对于任何细节和问题，请告诉我们
For any details and enquiry, please contact TENERG；Tel: 0755-33231651/33231653,Fax:0755-33231686

TENERG SPECIFICATION APPROVAL SHEET
TENERG产品承认书

Customer Name客户代码: _____

Customer Product Code客户产品料号: 4334030440

Product Model产品型号: TE-PL802036

Product Spec产品规格: 500mAh 3.7V

Product Code产品编码: _____

Prepared by制作	Checked by审核	Approved by批准
黄诗东	李沛东	尹鸿

Approved by customer 客户承认 (Stamp) (盖章)	Tested by测试	Checked by审核	Approved by批准

深圳市泰量电子有限公司
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Address:Room 638,Hengrun building,No.58,MinzhiRoad,Longhua district, Shenzhen City
Tel(联系电话): 18682005959 web（网址）：www.tenerg.com
东莞市泰量能源科技有限公司
工厂地址：东莞市常平镇桥梓村桥梓路6号
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Revision History

版本履历表

Revision No.版本号	Description 内容描述	Approval 审批人	Date 日期
T0	初版	李沛东	2024/7/1

Contents目录

1. Scope概述

The specification shall be applied to Rechargeable Lithium-ion battery which is manufactured by Shen Zhen TENERG Electronics Co., LTD, which is the basis for product design, production and inspection, and its purpose is to let the customer know the quality standard and the instruction.

本产品承认书描述深圳市泰量电子有限公司设计制造的可充电锂离子电池，它是产品设计、生产和检验的依据。其作用是让客户了解产品的质量标准及正确使用方法。

1.1 Cell 电芯

Basic manufactured unit providing a source of electrical energy by direct conversion of chemical energy, that consists of electrodes, separators, electrolyte, container and terminals,and that is designed to be charged electrically.

电芯是直接将化学能量转化为电能的基本可制造的单元，其由电极，隔膜，电解液，电池壳和极耳组成，并且可以进行充电。

1.2 Battery 电池

Assembly of secondary cell(s) which may include associated safety and control circuits and case, ready for use as a source of electrical energy characterized by its voltage, size, terminal arrangement, capacity and rate capability

电池是将电芯进行组装，还包括安全保护电路，壳体，并且可以作为电源使用，这个电源是有电压，尺寸，端子排列，容量和倍率性能.

1.3 Reference standard参考标准

GB 31241-2022 携式电子产品用锂离子电池和电池组 安全要求

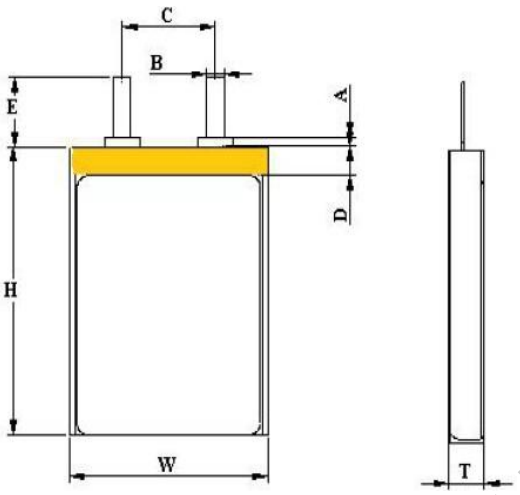
2. Product basic information 产品基本信息

No. 序号	Items 项目	Specifications 规格
1	Minimum capacity 最小容量	500mAh (The 0.2C discharging capacity ≥ 500mAh) (0.2C 放电容量 ≥ 500mAh)
2	Typical capacity 典型容量	500mAh (The 0.2C discharging capacity ≥ 500mAh) (0.2C 放电容量 ≥ 500mAh)
3	Nominal voltage标称电压	3.7V
4	Charge voltage充电电压	4.2V
5	Design scheme设计方案	G3J+8205+NTC
6	Charge充电	andard charging current / Voltage /Limited time/标准充电电流/电压/限 0.5C / 4.2V / 3 H Rapid charging current / Voltage / Limited time/快速充电电流/电压/限 2C / 4.2V / 1 H 温度temperature | 建议电流限制 Suggest Current limit 0 ℃~ 10 ℃ | max 0.5C (250 mA 0.02 C_5A cut-off) 10 ℃~ 45 ℃ | max 2C (1000 mA 0.02 C_5A cut-off) ℃~ ℃ | max
7	Discharge 放电	Standard discharging current / Voltage / Limited time/标准放电电流/电压/限时 0.2C / 3V / 5 H Rapid discharging current / Voltage / Limited time /快速放电电流/电压/限时: 2C / 3V / 1 H 温度temperature | 建议电流限制 Suggest Current limit -20 ℃~ 0 ℃ | max 0.2C (100 mA) 0 ℃~ 60 ℃ | max 2C (1000 mA)
8	Battery impedance电池内阻	170mΩ
9	Shipment voltage出货电压	3.8-4.0V
10	Operating temperature 工作环境温度	Charging/ 充电温度: 0 ℃~ 45 ℃ Discharging/放电温度: -20 ℃~ 60 ℃
11	Storage temperature 储存温度	时间 time | 温度 temperature | 保持容量capacity hold Less than 1 month/一个月 | -10°C ~+ 55°C | ≥80% Less than 6 month/ 六个月 | -10°C ~ +45°C | ≥60% Less than 12 month/十二个月 | -10°C ~ +25°C | ≥50%
12	Cell weight电芯重量	approximate : 10g
13	Visual Inspection 外观	There should not be any remarkable scratches, cracks,bolts,cauterization, deformations, swelling, and leakage and so on the surface of the cell. 禁止出现诸如撕裂、腐蚀、变形、气鼓、漏液等损害商业价值的不良现象。

3. Battery Drawing 电池尺寸

3.1 cell 电芯

Cell drawing(电芯图纸)



Dimension(尺寸)

Item	Description	Dimension
T	Thickness（厚度）	max 8mm
W	Width （宽度）	max 20mm
H	Height（高度）	max 35mm
C	Tab Center distance Tab	8±1.5mm
B	Anode Tab Width (极耳宽度)	2mm
E	Tabs Length (极耳长度 ）不含胶	6±1.5mm

背面喷码：

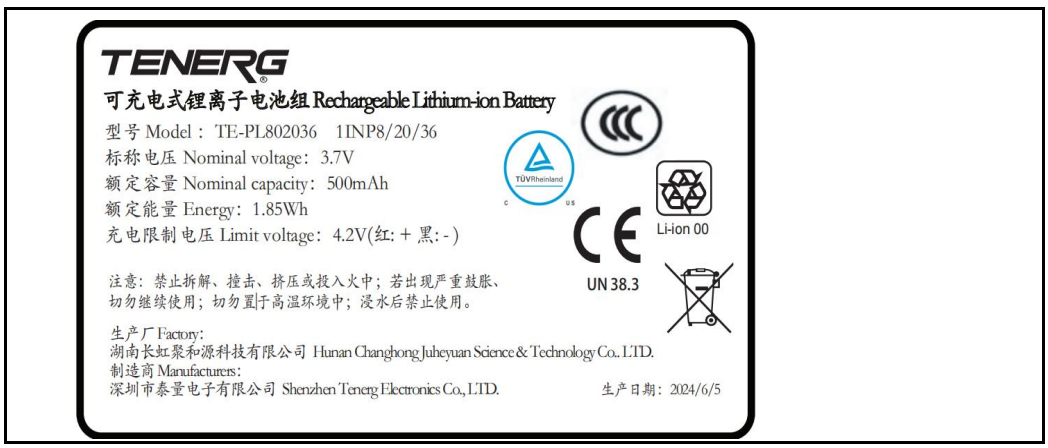
H013
3040
01234

实例释义：H01为工艺代码，3为2023年份尾数，30为周数，4为星期，001234为流水号

Remark(备注):
When measuring the battery size with the vernier caliper, use the vernier caliper to clip the battery without dropping it.
游标卡尺测量电池尺寸时，用游标卡尺的量爪夹住电池不掉下即可。

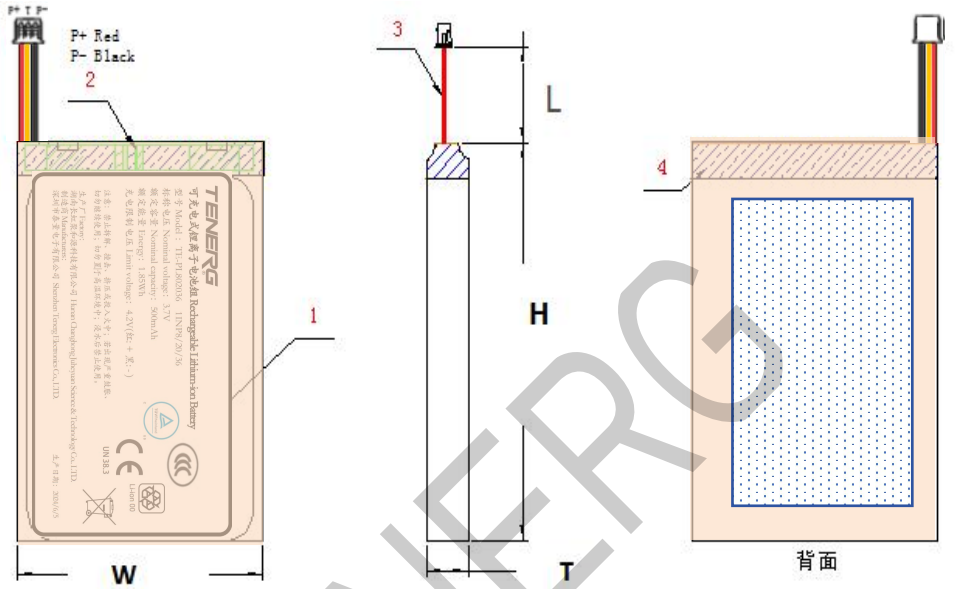
3.2 Battery Outline Drawing 电池外形

3.2.1 标签 Mark



3.2.2 尺寸 Size

成品尺寸 PACK dimension	厚度（T）不含胶	宽度（W）	高度（H）	线长（L）	端子线	others
	Max 8mm	Max 20mm	Max 38mm	30±3mm	PH-3PIN红黄黑正向UL3302-24AWG	背贴0.1*12*28mm双面胶 全包茶色高温胶 防火V0级



4.performance testing性能测试

4.1 Standard environmental test condition 标准环境测试条件

Unless otherwise specified, all tests stated in this Product Specification are conducted at below
除非有其他规格说明,所有测试条件都遵循以下规格:
Temperature/温度: 26 ± 2°C
Humidity/湿度: 65 ± 20% RH
Atmospheric pressure/大气压力： 86~106KPa

4.2 Measuring Instrument Apparatus 测量器具及设备

4.2.1 DimensionMeasuringInstrument（尺寸测量器具）

Thedimensionmeasurementshallbeimplementedbyinstrumentswithequalormoreprecisionscale
尺寸测量器具的精度等级应不小于0.01mm。

4.2.2 Voltmeter（伏特计）

Standardclassspecifiedinthenationalstandardormoresensitiveclasshavinginnerimpedance
按照国家标准指定规格等级或采用灵敏度更高的，测量电压时内阻不应小于10kΩ/V。

4.2.3 Ammeter（安培计）

Standardclassspecifiedinthenationalstandardormoresensitiveclass.Total external resistance includingammeterandwireislessthan0.01Ω.

4.2.4 ImpedanceMeter（电阻计）

Impedanceshallbemeasuredbyasinusoidalalternatingcurrentmethod(1kHzLCRmeter).
内阻测试仪测量原理应为交流阻抗法（1kHzLCR）。

4.3 Electrical characteristics 电性能

No.	Items 项目	Test Method and Condition 测试方法和条件	Criteria 标准
1	Standard Charge 标准充电	Charging the battery initially with constant current 0.2 , after battery voltage reach to 4.2 then Charge with constant voltage at 4.2 till charge current declines to 0.02C. 0.2 恒流充电,在电压达到 4.2 后,以 4.2 恒压充电直到充电电流小于 0.02C 。	N.A
2	Standard discharge 标准放电	Discharge current 0.2 C for continuous discharge, when the voltage drops to discharge cut-off voltage 3.0V 以放电电流 0.2 C 进行持续放电，使电压降至放电截止电压 3.0V 。	N.A
3	Minimum Capacity 初始（最小）容量	The capacity means the discharge capacity of the battery, which is measured with discharge current 0.2 wit 3V cut-off voltage the standard charge. 即标准充电后 0.2 恒流放电,截止电 3V 时放出的容量.	≥ 500mAh
4	Cycle Life 循环寿命	Step1: 0.2 charged to 4.2 ,0.02C cut-off current 第 1 0.2 充电至 4.2 ，截止电流 0.02C Step 2: Standby 30min; 第 2 步:静置 30 分钟 Step3: Discharge the battery 0.2 to 3V . 第 3 0.2 放电至 3V . Step 4: Standby 30min; 第 4 步: 静置 30 分钟; Step5: Repeat above steps continuously till discharging capacity higher than 80% of the Initial capacities of the Cells 第 5 步:重复以上步骤,直到放电容量是初始容量的80%.	300 cycles Thickness≤10%
5	Retention Capability 荷电保持能力	After full charging, storing the battery 28 days with20±5°C condition, and then discharge with discharge current of 0.2C till 3.0V cut-off voltage电池满充电后，在20±5℃的环境条件下存放28天，然后以0.2C电流连续放电至3.0V终止电压	Residual capacity >80% 残留容量>80%

4. 4 Condition adapting characteristics环境适应性

No.	Items 项目	Test Method and Condition 测试方法和条件	Criteria 标准
1	Constant temperature And Humidity 恒定湿热	After standard charging,put cell into the box that the temperature is 40±2℃ and the humidity ranges between90%-95%for 48hours. Then put it at23±2℃For 2 hours,then discharge with current of 0.2C to the cut-off voltage. 满充电后将电芯放入40℃±2℃及相对湿度为90～95%的恒温恒湿箱中48小时后，取出在23±2℃环境下搁置2h再以0.2C电流放电至3.0V。	No distortion,no rust,no venting,no fire,no explosion , discharge time is notless than 3hrs. 不变形、不泄漏、不起火、不爆炸、放电时间不低于3h 。

2	Discharge at low Temperature 低温放电	After standard charging, laying the Cells 16h at -20±2℃, then discharging at 0.2C to ending voltage, recording the discharging time. 电池标准充电后，在-20±2℃恒温环境放置 16 小时，采用 0.2C的电流放完电，记录放电时间。	≥180min
3	Discharge at High Temperature 高温放电	After standard charging, laying the Cells 2h at 55±2℃, then discharging at 0.2C to ending voltage, recording the discharging time. 电池标准充电后，在 55±2℃恒温环境放置 2 小时，采用 0.2C 的电流放完电，记录放电时间。	≥240min

4.5 Safety performance 安全性能

1	Over charge 过充电	Discharge:0.2C to 3.0V Charging: 1C to 4.6V Stop the test when The surface temperature of the cell decays to about 20% form the summit or continuous charging time up to 1 hours. 放电：0.2C 放电至 3.0V 充电：1C 充电至 4.6V 电芯表面温度比峰值低约 20%，或者持续充电时间达到 1小时后停止测试	No explosion, no fire. 不爆炸,不起火
2	Over discharge 过放电	Cell is discharge data current of 1C rate for 2.5hours.(If current stops by safety or passive circuiton the cell,test is finished.) 用1C的电流放电2.5小时（如果电芯由于安全保护启动致电芯放电停止，则测试完成）。	No explosion, no fire. 不爆炸,不起火
3	Short-circuit 短路	After Standard Charging ,Short circuit the positive and negative, and the resistance or copper wire is not more than 80±20mΩ, Stop the test when the surface temperature of the cell decays to about 20% from the maximum or short time reaches 24 hours. 电池标准充电后,使用内阻 80±20mΩ 的导线将电池正负极连接,当电芯表面温度比峰值低约 20%,或者短接时间达到 24 小时后停止测试。	No explosion, no fire. 不爆炸,不起火
4	Heat shock 热冲击	After fully charged, heat up the standard charged battery at heating rate 5℃ per minute up to 130℃ and keep the battery in oven for 10 minutes. 电池标准充电后,将电池放入烘箱中,以 5℃每分钟的速率 升温至 130℃,并保持 10 分钟.	No explosion, no fire. 不爆炸,不起火
5	Drop 跌落测试	The battery to be fully charged in accordance with standard charge condition, then drop the battery three times from a height of 1,2 m onto a concrete floor. The batteries are dropped so as to obtain impacts in random orientations. 电池按照标准充电条件充满电，然后从 1.2m 高度跌落电池到混土地板，随机跌落三次。	No explosion, no fire. 不爆炸,不起火

5.Long time Storage 长期储存

If the battery is stored for a long time, the battery’ s storage voltage should be 3.9~4.0V
电芯长期存放的存储电压应在 3.9~4.0V.
Please activate the battery once every 3 months according to the standard charge and discharge cycle.
请每隔 3 个月按标准充电放电循环激活电池一次。
20±5℃ is the recommended storage temperature
建议的存储温度为20±5℃

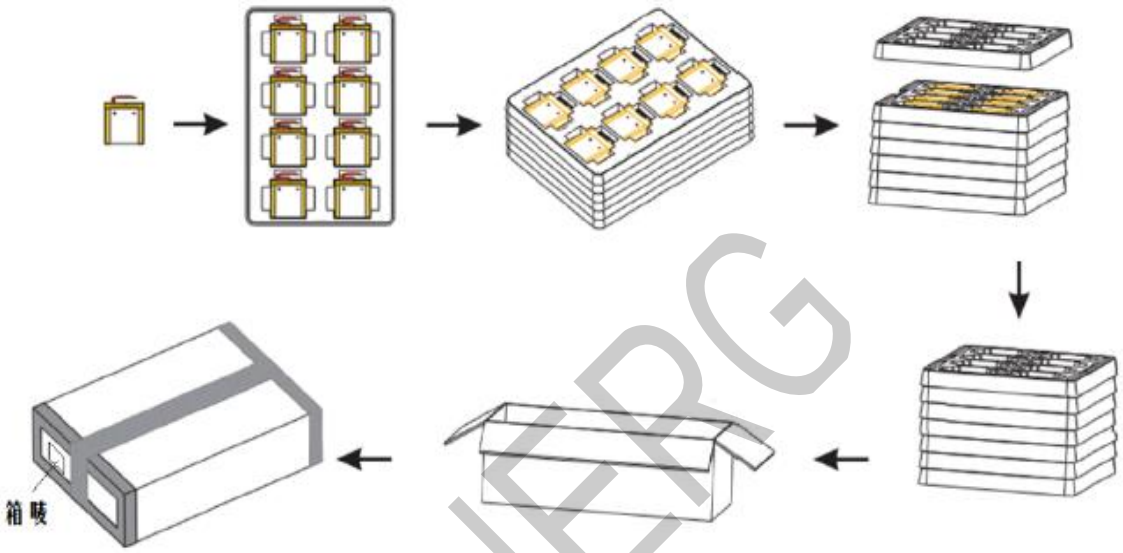
6.Product Cautionary Statement and Disclosure 产品警示声明

Thank you for purchasing from TENERG. Please review the following terms for the correct handing procedures before using the product. Keep this paper for future reference.
感谢您选择泰量，在产品使用之前,请认真阅读下列正确操作步骤, 并保存这份文件以日后备参考.
Important! Use the battery for the specified purpose only. If ignored or incorrectly followed, could lead to explosion or toxic gas leakage, and cause burn injury even death.
非常重要！电池只能用于指定用途。不正确使用操作，可能会导致爆炸或有毒气体泄漏，并引起烧伤甚至死亡。

⊙Place the battery out of the reach of children and infants.
请将电池放置在儿童接触不到的地方。
⊙Do not place the battery in grand-pro ovens or other similar appliances.
不要将电池放在烤箱或其他类似设备
⊙Do not remove the product label.
不要移除电池标贴
⊙Do not attempt to open or service the battery pack.
不要尝试拆解电池包。
⊙Do not expose to temperatures above 60℃ .
不要将电池暴露在 60℃以上温度环境中。
⊙Do not short-circuit the positive and negative terminals of the battery with wire or other metallic objects. Do not transport or store the battery with metallic items.
不要使用电线或其他金属物品直接将电池正负极短路,不要将电池和其他金属物品一起运输或储藏.
⊙Do not expose the battery to direct heat or flame, and do not use or store it near a fire or a location, subject to high temperatures. In addition, do not immerse or dampen the battery in water, saltwater, or any other liquid.
请勿让电池直接暴露在高温或火焰中,不要使用或储存在火旁边。 此外不要让电池浸入水、盐水或其他液体中。
⊙Do not puncture the battery with any sharp objects, hit it with a hammering device or similar device, step on it, drop it or subject it to strong shock.
不要用任何尖锐物品穿刺电池，或用锤子或相似设备敲打电池,或踩踏电池,或将之强烈振动.
⊙Do not use battery if it is damaged or deformed.
当电池被破坏时,请不要再使用。
⊙Immediately cease use of the battery if it produces strange smells or smokes or becomes abnormally hot.
当电池产生异味、冒烟或异常发热时,请立即终止使用
⊙If the battery fluids leak and come into contact with an eye, do not rub the eye and immediately flush it with plenty of water before seeking medical assistance.
当电池出现漏液情况并与眼睛有接触,请不要擦拭眼睛,在寻求医疗协助前,应立即用大量的水冲洗眼睛。
⊙The period of warranty is one year from the date of shipment. guarantees to give a replacement in case of battery with defects proven due to manufacturing process instead of the customers abuse and misuse.
电池的保质期从出货之日算起为 1 年。如果证明电池的缺陷是在制造过程中形成的而不是由于用户滥用及错误使用造成，本公司负责退换电池。

7.Others 其他

Any matters that this specification does not cover should be conferred between the customer and TENERG.
任何此规格书没有涉及的条件都应在客戶和泰量间协商确定。



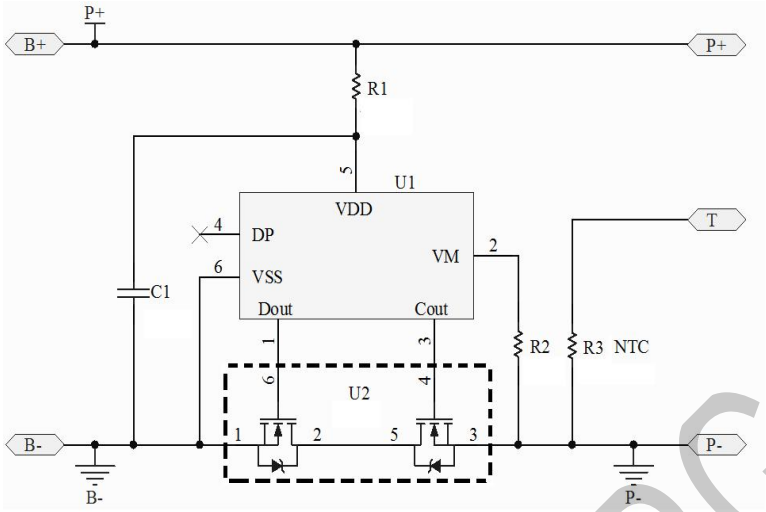
以上图片仅供参考

8.PCM Electric Features 保护板参数

8.1 Performance parameters性能参数

测试项目 Test Item	最小值 Min	典型值 TYP	最大值 Max	单位 Unit
输入电压（B+与B-间） Input voltage(B+ to B-)	1.5	/	6	V
过充保护电压 Over charge detection voltage	4.26	4.28	4.3	V
过充保护恢复电压 Over charge release voltage	4.03	4.08	4.13	V
过充保护延迟时间 Over charge detecion delay	700	1000	1300	ms
充电过流保护电流 Over current protection charging	1	/	3	A
充电过流保护延迟时间 Charging over current protection	5.6	8	10.4	ms
过放保护电压 Over discharge detection voltage	2.95	3	3.05	V
过放保护恢复电压 Over discharge release voltage	2.9	3	3.1	V
过放保护延迟时间 Over discharge release delay	89.6	128	166.4	ms
放电过流保护电流 Over current detection curren	1	/	3	A
放电过流保护延迟时间 Over current detection delay	5.6	8	10.4	ms
正常状态下静态电流 Current consumption (Operation)	1	/	7	uA
空载内阻 Load resistance	/	/	65	mΩ
短路保护延迟时间 Short delay	196	280	364	us
最大工作温度范围 Max operating temperature range	-40	25	85	℃

8.2 Circuit Drawing 电路图



8.3 PCM BOM 保护板主要物料清单

NO. 序号	Material Name (零件名称)	Specification (规格型号)	Position (零件位置)	Qty (用量)	Others 备注
1	PCB	FR4 UL94 V0	/	1	
2	IC	G3J,SOT-23-6	U1	1	
3	MOSFET	8205A , SOT-23-6	U2	1	
4	Chip resistor	470Ω,±5%,1/16W	R1	1	
5	Chip resistor	2KΩ,±5%,1/16W	R2	1	
6	Chip capacitors	0.1uf,10%,X7R,25V	C1	1	
7	NTC	10K B=3435	R3	1	
8					

9．Customer Inquiry 客户要求

9.1. If clientele ratify specification and showpiece, please sign back specification to TENERG in 1 week,
or else blank out it.
如果客户认可本承认书和样品，请于一周内回签本承认书给泰量电子有限公司，过期视为无效。
9.2. The customer is requested to write down your information and contact Shenzhen TENERG Electronics Co., LTD, in advance, if and when the customer needs applications or operating conditions other than those described in this document. Shenzhen TENERG Electronics Co., LTD, could design and build such products according to your special request.
如果客户需要其他方面的说明或工作条件与规格书内容不一致,请客户提前和深圳市泰量电子有限公司联系. 深圳市泰量电子有限公司将按照贵公司特殊要求设计和开发产品.
特殊要求标准:

项目 序号	Special Request 特殊要求	Criteria 标准
1		
2		
3		
4		
5		
6		

Company Name : Signature : Date:

公司名称: 签名: 日期: