AVNET ABACUS

Standard lithium-ion / polymer battery packs

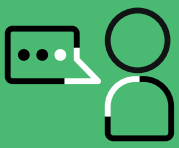
Battery solutions from Avnet Abacus

Battery power is at the heart of how your product operates. In some cases, you need your product to run for as long as possible between recharges, in others you need short bursts of power stretched out over long periods and sometimes you need the power to stay on when everything else has shut down. The environment where your product is being used and the equipment power profile all has to be considered when designing a battery into your application.

The Avnet Abacus team takes the time to understand your overall system including how and where it will be used, recommending the right battery strategy for your requirements.

Our portfolio covers primary and secondary cells from leading battery manufactures, as well as custom designed battery packs and assemblies in all cell chemistries.

ARE YOU READY TO KEEP YOUR SOLUTION FULLY CHARGED?



LET'S TALK

Speak to your local sales representative, or get in touch with our battery specialists in your local language at www.avnet-abacus.eu/ask-an-expert

Visit avnet-abacus.eu/batteries to:

View our linecard

Download technical brochures, white papers and datasheets

Read our guide to European battery legislation and safety requirements

Content

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 certification

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

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Cylindrical li-ion 18650

Voltage V	Capacity mAh	Avnet PN	Number of cells	Configuration	Manufacturer					Page
3.7	2250	YOB18650CA1S3J	1	1S1P	Dubilier					42
3.7	2400	YOBBAKTH18650CIL!B	1	1S1P	Dubilier					42
3.7	2600	VAR56653201012	1	1S1P	VARTA					9
3.7	2600	GBANTA3588	1	1S1P	GP Batteries					44
3.7	3350	PICPALNB154	1	1S1P	Panasonic					45
3.7	3350	PICPAULLNB19	1	1S1P	Panasonic					46
3.7	4500	YOB18650CA2P3J	2	1S2P	Dubilier					42
3.7	5200	VAR56653502013	2	1S2P	VARTA					10
3.7	5200	VAR56653702099	2	1S2P	VARTA					20
3.7	6700	PICPAULLNB46	2	1S2P	Panasonic					47
3.7	10050	PICPAULLNB33	3	1S3P	Panasonic					48
3.7	13400	PICPAULLNB55	4	1S4P	Panasonic					49
7.4	2250	YOB18650CA2S3J	2	2S1P	Dubilier					42
7.4	2600	VAR56653502012	2	2S1P	VARTA					11
7.2	2900	RRC2037	2	2S1P	RRC					69
7.2	3350	PICPALNB76	2	2S1P	Panasonic					50
7.4	6400	YOBBAKTH18650320!A	4	2S2P	Dubilier					43
7.5	6400	RRC2057	4	2S2P	RRC					72
10.8	3350	PICPALNB27	3	3S1P	Panasonic					51
11.3	2950	RRC2040	3	3S1P	RRC					70
11.3	6400	RRC20402	6	3S2P	RRC					73
11.3	8850	RRC2020	9	3S3P	RRC					74
15.0	2950	RRC2054	4	4S1P	RRC					71
14.4	3350	PICPALNB126	4	4S1P	Panasonic					52
14.4	3350	PICPALNB117	4	4S1P	Panasonic					53
14.4	6600	RRC2024	12	4S3P	RRC					76
14.4	6900	RRC20542	8	4S2P	RRC					75
25.2	6750	PICPAL1022	21	7S3P	Panasonic					56
25.2	20300	PICPAL1707	49	7S7P	Panasonic					57
25.2	29000	PICPAL1710	70	7S10P	Panasonic					58
36.0	14500	PICPAL1805	50	10S5P	Panasonic					59

Li-ion button cells

Voltage V	Capacity mAh	Avnet PN	Number of cells	Configuration	Manufacturer					Page
3.7	43	VAR63124101511	1	1S1P	VARTA					27
3.7	60	VAR63125101521	1	1S1P	VARTA					28
3.7	85	VAR63145101501	1	1S1P	VARTA					31
3.7	120	VAR63165101521	1	1S1P	VARTA					34

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				54
3.7	1800	YOB103450AR21S3M	1	1S1P	Dubilier				41
3.7	2000	RRC1120	1	1S1P	RRC				62
3.7	2050	YOB103456A1S3M	1	1S1P	Dubilier				41
3.6	2350	PICPAL2138	1	1S1P	Panasonic				55
3.7	3880	RRC1130	1	1S1P	RRC				64
7.6	3880	RRC2130	2	2S1P	RRC				66
11.4	3880	RRC2140	3	3S1P	RRC				67

Li-polymer

Voltage V	Capacity mAh	Avnet PN	Number of cells	Configuration	Manufacturer				Page
3.7	130	YOBLP401235IS2	1	1S1P	Dubilier				37
3.7	155	YOBLP402025IS3	1	1S1P	Dubilier				37
3.7	200	YOBLP6012351S3R	1	1S1P	Dubilier				37
3.7	300	YOBLP402933IS3	1	1S1P	Dubilier				37
3.7	370	YOBLP422339PACK	1	1S1P	Dubilier				38
3.7	560	YOBLP443440IS3	1	1S1P	Dubilier				38
3.7	560	YOBLP4434401S3M	1	1S1P	Dubilier				38
3.7	660	VAR56455701099	1	1S1P	VARTA				17
3.7	660	VAR56455201012	1	1S1P	VARTA				12
3.7	800	YOBLP403451IS2	1	1S1P	Dubilier				39
3.7	800	YOBLP573442IS3	1	1S1P	Dubilier				38
3.7	950	YOBLP523450PIS3	1	1S1P	Dubilier				39
3.7	1000	VAR56457201012	1	1S1P	VARTA				13
3.7	1050	YOBLP503562IS3	1	1S1P	Dubilier				39
3.7	1050	YOBLP9225431S3	1	1S1P	Dubilier				39
3.7	1130	VAR56437201012	1	1S1P	VARTA				14
3.7	1200	VAR56456701099	1	1S1P	VARTA				18
3.7	1200	VAR56456201012	1	1S1P	VARTA				15
3.7	1300	YOBLP503759IS3	1	1S1P	Dubilier				40
3.7	1590	VAR56426801095	1	1S1P	VARTA				21
3.7	2400	VAR56456302012	2	1S2P	VARTA				16
3.7	2400	VAR56456702099	2	1S2P	VARTA				19
3.7	3000	YOBLP4549652P3M	2	1S2P	Dubilier				40

= UN 38.3 = IEC 62133 = UL 2054

Modular battery system

Lithium-ion

Voltage V	Capacity mAh	Avnet PN	Number of cells	Configuration	Manufacturer				Page
25.9	64000	VES56654799098	140	7S20P	VARTA				23
51.8	32000	VES56654799097	140	14S10P	VARTA				24

= UN 38.3 = IEC 62133

Lithium iron phosphate

Voltage V	Capacity mAh	Avnet PN	Number of cells	Configuration	Manufacturer				Page
25.6	22800	VES56650764099	64	8S8P	VARTA				25
51.2	11400	VES56650764098	64	16S4P	VARTA				26

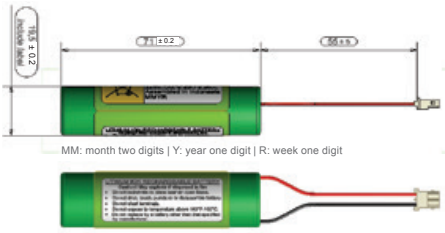
= UN 38.3 = IEC 62133

Standard lithium-ion/ polymer battery packs

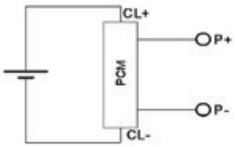
UN 38.3

IEC 62133

VAR56653201012 - 1S1P - 3.65V/2600mAh



Circuit Diagram



GENERAL (Battery pack in shrink sleeve incl. safety circuit and wire connector)

Wire	AWG24 UL1430 (red wire (+), black wire (-))
Connector	Molex connector (housing: 5264-0200, terminal: 5263-PBT)
Cell	LIC 18650-26 SKE
PCM	Yes
NTC	None
ID	None
Configuration	1S
Weight	Approx. 50 g

ELECTRICAL SPECIFICATION

Nominal voltage	3.65 V
Rated capacity at 0.2 C, 25 °C ± 2 °C	2,500 mAh min., 2,600 mAh nominal
Watt-hour rating	9.5 Wh
Charging method	Constant current + constant voltage
Max. charge voltage	4.2 V
Max. continuous charge current	1,300 mA (limited by cell)
Rec. charge cut off	52 mA ± 5 mA or timer 2.5 h
Max. continuous discharge current	2,500 mA (limited by connector)
Rec. discharge cut off	2.75 V
Internal impedance	Approx. 120 mΩ
Exp. cycle life at (0.2 C / 1.0 C), 25 °C ± 2 °C	≥ 300 cycles ≥ 80 %

CELL & BATTERY PROTECTION

Overcharge detection	4.275 V ± 0.020 V (0.8 sec. to 1.2 sec. delay, resume 4.075 V ± 0.030 V)
Overdischarge detection	2.500 V ± 0.035 V (76.8 msec. to 115.2 msec. delay, resume 2.900 V ± 0.10 V)
Overcurrent detection	5.7 A to 11.7 A (9.6 msec. to 14.4 msec. delay)

ENVIRONMENTAL CONDITIONS

Charge	0 °C to +45 °C
Discharge	-20 °C to +60 °C
Storage	1 month at -20 °C to +60 °C ≥ 90 %
	3 months at -20 °C to +40 °C ≥ 90 %
	1 year at -20 °C to +20 °C ≥ 90 %
Humidity	65 ± 20 RH %

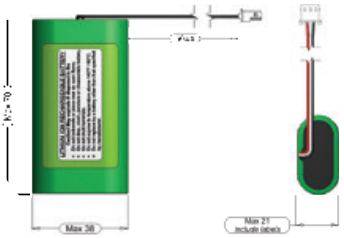
SAFETY CERTIFICATIONS

Please follow VARTA handling and safety precautions for LiIon & LiPolymer.
The cell used is a UL recognized component according to UL1642 and IEC 62133 ed. 2 certified.
The battery meets the requirements of battery directives and the battery parts are RoHS-compliant.
The battery is certified according to IEC 62133 ed. 2 and UN 38.3.

UN 38.3

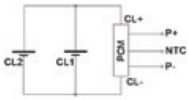
IEC 62133

VAR56653502013 – 1S2P – 3.65V/5200mAh



MM: month two digits | Y: year one digit | R: week one digit

Circuit Diagram



LIC 18650-26SKE (2X)

GENERAL (Battery pack in shrink sleeve incl. safety circuit and wires and connector)

Wire	AWG22 UL1430 (red wire (+), white wire (NTC), black wire (-))
Connector	Molex connector (housing: 5264-0300, terminal: 5263-PBT)
Cell	LIC 18650-26 SKE
PCM	Yes
NTC	10 kΩ; B-value 3,435 K ± 3 %
ID	None
Configuration	2P
Weight	Approx. 95 g

ELECTRICAL SPECIFICATION

Nominal voltage	3.65 V
Rated capacity at 0.2 C, 25 °C ± 2 °C	5,000 mAh min., 5,200 mAh nominal
Watt-hour rating	19.0 Wh
Charging method	Constant current + constant voltage
Max. charge voltage	4.2 V
Max. continuous charge current	1,300 mA (limited by cell)
Rec. charge cut off	52 mA or timer 3.0 h
Max. continuous discharge current	2,500 mA (limited by PCM)
Rec. discharge cut off	2.75 V
Internal impedance	Approx. 100 mΩ
Exp. cycle life at (0.2 C / 1.0 C), 25 °C ± 2 °C	≥ 300 cycles ≥ 80 %

CELL & BATTERY PROTECTION

Overcharge detection	4.250 V ± 0.050 V (0.96 sec. to 1.4 sec. delay, auto release)
Overdischarge detection	2.250 V ± 0.10 V (30 msec. to 46 msec. delay, auto release)
Overcurrent detection at charging	3.7 A to 11.3 A (7.2 msec. to 11.0 msec. delay)
Overcurrent detection at discharging	4.5 A to 10.0 A (7.2 msec. to 11.0 msec. delay)

ENVIRONMENTAL CONDITIONS

Charge	0 °C to +45 °C
Discharge	-20 °C to +60 °C
Storage	1 month at -20 °C to +60 °C ≥ 90 %
	3 months at -20 °C to +40 °C ≥ 90 %
	1 year at -20 °C to +20 °C ≥ 90 %
Humidity	65 ± 20 RH %

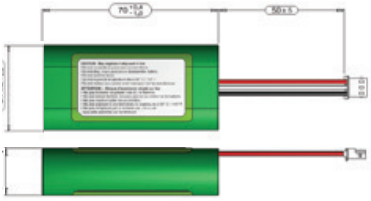
SAFETY CERTIFICATIONS

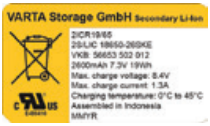
Please follow VARTA handling and safety precautions for LiIon & LiPolymer.
The cell used is a UL recognized component according to UL1642 and IEC 62133 ed. 2 certified.
The battery meets the requirements of battery directives and the battery parts are RoHS-compliant.
The battery is certified according to IEC 62133 ed. 2 and UN 38.3.

UN 38.3

IEC 62133

VAR56653502012 – 2S1P – 7.3V/2600mAh





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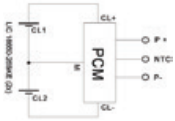
Circuit Diagram



GENERAL (Battery pack in shrink sleeve incl. safety circuit and wires and connector)

Wire	AWG22 UL1007 (red wire (+), white wire (NTC), black wire (-))
Connector	Molex connector (housing: 5264-03, terminal: 5263-PBT)
Cell	LIC 18650-26 SKE
PCM	Yes
NTC	10 kΩ; B-value 3,435 K ± 1 %
ID	None
Configuration	2S layflat multiple
Weight	Approx. 95 g

ELECTRICAL SPECIFICATION

Nominal voltage	7.3 V
Rated capacity at 0.2 C, 25 °C ± 2 °C	2,550 mAh min., 2,600 mAh nominal
Watt-hour rating	19.0 Wh
Charging method	Constant current + constant voltage
Max. charge voltage	8.4 V
Max. continuous charge current	1,300 mA (limited by cell)
Rec. charge cut off	52 mA or timer 3.0 h
Max. continuous discharge current	3,000 mA (limited by connector)
Rec. discharge cut off	5.5 V
Internal impedance	Approx. 220 mΩ
Exp. cycle life at (0.2 C / 1.0 C), 25 °C ± 2 °C	≥ 300 cycles ≥ 80 %

CELL & BATTERY PROTECTION

Overcharge detection	4.325 V ± 0.050 V (920 msec. to 1380 msec. delay, resume 4.100 V ± 0.10 V)
Overdischarge detection	2.250 V ± 0.10 V (115 msec. to 173 msec. delay, resume 2.800 V ± 0.20 V)
Overcurrent detection	4.0 A to 13 A (7.2 msec. to 11.0 msec. delay)

ENVIRONMENTAL CONDITIONS

Charge	0 °C to +45 °C
Discharge	-20 °C to +60 °C
Storage	1 month at -20 °C to +60 °C ≥ 90 %
	3 months at -20 °C to +40 °C ≥ 90 %
	1 year at -20 °C to +20 °C ≥ 90 %
Humidity	65 ± 20 RH %

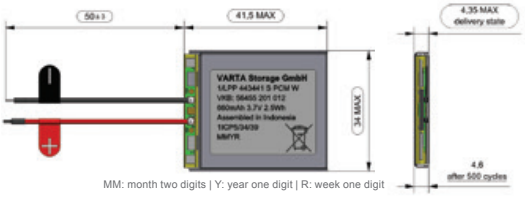
SAFETY CERTIFICATIONS

Please follow VARTA handling and safety precautions for LiIon & LiPolymer.
The cell used is a UL recognized component according to UL1642 and IEC 62133 ed. 2 certified.
The battery meets the requirements of battery directives and the battery parts are RoHS-compliant.
The battery is certified according to IEC 62133 ed. 2 and UN38.3.

VAR56455201012 – 443441 – 3.7V/660mAh

UN 38.3

IEC 62133



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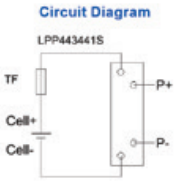


GENERAL (Battery pack incl. safety circuit and wires)

Wire	AWG26 UL1007 (red wire (+), black wire (-))
Cell	LPP 441443 S
PCM	Yes
NTC	None
ID	None
Configuration	1S
Weight	Approx. 13 g

ELECTRICAL SPECIFICATION

Nominal voltage	3.7 V
Rated capacity at (0.5 C / 0.2 C), 23 °C ± 5 °C	630 mAh min., 660 mAh nominal
Watt-hour rating	2.5 Wh
Charging method	Constant current + constant voltage
Max. charge voltage	4.2 V (± 0.05 V)
Max. continuous charge current	630 mA (limited by cell)
Rec. charge cut off	6.3 mA or timer 2.5h
Max. continuous discharge current	1,260 mA (limited by cell)
Rec. discharge cut off	3 V
Internal impedance	Approx. 120 mΩ
Exp. cycle life at (1.0 C / 1.0 C), 23 °C ± 5 °C	≥ 500 cycles ≥ 70 %

CELL & BATTERY PROTECTION

Overcharge detection	4.275 V ± 0.025 V (0.7 sec. to 1.3 sec. delay, resume 4.275 V ± 0.025 V)
Overdischarge detection	2.3 V ± 0.058 V (14 msec. to 26 msec. delay, resume 2.3 V ± 0.058 V)
Overcurrent detection	2.0 A to 4.5 A (8 msec. to 16 msec. delay at discharge)

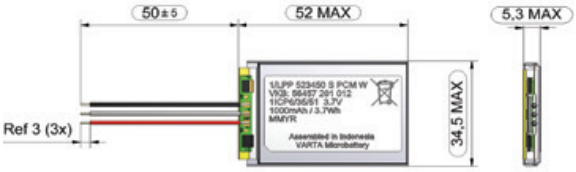
ENVIRONMENTAL CONDITIONS

Charge	0 °C to +45 °C
Discharge	-20 °C to +60 °C
Storage	1 month at -20 °C to +60 °C ≥ 80 %
	3 months at -20 °C to +45 °C ≥ 80 %
	1 year at -20 °C to +30 °C ≥ 80 %
Humidity	0 to 85 RH %

SAFETY CERTIFICIATIONS

Please follow VARTA handling and safety precautions for LiIon & LiPolymer.
The cell used is a UL recognized component according to UL1642 and IEC 62133 ed.2 certified.
The battery meets the requirements of battery directives and the battery parts are RoHS-compliant.
The battery is certified according to IEC 62133 ed. 2 and UN 38.3.

VAR56457201012 – 523450 – 3.7V/1000mAh



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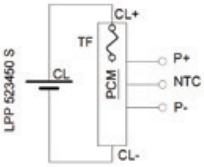
Circuit Diagram



GENERAL (Battery pack incl. safety circuit and wires)

Wire	AWG24 UL1007 (red wire (+), white wire NTC), black wire (-))
Cell	LPP 523450 S
PCM	Yes
NTC	10 kΩ ± 1 %; B-value 3,380 K
ID	None
Configuration	1S layflat
Weight	Approx. 20 g

ELECTRICAL SPECIFICATION

Nominal voltage	3.7 V
Rated capacity at (0.5 C / 0.2 C), 23 °C ± 5 °C	950 mAh min., 1,000 mAh nominal
Watt-hour rating	3.7 Wh
Charging method	Constant current + constant voltage
Max. charge voltage	4.2 V
Max. continuous charge current	1,000 mA (limited by cell)
Rec. charge cut off	10 mA or timer 3.5 h
Max. continuous discharge current	2,000 mA (limited by cell)
Rec. discharge cut off	3 V
Internal impedance	Approx. 100 mΩ
Exp. cycle life at (1.0 C / 1.0 C), 23 °C ± 5 °C	≥ 500 cycles ≥ 80%

CELL & BATTERY PROTECTION

Overcharge detection	4.275 V ± 0.025 V (0.7 sec. to 1.3 sec. delay, release 4.275 V ± 0.025 V)
Overdischarge detection	2.3 V ± 0.058 V (14 msec. to 26 msec. delay, resume 2.3 V ± 0.058 V)
Overcurrent detection	2.0 A to 4.5 A (8 msec. to 16 msec. delay)

ENVIRONMENTAL CONDITIONS

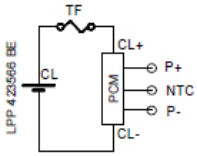
Charge	0 °C to +45 °C
Discharge	-10 °C to +60 °C
Storage	1 month at -20 °C to +60 °C ≥ 80 %
	3 months at -20 °C to +45 °C ≥ 80 %
	1 year at -20 °C to +30 °C ≥ 80 %
Humidity	0 to 85 RH %

SAFETY CERTIFICATIONS

Please follow VARTA handling and safety precautions for LiIon & LiPolymer.
The cell used is a UL recognized component according to UL1642 and IEC 62133 ed. 2 certified.
The battery meets the requirements of battery directives and the battery parts are RoHS-compliant and is UN 38.3 certified.
The battery is certified according to IEC 62133 ed. 2 and UN 38.3.

VAR56437201012 – 423566 – 3.7V/1160mAh

Circuit Diagram



GENERAL (Battery pack incl. safety circuit and wires)

Wire	AWG24 UL1007 (red wire (+), white wire (NTC), black wire (-))
Cell	LPP 423566 BE
PCM	Yes
NTC	10 kΩ ± 1 %; B-value 3,380 K ± 1 %
ID	None
Configuration	1S
Weight	Approx. 26 g

ELECTRICAL SPECIFICATION

Nominal voltage	3.7 V
Rated capacity at (0.5 C / 0.2 C), 25 °C ± 5 °C	1,130 mAh min., 1,160 mAh nominal
Watt-hour rating	4.3 Wh
Charging method	Constant current + constant voltage
Max. charge voltage	4.2 V (± 0.05 V)
Max. continuous charge current	1,130 mA (limited by cell)
Rec. charge cut off	By current 20 mA or timer 2.5 h
Max. continuous discharge current	2,000 mA (limited by PCM)
Rec. discharge cut off	3 V
Internal impedance	Approx. 120 mΩ
Exp. cycle life at (0.5 C / 0.5 C), 20 °C	≥ 400 cycles ≥ 75 %

CELL & BATTERY PROTECTION

Overcharge detection	4.275 V ± 0.025 V (0.7 sec. to 1.3 sec. delay, resume 4.275 V ± 0.025 V)
Overdischarge detection	2.3 V ± 0.058 V (14 msec. to 26 msec. delay, resume 2.3 V ± 0.058 V)
Overcurrent detection	2.0 A to 4.0 A (8 msec. to 16 msec. delay)

ENVIRONMENTAL CONDITIONS

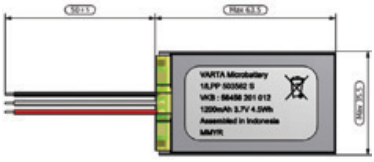
Charge	0 °C to +45 °C
Discharge	-20 °C to +60 °C
Storage	1 month at -20 °C to +45 °C ≥ 85 %
	3 months at -20 °C to +45 °C ≥ 80 %
	1 year at -20 °C to +35 °C ≥ 80 %
Humidity	0 to 85 RH %

SAFETY CERTIFICATIONS

Please follow VARTA handling and safety precautions for LiIon & LiPolymer.
The cell used is a UL recognized component according to UL1642 and IEC 62133 ed. 2 certified.
The battery meets the requirements of battery directives and the battery parts are RoHS-compliant and UN 38.3 certified.

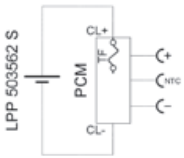
UN 38.3

VAR56456201012 – 503562 – 3.7V/1200mAh



MM: month two digits | Y: year one digit | R: week one digit

Circuit Diagram



GENERAL (Battery pack incl. safety circuit and wires with connector)

Wire	AWG24 UL1007 (red wire (+), white wire (NTC), black wire (-))
Cell	LPP 503562 S
PCM	Yes
NTC	10 kΩ ± 1 %; B-value 3,380 K
ID	None
Configuration	1S
Weight	Approx. 23 g

ELECTRICAL SPECIFICATION

Nominal voltage	3.7 V
Rated capacity at (0.5 C / 0.2 C), 23 °C ± 5 °C	1,150 mAh min., 1,200 mAh nominal
Watt-hour rating	4.5 Wh
Charging method	Constant current + constant voltage
Max. charge voltage	4.2 V
Max. continuous charge current	1,150 mA (limited by cell)
Rec. charge cut off	11.5 mA or timer 2.5 h
Max. continuous discharge current	2,000 mA (limited by PCM)
Rec. discharge cut off	3 V
Internal impedance	Approx. 100 mΩ
Exp. cycle life at (1.0 C / 1.0 C), 23 °C ± 5 °C	≥ 500 cycles ≥ 70 %

CELL & BATTERY PROTECTION

Overcharge detection	4.275 V ± 0.025 V (0.7 sec. to 1.3 sec. delay, resume 4.275 V ± 0.025 V)
Overdischarge detection	2.3 V ± 0.058 V (14 msec. to 26 msec. delay, resume 2.3 V ± 0.058 V)
Overcurrent detection	2.0 A to 4.5 A (8 msec. to 16 msec. delay at discharge)

ENVIRONMENTAL CONDITIONS

Charge	0 °C to +45 °C
Discharge	-10 °C to +60 °C
Storage	1 month at -20 °C to +60 °C ≥ 80 %
	3 months at -20 °C to +45 °C ≥ 80 %
	1 year at -20 °C to +30 °C ≥ 80 %
Humidity	0 to 85 RH %

SAFETY CERTIFICATIONS

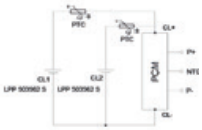
Please follow VARTA handling and safety precautions for LiIon & LiPolymer.
The cell used is a UL recognized component according to UL1642 and IEC 62133 ed. 2 certified.
The battery meets the requirements of battery directives and the battery parts are RoHS-compliant and is UN 38.3 certified.

UN 38.3

VAR56456302012 – 503562 – 3.7V/2400mAh

MM: month two digits | Y: year one digit | R: week one digit

Circuit Diagram



GENERAL (Battery pack incl. safety circuit and wires with connector)

Wire	AWG24 UL1007 (red wire (+), yellow wire (NTC), black wire (-))
Connector	JST connector (housing: PHR-03, terminal: SPH-002T-P0.5S)
Cell	LPP 503562 S
PCM	Yes
NTC	10 kΩ ± 1 %; B-value 3,435 K ± 1 %
ID	None
Configuration	2P stack up
Weight	Approx. 45 g

ELECTRICAL SPECIFICATION

Nominal voltage	3.7 V
Rated capacity at (0.5 C / 0.2 C), 23 °C ± 5 °C	2,300 mAh min., 2,400 mAh nominal
Watt-hour rating	8.9 Wh
Charging method	Constant current + constant voltage
Max. charge voltage	4.2 V
Max. continuous charge current	1,150 mA (limited by cell)
Rec. charge cut off	23 mA or timer 3.5 h
Max. continuous discharge current	2,000 mA (limited by connector)
Rec. discharge cut off	3 V
Internal impedance	Approx. 90 mΩ
Exp. cycle life at (1.0 C / 1.0 C), 23 °C ± 5 °C	≥ 500 cycles ≥ 70%

CELL & BATTERY PROTECTION

Overcharge detection	4.3 V ± 0.02 V (0.8 sec. to 1.2 sec. delay, resume 4.1 V ± 0.03 V)
Overdischarge detection	2.4 V ± 0.035 V (76.8 msec. to 115.2 msec. delay, at remove loader and charging current)
Overcurrent detection	3.2 A to 5.2 A (9.6 msec. to 14.4 msec. delay at discharge)

ENVIRONMENTAL CONDITIONS

Charge	0 °C to +45 °C
Discharge	-10 °C to +60 °C
Storage	1 month at -20 °C to +60 °C ≥ 80 %
	3 months at -20 °C to +45 °C ≥ 80 %
	1 year at -20 °C to +30 °C ≥ 80 %
Humidity	0 to 85 RH %

SAFETY CERTIFICATIONS

Please follow VARTA handling and safety p.recautions for LiIon & LiPolymer.
The cell used is a UL recognized component according to UL1642 and IEC 62133 ed. 2 certified.
The battery meets the requirements of battery directives and the battery parts are RoHS-compliant and is UN 38.3 certified.

VAR56455701099 – 3.7V/660mAh

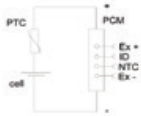
UN 38.3

IEC 62133

UL 2054

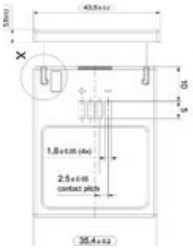
MM: month two digits | Y: year one digit | R: week one digit

Circuit Diagram



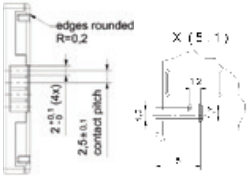
GENERAL (Battery with safety circuit and plastic housing)

Cell	LPP 441443 S
PCM	Yes
NTC	10 kΩ ± 1 %; B-value 3,435 K ± 1 %
ID	3.9 kΩ ± 1 %
Configuration	1S
Weight	Approx. 15 g



ELECTRICAL SPECIFICATION

Nominal voltage	3.7 V
Rated capacity at (0.5 C / 0.2 C), 23 °C ± 5 °C	630 mAh min., 660 mAh nominal
Watt-hour rating	2.5 Wh
Charging method	Constant current + constant voltage
Max. charge voltage	4.2 V (± 0.05 V)
Max. continuous charge current	630 mA
Rec. charge cut off	By current 6.3 mA or timer 3.5 h
Max. continuous discharge current	1,260 mA (limited by cell)
Rec. discharge cut off	3 V
Internal impedance	Approx. 115 mΩ
Exp. cycle life at (1.0 C / 1.0 C), 23 °C ± 5 °C	≥ 500 cycles ≥ 70 %



CELL & BATTERY PROTECTION

Overcharge detection	4.3 V ± 0.02 V (0.8 sec. to 1.2 sec. delay, resume 4.1 V ± 0.03 V)
Overdischarge detection	2.4 V ± 0.035 V (76.8 msec. to 115.2 msec. delay, resume remove load and charging current)
Overcurrent detection	3.2 A to 5.2 A (9.6 msec. to 14.4 msec. delay)

ENVIRONMENTAL CONDITIONS

Charge	0 °C to +45 °C
Discharge	-10 °C to +60 °C
Storage	1 month at -20 °C to +60 °C ≥ 80 %
	3 months at -20 °C to +45 °C ≥ 80 %
	1 year at -20 °C to +30 °C ≥ 80%
Humidity	0 to 85 RH %

SAFETY CERTIFICATIONS

Please follow VARTA handling and safety precautions for LiIon & LiPolymer.
The cell used is a UL recognized component according to UL1642 and IEC 62133 ed. 2 certified.
The battery meets the requirements of battery directives and the battery parts are RoHS-compliant.
The battery is UL 2054 listed and certified according to IEC 62133 ed.2 and UN 38.3.

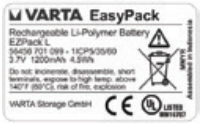
Mating connector
for the EasyPack S
Avnet PN
ELC009155004541006

VAR56456701099 – 3.7V/1200mAh

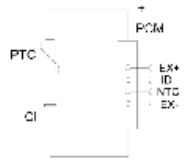
UN 38.3

IEC 62133

UL 2054

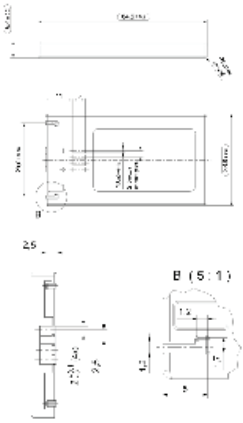


MM: month two digits | Y: year one digit | R: week one digit



GENERAL (Battery with safety circuit and plastic housing)

Cell	LPP 503562 S
PCM	Yes
NTC	10 kΩ ± 1 %; B-value K 3,435 ± 1 %
ID	10 kΩ ± 1 %
Configuration	1S
Weight	Approx. 26 g



ELECTRICAL SPECIFICATION

Nominal voltage	3.7 V
Rated capacity at (0.5 C / 0.2 C), 23 °C ± 5 °C	1,150 mAh min., 1,200 mAh nominal
Watt-hour rating	4.5 Wh
Charging method	Constant current + constant voltage
Max. charge voltage	4.2 V
Max. continuous charge current	1,150 mA
Rec. charge cut off	By current 11.5 mA or timer 3.5 h
Max. continuous discharge current	2,100 mA (limited by PTC)
Rec. discharge cut off	3 V
Internal impedance	Approx. 99 mΩ
Exp. cycle life at (1.0 C / 1.0 C), 23 °C ± 5 °C	≥ 500 cycles ≥ 70%

CELL & BATTERY PROTECTION

Overcharge detection	4.3 V ± 0.02 V (0.8 sec. to 1.2 sec. delay, resume 4.1 V ± 0.03 V)
Overdischarge detection	2.4 V ± 0.035 V (76.8 sec. to 115.2 msec. delay, resume remove load and charging current)
Overcurrent detection	3.2 A to 5.2 A (9.6 msec. to 14.4 msec. delay)

ENVIRONMENTAL CONDITIONS

Charge	0 °C to +45 °C
Discharge	-10 °C to +60 °C
Storage	1 month at -20 °C to +60 °C ≥ 80 %
	3 months at -20 °C to +45 °C ≥ 80 %
	1 year at -20 °C to +30 °C ≥ 80 %
Humidity	0 to 85 RH %

SAFETY CERTIFICATIONS

Please follow VARTA handling and safety precautions for LiIon & LiPolymer.
The cell used is a UL recognized component according to UL1642 and IEC 62133 ed. 2 certified.
The battery meets the requirements of battery directives and the battery parts are RoHS-compliant.
The battery is UL 2054 listed and certified according to IEC 62133 ed. 2 and UN 38.3.

Mating connector
for the EasyPack L
Avnet PN
ELC009155004541006

VAR56456702099 – 3.7V/2400mAh

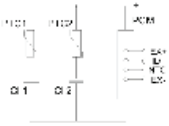
UN 38.3

IEC 62133

UL 2054

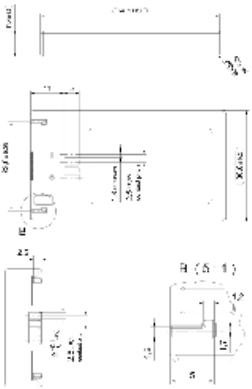
MM: month two digits | Y: year one digit | R: week one digit

Circuit Diagram



GENERAL (Battery with safety circuit and plastic housing)

Cell	LPP 503562 S
PCM	Yes
NTC	10 kΩ ± 1 %; B-value 3,435 K ± 1 %
ID	24 kΩ ± 1 %
Configuration	2P
Weight	Approx. 48 g



ELECTRICAL SPECIFICATION

Nominal voltage	3.7 V
Rated capacity at (0.5 C / 0.2 C), 23 °C ± 5 °C	2,300 mAh min., 2,400 mAh nominal
Watt-hour rating	8.9 Wh
Charging method	Constant current + constant voltage
Max. charge voltage	4.2 V
Max. continuous charge current	2,300 mA
Rec. charge cut off	By current 23 mA or timer 3.5 h
Max. continuous discharge current	3,200 mA (limited by PCM)
Rec. discharge cut off	3 V
Internal impedance	Approx. 68 mΩ
Exp. cycle life at (1.0 C / 1.0 C), 23 °C ± 5 °C	≥ 500 cycles ≥ 70 %

CELL & BATTERY PROTECTION

Overcharge detection	4.3 V ± 0.02 V (0.8 sec. to 1.2 sec. delay, release 4.1 V ± 0.03 V)
Overdischarge detection	2.4 V ± 0.035 V (76.8 msec. to 115.2 msec. delay, remove loader and charging current)
Overcurrent detection	3.2 A to 5.2 A (9.6 msec. to 14.4 msec. delay)

ENVIRONMENTAL CONDITIONS

Charge	0 °C to +45 °C
Discharge	-10 °C to +60 °C
Storage	1 month at -20 °C to +60 °C ≥ 80 %
	3 months at -20 °C to +45 °C ≥ 80 %
	1 year at -20 °C to +30 °C ≥ 80 %
Humidity	0 to 85 RH %

SAFETY CERTIFICATIONS

Please follow VARTA handling and safety precautions for LiIon & LiPolymer.
The cell used is a UL recognized component according to UL1642 and IEC 62133 ed. 2 certified.
The battery meets the requirements of battery directives and the battery parts are RoHS-compliant.
The battery is UL 2054 listed and certified according to IEC 62133 ed. 2 and UN 38.3.

Mating connector
for the EasyPack XL

Avnet PN
ELC009155004541006

VAR56653702099 – 3.65V/5200mAh

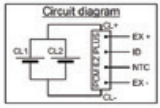
UN 38.3

IEC 62133

UL 2054

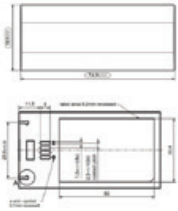
MM: month two digits | Y: year one digit | R: week one digit

Circuit Diagram



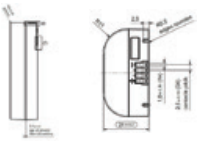
GENERAL (Battery with safety circuit and plastic housing)

Cell	LIC 18650-26 SKE
PCM	Yes
NTC	10 kΩ ± 1 %; B-value 3,435 K ± 1 %
ID	52.3 kΩ ± 1 %
Configuration	2P
Weight	Approx. 105 g



ELECTRICAL SPECIFICATION

Nominal voltage	3.65 V
Rated capacity at 0.2 C, 25 °C	5,000 mAh min., 5,200 mAh nominal
Watt-hour rating	19 Wh
Charging method	Constant current + constant voltage
Max. charge voltage	4.2 V
Max. continuous charge current	2,600 mA
Rec. charge cut off	By current 52 mA ± 5 mA
Max. continuous discharge current	4,500 mA (limited by PCM)
Rec. discharge cut off	3 V
Internal impedance	Approx. 65 mΩ
Exp. cycle life at (0.2 C / 0.2 C), 25 °C	≥ 300 cycles ≥ 80 %



CELL & BATTERY PROTECTION

Overcharge detection	4.225 V ± 0.025 V (0.96 sec. to 1.4 sec. delay, resume 4.025 V ± 0.050 V)
Overdischarge detection	2.8 V ± 0.050 V (61 msec. to 90 msec. delay, resume 2.80 V ± 0.100 V)
Overcurrent detection	5.4 A to 10 A (7.2 msec. to 11 msec. delay)

ENVIRONMENTAL CONDITIONS

Charge	0 °C to +45 °C
Discharge	-20 °C to +45 °C
Storage	1 month at -20 °C to +60 °C ≥ 90 % 3 months at -20 °C to +40 °C ≥ 90 % 1 year at -20 °C to +20 °C ≥ 90 %
Humidity	0 to 85 RH %

SAFETY CERTIFICATIONS

Please follow VARTA handling and safety precautions for Lilon & LiPolymer.
The cell used is a UL recognized component according to UL1642 and IEC 62133 ed. 2 certified.
The battery meets the requirements of battery directives and the battery parts are RoHS-compliant.
The battery is UL 2054 listed and certified according to IEC 62133 ed. 2 and UN 38.3.

Mating connector for the EasyPack PLUS:

PN

ELC009155004541006

VAR56426801095 – 3.7V/1590mAh

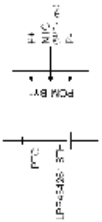
UN 38.3

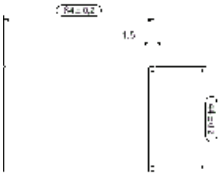
IEC 62133

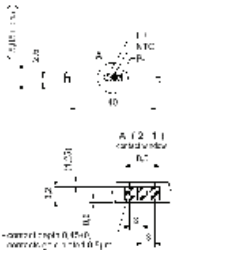
UL 2054

WW: week two digits | YY: year two digits

Circuit Diagram







GENERAL (Battery with safety circuit and plastic metal combination)

Cell	LPP 454261 8TH
PCM	Yes
NTC	10 kΩ ± 1 %; B-value 3,435 K ± 1 %
ID	None
Configuration	1S
Weight	Approx. 34 g

ELECTRICAL SPECIFICATION

Nominal voltage	3.7 V
Rated capacity at (1.0 C / 0.2 C), 23 °C ± 2 °C	1,530 mAh min., 1,590 mAh nominal
Watt-hour rating	5.9 Wh
Charging method	Constant current + constant voltage
Max. charge voltage	4.2 V (± 0.05 V)
Max. continuous charge current	1,600 mA (limited by PCM)
Rec. charge cut off	By current 50 mA or timer 2.5 h
Max. continuous discharge current	1,600 mA (limited by PCM)
Rec. discharge cut off	3 V
Internal impedance	Approx. 100 mΩ
Exp. cycle life at (1.0 C / 0.5 C), 23 °C ± 2 °C	≥ 500 cycles ≥ 67 %

CELL & BATTERY PROTECTION

Overcharge detection	4.275 V ± 0.025 V (0.7 sec. to 1.3 sec. delay, release 4.275 V ± 0.025 V)
Overdischarge detection	2.3 V ± 0.058 V (14 msec. to 26 msec. delay, release 2.3 V ± 0.058 V)
Overcurrent detection at charge	1.6 A to 5.0 A (8 msec. to 16 msec. delay)
Overcurrent detection at discharge	1.7 A to 4.5 A (11 msec. to 21 msec. delay)

ENVIRONMENTAL CONDITIONS

Charge	0 °C to +45 °C
Discharge	-20 °C to +55 °C
Storage	1 month at +23 °C ≥ 89 % 1 month at +45 °C ≥ 85 % 1 year at +23 °C ≥ 85 %
Humidity	0 to 85 RH %

Mating connector for the EasyPack SLIM:

PN

ELC009155004541006

SAFETY CERTIFICATIONS

Please follow VARTA handling and safety precautions for LiIon & LiPolymer.
The cell used is a UL recognized component according to UL1642 and IEC 62133 ed. 2 certified.
The battery meets the requirements of battery directives and the battery parts are RoHS-compliant.
The battery is UL 2054 listed and certified according to IEC 62133 ed. 2 and UN 38.3.

Easy Pack Charger – RRCNEWEPCHARGER

Suitable for charging VARTA easy pack batteries
Easy Pack S/Easy Pack L/Easy Pack XL/Easy Pack Plus

Input		
Voltage	5.00V nom.	
Current	1.00A nom.	
Power	5.00W	

Output		
Voltage range	4.20VDC	
Volt. tolerance	±1% max.	
Current max.	1.00A max. for VARTA EasyPack batteries L, XL, PLUS 0.50A max. for VARTA EasyPack batteries S	
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, orange)
Battery types	VARTA EasyPack batteries S, L, XL and 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 time-out or input voltage too low

Charger Mechanical Details	
Housing dimensions (LxWxH)	46.70 x 101.40 x 12.50mm
Weight	26g (without power supply)

Safety & EMC	**In combination with the included external power supply AC/DC**	
Regulatory approvals	Europe	CE
Electromagnetic Emissions	Europe	EN55032 class B + CISPR32 class B
	USA	FCC15 class B
Electromagnetic Immunity	ESD immunity	EN/IEC61000-4-2
	Electromagnetic field immunity	EN/IEC61000-4-3
	EFT / Burst	EN/IEC61000-4-4
	Surge	EN/IEC61000-4-5
	Conducted Immunity	EN/IEC61000-4-6
	Magnetic Fields	EN/IEC61000-4-8 + -4-11

UN 38.3

IEC 62133

VES56654799098
Easy Blade 24 – 25.9V/64Ah

* Illustration only

GENERAL (Battery with safety circuit and plastic / metal combination)

Size (l x w x h) in mm	230 x 330 x 80
General	Lithium-Nickel-Manganese-Cobalt-Oxide with BMS
Communications	CAN Bus (CanOpen)
Weight	Approx. 10 kg

ELECTRICAL SPECIFICATION

Power connection	Negative terminal: M6 (six) screw type, rated female terminal
	Positive terminal: M8 (eight) screw type, rated female terminal
CAN BUS connection	Type: 2x (two) M12-5, plug, female sockets
	Mating style: screw thread
	Coding: A
	Model: Tyco Electronics T4111002051-000 or similar
Nominal voltage	25.9 V
Nominal capacity (0.2 C; 2.50 V discharge)	64 Ah
Nominal energy	1,657 Wh
Charging method	Constant current + constant voltage
Max. charge voltage	29.4 V
Rec. charge voltage	29.05 V
Max. charge current	60 A
Rec. charge current	20.6 A
Rec. charge cut off	Current < 2.0 A
Rec. discharge cut off	21 V
Max. continuous discharge current	60 A
Rec. discharge current	31 A
Exp. cycle life at (0.3 C / 0.5 C), 22 °C ± 2 °C	≥ 80 % of initial capacity at 1,000 cycles

CELL & BATTERY PROTECTION

Safety function	Over/under temperature, over/under voltage, over current short circuit
Fuse	100 A

ENVIRONMENTAL CONDITIONS

Charge	0 °C to +45 °C
Discharge	-20 °C to +55 °C
Storage	1 to 3 months at -20 °C to +45 °C
	1 year at -20 °C to +24 °C
Humidity	25 to 85 RH %
IP rating	IP 30, not water resistant

SAFETY CERTIFICATIONS

Please follow VARTA handling and safety precautions for LiIon & LiPolymer.
The cell used is a UL recognized component according to UL1642.
This battery meets the requirements of battery directives and the battery parts are RoHS-compliant.
This battery is certified to according to IEC62133-2:2017 and UN38.3.

FEATURES

Active cooling for improved lifetime.
Easily connected up to 25 modules in parallel for higher capacities.
Housing with locking feature for easy attachment to adjacent module.
No external battery management needed. Automatic master-slave status established.
Zero maintenance, zero emissions.
Limited 2 year warranty.

UN 38.3

IEC 62133

VES56654799097
Easy Blade 48 – 51.8V/32Ah

* Illustration only

GENERAL (Battery with safety circuit and plastic / metal combination)

Size (l x w x h) in mm	230 x 330 x 80
General	Lithium-Nickel-Manganese-Cobalt-Oxide with BMS
Communications	CAN Bus (CanOpen)
Weight	Approx. 10 kg

ELECTRICAL SPECIFICATION

Power connection	Negative terminal: M6 (six) screw type, rated female terminal
	Positive terminal: M8 (eight) screw type, rated female terminal
CAN BUS connection	Type: 2x (two) M12-5, plug, female sockets
	Mating style: screw thread
	Coding: A
	Model: Tyco Electronics T4111002051-000 or similar
Nominal voltage	51.8 V
Nominal capacity (0.2 C; 2.50 V discharge)	32 Ah
Nominal energy	1,657 Wh
Charging method	Constant current + constant voltage
Max. charge voltage	58.8 V
Rec. charge voltage	58.1 V
Max. charge current	31 A
Rec. charge current	10.3 A
Rec. charge cut off	Current < 1.0 A
Rec. discharge cut off	42 V
Max. continuous discharge current	60 A
Rec. discharge current	15.5 A
Exp. cycle life at (0.3 C / 0.5 C), 22 °C ± 2 °C	≥ 80 % of initial capacity at 1,000 cycles

CELL & BATTERY PROTECTION

Safety function	Over/under temperature, over/under voltage, over current short circuit
Fuse	100 A

ENVIRONMENTAL CONDITIONS

Charge	0 °C to +45 °C
Discharge	-20 °C to +55 °C
Storage	1 to 3 months at -20 °C to +45 °C
	1 year at -20 °C to +24 °C
Humidity	25 to 85 RH %
IP rating	IP30, not water resistant

SAFETY CERTIFICATIONS

Please follow VARTA handling and safety precautions for LiIon & LiPolymer.
The cell used is a UL recognized component according to UL1642.
This battery meets the requirements of battery directives and the battery parts are RoHS-compliant.
This battery is certified to according to IEC62133-2:2017 and UN38.3.

FEATURES

Active cooling for improved lifetime.
Easily connected up to 25 modules in parallel for higher capacities.
Housing with locking feature for easy attachment to adjacent module.
No external battery management needed. Automatic master-slave status established.
Zero maintenance, zero emissions.
Limited 2 year warranty.

UN 38.3

IEC 62133

VES56650764099
Easy Block 24 – 25.6V/22.8Ah

* Illustration only

GENERAL (Battery with safety circuit and plastic)

Size (l x w x h) in mm	U1+ 209 x 137 x 185
General	Li-Iron-Phosphate
Communications	CAN Bus (CanOpen)
Weight	Approx. 7.5 kg

ELECTRICAL SPECIFICATION

Power connection	Negative terminal: M6 (six) screw type, rated female terminal Positive terminal: M8 (eight) screw type, rated female terminal
CAN BUS connection	Type: 2x (two) M12-5, plug, female sockets Mating style: screw thread Coding: A Model: Tyco Electronics T4111002051-000 or similar
Nominal voltage	25.6 V
Nominal capacity (0.2 C; 2.0 V discharge)	22.8 Ah
Nominal energy	583 Wh
Charging method	Constant current + constant voltage
Max. charge voltage	29.2 V
Rec. charge voltage	28.8 V
Max. charge current	22.8 A
Rec. charge current	20 A
Rec. charge cut off	Current < 1.2 A
Rec. discharge cut off	20 V
Max. continuous discharge current	60 A
Rec. discharge current	20 A
Exp. cycle life at (0.9 C / 0.9 C), 22 °C ± 2 °C	≥ 80 % of initial capacity at 4,000 cycles

CELL & BATTERY PROTECTION

Safety function	Over/under temperature, over/under voltage, over current short circuit
Fuse	100 A (one time)

ENVIRONMENTAL CONDITIONS

Charge	0 °C to +50 °C
Discharge	-20 °C to +60 °C
Storage	1 to 3 months at -20 °C to +45 °C 1 year at -20 °C to +24 °C
Humidity	25 to 85 RH %
IP rating	Not water resistant

SAFETY CERTIFICATIONS

Please follow VARTA handling and safety precautions for LiIon & LiPolymer.
The cell used is a UL recognized component according to UL1642.
This battery meets the requirements of battery directives and the battery parts are RoHS-compliant.
This battery is certified to according to IEC62133-2:2017 and UN38.3.

FEATURES

Extra-long cycle life for heavy duty cycle projects and reduced total cost of ownership.
Easily connected up to 25 modules in parallel for higher capacities.
Housing with locking feature for easy attachment to adjacent module.
No external battery management needed. Automatic master-slave status established.
Zero maintenance, zero emissions.
Limited 2 year warranty.

UN 38.3

IEC 62133

VES56650764098
Easy Block 48 – 51.2V/11.4Ah

* illustration only

GENERAL (Battery with safety circuit and plastic)

Size (l x w x h) in mm	U1+ 209 x 137 x 185
General	Li-Iron-Phosphate
Communications	CAN Bus (CanOpen)
Weight	Approx. 7.5 kg

ELECTRICAL SPECIFICATION

Power connection	Negative terminal: M6 (six) screw type, rated female terminal Positive terminal: M8 (eight) screw type, rated female terminal
CAN BUS connection	Type: 2x (two) M12-5, plug, female sockets Mating style: screw thread Coding: A Model: Tyco Electronics T4111002051-000 or similar
Nominal voltage	51.2 V
Nominal capacity (0.2 C; 2.0 V discharge)	11.4 Ah
Nominal energy	583 Wh
Charging method	Constant current + constant voltage
Max. charge voltage	58.4 V
Rec. charge voltage	57.6 V
Max charge current	11.4 A
Rec. charge current	10 A
Rec. charge cut off	Current < 600 mA
Rec. discharge cut off	40 V
Max. continuous discharge current	60 A
Rec. discharge current	10 A
Exp. cycle life at (0.9 C / 0.9 C), 22 °C ± 2 °C	≥ 80 % of initial capacity at 4,000 cycles

CELL & BATTERY PROTECTION

Safety function	Over/under temperature; over/under voltage, over current short circuit
Fuse	100 A (one time)

ENVIRONMENTAL CONDITIONS

Charge	0 °C to +50 °C
Discharge	-20 °C to +60 °C
Storage	1 to 3 months at -20 °C to +45 °C 1 year at -20 °C to +24 °C
Humidity	25 to 85 RH %
IP rating	Not water resistant

SAFETY CERTIFICATIONS

Please follow VARTA handling and safety precautions for LiIon & LiPolymer.
The cell used is a UL recognized component according to UL1642.
This battery meets the requirements of battery directives and the battery parts are RoHS-compliant.
This battery is certified to according to IEC62133-2:2017 and UN38.3.

FEATURES

Extra-long cycle life for heavy duty cycle projects and reduced total cost of ownership.
Easily connected up to 25 modules in parallel for higher capacities.
Housing with locking feature for easy attachment to adjacent module.
No external battery management needed. Automatic master-slave status established.
Zero maintenance, zero emissions.
Limited 2 year warranty.

VARTA

VAR63124101511 – CP1240 3.7V/43mAh

UN 38.3

IEC 62133

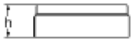
UL 1642

Type Designation	CP 1240 A3
Type Number	63124
Cell Code	ICR1240
System	Graphite – layered metal oxide ($LiNi_xMn_yCo_zO_2$)
UL Recognition	MH13654
Nominal Voltage [V]	3.7 (average)
Nominal Capacity C [mAh]	43 (at 0.2C from 4.2 V to 3.0 V at 20 °C)
Dimensions [mm] (without Tags)	
Diameter	12.1 +0.1/-0.3
Height	4.0 +0.1/-0.1
Weight. approx [g]	1.2 +0.2/-0.2
Charging Method	Constant Current + Constant Voltage
Charge Voltage [V]	4.20 ± 0.05
Initial Charge Current [mA]	Standard Charge: 21.5 Fast Charge[2]: 43 Rapid Charge[3]: 86
Charging Cut-Off (a) or (b)	
a) by time [h]	Standard Charge: 5 Fast/Rapid Charge: 3
b) by min current [mA]	1.0
Discharge Cut-Off Voltage [V]	3.0
Max. Pulse Discharge Current [mA]	129 @ 2s
Max. Continuous Discharge Current [mA]	86
Operating Temperature [°C]	Charge: 0 to 45 Discharge: -20 to 60
Storage Temperature **Capacity Recovery Rate[4] [%]**	1 Year at -20 to 20 °C > 90 3 Month at -20 to 45 °C > 90 1 Month at -20 to 60 °C > 85
Impedance Initial [Ω]	< 0.6 @ 1kHz
Cycle Life 0.5C/0.5C, 20 °C[5] [Cycles]	>500 (> 80% of C_{ini})
Safety	UN 38.3 passed relevant tests acc. IEC 62133 passed
Internal Approval	
Overcharge Test (12V, 3C, 12h)	passed
Overcharge Test (5V, 1A, 12h)	passed

VARTA

VAR63125101521 – CP1254 3.7V/60mAh

UN 38.3
IEC 62133
UL 1642



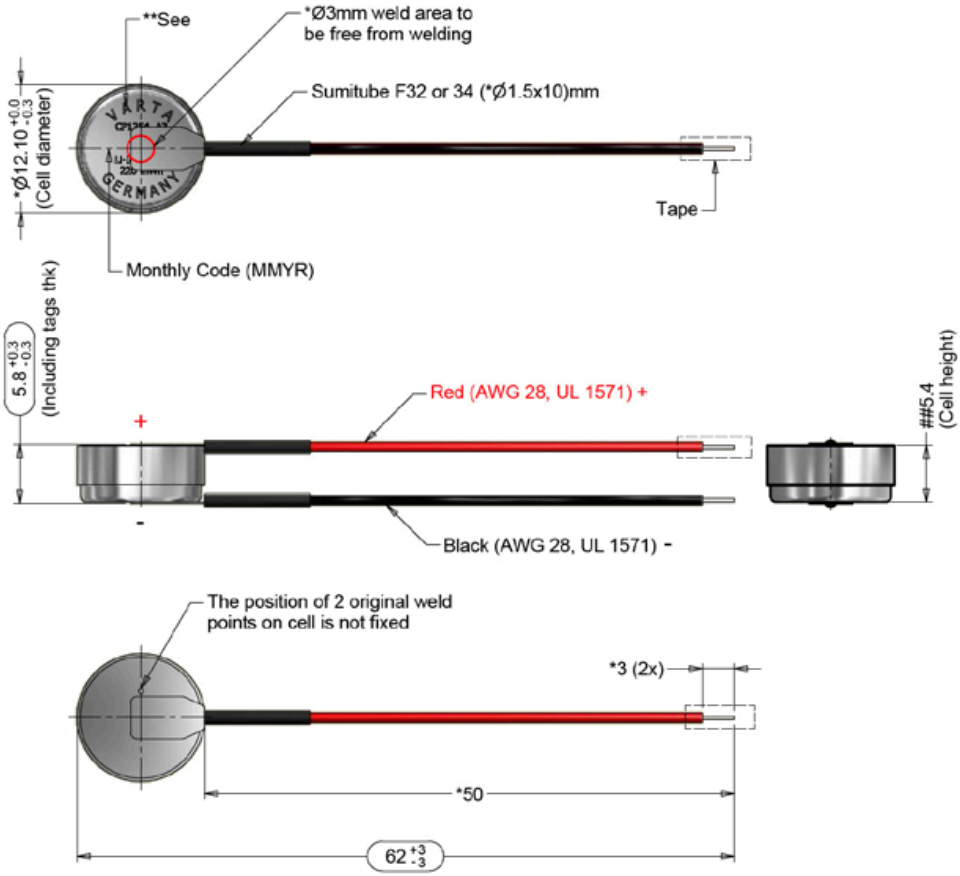
Type Designation	CP 1254 A3
Type Number	63125
Cell Code	ICR1254
System	Graphite – layered metal oxide ($LiNi_xMn_yCo_zO_2$)
UL Recognition	MH13654
Nominal Voltage [V]	3.7 (average)
Typical Capacity C [mAh]	63 (at 0.2C from 4.2 V to 3.0 V at 20 °C)
Nominal Capacity C [mAh]	60 (at 0.2C from 4.2 V to 3.0 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 **Capacity Recovery Rate[2] [%]**	1 Year at -20 to 20 °C > 90 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

UN 38.3

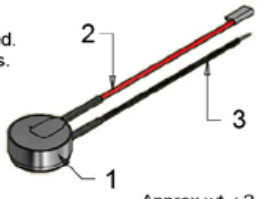
IEC 62133

UL 1642

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.



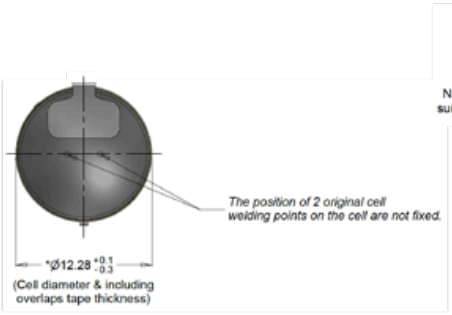
Approx wt. : 2 g

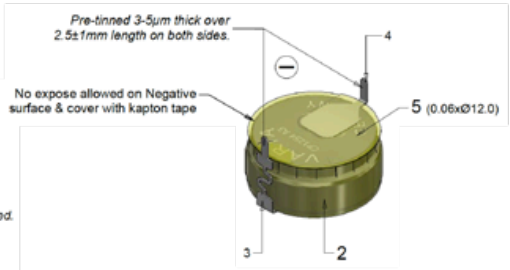
UN 38.3

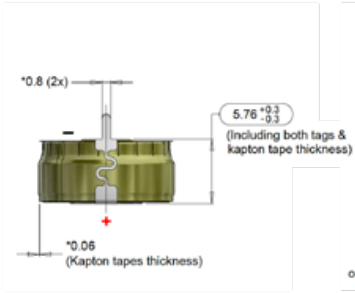
IEC 62133

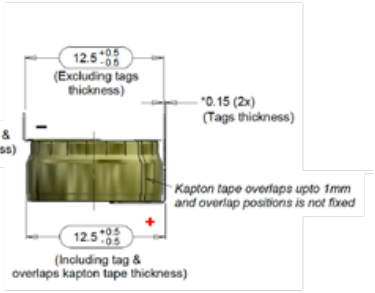
UL 1642

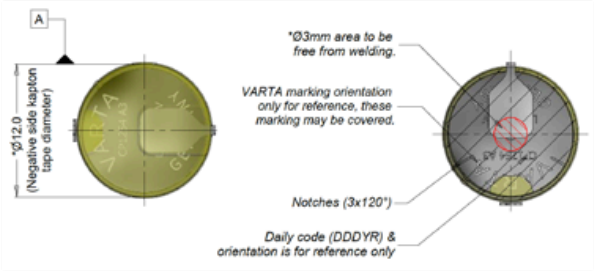
VAR63125201128 – CP1254
Solder tags version







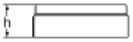




Note : 1) *Dimensions for reference only.
2) ▭ Dimensions to be considered for measurement.
3) ##Max. 7 including cell deflection
4) ***Cell deflection space 1.5mm is needed in case of abuse conditions. Please contact VARTA for more details.***
5) BATTERY VALIDATION INCLUDING SAFETY ELECTRONICS MUST BE DONE BY CUSTOMER ACCORDING TO UL2054.

VAR63145101501 – CP1454 3.7V/85 mAh

UN 38.3
IEC 62133
UL 1642



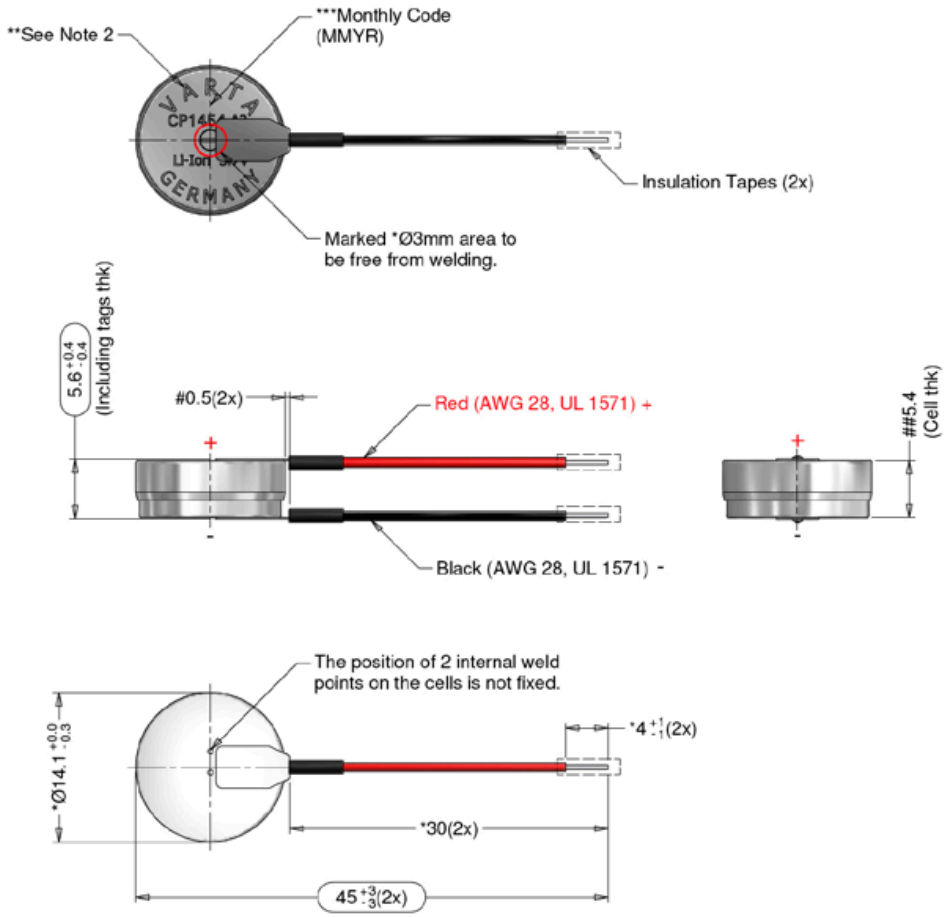
Type Designation	CP 1454 A3
Type Number	63145
Cell Code	ICR1454
System	Graphite – layered metal oxide ($LiNi_xMn_yCo_zO_2$)
UL Recognition	MH13654
Nominal Voltage [V]	3.7 (average)
Typical Capacity C [mAh]	90 (at 0.2C from 4.2 V to 3.0 V at 20 °C)
Nominal Capacity C [mAh]	85 (at 0.2C from 4.2 V to 3.0 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 **Capacity Recovery Rate[2] [%]**	1 Year at -20 to 20 °C > 90 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

UN 38.3

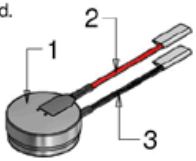
IEC 62133

UL 1642

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 weldded 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



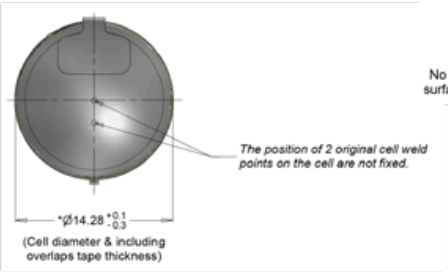
Approx wt. : 2 g

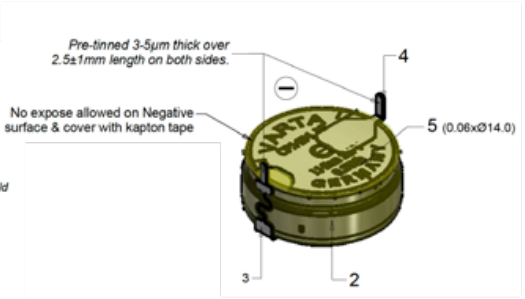
UN 38.3

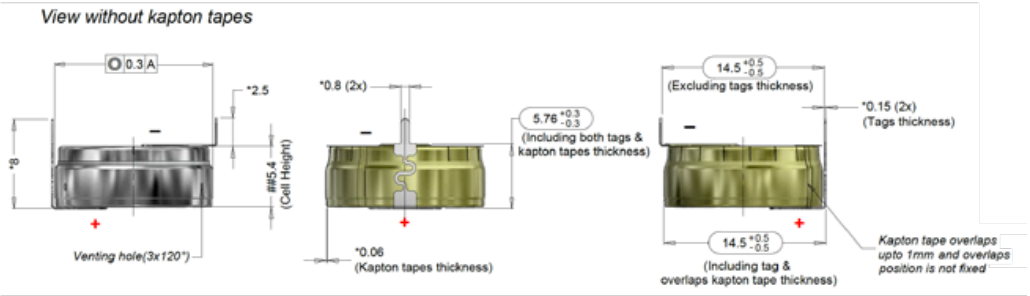
IEC 62133

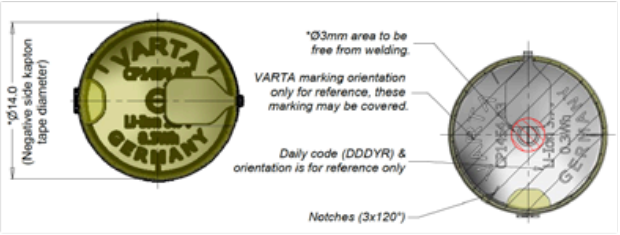
UL 1642

VAR63145201034 – CP1454
Solder tags version









Note : 1) *Dimensions for reference only.
2) ⬭ Dimensions to be considered for measurement.
3) ##Max. 7 including cell deflection
4) ***Cell deflection space 1.5mm is needed in case of abuse conditions. Please contact VARTA for more details.***
5) BATTERY VALIDATION INCLUDING SAFETY ELECTRONICS MUST BE DONE BY CUSTOMER ACCORDING TO UL2054.

Approx. wt : 3 g

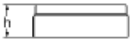
VARTA

VAR63165101521 – CP1654 3.7V/120mAh

UN 38.3

IEC 62133

UL 1642



Type Designation	CP 1654 A3
Type Number	63165
Cell Code	ICR1654
System	Graphite – layered metal oxide ($LiNi_xMn_yCo_zO_2$)
UL Recognition	MH13654
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 **Capacity Recovery Rate[2] [%]**	1 Year at -20 to 20 °C > 90 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

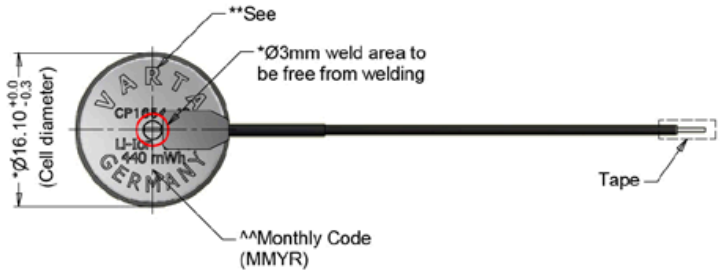
VARTA

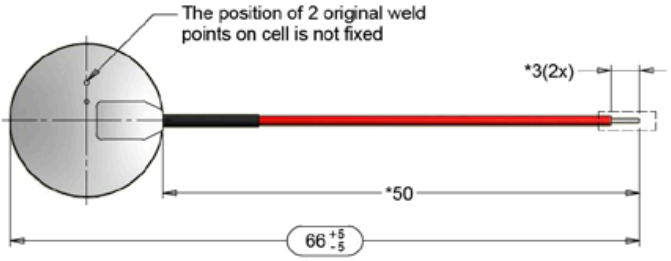
UN 38.3

IEC 62133

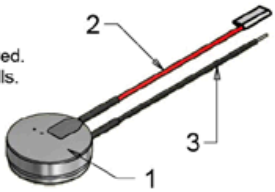
UL 1642

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

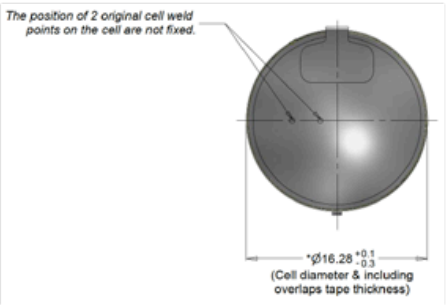
VARTA

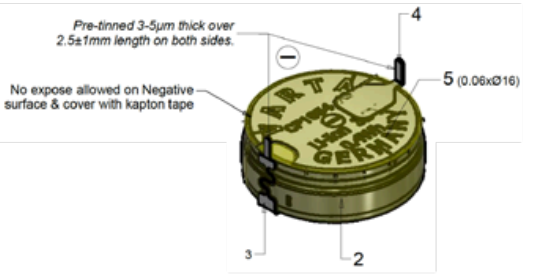
UN 38.3

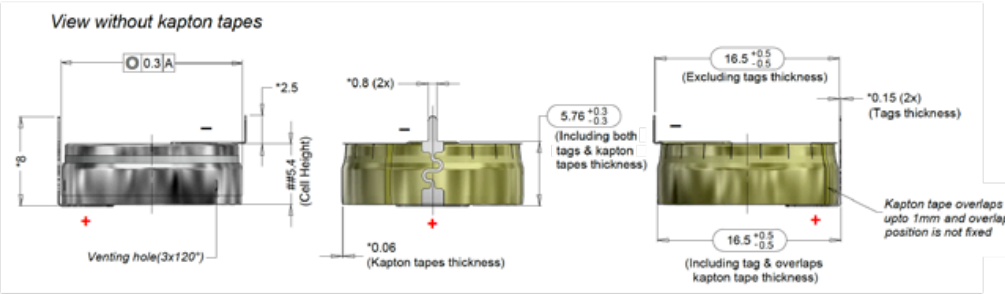
IEC 62133

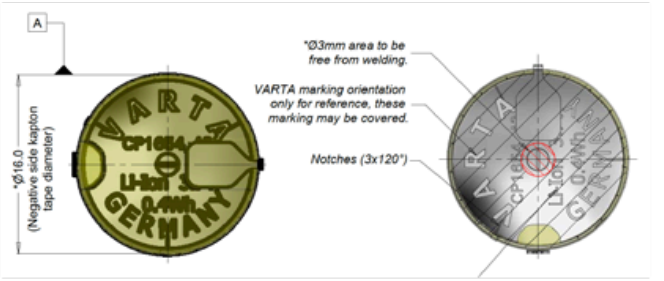
UL 1642

VAR63165201124 – CP1654
Solder tags version









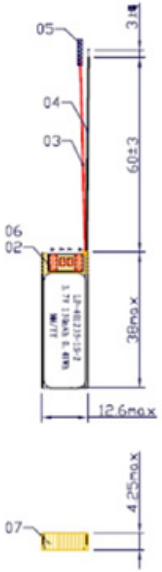
Note : 1) *Dimensions for reference only.
2) ⬭ Dimensions to be considered for measurement.
3) ##Max. 7 including cell deflection
4) ***Cell deflection space 1.5mm is needed in case of abuse conditions. Please contact VARTA for more details.***
5) BATTERY VALIDATION INCLUDING SAFETY ELECTRONICS MUST BE DONE BY CUSTOMER ACCORDING TO UL2054.

Approx. wt : 4 g

Dubilier lithium polymer

YOBLP401235IS2 – 401235 – 3.7V/130mAh

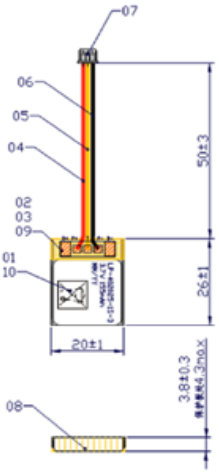
UN 38.3



YOBLP402025IS3 – 402025 – 3.7V/155mAh

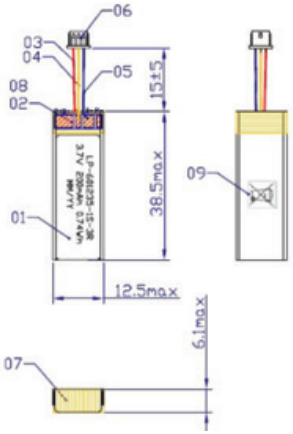
UN 38.3

IEC 62133



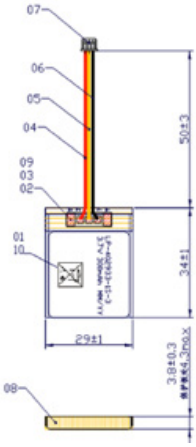
YOBLP6012351S3R – 601235 – 3.7V/200mAh

UN 38.3



YOBLP402933IS3 – 402933 – 3.7V/300mAh

UN 38.3

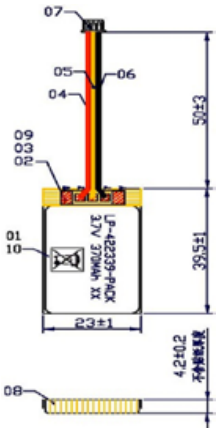


Dubilier lithium polymer

YOBLP422339PACK – 422339 – 3.7V/370mAh

UN 38.3

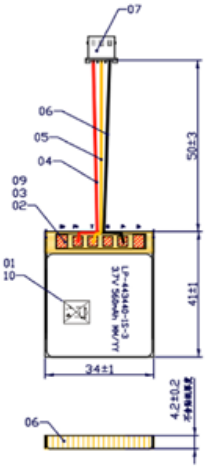
IEC 62133



YOBLP443440IS3 – 443440 – 3.7V/560mAh

UN 38.3

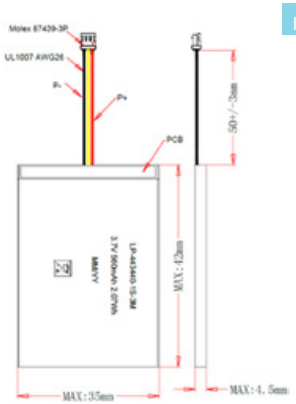
IEC 62133



YOBLP4434401S3M – 443440 – 3.7V/560mAh

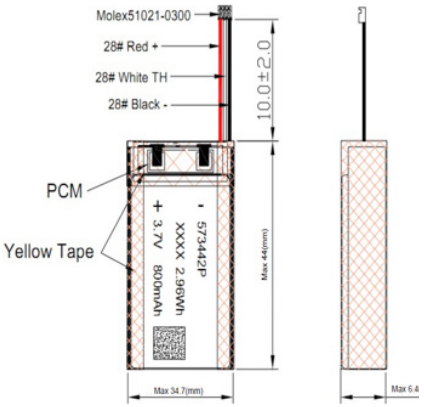
UN 38.3

IEC 62133



YOBLP573442IS3 – 573442 – 3.7V/800mAh

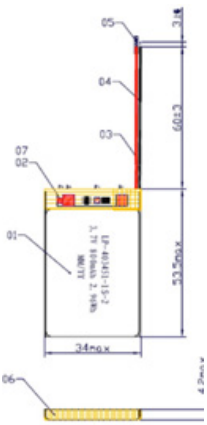
UN 38.3



Dubilier lithium polymer

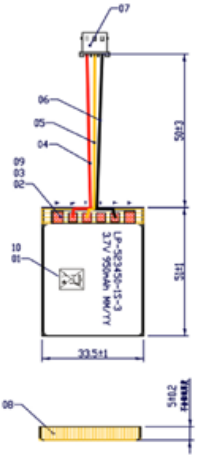
YOBLP403451IS2 – 403451 – 3.7V/800mAh

UN 38.3



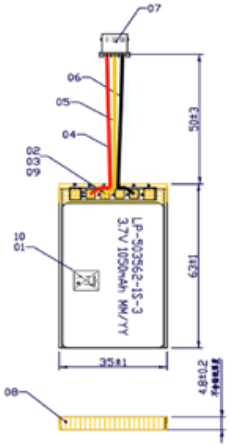
YOBLP523450PIS3 – 523450 – 3.7V/950mAh

UN 38.3



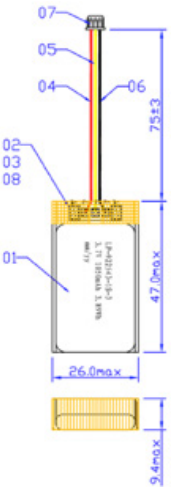
YOBLP503562IS3 – 503562 – 3.7V/1050mAh

UN 38.3



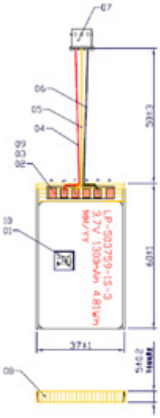
YOBLP9225431S3 – 922543 – 3.7V/1050mAh

UN 38.3



Dubilier lithium-polymer

YOBLP503759IS3 – 503759 – 3.7V/1300mAh



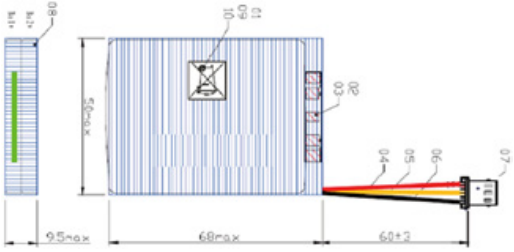
UN 38.3

IEC 62133

available with Molex and JST connector

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

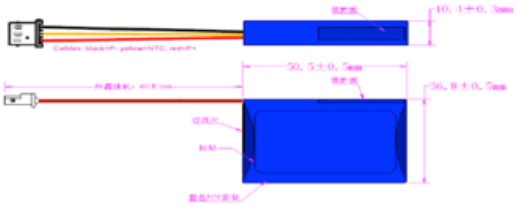
UN 38.3



Dubilier lithium-ion prismatic

YOB103450AR21S3M – 103450 – 3.7V/1800

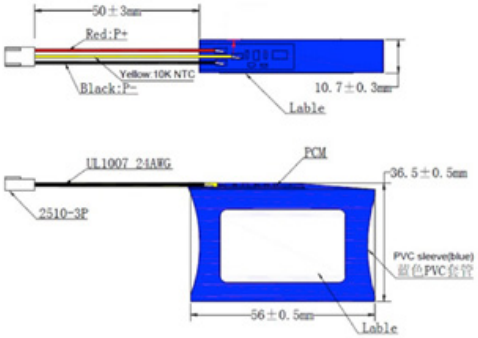
UN 38.3



YOB103456A1S3M – 103456 – 3.7V/2050mAh

UN 38.3

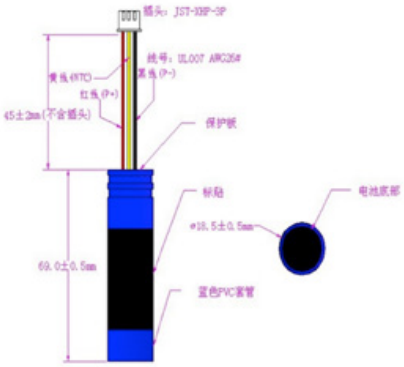
IEC 62133



Dubilier cylindrical lithium-ion 18650

1S1P – YOB18650CA1S3J – 3.7V/2250mAh

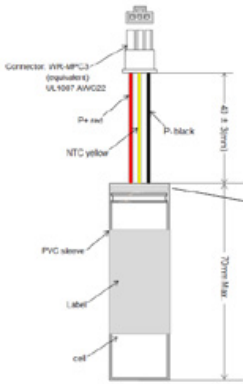
UN 38.3



1S1P – YOBBAKTH18650CIL!B – 3.6V/2400mAh

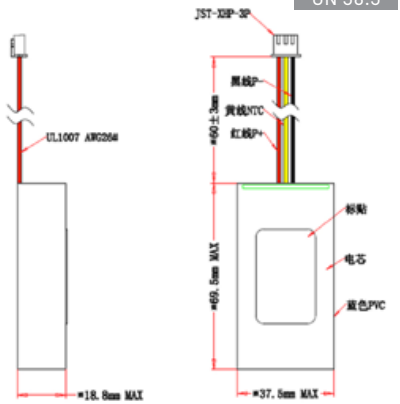
UN 38.3

IEC 62133



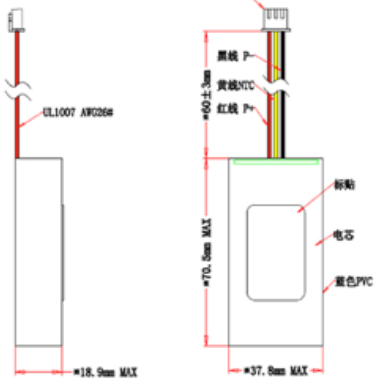
1S2P – YOB18650CA2P3J – 3.7V/4500mAh

UN 38.3



2S1P – YOB18650CA2S3J – 7.4V/2250mAh

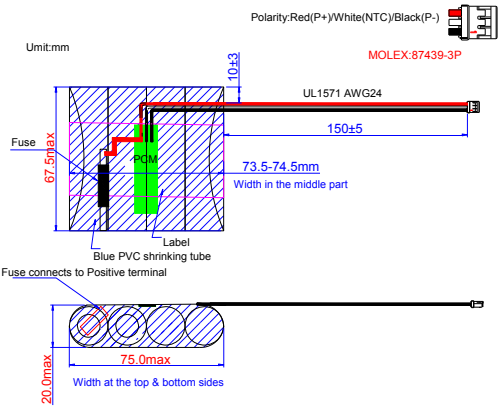
UN 38.3



Dubilier cylindrical lithium-ion 18650

YOBBAKTH18650320!A – 2S2P - 7.4V/6400mAh

UN 38.3

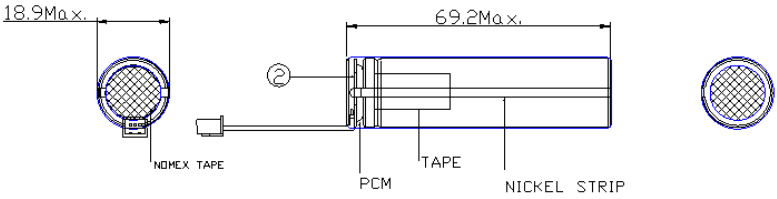


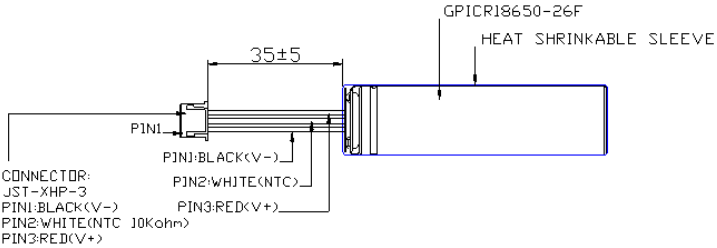
UN 38.3

IEC 62133

UL 2054

1S1P – GBANTA3588 – 3.7V/2600mAh





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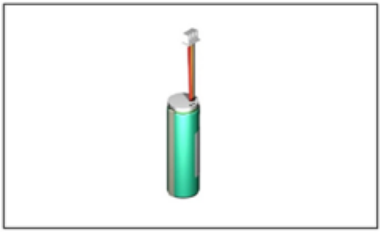
PICPALNB154 – 3.6V/3350mAh

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
over voltage (per cell)	release	4,05V	±100mV
under voltage (per cell)	cut off	2,25V	±100mV
under voltage (per cell)	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

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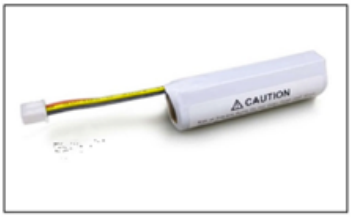
UN 38.3
IEC 62133
UL 2054

PICPAULLNB19 – 3.6V/3350mAh



Dimensions

length: 66 ± 2mm

width: 19 ± 1mm

height: 22 ± 1mm

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

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
			Pin 3: PLUS red
Cable length		45mm	±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

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INDUSTRY

UN 38.3
IEC 62133
UL 2054

PICPAULLNB46 – 3.6V/6700mAh

Dimensions

length: 66 ± 1mm

width: 19 ± 1mm

height: 41 ± 1mm

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

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
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
	power down	10µA	±2µA

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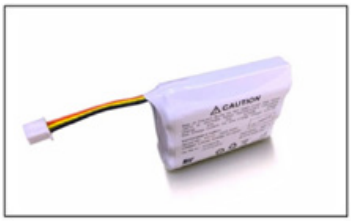
UN 38.3
IEC 62133
UL 2054

PICPAULLNB33 – 3.6V/10050mAh



Dimensions
length: 66 ± 2mm
width: 19 ± 1mm
height: 60 ± 2mm

Triangular shape available upon request: PICPAULLNB33X

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

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

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INDUSTRY

UN 38.3
IEC 62133
UL 2054

PICPAULLNB55 – 3.6V/13400mAh

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 avaible

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
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

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IEC 62133

PICPALNB76 – 7.2V/3350mAh

Dimensions

Lenght	37mm
Width	19mm
Height	71mm

Data for Pack					
Nominal voltage		7.2V	5V - 8.4V (max. 8,2V in medical applications)		
Nominal capacity		3350mAh	typical (3200mAh minimum)		
Used cell in pack		2pcs	Panasonic NCR-18650BF		
Internal resistance pack		125mΩ	±10%		
Charge voltage		8.4V	max		
Charge current	max	1625mA	10°C < T < 45°C		
Discharge	standard	1625mA	-20°C < T < 60°C *1)		
	max cont.	5000mA	-20°C < T < 60°C *1) (limited by connector)		
	max peak	7000mA	-20°C < T < 60°C t < 9ms *1)		
NTC		10kΩ	Tolerance ±3%; B-value 25°C/85°C = 3980K		
Connector	Molex	Microfit 3.0 43645-0300	Pin1	VBAT+	Red
			Pin2	NTC	Yellow
			Pin3	GND	Black
Cable Length		142mm	±5mm		
Weight		ca. 90g	±5g		
Watt-hour rating		24Wh	acc. to UN38.3 Certificate		

*1) discharge in ambient temperatures lower than 0°C will result in limited performance in current output and usable capacity

Limitations by Safety Unit (SU) @ Ta 25°C			
Over voltage (per cell)	cut off	4.210V	±0.025V
	release	4.000V	±0.050V
Under voltage (per cell)	cut off	2.400V	±0.080V
	release	2.900V	±0.100V
Current Limit by SU		>8A	<2.5ms
Short circuit protection		Yes	Implemented in Safety Unit
Power consumption	active	15µA	±5µA
	power down	3µA	±2µA (power down when U < UnderVoltage Cut off)

Recommended Charger
C-LIO-2SN15-1,8M-DIN4--PNG.R001

PICPALNB27 – 10.8V/3350mAh

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℃

over voltage (per cell)	cut off	4.35V	±25mV
over voltage (per cell)	release	4.15V	±50mV
under voltage (per cell)	cut off	2.4V	±80mV
under voltage (per cell)	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/3350mAh

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 (limitied by cell)
Discharge	standard	670 mA	-20°C < T < 60°C
	max.cont.	3350 mA	-20°C < T < 45°C (limitied 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	XHP-3	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

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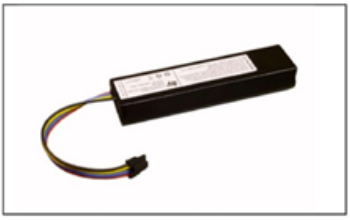
UN 38.3
IEC 62133
UL 2054

PICPALNB117 – 14.4V/3350mAh



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 -180mOhr mΩ
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	

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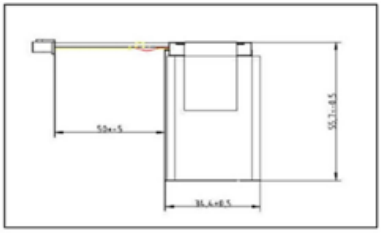
PICPAL36 – 3.7V/1300mAh



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℃ <T< 45℃
	rapid	1.250mA	10℃ <T< 45℃
Discharge	standard	1.250mA	-20℃ < T < 60℃
	max.cont.	2.500mA	-20℃ < T < 45℃
	max.peak	2.750mA	-20℃ < T < 45℃
Short circuit current		≈20A	<500µs
NTC		10 kOhm	Tolerance 5%; B-value 25℃/85℃ = 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
over voltage	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	

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UN 38.3

IEC 62133

PICPAL2138 – 3.6V/2350mAh

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	XHP-3	Pin 1: GND black
			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

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Panasonic 24V to 36V lithium-ion battery packs

PICPAL1022 – 25.2V/6750mAh

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℃ < T < 45℃ inte rmal charger
max. allowed external charger		3000mA	10℃ < T < 45℃
Discharge	standard	1350mA	-20℃ < T < 60℃
	max.cont.	7800mA	-20℃ < T < 45℃
	max.peak	30000mA	-20℃ < T < 45℃
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

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PICPAL1707 – 25.2V/20300mAh

UN 38.3

Dimensions

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

width: 171 +2/-2mm

hight: 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

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Panasonic 24V to 36V lithium-ion battery packs (CONTINUED)

PICPAL1710 – 25.2V/29000mAh

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	VALU-LOK		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

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PICPAL1805 – 36.0V/14500mAh

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	

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High-discharge li-ion battery series 3.6V

UN 38.3

Part No.	Max. current	Capacity	Energy		Dimensions
PICPALHC19	discharge 10A charge 1.3A	2.9Ah	9Wh		66 mm 18.6 mm 23 mm
PICPALHC46	discharge 10A charge 2.75A	5.8Ah	19.6Wh		66 mm 18.6 mm 41 mm
PICPALHC33	discharge 10A charge 4A	8.7Ah	29.4Wh		66 mm 18.6 mm 9 mm
PICPALHC55	discharge 10A charge 5A	11.6Ah	39.2Wh		66 mm 18.6 mm 7 mm
PICPALHC66	discharge 10A charge 5A	14.5Ah	49Wh		66 mm 18.6 mm 95 mm
PICPALHC77	discharge 10A charge 5A	17.4Ah	58.8Wh		66 mm 18.6 mm 113 mm

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INDUSTRY

Standard li-ion battery series 7.2V (IEC approved)

UN 38.3

IEC 62133

Part No.	Max. current	Capacity	Energy		Dimensions
PICPAIECLNB76	charge: 1.625A discharge: 4.8A	3.35Ah	24Wh		71 ±2mm 37 ±1mm 19 ±1mm
PICPAIECLNB162	charge: 3.25A discharge: 5A	6.7Ah	48Wh		71 ±2mm 73 ±1mm 19 ±1mm
PICPAIECLNB2006F	charge: 4.8A discharge: 5A	10.05Ah	72Wh		71 ±2mm 110 ±1mm 19 ±1mm
PICPAIECLNB175F	charge: 5A discharge: 5A	13.4Ah	96Wh		71 ±2mm 147 ±1mm 19 ±1mm
PICPAIECLNB175L	charge: 5A discharge: 5A	13.4Ah	96Wh		136 ±2mm 73 ±1mm 19 ±1mm
PICPAIECLNB162L	charge: 3.25A discharge: 5A	6.7Ah	48Wh		136 ±2mm 38 ±1mm 19 ±1mm
PICPAIECLNB2006L	charge: 3.25A discharge: 5A	10.05Ah	72Wh		136 ±2mm 55 ±1mm 19 ±1mm
PICPAIECLNB162Q	charge: 3.25A discharge: 5A	6.7Ah	48Wh		71 ±2mm 37.5 ±1mm 37.5 ±1mm
PICPAIECLNB2006Q	charge: 3.25A discharge: 5A	10.05Ah	72Wh		71 ±2mm 37.5 ±1mm 55 ±1mm
PICPAIECLNB175Q	charge: 5A discharge: 5A	13.4Ah	96Wh		71 ±2mm 37.5 ±1mm 73 ±1mm

configurations available in different shapes

RRC1120 – 3.7V/2000mAh

UN 38.3

IEC 62133

UL 2054

General	
Delivery status battery capacity	max. 30%
Compliance information	IEC62133 / CE / UL2054 / FCC / PSE / KC / Gost / EAC / CQC / RCM / BIS / TISI / UN38.3 / RoHS / REACH
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

Electrical Parameters	
Nominal voltage	3.70V
Nominal capacity	2.00Ah
Initial impedance	<100.00mΩ @ 1kHz at 20°C
Max. charge current	1.10A
Max. charge voltage	4.20V
Max. discharge	2.00A
Life expectancy @ 25°C 1.00A Charge/1.00A Discharge	>300 cycles with ≥ 80% of initial capacity

Battery Dimensions	
Length	52.50mm ±0.40mm
Width	34.78mm ±0.40mm
Thickness	11.30mm max.
Weight	42g
Contacts	+, -, SDA (NTC), SCL

Safety Parameters PCM	
Overcharge detection voltage	4.28V
Overdischarge detection voltage	2.80V
Overcharge detection current	1.36A
Overdischarge detection current	2.27A

Mating connector for the RRC1120 battery: PN RRCMC11902

FLATPAQ

RRCSCC1120 – Desktop charger for RRC1120

Input		
Voltage	5.00V nom.	
Current	1.00A nom.	
Power	5.00W	

Output		
Voltage	4.20VDC	
Current max.	1.00A	
Voltage tolerance	±1% max.	
Current tolerance	±10% max. @1.00A	
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, 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 error Charger over temperature error Battery over voltage error Battery charge time-out error Input voltage too low

Charger Mechanical Details	
Housing dimensions (LxWxH)	40.60 x 76.00 x 12.60mm
Weight	15g (excluding power supply)

Safety & EMC	In combination with included external AC/DC power supply	
Regulatory approvals	Europe	CE
Electromagnetic Emissions	Europe USA	EN55011, EN55022, level B FCC15 class B
Electromagnetic Immunity	ESD immunity Electromagnetic field immunity EFT / Burst Surge Conducted Immunity Magnetic Fields	EN/IEC61000-4-2 EN/IEC61000-4-3 EN/IEC61000-4-4 EN/IEC61000-4-5 EN/IEC61000-4-6 EN/IEC61000-4-8

FLATPAQ

RRC1130 – 3.7V/3880mAh

UN 38.3

IEC 62133

UL 2054

General	
Delivery status battery capacity	30%
Compliance information	IEC 62133 / CE / UL2054 / FCC / PSE / KC / Gost / EAC / CQC / RCM / BIS / TISI / UN 38.3 / RoHS / REACH
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

Electrical Parameters	
Nominal voltage	3.80V
Nominal capacity	3.88Ah
Initial impedance	<60mΩ @ 1kHz at 20°C
Max. charge current	2.40A
Max. charge voltage	4.35V
Max. discharge	3.00A
Life expectancy @ 25°C 1.89A Charge/3.78A Discharge	>300 cycles with ≥ 85% of initial capacity

Battery Dimensions	
Length	83.70mm +0.5/-0.5
Width	61.03mm +0.4/-0.4
Thickness	6.80mm max.
Weight	69g
Contacts	+, -, SDA (NTC), SCL

Safety Parameters PCM	
Overcharge detection voltage	4.40V
Overdischarge detection voltage	2.80V
Overcharge detection current	3.00A
Overdischarge detection current	4.00A

Mating connector for the RRC1130 battery: PN RRCMC11902

FLATPAQ

RRCSCC1130 – Desktop charger for RRC1130

Input	
Voltage	5.00V nom.
Current	1.00A nom.
Power	5.00W

Output	
Voltage range	4.35VDC
Current range	1.00A
Voltage tolerance[1]	±1% max.
Current tolerance[1]	±10% max. @1.00A
Protection	Short circuit, battery over/under temperature, charge 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, orange)
Battery types	Standard battery RRC1130
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 error Charger over temperature error Battery over voltage error Battery charge time-out error Input voltage too low

Safety & EMC	In combination with included external AC/DC power supply	
Regulatory approvals	Europe	CE
Electromagnetic Emissions	Europe USA	EN55011, EN55022, level B FCC15 class B
Electromagnetic Immunity	ESD immunity Electromagnetic field immunity EFT / Burst Surge Conducted Immunity Magnetic Fields	EN/IEC61000-4-2 EN/IEC61000-4-3 EN/IEC61000-4-4 EN/IEC61000-4-5 EN/IEC61000-4-6 EN/IEC61000-4-8

FLATPAQ

UN 38.3

IEC 62133

UL 2054

RRC2130 – 7.6V/3880mAh

General	
Delivery status battery capacity	30%
Compliance information	IEC 62133 / CE / UL2054 / FCC / Gost / PSE / BSMI / TISI / RCM / EAC / CQC / KC / BIS / UN38.3 / RoHS / REACH
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

Electrical Parameters	
Nominal voltage	7.60V
Nominal capacity	3.88Ah
Initial impedance	<200mΩ @ 1kHz at 20°C
Max. charge current	2.70A
Max. charge voltage	8.70V
Cont. discharge	3.78A
Max. discharge	5.67A
Life expectancy @ 25°C 1.89A Charge/3.78A Discharge	>300 cycles with ≥ 85% of initial capacity

Battery Dimensions	
Length	150.60mm +0.5/-0.5
Width	86.20mm +0.4/-0.4
Thickness	8.35mm +0.25/-0.25
Weight	172g
Contacts	+, +, C, D, T, -, -

Safety Parameters PCM	
Overcharge detection voltage / cell	4.39V
Overcharge release voltage / cell	4.20V
Overdischarge detection voltage / cell	2.75V
Overdischarge release voltage / cell	3.25V
Overcharge detection current	3.10A
Overdischarge detection current	6.00A

Mating connectors RRCMC219010/ RRCMC219020 available

UN 38.3

IEC 62133

UL 2054

RRC2140 – 11.4V/3880mAh

General	
Delivery status battery capacity	30%
Compliance information	IEC 62133 / CE / UL2054 / FCC / Gost / PSE / BSMI / TISI / RCM / EAC / CQC / KC / BIS / UN38.3 / RoHS / REACH
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

Electrical Parameters	
Nominal voltage	11.40V
Nominal capacity	3.88Ah
Initial impedance	<200mΩ @ 1kHz at 20°C
Max. charge current	2.70A
Max. charge voltage	13.05V
Cont. discharge	3.78A
Max. discharge	5.67A
Life expectancy @ 25°C 1.90A Charge/0.75A Discharge	>300 cycles with ≥ 85% of initial capacity

Battery Dimensions	
Length	212.90mm +0.5/-0.5
Width	86.20mm +0.4/-0.4
Thickness	8.35mm +0.25/-0.25
Weight	<255g
Contacts	+, +, C, D, T, -, -

Safety Parameters PCM	
Overcharge detection voltage / cell	4.39V
Overcharge release voltage / cell	4.20V
Overdischarge detection voltage / cell	2.75V
Overdischarge release voltage / cell	3.25V
Overcharge detection current	3.10A
Overdischarge detection current	6.00A

Mating connectors RRCMC219010/ RRCMC219020 available

FLATPAQ

RRCSMBFBC – FlatPaq smart battery charger

Input	
Voltage range	19.00 – 26.00VDC
Current	2.30A max.
Power	40.00W

Output	
Voltage range	0 - 17.40VDC
Current range	0 - 4.00A
Voltage tolerance(1)	±1% max.
Current tolerance(1)	±10% max. @1.00A, ±3% max. @4.00A
Charge power	40.00W max.
Protection	Short circuit, over temperature shutdown, input-/output over current

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	
Efficiency(2)	~95% at 100% load
Indicator	Multi-color LED (green, red, orange)
Battery types	Standard battery form factors RRC21xx 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	Self-test: 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)	88.5 x 38.5 x 19.9mm
Weight	36g (excluding power supply)

Safety & EMC	In combination with included external AC/DC power supply	
Regulatory approvals	Europe International	CE CB
Electromagnetic Emissions	Europe USA	EN55011, EN55032, level B FCC15 class B
Electromagnetic Immunity	ESD immunity Electromagnetic field immunity EFT / Burst Surge Conducted Immunity Magnetic Fields Voltage dips, short instrumentations & voltage variations Immunity characteristics	EN/IEC61000-4-2 EN/IEC61000-4-3 EN/IEC61000-4-4 EN/IEC61000-4-5 EN/IEC61000-4-6 EN/IEC61000-4-8 EN/IEC61000-4-11 EN55024

FLATPAQ

UN 38.3

IEC 62133

UL 2054

RRC2037 – 7.2V/2.9Ah

General	
Delivery status battery capacity	< 30%
Compliance information	CE / UL2054 / FCC / PSE / KC / Gost / EAC / CQC / RCM / IEC62133 / UN38.3 / RoHS / REACH / BIS / TISI / BSMI
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

Electrical Parameters	
Nominal voltage	7.20V
Nominal capacity	2.90Ah
Initial impedance	<200mΩ @ 1kHz at 25°C
Max. charge current	2.03A
Max. charge voltage	8.40V
Max. discharge current	4.50A
Life expectancy	300 cycles with ≥ 60% of initial capacity CC/CV Charge: 1.375A / 8.40V Discharge: 2.75A down to 5.00V @25°C

Battery Dimensions	
Length (min. – max.)	85.00mm – 85.80mm
Width (min. – max.)	41.60mm – 42.40mm
Thickness (min. – max.)	22.15mm – 22.80mm
Weight	121g
Contacts	+, C, D, T, -

Safety Parameters PCM	
Overcharge detection voltage / cell	4.25V
Overdischarge detection voltage / cell	2.50V
Overcharge detection current	2.75A
Overdischarge detection current	4.80A

RRC2040 – 11.25V/2950mAh

UN 38.3

IEC 62133

UL 2054

General	
Delivery status battery capacity	30%
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	IEC 62133 / CE / UL2054 / FCC / PSE / KC / BSMI / Gost / EAC / CQC / RCM / BIS / UN 38.3 / RoHS / REACH

Electrical Parameters	
Nominal voltage	11.25V
Nominal capacity	2.95Ah
Initial impedance	<200mΩ @ 1kHz at 20°C
Max. charge current	2.065A
Max. charge voltage	13.05V
Cont. discharge	3.00A
Peak discharge	10.00A
Life expectancy @ 25°C 1.50A Charge/1.50A Discharge	>300 cycles with ≥ 75% of initial capacity

Battery Dimensions	
Length	84.90mm +0.25/-0.25
Width	58.80mm +0.25/-0.25
Thickness	21.90mm +0.50/-0.25
Weight	170g
Contacts	+, C, D, T, -

Safety Parameters PCM	
Overcharge detection voltage / cell	4.42V
Overcharge release voltage / cell	4.20V
Overdischarge detection voltage / cell	2.60V
Overdischarge release voltage / cell	3.00V
Overcharge detection current	2.30A
Overdischarge detection current	3.50A

RRC2054 – 15V/3200mAh

UN 38.3

IEC 62133

UL 2054

General	
Delivery status battery capacity	30%
Compliance information	CE / UL2054 / FCC / PSE / KC / Gost / EAC / CQC / RCM / IEC62133 / UN38.3 / RoHS / REACH / BIS / TISI / BSMI
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

Electrical Parameters	
Nominal voltage	14.40V
Nominal capacity	3.45Ah
Initial impedance	<180mΩ @ 1kHz at 25°C
Max. charge current	2.415A
Max. charge voltage	16.80V
Max. discharge	5.00A
Life expectancy	300 cycles with ≥ 75% of initial capacity CC/CV Charge: 1.675A / 16.80V Discharge: 3.35A down to 10.00V @25°C

Battery Dimensions	
Length	85.1mm +0.25/-0.25
Width	77.4mm +0.25/-0.25
Thickness	22.4mm +0.60/-0.40
Weight	230g
Contacts	+, D, C, T, -

Safety Parameters PCM	
Overcharge detection voltage / cell	4.23V
Overdischarge detection voltage / cell	2.50V
Overcharge detection current	3.35A
Overdischarge detection current	5.50A

RRC2057 – 7.5V/6400mAh

UN 38.3

IEC 62133

UL 2054

General	
Delivery status battery capacity	30%
Compliance information	CE / UL2054 / FCC / PSE / KC / Gost / EAC / CQC / RCM / IEC62133 / UN38.3 / RoHS / REACH / BIS / TISI / BSMI
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

Electrical Parameters	
Nominal voltage	7.20V
Nominal capacity	6.90Ah
Initial impedance	<180mΩ @ 1kHz at 25°C
Max. charge current	4.83A
Max. charge voltage	8.40V
Max. discharge	9.50A
Life expectancy	300 cycles with ≥ 75% of initial capacity CC/CV Charge: 3.35A / 8.40V Discharge: 6.70A down to 5.00V @25°C

Battery Dimensions	
Length	85.1mm +0.25/-0.25
Width	77.4mm +0.25/-0.25
Thickness	22.4mm +0.60/-0.40
Weight	230g
Contacts	+, D, C, T, -

Safety Parameters PCM	
Overcharge detection voltage / cell	4.23V
Overdischarge detection voltage / cell	2.50V
Overcharge detection current	6.70A
Overdischarge detection current	10.50A

POWERPAQ

RRC20402 – 11.25V/6400mAh

UN 38.3

IEC 62133

UL 2054

General	
Delivery status battery capacity	30%
Compliance information	CE / UL2054 / FCC / PSE / KC / Gost / EAC / CQC / RCM / IEC62133 / UN38.3 / RoHS / REACH / BIS / TISI / BSMI
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

Electrical Parameters	
Nominal voltage	10.80V
Nominal capacity	6.90Ah
Initial impedance	<180mΩ @ 1kHz at 25°C
Max. charge current	4.83A
Max. charge voltage	12.60V
Max. discharge	7.50A
Life expectancy	300 cycles with ≥ 75% of initial capacity CC/CV Charge: 1.675A / 12.60V Discharge: 3.35A down to 10.00V @25°C

Battery Dimensions	
Length	150.25mm +0.25/-0.25
Width	58.75mm +0.25/-0.25
Thickness	21.90mm +0.50/-0.25
Weight	350g
Contacts	+, D, C, T, -

Safety Parameters PCM	
Overcharge detection voltage / cell	4.23V
Overdischarge detection voltage / cell	2.50V
Overcharge detection current	6.70A
Overdischarge detection current	8.00A

RRC2020 – 11.25V/8850mAh

UN 38.3

IEC 62133

UL 2054

General	
Delivery status battery capacity	30%
Compliance information	CE / UL2054 / FCC / PSE / KC / Gost / EAC / CQC / RCM / IEC62133 / UN38.3 / RoHS / REACH / BIS / TISI / BSMI
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

Electrical Parameters	
Nominal voltage	10.80V
Nominal capacity	9.22Ah
Initial impedance	<200mΩ @ 1kHz at 25°C
Max. charge current	6.20A
Max. charge voltage	12.30V
Max. discharge current	10.00A
Life expectancy	300 cycles with ≥ 63% of initial capacity CC/CV Charge: 4.88A / 12.30V Discharge: 4.88A down to 7.50V @25°C

Battery Dimensions	
Length (min. – max.)	148.30 – 149.70mm
Width (min. – max.)	88.75 – 89.25mm
Thickness (min. – max.)	19.45 – 20.10mm
Weight	480g
Contacts	+, C, D, T, -

Safety Parameters PCM	
Overcharge detection voltage / cell	4.15V
Overdischarge detection voltage / cell	2.50V
Overcharge detection current	8.00A
Overdischarge detection current	11.00A

RRC20542 – 14.4V/6900mAh

UN 38.3

IEC 62133

UL 2054

General	
Delivery status battery capacity	30%
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	IEC 62133 / CE / UL2054 / FCC / PSE / KC / Gost / EAC / CQC / RCM / BIS / BSMI / UN 38.3 / RoHS / REACH

Electrical Parameters	
Nominal voltage	14.40V
Nominal capacity	6.90Ah
Initial impedance	200mΩ @ 1kHz at 20°C
Max. charge current	4.83A
Max. charge voltage	16.80V
Max. discharge current	10.00A
Peak discharge current	20.00A
Life expectancy @ 25°C 1.675A Charge/3.35A Discharge	>300 cycles with ≥ 63% of initial capacity

Battery Dimensions	
Length	150.40mm +0.40/-0.40
Width	77.40mm +0.25/-0.25
Thickness	22.35mm +0.60/-0.40
Weight	430g
Contacts	+, C, D, T, -

Safety Parameters PCM	
Overcharge detection voltage / cell	4.27V
Overcharge release voltage / cell	4.10V
Overdischarge detection voltage / cell	2.50V
Overdischarge release voltage / cell	2.75V
Overcharge detection current	6.00A
Overdischarge detection current	10.50A

RRC2024 – 14.4V/6600mAh

UN 38.3

IEC 62133

UL 2054

General	
Delivery status battery capacity	30%
Compliance information	CE / UL2054 / FCC / PSE / KC / Gost / EAC / CQC / RCM / IEC62133 / UN38.3 / RoHS / REACH / BIS / TISI / BSMI
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

Electrical Parameters	
Nominal voltage	14.40V
Nominal capacity	6.60Ah
Initial impedance	<150mΩ @ 1kHz at 25°C
Max. charge current	4.53A
Max. charge voltage	16.80V
Max. discharge	10.00A
Life expectancy	300 cycles with ≥ 63% of initial capacity CC/CV Charge: 4.53A / 16.80V Discharge: 6.45A down to 12.00V @25°C

Battery Dimensions	
Length	167.2mm +0.50/-0.50
Width	107.2mm +0.40/-0.30
Thickness	21.5mm +0.30/-0.50
Weight	600g
Contacts	+, D, C, T, -

Safety Parameters PCM	
Overcharge detection voltage / cell	4.30V
Overdischarge detection voltage / cell	2.50V
Overcharge detection current	6.45A
Overdischarge detection current	11.00A

RRCPMM240 – smart battery power management module

Input (Power Supply Output)	
Input voltage range	Max. 24.00VDC, min. Battery charge voltage +1.00V
Input power	192.00W max.
Input current	8.00A max.
Input fuse	12.00A
Protection	Reverse polarity, short current

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	240.00W max.
Output current	10.00A max.
Output fuse	12.00A

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

Battery Input / Output	
Battery charge voltage	Up to 19.20V (± 0.5%)
Battery charge current	Up to 6.20A (± 3%)
Battery charge power	Up to 82.00W
Battery discharge current	10.00A max.
Protection	Battery short circuit, over temperature, over voltage, over current & reverse polarity
Standby current	Typical 1.00mA

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

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	

Recommended Voltage for External AC/DC Power Supplies				
Battery architecture	1SxP,	2SxP,	3SxP,	4SxP
DC input voltage	6.00VDC,	12.00VDC,	15.00VDC,	19.00VDC
Power supply wattage @ 4.00A max input current	≥30.00W,	≥48.00W,	≥64.00W,	≥80.00W
Power supply wattage @ 8.00A max input current	≥60.00W,	≥96.00W,	≥128.00W,	≥160.00W

RRCSMBUBC – smart battery charger/conditioner

Input	
Voltage range	19.00 – 26.00VDC
Current	3.40A max.
Power	65.00W

Output	
Voltage range	0 - 17.40VDC
Current range	0 - 4.80A
Voltage tolerance(1)	±1% max.
Current tolerance(1)	±10% max. @1.00A, ±3% max. @4.00A
Charge power	60.00W max.
Protection	Short circuit, over temperature shutdown, input-/output over current

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	
Efficiency	~95% at 100% load
Indicator	Multi-color LED (green, red, orange)
Battery types	Standard battery form factors RRC20x 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	Self-test: 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)

RRCSMBMBC – mini smart battery charger

Input		
Voltage range	19.00 – 26.00VDC	
Current	2.80A max.	
Power	50.00W	

Output		
Voltage range	0 - 17.40VDC	
Current range	0 - 4.80A	
Voltage tolerance(1)	±1% max.	
Current tolerance(1)	±10% max. @1.00A, ±3% max. @4.00A	
Charge power	50.00W max.	
Protection	Short circuit, over temperature shutdown, input-/output over current	

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	
Efficiency(2)	~95% at 100% load
Indicator	Multi-color LED (green, red, orange)
Battery types	Standard battery form factors RRC204x, RRC205x and RRC203x 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	Self-test: 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)

RRCSMBDBC – dual bay charger

Input		
Voltage range	19.00 – 26.00VDC	
Current	3.40A max.	
Power	65.00W	

Output		
Voltage range	0 - 17.40VDC	
Current range	0 - 4.80A	
Voltage tolerance[1]	±1% max.	
Current tolerance[1]	±10% max. @1.00A, ±3% max. @4.00A	
Charge power	30.00W max. per Bay	
Protection	Short circuit, over temperature shutdown, input-/output over current	

Environmental		
Cooling	convection cooled	
Temperature	Operating: 0°C to 50°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	
Efficiency[2]	~95% at 100% load
Indicator	Multi-color LED (green, red, orange)
Battery types	Standard battery form factors RRC20xx 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	Self-test: 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)	155 x 175 x 43mm
Weight	325g (excluding power supply)

RRCPS65 - power supply AC-DC

Input		
Voltage range	100.00 – 240.00VAC / 50~60Hz input	
Input current	Max. 1.60A @ 100.00VAC	
Stand-by power	No load < 0.21W @ 230.00VAC	
Output		
Voltage	19.00VDC	
Power	65.00W max.	
Current	3.43A max.	
Ripple & noise	<190.00mV$_{pk-pk}$	
Protection	Short circuit, over current, over voltage	
Environmental		
Cooling	convection cooling	
Temperature	Operating: 0°C to 40°C	Non-operating: -20°C to 80°C
Pressure & Altitude	Operating: 1060hPa to 540hPa max. 5000m above sea level	Non-operating: 1060hPa to 540hPa max. 5000m above sea level
Humidity (Non-condensing)	Operating: 20 to 80% RH	Non-operating 10 to 90% RH
General		
Efficiency	California's Energy Efficiency Level VI	
Green procurement	WEEE, RoHS	
AC Inlet	IEC320 C8 AC Inlet	
Output connector	DC barrel jack, 5.50 x 2.50 x 11.00mm	
Safety & EMC		
Regulatory approvals	Europe USA & Canada	ANSI/AAMI/IEC/EN ES60601-1:2012 (60601 edition 3.1) Means of Protection: 2x MOPP UL recognized
EMC	Europe & USA	IEC 60601-1-2:2014 (edition 4.0) The EMC assessment shall be conducted for the end system configuration.
Energy efficiency		CEC, DoE Level VI
Mechanical Details		
Housing dimensions (LxWxH)	119.00 x 60.00 x 36.00mm, without cables and connectors	
Output cable length	1500.00mm ±30.00mm	
Weight	310g	

Various power supplies are available upon request

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
- Worlwide 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 for the RRC SMART batteries is available from Avnet:
PN RRCMC209010 (rectangular),
RRCMC2018010 (straight)

RRCSMBUSREADER – SMBus reader

System Management Bus Reader

Features

- Simple and easy read out of SMBus batteries
- Diplays 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

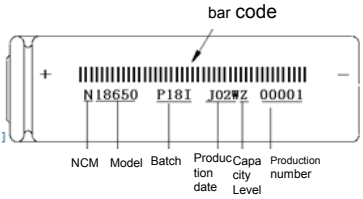
Custom battery designs can be made available on a project basis - Please consult your local Avnet representative

YOBNCM18650260 - 3.6V/2600mAh

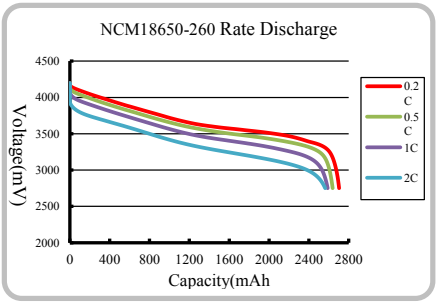
UN 38.3

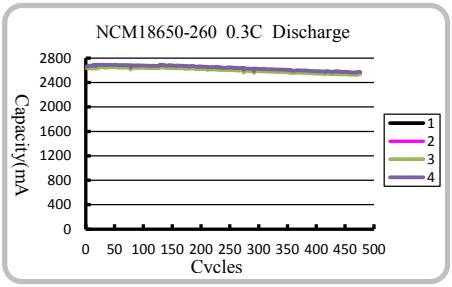
IEC 62133

UL 1642



SPECIFICATIONS	
Height (mm）	64.7±0.3
Diameter(mm)	18.50±0.2
Weight (g)	46±2
Capacity(Nominal/Lowest, AH, @ 0.2C discharge)	2.55/2.55
Nominal Voltage (V)	3.6
Internal Impedance (mΩ)	≤55
RECOMMENDED OPERATING CONDITIONS	
Continuous Discharge (A)	≤4.2A
Charge Current (A)	≤2.6A
Charge Voltage Cutoff (V)	4.2
Discharge Voltage Cutoff (V)	2.75
Operating Temperature, Charge(℃)	0~45℃
Operating Temperature, Discharge(℃)	-20~60℃
Storage Temperature (℃)	0~45℃
Recommend charging mode (normal temperature)	0.5C to 4.2V CCCV
Cycle life (≥80%)	≥500 cycles





Performance may vary depending on application. All specifications and operation conditions are subject to change without notice. This data is for evaluation purposes only. No guarantee is intended or implied by this data.

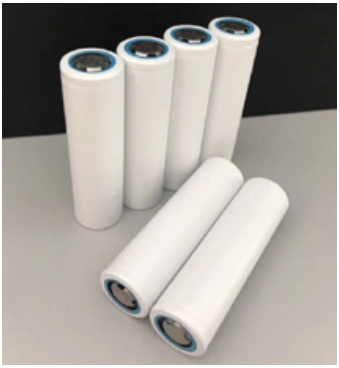
DLG®

YOBINR18650320 – 3.6V/3200mAh

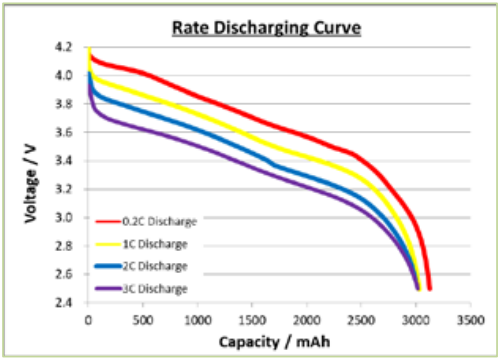
UN 38.3

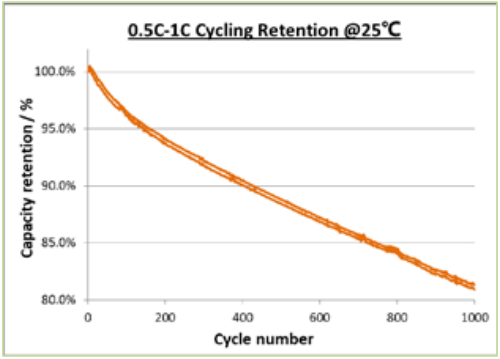
IEC 62133

UL 1642



SPECIFICATIONS	
Height (mm)	65.00±0.25
Diameter(mm)	18.30±0.20
Weight (g)	46±2
Capacity(Nominal/Lowest, AH, @ 0.2C discharge)	3.2/3.1
Average Operating Voltage (V)	3.6
Internal Impedance @ 1kHz, AC(mΩ)	≤40
RECOMMENDED OPERATING CONDITIONS	
Continuous Discharge (A)	≤6.4A
Charge Current (A)	≤3.2A
Charge Voltage Cutoff (V)	4.2
Discharge Voltage Cutoff (V)	2.5
Operating Temperature, Charge(℃)	0~45℃
Operating Temperature, Discharge(℃)	-30~60℃
Storage Temperature (℃)	-30~60℃
Recommend charging mode (normal temperature)	0.5C to 4.2V CCCV
Cycle life (≥70%)	≥500 cycles





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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

Tadiran cylindrical TLI

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

GP miniature cylindrical li-ion

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

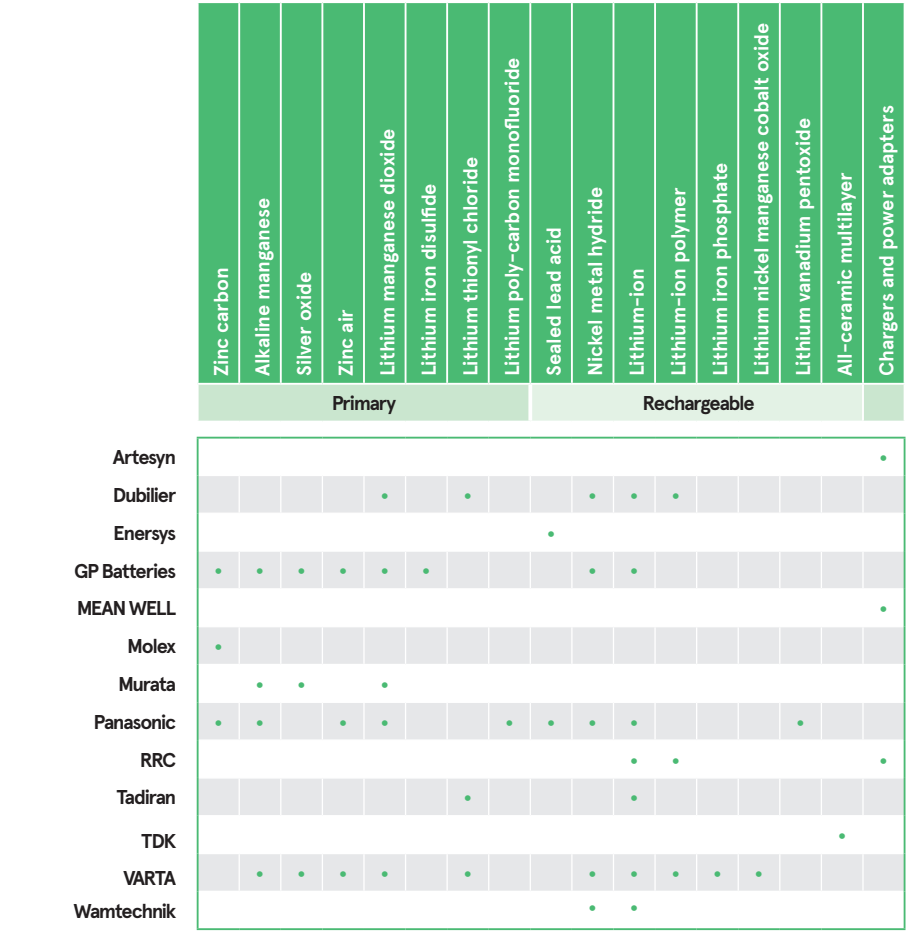
Dubilier prismatic li-polymer

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

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

Battery solutions linecard



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