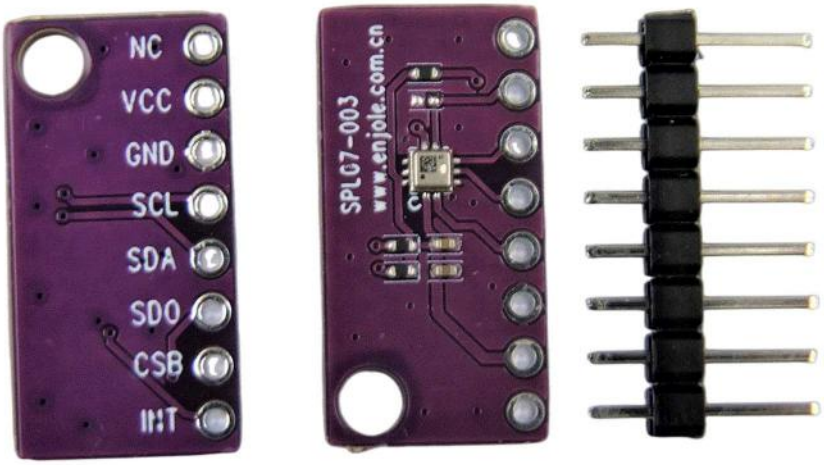
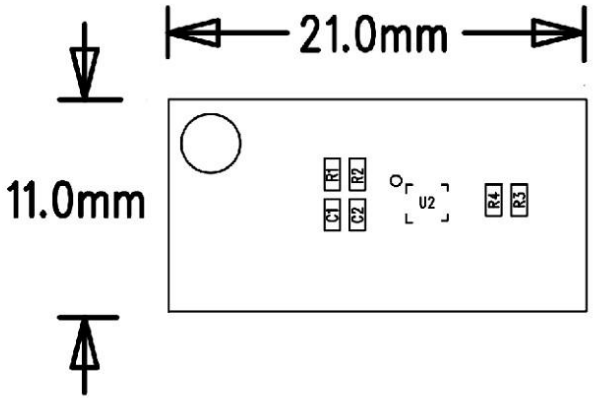
SPL07-003
压力传感器应用指引
Barometer Sensor Application Guideline

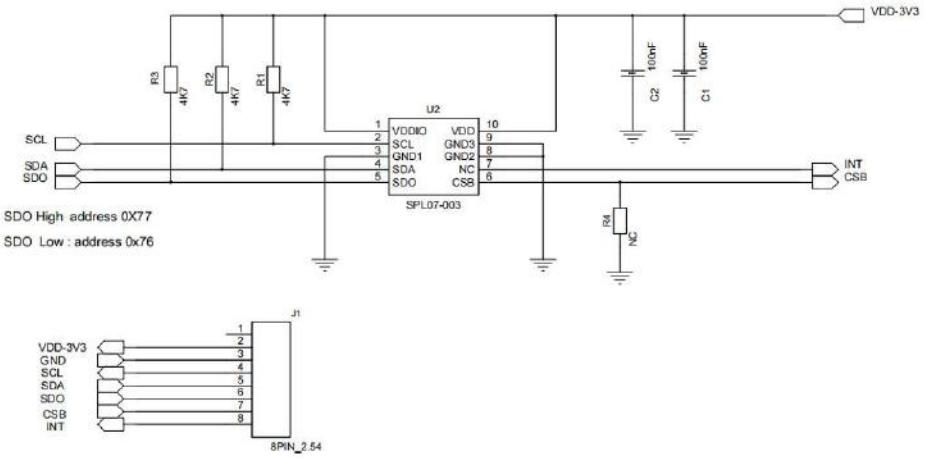
修 改 记 录 Publication history			
版次 Version	修改日期 Date	作者 Author	修改内容 Description
V1.0	2021.12.12	Richie.liu	Release

1. SPL07-003 大气压传感器模块外观 Appearance of module





2. 原理图 Schematic

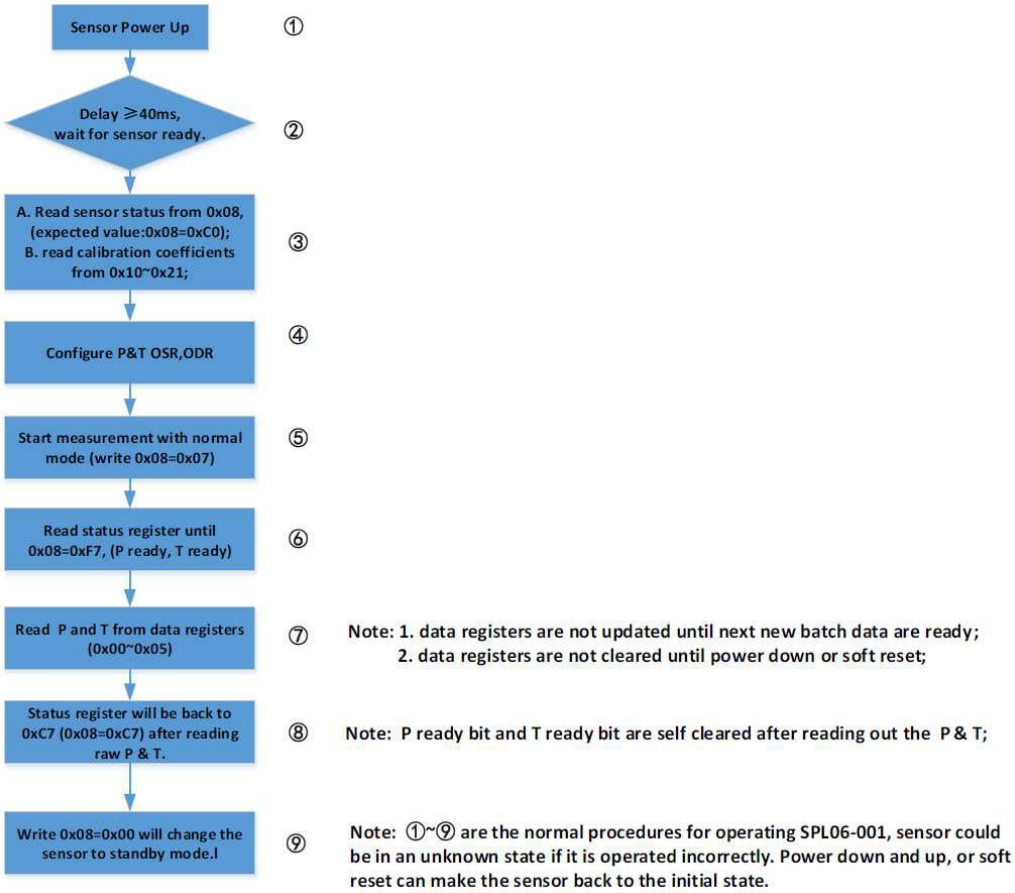


3. 相关参数讲解 Applications

3. 1 引脚 Module Pin configuration

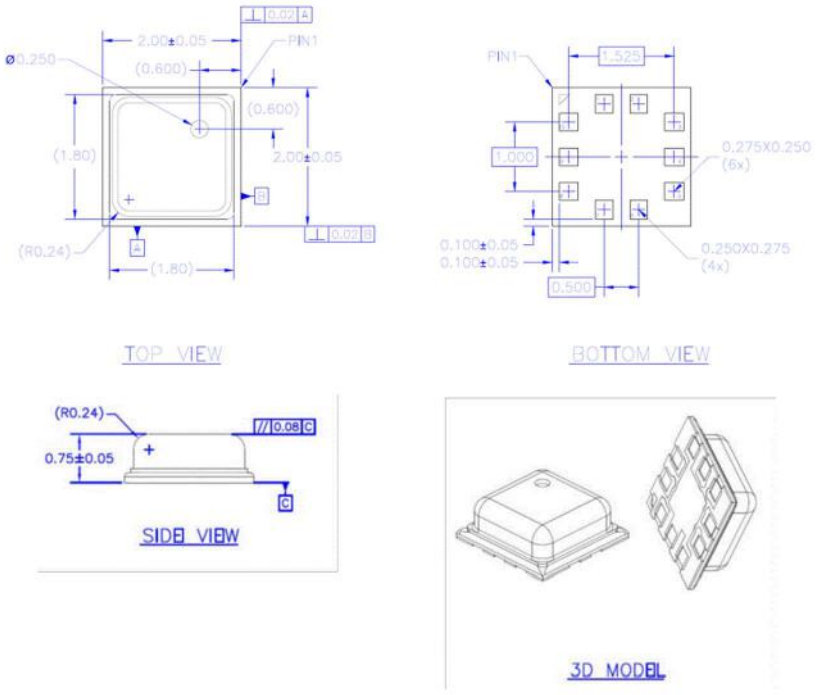
Pin	Name	SPI 3-wire	SPI 3-wire with interrupt	SPI 4-wire	I2C	I2C with interrupt	Note
1	NC	Not connected					
2	VCC	VDD and VDDIO combined, 1.7 to 3.6 volt is accepted.					
3	GND	Ground					
4	SCL	Serial Clock					
5	SDA	Serial data in/out	Serial data in/out	Serial data in	Serial data in/out	Serial data in/out	
6	SDO	Not used	Interrupt	Serial data out	Least significant bit in the device address	Interrupt pin and least significant bit in the device address	
7	CSB	Chip select – active low	Chip select – active low	Chip select – active low	Not used- open(internal pull-up) or Tie to VDDIO	Not used- open(internal pull-up) or Tie to VDDIO	
8	INT	Reserved for other chip					

3. 2 测量的基本流程 SPL07-003 Test Logic for reference

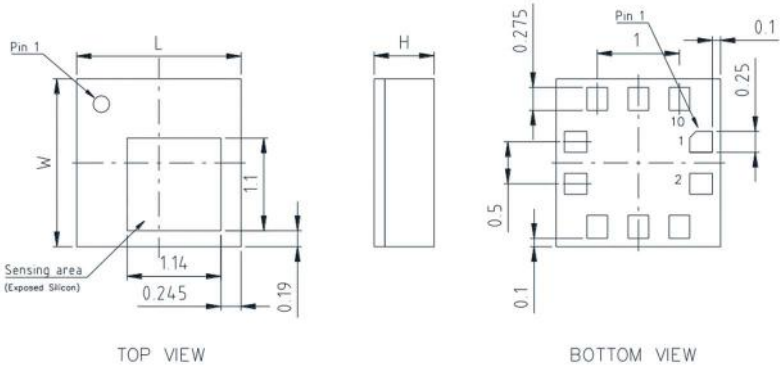


3.3 不同公司的型号介绍 Introduction others chip

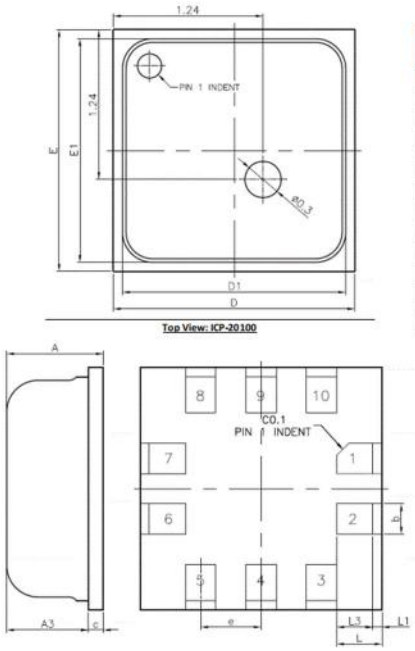
3.3.1 Manufacturer: BOSCH, Manufacturer code:BMP380/390
Package: LGA10 2.0x2.0x0.75mm
Outline dimensions



3.3.2 Manufacturer: ST, Manufacturer code:LPS22HB
Package: LGA10 2.0x2.0x0.76mm
Outline dimensions



3. 3. 3 Manufacturer: TDK , Manufacturer code:ICP-20100/10100
Package: LGA10 2.0x2.0x0.76mm
Outline dimensions



SYMBOLS	NOM.
A	0.800
A3	0.675
b	0.250
c	0.125
D	2.000
D1	1.850
E	2.000
E1	1.850
e	0.500
L	0.375
L1	0.075
L3	0.300

3. 3. 3 Chip Pin configuration

Code	Pin1	Pin2	Pin3	Pin4	Pin5	Pin6	Pin7	Pin8	Pin9	Pin10	Note
SPL07-003	VDDIO	SCL	GND	SDA	SDO	CSB	NC	GND	GND	VDD	
BMP380/390	VDDIO	SCL	VSS	SDI	SDO	CSB	INT	VSS	VSS	VDD	
LPS22HB	VDDIO	SCL/SPC	RES	SDA/SPI	SDO	CS	INT/ DRDY	GND	GND	VDD	
ICP-20100/10100	VDDIO	SCL	GND	SDA	VDD	VDDIO /GND	INT	GND	GND	VDDIO	

3. 3. 4 Hardware Design Note

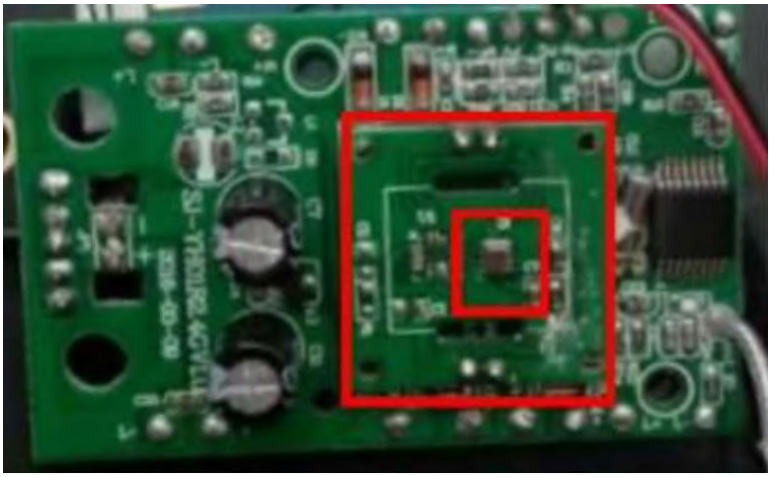
The module PCB and Schematic is compatible. If use different chip on the PCB , need to change the parameter included resistant and capacitor according to each datasheet .

For more detail information, please refer to the specification sheet.

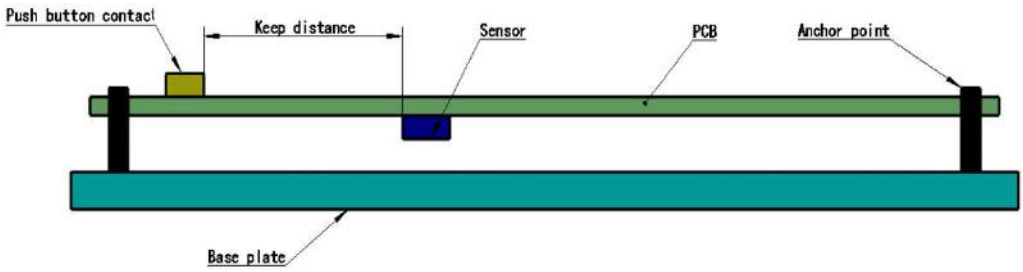
4. 设计和贴片指导 Design and SMT recommendation

4.1 设计建议 Design suggestion

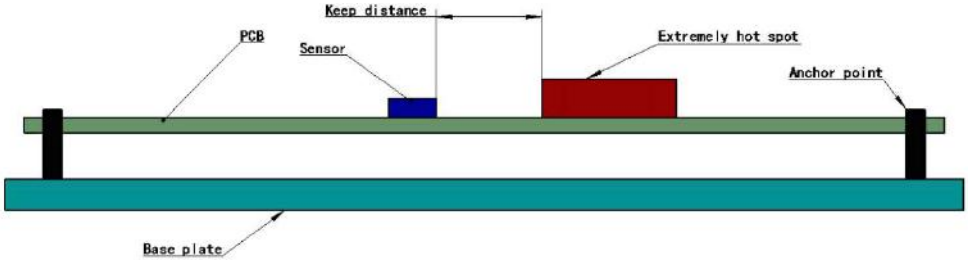
a) 气压计单独小板设计，选用 SMT 工艺稳定的贴片厂；
Barometer sensor using specific designed board, we suggest to choose a factory which has much stable SMT process.



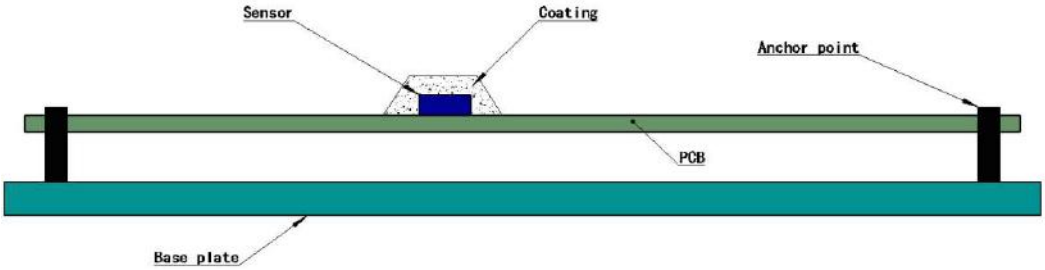
b) 气压计设计在远离应力集中区域；
Barometer sensor should be designed away from stress concentration area.



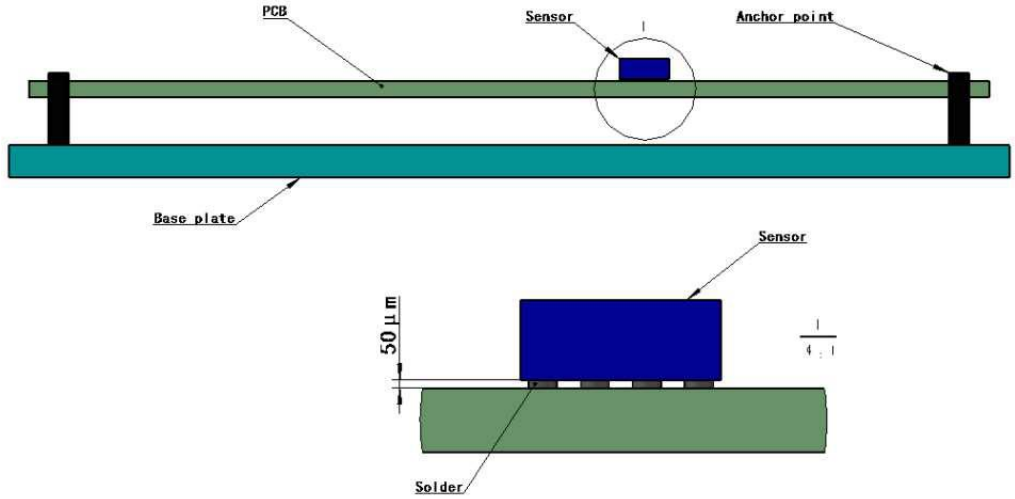
c) 气压计远离热源器件（包括 PCB 双面）；
Barometer sensor should be designed away from heat-source devices on both sides of PCB.



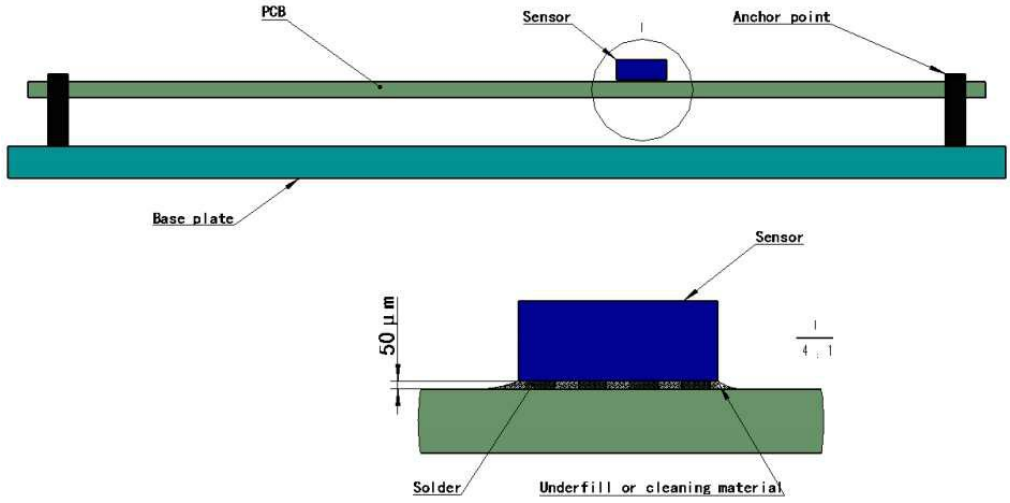
d) 产品不能被非透气材料包附；
Barometer sensor should not be covered by non- ventilate material.



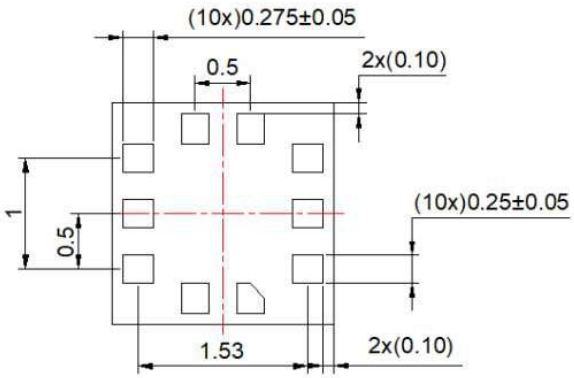
e) 锡球高度≥50um 以上(建议网板厚度 0.1mm)
Solder joint height should ≥50um, recommended stencil thickness is 0.1mm.



f) 产品 PCB 底部不能有填充物（同时注意非设计原因导致的底部有填充物）
There should be no filler under sensor PCB (Both designed and non-designed filler are rejected).



g) PCB layout 设计建议如下图。layout 开窗较大会增加锡量，从而增加锡膏 挥发的风险 （其中若贴片精度较差可适当增加开窗尺寸）。
Recommended PCB layout was as below.



4.2 过程控制建议 Process control recommendation

a) 产品在使用中要求进行防水、防尘、防腐蚀；若使用条件比较复杂，建议使 用防尘网进行保护；
The barometer sensor should away from liquid, dust or corrosion, if the using condition is complicated, we recommend to use dustproof net.
b) 如果存在产品返修的情况，禁止使用热风枪进行焊接；建议使用点锡膏过回流的方式；
Can’t use heat gun to rework the barometer, recommend to use reflow method to rework it.



c) 含气压计的部分不建议使用喷阻焊剂浸锡炉的方式焊接（即使器件表面有防护）；
We don’t recommend to use flux-spray resistance welding stove to solder barometer contain devise, even there is protection on surface.

d) 在接插件焊接过程中注意气压计的防护，不要直接用手触摸器件，以及防止焊锡落入器件内部。
Pay attention to protect the barometer during connector welding process. Don't touch device directly. Prevent solder from falling into the device

4.3 锡膏的使用说明 Handling guide of solder tin

a) 焊锡膏中金属含量通常在（90±0.5）%，金属含量过低会导致助焊剂成分过多，因此过多的助焊剂会因预热阶段不易挥发而引起飞珠。
General metallic content is (90±0.5) %. Too low metallic content means too much flux inside, which will make the tin easily splash during pre-heating.
b) 焊锡膏中水蒸气和氧含量增加也会引起飞珠；由于焊锡膏通常冷藏，当从冰箱中取出时，如果没有确保恢复时间，将会导致水蒸气进入；此外焊锡膏瓶盖子每次使用后要盖紧，若 没有及时盖严，也会导致水蒸气的进入。
Too much vapor or oxygen will also make the tin splashing. Too short recovering time after take the tin out of fridge or not tighten the cover after use will make vapor go into solder tin.
c) 放在模板上印制的焊锡膏在完工后，剩余的部分应另行处理；若再放回原来瓶中，会引起瓶中焊锡膏变质，也会产生锡珠。
Cannot put the residual tin back to the origin bottle, it will make the tin metamorphism, which will cause solder ball during soldering.

管控内容/Item	参数/Parameter	备注/Remark
锡膏的保存温度/ Storage temperature	0℃~10℃	具体参数根据锡膏规格书调整 The specific parameters will be adjusted according to the solder tin specification
室温回温时间 Recovering time at RT	≥4h	
使用时间限制/Using time	≤168h	

4.4 贴片厂注意事项 Note for device SMT

a) 定期清理回流炉，防止回流炉内异物进入产品内部；
Clean the reflow oven regularly to avoid foreign particles go into Sensor product.
b) 每天测试回流炉内实际温度；
Check the actual reflow temperature daily.
c) 返修气压计产品及其周围器件严禁使用热风枪；
Cannot using heating gun to rework Sensor or its surrounding devices.
d) 严禁对气压计进行清洗或液体擦拭，即使对其周围器件清洗或液体擦拭过程 中也要注意不能有液体进入气压计内部；
Cannot cleaning or wipe barometer sensor using liquid. Cannot let the liquid go into barometer sensor when cleaning or wiping its surrounding devices using liquid.
e) 按锡膏的使用说明使用锡膏；

Use the solder paste according to its instructions.
f) SMT 贴片后气泡面积应≤25%Pad 面积（X-ray 下观察）。
Bubble area should be lower than 25% Pad area (Check using X-Ray).
g) SMT 回流曲线最高温度≤260℃ (20~40s).
SMT reflow peak temperature should ≤260℃(20~40s).

5. 应用 Applications

5.1 GPS 导航增强，智能手机、手表
Enhancement of GPS navigation, e.g. smartphone
5.2 室内导航（室内检测、电梯检测）
Indoor navigation (floor detection , elevator detection)
5.3 户外导航，休闲和运动应用
Outdoor navigation,leisure and sports applications
5.4 天气预报
Weather forecast
5.5 健康保健应用（如血压测量）
Health care applications(e.g.blood pressure monitoring)
5.6 垂直速度指示（如上升/下沉速度），无人机，飞行玩具
Vertical velocity indication,e.g.UAV,flying toy