54Ah 304Wh/kg High-Rate Solid-State Cell

Key Specifications

Capacity	54Ah	Voltage	3.6V
Model	PP54N-E	Operating Temp	-43–65°C

Product Overview

Model Number	PP54N-E
Classification	High Energy Density, High-Rate Solid-State Cell
Chemical Materials	Solid-state lithium-ion cell
Cell Structure	Pouch cell
Nominal Capacity (Ah)	54
Nominal Voltage (V)	3.60
Cell Weight (g)	657
Energy Density (Wh/kg)	304
Max. Continuous Charge Rate	2C
Max. Continuous Discharge Rate	3C
Max. Pulse Charge Rate	3C
Max. Pulse Discharge Rate	10C
Operating Temperature (°C)	-43°C to 65°C
Dimensions (T×W×H, mm)	8.5×142×232

Test Conditions and Performance Data

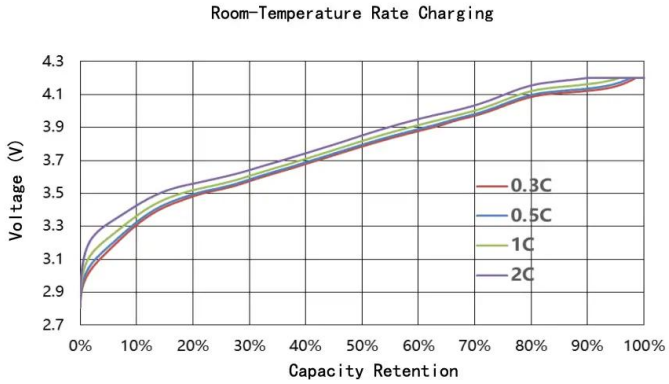
PP54N-E electrical data is measured under controlled standard-atmosphere conditions: 25±3°C, 20%–80% relative humidity, and 86–106kPa atmospheric pressure. Test instruments and equipment are calibrated and verified within their valid calibration periods.

Test Item	Condition / Result
Nominal Capacity	54.0Ah at 0.3C discharge, 25±3°C
Nominal Voltage	3.60V at 0.3C discharge, 25±3°C
AC Internal Resistance	≤0.7mΩ at 1kHz
Standard Charge Method	0.3C constant-current charge to 4.2V, then 4.2V constant-voltage charge until current is ≤0.05C
Standard Discharge Method	0.3C constant-current discharge to 2.5V cutoff at 25±3°C
Maximum Continuous Charge Rate	2.0C at 25±3°C
Maximum Pulse Charge Rate	5.0C for 30s at 25±3°C, SOC ≤50%
Maximum Continuous Discharge Rate	3.0C at 25±3°C
Maximum Pulse Discharge Rate	10.0C for 30s at 25±3°C, SOC ≥80%
Discharge Cutoff Voltage	2.5V at T>0°C; 2.0V at T≤0°C
Recommended SOC Window	10%–90%
Charging Temperature	0°C to 45°C; current limits subject to technical agreement

Discharging Temperature	-43°C to 55°C; current limits subject to technical agreement
Cell Weight	653±10g
Cell Enclosure Material	Aluminum-plastic film

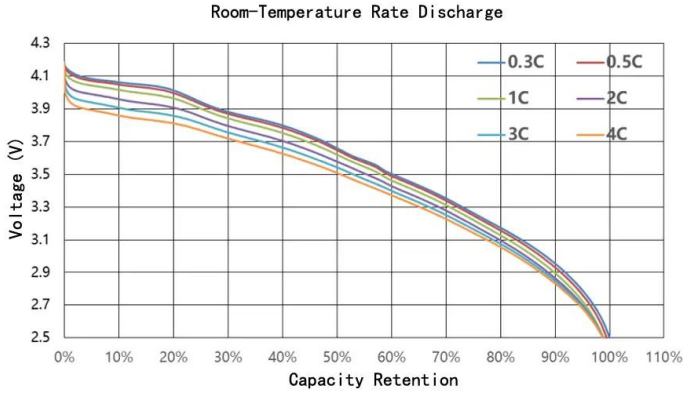
Rate Charge Performance

The room-temperature charge curve compares 0.3C, 0.5C, 1C, and 2C charging profiles up to 4.2V. The published 2C continuous charge rating applies at 25±3°C; final charging limits for a complete battery pack must also account for pack thermal design and BMS control.



Rate Discharge Performance

The room-temperature discharge curve compares 0.3C, 0.5C, 1C, 2C, 3C, and 4C test profiles down to the specified cutoff voltage. The PP54N-E continuous discharge rating is 3C. The 4C trace is presented as test data and is not a continuous-discharge rating.



Storage Conditions

For short-term storage of up to one month, store the cell at -20°C to 45°C and relative humidity of 90% or below. For long-term storage of up to one year, store at 0°C to 35°C and relative humidity of 70% or below.

Other Cells in the High Energy Density High-Rate Solid-State Series

PT18N-EB	18Ah	3.55V	206g	2C/5C	3C/10C	-43°C~65°C	7.0×74×172mm
PT22N-EB	22Ah	3.55V	250g	2C/5C	3C/10C	-43°C~65°C	8.5×74×172mm
PT25N-EB	25Ah	3.55V	285g	2C/5C	3C/10C	-43°C~65°C	9.6×74×172mm
PT28N-EB	28Ah	3.55V	313g	2C/4C	3C/10C	-43°C~65°C	10.5×74×172mm
PT30N-EB	30Ah	3.55V	334g	2C/4C	3C/10C	-43°C~65°C	11.3×74×172mm
PE30N-EB	30Ah	3.60V	336g	2C/4C	3C/10C	-43°C~65°C	8.8×87×187mm
PE32N-EB	32Ah	3.60V	366g	2C/3C	3C/10C	-43°C~65°C	9.6×87×187mm
PE36N-EB	36Ah	3.60V	404g	2C/3C	3C/10C	-43°C~65°C	10.5×87×187mm
PE40N-EB	40Ah	3.60V	450g	2C/3C	3C/10C	-43°C~65°C	11.6×87×187mm
PE40N-PB	40Ah	3.50V	427g	3C/5C	5C/15C	-43°C~65°C	11.4×87×187mm
PK50N-EB	50Ah	3.55V	568g	2C/4C	3C/10C	-43°C~65°C	10.3×105×230mm
PP45N-E	45Ah	3.60V	548g	2C/4C	3C/10C	-43°C~65°C	7.2×142×232mm

PP54N-E	54Ah	3.60V	657g	2C/3C	3C/10C	-43℃~65℃	8.5×142×232mm
PP65N-E	65Ah	3.60V	777g	2C/3C	3C/10C	-43℃~65℃	9.9×142×232mm
PT30N-EC	30Ah	3.50V	308g	1C/3C	2C/6C	-43℃~65℃	10.5×74×172mm
PE40N-EC	40Ah	3.50V	410g	1C/3C	2C/6C	-43℃~65℃	10.8×87×187mm

Solution

High-energy cells are often selected for flight time first and current delivery second. That becomes a problem when a platform needs both: a large energy reserve for endurance, stable continuous output under load, and a short high-current pulse during takeoff, climbing, manoeuvring, or payload changes. Oversizing the pack to compensate adds mass and reduces the value of the higher-energy cell.

The PP54N-E is a 54Ah solid-state pouch cell built for that design window. With 304Wh/kg energy density, 3C continuous discharge capability, and up to 10C pulse discharge, it gives integrators a practical starting point for high-energy systems that still need controlled high-rate output. Its -43°C to 65°C operating range also supports projects with demanding ambient-temperature requirements. Explore LiTrue's wider range of battery cells or contact our engineering team to discuss pack configuration and validation requirements.

Application Areas

- Heavy-Lift UAVs: 54Ah capacity and 304Wh/kg energy density help system designers balance flight endurance against airframe weight, while 10C pulse discharge supports high-demand flight phases.
- High-Altitude and Cold-Climate UAV Platforms: the stated -43°C to 65°C operating range makes the PP54N-E relevant for projects that must evaluate cell performance beyond standard ambient conditions.
- eVTOL and Electric Aviation Development: suitable for engineering evaluations where high specific energy and controlled continuous/pulse power delivery are both design priorities.
- Portable Industrial Power Systems: the large-format pouch design can support custom battery-pack development where runtime, mass, and short-duration peak power must be considered together.

- Custom Battery Pack Programs: LiTrue can help integrators assess series-parallel configuration, thermal design, and application requirements through its custom battery pack development capability.

FAQs

What is the continuous and pulse discharge capability of the PP54N-E?

The PP54N-E is rated for 3C maximum continuous discharge and 10C maximum pulse discharge. C-rate expresses current relative to cell capacity; for a 54Ah cell, 1C equals 54A. Final pack current must also account for thermal design, interconnect resistance, BMS limits, and the actual duty cycle.

Can this cell be used in a 48V-class battery system?

Yes. At 3.60V nominal, a 14S configuration is approximately 50.4V nominal before considering the full operating-voltage window. The final series-parallel design should be confirmed against the equipment voltage range, required usable energy, peak current, and protection requirements.

Is the PP54N-E suitable for low-temperature applications?

It is specified for operation from -43°C to 65°C. Actual available capacity, power capability, charging limits, and heating requirements at the temperature extremes must be confirmed for the intended duty cycle and pack design.

What information is needed to select the right pack configuration?

Provide the target system voltage, required usable energy, continuous and peak current, operating-temperature range, space and weight limits, and expected mission profile. LiTrue's applications team can use this information to evaluate a suitable series-parallel configuration.

Are samples and shipping documents available?

Sample availability, production MOQ, transport documentation, and applicable certifications depend on the project and destination. Contact LiTrue with your required quantity, delivery market, and validation plan so the correct documentation can be confirmed before shipment.