



Approve datasheet

Customer: Renata

Model: ICP582035PR-01

Version: V4.0

Customer Model: ICP582035PR-01

Description: 3.7V / 340mAh

Comment:
Customer Approval/Date:
Renata Sales/Date:



Renata SA, Switzerland

Product Specification

Model No. : ICP582035PR-01

Issued Date : 2023/08/10

Version: V 4.0

PREPARED BY	CHECKED BY	SALES & MARKETING DIV.	QUALITY ASSURANCE DIV.	APPROVED BY
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2023/08/10	2023/08/10	2023/08/10	2023/08/10	2023/08/10

Model	Description	Rev.	Page
ICP582035PR-01	Lithium-ion Polymer Battery Pack	Rev.4.0	2/14
1. Preface			
<p>The purpose of this product specification is to provide technical information for the rechargeable Lithium-ion polymer battery pack ICP582035PR-01.</p>			
2. Description and Model			
2.1 Description	Rechargeable Lithium-ion Polymer Battery Pack		
2.2 Model	ICP582035PR-01		
3. Specifications			
3.1 Typical Capacity	340mAh (at 0.2C rate discharge process after standard charge)		
3.2 Minimum Capacity	330mAh (at 0.2C rate discharge process after standard charge)		
3.3 Charging Voltage	4.2V		
3.4 Average working Voltage	3.7V at 0.2C rate		
3.5 Standard Charge	Constant current 0.5C		
	Constant voltage 4.2V		
	0.05C cut-off		
3.6 Fast Charge	Constant current 1.0C		
	Constant voltage 4.2V		
	0.05C cut-off		
3.7 Discharge Cut-off Voltage	3.0V		
3.8 Max. Discharge Current	1.0C		
3.9 Max. Charge Current	1.0C		
3.10 Cycle Life	500 cycles, more than 80% at 0.5C rate discharge		
3.11 Temperature range of operation			
Standard Charge	0°C to 45°C		
Discharge	-20°C to 60°C		
3.12 Weight of Battery Pack	Approx. 7.3 g		
3.13 Initial Internal Impedance	$\leq 350\text{m}\Omega$ (30% SOC)		
3.14 Volumetric energy density	319Wh/L		
3.15 Weight energy density	177Wh/g		
3.16 Storage	At 30% SOC and specified temp, recoverable capacities in % vs time.		
	-20°C to 25°C (12 months, $\geq 85\%$)		
	25°C to 45°C (3 months, $\geq 80\%$)		
3.17 Recharging Necessity	To prevent over-discharge at long storage time, the battery pack shall be charged within 3 months after shipment.		

Model	Description	Rev.	Page
ICP582035PR-01	Lithium-ion Polymer Battery Pack	Rev.4.0	3/14

4. Outline Dimension

See attached drawing for ICP582035PR-01 (Fig. 1). The thickness is the maximum thickness after 500 cycles.

5. Appearance

Free from deformation, damage, noticeable scratch, flaw, rust, discoloration or electrolyte leakage.

6. Cell Marking

The cells will be marked on the front side with DAILY date code which should be consistent with the cell manufacturing date. The marking should consist of three lines. The first line indicates the ICP model number. The second line indicates the manufacturing date, lot number and the serial number in that lot. The third line indicates the energy carried in watt hour.

Example:	2D	-ICP582035	Model ICP582035
	CODE	YMDDLN-xxxx	2D code information
		1.3Wh	Typical Capacity

-: indicates the negative terminal. The position of “-” should be near the negative lead.

Y: 2-2022, 3-2023, 4-2024,.....

M: 1-Jan., 2-Feb., ..., A-October, B-November, C-December,

DD: 01-1st day of the month, 02-2nd day of the month, and

LN: 012: lot number of cells to be produced.

xxxx: serial number, four digits.

7. Standard Test Condition

7.1 Environmental Conditions

Unless otherwise specified, all tests shall be conducted within one month of delivery at the temperature 20±5°C and the relative humidity ≤75% RH.

7.2 Test Equipments

- (1) Ammeter and voltmeter

The ammeter and voltmeter shall have an accuracy of ± 0.1mA and ± 0.1mV, respectively.

- (2) Slide caliper

The slide caliper shall meet with JIS B7507 standard (slide caliper) and have a scale of 0.01 mm.

- (3) Impedance meter

The impedance meter shall be operated at 1 kHz.

8. RoHS compliance is for all parts.

Model	Description	Rev.	Page
ICP582035PR-01	Lithium-ion Polymer Battery Pack	Rev.4.0	4/14
9. Test Procedure and its Standard			
Item	Measuring Procedure	Standard	
9.1 Appearance	Visual	No Defects and Leakage	
9.2 Dimension	Caliper for dimension	As item 4	
9.3 Weight	Balance	As item 3.12	
9.4 Initial Open Circuit Voltage	Voltmeter	3.6~3.8V	
9.5 Initial Internal Impedance	Measure the AC impedance at 1kHz	$\leq 350\text{m}\Omega$ (30% SOC)	
9.6 Discharge Capacity	After standard charge, discharge at 0.2C until final discharge voltage of 3.0V and measure the capacity	$\geq 330\text{mAh}$ (min.)	
9.7 Maximum Discharge Current	Until final discharge end voltage of 3.0V	1.0C	

Model	Description	Rev.	Page				
ICP582035PR-01	Lithium-ion Polymer Battery Pack	Rev.4.0	5/14				
9.8 Charge/Discharge Cycle Life	<table border="1"> <tr> <td rowspan="2">0.5C</td> <td>Charge: CC- 0.5C, CV-4.2V, Cut-off current: 0.05C</td> <td rowspan="2">Discharge capacity should be $\geq 80\%$ of 1st cycle capacity @ 500th cycle. Rest for 10 minutes between each charge/discharge step.</td> </tr> <tr> <td>Discharge: 0.5C to 3.0V</td> </tr> </table>	0.5C	Charge: CC- 0.5C, CV-4.2V, Cut-off current: 0.05C	Discharge capacity should be $\geq 80\%$ of 1 st cycle capacity @ 500 th cycle. Rest for 10 minutes between each charge/discharge step.	Discharge: 0.5C to 3.0V		
0.5C	Charge: CC- 0.5C, CV-4.2V, Cut-off current: 0.05C		Discharge capacity should be $\geq 80\%$ of 1 st cycle capacity @ 500 th cycle. Rest for 10 minutes between each charge/discharge step.				
	Discharge: 0.5C to 3.0V						
9.9 Leakage Proof	The fully charged battery shall be stored at $65\pm 3^{\circ}\text{C}$ and relative humidity $95\pm 5\%$ for 7 days.	No leakage.					
9.10 Temperature Characteristics	1) Charge: CC/CV, CC-0.5C, CV-4.2V Cut-off 0.05C at $23\pm 3^{\circ}\text{C}$. 2) Discharge: 0.5C to 3.0V at $-10\pm 3^{\circ}\text{C}$ and $\sim 60\pm 3^{\circ}\text{C}$, respectively. Hold for 1 hour after standard charging.	Discharge capacities should be $\geq 60\%$ for $-10\pm 3^{\circ}\text{C}$ and $\geq 95\%$ for $60\pm 3^{\circ}\text{C}$.					
9.11 Self Discharge (for cell only)	Capacity after 30 days storage, measured under the same conditions as $20\pm 5^{\circ}\text{C}$ and relative humidity $\leq 75\%$ RH environmental test conditions. Data is collected by fully charging the battery, measuring the initial capacity (discharging), recharging the battery, storing the battery, and then measuring the residual capacity after storing.	Residual capacity $\geq 306\text{mAh}$					
10. PCM (Protection Circuit Module) SPECIFICATIONS : (Fig.2)							
10.1 Operating input voltage		1.5 – 12V					
10.2 Current consumption (Operation)		$\leq 5.5 \mu\text{A}$					
10.3 Current consumption (Power down)		$\leq 0.2 \mu\text{A}$					
10.4 Over-charge threshold voltage		$4.28\text{V} \pm 25\text{mV}$					
10.5 Charge Current Protection		0.5 ~ 1.7 A					
10.6 Over-discharge Threshold voltage		$3.0\text{V} \pm 50\text{mV}$					
10.7 Discharge Current Protection		0.4 ~ 1.2 A					
10.8 On-State Resistance ($V_B = 3.7\text{V}$)		$\leq 180 \text{m}\Omega$					
10.9 Dimensions		$18.2 \times 4.3 \times 2.0 \text{mm}$					
10.10 0V battery charge function		Available					

Model	Description	Rev.	Page
ICP582035PR-01	Lithium-ion Polymer Battery Pack	Rev.4.0	6/14
11. Safety Criteria for Acceptance			
Item	State	Test method	Specification
External Short-circuit Test	Fully Charged	Cell terminals are short-circuited for 6 hours or longer with a resistance of $80\pm 20\text{m}\Omega$ or less. Tests are to be conducted at $20\pm 5^\circ\text{C}$ room temperature and $55\pm 5^\circ\text{C}$.	NO EXPLOSION or FIRE.
Forced-Discharge Test	Fully Charged	Cell is discharged at a current of 1C rate for 1.5 hours.	NO EXPLOSION or FIRE.
Heating Test	Fully Charged	The temperature of the oven is to be raised at a rate of $5\pm 2^\circ\text{C}/\text{min}$. to a temperature of $130\pm 2^\circ\text{C}$, and remains for 30 minutes at this temperature.	NO EXPLOSION or FIRE.
Crush Test	Fully Charged	Crush between two flat plates. Applied force is about 13kN.	NO EXPLOSION or FIRE.
Impact Test	Fully Charged	Impact between bar (15.8mm diameter) and 9.1 Kg falling material (at a height of 61 cm). Bar is laid across the center of the test sample.	NO EXPLOSION or FIRE.
Drop Test	Fully Charged	Drop a fully charged cell onto a concrete floor from the height of 1.0 meters for 3 times.	NO EXPLOSION or FIRE.
Vibration Test	Fully Charged	Vibrate the cell in tri-axial directions each for 90~100 min. in conditions of frequency 10 ~ 55 Hz with amplitude 0.8 mm.	NO EXPLOSION or FIRE.
Abnormal Charge Test	Fully Discharged	Charging the battery by 3C and 4.4 V for 7 hrs.	NO EXPLOSION or FIRE.

Model	Description	Rev.	Page
ICP582035PR-01	Lithium-ion Polymer Battery Pack	Rev.4.0	7/14
12. Battery Pack Safety Criteria			
Item	State	Test method	Specification
Overcharge Test	Fully Discharged	<ul style="list-style-type: none"> - Fully charge battery pack Settings: CVC mode: 4.2V, set charging current (0.8C), cut-off by taper current (or end Current) 0.02C. - Continuously charge battery pack Settings: CVC mode: 4.6V, set charging current (0.2C). As the pack enters into protection mode, the charging current become to zero. 	Test passed according to test method.
Over Current Protection	Fully Charged	For the battery pack, set a load of 300mA to check if the pack would be protected.	Test passed according to test method.
Over-Discharge Test	Fully Charged	<ul style="list-style-type: none"> - Fully charge battery pack Settings: CCD mode set discharging current (0.5C), cut-off voltage (or end voltage) 3.0V. - Continuously discharge battery pack Settings: CCD mode set discharging current (0.2C). End voltage 2.0V. As the pack enters into protection mode, the discharging current become to zero. 	Test passed according to test method.
Short Circuit	Fully Charged	Fully charge battery pack, short +ve & -ve terminal directly. If protected, pack would not be discharged. Then charge by small current, it would be resumed accordingly.	Test passed according to test method.

Model	Description	Rev.	Page
ICP582035PR-01	Lithium-ion Polymer Battery Pack	Rev.4.0	8/14

13. Charge State of Battery Before Shipment

The battery is charged to 30 % of minimum capacity. Voltage is 3.6V~3.8V.

This measuring test should be performed within one month after shipment from our factory.

14. Handling Precautions

ICP battery pack shall have enough protection for ICP cell from the specification of electrical, mechanical and environmental characteristics. For use of this battery, must follow as specified below. Other than UL1642 or above PACK safety requirement conditions listed may cause major burst, fire, some smokes and it would cause severe performance failure and unsafe for use.

Please be sure to follow instructions carefully.

DANGERS:

- (1) Don't disassemble or modify the battery.
The battery has safety function and protection circuit to avoid the danger. ICP cell is packaged by Aluminum laminated plastic film which is easy to be damaged by sharp edge such as pin, needle, edge of devices like nickel tabs, etc. If they have serious damage, electrolyte leakage, short-circuit between positive and negative tabs, etc. It would cause the generation, smoke, rupture, or flaming with mishandling.
- (2) Don't incinerate or heat the battery
Don't use or leave battery nearby fire, stove or heated place (more than 130°C). These occur the melting of insulator, damage of safety function, or ignition on electrolyte. In case that separator made of polymer is melted by high temperature, the internal short-circuit occurs in individual cells and then it would cause the generating, smoke, rupture or flaming.
- (3) Don't use any damage battery
Do not use the battery that are dented or bent on their edge part. ICP batteries are possible to be damaged by strong mechanical shock and it would cause wire break, short-circuit inside the cell, leakage of electrolyte, etc.
- (4) Don't use battery nearby the high temperature place or under the blazing sun.
ICP batteries have possibility to be degraded its performance such as capacity, thickness increase, impendence, etc. The battery will be charged at the abnormal chemical reaction occurs in the high temperature place. The thickness change may lead to stressing on battery case/ device, wiring or cell which may have possibility to lead to damage performance.
- (5) Don't use the unspecified charger.
If the battery is charged with unspecified condition (under high temperature over the regulated value, excessive high voltage or current over regulated value, or remodeled charger with PCM failed or disassemble), there are causes that it will be overcharged or the abnormal chemical reaction will occur in cells. It causes the gas generating, smoke, rupture or flaming.

Model	Description	Rev.	Page
ICP582035PR-01	Lithium-ion Polymer Battery Pack	Rev.4.0	9/14
<p>(6) Don't short-circuit terminals Don't connect metals including wire to the (+) and (-) terminals. Don't carry or store the battery with metal objects. If the battery is short-circuited, excessive large current will flow and then the gas generating, smoking, rupture or flaming will occur.</p> <p>(7) Don't drive a nail into a battery, strike it by hammer, or tread it. As the battery might be broken or deformed and then it will be short-circuited, it would cause the generating, smoke, rupture or flaming.</p> <p>(8) Don't give battery impact or fling it If the protection circuit assembled in the battery is broken, the battery will be charged at abnormal voltage or current and abnormal chemical reaction will occur. It may cause the generating, smoke, rupture or flaming.</p> <p>(9) Don't make the direct ultrasonic wave power to the battery or soldering near the battery It may cause serious damage to the batteries. Soldering near the battery may cause damage of the components, such as separator and insulator, are melted by heat, it would cause the gas generating, smoke, rupture or flaming.</p> <p>(10) Don't reverse polarity (and terminals) If the protection circuit assembled in the battery is broken. On charging, the battery is reversed-charged and abnormal chemical reaction occurs. And also, there may be case that unexpected large current flows on discharging. There causes the generating, smoke, rupture or flaming.</p> <p>(11) Don't reverse-charge or reverse-connect The battery has polarity. In case the battery is not connected with charger or equipment smoothly do not force them to connect and do check polarity of battery. If the battery is connected to opposite polarity with charger. It will be reverse-charged and abnormal chemical reaction will occur. If the protection circuit assembled in the battery is broken, it would cause the generating, swelling, smoke, rupture or flaming.</p> <p>(12) Don't connect battery to the plug socket or car-cigarette-plug Added high voltage to the battery, if the protection circuit assembled in the battery is broken, the excessive current will flow in it and then it may cause the generating, swelling, smoke, rupture or flaming.</p> <p>(13) Any components or conductive metals from devices must be insulated and averted to contact the edges of pouch cell.</p> <p>(14) Don't use battery for another equipment If the battery is used for unspecified equipment, it will deteriorate its performance and cycle-life.</p> <p>(15) Don't touch a leaked battery directly In case the leaked electrolyte gets into eyes, wash them with fresh water as soon as possible without rubbing eyes. And then, see a doctor immediately. If leave damaged eyes undone, it will cause eye-trouble.</p>			

Model	Description	Rev.	Page
ICP582035PR-01	Lithium-ion Polymer Battery Pack	Rev.4.0	10/14

WARNINGS:

- (1) Keep the battery away from babies
Keep the little battery out of the reach of babies in order to avoid troubles by swallowing. In case of swallowing the battery, see a doctor immediately.
- (2) Don't get into a microwave or a high pressure container
Because of sudden heat or damage of sealing condition of battery, it may cause the generating, smoke, rupture or flaming.
- (3) Don't use a leaked battery nearby fire
If the liquid leaks from the battery (or the battery gives out bad smell), let the battery leave from flammable objects immediately. Unless do that, the electrolyte leaked from battery may catch fire and it would cause the smoke, flaming or rupture of it.
- (4) Don't use an abnormal battery, such as leakage, swelling, deformation, etc.
In case the battery has bad smell, it generates, its color change or it is warped in using (includes charging and storage), let it take out from equipment or charger and do not use it. If an abnormal battery is used, it may generate bad performance or damage the device or pack.
- (5) Don't store the battery at high voltage and/or high temperature environment which may cause the loss of battery performances and safety features.
- (6) Notice for Assembling Battery Pack: Tab connection;
Ultrasonic welding or spot welding is recommended to connect battery with PCM or other parts. If the manual solder method is applied to connect the tab with PCM, notices shown below are very important to ensure battery performance.
 - A. The solder iron should be well controlled with a moderate temperature and safe ESD.
 - B. The soldering temperature should not be exceeded 350°C.
 - C. The soldering time should not be longer than 3 sec.
 - D. The soldering time should not be exceeded over 4 times and leave the battery tab to be cooling down before next soldering. Directly heating cell body is strictly prohibited because battery may be damaged via a heating above approx.100°C.

Model	Description	Rev.	Page
ICP582035PR-01	Lithium-ion Polymer Battery Pack	Rev.4.0	11/14

CAUTIONS:

- (1) Don't use or leave the battery under the blazing sun (or in heated car by sunshine)
The battery may smoke, heat or flame. And also, it might cause the deterioration of battery's characteristics or cycle life.
- (2) Static Electricity
The battery has the protection circuit to avoid the danger. Do not use nearby the place where generates static electricity (more than 100V) which gives damage to the protection circuit. If the protection circuit were broken under abnormal handling, the battery would generate, smoke, rupture or flame.
- (3) Manual
Please read the manual before using the battery and let it keep after reading. And also, please read it necessary.
- (4) Charging Method
Please read the manual of specific charger about charging method.
- (5) First time use
When the battery has rust, bad smell or something abnormal at first-time-using, do not use the equipment and go to the shop which it was bought.

DISPOSAL METHOD

- (1) The disposal of battery should be in accordance with local, state or national legislation.
- (2) According to terms 7.3 of the Regulation, it is not necessary for a manufacturer or importer to provide measures to ensure that SVHC substances are not exposed to humans or the environment. If the articles are used under normal or reasonably foreseeable circumstances (including disposal) they do not need to fulfill the responsibilities of EU REACH Regulation 7.2 terms, but they should provide the appropriate instructions with the recipients of article.

15. Period of Warranty

The period of warranty is 12 months from the date of shipment date. Renata guarantees to give a replacement in case of any defects in batteries approved and resulted from the manufacturing process instead of the customer abuse or misuse.

16. Storage



The batteries should be stored at room temperature, with SOC approx. 30% to 60%. It is recommend that the batteries need to be charged, generally per three months a year to prevent the over discharge.

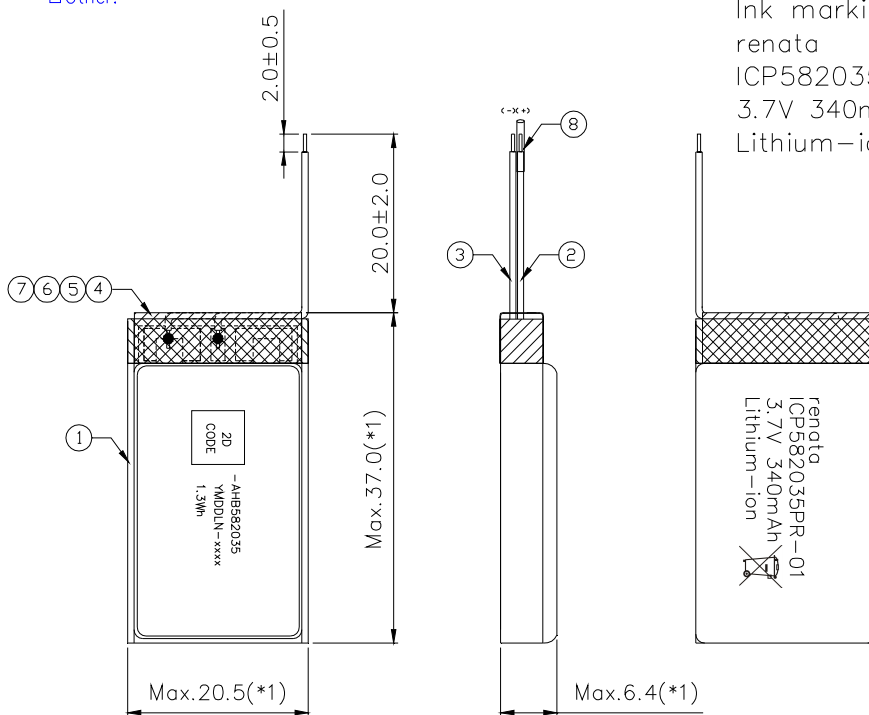
Model	Description		Rev.	Page	
ICP582035PR-01	Lithium-ion Polymer Battery Pack		Rev.4.0	12/14	
17. History of Revision					
REV.	ISSUE	CONTENT OF AMENDMENT	PRE.	CHK.	APP.
1.0	July 08, 2009	1 st Edition	MKL	KS	KW
2.0	Sep. 14, 2009	2 nd Edition Fig.1($\triangle_0 \Rightarrow \triangle_1$) The Item 3.1 and 3.2 is changed.	MKL	KS	KW
3.0	Dec. 07, 2009	3 rd Edition Fig.1($\triangle_1 \Rightarrow \triangle_2$)	MKL	KS	KW
4.0	Aug. 10, 2023	4 th Edition Fig.1($\triangle_2 \Rightarrow \triangle_3$) Page2 item3.13 、 3.16 is changed. Page2 item3.17 is added. Page3 item6 is added. Page3 item item7.1 is changed. Page4 item9.4 、 9.5 is changed. Page5 item9.11 、 item10 is changed. Page6 item11 External Short-circuit Test 、 Forced-Discharge Test 、 Heating Test Test method is changed. Page8 item13 is changed. Page10 warnings item5 、 6 is added. Page11 disposal method is changed. Page11 item15 、 16 is added. Page14 part list 、 circuit diagram is changed.	YHF	KM	BS
End					

Model	Description	Rev.	Page
ICP582035PR-01	Lithium-ion Polymer Battery Pack	Rev.4.0	13/14

NO.	PART NAME	DESCRIPTION	QTY.	UM	NOTE
1	Battery	ICP582035	1	EA	Polymer
2	Red Wire	POS.POLE UL3302,AWG30	1	EA	(+)
3	Black Wire	NEG.POLE UL3302,AWG30	1	EA	(-)
4	CT89LPR or Same Spec	CIRCUIT PROTECTION	1	EA	PCM
5	Insulating Tape	FOR PROTECTION CELL	2	EA	Nomex
6	Double Coated Adhesive Tape	FOR INSULATING PCM	1	EA	PET
7	Insulating Tape	FOR INSULATING	2	EA	PI
8	Insulating Tube	FOR INSULATING +/-	1	EA	(+)

- HSF reference W-Y001
- Halogen Free reference W-0080
- Other:

Note:
 Ink marking:
 renata
 ICP582035PR-01
 3.7V 340mAh 
 Lithium-ion 



(*1) Measure between two parallel plates with caliper after 500 cycles.

Fig.1

Model	Description	Rev.	Page
ICP582035PR-01	Lithium-ion Polymer Battery Pack	Rev.4.0	14/14

Part list:

Item	Ref	Part name	Number	Qty	Marker
1	C1/C2	CAP	0.1 μ F/SMD0603	2	YAGEO or Same Spec
2	R1	RES	220 Ω /±5%/SMD0603	1	YAGEO or Same Spec
3	R2	RES	1K Ω /±5%/SMD0603	1	YAGEO or Same Spec
4	U1	CONTROL IC	S-8211CAZ/SOT-23-5	1	ABLIC
5	Q1	MOSFET	AO6800/SOT-23-6	1	AOS
			PDQ2218/SOT-23-6		POTENS
6	--	PCB	PCT1804-28HF	1	Sunjung or Same Spec

Circuit diagram:

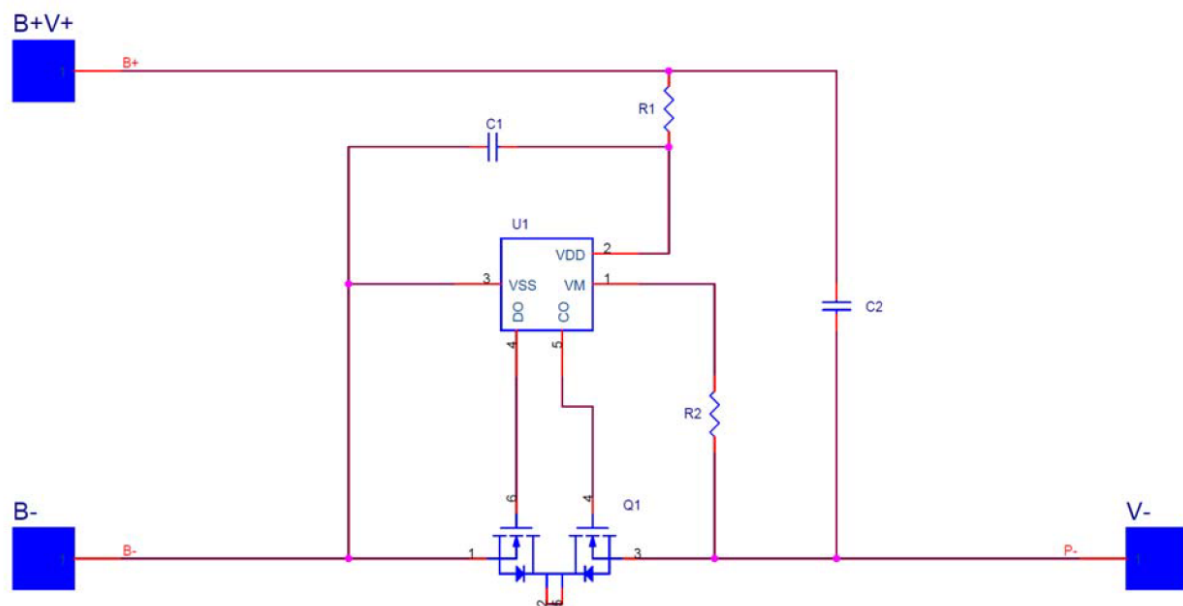


Fig.2