



DESCRIPTION

The ISIS Electrical Power System (iEPS) is the second-generation compact power system for nanosatellites. It is an off-the-shelf Electrical Power System available in three standard configurations (Type A/B/C), ideal for powering 1U – 3U Cubesats. The system leverages wide bandgap semiconductor technologies, implementing GaN-FETs to improve solar power conversion efficiency and performance. It is equipped with an integrated heater, hardware-based Maximum Power Point Tracking (MPPT) and hardware voltage and over-current protection. The iEPS provides 3.3V and 5 V regulated buses, as well as an unregulated bus. An add-on daughterboard allows additional configurations to suitably power the system and payload instruments.

FEATURES

- Compact solution – one PC104 form factor board, ideal for 1U-3U sized platforms
- Communication over I²C, UART for testing
- FRAM-based MCUs for improved radiation tolerance
- Low (idle) power consumption, dedicated emergency low power mode for EPS survivability
- Hardware voltage, over-current protection and hardware-based maximum power point tracking
- Hardware Supervisor including Watchdog
- Solar Panel interface utilizes GaN-FETs
- Allows customizations through mountable daughterboard

CONFIGURATIONS AND OPTIONS

Type A: iEPS board and a pack of 2 batteries

Type B: iEPS board, daughter board and a pack of 4 batteries

Type C: iEPS board only

- Allows customization through mountable daughterboard, provides the following voltage domains:
 - VD10: Unregulated voltage with one output channel
 - VD11: Custom voltage lower than VD10, one output channel
 - VD12: Set to 5V with 4 output channels. Voltage can be customized to any voltage lower than VD0.
- Daughter board enables ISIS AntS2.0 interface and ISIS solar panel data interface and readout

PRODUCT PROPERTIES

Mass	Type A 184 ± 5 grams (2 cell battery pack) Type B 310 ± 5 grams (4 cell battery pack) Type C 360 ± 5 grams (4 cell battery pack + daughterboard)
Volume	Type A 96 x 92 x 26.45 mm (PCB and top battery) Type B 96 x 92 x 11.34 mm (PCB B only) Type C 96 x 92 x 15.95 mm (PCB C only) Type B/C 94.4 x 89.3 x 21 mm (4-Cell Battery Pack)
Operating temperature range	-20°C to +60°C
Power delivered	20W @ 5V over 4 channels
Energy storage	6300mAh/22.5Wh (Type A) 12800mAh/22.5Wh (Type B/C)

PERFORMANCE

Output voltage domains	VDO: 5V VD1: 3V3 VD2: user selectable (model B with Daughter board)
Main bus organization	Unregulated bus
Functional protection	Emergency Low Power Mode (when Bus voltage low) Hardware Supervisor including Watchdog Firecode stack reset capability On board housekeeping measurement
Electrical protection	Overcurrent/thermal limit on Unit input on each output bus channel: - overcurrent/thermal protection - reverse current protection
Communication interface	I²C

QUALIFICATION AND ACCEPTANCE TESTING

Test	QT	AT
Functional	✓	✓
Vibration	✓	-
Mechanical Shock	✓	-
Thermal Cycling	✓	✓
Thermal Vacuum	✓	-
*QT is performed on the design/qualification model		
*AT is performed on the unit to be shipped		

This document is subject to change without notice. Latest information is on www.isispace.nl

