

Power Pack Solutions

VARTA Storage GmbH

CellPac LITE

IATA SOC Topic

May 2016



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- VARTA Storage GmbH is receiving cells of various SOC from its suppliers.
- All products will transition to an SOC of 30% as soon as documentation can be released and updated.
- A new VARTA Storage GmbH part number is necessary to control legal aspects like correct Declaration of Conformity issuance for compliance with transportation.
- This process is underway for several hundred part numbers, including CellPac LITE part numbers.
- This presentation shows the current status of this transition as of May 2016.
- For actual delivery transfer SAP Order confirmations overrule all other documentation.

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Overview of current CellPac LITE product range with notifications of all changes:

Description	Order Code (VKB)	OLD Order Code (50% SOC)	Minimum State of Charge	Calculated storage time (months)*
1/LIC18650-26 HC PCM S WC	56637 201 016	56637 201 014	17%	14,36
2S/LIC18650-26 HC PCM S WC	56637 502 016	56637 502 013	17%	12,74
2P/LIC18650-26 HC PCM S WC	56637 502 017	56637 502 014	17%	14,30
1/LIP103450 SC PCM S WC	56429 201 016	56429 201 015	17%	12,32
1/LPP 523450 S PCM W	56457 201 012	no change	~ 50%	31,56
1/LPP 503759 8HH PCM W	56427 201 018	no change	~ 50%	34,97
1/LPP 443441 S PCM W	56455 201 012	no change	~ 50%	26,76
1/LPP 423566 BE NTC W	56437 201 012	no change	~ 50%	33,13
2P/LPP 503562 S PCM WC	56456 302 012	no change	~ 50%	39,87
1/LPP 503562 S PCM W	56456 201 012	no change	~ 50%	33,47
EasyPack S	56455 701 099	no change	~ 50%	27,72
EasyPack L	56456 701 099	no change	~ 50%	34,26
EasyPack XL	56456 702 099	no change	~ 50%	39,87

*At 20-25C and normal or low humidity

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~50% SOC

Description: 1/LIC 18650 26 HC PCM S WC

Order # 56637 201 014

Product Information

1/LIC 18650 26 HC PCM S WC
▶ VKB 56637 201 014

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

1. GENERAL

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

Cell ▶ LIC 18650-26 HC

PCM ▶ Yes

NTC ▶ None

ID ▶ None

Configuration ▶ 1S

Weight ▶ appr. 50g

2. ELECTRICAL SPECIFICATION

Rated Capacity ▶ 2500mAh min., 2600mAh nominal

Nominal Voltage ▶ 3.63V

Watt-Hour Rating ▶ 9.5Wh

Charging Method ▶ Constant Current + Constant Voltage

Max. Charge Voltage [V]: ▶ 4.2 (±50mV)

Max. Continuous Charge Current: ▶ 2500mA (limited by Connector)

Rec. Charge Cut Off: ▶ 0.05C or timer 2.5h

Max. Continuous Discharge Current: ▶ 2500mA (limited by Connector)

Rec. Discharge Cut Off: ▶ 2.75V

Internal Impedance: ▶ approx. 120mΩ

Expected Cycle Life @ (0.5C/0.5C) @ 25°C ▶ 300 cycles @ ≥ 1785mAh

CELL PROTECTION

Overcharge Detection ▶ 4.300 ± 0.025V (0.8 to 1.2sec. delay, resume 4.100V ± 0.030V)

Overdischarge Detection: ▶ 2.400V ± 0.035V (76.8 to 115.2msec. delay, resumed by removing load)

Overcurrent Detection ▶ 6A to 8A (9.6 to 14.4msec. delay)

3. AMBIENT CONDITIONS

Temperature Range

- Charge ▶ 0 to +45°C
- Discharge ▶ -20 to +60°C
- Charge Retention/ Storage [%] ▶ 1 year at -20 to +25°C > 80%
- ▶ 3 months at -20°C to +45°C > 80%
- ▶ 1 month at -20°C to +60°C > 80%

• Humidity ▶ 65 ± 20%RH

4. ENVIRONMENTAL AND SAFETY

Please follow VARTA Handling and Safety Precautions for Lilon & 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 according to IEC62133 edition 2 and UN 38.3.

Minimum Order Quantity: 550 pcs / Order Multiples: 110 pcs - Product for OEM customers only!

Molex connector: Housing 5264-0200 Terminal E263 PBT
Pin 2: red wire (+) AWG 24 UL 1430
Pin 1: black wire (-) AWG 24 UL 1430



<30% SOC

Description: 1/LIC 18650 26 HC PCM S WC

Order # 56637 201 016

Product Information

1/LIC 18650 26 HC PCM S WC
▶ VKB 56637 201 016

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

1. GENERAL

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

Cell ▶ LIC 18650-26 HC

PCM ▶ Yes

NTC ▶ None

ID ▶ None

Configuration ▶ 1S

Weight ▶ appr. 50g

2. ELECTRICAL SPECIFICATION

Rated Capacity ▶ 2500mAh min., 2600mAh nominal

Nominal Voltage ▶ 3.63V

Watt-Hour Rating ▶ 9.5Wh

Charging Method ▶ Constant Current + Constant Voltage

Max. Charge Voltage [V]: ▶ 4.2 (±50mV)

Max. Continuous Charge Current: ▶ 2500mA (limited by Connector)

Rec. Charge Cut Off: ▶ 0.05C or timer 2.5h

Max. Continuous Discharge Current: ▶ 2500mA (limited by Connector)

Rec. Discharge Cut Off: ▶ 2.75V

Internal Impedance: ▶ approx. 120mΩ

Expected Cycle Life @ (0.5C/0.5C) @ 25°C ▶ 300 cycles @ ≥ 1785mAh

CELL PROTECTION

Overcharge Detection ▶ 4.300 ± 0.025V (0.8 to 1.2sec. delay, resume 4.100V ± 0.030V)

Overdischarge Detection: ▶ 2.400V ± 0.035V (76.8 to 115.2msec. delay, resumed by removing load)

Overcurrent Detection ▶ 6A to 8A (9.6 to 14.4msec. delay)

3. AMBIENT CONDITIONS

Temperature Range

- Charge ▶ 0 to +45°C
- Discharge ▶ -20 to +60°C
- Charge Retention/ Storage [%] ▶ 1 year at -20 to +25°C > 80%
- ▶ 3 months at -20°C to +45°C > 80%
- ▶ 1 month at -20°C to +60°C > 80%

• Humidity ▶ 65 ± 20%RH

4. ENVIRONMENTAL AND SAFETY

Please follow VARTA Handling and Safety Precautions for Lilon & 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 according to IEC62133 edition 2 and UN 38.3.

Minimum Order Quantity: 550 pcs / Order Multiples: 110 pcs - Product for OEM customers only!

Molex connector: Housing 5264-0200 Terminal E263 PBT
Pin 2: red wire (+) AWG 24 UL 1430
Pin 1: black wire (-) AWG 24 UL 1430

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~50% SOC

Description: 2S/LIC 18650 26 HC PCM S WC

Order # 56637 502 013

Product Information

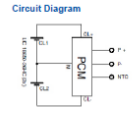
2S/LIC 18650 26 HC PCM S WC
▶ VKB 56637 502 013



Varta Microbattery Li-Ion
2CR1865
25A/LIC 18650-26HC
VKB: 56637 502 013
2600mAh 7.20V 19Wh
Made in Korea
(MNT)

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

Circuit Diagram



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

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

2. ELECTRICAL SPECIFICATION

Rated Capacity	▶ 2550mAh min., 2600mAh nominal
Nominal Voltage	▶ 7.20V
Watt-Hour Rating	▶ 19Wh
Charging Method	▶ Constant Current + Constant Voltage
Max. Charge Voltage [V]	▶ 8.4 (±50mV)
Max. Continuous Charge Current	▶ 2000mA (limited by PCM)
Rec. Charge Cut Off	▶ 0.05C or timer 3h
Max. Continuous Discharge Current	▶ 2000mA (limited by PCM)
Rec. Discharge Cut Off	▶ 5.5V
Internal Impedance	▶ approx. 220mΩ
Expected Cycle Life @ (0.5C/0.5C) @ 25°C	▶ 300 cycles @ ≥ 1785mAh

CELL PROTECTION

Overcharge Detection	▶ 4.325V ~ 4.375V (920msec. ~ 1380msec. delay, resume 4.100V ~ 4.200V)
Overdischarge Detection	▶ 2.220V ~ 2.350V (115msec. ~ 173msec. delay, resume 2.800V ~ 3.000V)
Overcurrent Detection	▶ 2.6A to 4.6A (7.20msec. ~ 11.00msec. delay)

3. AMBIENT CONDITIONS

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

4. ENVIRONMENTAL AND SAFETY
Please follow VARTA Handling and Safety Precautions for Lilon & 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 according to IEC62133 edition 2 and UN 38.3.

Minimum Order Quantity: 400 pcs / Order Multiples: 50 pcs - Product for OEM customers only!




<30% SOC

Description: 2S/LIC 18650 26 HC PCM S WC

Order # 56637 502 016

Product Information

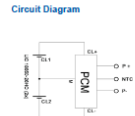
2S/LIC 18650 26 HC PCM S WC
▶ VKB 56637 502 016



VARTA Storage GmbH Li-Ion
2CR1865
25A/LIC 18650-26HC
VKB: 56637 502 016
2600mAh 7.20V 19Wh
Assembled in Indonesia
(MNT)

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

Circuit Diagram



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

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

2. ELECTRICAL SPECIFICATION

Rated Capacity	▶ 2550mAh min., 2600mAh nominal
Nominal Voltage	▶ 7.20V
Watt-Hour Rating	▶ 19Wh
Charging Method	▶ Constant Current + Constant Voltage
Max. Charge Voltage [V]	▶ 8.4 (±50mV)
Max. Continuous Charge Current	▶ 2000mA (limited by PCM)
Rec. Charge Cut Off	▶ 0.05C or timer 3h
Max. Continuous Discharge Current	▶ 2000mA (limited by PCM)
Rec. Discharge Cut Off	▶ 5.5V
Internal Impedance	▶ approx. 220mΩ
Expected Cycle Life @ (0.5C/0.5C) @ 25°C	▶ 300 cycles @ ≥ 1785mAh

CELL PROTECTION

Overcharge Detection	▶ 4.325V ~ 4.375V (920msec. ~ 1380msec. delay, resume 4.100V ~ 4.200V)
Overdischarge Detection	▶ 2.220V ~ 2.350V (115msec. ~ 173msec. delay, resume 2.800V ~ 3.000V)
Overcurrent Detection	▶ 2.6A to 4.6A (7.20msec. ~ 11.00msec. delay)

3. AMBIENT CONDITIONS

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

4. ENVIRONMENTAL AND SAFETY
Please follow VARTA Handling and Safety Precautions for Lilon & 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 according to IEC62133 edition 2 and UN 38.3.

Minimum Order Quantity: 400 pcs / Order Multiples: 50 pcs - Product for OEM customers only!

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~50% SOC

Description: 2P/LIC 18650 26 HC PCM S WC

Order # 56637 502 014

Product Information

2P/LIC 18650 26 HC PCM S WC
▶ VKB 56637 502 014



Varta Microbattery Li-Ion
ICR18650-2
2P/LIC 18650-26HC
VKB: 56637 502 014
5200mAh 3.63V 19Wh
Made in Korea
MMYR

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

1. GENERAL

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

Cell ▶ LIC 18650-26 HC

PCM ▶ Yes

NTC ▶ 10kΩ ± 3%; B-value: 3435K ± 3%

ID ▶ None

Configuration ▶ 2P

Weight ▶ appr. 65g

2. ELECTRICAL SPECIFICATION

Rated Capacity ▶ 5100mAh min., 5200mAh nominal

Nominal Voltage ▶ 3.63V

Watt-Hour Rating ▶ 19Wh

Charging Method ▶ Constant Current + Constant Voltage

Max. Charge Voltage [V] ▶ 4.2 (±50mV)

Max. Continuous Charge Current ▶ 2500mA (limited by PCM)

Rec. Charge Cut Off ▶ 0.05C or timer 3h

Max. Continuous Discharge Current ▶ 2500mA (limited by PCM)

Rec. Discharge Cut Off ▶ 2.75V

Internal Impedance ▶ approx. 100mΩ

Expected Cycle Life @ (0.5C/0.5C) @ 25°C ▶ 300 cycles @ ≥ 3570mAh

CELL PROTECTION

Overcharge Detection ▶ 4.250V ± 4.300V (0.6 to 1.3sec. delay, auto release)

Overdischarge Detection ▶ 2.220V ± 2.380V (60 to 130msec. delay, auto release)

Overcurrent Detection @ charging ▶ 3.6A to 7.0A (15 to 33msec. delay)

Overcurrent Detection @ discharging ▶ 4.0A to 6.3A (9.8 to 22msec. delay)

3. AMBIENT CONDITIONS

Temperature Range

- Charge ▶ 0 to +45°C
- Discharge ▶ -20 to +60°C
- Charge Retention/Storage [%] ▶ 1 year at -20 to +25°C > 80%
- ▶ 3 months at -20°C to +45°C > 80%
- ▶ 1 month at -20°C to +60°C > 80%

• Humidity ▶ 65 ± 20%RH

4. ENVIRONMENTAL AND SAFETY

Please follow VARTA Handling and Safety Precautions for Li-Ion & LiPolymer.

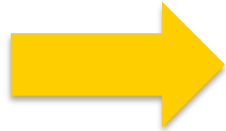
The cell used is a UL recognized component according to UL1642.

This battery meets the requirements of Battery Directives and the battery parts are RoHS-Compliant.

This battery is certified according to IEC62133 edition 2 and UN 38.3.

Minimum Order Quantity: 400 pcs / Order Multiples: 50 pcs - Product for OEM customers only

VARTA Storage GmbH - Rev. No.: 14-046 712348 1 03-8T



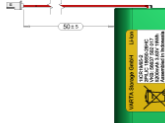
<30% SOC

Description: 2P/LIC 18650 26 HC PCM S WC

Order # 56637 502 017

Product Information

2P/LIC 18650 26 HC PCM S WC
▶ VKB 56637 502 017



VARTA Storage GmbH Li-Ion
ICR18650-2
2P/LIC 18650-26HC
VKB: 56637 502 017
5200mAh 3.63V 19Wh
Assembled in Indonesia
MMYR

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

1. GENERAL

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

Cell ▶ LIC 18650-26 HC

PCM ▶ Yes

NTC ▶ 10kΩ ± 3%; B-value: 3435K ± 3%

ID ▶ None

Configuration ▶ 2P

Weight ▶ appr. 65g

2. ELECTRICAL SPECIFICATION

Rated Capacity ▶ 5100mAh min., 5200mAh nominal

Nominal Voltage ▶ 3.63V

Watt-Hour Rating ▶ 19Wh

Charging Method ▶ Constant Current + Constant Voltage

Max. Charge Voltage [V] ▶ 4.2 (±50mV)

Max. Continuous Charge Current ▶ 2500mA (limited by PCM)

Rec. Charge Cut Off ▶ 0.05C or timer 3h

Max. Continuous Discharge Current ▶ 2500mA (limited by PCM)

Rec. Discharge Cut Off ▶ 2.75V

Internal Impedance ▶ approx. 100mΩ

Expected Cycle Life @ (0.5C/0.5C) @ 25°C ▶ 300 cycles @ ≥ 3570mAh

CELL PROTECTION

Overcharge Detection ▶ 4.250V ± 4.300V (0.6 to 1.3sec. delay, auto release)

Overdischarge Detection ▶ 2.220V ± 2.380V (60 to 130msec. delay, auto release)

Overcurrent Detection @ charging ▶ 3.6A to 7.0A (15 to 33msec. delay)

Overcurrent Detection @ discharging ▶ 4.0A to 6.3A (9.8 to 22msec. delay)

3. AMBIENT CONDITIONS

Temperature Range

- Charge ▶ 0 to +45°C
- Discharge ▶ -20 to +60°C
- Charge Retention/Storage [%] ▶ 1 year at -20 to +25°C > 80%
- ▶ 3 months at -20°C to +45°C > 80%
- ▶ 1 month at -20°C to +60°C > 80%

• Humidity ▶ 65 ± 20%RH

4. ENVIRONMENTAL AND SAFETY

Please follow VARTA Handling and Safety Precautions for Li-Ion & 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 according to IEC62133 edition 2 and UN 38.3.

Minimum Order Quantity: 400 pcs / Order Multiples: 50 pcs - Product for OEM customers only

VARTA Storage GmbH - Rev. No.: 14-046 712351 00-8T

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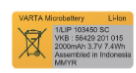
~50% SOC

Description: 1/LIC 103450 SC PCM S WC

Order # 56429 201 015

Product Information

1/LIP 103450 SC PCM S WC
VKB 56429 201 015

1. GENERAL
Li-Ion Battery Pack in shrink sleeve including safety circuit and wire connector
Cell LIP 103450 SC

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

2. ELECTRICAL SPECIFICATION

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

CELL PROTECTION


Overcharge Detection	▶ 4.275V ± 25mV (0.98 to 1.4sec. delay, resume 4.075V ± 50mV, remove charge current)
Overdischarge Detection	▶ 2.30V ± 50mV (30 to 46msec. delay, resume 2.3V ± 100mV @ charge current)
Overcurrent Detection	▶ 5.2A to 8.0A (7.2 to 11msec. delay)

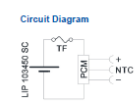
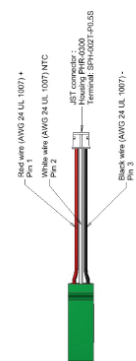
3. AMBIENT CONDITIONS

Temperature Range	▶ 0 to +45°C
• Charge	▶ -20 to +50°C
• Discharge	▶ -20 to +50°C
• Storage Temperature	▶ 1 year at -20 to +20°C > 80% ▶ 3 months at -20°C to +45°C > 80% ▶ 1 month at -20°C to +50°C > 80%
• Humidity	▶ 65 ± 20%/RH


4. ENVIRONMENTAL AND SAFETY
Please follow VARTA Handling and Safety Precautions for L-Ion & LiPolymer.
The cell used is a UL recognized component according to UL1642 and UN38.3 certified.
This battery meets the requirements of Battery Directives and the battery parts are RoHS-Compliant.

Minimum Order Quantity: 500 pcs / Order Multiples: 100 pcs - Product for OEM customers only!



VARTA Storage GmbH, Rev. No. 201403 31/MSA 4.0/ST



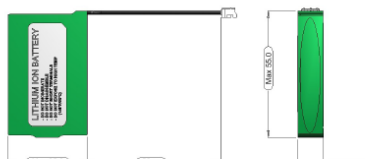
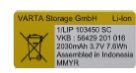
<30% SOC

Description: 1/LIC 103450 SC PCM S WC

Order # 56429 201 016

Product Information

1/LIP 103450 SC PCM S WC
VKB 56429 201 016

1. GENERAL
Li-Ion Battery Pack in shrink sleeve including safety circuit and wire connector
Cell LIP 103450 SC

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

2. ELECTRICAL SPECIFICATION

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

CELL PROTECTION


Overcharge Detection	▶ 4.275V ± 25mV (0.98 to 1.4sec. delay, resume 4.075V ± 50mV, remove charge current)
Overdischarge Detection	▶ 2.30V ± 50mV (30 to 46msec. delay, resume 2.3V ± 100mV @ charge current)
Overcurrent Detection	▶ 5.2A to 8.0A (7.2 to 11msec. delay)

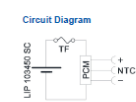
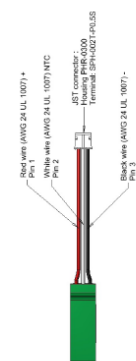
3. AMBIENT CONDITIONS

Temperature Range	▶ 0 to +45°C
• Charge	▶ -20 to +50°C
• Discharge	▶ -20 to +50°C
• Storage Temperature	▶ 1 year at -20 to +20°C > 80% ▶ 3 months at -20°C to +45°C > 80% ▶ 1 month at -20°C to +50°C > 80%
• Humidity	▶ 65 ± 20%/RH


4. ENVIRONMENTAL AND SAFETY
Please follow VARTA Handling and Safety Precautions for L-Ion & LiPolymer.
The cell used is a UL recognized component according to UL1642 and UN38.3 certified.
This battery meets the requirements of Battery Directives and the battery parts are RoHS-Compliant.

Minimum Order Quantity: 500 pcs / Order Multiples: 100 pcs - Product for OEM customers only!



VARTA Storage GmbH, Rev. No. 201403 31/MSA 4.0/ST



Power Pack Solutions

VARTA Storage GmbH

