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Custom Lithium Ion / Polymer Batteries & Battery Pack Assemblies

Cornerstone manufactures high quality, high performance custom lithium ion (Li-ion) and lithium polymer battery packs and assemblies. Using advanced mechanical and electronic design tools, our expert battery design team will optimize your battery packs for better manufacturability, safety, and reliability, giving you the most dependable and cost effective custom lithium ion packs for your needs.

Request a quote on custom the custom lithium ion/polymer batteries and battery pack assemblies your application requires. Or, contact Cornerstone to discuss your battery pack specification.

Custom Lithium Ion Battery Packs (Li-Ion Batteries)

Lithium ion (Li-ion) battery packs are an advanced chemistry that provides increased performance over nickel- or lead-based chemistries at a price premium. Li-ion and lithium polymer batteries can have as much as twice the energy density of NiCd (nickel cadmium) batteries, have relatively low self-discharge rates, and are capable of high discharge currents.

Lithium Battery Pack Chemistries

Custom lithium battery packs are available in several chemistries:

- Lithium cobalt oxide provides the greatest energy density
- Lithium manganese offers greater safety with lower energy density than lithium cobalt oxide
- Lithium iron phosphate provides high discharge rate capabilities, as well as long cycle and calendar life

- Mixed cathodes can be used to optimize lithium rechargeable cells' specific performance characteristics

Technical Specifications

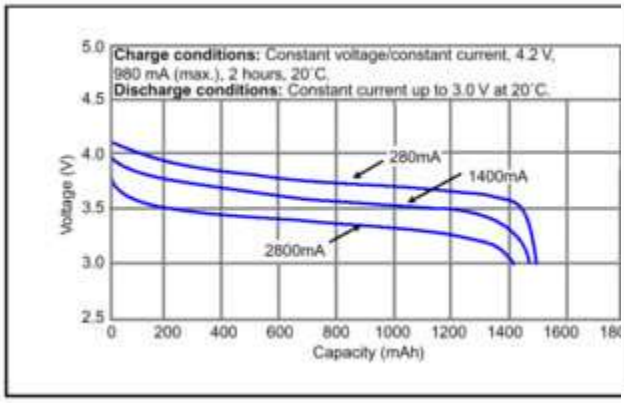
- Cell voltage: 3.2 – 3.7V (nominal)
- Capacity: 500mAh to 5000mAh
- Energy by volume: 270 Wh/L to 324 Wh/L
- Energy by weight: 105 Wh/kg to 130 Wh/kg
- Cycle life: 300 – 1000 cycles
- Self-discharge rate: approx. 10% per month
- Operating temperature range: -20°C to 60°C
- Preferred charge method: constant voltage/constant current
- Size: variable
- Applications: military, industrial, medical, consumer electronics

Note: Because of lithium's inherent volatility and lithium ion's high energy density, all custom lithium ion battery packs and cells require a special control circuit to manage the upper and lower voltage thresholds and to regulate operating currents and temperatures during charge and discharge.

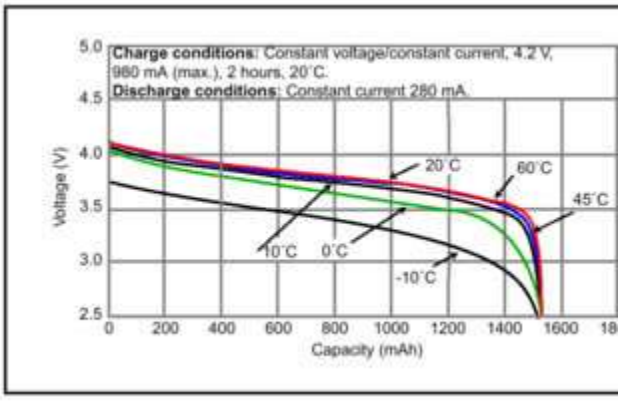
Charge/Discharge Characteristics

In general, lithium ion charge circuits are of two-stage constant current/constant voltage design. Fully discharged cells take constant current charges at a rate of 1C (1x the rated capacity), until reaching their set voltage of between 3.6 and 4.2 volts (depending on specific chemistry), a process which takes approximately one hour. The batteries' chargers then switch to constant voltage, with the current tapering off until the batteries are fully charged—approximately another two hours. The entire charging process is a fairly fast one, at about three hours. Lithium ion batteries may be removed from charge

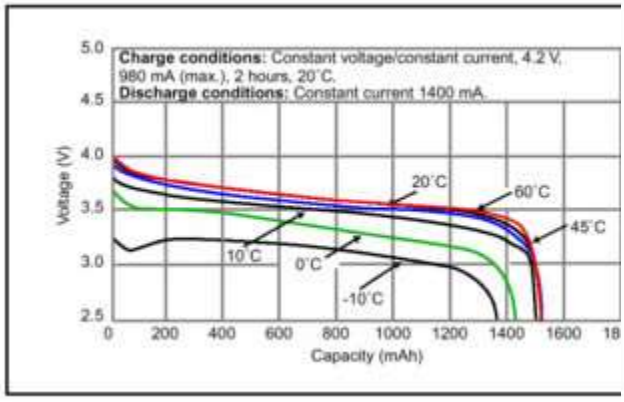
before they're fully charged, with no side effects. However, Li-ion batteries cannot be trickle charged, as they do not tolerate overcharge conditions.



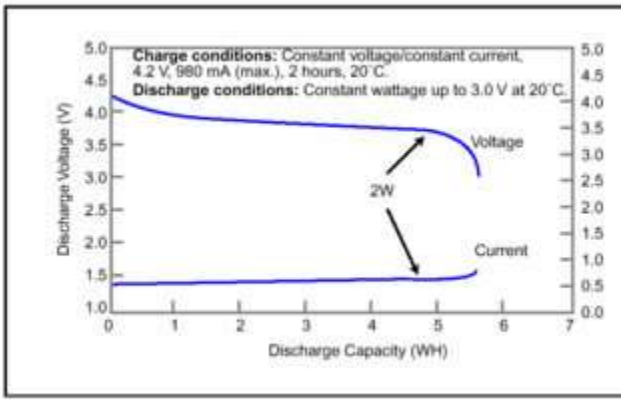
Discharge Characteristics for a Typical Li-ion 18650 Cell



Discharge Vs. Temperature Characteristics for a Typical Li-ion 18650 Cell



High Rate Discharge Characteristics for a Typical Li-ion 18650 Cell



Voltage Vs. Current Discharge Characteristics for a Typical Li-ion 18650 Cell

Custom Lithium Polymer Battery Packs

Lithium-ion-polymer batteries differ from lithium-ion batteries only in construction—it is not a unique and different chemistry. Li-polymer can be created in an array of chemistries, the most widely used of which is Li-cobalt. The difference in construction over conventional li-ion cells allows for lower cost, safer operation, and flexible packaging options; these custom lithium battery packs can be as thin as a credit card.

These factors make custom lithium polymer battery packs and battery assemblies an increasingly popular choice for a wide range of applications.

- Cell voltage: 3.2 – 3.7V (nominal)
- Capacity: 500mAh to 3000mAh
- Energy by volume: 250 Wh/L
- Energy by weight: 120 Wh/kg
- Cycle life: 500+ cycles
- Self discharge rate: approx. N/A
- Operating temperature range: -20°C to 60°C
- Preferred charge method: constant voltage/constant current
- Applications: audio-visual equipment, cellular phones, office automation, notebook PCs, PDAs, handheld devices

Contact Us for Custom Lithium Battery Packs

We are the experts in custom lithium ion/polymer batteries and battery pack assemblies. Request a quote today or contact Cornerstone to discuss your custom requirements.