系统和设备而设计的。对于使用本公司的产品而导致的故障，造成的人身伤害、甚至死亡、或是严重的财产或环境损害的应用程序。如果本公司的产品应用在此类的设备或应用程序中，本公司对此造成的风险将不承担任何的责任，因此这些风险由客户自行承担。

应用 —— 在这里所有描述有关产品的任何应用程序仅用于说明的目的。在没有进一步测试或修改的情况下，本公司对该应用程序的指定用途是否合适不作任何表示或保证。本公司不负责协助应用程序或客户的产品设计。同时客户应自行负责决定我司的产品是否适合应用计划产品、计划的应用程序以及第三方客户的使用。

客户应适当的提供设计和运行，保障措施以尽量减少其产品与应用的相关风险。如果因客户的应用或产品的弱点或缺陷所产生的，或因使用其他第三方的产品而造成的任何缺陷、损失、费用支出等问题，本公司不承担任何责任。客户应负责为其使用本公司产品的第三方客户做必要的产品或应用的测试，以避免使用不当而造成不必要的损失。本公司对在此方面不承担任何责任。

商业销售条件 —— 本公司的产品销售条款适用于通用的商业销售条款。如有其他要求可另出一份单独有效的书面协议，在此种情况下，将适用该单独有效的书面协议条款和条件。关于客户采购本公司的产品，本公司在此明确拒绝适用客户的通用条款和条件。

出口控制 —— 本文档描述的产品以及其项目可能受出口管制条例限制。出口可能需事先获得国家机关许可。

11 历史版本

No.	版本	日期	修订内容	检查
1	1.0	2018-08-10	原始版本	YES
2	1.1	2020-02-11	添加参考电路	YES
3	1.2	2024-10-24	更新内容	YES

[1] 在开始或完成设计之前，请查阅最近发布的文件。

[2] 自本档发布以来，本档中描述的设备产品状态可能已经发生了变化，并且在多个情况下可能会有所不同。最新的产品状态信息可在互联网上查询，网址为 <https://www.szvinka.com/>