

DATA CENTER POWER SOLUTIONS

AC-DC SOLUTIONS | DC-DC SOLUTIONS



PRECISION | POWER | PERFORMANCE | TRUST



Data Center Power Solutions

Accelerate, Improve, and Enhance the
Capabilities of Your Next System Design

Your Global Partner for Data Center Power Supplies

As one of the largest power supply companies in the world, Advanced Energy has extensive experience designing and manufacturing advanced power solutions for data center, enterprise, telecom, industrial, and medical applications. Our ability to design power conversion solutions for your specific needs is unmatched.

Advanced Energy's innovations for hyperscale and cloud computing data centers optimize efficiency and power density to reduce the total cost of ownership.

Contact your Advanced Energy sales representative to learn how you can reduce operating costs for your data center. Our dedicated research and development and operations teams ensure swift deployment and stable operations for your program needs.

Benefits

- OCP Compliance
- High Reliability
- High Quality
- High Efficiency
- High Density
- Broadest Portfolio
- Versatile Designs
- In-house Manufacturing
- Custom Designs
- Fluid Cooling

Portfolio

- Power Shelves
- Battery Backup Modules
- Cooling Modules
- PDU Solutions
- PDB Solutions
- HVDC Solutions
- M-CRPS Solutions



Power Supply Design Controls

Advanced Energy uses the latest design methodologies and techniques to ensure that our power supplies meet the rigorous quality and reliability requirements of hyperscale data centers.

Reliability Models and Predictions

- Sophisticated modeling enables us to predict design reliability in terms of mean time between failures (MTBF) using Telcordia, Bellcore, or MIL-HDBK-217F.
- We provide design tradeoff analysis and a review of part stress derating performance.

Failure Modes and Effect Analysis

- Our analytical techniques enable us to identify, review, and mitigate failure modes, their causes, mechanisms, and effects.
- We provide a formal risk assessment to reduce field failures at the customer site.

Derating Analysis

We implement custom or industry standard derating guidelines to predict and reduce the failure rate of the power supply.

Component Selection

- We maintain a database warehouse of all component information.
- Our design engineers only select components rigorously approved from suppliers that have undergone strict qualification and auditing processes.

Design for Manufacturability

Our internal design rules related to manufacturability ensure consistency and highest quality in the production process.

Common Firmware Platform

- Our rapid prototyping capability and fast firmware development help improve time to market.
- Modules are produced, tested, reviewed, and revised, resulting in remarkable quality.

Advanced Energy Computer-Aided Engineering Tools Simulation Analysis

- Thermal Simulation
- Circuit Simulation
- EMI Field Simulation
- Detailed Mechanical Design
- PCB Layout and Tracking
- Structural Simulation

Power Solutions for Data Center Racks

Advanced Energy power supplies offer architectural simplicity for rapid deployment, making them the ideal for hyperscale and cloud computing data centers.

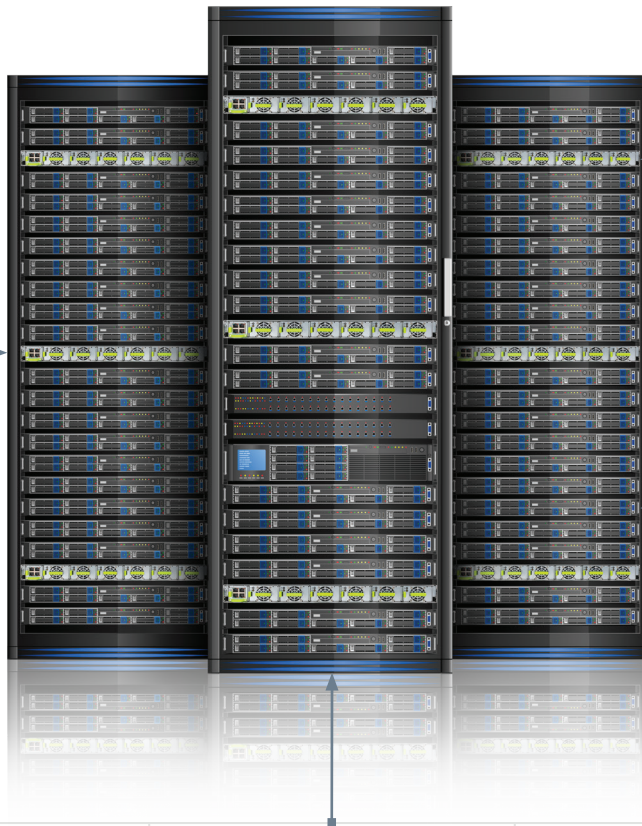
Expertly designed power shelves:

- OCP compliant
- > 97.5% peak efficiency
- Designed for AI/machine learning applications
- State-of-the-art dynamic performance for GPU loads
- Enable 1 MW hyperscale racks and beyond



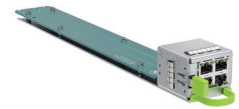
POWER SUPPLY UNITS

Our supply units are engineered to deliver industry-leading efficiency and dynamic power responsiveness, creating less burden on the AC power infrastructure of your data center.



POWER SHELVES

Our power shelves are OCP compliant. They can be operated in parallel to deliver up to 1 MW of power.



POWER SHELF COMMUNICATION AND CONTROL

State of the art PSU and BBU control supports multiple communication protocols.



DC-DC BMP SOLUTIONS

Our DC-DC converter portfolio supports isolated and non-isolated architectures for scalable power delivery across compute and storage systems. Designed for 48 to 12 V conversion with up to 98% peak efficiency, our solutions feature compact footprints and strong thermal performance for high-density environments.



DC-DC PSU SOLUTIONS

Our DC-DC PSU portfolio supports 48 VDC input options in standard M-CRPS and CRPS form factors to provide design flexibility for evolving hyperscale and enterprise data center environments.



AC-DC PSU SOLUTIONS

Our M-CRPS PSUs are OCP-compliant and enable high-density, high-efficiency designs. Our broad portfolio offers 12 and 54 V output voltage options, with power levels ranging from 550 to 3600 W. CRPS solutions also are available.

Power Shelf Solutions

Advanced Energy power shelves can be populated with power supplies from our standard product range, allowing you to configure a rack scale power system to suit your data center applications. A rack

management controller (RMC), also known as a *shelf management controller*, provides monitoring and control functions via the data center management network.



18 kW, 48 V ORv3 Power Shelf

- > 97.5% efficiency PSUs
- 18 kW output (15 kW N+1)
- Six 3 kW PSU modules
- 21 in rack, 10U height
- Supports AC and DC input
- Hot-swappable PSUs
- RMC for management
- OCP compliant



33 kW, 48 V ORv3 Power Shelf

- > 97.5% efficiency PSUs
- 33 kW output (33 kW N+1)
- Twelve 5.5 kW PSU modules
- 21 in rack, 10U height
- AC and DC support
- Hot-swappable PSUs
- RMC for management
- OCP compliant



72 kW, 48 V ORv3 Power Shelf

- > 97.5% efficiency PSUs
- 72 kW output (72 kW N+1)
- Twelve 12 kW PSU modules
- 21 in rack, 10U height
- AC and DC input support
- Hot-swappable PSUs
- RMC for management
- OCP compliant



HVDC Input 100 kW Power Shelf

- > 98% efficiency PSUs
- PSU rating 18 kW
- 6 PSU modules
- 21 in rack, 10U height
- Hot-swappable PSUs
- PMM for management



HVDC Input 160 kW Power Shelf

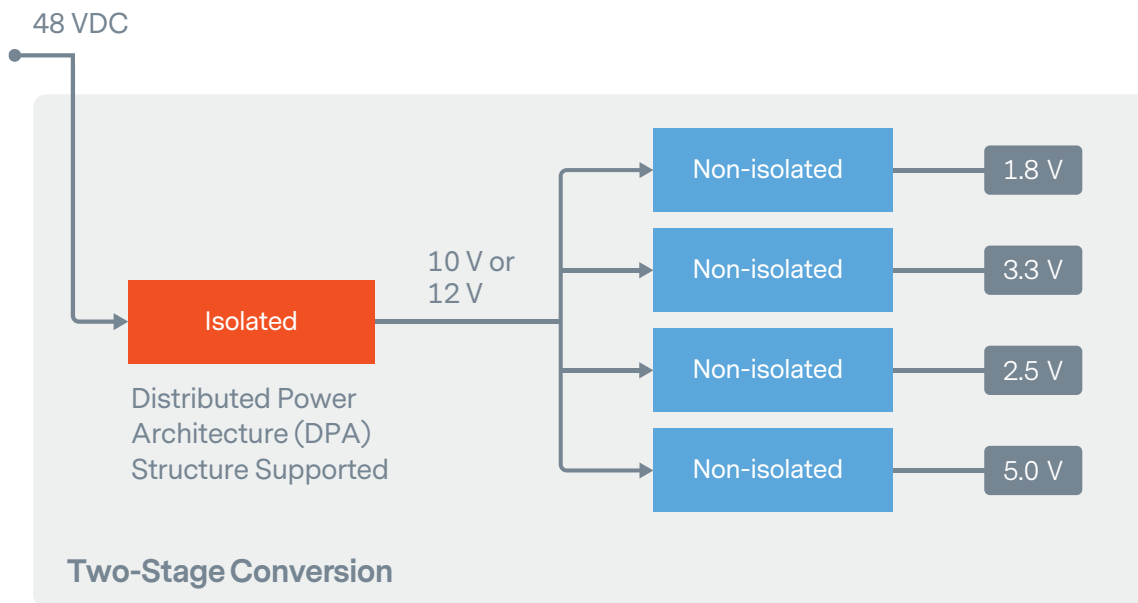
- > 98% efficiency PSUs
- PSU rating 18 kW
- 11 PSU modules
- 42 in rack, 10U height
- Hot-swappable PSUs
- PMM for management

Board Mount Power Products

Advanced Energy's portfolio of DC-DC board mount power products comprises modules that support the conventional two-stage conversion power converter architecture. All have a digital PMBus® interface for digital control and monitoring, as well as high power conversion efficiency for high power density.



- The bus converters (48 to 12 V), either isolated or non-isolated
- The non-isolated point-of-load POL type



Non-isolated Bus Converters (NIBC)

- Industry 1/4 brick footprint across all modules
- Power ratings of 900, 1300, 1600 W.
- Non-isolated, highest efficiency 48 V:12 V power conversion of up to 98%
- Digital control and interface



NDQ900



NDQ1300



NDQ1600

Isolated Bus Converters (IBC)

Isolated 12 Vout 1/8 and 1/4 Bricks

- 1/8 brick: 300 W and 550 W
- 1/4 brick: 500 W, 600 W, 700 W, 800 W, and 1300 W
- Digital control and interface
- Up to 97.5% efficiency

ADO550



BDQ1300



Point of Load (POL)

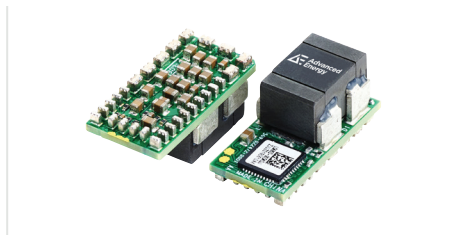
LGA110D, LGA80D, and LGA50D Non-Isolated

- 220 A per in² current density
- Flexibility of use with digital/analog control
- Wide-range output (0.6 to 5.2), dual independent channel
- Stackable up to four (4) units:
 - 440 A for LGA110D
 - 320 A for LGA80D
 - 200 A for LGA50D

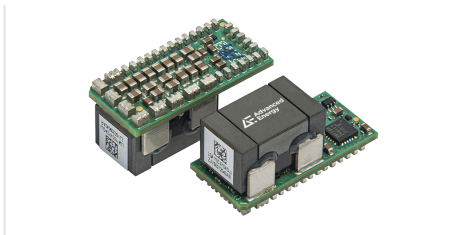
LGA50D



LGA80D



LGA110D



Industry Standard Power Supply Options

Industry standard form factors for computing, storage, and networking needs

Industry Standard Features

- Titanium-level and platinum-level 80 plus efficiency certified
- AC input (highline and lowline) and -48 VDC input options
- 12 Vout and 54 Vout options
- 550 to 3600 W
- OCP compliant M-CRPS power supplies
- N+1 or N+N redundancy
- Hot-pluggable PSUs
- PMBus® compliant
- Cybersecurity features



M-CRPS

1U x 60 mm x 185 mm

- CST1800AT-3-3M0 (1800 W)

1U x 73.5 mm x 185 mm

- CSU2400AT-3-3M0 (2400 W)
- CSU3200AT-3-3M0 (3200 W)
- CSU3600AT-9-3M0 (3600 W)



CRPS (Titanium)

1U x 73.5 mm x 185 mm

- CSU1600AT-3-100 (1600 W)
- CSU1800AT-3-100 (1800 W)
- CSU2000AT-3-100 (2000 W)
- CSU2400AT-3-100 (2400 W)

1U x 73.5 mm x 265 mm:

- CSU3200ET-3-100 (3200 W)



CRPS (Platinum)

1U x 73.5mm x 185 mm

- CSU550AP (550 W)
- CSU800AP (800 W)
- CSU1300AP (1300 W)
- CSU1800AP (1800 W)
- CSU2000AP (2000 W)
- CSU2400AP (2400 W)



DC-Input

1U x 73.5 mm x 185 mm

- CSU1300ADC (1300 W)
- CSU2000ADC (2000 W)
- CSU3200ADC-3-3M0 (3200 W)

Other Form Factors

1U x 100 mm x 369.5 mm

- CSZ3200FT-9 (3200 W)

1U x 54.6 mm x 321.5 mm

- CSS1500FP-3 (1500 W)

M-CRPS and CRPS Applications

Compute

- AI servers
- Enterprise rack
- Cloud and hyperscale
- High-performance computing (HPC) servers
- Edge data center servers
- Streaming

Storage

- Database
- Cold storage JBOD
- Flash array
- SSD
- OCP open storage

Networking

- Spine/leaf switch
- Top-of-rack (ToR) switch
- SDN switch
- Storage switch
- Data center switch
- Firewall
- Router



Why Work with Advanced Energy?

01 Shorter Time-to-Market

We use modular hardware and software approaches to help drive mature solutions during development. Your custom power solution will benefit from our design experience and years of applied deployments. Our in-house EMI/EMC compliance and safety certification laboratory help speed the product design process.

02 High Reliability

A wide range of on-site environmental testing capabilities ensures Advanced Energy products are designed for quality and reliability.

03 Scalability

Our design philosophy helps drive common platforms that are scalable, programmable, and plug-compatible with our earlier-generation products, enabling quick system changes or enhancements. You can now satisfy most changes in power requirements simply by reprogramming the power supplies — and if your needs change, our scalable platforms allow fast transitions to optimized designs.

04 High Efficiency

We not only design some of the highest efficiency power supplies on the market, Advanced Energy power solutions incorporate best-in-class technology, powerful programming, monitoring, and self-testing software that provides the critical data you need to manage power consumption.

05 Dedicated Project Team

Your power conversion project will be handled by a seasoned and committed team of expert engineers, project managers, and operations professionals to ensure it is delivered on time and on budget.

06 Outstanding Technical Support

Our experienced field application engineers ensure the solution meets your needs. Our dedicated customer application support lab is staffed by power engineering experts and fully equipped to test almost any power supply for almost any application. We test power supply performance in specific situations and provide written application test notes.

07 In-house Manufacturing

Advanced Energy products are backed by state-of-the-art equipment, innovative automation processes, and industry-leading quality.

08 Operational Excellence

We use innovative demand and supply replenishment systems with an uncompromising focus on helping you succeed.




Advanced Energy

NDQ1300



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ABOUT ADVANCED ENERGY

Advanced Energy (AE) has devoted more than three decades to perfecting power for its global customers. We design and manufacture highly engineered, precision power conversion, measurement and control solutions for mission-critical applications and processes.

Our products enable customer innovation in complex applications for a wide range of industries including semiconductor equipment, industrial, manufacturing, telecommunications, data center computing, and medical. With deep applications know-how and responsive service and support across the globe, we build collaborative partnerships to meet rapid technological developments, propel growth for our customers, and innovate the future of power.

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