



**BA-06**



## SUMMARY

As thin as 9 millimeters thick, the EXA BA06 High Energy Density Battery Array is a family of power store/delivery devices designed to provide the highest energy capacity and redundancy: From a minimum of 26Whr to a maximum of 84Whr per bank. All BA06 modules have integrated dual chargers at 2C or 4C. BA06 enables your system to perform longer and better and pack more power than a similar sized satellite, the double-sided arrays are user-configurable to output 3.7V or 7.4V. With three variant base battery cells and single- or double-sided options, all our batteries are fully customizable to your mission's needs in terms of output, cable, connectors or interfaces. Options are available as integrated Carbon Nanotubes Thermal Transfer Bus (CN/TTB) shield which allows missions to reuse the spacecraft self-generated heat, embedded redundant thermal sensors and embedded redundant active heaters.

## DESCRIPTION

The BA06 battery family is a semi-independent battery module with integrated chargers, this liberates you to select whatever EPS system you like or already have and supercharge it in order to obtain the best from any product you may have selected without compromising your system standards, the BA06 family can integrate with almost any EPS system actually in the market. When coupled with our DSA family of deployable solar arrays based on artificial muscles, the BA06 batteries are capable to provide even longer mission lifetimes, as our own satellites can attest: Almost 4 years in orbit and still working.

Every array is tested and qualified in our own facilities and shipped with full reports and packed with additional match connectors interfaces. Check the paper in the documents section of the product to know more about in-orbit test results and the engineering of the batteries, the BA0X family has flight heritage since 2013 in 4 missions.



## FEATURES

- Very thin versions available: only 9 mm single-sided and 25 mm double-sided
- Very high energy density cells can power from 1U to 27U missions
- Unique containment technology prevents swelling of the cells in a vacuum
- The double-sided arrays can be used as serial or parallel (3.7V or 7.4V) user configurable
- Perfectly coupled with our DSA Deployable Solar Arrays
- Multiple redundant cells ensure mission survivability
- Embedded redundant thermal sensors
- Embedded redundant active heaters.
- Multiple BA06 can be connected in series or parallel enabling ultra-high-power missions.
- Designed for LEO missions and requirements
- Stand-alone charge port available.
- High discharge capable for deep cycle payloads.
- Flight heritage positive TRL9 since 2013
- Tested and qualified for more than 10 years.
- Manufactured with space grade materials according to space standards and custom mission design.
- Functional, performance, thermal bake out and vibration tests provided with documentation.
- Compatible with ISIS and Pumpkin Structures and compliant to CubeSat Standard
- Charging cables provided by default and custom Interface available.

## PERFORMANCE

- Supply Voltage: 3.7V nominal, 4.2V at full charge for parallel or 7.4V ~ 8.4V for serial models
- Supply Current: 6.2A/8A/10A/12.4A/16A/20A depending on the model
- Typical internal resistance: 1 to 7 milliohms @ 25°C
- High discharge rate: 10 times the nominal capacity within 2 seconds
- High-speed charge rate: 3 times the nominal capacity



## PRODUCT PROPERTIES

Variant	Power Output	Capacity	V@A	Dimensions (LxWxH)	Mass
BA06 A/S	26Whr	6200mAh	4.2V	90x96x9 mm	209.45
BA06 A/DP	52Whr	12400mAh	4.2V	90x96x19 mm	256.44
BA06 A/DS	52Whr	6200mAh	8.4V	90x96x19 mm	256.44
BA06 B/S	33.6Whr	8000mAh	4.2V	90x96x12 mm	227.78
BA06 B/DP	67.2Whr	16000mAh	4.2V	90x96x12 mm	227.78
BA06 B/DS	67.2Whr	8000mAh	8.4V	90x96x25 mm	291.56
BA06 C/S	42Whr	10000mAh	4.2V	100x96x9 mm	216.70
BA06 C/DP	84Whr	20000mAh	4.2V	100x96x19 mm	270.56
BA06 C/DS	84Whr	10000mAh	8.4V	100x96x19 mm	270.56

- **Operating Temperature:**

- - 30 to +80°C w/o CN/TTB option
- - 60 to +120°C with CN/TTB option

- Radiation Tolerance: 2 years minimum in LEO, 4 years minimum when the S/C has NEMEA shielding



## MATERIALS

- Base panel: FR4-Tg170
- Shielding: Optional integrated Carbon Nanotubes Thermal Transfer Bus (CN/TTB) shield
- Cell Material: Lithium polymer
- Cell Interconnector: Invar Silver plated copper
- **Interfaces:**
  - Custom choice, normally Molex PicoBlade/PicoSpox inline 2 pin/4 pin connector with gold plated contacts or SAMTEC multi pin gold coated interface
  - PTFE (Teflon) space grade cables, multi strand, silver plated copper (AWG22 to AWG24)

## TESTING

All batteries are provided with tests reports regarding the following tests:

Test	QT	AT
Functional	✓	✓
Vibration	—	✓
Thermal Cycling	—	✓
Thermal Vacuum	—	✓
Cable/Connector integrity	✓	✓
Polarity	✓	✓
Performance	✓	✓
Freezing/Overheating	✓	✓

- Thermal Bake out (10E-7 mbar @ 50C for 24 hours)
- Full vibration test for Dnepr and Long March 2D vibration profiles, other LV profiles available upon request
- QT and AT is performed on the unit to be shipped at no charge.



## CONFIGURATIONS

BA06 A/S	€
BA06 A/DP – BA06 A/DS	€
BA06 B/S	€
BA06 B/DP - BA06 B/DS	€
BA06 C/S	€
BA06 C/DP - BA06 B/DS	€

## EXTRA OPTIONS

Optional Integrated Carbon Nanotubes Thermal Transfer Bus (CN/TTB) Shield	500€
Optional Embedded Redundant Thermal Sensor	200€
Optional Embedded Redundant Active Heater	500€



## FIGURES

