

Rechargeable lithium-ion battery

VL12 V - Very high power cell

Optimized for 2 C to 100 C continuous discharge or up to 250 C pulse power



Benefits

- Excellent power density and specific power
- Power capability at cold temperature
- 100% columbic efficiency
- Completely maintenance-free
- Operates in any orientation
- Long cycle life:
 - > 80% of initial capacity remaining after 2,000 cycles at 100% DOD
 - > 500,000 cycles during shallow cycling (50% SOC Δ ~3% DOD)
- Projected 15 years calendar life for military hybrid electric vehicle applications
- No memory effect
- Integral safety vent

Main applications

- Military hybrid electric vehicles
- Very high pulse power applications
- Defense

Key features

- Graphite-based negative
- Nickel-oxide based positive
- Hermetically-sealed cells
- Sold only as assembled batteries
- Incorporating electronics for performance efficiency:
 - Charge/floating/discharge management
 - Cell balancing

Cell electrical characteristics

Nominal voltage	3.6 V
Nominal capacity at C rate at 4.1 V/2.5 V & 25° C	12 Ah
Maximum discharge current at 25° C:	
Continuous	1,500 A
2 s Pulse	2,200 A
100 ms Pulse	3,200 A
Specific energy	74 Wh/kg
Energy density ¹	175 Wh/l
Specific power at 25° C, 100% SOC (2.5 V)	6,000 W/kg*
	8,000 W/kg**
	12,000 W/kg***
Power density ¹ (25° C/peak pulse/100% SOC)	14,000 W/l*
	19,000 W/l**
	29,000 W/l***
2 s pulse at -30° C at 50% SOC (1.9 V)	2,150 W/kg

Cell mechanical characteristics

Diameter max	47 mm
Height max ¹	173 mm
Mass max	0.64 kg
Volume max ¹	0.27 l

Cell operating conditions

Lower voltage limit for discharge:		
Continuous (- 20 C to + 45 C) pulse		2.5/2.0 V
Pulse		1.9 V
Charging method	Constant current/Constant voltage (CCCV)	
Charging voltage	4.1 \pm 0.04 V	
Recommended continuous charge current at 25° C	C/1 (2.5 hours)	
End of charge detection	100 mA	
Total charging time:		
15 C (80% SOC)		20 minutes
5 C (85% SOC)		50 minutes
Operating temperature	Charge	+ 5° C to + 35° C
	Discharge	- 40° C to + 60° C
Storage and transportation temperature	- 50° C to + 65° C	

¹Includes terminals

* 18 s pulse (2.5 V)

** 2 s pulse (2.5 V)

*** 200 ms pulse (2.5 V)

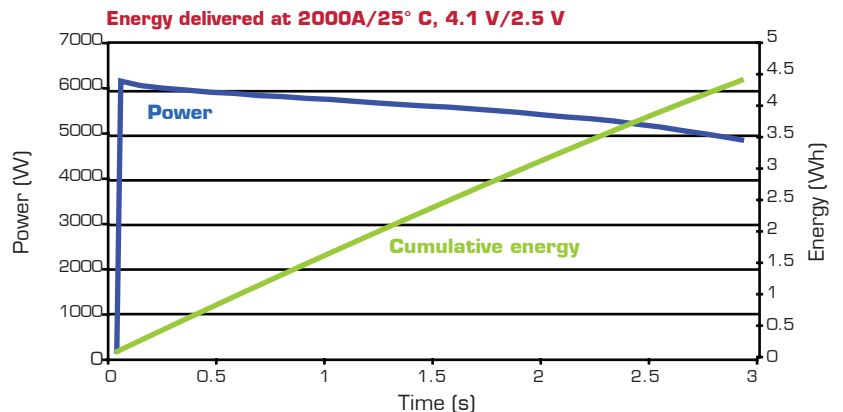
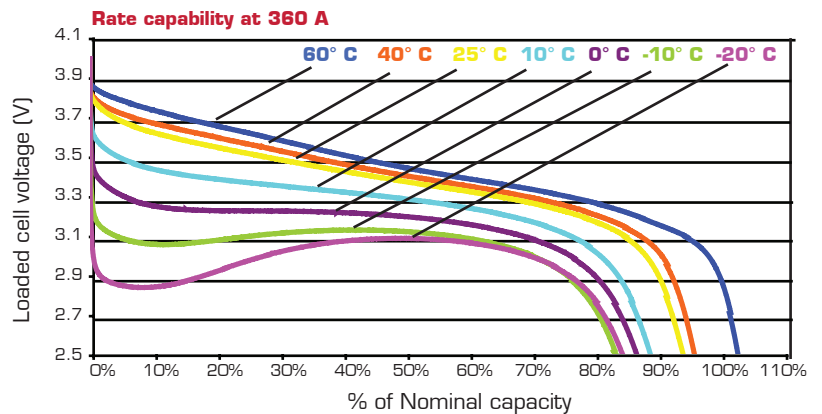
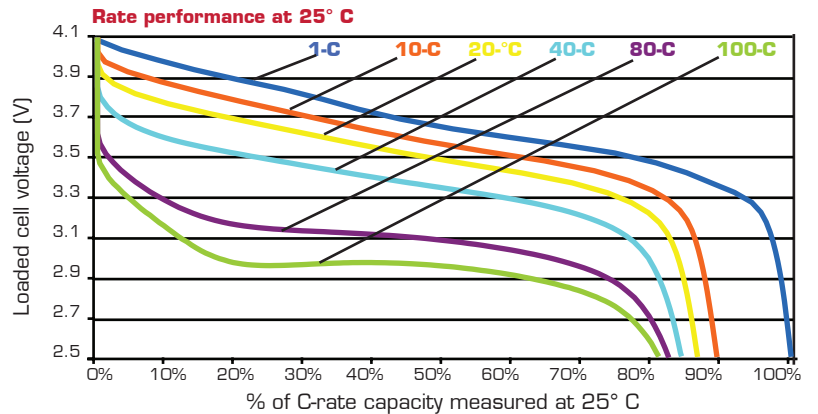
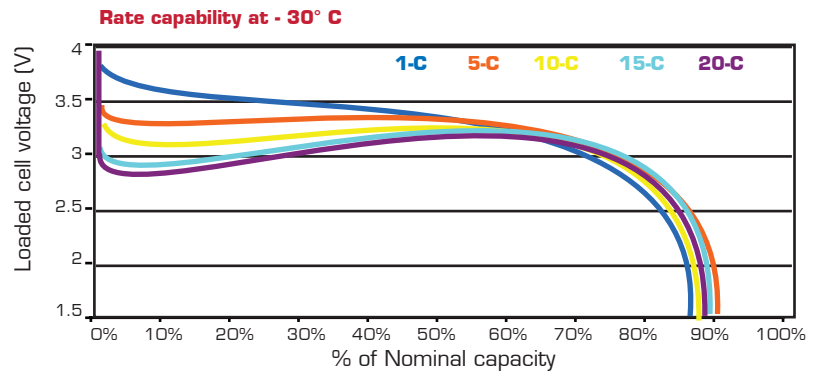


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VL12 V

Battery-level safety

- Incorporation of several levels of redundant safety features to prevent abuse conditions such as overcharge, over-discharge, and short-circuit including:
 - Battery protection controller at battery pack level
 - CANProbe at module level
 - Vent and shutdown separator at cell level



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