

宜電電池科技股份有限公司

Edan Technology Corporation

Lithium-Ion Battery Pack

Specifications

Customer	MCM
Model	ED-C13041645A
Class	B
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Modifications	Down lead mode

Approval (Date)	QA (Date)	Engineering (Date)

Customer Signatures

Approval (Date)

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APPENDIX A: SPECIFICATIONS OF BATTERY CELL ED041630A

APPENDIX B: SPECIFICATIONS OF PROTECTION IC S8261

APPENDIX C: SPECIFICATIONS OF MOSFET FDC6305N

APPENDIX D: SPECIFICATIONS OF MOSFET TCP6201

APPENDIX E: SPECIFICATIONS OF PTC E0805SMD050

APPENDIX F: SPECIFICATIONS OF NTC EWTH02-103-J-3I-H

APPENDIX G: SAMPLE TEST REPORT

1. Scope:

This specification provides general engineering information and electrical specifications for the lithium-ion battery pack EDC-13041645A made by Edan Electronic (Shanghai) Corporation, an ISO9001:2000 certified manufacturer.

2. Legends

2.1 Model

Format: ED-I-mmmm

- ED: indicates a pack is made by Edan.
- I: Specification Initiator. **S** indicates that the pack is initiated by a well-known company and thus considered as an industrial **Standard** pack. **C** indicates that the pack is a **Custom** design initiated by customer or **Edan**.
- mmmm: Model name, e.g. NP60 indicates the model is known as NP60 by the industry. For custom design initiated by Edan, the model name usually has the format nOttwwllm, where
 - n: the number of cells connected in serial.
 - O: options of the pack; it includes the information of 4 options encoded in hexadecimal. The MSB is 1 if PTC exists; 0 otherwise. The next bit is for ID register, followed by NTC thermistor and connector. For example, if a pack has PTC, NTC, and Connector, the bits are 1011, which is also represented by B in hexadecimal.
 - tt: thickness of the battery pack
 - ww: width of the battery pack
 - ll: length of the battery pack; not including the wires and connectors if any.
 - m: material of the cell enclosure. A: aluminum, S: Stainless steel.

2.2 Capacity Classifications

- **A** indicates minimum capacity is 190mAh
- **B** indicates minimum capacity is 200mAh
- Capacity is measured by discharging the pack with 0.2CmA current.
- 1CmA = the minimum capacity of the specified capacity class.

3. Physical Structure

- Pack Body Dimensions (mm): $4.5^{+0.4}_{-0.4} * 16.4^{+0.4}_{-0.4} * 43.0^{+1.0}_{-1.0}$

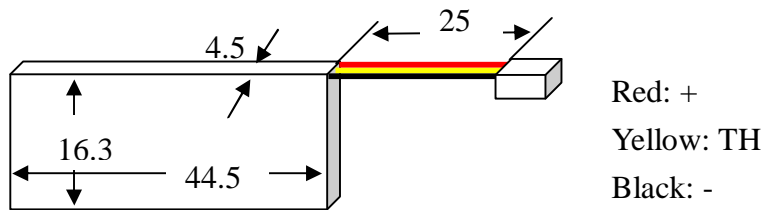


Figure 1. Pack Dimensions

- Connectors & Wires:
 - Connector: Molex-051021-3P
 - Wires: AWG28, UL1571 , 25±4mm
- Pin Outs
 - Pin 1: Red, Positive
 - Pin 2: Yellow, TH = 10Kohm
 - Pin3: Black, Negative
- Circuit Structure

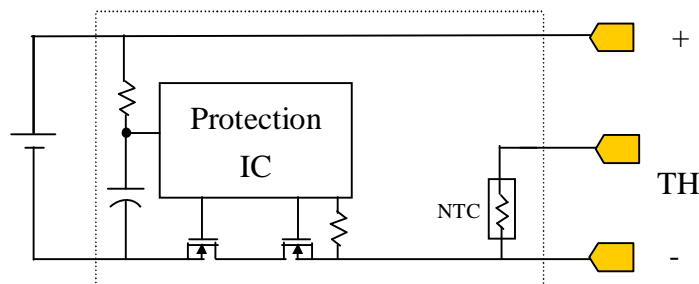
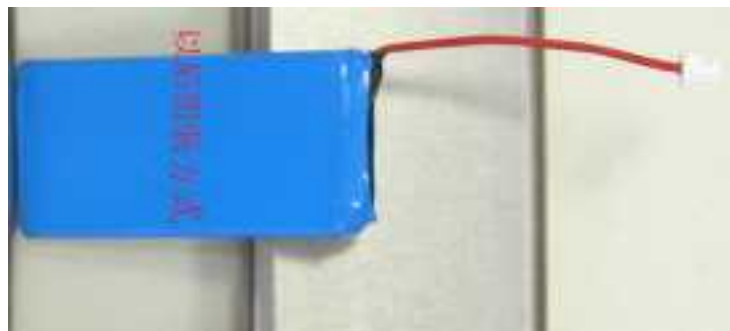


Figure 2. Circuit Structure

- Appearance of the Battery Pack



4. Protections

- Over charge: When the battery pack is over charged, the charging path will be

cut off by the MOSFET on the protection circuit module (PCM).

- Over discharge: When the battery pack is over discharged, the discharge path will be cut off by the MOSFET on the PCM.
- Over current: When the battery pack is over current or short circuit, the discharge path will be cut off by either
 - the MOSFET on the PCM, or (if the active protection fails)
- Over temperature: When the battery pack temperature increases, the resistance of the thermistor, connected between the “ TH ” and “ - ” pins, will decrease.

5. Specifications of Battery Pack

No.	Item	Specifications
5.1	Capacity	≥ 200mAh
5.2	Rated voltage	3.7V
5.3	Dimensions (mm)	4.5 ^{+0.4} _{-0.4} * 16.3 ^{+0.4} _{-0.4} * 43.0 ^{+1.0} _{-1.0}
5.4	Weight (g)	7 ± 5 g
5.5	Impedance	<650 m
5.6	Thermistor (NTC)	10K ±5% (B=3435)
5.7	Overcharge detection voltage	4.28V
5.8	Overcharge release voltage	4.08V
5.9	Overdischarge detection voltage	2.30V
5.10	Overdischarge release voltage	2.30V
5.11	Overcurrent protection (PCM)	Approx. 500mA / 10 msec
5.12	0V charge capability	Yes
5.13	Charge temperature	0 ~ + 45
5.14	Discharge temperature	-20 ~ + 60
5.15	Storage temperature	-20 ~ + 35
5.16	Storage humidity	< 85%
5.17	Charge status at delivery	40%~50% charged

6. Requirements on Charger and Application

- Max charge voltage: 4.25V
- Minimum cut off voltage: 3.0V
- Max charge current: 1CmA
- Max discharge current: 1CmA
- Charge temperature: 0 ~ + 45
- Discharge temperature: -20 ~ + 60

7. Battery Pack Assembly

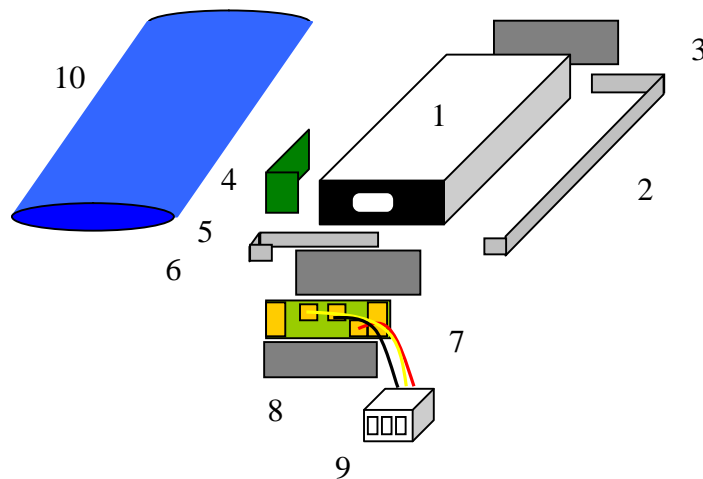
■ Bill of Materials

No.	Items	Specifications	Manufacturer
1	Battery Cell	ED041640A	Edan
2	Nickel plates 1	T=0.08, W=2, L=50	
3	Bottom insulation plate	PVC,T=0.3 with glue on inner side	
4	Insulation tape	T=0.08, W= 4, L=20	3M
5	Nickel plates 2	T=0.08, W=2, L=12	
6	Middle insulation plate	PVC,T=0.3 with glue on both sides	
7	PCM	edan-1s11	Edan
7.1	PCB	FR-4, UL94V-0	Edan
7.2	Protection IC	S8261A	Seiko
7.3	MOS FET	FDC6305N	Fairchild
		TCP6201	Toshiba
7.4	PTC	0805, 0.5A	EWAY or eqvl.
7.5	NTC	0402, 10K Ω , B3435	EWAY or eqvl.
7.6	R1	0402, 470 Ω	Yageo or eqvl.
7.7	R2	0402, 2K Ω	Yageo or eqvl.
7.8	C1	0402, 0.1uF	Yageo or eqvl.
8	Wire & Connector	AWG28,UL1571, Molex-051021-3P	
9	Top insulation plate	PVC,T=0.3 with glue on inner sides	
10	Hear Shrinking Sleeve	UL224, \varnothing =21	KSS or eqvl.

■ Assembly Procedures

1. Use resistive welding to connect nickel plate 1 (BOM#2) onto the bottom (positive electrode) of the li-ion cell (BOM#1).
2. Adhere bottom insulation plate (BOM#3) on the bottom of the cell.
3. Adhere insulation tape (BOM#4) at the shoulder of the cell.
4. Use resistive welding to connect nickel plate 2 (BOM#5) onto the tip (negative electrode) of the li-ion cell.
5. Adhere middle insulation plate (BOM#6) on top of the cell.

6. Adhere the PCM (BOM#7) on top of the middle insulation plate.
7. Use solder welding to connect the two dangling terminals of the nickel plates to the PCM with nickel plate 1 connected to the B+ pad.
8. Feed the wires (BOM#9) through the hole of the top insulation plate (BOM#8), then solder the wires on the PCM.
9. Adhere the top insulation plate on the PCM.
10. Fit the battery pack into the heat shrinking sleeve (BOM#10).
11. Heat shrink the sleeve.



8. Key Components

Item	Model	Manufacturer	Comments
Battery Cell	ED041640A	Edan	Refer to Appendix A.
Protection IC	S8261	Seiko	Refer to Appendix B.
MOSFET	FDC6305N	Fairchild	Refer to Appendix C.
	TCP6201	Toshiba	Refer to Appendix D.
PTC	E0805SMD050	EWAY	Refer to Appendix E.
NTC	EWTH02-103-J-3I-H	EWAY	Refer to Appendix F.

Note: TCP6201 is served as the 2nd source of the MOSFET.

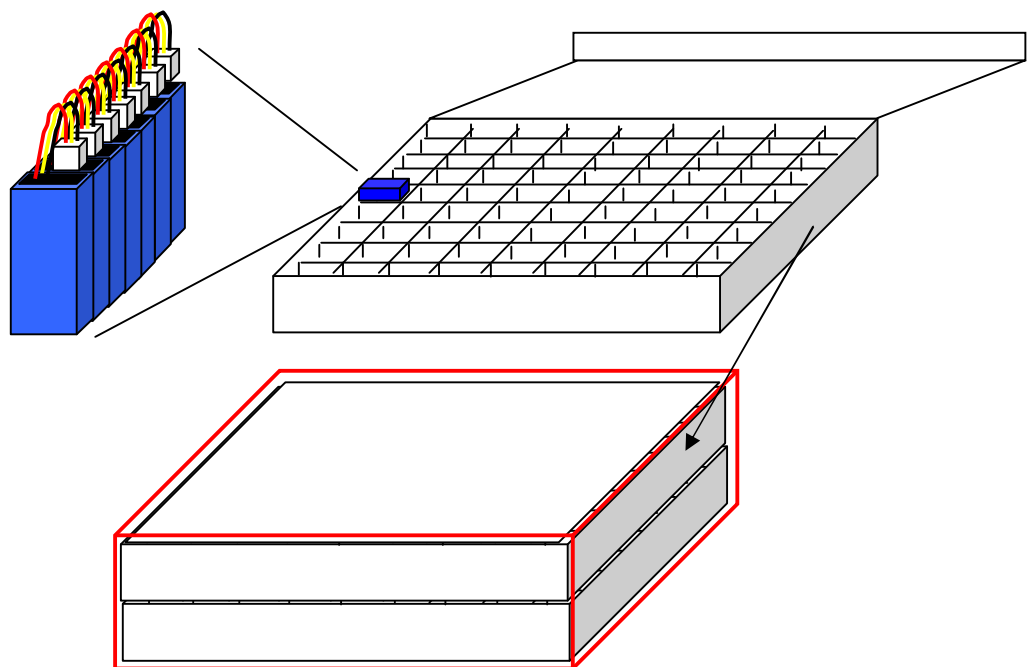
9. Specifications of PCB

- Model ED-J2J3
- Material FR-4
- Dimension 15.4 x 4.1 mm
- UL 94V-0
- Material 1 oz copper double sided bonded to FR-4 base material.
- 2 layers with through holes.

- All through holes connections to have solder resist applied.
- Printed Silk.

10. Packaging

- Carton Size: 16cm * 28 cm * 48 cm
- Boxes per Carton: 2 boxes
- Box size: 7cm * 25cm * 46cm
- Partitions per Box: 9 * 12 = 108 partitions
- Battery Packs per partition: 7 (wrapped in a heat shrinking sleeve)
- Battery packs per carton: 2 * 108 * 7 = 1512 pcs.



11. Simple Tests

- Over Current Test

See figure 3 below. Connect a $1\Omega\sim 5\Omega$ resistor between the “+” pin and “-“ pin to create over current condition ($> 0.6A$). Measure the voltage across the resistor. If the voltage $> 0.1V$, fail. Remove the resistor and measure the voltage again. If voltage backs to normal ($> 3V$), pass.

- Over Charge Test

See figure 4 below. Full charge the battery pack with a charger. Then charge the pack with a 5V power supply through a $10\Omega/1W$ resistor. Measure the

voltage across the “+” pin and “-“ pin. If the voltage jumps from around 4.4V to 5.0V within a couple of minutes, pass. Otherwise, fail.

■ Over Discharge Test

See figure 5 below. Discharge the battery pack to 3.0V, then discharge it with a 20Ω/1W resistor. Measure the voltage across the resistor. If the voltage jumps from around 2.1V to 0V, pass. Otherwise, if the voltage falls below 2.0V, fail.

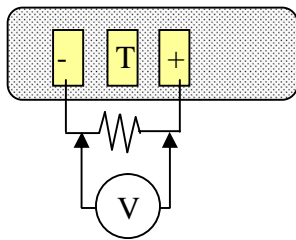


Fig. 3. Over Current Test

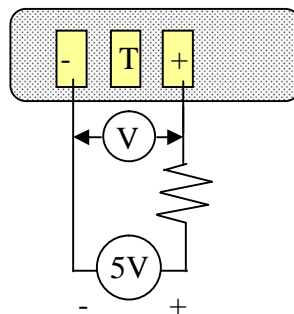


Fig. 4. Overcharge Test

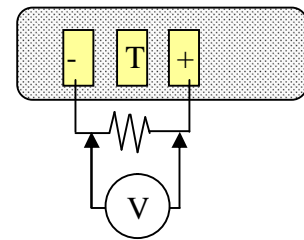


Fig. 5. Overdischarge Test

12. Guarantees

- If the battery pack is neither sold nor used, the manufacturer guarantees that
 - within 6 months from the date the product is delivered the output voltage of the pack will be above 3.0V, no leakage, and the thickness is within the specification. Otherwise, the manufacturer will replace it with a new one.
- After the battery pack is sold, the manufacturer guarantees that 6 months from the date the product is sold and the battery pack is not abused, including but not limited to being charged by a charger not made by the specified customer, the battery pack will
 - have a remaining capacity more than 80% of the rated capacity.
 - have no leak
 - have a thickness within the specification.
 Otherwise, the manufacturer will replace it with a new one.

13. Product Liability

It is requested to use the battery pack in strict accordance with the specifications and warnings in this document. Improper usage of the battery pack may cause an accident or a fire due to the heat generated by the abused battery pack. The battery pack manufacturer holds no liability if the battery pack is abused or not used in accordance with the specifications and warnings in this document.

14. Updates

This document may be updated without notice.

15. Warnings

At least the following warning messages must be marked on the product:

- Use only specified charger.
- Do not short-circuit
- May explode if disposed of in fire

Regarding the guarantee and responsibility described in this specification sheet, it is applied when no wonder that the root cause of the abnormality arise from the manufacture of this product .

Please note that the transaction value is set as the higher limit in the guarantee of this product.