



昌 勃 股 份 有 限 公 司
 Dr . POWER CORPORATION

零 件 規 格 書/承 認 書
 SPECIFICATION FOR APPROVAL

CUSTOMER : _____

DESCRIPTION : Battery Pack

MODEL : PANASONIC 1S1P NCR18500A 鋰電池組

CUSTOMER PART NO : _____

APPROVED SIGNATURES

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Rev	Date	Description	Designed	Checked	Approved
A	2022/08/26	Release		Kevin	
B	2024/01/17	更新保護板規格和導線規格		Kevin	

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	Document Name		Rev.	1.0
	Model No.	NCR18500A-1G/D		

1. Scope

This specification shall be applied to Sonata Lithium Ion battery pack (%series 1 parallel)

* Recharge battery after long time storage before use.

2. Composition

The Single cell consists of 2040 mAh capacity also Battery Pack 2040 mAh combines with protection circuit and thermal protection.

3. Product specification

No	Item	Rating performance	Remark
1	Typical Capacity	2040 mAh	Minimum 1940mAh
2	Nominal voltage	3.7V	
3	Maximum charge voltage	4.2V	
4	The end of discharging voltage	3.0V	
5	Suggestive charging current(standard)	408mA / 0.2C	
6	Suggestive charging current(Max)	2040mA / 1C	
7	Suggestive continuous discharging current	408mA / 0.2C	
8	Suggestive continuous discharging current (Max)	2040mA / 1C	
9	Internal resistance	<100mΩ	Measured by the alternate current method (1Khz)
10	Outer Dimension(mm) (L*W*T)	54*25 mm(Max)	
11	Weight	33.75 (About)	g
12	Ambient Temperature	Charge	0°C ~ +45°C
		Discharge	-20°C ~ +60°C
		Storage	-20°C ~ +50°C

SPECIFICATION

Model No. : CT-NP80-PTC-801 (Lead Free)(For 21700)

Document No. : DM-NP80-PTC (Rev. A)

Customer :

Record of Revisions

Revision	Model. No.	From	Description	Date
A	CT-NP80-PTC-800	R&D Dept.	New issue from R&D	Dec., 24, 2019

Prepared by : Gary Wang, Project Engineer

Checked by : Jonathan Chiang, Project Manager

Approved by : Sam Tsao, R&D Manager

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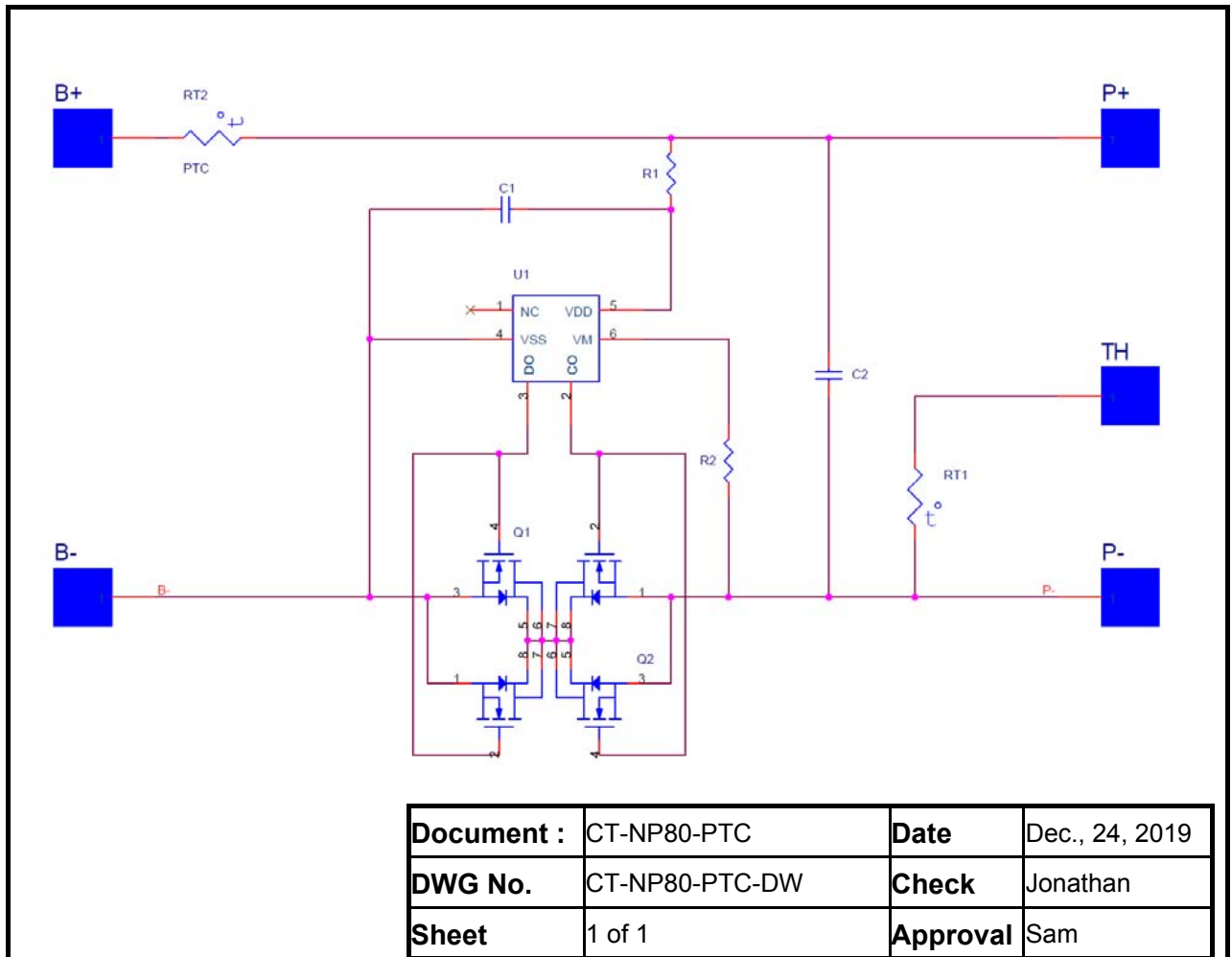
1. Introduction :

This specification provides engineering information and electrical specifications for the protection circuit module of Li-ion cells.

2. Description :

The CT-NP80-PTC PCM provides protection for single-cell Li-ion battery. The semiconductor devices with ESD protections are utilized on CT-NP80-PTC PCM.

3. Circuit diagram :



4. Major components :

ITEM	P/N	Package
Li-ion Protection IC	<i>S8211CAK</i>	<i>SNT-6A</i>
MOSFET	<i>FKBE2730/SP8601</i>	<i>S mini 8</i>

5. Bill of materials :

Document: Subject:					Revision: A		
CT-NP80-PTC-801-BOM					BOM for		
					CT-NP80-PTC-801		
					Date:		
					Dec., 24, 2019		
No.	Bill of materials for CT-NP80-PTC				Q'ty	Maker Remark	
	Ref. Part	Name	DESCRIPTION	Package			
1	C1,C2	Capacitor	0.1μF	SMD0402	2	Yageo, or similar parts	
2	R1	Resistor	220 ohm ±5%	SMD0402	1	Yageo, or similar parts	
3	R2	Resistor	2K ohm ±5%	SMD0402	1	Yageo, or similar parts	
4	RT1	Thermistor	NC	SMD0402	0	-	
5	RT2	PTC	NC		0		6.0A
6	B+,B-	Nickel strip	3.0x2.0x0.3mm	-	2	JI-YU, or similar parts	
7	U1	Protection IC	S8211CAK	SNT-6A	1	ABLIC	
8	Q1	MOSFET	FKBE2730/SP8601	S mini 8	1	FETek/SamHop	Option used
9	Q2	MOSFET	FKBE2730/SP8601	S mini 8	1	FETek/SamHop	Option used
10	-	PCB	PNP80-PTC	-	1	Sunjung, or similar parts	

6. Absolute maximum rating :

Parameter Rating		Unit
Operating temperature range	-20 ~ 75	°C
Operating humidity range	Less than 85% RH	%RH
Storage temperature range	-45 ~ 85	°C
Storage humidity range	Less than 85% RH	%RH
Voltage between terminals of P+ and P-	12.0	V
Voltage Between terminals of B+ and B-	12.0	V
Maximum continue current	4	A

Remarks:

The negative voltage is not allowed to be applied between the charge / discharge terminals (P+ and P-) or between the cell connection terminals (B+ and B-).

7. Basic functions :

(1) Over-charge protection

Over-charge occurs whenever the voltage applied to each battery is over $4.280V \pm 0.025V$.

Protection circuit on CT-NP80-PTC should stop charging the battery when over-charge condition occurs and any deformation in the outer appearance of the Lithium cell connected to CT-NP80-PTC should not occur.

(2) Over-discharge protection

Over-discharge occurs whenever the battery is discharged with voltage below $2.300V \pm 0.050V$

Protection Circuit on CT-NP80-PTC should stop discharging the cells when over-discharge condition occurs.

(3) Over-current protection

Over-current condition occurs when excessive discharge current occurs or excessive charge current occurs. The excessive discharge current threshold is higher than 0.130V and the excessive charge current threshold is higher than 0.100V when S8211CAK is used.

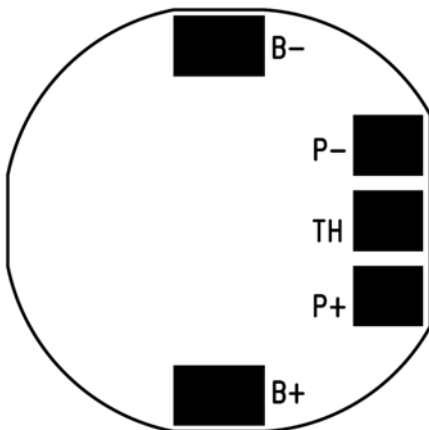
Protection circuit on CT-NP80-PTC should stop discharging the cell when discharge over-current condition occurs and stop charging the cell when charge over-current condition occurs.

(4) Short-circuit protection

Short-circuit condition occurs when the terminals between P+ and P- is shortened.

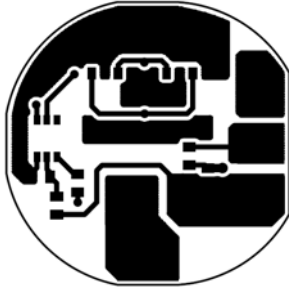
Protection circuit on CT-NP80-PTC should stop discharging the cell when short-circuit condition occurs and temperature of MOSFET should not be overheated.

8. Connection Layout Diagram :

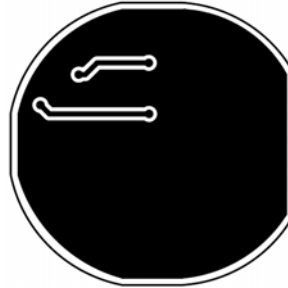


Document :	CT-NP80-PTC	Date	Dec., 24, 2019
DWG No.	CT-NP80-PTC	Check by	Jonathan
Revision	A	Approval by	Sam

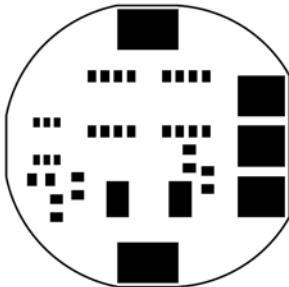
9. Artwork drawing :



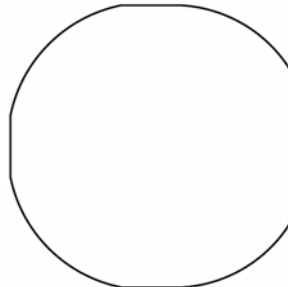
TOP SIDE



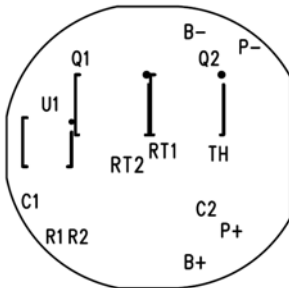
BOT SIDE



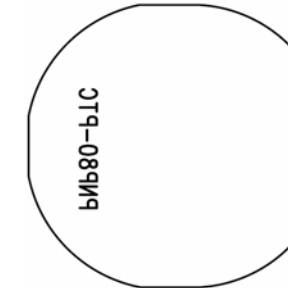
TOP MASK



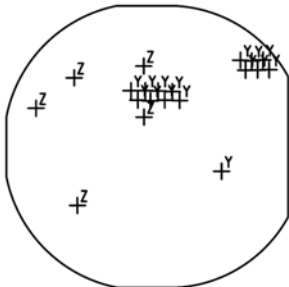
BOT MASK



TOP SILK



BOT SILK



DRILL

Document:	CT-NP80-PTC-AD	Date	Dec., 24, 2019
DWG No.	CT-NP80-PTC	Check by	Jonathan
Revision	A	Approval by	Sam

10. Electrical characteristics :

10.1 Parameters of protection circuit (@25°C) :

No	ITEM	Specification	UNIT
1	Over-charge detection voltage	4.280±0.025	V
2	Over-charge release voltage	4.080±0.050	V
3	Over-discharge detection voltage	2.300±0.050	V
4	Over-discharge release voltage	Reset by charge	V
5	Over-charge current detection voltage	0.100±0.030	V
6	Over-charge current release	Reset by charger release	V
7	Over current detection voltage	0.130±0.015	V
8	Over current release	Reset by load release	V
9	Over-charge detection delay time	0.96 ~ 1.4	sec
10	Over-discharge detection delay time	120 ~ 180	msec
11	Over-charge current detection delay time	7.2 ~ 11	msec
12	Over current detection delay time	7.2 ~ 11	msec
13	Short circuit detection delay time	240 ~ 360	usec
14	Supply current (Normal mode)	5.5 (max)	uA
15	Supply current (Sleep mode)	0.2 (max)	uA

10.2 Requirement of protection functions (@25°C) :

No.	Item	Criteria
1	Over-charge current protection	2.8 ~ 11A
2	Over-current protection	4.5 ~ 12A
3	Internal Impedance(B~P-)	60m ohm (max Vgs=4V)

11. Specification of PCB :

Material	FR-4
Dimension	L: 14.00+0.20/-0.20mm W: 14.00+0.20/-0.20mm
Thickness	0.60+0.10/-0.10 mm (overall)
UL	94V-0

- (1) Material 1 oz copper double sided bonded to FR-4 base material.
- (2) 2 layers with through hole.
- (3) All through hole connections to have solder resist applied
- (4) RoHs compliance.

Specifications for NCR18500A

5. Battery Specification

Specifications		
Rated capacity ⁽¹⁾		1900mAh
Capacity ⁽²⁾	Minimum	1940mAh
	Typical	2040mAh
Nominal voltage		3.6V
Charging	Method	CC-CV
	Voltage	4.20V
	Current	Std. 0.7CA
	Time	Std. 0.02C cut.
Weight (max.)		33.5g
Temperature	Charge	10 to +45° C
	Discharge	-20 to +60° C
	Storage	-20 to +50° C
Energy density ⁽³⁾	Volumetric	536 Wh/l
	Gravimetric	204 Wh/kg

Dimensions		
With tube	H	Max. 49.36mm
	D	Max. 18.15mm
	d	Max. 6.6mm

⁽¹⁾ At 20° C ⁽²⁾ At 25° C

⁽³⁾ Energy density is calculated using bare cell dimensions (without tube).

When designing a pack, refer to the cell's mechanical drawing for precise dimensions.

1

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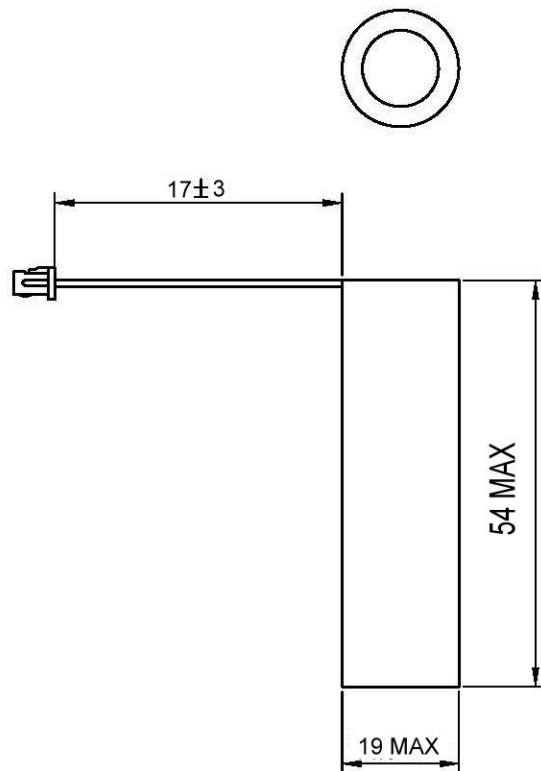
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REV.	EC#	DESCRIPTION	DATE	DRAWN	CHECKED	APPROVED

6.Outer Dimension



Connector : Housing 2.0mm 2PIN
Wire 22 AWG

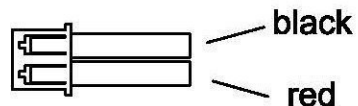


TABLE A

COMMON TOLERANCE			
CLASS	A	B	C
L ≤ 3	±0.05	±0.1	±0.2
3 < L ≤ 6	±0.05	±0.1	±0.2
6 < L ≤ 16	±0.1	±0.15	±0.3
16 < L ≤ 30	±0.1	±0.2	±0.5
30 < L ≤ 120	±0.15	±0.3	±0.8
120 < L ≤ 315	±0.2	±0.5	±1.2
315 < L ≤ 1000	±0.5	±0.8	±2.0
1000 < L ≤ 2000	±1.0	±1.2	±3.0

ITEM	PART NAME	PART NO.	COLOR	MATERIAL
DESIGN	Benson	DATE		
DESIGN		DATE		
CHECKED	James	DATE		
APPROVED	James	DATE		
SHEET	OF			
UNIT	mm			
18500 3.6V Battery Pack				
REV. NO.				0

7.Finished Goods Package Drawing

