

项目 Item	最小值 Min	典型值 Typical	最大值 Max	单位 Unit	备注 Remark
自耗电流 Quiescent Current	12	18	24	uA	
过充保护电压 Overcharge Protection Voltage	4.20	4.25	4.30	V	
均衡启动电压 Balancing Start Voltage	4.17	4.20	4.23	V	均衡版 Balanced version
均衡电流 Balancing Current	95	100	105	mA	均衡版 Balanced version
均衡发热功率 Balancing Power Dissipation	1.17	1.29	1.43	W	均衡版 Balanced version
过充恢复电压 Overcharge Recovery Voltage	4.10	4.15	4.20	V	
过放保护电压 Over-discharge Protection Voltage	2.40	2.50	2.60	V	
过放恢复电压(1C 放电) Recovery after ODP (1C)	2.80	3.00	3.20	V	1C discharge
过放恢复电压(2C 放电) Recovery after ODP (2C)	3.20	3.50	3.80	V	2C discharge
过放恢复电压 Over-discharge Recovery Voltage	2.90	3.20	3.30	V	

导通内阻 On-resistance	2.5	3.0	3.5	mΩ	
过流保护电流 Over-current Protection Current	70	80	90	A	
过流延迟时间 Over-current Delay Time	100	150	200	ms	
持续工作电流 Continuous Working Current	0	40	40	A	阻性负载 Resistive load
持续输出功率 Continuous Output Power	0	504	504	W	阻性负载 Resistive load
环境温度 Ambient Temperature	-40	25	85	℃	

Enhanced Version / Balanced Version 3S 11.1V 12.6V 18650 Lithium Battery Protection Board, with balancing function, suitable for power drill startup, 40A continuous current

二.

故障现象 Fault Phenomenon	故障检查与原因 Inspection & Cause	处理方法 Solution	保修说明 Warranty
无法充电 Cannot charge	测量 3 组电池电压，任意电芯超过约 4.25V 触发过充保护 Measure 3 battery groups; overcharge protection activates if any cell exceeds ~4.25V	搭配一致性好的电 池组，不要新旧电池 混用 Use well-matched battery packs; do not mix new and degraded cells	正常功能，不 保修 Normal function, no warranty

无法放电 Cannot discharge	测量 3 组电池电压，任意电芯低于约 2.7V 触发过放保护 Measure 3 battery groups; over-discharge protection activates if any cell drops below ~2.7V	搭配一致性好的电池组，不要新旧电池混用 Use well-matched battery packs; do not mix new and degraded cells	正常功能，不保修 Normal function, no warranty
充放电失效 Charge/Discharge failure	0V/4.2V/8.4V/12.6V 接线错误 Wrong wiring at 0V/4.2V/8.4V/12.6V terminals	重新接线或更换新板 Rewire or replace the board	人为故障，不保修 Man-made fault, not covered
过充过放失效 Overcharge/Over-discharge failure	0V/4.2V/8.4V/12.6V 接线错误 Wrong wiring at 0V/4.2V/8.4V/12.6V terminals	重新接线或更换新板 Rewire or replace the board	人为故障，不保修 Man-made fault, not covered
放电保护触发 Discharge protection triggered	检查电池组放电能力；负载启动电流是否超过过流值 Check battery discharge capability; check if load startup current exceeds over-current limit	更换放电能力更强的电池或更大电流保护板 Replace with stronger battery or higher current board	超出工作范围，不保修 Out of working range, no warranty
元件虚焊 Cold solder joint	元件引脚与 PCB 焊盘未连通 No connection between component pin and PCB pad	重新焊接 Resolder	可维修，支持返修 Repairable, support return maintenance
元件连焊 Short solder	元件引脚间短路 Short circuit between component pins	拆除元件重新焊接 Remove component and re-solder	可维修，支持返修 Repairable, support return maintenance
静电击穿 A ESD damage Type A	断电状态测 MOS 管 G/D/S 脚，任意两脚正反电阻为 0Ω 则击穿 Measure MOSFET G/D/S pins; 0Ω resistance between any two pins means breakdown	更换 MOS 管 Replace MOSFET	支持返修 Support return maintenance
静电击穿 B ESD damage Type B	拆下 MOS 管测 G-D/G-S 间电阻，导通为击穿，正常应为无穷大 Remove MOSFET, test G-D/G-S resistance; conductive = breakdown, normal = infinite	更换 MOS 管 Replace MOSFET	支持返修 Support return maintenance

三、Product Information

3S 12.6V 40A Lithium Battery Protection Board

Application: Suitable for lithium cells with nominal 3.7V, full charge voltage 4.2V, including 18650, 26650 & lithium polymer cells, no limit on dimension.

Dimensions:

Enhanced: 41*55*3.4mm

Balanced: 41*60*3.4mm

Weight:

Enhanced: 8.8g

Balanced: 9.8g

Charging Voltage: 12.6V ~ 13.6V

Max Continuous Discharge Current: 40A (Reduce load current under poor heat dissipation)

Max Continuous Charging Current: 20A

Enhanced Version: For power drills with startup current $\leq 80A$ and power $\leq 170W$

Balanced Version: For power drills with startup current $\leq 80A$ and power $\leq 170W$, built-in cell balancing function

Notes

1. To successfully start power drill: Use 3pcs 10C~20C power cells OR 6pcs 5C~10C power cells. Recommended cell model: SONY VTC4、VTC4A、VTC5A、VTC6. Use copper wire $\geq 3mm^2$ cross-section for 0V & 12.6V connection terminals. **Lug terminals cannot be used!**
2. Strictly follow wiring diagram. Do not short any components on PCB during soldering terminals of 0V/4.2V/8.4V/12.6V.
3. When soldering batteries for first time or during charging: If single cell voltage exceeds 4.2V, the "430" resistor will discharge and release heat (stop heating around 4.19V). If resistor becomes extremely hot (untouchable), please check wrong wiring.

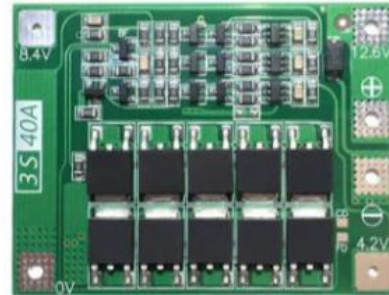
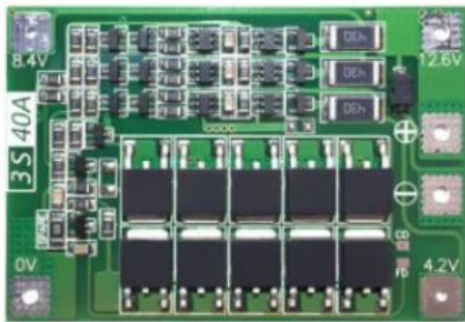
四、Requirements to Start Power Drill

1. Use 3pcs 15C–20C power lithium cells, OR 6pcs 10C–15C power lithium cells. **Ordinary 18650 cells CANNOT start power drill!!!**

2. Copper cable $\geq 3\text{mm}^2$ cross-section must be adopted for 0V and 12.6V wiring; shorter length is better.
3. If startup still fails, please contact seller for troubleshooting.

40A continuous current

<Capable of starting a power drill>



100mA balancing current

40A continuous current

<Capable of starting a power drill>

