

A close-up photograph of a person's face and hands. The person is looking down at a handheld electronic device, which appears to be a ruggedized smartphone or PDA. The device has a screen and a full QWERTY keyboard. The person is wearing a grey and white jacket. The background is a blurred industrial setting with blue machinery. Two large, bright green diagonal bars are overlaid on the image, one on the left and one on the right, framing the central subject.

Standard lithium-ion /
polymer battery packs

Why choose an Avnet Abacus standard battery pack?

- **Standard product** > very fast time-to-market
- **Availability** > short lead times, low MOQs
- **Approvals** > all packs meet minimum approvals required for shipping lithium-ion and polymer product

LITHIUM-ION / POLYMER BATTERY CERTIFICATIONS

UN regulations (UN38.3)

All lithium batteries are required to pass section 38.3 testing of the UN Manual of Tests and Criteria (UN Transportation Test). This regulation applies worldwide for transportation of dangerous goods. Standards for road- (ADR), air- (IATA) and sea freight (IMDG) refer to this UN3480 regulation.

UN38.3 approval is required to ship production quantities of lithium batteries.

IEC62133 / CB Scheme

IEC 62133 is the most important safety standard for lithium-ion batteries, including those used in IT equipment, tools, laboratory, household and medical equipment.

The CB Scheme is essential for various regional approvals (KC, PSE, Gost, etc.)

UL2054

Standard for Household and Commercial Batteries that applies to battery packs for the US market. The basic requirement for testing according to UL2054 is that the battery cells have been certified according to the UL1642 Standard for Lithium Batteries.

Lithium battery test costs

Test costs shown below are approximate and subject to change – they have been calculated based on a single li-ion battery pack. Cost may vary depending on battery design.

UN38.3 – mandatory for transport

Test charge: \$1500/model

Test sample quantity: 16pcs finished pack and 25pcs cells included in test cost

UL1642 – safety testing for cells

(Most cells already have this approval but this should be confirmed)

Test charge: \$22500/model

Test sample quantity: 55pcs cells included in test cost

Factory audit charge: approx \$850/audit, required quarterly, charged quarterly

File management charge: approx \$1500/year, charged annually

UL2054 – safety testing for battery packs

Test charge: \$20000/model

Test sample quantity: 55pcs cells included in test cost

Factory audit charge: approx \$850/audit, required quarterly, charged quarterly

File management charge: approx \$1500/year, charged annually.

For UL2054 battery pack approval the cell must first be confirmed as approved to UL1642.

IEC62133 – combined cell and pack approval

Test charge: \$6350/model (includes cell and pack CB reports, and test report)

Test sample quantity: 73pcs cells and 36pcs finished pack included in test cost



Cylindrical li-ion 18650

Voltage V	Capacity mAh	Avnet PN	Number of cells	Configuration	Manufacturer				Page
3.7	2250	YOB18650CA1S3J	1	1S1P	Dubilier				35
3.7	2600	VAR56637201016	1	1S1P	VARTA				6
3.7	3350	PICPALNB154	1	1S1P	Panasonic				37
3.7	3350	PICPAULLNB19	1	1S1P	Panasonic				38
3.7	4500	YOB18650CA2P3J	2	1S2P	Dubilier				35
3.7	5200	VAR56637502017	2	1S2P	VARTA				7
3.7	5200	VAR56637702099	2	1S2P	VARTA				19
3.7	6700	PICPAULLNB46	2	1S2P	Panasonic				39
3.7	10050	PICPAULLNB33	3	1S3P	Panasonic				40
3.7	13400	PICPAULLNB55	4	1S4P	Panasonic				41
7.4	2250	YOB18650CA2S3J	2	2S1P	Dubilier				35
7.4	2600	VAR56637502016	2	2S1P	VARTA				8
7.4	3350	PICPALNB76	2	2S1P	Panasonic				42
7.4	6400	RRC2057	4	2S2P	RRC				59
7.4	6700	WAT2S2PNCR18650B1A	4	2S2P	Panasonic				36
11.1	2200	WAT3S1PICR1865022F	3	3S1P	Samsung				36
11.1	3350	PICPALNB27	3	3S1P	Panasonic				43
11.1	2950	RRC2040	3	3S1P	RRC				56
11.1	6400	RRC20402	6	3S2P	RRC				60
11.1	8850	RRC2020	9	3S3P	RRC				61
14.8	2950	RRC2054	4	4S1P	RRC				58
14.8	3350	PICPALNB126	4	4S1P	Panasonic				44
14.8	3350	PICPALNB117	4	4S1P	Panasonic				45
14.8	6600	RRC2024	12	4S3P	RRC				63
14.8	6900	RRC20542	8	4S2P	RRC				62
25.2	6750	PICPAL1022	21	7S3P	Panasonic				48
25.2	20300	PICPAL1707	49	7S7P	Panasonic				49
25.2	29000	PICPAL1710	70	7S10P	Panasonic				50
36.0	14500	PICPAL1805	50	10S5P	Panasonic				51



Li-ion button cells

Voltage V	Capacity mAh	Avnet PN	Number of cells	Configuration	Manufacturer				Page
3.7	60	VAR63125101521	1	1S1P	VARTA				22
3.7	85	VAR63145101501	1	1S1P	VARTA				25
3.7	120	VAR63165101521	1	1S1P	VARTA				28

Custom versions can be made available on a project basis - please consult your local Avnet Abacus representative

■ = UN 38.3

■ = IEC 62133

■ = UL 2054

■ = UL 1642

Prismatic li-ion



Voltage V	Capacity mAh	Avnet PN	Number of cells	Configuration	Manufacturer				Page
3.7	1300	PICPAL36	1	1S1P	Panasonic				46
3.7	1800	YOB103450AR21S3M	1	1S1P	Dubilier				34
3.7	2000	RRC1120	1	1S1P	RRC				52
3.7	2030	VAR56429201016	1	1S1P	VARTA				9
3.7	2050	YOB103456A1S3M	1	1S1P	Dubilier				34
3.7	2350	PICPAL2138	1	1S1P	Panasonic				47
3.7	3880	RRC1130	1	1S1P	RRC				54
11.4	3880	RRC2140	3	3S1P	RRC				57

Li-polymer



Voltage V	Capacity mAh	Avnet PN	Number of cells	Configuration	Manufacturer				Page
3.7	130	YOBLP401235IS2	1	1S1P	Dubilier				31
3.7	155	YOBLP402025IS3	1	1S1P	Dubilier				31
3.7	300	YOBLP402933IS3	1	1S1P	Dubilier				31
3.7	370	YOBLP422339PACK	1	1S1P	Dubilier				31
3.7	560	YOBLP443440IS3	1	1S1P	Dubilier				32
3.7	560	YOBLP4434401S3M	1	1S1P	Dubilier				32
3.7	660	VAR56455201012	1	1S1P	VARTA				10
3.7	660	VAR56455701099	1	1S1P	VARTA				16
3.7	800	YOBLP403451IS2	1	1S1P	Dubilier				32
3.7	800	YOBLP573442IS3	1	1S1P	Dubilier				32
3.7	950	YOBLP523450PIS3	1	1S1P	Dubilier				33
3.7	1000	VAR56457201012	1	1S1P	VARTA				11
3.7	1050	YOBLP503562IS3	1	1S1P	Dubilier				33
3.7	1050	YOBLP922543IS3	1	1S1P	Dubilier				33
3.7	1130	VAR56437201012	1	1S1P	VARTA				12
3.7	1200	VAR56456701099	1	1S1P	VARTA				17
3.7	1200	VAR56456201012	1	1S1P	VARTA				13
3.7	1300	YOBLP503759IS3	1	1S1P	Dubilier				33
3.7	1400	VAR56427201020	1	1S1P	VARTA				14
3.7	1590	VAR56426801095	1	1S1P	VARTA				20
3.7	2400	VAR56456302012	2	1S2P	VARTA				15
3.7	2400	VAR56456702099	2	1S2P	VARTA				18
3.7	3000	YOBLP4549652P3M	2	1S2P	Dubilier				34

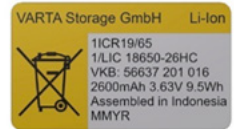
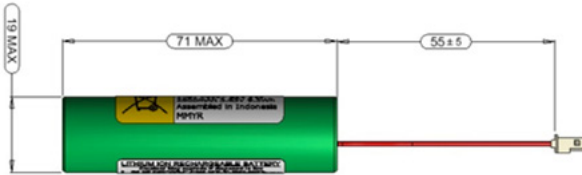
= UN 38.3

= IEC 62133

= UL 2054

VAR56637201016 - 1S1P - 3.6V / 2600 mAh

This product will soon be replaced due to a change in the cell used in the pack - The part number will be updated when it is made available.



MM ▶ month two digits
Y ▶ year one digit
R ▶ VARTA internal one digit

1. GENERAL

Battery Pack in shrink sleeve incl. safety circuit and wire connector

Cell	▶ LIC 18650-26 HC
PCM	▶ Yes
NTC	▶ None
ID	▶ None
Configuration	▶ 1S
Weight	▶ appr. 50g

2. ELECTRICAL SPECIFICATION

Rated Capacity	▶ 2550mAh min., 2600mAh nominal
Nominal Voltage	▶ 3.63V
Watt-Hour Rating	▶ 9.5Wh
Charging Method	▶ Constant Current + Constant Voltage
Max. Charge Voltage [V]:	▶ 4.2 (±50mV)
Max. Continuous Charge Current:	▶ 2500mA (limited by Connector)
Rec. Charge Cut Off:	▶ 0.05C or timer 2.5h
Max. Continuous Discharge Current:	▶ 2500mA (limited by Connector)
Rec. Discharge Cut Off:	▶ 2.75V
Internal Impedance:	▶ approx. 120mΩ
Expected Cycle Life @ (0.5C/0.5C) @ 25°C	▶ 300 cycles @ ≥ 1785mAh

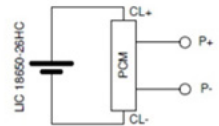
CELL PROTECTION

Overcharge Detection	▶ 4.300 ± 0.025V (0.8 to 1.2sec. delay, resume 4.100V ± 0.030V)
Overdischarge Detection:	▶ 2.400V ± 0.035V (76.8 to 115.2msec. delay, resumed by removing load)
Overcurrent Detection	▶ 6A to 8A (9.6 to 14.4msec. delay)

3. AMBIENT CONDITIONS

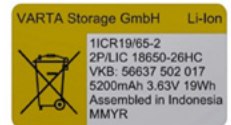
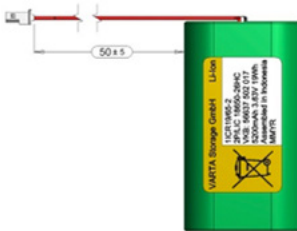
Temperature Range	
• Charge	▶ 0 to +45°C
• Discharge	▶ -20 to +60°C
• Charge Retention/ Storage [%]	▶ 1 year at -20 to +25°C > 80%
	▶ 3 months at -20°C to +45°C > 80%
	▶ 1 month at -20°C to +60°C > 80%
• Humidity	▶ 65 ± 20%RH

Circuit Diagram



VAR56637502017 – 1S2P – 3.6V / 5200 mAh

This product will soon be replaced due to a change in the cell used in the pack - The part number will be updated when it is made available.



MM ▶ month two digits
Y ▶ year one digit
R ▶ VARTA internal one digit

1. GENERAL

Li-Ion Battery Pack in shrink sleeve incl. safety circuit, wires and connector

Cell	▶ LIC 18650-26 HC
PCM	▶ Yes
NTC	▶ 10kΩ ± 3%; B-value: 3435K ± 3%
ID	▶ None
Configuration	▶ 2P
Weight	▶ appr. 95g

2. ELECTRICAL SPECIFICATION

Rated Capacity	▶ 5100mAh min., 5200mAh nominal
Nominal Voltage	▶ 3.63V
Watt-Hour Rating	▶ 19Wh
Charging Method	▶ Constant Current + Constant Voltage
Max. Charge Voltage [V]:	▶ 4.2 (±50mV)
Max. Continuous Charge Current:	▶ 2500mA (limited by PCM)
Rec. Charge Cut Off:	▶ 0.05C or timer 3h
Max. Continuous Discharge Current:	▶ 2500mA (limited by PCM)
Rec. Discharge Cut Off:	▶ 2.75V
Internal Impedance:	▶ approx. 100mΩ
Expected Cycle Life @ (0.5C/0.5C) @ 25°C	▶ 300 cycles @ ≥ 3570mAh

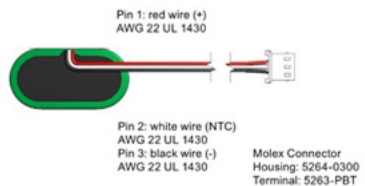
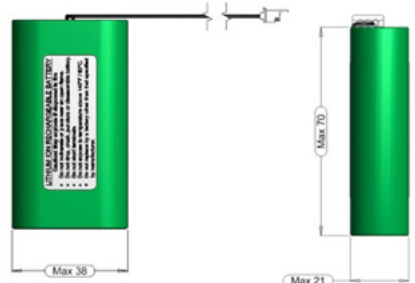
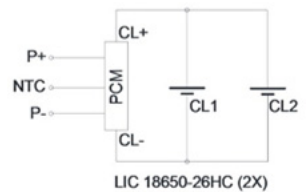
CELL PROTECTION

Overcharge Detection	▶ 4.250V ± 4.300V (0.6 to 1.3sec. delay, auto release)
Overdischarge Detection:	▶ 2.220V ± 2.380V (60 to 130msec. delay, auto release)
Overcurrent Detection @ charging	▶ 3.6A to 7.0A (15 to 33msec. delay)
Overcurrent Detection @ discharging	▶ 4.0A to 6.3A (9.8 to 22msec. delay)

3. AMBIENT CONDITIONS

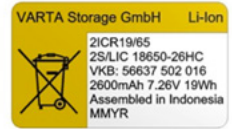
Temperature Range	
• Charge	▶ 0 to +45°C
• Discharge	▶ -20 to +60°C
• Charge Retention/ Storage [%]	▶ 1 year at -20 to +25°C > 80%
	▶ 3 months at -20°C to +45°C > 80%
	▶ 1 month at -20°C to +60°C > 80%
• Humidity	▶ 65 ± 20%RH

Circuit Diagram



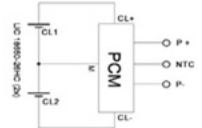
VAR56637502016 – 2S1P – 7.2V / 2600 mAh

This product will soon be replaced due to a change in the cell used in the pack - The part number will be updated when it is made available.



MM ▶ month two digits
Y ▶ year one digit
R ▶ VARTA internal one digit

Circuit Diagram



1. GENERAL

Li-Ion Battery Pack in shrink sleeve incl. safety circuit, wires and connector

Cell	▶ LIC 18650-26 HC
PCM	▶ Yes
NTC	▶ 10kΩ; B-value: 3435 ±1%
ID	▶ None
Configuration	▶ 2S layflat multiple
Weight	▶ appr. 95g

2. ELECTRICAL SPECIFICATION

Rated Capacity	▶ 2550mAh min., 2600mAh nominal
Nominal Voltage	▶ 7.26V
Watt-Hour Rating	▶ 19Wh
Charging Method	▶ Constant Current + Constant Voltage
Max. Charge Voltage [V]:	▶ 8.4 (±50mV)
Max. Continuous Charge Current:	▶ 2000mA (limited by PCM)
Rec. Charge Cut Off:	▶ 0.05C or timer 3h
Max. Continuous Discharge Current:	▶ 2000mA (limited by PCM)
Rec. Discharge Cut Off:	▶ 5.5V
Internal Impedance:	▶ approx. 220mΩ
Expected Cycle Life @ (0.5C/0.5C) @ 25°C	▶ 300 cycles @ ≥ 1785mAh

CELL PROTECTION

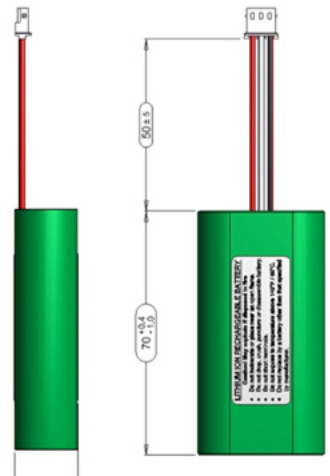
Overcharge Detection	▶ 4.325V ~ 4.375V (920msec. ~ 1380msec. delay, resume 4.100V ~ 4200V)
Overdischarge Detection:	▶ 2.220V ~ 2.350V (115msec. ~ 173msec. delay, resume 2.800V ~ 3.000V)
Overcurrent Detection	▶ 2.6A to 4.6A (7.20msec. ~ 11.00msec. delay)

3. AMBIENT CONDITIONS

Temperature Range	
• Charge	▶ 0 to +45°C
• Discharge	▶ -20 to +60°C
• Storage with >80% Capacity recovery	
	▶ 1 year at -20 to +25°C
	▶ 3 months at -20°C to +45°C
	▶ 1 month at -20°C to +60°C

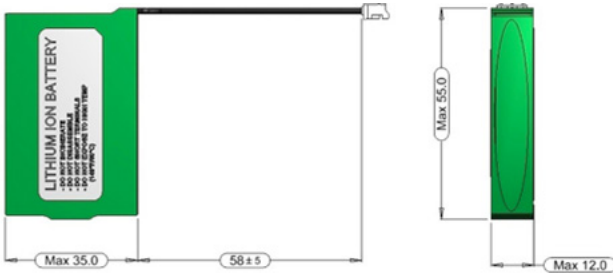
Pin 1: red wire (+)
AWG 22 UL 1007
Pin 2: white wire (NTC)
AWG 22 UL 1007
Pin 3: black wire (-)
AWG 22 UL 1007

Molex connector:
Housing 5264-03
Terminal 5263 PBT



VAR56429201016 – 103450 – 3.7V / 2030 mAh

This product will soon be replaced due to a change in the cell used in the pack - The part number will be updated when it is made available.



1. GENERAL

Li-Ion Battery Pack in shrink sleeve including safety circuit and wire connector

Cell	▶ LIP 103450 SC
PCM	▶ Yes
NTC	▶ 10 kΩ ± 1%; B-Value = 3435 ± 1%
ID	▶ None
Configuration	▶ 1S
Weight	▶ appr. 43g

2. ELECTRICAL SPECIFICATION

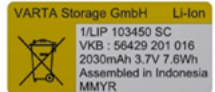
Rated Capacity	▶ 2000mAh min., 2030mAh typical
Nominal Voltage	▶ 3.7V
Watt-Hour Rating	▶ 7.4Wh
Charging Method	▶ Constant Current + Constant Voltage
Max. Charge Voltage [V]:	▶ 4.2 (±50mV)
Max. Continuous Charge Current:	▶ 1500mA (limited by PCM)
Rec. Charge Cut Off:	▶ 100mA or timer 3h
Max. Continuous Discharge Current:	▶ 1500mA (limited by PCM)
Rec. Discharge Cut Off:	▶ 3V
Internal Impedance:	▶ approx. 140mΩ
Expected Cycle Life @ (0.5C/0.5) @ 20°C	▶ 300 cycles >80% of min. capacity ▶ 500 cycles >70% of min. capacity

CELL PROTECTION

Overcharge Detection	▶ 4.275V ± 25mV (0.96 to 1.4sec. delay, resume 4.075V ± 50mV, remove charge current)
Overdischarge Detection:	▶ 2.30V ± 50mV (30 to 46msec. delay, resume 2.3V ± 100mV @ charge current)
Overcurrent Detection	▶ 5.2A to 8.0A (7.2 to 11msec. delay)

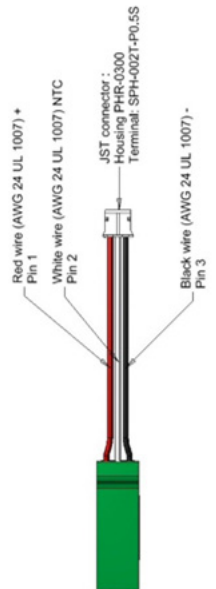
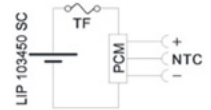
3. AMBIENT CONDITIONS

Temperature Range	
• Charge	▶ 0 to +45°C
• Discharge	▶ -20 to +60°C
• Storage Temperature	▶ 1 year at -20 to +20°C > 80% ▶ 3 months at -20°C to +45°C > 80% ▶ 1 month at -20°C to +60°C > 80%
• Humidity	▶ 65 ± 20%RH

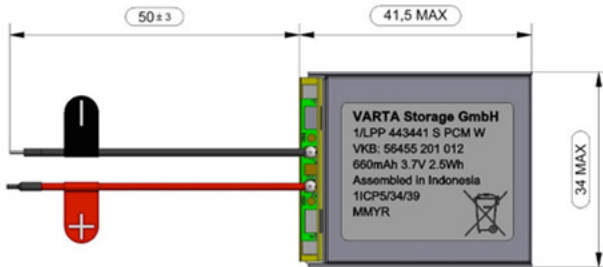


MM	▶ month two digits
Y	▶ year one digit
R	▶ plant one digit

Circuit Diagram



VAR56455201012 - 443441 - 3.7V / 660 mAh



VARTA Storage GmbH
1/LPP 443441 S PCM W
VKB: 56455 201 012
660mAh 3.7V 2.5Wh
Assembled in Indonesia
1ICP5/34/39
MMYR

MM ▶ month two digits
Y ▶ year one digit
R ▶ week one digit

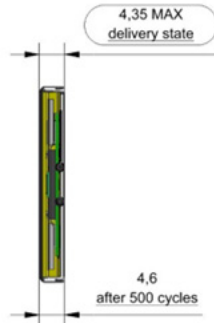
1. GENERAL

Battery Pack including safety circuit and wires

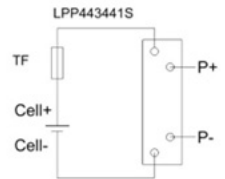
Cell	▶ LPP 443441 S
PCM	▶ Yes
NTC	▶ None
ID	▶ None
Configuration	▶ 1S
Weight	▶ appr. 13g

2. ELECTRICAL SPECIFICATION

Rated Capacity	▶ 630mAh min., 660mAh nominal
Nominal Voltage	▶ 3.7V
Watt-Hour Rating	▶ 2.5Wh
Charging Method	▶ Constant Current + Constant Voltage
Max. Charge Voltage:	▶ 4.2V (±50mV)
Max. Continuous Charge Current:	▶ 630mA (limited by cell DS)
Rec. Charge Cut Off:	▶ 6.3mA or timer 2.5h
Max. Continuous Discharge Current:	▶ 1260mA (limited by cell DS)
Rec. Discharge Cut Off:	▶ 3V
Internal Impedance:	▶ approx. 130mΩ
Expected Cycle Life @ (1C/1C) @ 23 ±5°C	▶ 500 cycles ≥70%



Circuit Diagram

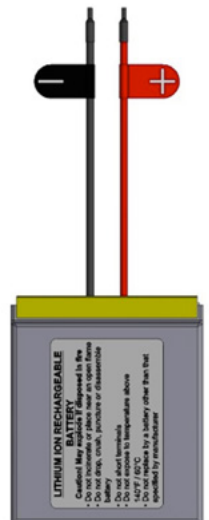


CELL PROTECTION

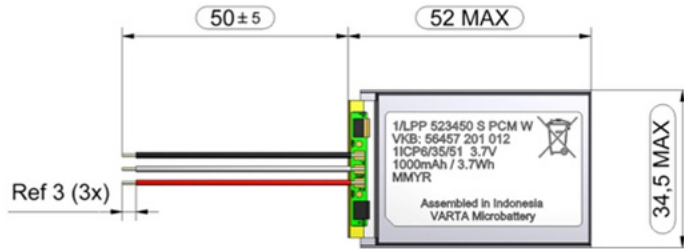
Overcharge Detection	▶ 4.275V ± 25mV (0.7 to 1.3sec. delay, resume 4.275V ± 25mV)
Overdischarge Detection:	▶ 2.30V ± 58mV (14 to 26msec. delay, resume 2.3V ± 58mV)
Overcurrent Detection	▶ 2.0A to 4.5A (8 to 16msec. delay @ discharge)

3. AMBIENT CONDITIONS

Temperature Range	
• Charge	▶ 0 to +45°C
• Discharge	▶ -10 to +60°C
• Storage Temperature	▶ 1 year at -20 to +30°C with >80% capacity recovery ▶ 3 months at -20 to 45°C with >80% capacity recovery ▶ 1 month at -20 to 60°C with >80% capacity recovery
• Humidity	▶ 65 ± 20%RH



VAR56457201012 – 523450 – 3.7V / 1000 mAh



MM ▶ month two digits
Y ▶ year one digit
R ▶ week one digit

1. GENERAL

Battery Pack incl. safety circuit & wires

Cell	▶ LPP 523450 S
PCM	▶ Yes
NTC	▶ 10kΩ ±1%; B-value 3380K
ID	▶ None
Configuration	▶ 1S layflat
Weight	▶ appr. 20g

2. ELECTRICAL SPECIFICATION

Rated Capacity	▶ 950mAh min., 1000mAh typical
Nominal Voltage	▶ 3.7V
Watt-Hour Rating	▶ 3.7Wh
Charging Method	▶ Constant Current + Constant Voltage
Max. Charge Voltage:	▶ 4.2V
Max. Continuous Charge Current:	▶ 1000mA (limited by cell DS)
Rec. Charge Cut Off:	▶ 10mA or timer 3.5h
Max. Continuous Discharge Current:	▶ 2000mA (limited by cell DS)
Rec. Discharge Cut Off:	▶ 3V
Internal Impedance:	▶ approx. 100mΩ
Expected Cycle Life @ (1C/1C) @ 23 ±5°C	▶ 500 cycles ≥ 800mAh

CELL PROTECTION

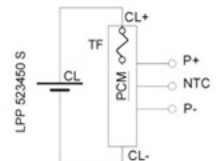
Overcharge Detection	▶ 4.275V ±25mV (0.7 to 1.3sec. delay, release 4.275V ±25mV)
Overdischarge Detection:	▶ 2.3V ±58mV (14 to 26msec. delay, resume 2.3V ±58mV)
Overcurrent Detection	▶ 2A to 4.5A (8 to 16msec. delay)

3. AMBIENT CONDITIONS

Temperature Range

• Charge	▶ 0 to +45°C
• Discharge	▶ -20 to +60°C
• Storage	▶ 1 year at -20 to +30°C >80%
	▶ 3 months at -20 to +45°C >80%
	▶ 1 month at -20 to +60°C >80%
• Humidity	▶ 65 ± 20%RH

Circuit Diagram



5,3 MAX

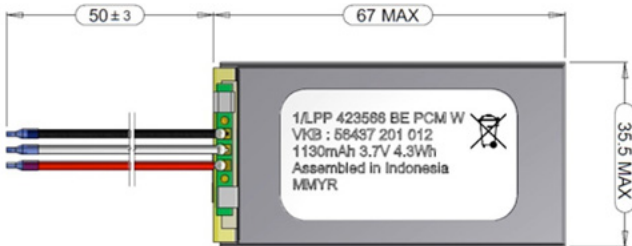


Red wire (+)
(AWG24 UL 1007)

White wire (NTC)
(AWG24 UL 1007)

Black wire (-)
(AWG24 UL 1007)

VAR56437201012 – 423566 – 3.7V / 1130 mAh



1. GENERAL

Battery Pack including safety circuit and wires

Cell	▶ LPP 423566 BE
PCM	▶ Yes
NTC	▶ 10 kΩ ± 1%; B-Value 3380 ± 1%
ID	▶ None
Configuration	▶ 1S
Weight	▶ appr. 26g

2. ELECTRICAL SPECIFICATION

Rated Capacity	▶ 1130mAh min., 1160mAh typical
Nominal Voltage	▶ 3.7V
Watt-Hour Rating	▶ 4.3Wh
Charging Method	▶ Constant Current + Constant Voltage
Max. Charge Voltage [V]:	▶ 4.2 (±50mV)
Max. Continuous Charge Current:	▶ 1130mA (limited by cell DS)
Rec. Charge Cut Off:	▶ by current 20mA or timer 2.5h
Max. Continuous Discharge Current:	▶ 2000mA (limited by PCM)
Rec. Discharge Cut Off:	▶ 3V
Internal Impedance:	▶ approx. 120mΩ
Expected Cycle Life @ (C/2) @ 20°C	▶ 400 cycles >75% of initial cap.

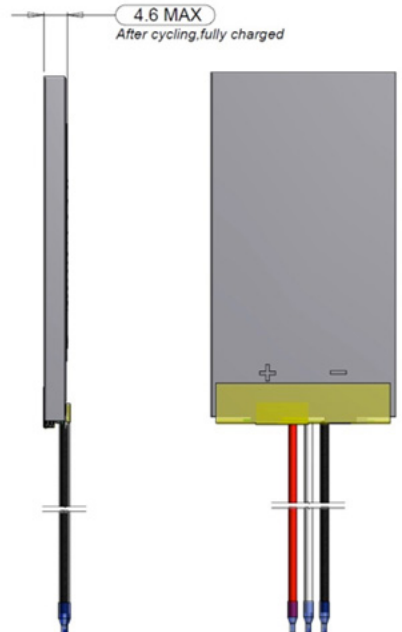
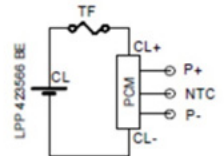
CELL PROTECTION

Overcharge Detection	▶ 4.275V ± 25mV (0.7 to 1.3sec. delay, resume 4.275V ± 25mV)
Overdischarge Detection:	▶ 2.30V ± 85mV (14 to 26msec. delay, resume 2.3V ± 58mV)
Overcurrent Detection	▶ 2.0A to 4.0A (8 to 16msec. delay)

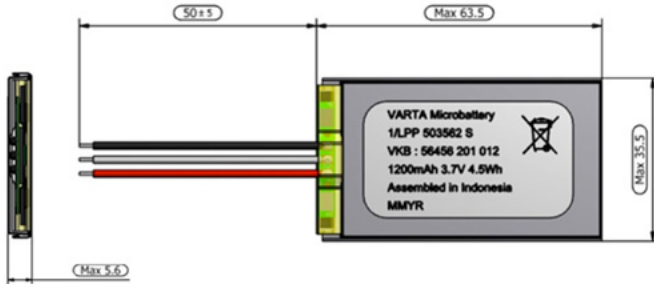
3. AMBIENT CONDITIONS

Temperature Range	
• Charge	▶ 0 to +45°C
• Discharge	▶ -20 to +60°C
• Storage Temperature	▶ 6 months at -20 to +35°C
	▶ 1 month at -20°C to +45°C
• Humidity	▶ 65 ± 20%RH

Circuit Diagram



VAR56456201012 – 503562 – 3.7V / 1200 mAh



VARTA Microbattery
1/LPP 503562 S
VKB : 56456 201 012
1200mAh 3.7V 4.5Wh
Assembled in Indonesia
MMYY

MM ▶ month two digits
Y ▶ year one digit
R ▶ week one digit

1. GENERAL

Battery with safety circuit & wires

Cell	▶ LPP 503562 S
PCM	▶ Yes
NTC	▶ 10kΩ ± 1%; B-value 3380
ID	▶ None
Configuration	▶ 1S
Weight	▶ appr. 23g

2. ELECTRICAL SPECIFICATION

Rated Capacity	▶ 1150mAh min., 1200mAh nominal
Nominal Voltage	▶ 3.7V
Watt-Hour Rating	▶ 4.5Wh
Charging Method	▶ Constant Current + Constant Voltage
Max. Charge Voltage:	▶ 4.2V
Max. Continuous Charge Current:	▶ 1150mA (limited by cell DS)
Rec. Charge Cut Off:	▶ 11.5mA or timer 2.0h
Max. Continuous Discharge Current:	▶ 2A (limited by PCM)
Rec. Discharge Cut Off:	▶ 3V
Internal Impedance:	▶ approx. 100mΩ
Expected Cycle Life @ (1.0C/1.0C) @ 23.5°C	▶ 500 cycles > 70%

CELL PROTECTION

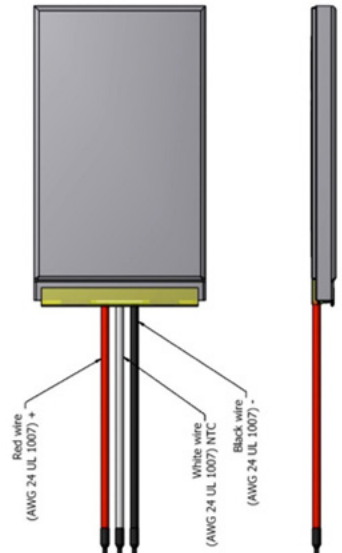
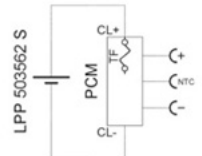
Overcharge Detection	▶ 4.275V ± 25mV (0.7 to 1.3sec. delay, resume 4.275V ± 25mV)
Overdischarge Detection:	▶ 2.3V ± 58mV (14 to 26msec. delay, resume 2.3V ± 58mV)
Overcurrent Detection	▶ 2A to 4.5A (8 to 16msec. delay @ discharge)

3. AMBIENT CONDITIONS

Temperature Range

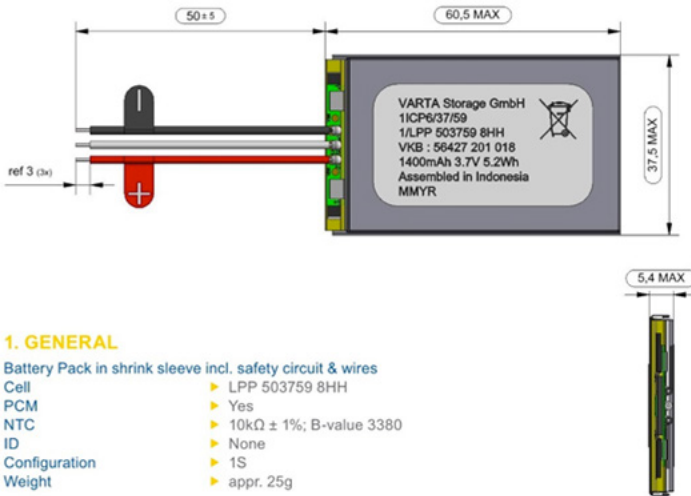
• Charge	▶ 0 to +45°C
• Discharge	▶ -20 to +60°C
• Storage with >60% recovery	▶ 1 year at -20 to +30°C ▶ 3 months at -20 to +45°C ▶ 1 month at -20 to +60°C
• Humidity	▶ 65 ± 20%RH

Circuit Diagram



VAR56427201018 – 503759 – 3.7V / 1400 mAh

This PN will soon be replaced by PN VAR5642720102 that is 30% charged.



VARTA Storage GmbH
1ICP6/37/59
1/LPP 503759 8HH
VKB : 56427 201 018
1400mAh 3.7V 5.2Wh
Assembled in Indonesia
MMYR



MM ▶ month two digits
Y ▶ year one digit
R ▶ week one digit

1. GENERAL

Battery Pack in shrink sleeve incl. safety circuit & wires

Cell	▶ LPP 503759 8HH
PCM	▶ Yes
NTC	▶ 10kΩ ± 1%; B-value 3380
ID	▶ None
Configuration	▶ 1S
Weight	▶ appr. 25g

2. ELECTRICAL SPECIFICATION

Rated Capacity	▶ 1320mAh min., 1400mAh typical
Nominal Voltage	▶ 3.7V
Watt-Hour Rating	▶ 5.2Wh
Charging Method	▶ Constant Current + Constant Voltage
Max. Charge Voltage:	▶ 4.2V (±50mV)
Max. Continuous Charge Current:	▶ 1980mA (limited by cell DS)
Rec. Charge Cut Off:	▶ 50mA or timer 2.5h
Max. Continuous Discharge Current:	▶ 2000mA (limited by PCM)
Rec. Discharge Cut Off:	▶ 3V
Internal Impedance:	▶ approx. 100mΩ
Exp. Cycle Life @ (1C/0.5C) @ 23 ± 2°C	▶ 500 cycles ≥ 1098mAh

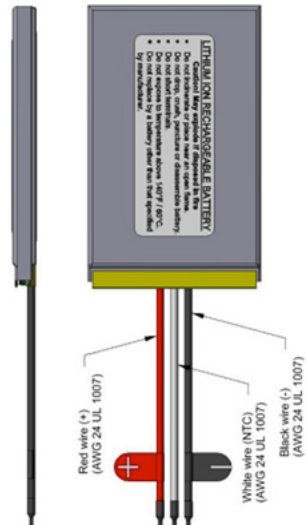
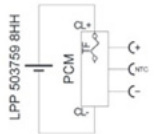
CELL PROTECTION

Overcharge Detection	▶ 4.275V ± 25mV (0.7 to 1.3sec. delay, resume 4.275V ± 25mV)
Overdischarge Detection:	▶ 2.3V ± 58mV (14 to 26msec. delay, resume 2.3V ± 58mV)
Overcurrent Detection	▶ 2A to 4.5A (8 to 16msec. delay @ discharge)

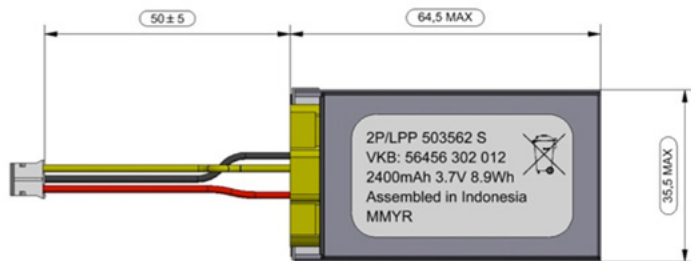
3. AMBIENT CONDITIONS

Temperature Range	
• Charge	▶ 0 to +45°C
• Discharge	▶ -20 to +60°C
• Storage Capacity	
• Recovery Rate	▶ 1 month at -10 to +45°C > 85%
• Humidity	▶ 65 ± 20%RH

Circuit Diagram



VAR56456302012 – 503562 – 3.7V / 2400 mAh



2P/LPP 503562 S
VKB: 56456 302 012
2400mAh 3.7V 8.9Wh
Assembled in Indonesia
MMYR

MM ▶ month two digits
Y ▶ year one digit
R ▶ week one digit

1. GENERAL

Battery Pack including safety circuit & wires with connector

Cell	▶ LPP 503562 S
PCM	▶ Yes
NTC	▶ $10k\Omega \pm 1\%$; B-value $3435K \pm 1\%$
ID	▶ None
Configuration	▶ 2P stack up
Weight	▶ appr. 45g

2. ELECTRICAL SPECIFICATION

Rated Capacity	▶ 2300mAh min., 2400mAh nominal
Nominal Voltage	▶ 3.7V
Watt-Hour Rating	▶ 8.9Wh
Charging Method	▶ Constant Current + Constant Voltage
Max. Charge Voltage:	▶ 4.2V
Max. Continuous Charge Current:	▶ 1150mA (limited by cell DS)
Rec. Charge Cut Off:	▶ 23mA or timer 3.5h
Max. Continuous Discharge Current:	▶ 2000mA (limited by connector)
Rec. Discharge Cut Off:	▶ 3V
Internal Impedance:	▶ approx. 90m Ω
Expected Cycle Life @ (1.0C/1.0C) @ 23.5°C	▶ 500 cycles > 70%

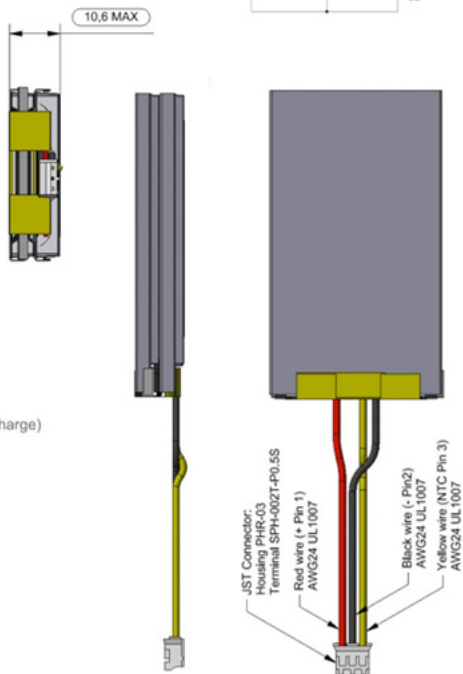
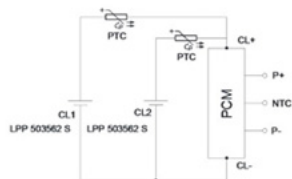
CELL PROTECTION

Overcharge Detection	▶ 4.3V $\pm$ 20mV (0.8 to 1.2sec. delay, resume 4.1V $\pm$ 30mV)
Overdischarge Detection:	▶ 2.4V $\pm$ 35mV (76.8 to 115.2msec. delay, @ remove loader & charging current)
Overcurrent Detection	▶ 3.2A to 5.2A (9.6 to 14.4msec. delay @ discharge)

3. AMBIENT CONDITIONS

Temperature Range	
• Charge	▶ 0 to +45°C
• Discharge	▶ -20 to +60°C
• Storage with >80% capacity recovery	▶ 1 year at -20 to +30°C ▶ 3 months at -20 to +45°C ▶ 1 month at -20 to +60°C
• Humidity	▶ 65 $\pm$ 20%RH

Circuit Diagram



VAR56455701099 – 3.7V / 660 mAh



Mating connector
for the EasyPack S

Avnet PN

ELC009155004541006



MM ▶ month two digits
Y ▶ year one digit
R ▶ week one digit

1. GENERAL

Battery with safety circuit and plastic housing

Cell	▶ LPP 443441 S
PCM	▶ Yes
NTC	▶ 10 k Ω $\pm$ 1%; B-Value 3435K $\pm$ 1%
ID	▶ 3.9 k Ω $\pm$ 1%
Configuration	▶ 1S
Weight	▶ appr. 15g

2. ELECTRICAL SPECIFICATION

Rated Capacity	▶ 630mAh min., 660mAh typical
Nominal Voltage	▶ 3.7V
Watt-Hour Rating	▶ 2.4Wh
Charging Method	▶ Constant Current + Constant Voltage
Max. Charge Voltage:	▶ 4.2V
Max. Continuous Charge Current:	▶ 630mA
Rec. Charge Cut Off:	▶ by current 6.3mA or time 3.5h
Max. Continuous Discharge Current:	▶ 1260mA (limited by cell)
Rec. Discharge Cut Off:	▶ 3V
Internal Impedance:	▶ approx. 115 m Ω
Expected Cycle Life @ (1C/1C) @ 23 $\pm$ 5 °C	▶ >500 cycles >70% of initial cap.

CELL PROTECTION

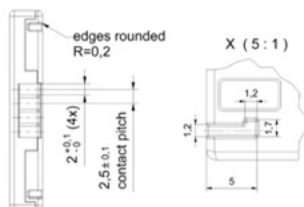
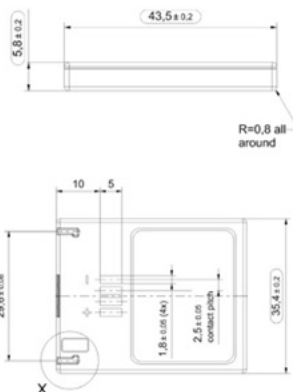
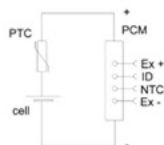
Overcharge Detection	▶ 4.3 $\pm$ 0.02V (0.8 to 1.2sec. delay, resume 4.1V $\pm$ 0.03V)
Overdischarge Detection:	▶ 2.40V $\pm$ 0.035V (76.8 to 115.2msec. delay, resume remove load & charging current)
Overcurrent Detection	▶ 3.2A to 5.2A (9.6 to 14.4msec. delay)

3. AMBIENT CONDITIONS

Temperature Range

• Charge	▶ 0 to +45°C
• Discharge	▶ -10 to +60°C
• Storage	▶ Less than 1 month at -20 to +60°C Less than 3 months at -20°C to +45°C Less than 1 year at -20°C to +30°C
• Humidity	▶ 65 $\pm$ 20%RH

Protection Circuit Module



VAR56456701099 – 3.7V / 1200 mAh



Mating connector
for the EasyPack L

Aynat PN

ELC009155004541006



- MM ▶ month two digits
- Y ▶ year one digit
- R ▶ week of month one digit

1. GENERAL

Battery with safety circuit and plastic housing

Cell	▶ LPP 503562 S
PCM	▶ Yes
NTC	▶ 10 kΩ ±1%; B-Value 3435K ±1%
ID	▶ 10 kΩ ±1%
Configuration	▶ 1S
Weight	▶ appr. 26g

2. ELECTRICAL SPECIFICATION

Rated Capacity	▶ 1150mAh min., 1200mAh typical
Nominal Voltage	▶ 3.7V
Watt-Hour Rating	▶ 4.3Wh
Charging Method	▶ Constant Current + Constant Voltage
Max. Charge Voltage:	▶ 4.2V
Max. Continuous Charge Current:	▶ 1150mA
Rec. Charge Cut Off:	▶ by current 11.5mA or time 3.5h
Max. Continuous Discharge Current:	▶ 2100mA (limited by PTC)
Rec. Discharge Cut Off:	▶ 3V
Internal Impedance:	▶ approx. 99mΩ
Expected Cycle Life @ (1C/1C) @23 ±5°C	▶ >500 cycles >70% of initial cap.

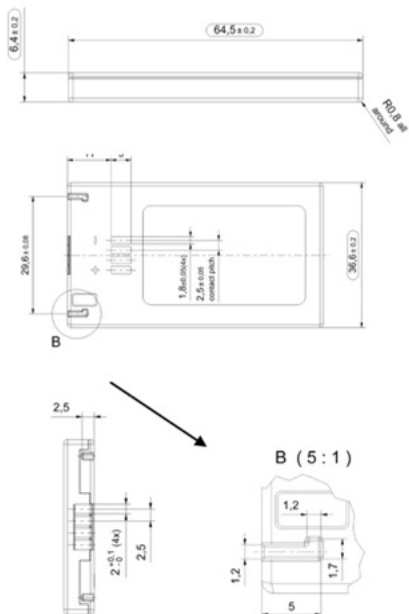
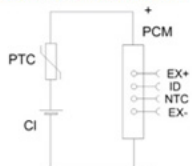
CELL PROTECTION

Overcharge Detection	▶ 4.3 ± 0.02V (0.8 to 1.2sec. delay, resume 4.1V ± 0.03V)
Overdischarge Detection:	▶ 2.40V ± 0.035V (76.8 to 115.2msec. delay, resume remove load & charging current)
Overcurrent Detection	▶ 3.2A to 5.2A (9.6 to 14.4msec. delay)

3. AMBIENT CONDITIONS

- **Temperature Range**
 - ▶ 0 to +45°C
 - ▶ -10 to +60°C
 - ▶ Less than 1 month at at -20 to +60°C
 - ▶ Less than 3 months at -20°C to +45°C
 - ▶ Less than 1 year at -20°C to +30°C°C
- **Humidity**
 - ▶ 65 ± 20%RH

Protection Circuit Module



VAR56456702099 – 3.7V / 2400 mAh

UN 38.3

IEC 62133

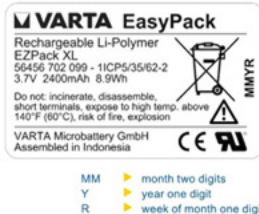
UL 2054



Mating connector
for the EasyPack XL

Avnet PN

ELC009155004541006



1. GENERAL

Battery with safety circuit and plastic housing

Cell	▶ LPP 503562 S
PCM	▶ Yes
NTC	▶ 10 kΩ ±1%; B-Value 3435K ±1%
ID	▶ 24 kΩ ±1%
Configuration	▶ 2P
Weight	▶ appr. 48g

2. ELECTRICAL SPECIFICATION

Rated Capacity	▶ 2300mAh min., 2400mAh typical
Nominal Voltage	▶ 3.7V
Watt-Hour Rating	▶ 8.6Wh
Charging Method	▶ Constant Current + Constant Voltage
Max. Charge Voltage:	▶ 4.2V
Max. Continuous Charge Current:	▶ 2300mA
Rec. Charge Cut Off:	▶ by current 23mA or time 3.5h
Max. Continuous Discharge Current:	▶ 3200mA (limited by PCM)
Rec. Discharge Cut Off:	▶ 3V
Internal Impedance:	▶ approx. 68mΩ
Expected Cycle Life @ (1C/1C) @ 23 ±5°C	▶ >500 cycles >70% of initial cap.

CELL PROTECTION

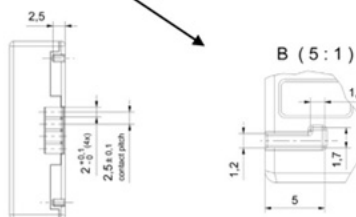
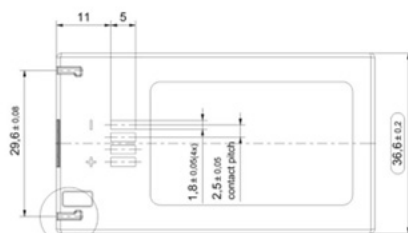
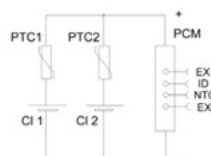
Overcharge Detection	▶ 4.3 ±0.02V (0.8 to 1.2sec. delay, release 4.1V ±0.03V)
Overdischarge Detection:	▶ 2.40V ±0.035V (76.8 to 115.2msec. delay, release remove load & charging current)
Overcurrent Detection	▶ 3.2A to 5.2A (9.6 to 14.4msec. delay)

3. AMBIENT CONDITIONS

Temperature Range

• Charge	▶ 0 to +45°C
• Discharge	▶ -10 to +60°C
• Storage	▶ Less than 1 month at at -20 to +60°C
	▶ Less than 3 months at -20°C to +45°C
	▶ Less than 1 year at -20°C to +30°C
• Humidity	▶ 65 ± 20%RH

Protection Circuit Module



VAR56637702099 – 3.7V / 5200 mAh

UN 38.3

IEC 62133

UL 2054

This product will soon be replaced due to a change in the cell used in the pack - The part number will be updated when it is made available.



WW ▶ week two digits
YY ▶ year two digits

1. GENERAL

Battery rechargeable with safety circuit

Cell	▶ LIC 18650-26HC
PCM	▶ Yes
NTC	▶ $10k\Omega \pm 1\%$, B25/85=3435K $\pm 1\%$
ID	▶ $52.3k\Omega \pm 1\%$
Configuration	▶ 2P
Weight	▶ appr. 105g

2. ELECTRICAL SPECIFICATION

Nominal Capacity	▶ 5200mAh min (at 0.2C and 20°C)
Minimum Capacity	▶ 5100mAh min
Nominal Voltage	▶ 3.63V
Charging Method	▶ Constant Current + Constant Voltage
Max. Charge Voltage:	▶ 4.2V
Standard Charge Current:	▶ 1250mA
Max. Continuous Charge Current:	▶ 2500mA (limited by PCM)
Rec. Charge Cut Off:	▶ by time standard charge 3h rapid charge 2.5h by min current 0.05C
Max. Continuous Discharge Current:	▶ 4500mA
Rec. Discharge Cut Off:	▶ 3V
Internal Impedance:	▶ $\leq 80m\Omega$ @ 1kHz at 4.2V
Expected Cycle Life	▶ 300 cycles $\geq 3570mAh$

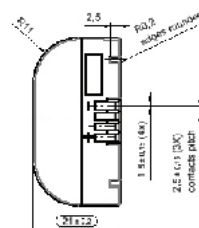
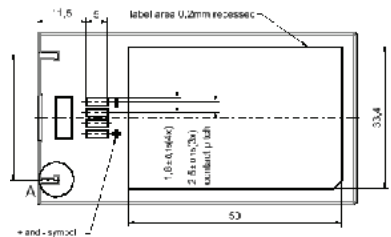
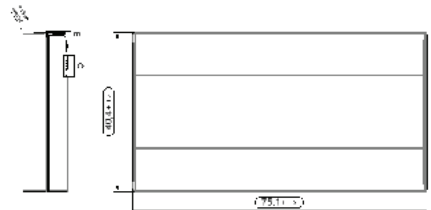
CELL PROTECTION

Overcharge Detection	▶ $4.225V \pm 0.025V$ (0.96 to 1.4sec. delay, resume $4.025V \pm 0.05V$)
Overdischarge Detection:	▶ $2.8V \pm 0.05V$ (61 to 90msec. delay, resume $2.8V \pm 0.1V$)
Overcurrent Detection	▶ $5.4A$ to $9.2A$ (7.2 to 11msec. delay)

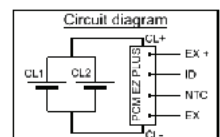
3. AMBIENT CONDITIONS

Temperature Range

• Charge	▶ 0 to +45°C
• Discharge	▶ -20 to +45°C
• Storage	▶ 1 year at -20 to +25°C 3 months at -20 to +45°C 1 month at -20 to +25°C
• Humidity	▶ $65 \pm 20\%RH$

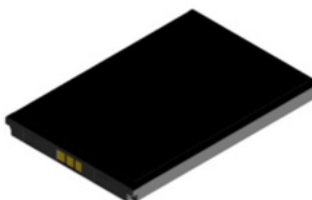


Protection Circuit Module



VAR56426801096 – 3.7V / 1590 mAh

This PN will soon be replaced by PN VAR56426801095 that is 30% charged.



WW ▶ week two digits
YY ▶ year two digits

1. GENERAL

Battery with safety circuit and plastic metal combination

Cell	▶ LPP 454261 8TH
PCM	▶ Yes
NTC	▶ 10 kΩ ±1%; B-Value 343K ±1%
ID	▶ None
Configuration	▶ 1P
Weight	▶ appr. 34g

2. ELECTRICAL SPECIFICATION

Rated Capacity	▶ 1530mAh min., 1590mAh typical
Nominal Voltage	▶ 3.7V
Watt-Hour Rating	▶ 5.9Wh
Charging Method	▶ Constant Current + Constant Voltage
Max. Charge Voltage:	▶ 4.2V (±50mV)
Max. Continuous Charge Current:	▶ 1.6A (limited by PCM)
Rec. Charge Cut Off:	▶ by current 50mA or time 2.5h
Max. Continuous Discharge Current:	▶ 1.6A (limited by PCM)
Rec. Discharge Cut Off:	▶ 3V
Internal Impedance (1kHz):	▶ approx. 100 mΩ fully charged
Expected Cycle Life @ (1C/0.5C) @ 23 ±2°C	▶ 500 cycles ≥ 67% of initial cap.

CELL PROTECTION

Overcharge Detection	▶ 4.275V ±0.25V (0.7 to 1.3sec. delay, resume 4.275V ±0.25V)
Overdischarge Detection:	▶ 2.3V ±0.58V (14 to 26msec. delay, resume 2.3V ±0.58V)
Overcurrent Detection	▶ discharge: 1.7A to 4.5A (11 to 21msec. delay) charge: 1.6A to 5A (8 to 16 msec. delay)

3. AMBIENT CONDITIONS

Temperature Range	
• Charge	▶ 0 to +45°C
• Discharge	▶ -20 to +55°C
• Charge Retention/Storage	▶ 1 month at -10 to +45°C >85%
• Humidity	▶ 65 ± 20%RH

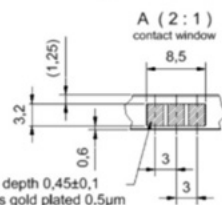
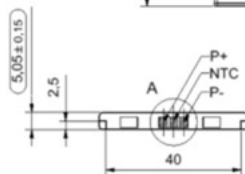
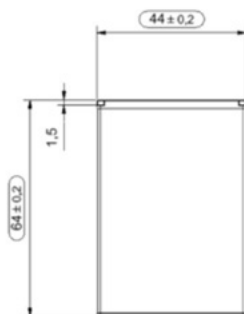
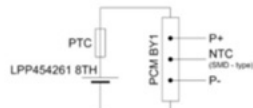
Mating connector
for the EasyPack SLIM

Avnet PN

ELC009155003301006



Protection Circuit Module



- contact depth 0.45±0.1
- contacts gold plated 0.5µm

Easy Pack Charger – RRCSCCEZP



5 Watt Desktop Battery Charger for Varta EasyPack batteries S, L, XL and PLUS

Features:

- Single bay charger
- For the standard Varta EasyPack batteries S, L, XL and PLUS
- Simple operation – Plug and Play
- External wall plug power supply for worldwide use

Applications:

- Charging station for VARTA EasyPack battery packs for mobile devices used in industry and customer areas

Specification RRC-SCC-EZP

Input	
Voltage	5V nom.
Current	1000mA nom.
Power	5W

Environmental	
Cooling	convection cooled
Temperature	Operating: 0°C to 40°C Non-operating -10°C to 70°C
Pressure & Altitude	Operating: 1060hPa to 795hPa -382m to 2000m Non-operating: 1060hPa to 572hPa -382m to 4570m
Humidity	5% to 95% r.H., non-condensing

Output	
Voltage	4.2VDC
Volt. tolerance ⁽¹⁾	±1 % max.
Current max.	1A max. for EZPack L, XL, PLUS 0.5A max. for the EZPack S
Protection	Short circuit Battery over/under temperature Charger over temperature Charge timer

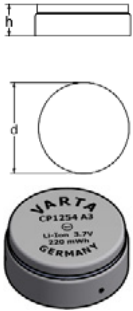
General	
Indicator	Multi-color LED (green, red, orange)
Battery types	EZPack S, EZPack L, EZPack XL, EZPack PLUS
Energy Efficiency	CEC, DoE
Green procurement	RoHS 2011/65/EU WEEE 2012/19/EU

LED Indications	
Orange light	The inserted battery is currently being charged.
Green light	The battery is charged and can be removed for use.
Red blinking	Battery detection phase
Red light	No battery inserted, battery over/under temperature-, charger over temperature-, battery over voltage-, battery charge timer time-out-error or input voltage too low

Charger Mechanical Details	
Housing dimensions (LxWxH)	46.7 x 101.4 x 12.5mm
Weight	26g (without power supply)

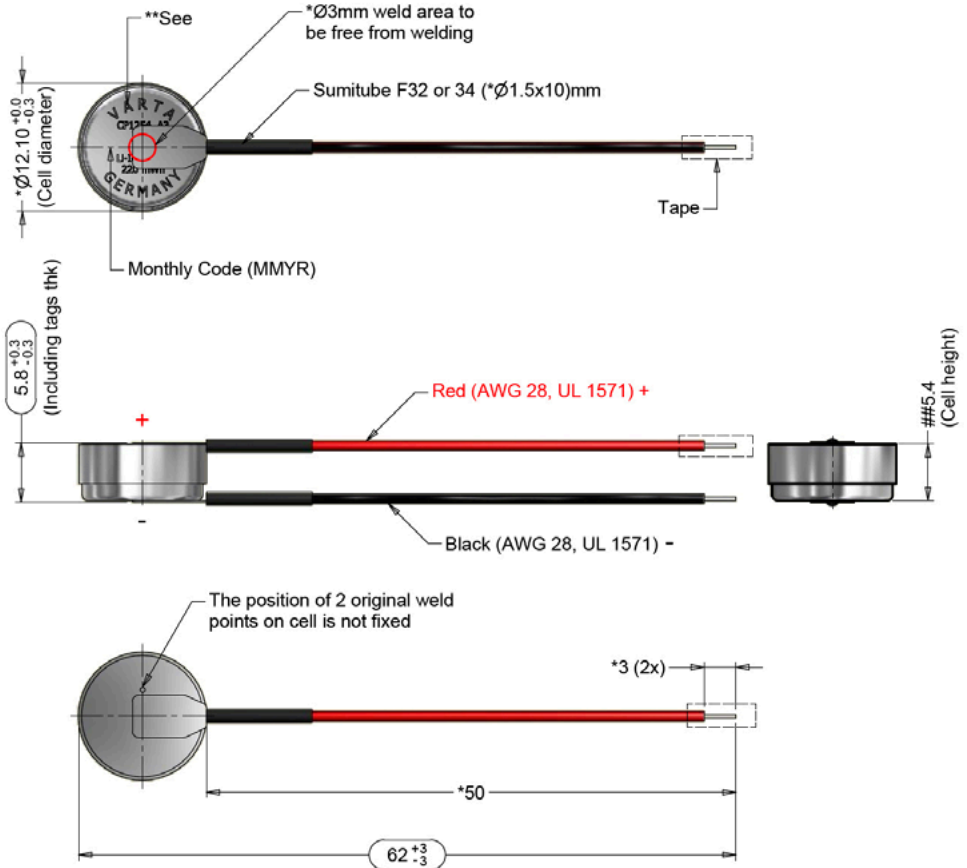
VAR63125101521 – CP1254 3.7V / 60 mAh

UN 38.3
IEC 62133
UL 1642



Type Designation	CP 1254 A3
Type Number	63125
Cell Code	ICR1254
System	Graphite – layered metal oxide ($\text{LiNi}_x\text{Mn}_y\text{Co}_z\text{O}_2$) MH13654
UL Recognition	
Nominal Voltage [V]	3.7 (average)
Typical Capacity C [mAh]	63 (at 0.2C from 4.2 V to 3.0 V at 20 °C)
Nominal Capacity C [mAh]	60 (at 0.2C from 4.2 V to 3.0 V at 20 °C)
Dimensions [mm] (without Tags)	
Diameter	12.1 +0.0/-0.3
Height	5.4 +0.2/-0.1
Weight. approx [g]	1.6 +0.2/-0.2
Charging Method	Constant Current + Constant Voltage
Charge Voltage [V]	4.20 ± 0.05
Initial Charge Current [mA]	Standard Charge: 30
Charging Cut-Off (a) or (b)	
a) by time [h]	Standard Charge: 5
b) by min current [mA]	1.2
Discharge Cut-Off Voltage [V]	3.0
Max. Pulse Discharge Current [mA]	180 @ 2s
Max. Continuous Discharge Current [mA]	120
Operating Temperature [°C]	Charge: 0 to 45 Discharge: -20 to 60
Storage Temperature	1 Year at -20 to 20 °C > 90
Capacity Recovery Rate ² [%]	3 Month at -20 to 45 °C > 90
	1 Month at -20 to 60 °C > 85
Impedance Initial [Ω]	< 0.5 @ 1kHz
Cycle Life 0.5C/0.5C, 20 °C ³ [Cycles]	>500 (> 80% of C _{ini})
Safety	UN 38.3 passed UL 1642 passed IEC 62133 relevant tests passed
Internal Approval	
Overcharge Test (12V, 1.5C, 12h)	passed
Overcharge Test (5V, 1A, 12h)	passed

VAR63125201025 – CP1254 Crimp tag with wires version



Note : 1) * Dimensions for reference only.

2) **VARTA marking orientation only for reference, these marking may be covered.

3) Weld on the positive side first, avoid welding on the original weld points of cells.

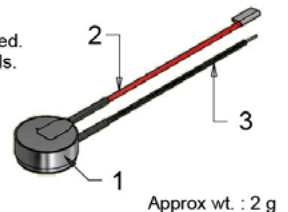
4) Marked dimensions are to be considered for inspectable.

5) ^^Monthly code MMYR position on battery is for reference only.

6) ##Max. 7 including cell deflection

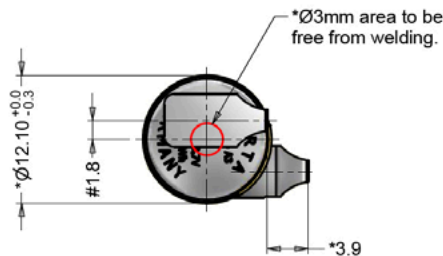
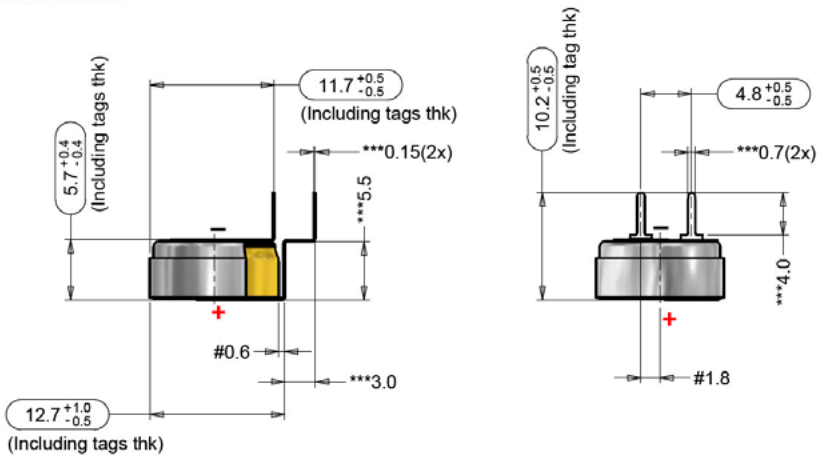
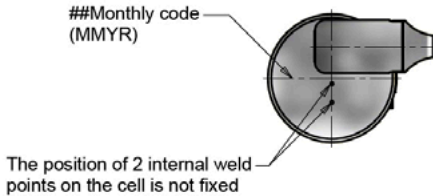
7) Cell deflection space 1.5mm is needed in case of abuse conditions.
Please contact VARTA for more details.

8) BATTERY VALIDATION INCLUDING SAFETY ELECTRONICS MUST
BE DONE BY CUSTOMER ACCORDING UL 2054.

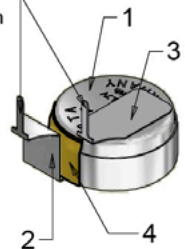


VAR63125201035 – CP1254

Solder tag version



Pre - tinned 3-5µm thick over 4±1mm length on both sides



Note : 1) * Dimensions for reference only.

2) **VARTA marking orientation only for reference, these marking may be covered.

3) Weld on the positive side first, avoid welding on the original weld points of cells.

4)  Marked dimensions are to be considered for inspectable.

5) ***Marked dimensions controlled in IQC.

6) #Marked dimensions controlled by welding fixture.

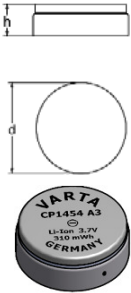
7) ##Monthly code MMYR position on battery is for reference only.

8) Cell deflection space 1.5mm is needed in case of abuse conditions.
Please contact VARTA for more details.

Approx. wt : 2 g

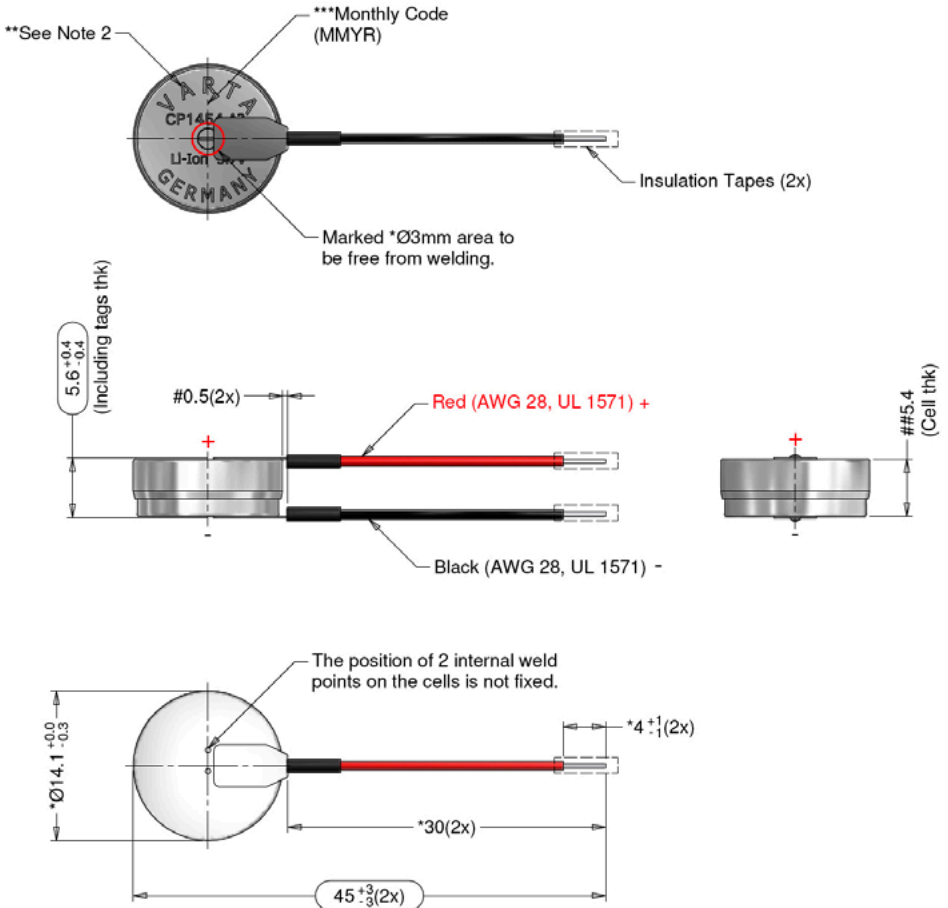
VAR63145101501 – CP1454 3.7V / 85 mAh

UN 38.3
IEC 62133
UL 1642



Type Designation	CP 1454 A3
Type Number	63145
Cell Code	ICR1454
System	Graphite – layered metal oxide ($\text{LiNi}_x\text{Mn}_y\text{Co}_z\text{O}_2$)
UL Recognition	MH13654
Nominal Voltage [V]	3.7 (average)
Typical Capacity C [mAh]	90 (at 0.2C from 4.2 V to 3.0 V at 20 °C)
Nominal Capacity C [mAh]	85 (at 0.2C from 4.2 V to 3.0 V at 20 °C)
Dimensions [mm] (without Tags)	
Diameter	14.1 +0.0/-0.3
Height	5.4 +0.2/-0.1
Weight. approx [g]	2.4 +0.2/-0.2
Charging Method	Constant Current + Constant Voltage
Charge Voltage [V]	4.20 ± 0.05
Initial Charge Current [mA]	Standard Charge: 42.5
Charging Cut-Off (a) or (b)	
a) by time [h]	Standard Charge: 5
b) by min current [mA]	1.7
Discharge Cut-Off Voltage [V]	3.0
Max. Pulse Discharge Current [mA]	255 @ 2s
Max. Continuous Discharge Current [mA]	170
Operating Temperature [°C]	Charge: 0 to 45 Discharge: -20 to 60
Storage Temperature	1 Year at -20 to 20 °C > 90
Capacity Recovery Rate ² [%]	3 Month at -20 to 45 °C > 90 1 Month at -20 to 60 °C > 85
Impedance Initial [Ω]	< 0.5 @ 1kHz
Cycle Life 0.5C/0.5C, 20 °C ³ [Cycles]	>500 (> 80% of C _{ini})
Safety	UN 38.3 passed UL 1642 passed IEC 62133 relevant tests passed
Internal Approval	
Overcharge Test (12V, 1.5C, 12h)	passed
Overcharge Test (5V, 1A, 12h)	passed

VAR63145201012 – CP1454 Crimp tag with wires version



Note : 1) *Dimensions for reference only.

2) **VARTA marking orientation is for reference only, VARTA marking may be covered.

3) ***Monthly code orientation is for reference only, should not print on welded tags

4) Marked dimensions to be consider for measurement.

5) Weld on Positive side first to avoid welding on original weld points.

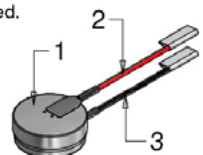
6) #Marked dimensions to be controlled by fixture.

7) ##Max. 7 including cell deflection

8) Cell deflection space 1.5mm is needed in case of abuse conditions.

Please contact VARTA for more details.

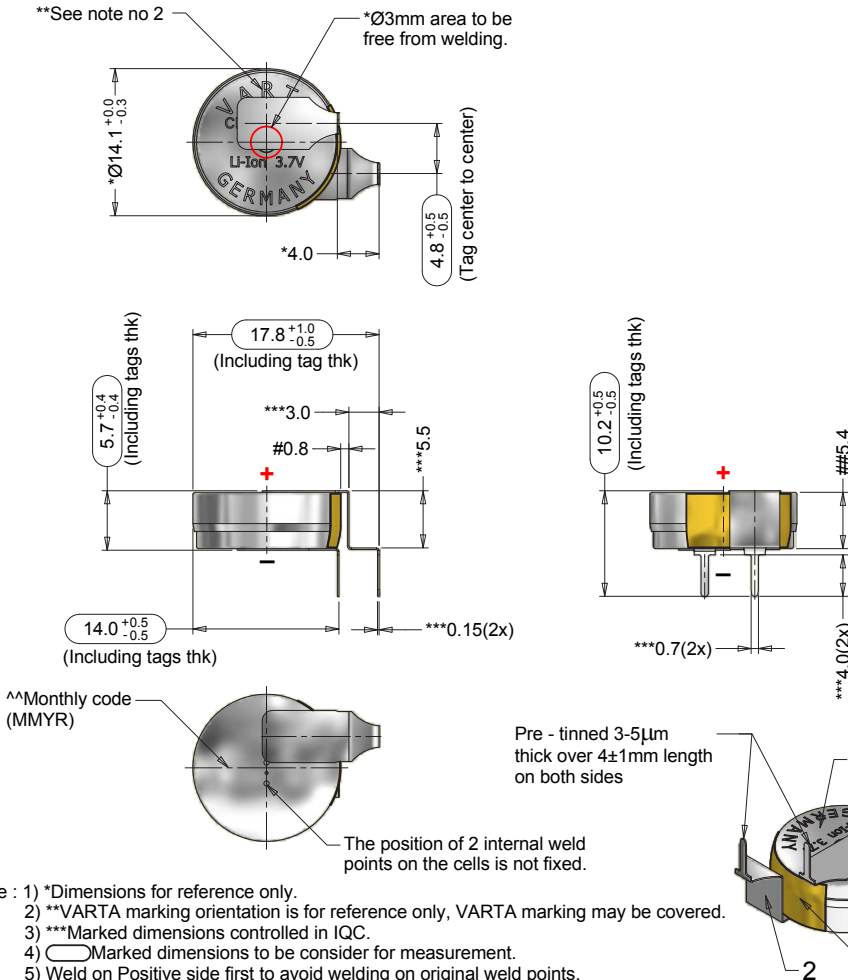
9) BATTERY VALIDATION INCLUDING SAFETY ELECTRONICS MUST BE DONE BY CUSTOMER ACCORDING UL 2054



Approx wt. : 2 g

VAR63145201013 – CP1454

Solder tag version

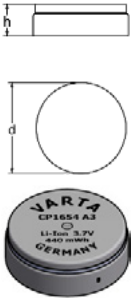


- Note : 1) *Dimensions for reference only.
 2) **VARTA marking orientation is for reference only, VARTA marking may be covered.
 3) ***Marked dimensions controlled in IQC.
 4) Marked dimensions to be consider for measurement.
 5) Weld on Positive side first to avoid welding on original weld points.
 6) ^^Monthly code orientation is for reference only, should not print on welded tags.
 7) #Marked dimensions to be controlled by fixture.
 8) ##Max. 7 including cell deflection.
 9) Cell deflection space 1.5mm is needed in case of abuse conditions.
 Please contact VARTA for more details.
 10) BATTERY VALIDATION INCLUDING SAFETY ELECTRONICS MUST BE DONE BY CUSTOMER ACCORDING UL2054.

Approx. wt : 2 g

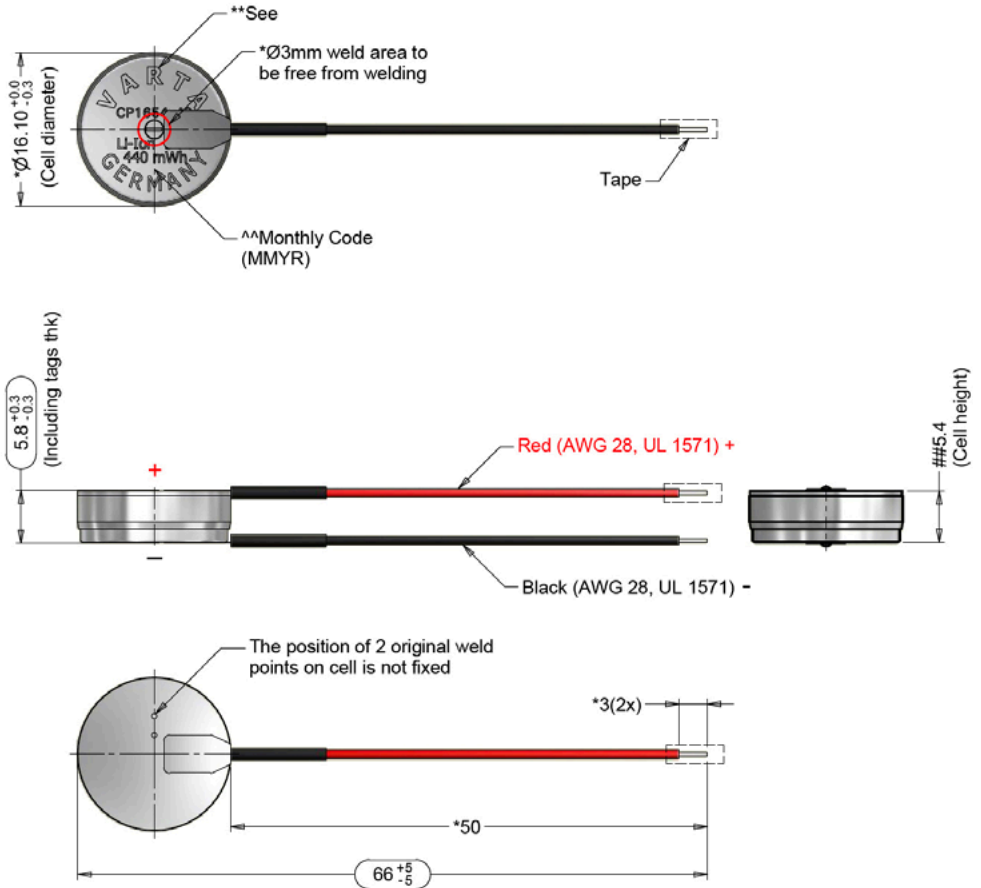
VAR63165101521 – CP1654 3.7V / 120 mAh

UN 38.3
IEC 62133
UL 1642



Type Designation	CP 1654 A3
Type Number	63165
Cell Code	ICR1654
System	Graphite – layered metal oxide ($\text{LiNi}_{0.8}\text{Mn}_{0.1}\text{Co}_{0.1}\text{O}_2$) MH13654
UL Recognition	
Nominal Voltage [V]	3.7 (average)
Typical Capacity C [mAh]	122 (at 0.2C from 4.2 V to 3.0 V at 20 °C)
Nominal Capacity C [mAh]	120 (at 0.2C from 4.2 V to 3.0 V at 20 °C)
Dimensions [mm] (without Tags)	
Diameter	16.1 +0.0/-0.3
Height	5.4 +0.2/-0.1
Weight. approx [g]	3.2 +0.2/-0.2
Charging Method	Constant Current + Constant Voltage
Charge Voltage [V]	4.20 ± 0.05
Initial Charge Current [mA]	Standard Charge: 60
Charging Cut-Off (a) or (b)	
a) by time [h]	Standard Charge: 5
b) by min current [mA]	2.4
Discharge Cut-Off Voltage [V]	3.0
Max. Pulse Discharge Current [mA]	360 @ 2s
Max. Continuous Discharge Current [mA]	240
Operating Temperature [°C]	Charge: 0 to 45 Discharge: -20 to 60
Storage Temperature	1 Year at -20 to 20 °C > 90
Capacity Recovery Rate ² [%]	3 Month at -20 to 45 °C > 90
	1 Month at -20 to 60 °C > 85
Impedance Initial [Ω]	< 0.4 @ 1kHz
Cycle Life 0.5C/0.5C, 20 °C ³ [Cycles]	>500 (> 80% of C _{ini})
Safety	UN 38.3 passed UL 1642 passed IEC 62133 relevant tests passed
Internal Approval	
Overcharge Test (12V, 1.5C, 12h)	passed
Overcharge Test (5V, 1A, 12h)	passed

VAR63165201018 – CP1654 Crimp tag with wires version



Note : 1) * Dimensions for reference only.

2) **VARTA marking orientation only for reference, these marking may be covered.

3) Weld on the positive side first, avoid welding on the original weld points of cells.

4)  Marked dimensions are to be considered for inspectable.

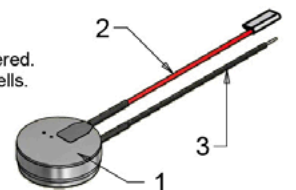
5) ^^Monthly code MMYR position on battery is for reference only.

6) ###Max. 7 including cell deflection

7) Cell deflection space 1.5mm is needed in case of abuse conditions.

Please contact VARTA for more details.

8) BATTERY VALIDATION INCLUDING SAFETY ELECTRONICS MUST BE DONE BY CUSTOMER ACCORDING UL 2054.

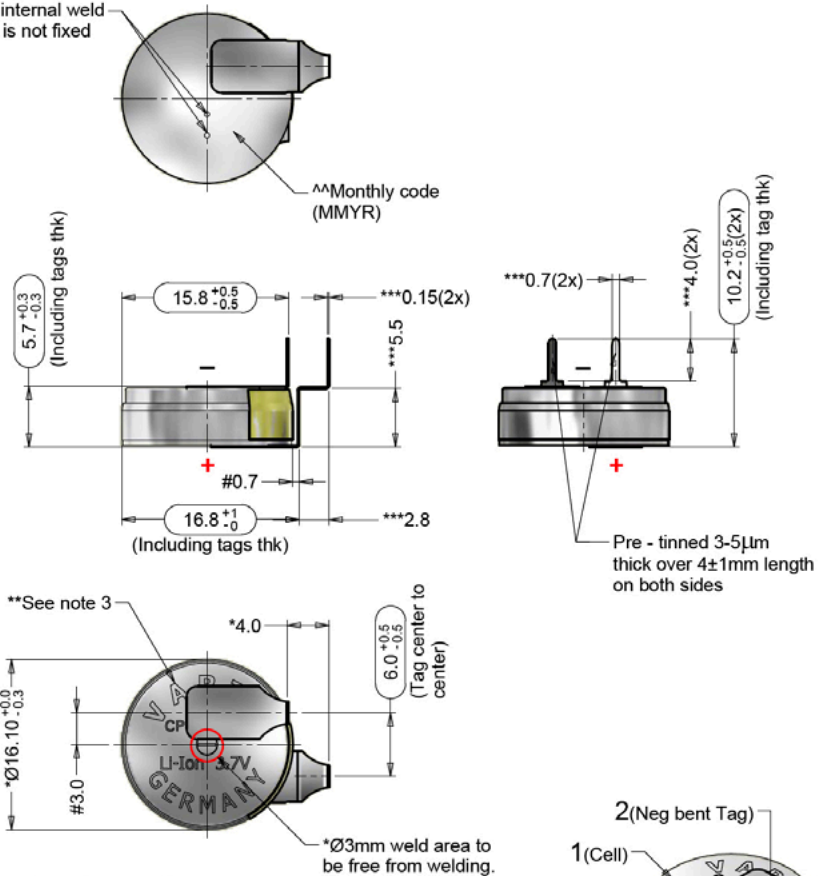


Approx wt. : 4 g

VAR63165201028 – CP1654

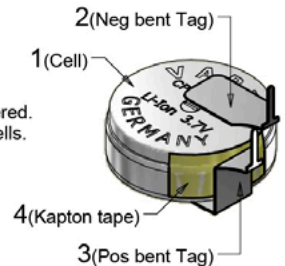
Solder tags version

The position of 2 internal weld points on the cell is not fixed



Note : 1) * Dimensions for reference only.

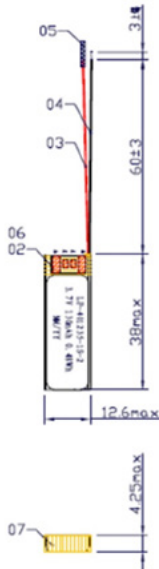
- 2) **VARTA marking orientation only for reference, these marking may be covered.
- 3) Weld on the positive side first, avoid welding on the original weld points of cells.
- 4) Marked dimensions are to be considered for inspectable.
- 5) ***Marked dimensions controlled in IQC.
- 6) #Marked dimensions controlled by welding fixture.
- 7) ^^Monthly code MMYR position on battery is for reference only.
- 8) ##Max. 7 including cell deflection
- 9) Cell deflection space 1.5mm is needed in case of abuse conditions.
Please contact VARTA for more details.
- 10) BATTERY VALIDATION INCLUDING SAFETY ELECTRONICS MUST BE DONE BY CUSTOMER ACCORDING UL 2054.



Approx. wt : 4 g

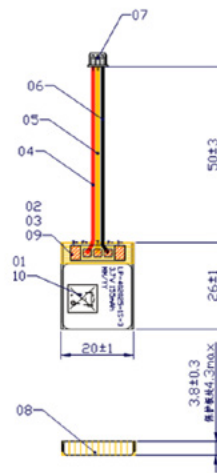
Dubilier lithium polymer

YOBLP401235IS2 – 401235 – 3.7V / 130 mAh



UN 38.3

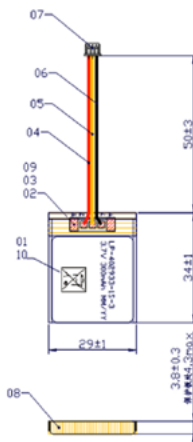
YOBLP402025IS3 – 402025 – 3.7V / 155 mAh



UN 38.3

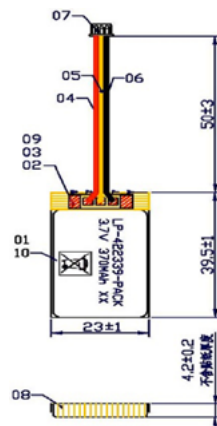
IEC 62133

YOBLP402933IS3 – 402933 – 3.7V / 300 mAh



UN 38.3

YOBLP422339PACK – 422339 – 3.7V / 370 mAh

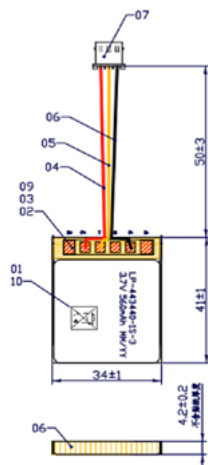


UN 38.3

IEC 62133

Dubilier lithium polymer

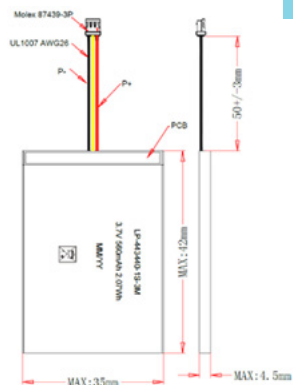
YOBLP443440IS3 – 443440 – 3.7V / 560 mAh



UN 38.3

IEC 62133

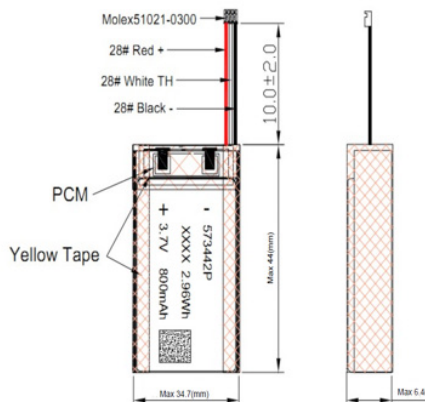
YOBLP443440IS3M – 443440 – 3.7V / 560 mAh



UN 38.3

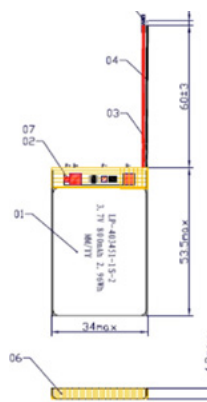
IEC 62133

YOBLP573442IS3 – 573442 – 3.7V / 800 mAh



UN 38.3

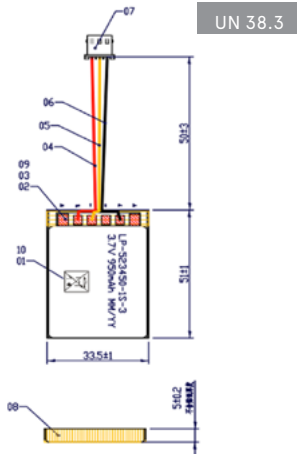
YOBLP403451IS2 – 403451 – 3.7V / 800 mAh



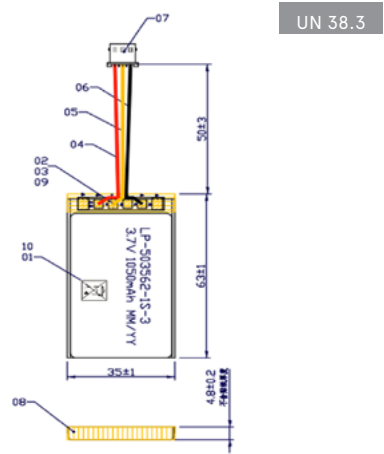
UN 38.3

Dubilier lithium polymer

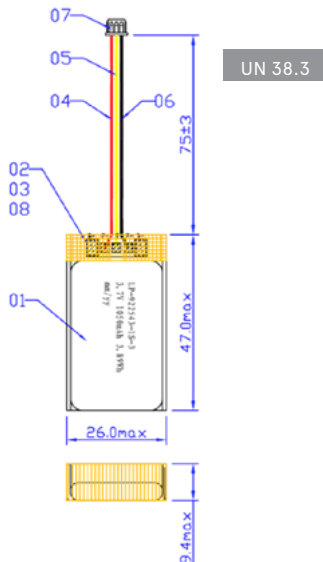
YOBLP523450PIS3 – 523450 – 3.7V / 950 mAh



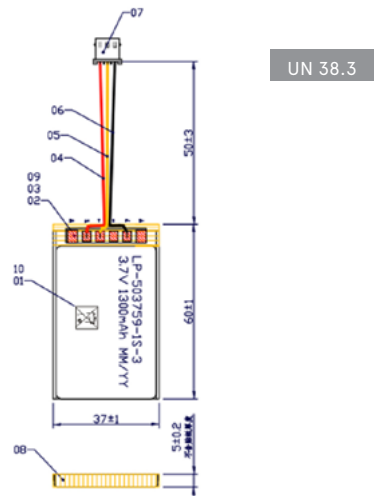
YOBLP503562IS3 – 503562 – 3.7V / 1050 mAh



YOBLP922543IS3 – 922543 – 3.7V / 1050 mAh



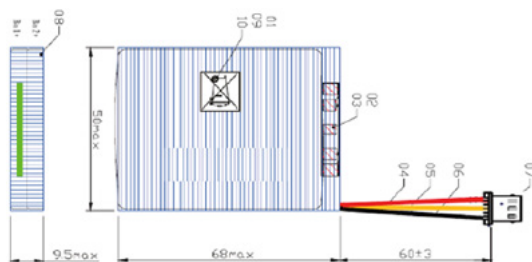
YOBLP503759IS3 – 503759 – 3.7V / 1300mAh



Dubilier lithium-polymer

YOBLP4549652P3M – 2P-454965 – 3.7V / 3000 mAh

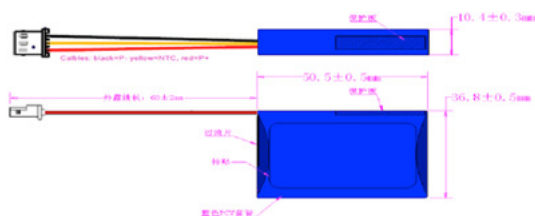
UN 38.3



Dubilier lithium-ion prismatic

YOB103450AR21S3M – 103450 – 3.7V / 1800

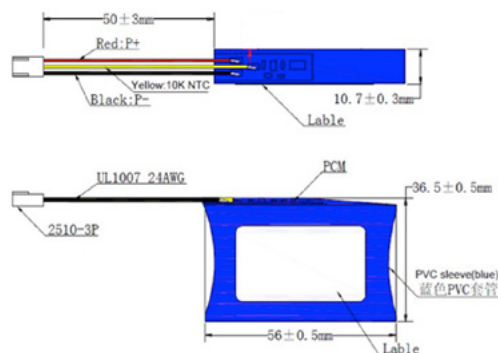
UN 38.3



YOB103456A1S3M – 103456 – 3.7V / 2050 mAh

UN 38.3

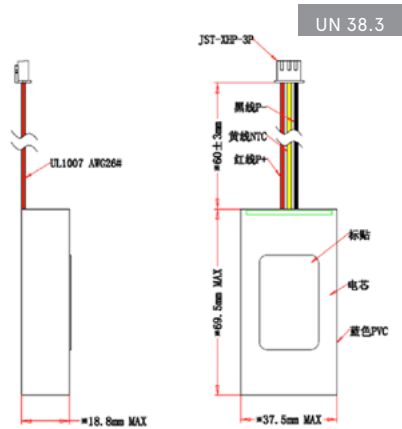
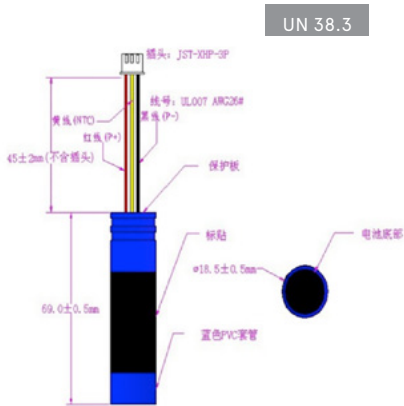
IEC 62133



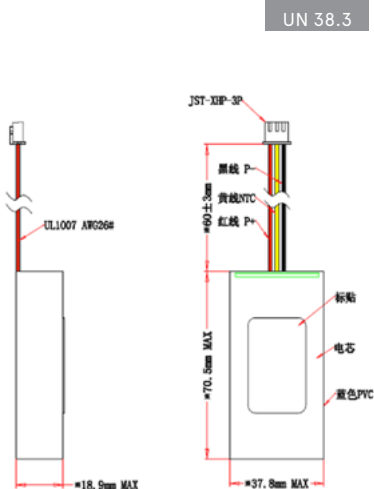
Dubilier cylindrical lithium-ion 18650

1S1P – YOB18650CA1S3J – 3.7V / 2250 mAh

1S2P – YOB18650CA2P3J – 3.7V / 4500 mAh

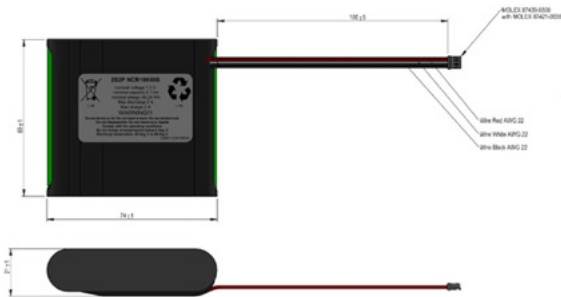


2S1P – YOB18650CA2S3J – 7.4V / 2250 mAh



WAT2S2PNCR18650B!A – 7.4V / 6700 mAh

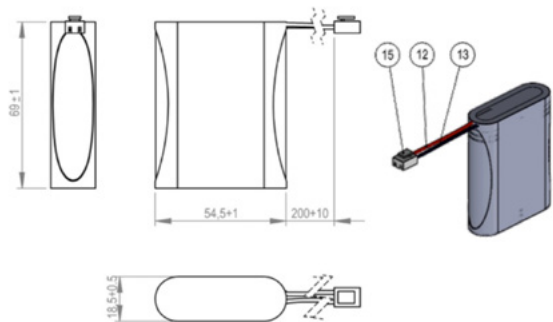
UN 38.3



Specifications	
Nominal Voltage [V]	7.2
Minimum capacity [mAh]	6500
Typical capacity [mAh]	6700
Charging method	CC/CV
Charging voltage [V]	8.4
Size [mm]	According to the drawing
Weight [g]	250 ± 25
Typical charge [mA]	2000
Maximum continuous discharge current [mA]	2000 (temp. 20 °C)
Discharge cut-off voltage [V]	5
Charge temperature	Typical 0 °C do 45 °C
Discharge temperature	Continuous -20 °C do 60 °C
Storage temperature	Recommended -20 °C do 20 °C

WAT3S1PICR1865022F – 11.1V / 2200 mAh

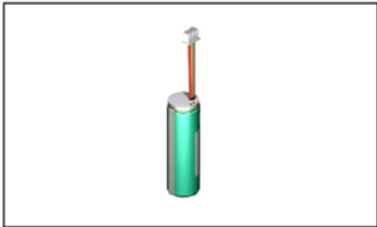
UN 38.3



Specifications	
Nominal Voltage [V]	11.1
Typical capacity [mAh]	2 200
Charging method	CC/CV
Charging voltage [V]	4.2
Size [mm]	According to the drawing
Weight [g]	200
Typical charge [mA]	1 100
Rapid charge [mA]	2 200
Maximum continuous discharge current [mA]	3 500
Pulse discharge current [mA]	4 400
Charge temperature	Typical 0 °C to 45 °C Rapid 0 °C to 45 °C
Discharge temperature	Continuous -20 °C to 60 °C
Storage temperature	Recommended -20 °C do 25 °C

PICPALNB154 – 3.6V / 3350 mAh

UN 38.3



Dimensions

height: 71 +2 / -1 mm
diameter: 18,5 +1 mm

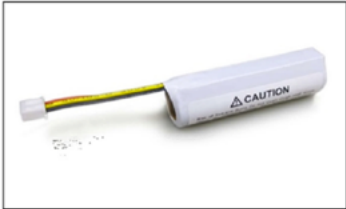
Data for pack

Nominal Voltage		3,6V	4,2V - 3,0V
Nominal capacity		3350mAh	typical
Used cell in Pack		1x	Panasonic NCR-18650B
internal resistance pack		200mOhm	180 - 230mOhm
Max charge voltage		4,2V	
Charge current	standard	550mA	0°C < T < 45°C
	rapid	1250mA	10°C < T < 45°C
Discharge	standard	550mA	-20°C < T < 60°C
	max.cont.	1250mA	-20°C < T < 45°C
	max.peak	1300mA	-20°C < T < 45°C
Short circuit current		~20A	<500µs
NTC		10 kOhm	Tolerance 5%; B-value 25°C/85°C = 3980K
Connector	JST	XHP-3	Pin 1 : GND black
			Pin 2: NTC yellow
			Pin 3: PLUS red
Cable length		AWG	45mm ±5mm
Weight		ca. 49g	±5g
Watt-hour rating		12Wh	acc. to UN38.3 Certificate Rev. 5.1

Limitations by Safety Unit (SU)

over voltage (per cell)	cut off	4,3V	±25mV
	release	4,05V	±100mV
under voltage (per cell)	cut off	2,25V	±100mV
	release	3,0V	2,250V – 3,450V
Current limit 1 by SU		1250mA	continuous (typical)
Current limit 2 by SU		>1300mA	< 150ms (typical)
Current limit 3 by SU		≤ 20A	< 4ms (typical)
Power consumption	active	12,5µA	-0/+7,5µA
	shutdown	1,5µA	-0/+0,1µA

PICPAULLNB19 – 3.6V / 3350 mAh



Dimensions	
length:	66 ± 2mm
width:	19 ± 1mm
height:	22 ± 1mm
 UL recognized MH45979, IEC62133 2nd ed. CB Report available	

Data for pack

Nominal Voltage	3.6V	2.5V - 4.2V
Nominal capacity	3350mAh	typical
Used cell in Pack	1pcs	Panasonic NCR-18650BF
internal resistance pack	130mΩ	117 - 147mΩ
Max charge voltage	4.2V	
Charge current	max.	1650mA 10°C < T < 45°C
Discharge	standard	650mA -20°C < T < 60°C
	max.cont.	3000mA -20°C < T < 60°C (limited by connector)
	max.peak	3000mA -20°C < T < 60°C
Short circuit current	≥34.5A	>320μs
NTC	10 kΩ	
Connector	JST	XHP-3
		Pin 1: GND black
		Pin 2: NTC yellow
Cable length	45mm	Pin 3: PLUS red
		±5mm
Weight	ca. 49.5g	±5g
Watt-hour rating	12Wh	acc. to UN38.3 Certificate Rev. 5.1

Limitations by Safety Unit (SU)

over voltage (per cell)	cut off	4.215V	±25mV
over voltage (per cell)	release	4.1V	±25mV
under voltage (per cell)	cut off	2.3V	±50mV
under voltage (per cell)	release	2.4V	±50mV
Current limit 1 by SU		≤3A	continuous (typical)
Current limit 2 by SU		≥14.5A	>2.24ms (typical)
Current limit 3 by SU		≥34.5A	>320μs (typical)
Power consumption	active	≤35μA	@4.2V ±5μA
	sleep	10μA	±2μA

PICPAULLNB46 – 3.6V / 6700 mAh



Dimensions	
length:	66 ± 1mm
width:	19 ± 1mm
height:	41 ± 1mm
 UL recognized MH45979, IEC62133 2nd ed. CB Report available	

Data for pack

Nominal Voltage		3.6V	2.5V - 4.2V
Nominal capacity		6700mAh	typical
Used cell in Pack		2 pcs	Panasonic NCR-18650BF
internal resistance pack		115mΩ	103mΩ - 127mΩ
Max charge voltage		4.2V	
Charge current	standard	1625mA	10°C < T < 45°C
	rapid	3000mA	10°C < T < 45°C (limited by connector)
Discharge	standard	1300mA	-20°C < T < 60°C
	max.cont.	3000mA	-20°C < T < 60°C (limited by connector)
	max.peak	3000mA	-20°C < T < 60°C
Short circuit current		≤ 34.5A	< 320μs
NTC		10 kΩ	
Connector	JST	XHP-3	Pin 1: GND black
			Pin 2: NTC yellow
			Pin 3: PLUS red
Cable length		45mm	±5mm
Weight		125g	±5g
Watt-hour rating		24Wh	acc. to UN38.3 Certificate Rev. 5.1

Limitations by Safety Unit (SU)

over voltage (per cell)	cut off	4.215V	±25mV
	release	4.1V	±25mV
under voltage (per cell)	cut off	2.3V	±50mV
	release	2.4V	±50mV
Current limit 1 by SU		< 3A	continuous (typical)
Current limit 2 by SU		≥ 14.5A	< 2.24ms (typical)
Current limit 3 by SU		≥ 34.5A	< 320μs (typical)
Power consumption	active	≤35μA	@4.2V ±5μA
	power down	10μA	±2μA

PICPAULLNB33 – 3.6V / 10050 mAh**Dimensions**

length: 66 ± 2mm

width: 19 ± 1mm

height: 60 ± 2mm

Triangular
shape available
upon request:
PICPAULLNB33X



UL recognized MH45979, IEC62133 2nd ed. CB Report available

Data for pack

Nominal Voltage	3.6V	2.75V	-	4.2V
Nominal capacity	10050mAh	typical		
Used cell in Pack	3pcs	Panasonic NCR-18650BF		
Internal resistance pack	114mΩ	103	-	125mΩ
Max charge voltage	4.2V			
Charge current	standard	3000mA	10°C < T < 45°C (limited by connector)	
	rapid	3000mA	10°C < T < 45°C (limited by connector)	
Discharge	standard	1950mA	-20°C < T < 60°C	
	max.cont.	3000mA	-20°C < T < 60°C (limited by connector)	
	max.peak	4200mA	-20°C < T < 60°C	
Short circuit current	≤29A	>2.4ms		
NTC	10 kΩ	Tolerance 5%; B-value 25°C/85°C = 3980K		
Connector	JST	XHP-3	Pin 1: GND black	
			Pin 2: NTC yellow	
			Pin 3: PLUS red	
Cable length	45mm	±5mm		
Weight	ca.131.5g	±5g		
Watt-hour rating	36Wh	acc. to UN38.3 Certificate		

Limitations by Safety Unit (SU)

over voltage (per cell)	cut off	4.215V	±25mV
over voltage (per cell)	release	4.10V	±100mV
under voltage (per cell)	cut off	2.3V	±100mV
under voltage (per cell)	release	>2.4V	2.4V - 3.46V
Current limit 1 by SU		3500mA	continuous (typical) [3.0V < Upack < 4.2V]
Current limit 2 by SU		>4200mA	<20ms (typical)
Current limit 3 by SU		≤29A	>2.4ms (typical)
Power consumption	active	≈70μA	-0/+10μA
	sleep	15μA	-0/+0.1μA

PICPAULLNB55 – 3.6V / 13400 mAh**Dimensions**

length: 67 ± 1mm

width: 19 ± 1mm

height: 78 ± 1mm

Different

shapes available

upon request:

PICPAULLNB55Q

PICPAULLNB55V



UL recognized MH45979, IEC62133 2nd ed. CB Report available

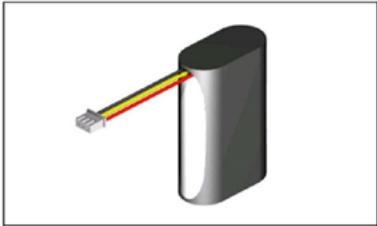
Data for pack

Nominal Voltage		3.6V	2.5V - 4.2V
Nominal capacity		13400mAh	typical
Used cell in Pack		4 pcs	Panasonic NCR-18650BF
internal resistance pack		110mΩ	99mΩ - 121mΩ
Max charge voltage		4.2V	
Charge current	standard	3000mA	10°C < T < 45°C (limited by connector)
	rapid	3000mA	10°C < T < 45°C (limited by connector)
Discharge	standard	2600mA	-20°C < T < 60°C
	max.cont.	3000mA	-20°C < T < 60°C (limited by connector)
	max.peak	3000mA	-20°C < T < 60°C (limited by connector)
Short circuit current		≥34.5A	>320μs
NTC		10 kΩ	
Connector	JST	XHP-3	Pin 1: GND black
			Pin 2: NTC yellow
			Pin 3: PLUS red
Cable length		45mm	±5mm
Weight		ca. 179g	±5g
Watt-hour rating		48Wh	acc. to UN38.3 Certificate

Limitations by Safety Unit (SU)

over voltage (per cell)	cut off	4.215V	±25mV
	release	4.1V	±25mV
under voltage (per cell)	cut off	2.3V	±50mV
	release	2.4V	±50mV
Current limit 1 by SU		≤3A	continuous (typical)
Current limit 2 by SU		≥14.5A	>2.24ms (typical)
Current limit 3 by SU		≥34.5A	>320μs (typical)
Power consumption	active	≤35μA	@4.2V ±5μA
	sleep	10μA	±2μA

PICPALNB76 – 7.2V / 3350 mAh



Dimensions
length: 71 +1/-0,5mm
width: 36,8 +1/-0,5mm
hight: 18,6 +1mm

Data for pack

Nominal Voltage	7,2V	6,0V - 8,4V
Nominal capacity	3350mAh	typical
Used cell in Pack	2x	Panasonic: NCR-18650B
internal resistance pack	150mOhm	120 - 180 mOhm
Max charge voltage	8,4V	
Charge current	standard	670mA 0°C < T < 45°C
	rapid	1650mA 10°C < T < 45°C (limited by connector)
Discharge	standard	670mA -20°C < T < 60°C (limited by connector)
	max.cont.	3000mA -20°C < T < 45°C (limited by connector)
	max.peak	4500mA -20°C < T < 45°C (pls. note: Connector limitation!)
Short circuit current	≤45A	<500µs
NTC	10 kOhm	Tolerance 5%; B-value 25°C/85°C = 3980K
Connector	JST	XHP-3 Pin 1 : GND black
		Pin 2: NTC yellow
		Pin 3: PLUS red
Cable length	AWG24	45mm ±5mm
Weight	ca. 150g	±5g
Watt-hour rating	24Wh	acc. to "Certificate of UN-test" - Panasonic

Limitations by Safety Unit (SU)

over voltage (per cell)	cut off	4,30V	±25mV
	release	4,05V	±100mV
under voltage (per cell)	cut off	2,0V	±100mV
	release	3,0V	2,250V – 3,450V
Current limit 1 by SU		4000mA	continuous (typical) [6.0V < U < 8.4V]
Current limit 2 by SU		>5900mA	<10ms (typical)
Current limit 3 by SU		≤35A	>1ms (typical)
Power consumption	active	7,5µA	-0/+7,5µA
	sleep	0,2µA	-0/+0,1µA
ESD Protection		no	

PICPALNB27 – 10.8V / 3350 mAh



Dimensions	
length:	72.2 ±0.5mm
width:	18.2 ±0.5mm
height:	55.1 ±0.5mm

Data for pack

Nominal Voltage		10.8V	9V	-	12.6V
Nominal capacity		3,35Ah	typical		
Used cell in Pack		3 pcs	Panasonic NCR-18650B		
internal resistance pack		180mΩ	160	-	210 mΩ
Max charge voltage		12.6V			
Charge current	standard	670mA	10°C	< T	< 45°C
	rapid	1600mA	10°C	< T	< 45°C
Discharge	standard	430mA	-20°C	< T	< 60°C
	max.cont.	3350mA	-20°C	< T	< 60°C
	max.peak	4000mA	-20°C	< T	< 60°C
Short circuit current		≤40A			
NTC		10 kΩ	Tolerance 5%; B-value 25°C/85°C = 3980K		
Connector	JST	XHP-3	Pin 1: GND black		
			Pin 2: NTC yellow		
			Pin 3: PLUS red		
Cable length		45mm	±5mm		
Weight		142g	±5g		
Watt-hour rating		36Wh	acc. to UN38.3 Certificate		

Limitations by Safety Unit (SU) | TA=25°C

over voltage (per cell)	cut off	4.35V	±25mV
	release	4.15V	±50mV
under voltage (per cell)	cut off	2.4V	±80mV
	release	3V	±100mV
Current limit 1 by SU		4000mA	±0.5A continuous (typical) <1ms
Current limit 2 by SU		≤10A	±2A (typical) <1ms
Current limit 3 by SU		24A<ISC≤40A	<0.4ms (typical)
Power consumption	active	~135μA	±15μA
	sleep	~22μA	±5μA

PICPALNB126 – 14.4V / 3350 mAh



Dimensions	
length:	73 ±1mm
width:	18,5 ±1mm
height:	71,5 ±1mm

Data for pack

Nominal Voltage	14,4V	12,0 V - 16,8 V
Nominal capacity	3350mAh	typical
Used cell in Pack	4 pcs	Panasonic NCR-18650B
internal resistance pack	220 mΩ	typical
Max charge voltage	16,8 V	
Charge current	standard	550 mA 0°C < T < 45°C
	rapid	1675 mA 10°C < T < 45°C (limited by cell)
Discharge	standard	670 mA -20°C < T < 60°C
	max.cont.	3350 mA -20°C < T < 45°C (limited by cell)
	max.peak	5500 mA -20°C < T < 45°C (limited by connector)
Short circuit current	≤50 A	<500μs
NTC	10 kΩ	Tolerance 5%; B-value 25°C/85°C = 3980K
Connector	JST	Pin 1: GND black
		Pin 2: NTC yellow
		Pin 3: PLUS red
Cable length	45mm	±5mm
Weight	ca. 245g	±5g
Watt-hour rating	48Wh	acc. to UN38.3 certificate

Limitations by Safety Unit (SU)

over voltage (per cell)	cut off	4,35V	±25mV
over voltage (per cell)	release	4,15V	±100mV
under voltage (per cell)	cut off	2,4V	±100mV
under voltage (per cell)	release	3,0V	2,9V - 3,1V
Current limit 1 by SU		4200mA	continuous (typical) [6.0V < U < 8.4V]
Current limit 2 by SU		>4200mA	<10ms (typical)
Current limit 3 by SU		≤40A	>1ms (typical)
Power consumption	active	194μA	-40/+40μA
	sleep	0,1μA	-0/+1μA

PICPALNB117 – 14.4V / 3350 mAh



Dimensions	
length:	134 ±1mm
width:	38 ±1mm
height:	25 ±1mm

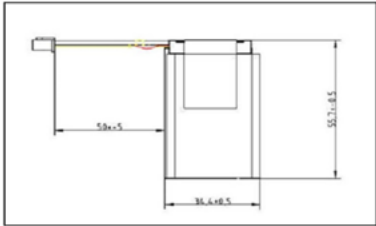
Data for pack

Nominal Voltage	14.4V	12V - 16.8V
Nominal capacity	3350mAh	typical
Used cell in Pack	4 pcs	Panasonic NCR-18650B / NCR-18650BF
internal resistance pack	150mΩ	120 -180mΩ
Max charge voltage	16.8V	
Charge current	max.1625mA	10°C < T < 45°C
Discharge	standard	500mA -20°C < T < 60°C
	max.cont.	4875mA 0°C < T < 40°C (limited by connector)
	max.peak	5000mA -20°C < T < 60°C (limited by connector)
Short circuit current	≤ 22.5A	<915μs
NTC	10 kΩ	Tolerance 5%; B-value 25°C/85°C = 3980K
Connector	Molex	Micro Fit
		Pin 1: BAT+/red Pin 2: SCL/blau 43645-0400 Pin 3: SDA/gelb Pin 4: GND
Cable length	135mm	±5mm
Weight	ca. 220g	
Watt-hour rating	48Wh	acc. to UN38.3 Certificate

Limitations by Safety Unit (SU)

over voltage (per cell)	cut off	4210mV	±25mV
over voltage (per cell)	release	4050mV	±25mV
under voltage (per cell)	cut off	2500mV	±25mV
under voltage (per cell)	release	3000mV	±25mV
Current limit 1 by SU		< 5A	continuous (typical)
Current limit 2 by SU		> 14A	>31ms (typical)
Current limit 3 by SU		≤ 22.5A	>915μs
Power consumption	active	350μA	
	sleep	120μA	

PICPAL36 – 3.7V / 1300 mAh



Dimensions
length: 35mm +1/-0,5mm
width: 6,5mm +1/-0,5mm (Swelling 1mm possible)
hight: 55,7 +1mm/-0,5mm

Data for pack

Nominal Voltage		3.7V	3.0V – 4.2V
Nominal capacity		1300mAh	typical
Used cell in Pack		1x	Sanyo UF653450S
internal resistance pack		150mOhm	100 - 180 mOhm
Max charge voltage		4.2V	
Charge current	standard	1.250mA	0°C <T< 45°C
	rapid	1.250mA	10°C <T< 45°C
Discharge	standard	1.250mA	-20°C < T < 60°C
	max.cont.	2.500mA	-20°C < T < 45°C
	max.peak	2.750mA	-20°C < T < 45°C
Short circuit current		≈20A	<500µs
NTC		10 kOhm	Tolerance 5%; B-value 25°C/85°C = 3980K
Connector	JST	XHP-3	Pin 1 : GND black
			Pin 2: NTC yellow
			Pin 3: +3.7V red
Cable length		50mm	±5mm
Weight		27g	±2.5g
Watt hour rating		4,625 Wh	acc. UN38.3

Limitations by Safety Unit (SU)

over voltage	cut off	4.28V	±25mV
	release	4.08V	±100mV
under voltage	cut off	2.25V	±100mV
under voltage	release	3.0V	2.250V – 3.450V
Current limit 1 by SU		2.600mA	continuous (typical)
Current limit 2 by SU		>2.730mA	<150ms (typical)
Current limit 3 by SU		<14A	<4ms (typical)
Power consumption	active	12.5µA	-0/+7.5µA
	shutdown	1.5µA	-0/+1.0µA
ESD Protection		no	

PICPAL2138 – 3.6V / 2350 mAh



Dimensions	
length:	50.3 ±1mm
width:	11 ±0,5mm
height:	41 ±1mm

Data for pack

Nominal Voltage		3,6V	2,75V - 4,2V
Nominal capacity		2350mAh	typical
Used cell in Pack		1pcs	Panasonic NCA103450
internal resistance pack		172mΩ	155mΩ - 189mΩ
Max charge voltage		4,2V	
Charge current	standard	560mA	0 °C < T < 45 °C
	rapid	1500mA	10 °C < T < 45 °C
Discharge	standard	560mA	-20°C < T < 60 °C
	max.cont.	2950mA	-20°C < T < 60 °C
	max.peak	22A	-20°C < T < 60 °C (t ≤ 1ms)
Short circuit current		≤ 22A	< 2,5ms
NTC		10 kΩ	Tolerance 5%; B-value 25°C/85°C = 3980K
Connector	JST		Pin 1: GND black
		XHP-3	Pin 2: NTC yellow
			Pin 3: PLUS red
Cable length		45mm	±5mm
Weight		ca. 45g	±5g
Watt-hour rating		8Wh	acc. to UN38.3 Certificate Rev. 5.1

Limitations by Safety Unit (SU)

over voltage (per cell)	cut off	4210mV	± 25mV
over voltage (per cell)	release	4100mV	± 25mV
under voltage (per cell)	cut off	2280mV	± 25mV
under voltage (per cell)	release	2400mV	± 25mV
Current limit 1 by SU		3000mA	continuous (typical)
Current limit 2 by SU		n.a.	n.a.
Current limit 3 by SU		≤ 22A	> 2,5ms
Power consumption	active	50µA	-20/+20µA
	shutdown	10µA	-5/+5µA

Panasonic 24-36V lithium-ion battery packs

PICPAL1022 – 25.2V / 6750 mAh

UN 38.3



Dimensions(at max. positions)	
length	148mm +/-2mm
width	61mm +/-2mm
hight	98mm +/-2mm
Plastic housing	

Data for pack

Nominal Voltage		25,9V	29,4V - 21,0V
Nominal capacity		6.750mAh	typical
Used cell in Pack		21x	Panasonic CGR-18650CG
internal resistance pack		mOhm	mOhm - mOhm
Input voltage charge pin 6 (orange)		15V to 30V	
Charge current(internal charger)		1000mA	0°C < T < 45°C inte rmal charger
max. allowed by external charger		3000mA	10°C < T < 45°C
Discharge	standard	1350mA	-20°C < T < 60°C
	max.cont.	7800mA	-20°C < T < 45°C
	max.peak	30000mA	-20°C < T < 45°C
Short circuit current		≈150A	<500µs
NTC		---	on board charger and via SM-Bus
Connector	AMP VAL U-LOCK	SM-Bus	Pin 1+2+3: GND
			Pin 4: SM data SDA
			Pin 5: SM clock SCL
			Pin 6: --
			Pin 7: charger (15V to 32V)
			Pin 8,9,10: +25,9V
Cable lengh		n.a.	
Weight		1290g	±30g
Lithium content		13,35g	Energy: 170 Wh

Panasonic 24-36V lithium-ion battery packs

PICPAL1707 – 25.2V / 20300 mAh

UN 38.3



Dimensions

length: 190mm +3/-3mm (incl. connector)

width: 171 +2/-2mm

height: 73mm +2/-2mm

Data for pack

Nominal Voltage		25,2V	19,6V - 29,4V
Nominal capacity		20,3Ah	typical
Used cell in Pack		49	Panasonic NCR-18650
internal resistance pack		130mOhm	100- 210 mOhm
Max charge voltage		29,4V	External charger
Charge current +/- Contacts	external	4,3A	10°C < T < 45°C
Charge current internal charger		1,0A	0°C < T < 45°C
Discharge	standard	5,8A	-20°C < T < 60°C
	max.cont.	25,0A	-20°C < T < 60°C (limited by SU)
	max.peak	60A	t< 900ms
Short circuit current		2500A	t< 10ms
NTC		10 kOhm	Tolerance 5%; B-value 25°C/85°C = 3980K
Connector	AMP	VAL-U-LOK	Pin 1, 2, 3 : GND
			Pin 4: SDA, Pin 5: SDL ; Pin 6 Onboard charger IN
			Pin 7,8,9: PLUS ; Pin 10: NTC
Cable length		n.a.	
Weight		ca.3,3kg	
Watt-hour rating		511Wh	Typical value

Panasonic 24-36V lithium-ion battery packs

PICPAL1710 – 25.2V / 29000 mAh

UN 38.3



Dimensions	
length:	245 ±2mm
width:	170 ±2mm
height:	72 ±0.5mm

Data for pack

Nominal Voltage		25,2V	21V - 29,4V
Nominal capacity		29Ah	typical
Used cell in Pack		70pcs	Panasonic NCR-18650TB
internal resistance pack		60mΩ	50 - 100 mΩ
Max charge voltage		29,4V	external charger
Max Charge current		5A	10 °C < T < 45°C
Discharge	standard	5,8A	-20°C < T < 45°C
	max.cont.	25A	-20°C < T < 45°C
	max.peak	60A	-20°C < T < 45°C
Short circuit current		100A	t < 100µs
NTC		10 kΩ	Tolerance 5%; B-value 25°C/85°C = 3980K
Connector	V A L - U - L O K		Pin 1,2,3 GND
			Pin 4 SMB Data
			Pin 5 SMB Clock
			Pin 6,7,8 Pack +
			Pin 9 NC
			Pin 10 NTC
Cable length		n.a.	±mm
Weight		ca. 4600g	±50g
Watt-hour rating		686Wh	acc. to UN38.3 Certificate

Panasonic 24-36V lithium-ion battery packs

PICPAL1805 – 36.0V / 14500 mAh

UN 38.3

**Dimensions**

length: 245mm

width: 170mm

height: 72mm

Data for pack

Nominal Voltage		36V	nominal
Nominal capacity		14,5Ah	typical
Used cell in Pack		50x	Panasonic NCR-18650
internal resistance pack		95mOhm	80 - 180 mOhm
Max charge voltage		42V	External Charger
Charge current	standard	2A	0°C < T < 45°C
	rapid	4,5A	10°C < T < 45°C (limited by connector)
Discharge	standard	10A	-20°C < T < 60°C (limited by connector)
	max.cont.	25A	-20°C < T < 45°C (limited by connector)
	max.peak	60A	-20°C < T < 45°C (pls. note: Connector limitation!)
Short circuit current		≤2500 A	<100μs
NTC		10 kOhm	Tolerance 1% B-value 25°C/85°C = 3988K
Connector	AMP VAL-U-LOK		Pin 1 - 3 : GND Pin 6 - 8 : Bat +
			Pin 4 : - Pin 9 : -
			Pin 5 : - Pin 10 : NTC
Cable length			n/a
Weight		3,8 kg	approximately
Watt-hour rating		490 Wh	

RRC1120 – 3.7V / 2000 mAh

UN 38.3

IEC 62133

UL 2054



Standard Li-ion battery pack RRC1120 (1S1P) with 3.70V / 2000mAh / 7.4Wh

Features:

- Off-the-shelf single cell pack with high-energy density in a slim and compact design
- Allows to develop smaller and lightweight portable devices with long runtime, lower NRE costs and shorter time to market
- Fuel Gauge based on Impedance Tracking™ delivers accurate Time-To-Empty & Remaining Capacity predictions over the life time
- I²C communication
- Temperature control by NTC
- Comprehensive charging/discharging and passive safety systems
- Worldwide approvals
- Registered with recycling systems worldwide

Applications:

Suitable for use with hand held compact devices for industrial and medical areas, etc.

Specification

General

Delivery status	30%
battery capacity	
Compliance information	CE / UL2054 / FCC / PSE / KC / Gost / EAC / CQC / RCM / IEC 62133 / UN 38.3 / RoHS / REACH / BIS
Operating temperature	0°C to 45°C (charge) -20°C to 60°C (discharge)
Storage temperature	-20°C to 60°C max. -20°C to 20°C recommended

Battery Dimensions

Length	52.5mm±0.4
Width	34.78mm±0.4
Thickness	11.3mm max.
Weight	42g
Contacts	+, -, SDA (NTC), SCL

Electrical Parameters

Nominal voltage	3.7V
Nominal capacity	2000mAh
Initial impedance	<100mΩ @ 1kHz at 20°C
Max. charge current	1100mA
Max. charge voltage	4.2V
Max. discharge	2000mA
Life expectancy @25°C	>300 cycles with 1.0A Charge/1.0A Discharge
	min 80% of initial capacity

Safety Parameters PCM

Overcharge detection voltage	4280mV
Overdischarge detection voltage	2800mV/cell
Overcharge detection current	1360mA
Overdischarge detection current	2270mA



Mating connector from AVX for the RRC1120 battery is available from Avnet:
PN [ELC009155004541006](#)

RRCSCC1120 – Desktop Charger for RRC1120



5 Watt Desktop Battery Charger for RRC1120

Features:

- Single bay charger
- For the standard battery RRC1120
- Optimized charging process for RRC battery:
 - Longer cycle life
- Simple operation – Plug and Play
- External wall plug power supply for worldwide use

Applications:

- Standard charging station for mobile devices used in medical, industrial and consumer markets

Specification RRC-SCC1120

Input	
Voltage	5V nom.
Current	1000mA nom.
Power	5W

Environmental	
Cooling	convection cooled
Temperature	Operating: 0°C to 40°C
	Non-operating -10°C to 70°C
Pressure & Altitude	Operating: 1060hPa to 795hPa -382m to 2000m
	Non-operating: 1060hPa to 572hPa -382m to 4570m
Humidity	5% to 95% r.H., non-condensing

Output	
Voltage	4.2VDC
Current max.	1A
Voltage tolerance ⁽¹⁾	±1% max.
Current tolerance ⁽¹⁾	±10% max. @1A
Protection	Short circuit Battery over/under temperature Charger over temperature Charge timer

General	
Indicator	Multi-color LED (green, red, orange)
Battery types	Standard battery RRC1120
Green procurement	RoHS 2011/65/EU WEEE 2012/19/EU Chinese RoHS

LED Indications

Orange light	The inserted battery is of the correct type and is currently being charged.
Green light	The battery is charged and can be removed for use.
Red blinking	Battery detection phase
Red light	No battery inserted, battery over/under temperature-, charger over temperature-, battery over voltage-, battery charge timer time-out-error or input voltage too low

Charger Mechanical Details

Housing dimensions (LxWxH)	40.6 x 76 x 12.6mm
Weight	15g (excluding power supply)

RRC1130 – 3.7V / 3.880 mAh

UN 38.3

IEC 62133

UL 2054



Standard Li-ion battery pack RRC1130 (1S1P) with 3.80V / 3880mAh / 14.7Wh

Features:

- Off-the-shelf single cell pack with high-energy density in a slim and compact design
- Allows to develop smaller and lightweight portable devices with long runtime, lower NRE costs and shorter time to market
- Fuel Gauge based on Impedance Tracking™ delivers accurate Time-To-Empty & Remaining Capacity predictions over the life time
- I²C communication
- Temperature control by NTC
- Comprehensive charging/discharging and passive safety systems
- Worldwide approvals
- Registered with recycling systems worldwide

Applications:

Suitable for use with hand held compact devices in industrial and medical areas, etc.

Specification

General	
Delivery status	30%
battery capacity	
Compliance information	CE / UL2054 / FCC / PSE / KC / Gost / EAC / CQC / RCM / IEC 62133 / UN 38.3 / RoHS / REACH / BIS
Operating temperature	0°C to 45°C (charge) -20°C to 60°C (discharge)
Storage temperature	-20°C to 60°C max. -20°C to 20°C recommended

Battery Dimensions	
Length	83.7mm±0.5
Width	61.03mm±0.4
Thickness	6.8mm max.
Weight	69g
Contacts	+, -, SDA (NTC), SCL

Electrical Parameters	
Nominal voltage	3.8V
Nominal capacity	3880mAh
Initial impedance	<60mΩ @ 1kHz at 20°C
Max. charge current	2400mA
Max. charge voltage	4.35V
Max. discharge	3000mA
Life expectancy @25°C	>300 cycles with min 85% of initial capacity
1.9A Charge/0.75A Discharge	

Safety Parameters PCM	
Overcharge detection voltage	4400mV
Overdischarge detection voltage	2800mV
Overcharge detection current	3000mA
Overdischarge detection current	4000mA



Mating connector from AVX for the RRC1130 battery is available from Avnet: PN [ELC009155004541006](#)

RRCSCC1130 – Desktop Charger for RRC1130



5 Watt Desktop Battery Charger for RRC1130

Features:

- Single bay charger
- For the standard battery RRC1130
- Optimized charging process for RRC battery:
 - Longer cycle life
- Simple operation – Plug and Play
- External wall plug power supply for worldwide use

Applications:

- Standard charging station for mobile devices used in medical, industrial and consumer markets

Specification RRC-SCC1130

Input	
Voltage	5V nom.
Current	1000mA nom.
Power	5W

Output	
Voltage	4.35VDC
Current max.	1A
Voltage tolerance ⁽¹⁾	±1% max.
Current tolerance ⁽¹⁾	±10% max. @1A
Protection	Short circuit Battery over/under temperature Charger over temperature Charge timer

Environmental	
Cooling	convection cooled
Temperature	Operating: 0°C to 40°C Non-operating -10°C to 70°C
Pressure & Altitude	Operating: 1060hPa to 795hPa -382m to 2000m Non-operating: 1060hPa to 572hPa -382m to 4570m
Humidity	5% to 95% r.H., non-condensing

General	
Indicator	Multi-color LED (green, red, yellow)
Battery types	Standard battery RRC1130
Green procurement	RoHS 2011/65/EU WEEE 2012/19/EU Chinese RoHS

LED Indications	
Yellow light	The inserted battery is of the correct type and is currently being charged.
Green light	The battery is charged and can be removed for use.
Red blinking	Battery detection phase
Red light	No battery inserted, Battery over/under temperature-, charger over temperature-, battery charge timer time-out-error or input voltage too low

Charger Mechanical Details	
Housing dimensions (LxWxH)	67 x 107 x 9mm
Weight	25g (excluding power supply)

RRC2040 – 11.25V / 2950 mAh

UN 38.3

IEC 62133

UL 2054



Standard Li-ion battery pack RRC2040 3 x 18650 cells (3S1P) with 11.25V / 2950mAh / 33.2Wh

Features:

- Highest available energy density
- SMBus v1.1 compliant
- Fulfils JEITA standards, advanced temperature-dependent charging profile
 - Fastest charging
 - Maximized cycle life
- Impedance tracking and cell balancing
 - No manual recalibration necessary
 - Longest lifetime
- Comprehensive charging/discharging and passive safety systems
- Worldwide approvals
- Registered with recycling systems worldwide

Applications:

Suitable for use with tablet PC's, notebooks, industrial and medical devices, etc.

Specification

General

Basic Cell	18650
Delivery status	30%
battery capacity	
Operating temperature	0°C to 45°C (charge) -20°C to 60°C (discharge)
Storage temperature	-20°C to 60°C max. -20°C to 20°C recommended
Compliance information	CE / UL2054 / FCC / PSE / KC / BSMI / Gost / EAC / CQC / RCM / IEC 62133 / UN 38.3 / ROHS / Reach / BIS

Battery Dimensions

Length	84.9mm±0.25
Width	58.8mm±0.25
Thickness	21.9mm+0.5/-0.25
Weight	170g
Contacts	+, C, D, T, -

Electrical Parameters

Nominal Voltage	11.25V
Nominal capacity	2950mAh
Initial impedance	<200mΩ @ 1kHz at 20°C
Max. charge current	2065mA
Max. charge voltage	13.05V
Cont. discharge	3000mA
Peak discharge	10000mA
Life expectancy @25°C	>300 cycles with 1.5A Charge/1.5A Discharge
	min 75% of initial capacity

Safety Parameters PCM

Overcharge detection voltage	4420mV
Overcharge release voltage	4200mV
Overdischarge detection voltage	2600mV
Overdischarge release voltage	3000mV
Overcharge detection current	2300mA
Overdischarge detection current	3500mA

RRC2140 – 11.40V / 3880 mAh

UN 38.3

IEC 62133

UL 2054



Standard Li-ion battery pack RRC2140 3 x 596080B cells (3S1P) with 11.40V / 3880mAh / 44.2Wh

Features:

- Slim and flat standard battery pack with higher capacity and lower height than round cell packs with similar energy
- Allows to develop smaller and thinner portable devices with long runtime
- SMBus & SBDS Rev 1.1 compliant
- Fulfills JEITA standards, advanced temperature-dependent charging profile
 - Fastest charging
 - Maximized cycle life
- Impedance tracking and cell balancing
 - No manual recalibration necessary
 - Longest lifetime
- Comprehensive charging/discharging and passive safety systems
- Worldwide approvals
- Registered with recycling systems worldwide

Applications:

Suitable for use in slim devices for industrial and medical applications, etc.

Specification

General	
Delivery status	30%
Delivery status battery capacity	
Compliance information	CE / UL2054 / FCC / PSE / KC / Gost / EAC / CQC / RCM / IEC 62133 / UN 38.3 / RoHS / REACH / BIS / TIS 2217-2548
Operating temperature	0°C to 45°C (charge) -20°C to 60°C (discharge)
Storage temperature	-20°C to 60°C max. -20°C to 25°C recommended

Battery Dimensions	
Length	212.9mm +/-0.5
Width	86.2 +/-0.4mm
Thickness	8.1mm +/-0.25
Weight	<245g
Contacts	+, +, C, D, T, -, -

Electrical Parameters	
Nominal voltage	11.4V
Nominal capacity	3880mAh
Initial impedance	<200mΩ @ 1kHz at 20°C
Max. charge current	2700mA
Max. charge voltage	13.05V
Cont. discharge	3780mA
Max. discharge	5670mA
Life expectancy @25°C	>300 cycles with min. 85% of initial capacity
1.9A Charge/0.75A Discharge	

Safety Parameters PCM	
Overcharge detection voltage	4390mV/cell
Overcharge release voltage	4200mV/cell
Overdischarge detection voltage	2750mV/cell
Overdischarge release voltage	3250mV/cell
Overcharge detection current	3100mA
Overdischarge detection current	6000mA

Notes: Prior to use read handling precaution and prohibitions for Li-ion batteries

RRC2054 – 15.00V / 2950 mAh

UN 38.3

IEC 62133

UL 2054



Standard Li-ion battery pack RRC2054 4 x 18650 cells (4S1P) with 15.0V / 3200mAh / 48.0Wh

Features:

- Highest available energy density
- SMBus & SBDS Rev 1.1 compliant
- Fulfills JEITA standards, advanced temperature-dependent charging profile
 - Fastest charging
 - Maximized cycle life
- Impedance tracking and cell balancing
 - No manual recalibration necessary
 - Longest lifetime
- Comprehensive charging/discharging and passive safety systems
- Worldwide approvals
- Registered with recycling systems

Applications:

Suitable for use with tablet PC's, notebooks, industrial and medical devices, etc.

Specification

General	
Basic Cell	18650
Delivery status	30%
battery capacity	
Operating temperature	0°C to 45°C (charge) -20°C to 60°C (discharge)
Storage temperature	-20°C to 60°C max. -20°C to 25°C recommended
Compliance information	CE / UL2054 / FCC / PSE / KC / Gost / EAC / CQC / RCM / IEC 62133 / UN 38.3 / ROHS / Reach / BIS

Battery Dimensions	
Length	85.1mm±0.25
Width	77.4mm±0.25
Thickness	22.4mm±0.6/-0.4
Weight	240g
Contacts	+, C, D, T, -

Electrical Parameters	
Nominal Voltage	15.0V
Nominal capacity	3200mAh
Initial impedance	<270mΩ @ 1kHz at 20°C
Max. charge current	2170mA
Max. charge voltage	17.4V
Cont. discharge	4250mA
Peak discharge	10000mA
Life expectancy @23°C	>300 cycles with 1.6A Charge/1.6A Discharge
	min. 75% of initial capacity

Safety Parameters PCM	
Overcharge detection voltage	4420mV/cell
Overcharge release voltage	4200mV/cell
Overdischarge detection voltage	2750mV/cell
Overdischarge release voltage	3000mV/cell
Overcharge detection current	2400mA
Overdischarge detection current	4350mA

RRC2057 – 7.50V / 6400 mAh

UN 38.3

IEC 62133

UL 2054



Standard Li-ion battery pack RRC2057 4 x 18650 cells (2S2P) with 7.5V / 6400mAh / 48.0Wh

Features:

- Highest available energy density
- SMBus & SBDS Rev 1.1 compliant
- Fulfills JEITA standards, advanced temperature-dependent charging profile
 - Fastest charging
 - Maximized cycle life
- Impedance tracking and cell balancing
 - No manual recalibration necessary
 - Longest lifetime
- Comprehensive charging/discharging and passive safety systems
- Worldwide approvals
- Registered with recycling systems

Applications:

Suitable for use with tablet PC's, notebooks, industrial and medical devices, etc.

Specification

General	
Basic Cell	18650
Delivery status	30%
battery capacity	
Operating temperature	0°C to 45°C (charge) -20°C to 60°C (discharge)
Storage temperature	-20°C to 60°C max. -20°C to 25°C recommended
Compliance information	CE / UL2054 / FCC / PSE / KC / Gost / EAC / CQC / RCM / IEC 62133 / UN 38.3 / ROHS / Reach / BIS

Battery Dimensions	
Length	85.1mm±0.25
Width	77.4mm±0.25
Thickness	22.4mm±0.6/-0.4
Weight	240g
Contacts	+, C, D, T, -

Electrical Parameters	
Nominal Voltage	7.5V
Nominal capacity	6400mAh
Initial impedance	<200mΩ @ 1kHz at 20°C
Max. charge current	4340mA
Max. charge voltage	8.7V
Cont. discharge	8500mA
Peak discharge	20000mA
Life expectancy @23°C	>300 cycles with min. 75% of initial capacity
3.2A Charge/3.2A Discharge	

Safety Parameters PCM	
Overcharge detection voltage	4420mV/cell
Overcharge release voltage	4200mV/cell
Overdischarge detection voltage	2750mV/cell
Overdischarge release voltage	3000mV/cell
Overcharge detection current	4800mA
Overdischarge detection current	8700mA

RRC20402 – 11.25V / 6400 mAh

UN 38.3

IEC 62133

UL 2054



Standard Li-ion battery pack RRC2040-2 6 x 18650 cells (3S2P) with 11.25V / 6400mAh / 72.0Wh

Features:

- Highest available energy density
- SMBus & SBDS Rev 1.1 compliant
- Fulfills JEITA standards, advanced temperature-dependent charging profile
 - Fastest charging
 - Maximized cycle life
- Impedance tracking and cell balancing
 - No manual recalibration necessary
 - Longest lifetime
- Comprehensive charging/discharging and passive safety systems
- Worldwide approvals
- Registered with recycling systems

Applications:

Suitable for use with tablet PC's, notebooks, industrial and medical devices, etc.

Specification

General	
Basic Cell	18650
Delivery status	30%
battery capacity	
Operating temperature	0°C to 45°C (charge) -20°C to 60°C (discharge)
Storage temperature	-20°C to 60°C max. -20°C to 25°C recommended
Compliance information	CE / UL2054 / FCC / PSE / KC / Gost / EAC / CQC / RCM / IEC 62133 / UN 38.3 / ROHS / Reach / BIS

Battery Dimensions	
Length	150.25mm±0.25
Width	58.8mm±0.25
Thickness	21.9mm+0.5/-0.25
Weight	340g
Contacts	+, C, D, T, -

Electrical Parameters	
Nominal Voltage	11.25V
Nominal capacity	6400mAh
Initial impedance	<250mΩ @ 1kHz at 20°C
Max. charge current	4340mA
Max. charge voltage	13.05V
Cont. discharge	6500mA
Peak discharge	20000mA
Life expectancy @23°C	>300 cycles with 3.2A Charge/3.2A Discharge
	min 75% of initial capacity

Safety Parameters PCM	
Overcharge detection voltage	4420mV/cell
Overcharge release voltage	4200mV/cell
Overdischarge detection voltage	2750mV/cell
Overdischarge release voltage	3000mV/cell
Overcharge detection current	4800mA
Overdischarge detection current	7500mA

RRC2020 – 11.25V / 8850 mAh

UN 38.3

IEC 62133

UL 2054



Standard Li-ion battery pack RRC2020 9 x 18650 cells (3S3P) with 11.25V / 8850mAh / 99.6Wh

Features:

- Highest available energy density
- SMBus & SBDS Rev 1.1 compliant
- Fulfills JEITA standards, advanced temperature-dependent charging profile
 - Fastest charging
 - Maximized cycle life
- Impedance tracking and cell balancing
 - No manual recalibration necessary
 - Longest lifetime
- Comprehensive charging/discharging and passive safety systems
- Worldwide approvals
- Registered with recycling systems worldwide

Applications:

Suitable for use with tablet PC's, notebooks, industrial and medical devices, etc.

Specification

General	
Basic Cell	18650
Delivery status	30%
battery capacity	
Operating temperature	0°C to 45°C (charge) -20°C to 60°C (discharge)
Storage temperature	-20°C to 60°C max. -20°C to 20°C recommended
Compliance information	CE / UL2054 / FCC / PSE / KC / Gost / EAC / CQC / RCM / IEC 62133 / UN 38.3 / RoHS / REACH / BIS

Battery Dimensions	
Length	149mm±0.7
Width	89mm±0.25
Thickness	19.7mm±0.4/-0.25
Weight	490g
Contacts	+, C, D, T, -

Electrical Parameters	
Nominal Voltage	11.25V
Nominal capacity	8850mAh
Initial impedance	<100mΩ @ 1kHz at 20°C
Max. charge current	6195mA
Max. charge voltage	13.05V
Cont. discharge	10000mA
Peak discharge	14000mA
Life expectancy @25°C	>300 cycles with min 80% of initial capacity
4.4A Charge/4.4A Discharge	

Safety Parameters PCM	
Overcharge detection voltage	4420mV/cell
Overcharge release voltage	4200mV/cell
Overdischarge detection voltage	2600mV/cell
Overdischarge release voltage	3000mV/cell
Overcharge detection current	7000mA
Overdischarge detection current	11000mA

RRC20542 - 14.4V / 6900 mAh

UN 38.3

IEC 62133

UL 2054



Standard Li-ion battery pack RRC2054-2 8 x 18650 cells (4S2P) with 14.4V / 6900mAh / 99.4Wh

Features:

- Highest available energy density
- SMBus & SBDS Rev 1.1 compliant
- Fulfills JEITA standards, advanced temperature-dependent charging profile
 - Fastest charging
 - Maximized cycle life
- Impedance tracking and cell balancing
 - No manual recalibration necessary
 - Longest lifetime
- Comprehensive charging/discharging and passive safety systems
- Worldwide approvals
- Registered with recycling systems

Applications:

Suitable for use with tablet PC's, notebooks, industrial and medical devices, etc.

Specification

General

Basic Cell	18650
Delivery status	30%
battery capacity	
Operating temperature	0°C to 45°C (charge) -20°C to 60°C (discharge)
Storage temperature	-20°C to 50°C max. -20°C to 25°C recommended
Compliance information	CE / UL2054 / FCC / PSE / KC / Gost / EAC / CQC / RCM / IEC 62133 / UN 38.3 / ROHS / Reach / BIS

Battery Dimensions

Length	150.4mm±0.4
Width	77.4mm±0.25
Thickness	22.35mm±0.6/-0.4
Weight	430g
Contacts	+, C, D, T, -

Electrical Parameters

Nominal Voltage	14.4V
Nominal capacity	6900mAh
Initial impedance	200mΩ @ 1kHz at 20°C
Max. charge current	4830mA
Max. charge voltage	16.8V
Max. discharge current	10000mA
Peak discharge current	20000mA
Life expectancy @25°C	>300 cycles with 1.675A Charge/3.35A Discharge
	min. 63% of initial capacity

Safety Parameters PCM

Overcharge detection voltage	4270mV/cell
Overcharge release voltage	4100mV/cell
Overdischarge detection voltage	2500mV/cell
Overdischarge release voltage	2750mV/cell
Overcharge detection current	6000mA
Overdischarge detection current	10500mA

RRC2024 – 14.40V / 6600 mAh

UN 38.3

IEC 62133

UL 2054



Standard Li-ion battery pack RRC2024 12 x 18650 cells (4S3P) with 14.40V / 6600mAh / 95.0Wh

Features:

- Highest available energy density
- SMBus & SBDS Rev 1.1 compliant
- Fulfils JEITA standards, advanced temperature-dependent charging profile
 - Fastest charging
 - Maximized cycle life
- Impedance tracking and cell balancing
 - No manual recalibration necessary
 - Longest lifetime
- Comprehensive charging/discharging and passive safety systems
- Worldwide approvals
- Registered with recycling systems worldwide

Applications:

Suitable for use with tablet PC's, notebooks, industrial and medical devices, etc.

Specification

General	
Basic cell type	18650
Delivery status	30%
battery capacity	
Operating temperature	0°C to 45°C (charge) -20°C to 60°C (discharge)
Storage temperature	-20°C to 60°C max. -20°C to 20°C recommended
Compliance information	CE / UL2054 / FCC / PSE / KC / Gost / EAC / CQC / RCM / IEC 62133 / UN 38.3 / RoHS / REACH / BIS

Battery Dimensions	
Length	167.2mm±0.5
Width	107.5mm+0.4/-0.3
Thickness	21.5mm+0.3/-0.5
Weight	590g
Contacts	+, C, D, T, -

Electrical Parameters	
Nominal voltage	14.4V
Nominal capacity	6600mAh
Initial impedance	<150mΩ @ 1kHz at 20°C
Max. charge current	4620mA
Max. charge voltage	16.8V
Cont. discharge	10000mA
Peak discharge	14000mA
Life expectancy @25°C	>300 cycles with 3.3A Charge/3.3A Discharge
	min 80% of initial capacity

Safety Parameters PCM	
Overcharge detection voltage	4300mV/cell
Overcharge release voltage	4100mV/cell
Overdischarge detection voltage	2750mV/cell
Overdischarge release voltage	3000mV/cell
Overcharge detection current	5300mA
Overdischarge detection current	11000mA

RRCPMM240 – smart battery power management module



C **UL** **US** **CB**

Power Management Module for Mobile Applications

Features:

- 240 Watt max. output power to application
- 82 Watt max. output power to battery
- Automatic power source selection
- Wide DC input voltage range
- 3D data available of power management module and batteries for easy integration into user application
- Fits to standard smart batteries from RRC (e.g. RRC2020, RRC2024, RRC2040, RRC2040-2, RRC2054, RRC2057, ...)

Applications:

- Power management and smart battery charging capability for medical and industrial applications

Specification

Power supply Input

	Min.	Max.
Input voltage range	Battery charge voltage+1V	24VDC
Total input power	192W max.	
Input current	8A max.	
Input fuse	12A	
Protection	Reverse polarity, short current	
Standby current	Typical 1mA	

Power Management

Automatic power source selection with seamless transition between ext. DC power supply and battery

Environmental Condition

Operating Temperature	-20° to +60°C
Transport & Storage Temperature	-20° to +60°C
Relative Humidity	5% - 95% non-condensing
Ambient pressure	500-1070hPa

Recommended Voltage for External AC/DC Power Supplies

Battery architecture	DC input voltage	Power supply wattage @ 4A max input current	Power supply wattage @ 8A max input current
1SxP	6VDC	≥30W	≥60W
2SxP	12VDC	≥48W	≥96W
3SxP	15VDC	≥64W	≥128W
4SxP	19VDC	≥80W	≥160W

Regulatory Approvals

International: IEC 60601-1(ed.3), IEC 60601-1(ed.3);am1

USA: ANSI/AAMI ES60601-1:2005/(R)2012
Canada: CAN/CSA-C22.2 NO. 60601-1:14

Mechanical Details

Board dimensions (LxWxH)	60mm x 50mm x 11mm, without cables and connectors
Weight	Typical 22g
Connectors:	DC input & DC output (2 pin) / User interface (6 pin) / Battery connector (5 pin smart battery connector)

Application Output

Output voltage range	Equal to DC input voltage if ext. DC power supply is present. Equal to battery voltage if no ext. DC power supply is present.
Total output power	240W max.
Output current	10A max.
Output fuse	12A

Battery Input / Output

Battery charge voltage	Up to 19.2V (± 0.5%)
Battery charge current	Up to 6.2A (± 3%)
Total output power	82W max.
Battery discharge current	10A max.
Protection	Battery short circuit, over temperature, over voltage, over current & reverse polarity

User Interface

UI via GPIO / available info	Charging: yes/no Ext. DC power supply: yes/no Battery/hardware error
SMBus commands to set	Charge current limit, input current limit
Battery information available via standard SMBus	

RRC SMBUBC – smart battery charger / conditioner



Specification RRC-SMB-UBC

Input	
Voltage range	19 - 26VDC
Current	3400mA max.
Power	65W

Environmental	
Cooling	convection cooled
Temperature	Operating: 0°C to 40°C Non-operating -10°C to 70°C
Pressure & Altitude	Operating: 1060hPa to 795hPa -382m to 2000m Non-operating: 1060hPa to 572hPa -382m to 4570m
Humidity	5% to 95% r.H., non-condensing

LED Indications	
One time Red/Orange/Green	Selftest: Charger is ready for use.
Red/Green blinking	Battery recognition and initialization.
Orange blinking	The battery is currently being calibrated.
Orange light	The inserted battery is of the correct type and is currently being charged.
Green light	The battery is charged and can be removed for use.
Red blinking	The battery is too hot or too cold to be charged without damage. If the battery is too cold it will be charged as soon as it has warmed up sufficiently. If the battery is too hot it should be removed to cool down.
Red light	The battery is damaged or it is a conventional battery which cannot be recharged.

Charger Mechanical Details	
Housing dimensions (LxWxH)	151 x 90 x 43mm
Weight	198g (excluding power supply)

65 Watt SMBUS Desktop Universal Battery Charger for Smart Batteries

Features:

- Single bay fast charger
- For the standard battery form factors RRC2020, 2024, 2040, 2040-2, 2054, 2057 or smart batteries with a similar footprint (e.g. 202x range, 204x range, 205x range, DR36, etc.)
- Optimized charging process for RRC batteries:
 - Longer cycle life
 - Faster charging
- Simple operation – Plug and Play
- Automatic recognition and calibration of smart battery learned capacity
- External power supply for worldwide use
- Country specific AC input cables available

Applications:

- Standard charging station for mobile devices used in medical, industrial and consumer markets

Output	
Voltage range	0 - 17.4VDC
Current range	0 - 4.8A
Voltage tolerance ⁽¹⁾	±1% max.
Current tolerance ⁽¹⁾	±10% max. @1A, ±3% max. @4A
Protection	Short circuit Over temperature shutdown Input/output over current

General	
Efficiency ⁽²⁾	~95% at 100% load
Indicator	Multi-color LED (green, red, orange)
Battery types	Standard battery form factors RRC2020, 2024, 2040, 2040-2, 2054, 2057 or smart batteries with a similar footprint (e.g. 202x range, 204x range, 205x range, DR36, etc.)
Green procurement	RoHS 2011/65/EU WEEE 2012/19/EU Chinese RoHS

RRC SMBMBC – mini smart battery charger



50 Watt SMBUS Desktop Mini Battery Charger for Smart Batteries

Features:

- Single bay charger
- For the standard battery form factors 2040, 2040-2, 2054, 2057 or smart batteries with a similar footprint
- Optimized charging process for RRC batteries:
 - Longer cycle life
 - Faster charging
- Simple operation – Plug and Play
- External power supply for worldwide use
- Country specific AC input cables available

Applications:

- Standard charging station for mobile devices used in medical, industrial and consumer markets

Specification RRC-SMB-MBC

Input	
Voltage	19 - 26VDC
Current	2800mA max.
Power	50W

Environmental	
Cooling	convection cooled
Temperature	Operating: 0°C to 40°C
	Non-operating -10°C to 70°C
Pressure & Altitude	Operating: 1060hPa to 795hPa -382m to 2000m
	Non-operating: 1060hPa to 572hPa -382m to 4570m
Humidity	5% to 95% r.H., non-condensing

Output	
Voltage range	0 - 17.4VDC
Current range	0 - 4.8A
Voltage tolerance ⁽¹⁾	±1% max.
Current tolerance ⁽¹⁾	±10% max. @1A, ±3% max. @4A
Protection	Short circuit Over temperature shutdown Input-/output over current

General	
Efficiency ⁽²⁾	~95% at 100% load
Indicator	Multi-color LED (green, red, orange)
Battery types	Standard battery form factors 2040, 2040-2, 2054, 2057 or smart batteries with a similar footprint
Green procurement	RoHS 2011/65/EU WEEE 2012/19/EU Chinese RoHS

LED Indications

One time Red/Orange/Green	Selftest: Charger is ready for use.
Red/Green blinking	Battery recognition and initialization.
Orange light	The inserted battery is of the correct type and is currently being charged.
Green light	The battery is charged and can be removed for use.
Red blinking	The battery is too hot or too cold to be charged without damage. If the battery is too cold it will be charged as soon as it has warmed up sufficiently. If the battery is too hot it should be removed to cool down.
Red light	The battery is damaged or it is a conventional battery which cannot be recharged.

Charger Mechanical Details

Housing dimensions (LxWxH)	120 x 64 x 43mm
Weight	110g (excluding power supply)

RRCPMC02APMCM027NC – 2-bay smart battery charger



64 Watts 2 bay desktop professional modular battery charger

Features:

- 32W maximum charging power per bay
- Consisting of a base charger and a customizable battery adapter module
- Two bay charger for Smart batteries
- Suitable for cell chemistries NiCd, NiMH, LiIon or LiPol
- Fast design modification for battery adapter modules
- Very safe charging, monitoring of cell-voltage, cell-temperature and charge time
- Wide input voltage range for worldwide use
- With external power supply
- International approvals for safety and EMI

Applications:

- Suitable for use with notebook and other IT batteries as well as RRC standard batteries

Specification PMC02A

Input

Voltage	19-24VDC
Power	65W max.
Current range	0 - 3.42A

Environmental

Cooling	convection cooled
Temperature	Operating: 5°C to 35°C Non-operating: -10°C to 60°C
Pressure & altitude	Operating: 1060hPa to 795hPa -382m to 2000m Non-operating: 1060hPa to 572hPa -382m to 4570m
Humidity	5 to 95% r. H., non-condensing

Output

Voltage range	0 – 16.8VDC
Power	2 x 32W max.
Current	0 – 3.3A
Voltage tolerance ⁽¹⁾	±1% max.
Current tolerance ⁽¹⁾	±10% max.
Protection	Short circuit Over temperature shutdown

General

Battery Adapter	Customized
Efficiency ⁽²⁾	typical 80% at 100% load
MTBF	> 20000h at 25°C and full load per MIL-HDBK 217F
Green procurement	RoHS WEEE Chinese RoHS
Indicator	LED panel (See next page)

Operation display

LED Indicator	LED color	Charging condition
LED N°4	Off Solid green	Battery charging station is not supplied Battery charging station is supplied
LED N°1	Solid Green	Charging complete
LED N°2	Solid Amber	Charging in process (rapid or trickle)
LED N°3	Solid Red Blinking Red	Abnormal charge mode (due to defective battery) Standby mode (due to abnormal temperature)
LED N°1, 2, 3	Off	Battery not installed or improperly installed.

RRCSMBCAR – car adapter for MBC/UBC chargers



90 Watt automobile power adapter

Features:

- 90 Watt continuous output power (85W main-output + 5W USB-output)
- Ultra compact and lightweight car adapter
- Wide input voltage range
- USB charging port
- Worldwide approvals
- High safety standards (e. g. protection against short circuit, over current, over voltage, over temperature)
- For use in cars and trucks
- To power RRC-SMB-UBC and RRC-SMB-MBC charger

Applications:

- Suitable for portable or mobile devices as well
- Simultaneous power for a battery charger and USB compatible device

RRCBATTERYCABLE – SMBus battery cable



SMBus battery cable

Applications:

- Extension cable for battery applications
- Suitable for use with RRC Standard Battery Packs RRC2040, RRC2040-2, RRC2054 and RRC2057



Mating connector from TE Connectivity for the RRC SMART batteries is available from Avnet: PN [AMP57874461](#)

RRCSMBUSREADER – SMBus reader



System Management Bus Reader

Features

- Simple and easy read out of SMBus batteries
- Displays information direct from battery controlled by only two buttons
- No external PSU required
- Compatible with all SMBus batteries with 5 way blade connector
- All information displayed could be sent via standard RS232 interface to a connected host
- Screen: 16*2

Applications

- The ideal and essential SMBus battery diagnostic tool for development engineers

Custom battery designs

Custom battery designs can be made available on a project basis - Please consult your local Avnet representative



Miniature lithium-ion batteries for Bluetooth applications

Avnet Abacus offers rechargeable miniature li-ion batteries in various sizes and shapes



Varta CoinPower CP1245 / CP1454 / CP1654

- Robust design, more than 1.000 cycles achievable
- Low internal resistance for high charge and discharge rates (up to 5C discharge peak, 2C continous)
- Available for direct PCB mounting with pins/wires



GP miniature cylindrical li-ion

- Robust can design
- Low internal resistance for high charge and discharge rates
- Available with protection module attached



Panasonic CG-320 pin-type li-ion

- Specific pin design, only 3.5mm diameter
- Low internal resistance for high peak discharge
- Available with tags for SMT assembly



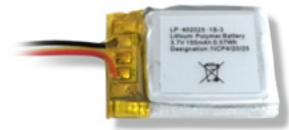
Coming soon - ProLogium flexible li-ceramic FLCB

- Solid state battery on flexible FPC material (very safe against mechanical damage)
- Only 0.38 mm thick
- -20°C to +60°C operating temperature



Tadiran cylindrical TLI

- More than 5.000 cycles achievable
- Up to 20 years lifetime and more
- -40°C to +85°C operating temperature



Dubilier prismatic li-polymer

- Various shapes available
- High energy density
- Standard designs with protection module

Battery solutions linecard

	Zinc carbon	Alkaline	Lithium	Lithium thionyl chloride	Sealed lead acid	Nickel metal hydride	Lithium ion	Lithium polymer	Battery chargers
	Primary				Rechargeable				
Dubilier			•	•		•	•	•	
Energysys					•				
GP Batteries	•	•	•			•	•		
Panasonic	•	•	•		•	•	•		
RRC							•		•
Tadiran				•			•		
VARTA Microbattery		•	•	•		•	•	•	
Wamtechnik						•	•		



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