

28V12857F Specification for supercapacitors

28V12857F 超级电容器 产品规格书

Revision History

规格书修订记录

Version 版本	Date 日期	Page 页码	Revision 变更内容	Prepared by 编写	Remark 备注
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CONTENTS 目录

1、 Scope 适用范围.....	3
2、 General characteristics 产品通用特性.....	3
2.1 Features and advantages 特点与优势.....	3
2.2 Typical application areas 典型应用领域.....	3
3、 Main components,appearance,and dimensions 主要部件、外观尺寸	4
3.1 Main components 主要部件	4
3.2 Appearance 外观	5
3.3 Dimensions 尺寸	5
4、 Specification 主要技术参数.....	6
5、 Product Circuit 产品电路	7
5.1 Circuit Diagram 电路原理图.....	7
5.2 Capacitor management system parameters 电容管理系统参数	8
6、 Product performance testing 产品性能测试.....	8
6.1 Test conditions 测试条件.....	8
6.2 According to standards 依据标准.....	9
6.3 Reliability and safety testing methods and requirements 可靠性、安全性测试方法及要求	9
7、 Notice 使用注意事项	11
8、 Storage 储存	11

1、Scope 适用范围

This specification describes the characteristics, appearance, dimensions, performance, test methods and precautions of the supercapacitor (28V_12857F_7S6P_MAA007061288DB1) developed by Shenzhen Tsingyan Energy Storage Co., Ltd.

本规格书对深圳市清研储能技术有限公司开发的28V_12857F_7S6P_MAA007061288DB1 超级电容器的特性、外观、尺寸、性能、测试方法、及注意事项进行了说明。

2、General characteristics 产品通用特性

2.1 Features and advantages 特点与优势

- ❖ High energy density 高能量密度
- ❖ High power density 高功率密度
- ❖ Ultra-low internal resistance 超低内阻
- ❖ Ultra Long Cycle Life 超长循环寿命
- ❖ Green and environmentally friendly 绿色环保
- ❖ Good safety performance 安全性能好
- ❖ Wide operating temperature range 工作温度范围宽

2.2 Typical application areas 典型应用领域

- ❖ Low temperature emergency starting power supply 低温应急启动电源
- ❖ Low speed autonomous vehicle 低速无人驾驶车辆
- ❖ Mobile robot 移动机器人AGV

- ❖ Logistics vehicle, electric bicycle 物流车, 电动自行车
- ❖ Uninterruptable Power Supply 后备电源
- ❖ Energy storage system 储能系统
- ❖ Dynamic Voltage Restorer (DVR) 动态电压恢复器 (DVR)
- ❖ Primary frequency regulation 一次调频

3、Main components, appearance, and dimensions 主要部件、外观尺寸

3.1 Main components 主要部件

Table 1 Main Components
表 1 主要部件

NO. 序号	Items 项目	Specification 规格	Quantity 数量	Remark 备注
1	Cell 单体电容	HESC 4.2V/15000F	42PCS	
2	Main board 主板	BMS board BMS 板	1PCS	
3	Charging terminal 充电端子	FE25A02WB-14Z	1PCS	
4	Discharge terminal 放电端子	FHV201291CN-UM81Z	1PCS	
5	Display 显示屏	9G-21024-Z084H	1PCS	
6	按钮	MPB16BF-11Z/S	1PCS	
7	Housing 外壳	330×291×181mm	1PCS	

3.2 Appearance 外观



Figure 1 Appearance
图 1 外观

3.3 Dimensions 尺寸

单位: mm

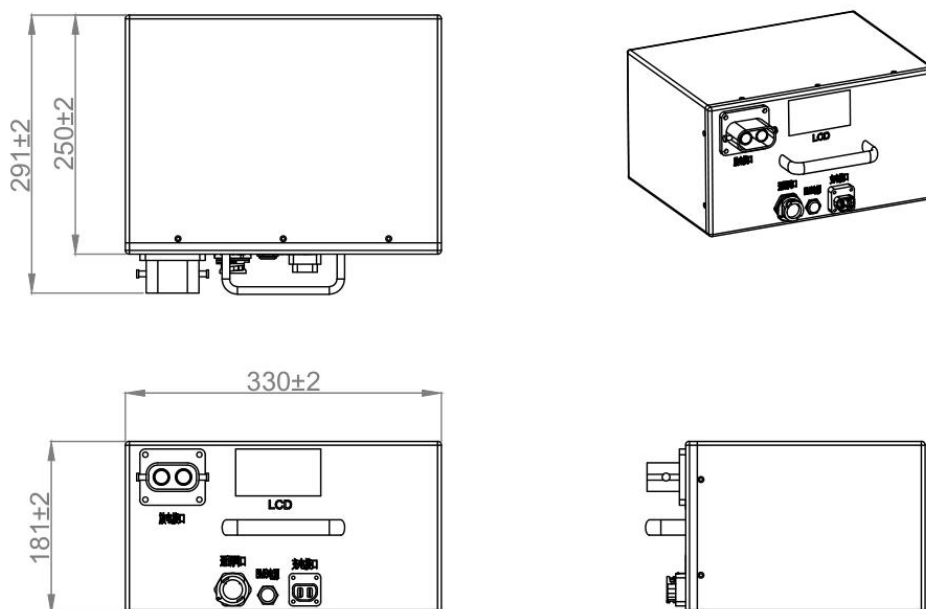


Figure 2 Dimensions
图 2 尺寸

4、Specification 主要技术参数

Table2 Specification

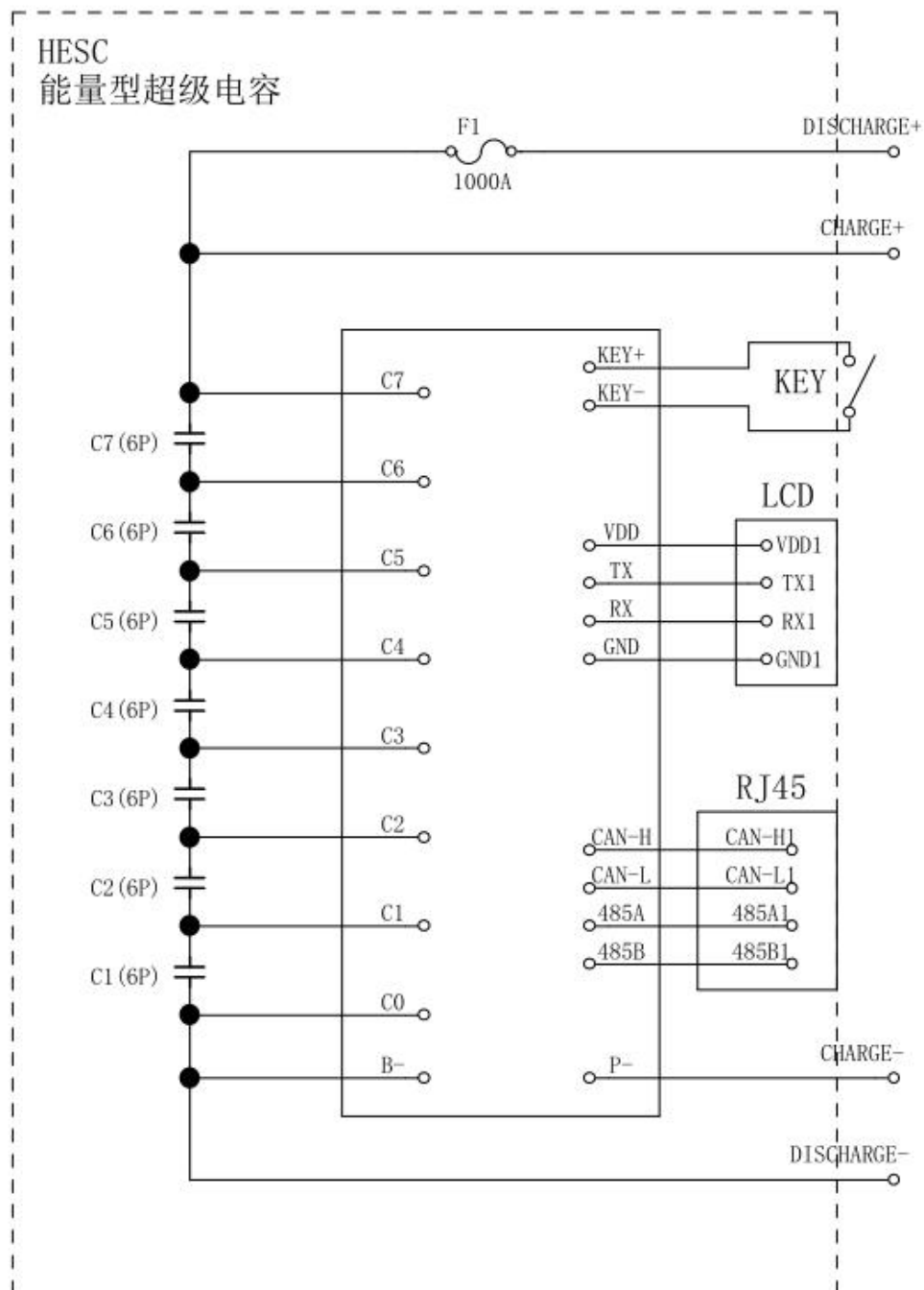
表 2 主要技术参数

NO. 序号	Items 项目	Specification 规格
1	Electrostatic capacity 静电容量	12857F/42Ah
2	Nominal capacity 标称电量	≥42Ah (17.5-29.4V)
3	Module composition 模组构成	HESC 4.2V/15000F 7S6P
4	Nominal voltage 标称电压	28V
5	Surge voltage 浪涌电压	29.4V
6	Minimum working voltage 最低电压	17.5V
7	Internal AC Resistance 交流内阻	≤2.5mΩ@25°C
8	Internal DC Resistance 直流内阻	≤3.8mΩ@25°C
9	Energy capacity(Fully Charged) 最大存储能量	984.9Wh
10	Standard charging and discharging current 标准充放电电流	40A
11	Maximum discharge current 最大放电电流	1000A/10S
12	Storage voltage Range 储存电压范围	23.52V (±2%)
13	Cycle life 循环寿命	50000 times 50000 次
14	Operation temperature 工作温度	-40°C~65°C
15	Storage temperature 贮存温度	-20°C~45°C
16	Communication Interface 通讯接口	RS485/CAN

17	Communication Protocol 通讯协议	Modbus RTU
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5、Product Circuit 产品电路

5.1 Circuit Diagram 电路原理图



5.2 Capacitor management system parameters 电容管理系统参数

Table3 BMS Specification

表 3 BMS 技术参数

No. 序号	Items 项目	Conditions 条件	Parameters 参数	Tolerance 精度	Units 单位
1	Balancing Start Voltage 均衡开启电压	Cell Voltage 单体电压	4.125	± 0.025	V
2	Balancing Stop Voltage 均衡关闭电压	Cell Voltage 单体电压	< 4.125		V
3	Balancing Current 均衡电流		45	± 35	mA
4	Over Charge Protection 过充保护	Cell Voltage 单体电压	4.25	± 0.05	V
5	Over Discharge Protection 过放保护	Cell Voltage 单体电压	2.50	± 0.1	V
6	Temperature protection 温度保护	Module 模组	65	± 2	$^{\circ}\text{C}$

6、Product performance testing 产品性能测试

6.1 Test conditions 测试条件

Standard test conditions for this product specification:

Temperature: $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$, relative humidity: 25%~85%, atmospheric pressure: 86KPa~106 KPa.

本产品规格书标准测试条件为：

温度： $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 、相对湿度： 25%~85%、大气压力： 86KPa~106 KPa。

6.2 According to standards 依据标准

QC/T741—2017	《车用超级电容器》
GB/T36276—2018	《电力储能用锂离子电池》
GB/T34870.1—2017	《超级电容器》
GB/T 31485-2015	《电动汽车用动力蓄电池安全要求及试验方法》

6.3 Reliability and safety testing methods and requirements 可靠性、安全性测试方法及要求

Table4 test method

表 4 测试方法

No. 序号	Items 项目	Testing methods 测试方法	Testing requirements 测试要求
1	Standard charging method 标准充电方式	Under normal temperature conditions, charge at a constant current of 40A. When the product voltage reaches the charging limit voltage of 29.4V, switch to constant voltage charging until the charging current is less than 300mA and stop charging. 在常温条件下, 以 40A 恒流充电, 当产品电压达到充电限制电压 29.4V 时, 改为恒压充电, 直到充电电流小于 300mA 停止充电。	/
2	Standard discharge method 标准放电方式	Under normal temperature conditions, discharge at a constant current of 40A. When the product voltage reaches the discharge limit voltage of 17.5V, stop discharging. 在常温条件下, 以 40A 恒流放电, 当产品电压达到放电限制电压 17.5V 时, 停止放电。	/
3	Rated capacity 额定容量	The product is charged to the rated voltage of 29.4V according to the standard charging method. 产品按标准充电方式充至电压 29.4V。 Leave for 10 minutes. 2. 搁置 10min。 3. The product is discharged to the limit voltage of 17.5V according to the standard discharge method.	The product capacity should not be less than 80% 产品容量应不低于 80%

		3. 产品按标准放电方式放电至限制电压 17.5V。	
4	Internal resistance 内阻	AC internal resistance testing instrument testing, accuracy:0.01mΩ 交流内阻测试仪测试, 精度: 0.01mΩ	$\leq 2.5\text{m}\Omega$
5	High temperature discharge 高温放电	The product is charged to the rated voltage of 29.4V according to the standard charging method. 产品按标准充电方式充电至额定电压 29.4V。 Place the product in a high-temperature oven at $60\pm 2^\circ\text{C}$ for 2 hours. 2. 将产品放入 $60\pm 2^\circ\text{C}$ 的高温箱中恒温箱 2H。 3. The product is discharged to the limit voltage of 17.5V according to the standard discharge method, and the discharge capacity is recorded. 3. 产品按标准放电方式放电至限制电压 17.5V, 记录放电容量。 4. After discharge, take out the product and place it at room temperature for 2 hours, then visually inspect its appearance. 4. 放电结束后将产品取出放在常温条件下搁置 2H, 然后目测外观。	The discharge capacity shall be $\geq 95\%$ of the Nameplate capacity, and the product appearance shall be free of deformation and burst. 放电容量应 $\geq 95\%$ 额定容量, 产品外观无变形, 无爆裂。
6	Low temperature discharge 低温放电	The product is charged to the rated voltage of 29.4V according to the standard charging method. 产品按标准充电方式充电至额定电压 29.4V。 Place the product in a low-temperature oven at $-40\pm 2^\circ\text{C}$ for a constant temperature of 4 hours. 2. 将产品放入 $-40\pm 2^\circ\text{C}$ 的低温箱中恒温 4H。 3. The product is discharged to the limit voltage of 17.5V according to the standard discharge method, and the discharge capacity is recorded. 3. 产品按标准放电方式放电至限制电压 17.5V, 记录放电容量。 4. After discharge, take out the product and place it at room temperature for 2 hours, then visually inspect its appearance. 4. 放电结束后将产品取出放在常温条件下搁置 2H, 然后目测外观。	The discharge capacity shall be $\geq 60\%$ of Nameplate capacity, and the product appearance shall be free of deformation and burst. 放电容量应 $\geq 60\%$ 额定容量, 产品外观无变形, 无爆裂。

7	Safety testing 安全性测试	参照 GB/T 31485-2015 《电动汽车用动力 蓄电池安全要求及试验方法》	
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7、Notice 使用注意事项

- ❖ High energy super capacitors have fixed polarity.高能量型超级电容器具有固定的极性。
- ❖ Do not touch metal objects when using supercapacitors to avoid short circuits caused by positive and negative pole connections.使用超级电容器时请勿接触金属物体，以免正负极连接引起产品短路。
- ❖ The ambient temperature affects the lifespan of supercapacitors.环境温度影响超级电容器的寿命。
- ❖ Do not apply pressure outside the product.请勿在产品外部施压。
- ❖ Reverse charging is not allowed.不可以反向充电。
- ❖ The product should be used at nominal voltage and current.产品应在标称电压、电流下使用。
- ❖ Please do not place the product near a heat source. The product should not be used in an environment exceeding 65 °C.请勿将产品靠近热源，产品不宜在超过 65°C 的环境中使用。
- ❖ The product is suitable for live storage during storage.储存时产品适宜带电存储。

8、Storage 储存

- ❖ The capacitor cannot be stored in place with humidity over 85%RH or place with toxic gas.
产品不能储存在湿度超过 85%，或有毒气体的地方。
- ❖ The capacitor should be best stored in the environment within -20~45°C temperature with relative humidity less than 60%.
最好储存在温度-20~45°C，湿度 60%的环境中。