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Digital DC-DC Power Module



Power management has become a critical issue in telecom, networking and computing applications. The considerations involved go beyond a simple efficiency calculation, requiring developers of data centers, telecom central offices, cloud infrastructure and hyperscale installations to consider factors such as thermal and load management.

Digital control techniques offer you a comprehensive solution to provide monitoring and management functions. Monitoring voltage, current, power and temperature allow you to measure the power demand of the system and actively control the units. These monitoring functions can also be configured to generate warnings if shutdown points are approached, which improves system reliability and can improve up time.

Digital and analog converters have much in common, with similar power switching devices and magnetic structures (inductors and transformers).

However, the vital inner control loop design, which has traditionally been the domain of analog engineers, can now be implemented using digital techniques. Communications, monitoring and control are implemented over the industry-standard PMBus[®] command protocol.

In the design phase, digital control means that a unit can be configured to be optimal for the system/application with far greater flexibility than analog controlled units. In deployment, the power system can dynamically adapt to changes in operating conditions – all in real time.

The movement to a digital distributed power architecture allows much greater flexibility and control in system design, management and monitoring functions.

**300 W, 500 W,
700 W and 1300 W
Isolated Bricks**

**100 W and 200 W
Non-isolated Unit**

**Isolated:
48 V Input**

**Non-isolated:
7.5 – 14 V Input**

**Isolated Brick
Output: 12 V**

**Non-isolated
Output: 0.6 – 5.2 Vdc**

**Standard PMBus
Controlled
Isolated and
Non-isolated Units**

**DOSA
Footprint
Isolated Brick
Form Factor**

Artesyn Digital DC-DC Converters

Digital control and monitoring enables a wide range of functions not typically available when using analog-controlled modules, including application-tailored overcurrent protection limits, temperature warning levels, reporting of fault conditions, modified output voltages, and real-time power and efficiency monitoring, all via the PMBus interface. For example, some processors have recommended power rail start-up characteristics, which can be configured digitally and applied to the DC-DC module. Control loops can also be modified to accurately suit the transient load characteristics of applications.

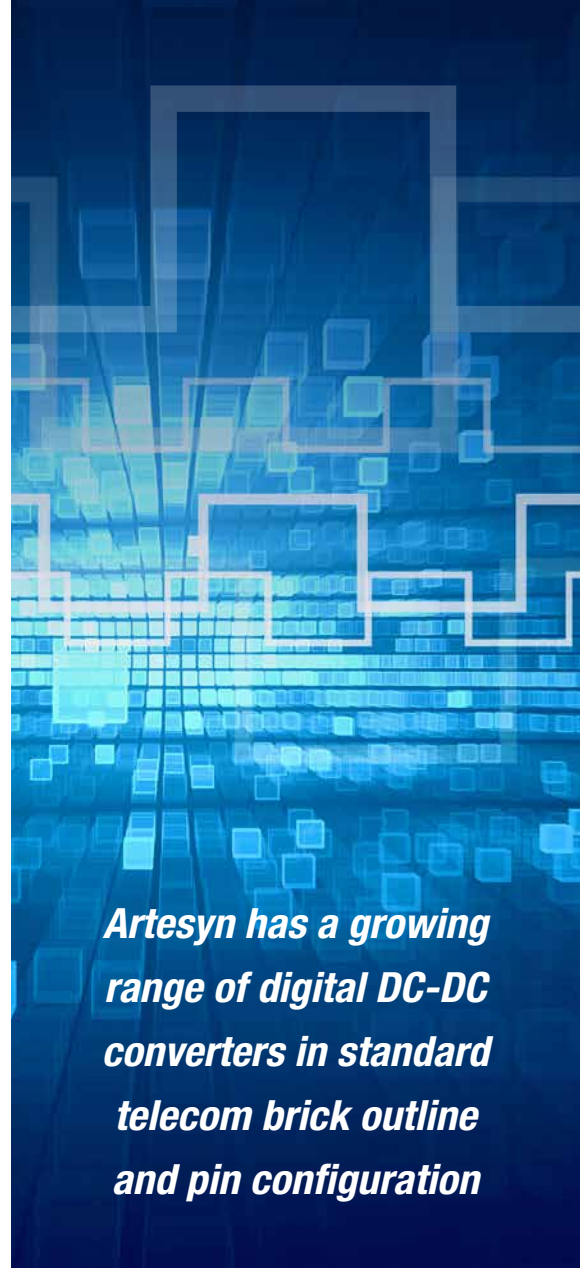
Isolated DC-DC Modules

These single output isolated modules offer excellent thermal performance, which, together with an enhanced pre-bias start-up capability, makes them an ideal choice for use in data processing and telecommunication applications, particularly in the application of supplying power to non-isolated modules.

Their open-frame design is optimized for forced air or conduction cooling or an aluminum baseplate option is available for enhanced thermal performance.

Artesyn's isolated digital DC-DC converters are low profile units that are ideal for systems with demanding inter-board spacing requirements; the open-frame models have an installed height of 0.43 inch (11 mm), while the baseplate versions require 0.52 inch (13.3 mm).

The 1/8 brick and 1/4 brick units follow the industry standard PMBus interface DOSA footprints, giving you options to scale your power module with your application, from 300 to 700 watts.



Artesyn has a growing range of digital DC-DC converters in standard telecom brick outline and pin configuration



300 W 1/8 Brick
ADO300

- 36 – 75 V input range
- Up to 26 A output current
- 11.7 V output voltage
- 95.2% typical efficiency



500 W 1/4 Brick
ADQ500

- 36 – 75 V input range
- Up to 42 A output current
- 12 V output voltage
- 96% typical efficiency



700 W 1/4 Brick
ADQ700

- 40 – 60 V input range
- Up to 58 A output current
- 12 V output voltage
- 96% typical efficiency



1300 W 1/4 Brick
BDQ1300

- 40 - 60 V input range
- Up to 107 A output current
- 12 V nominal output voltage
- 97.5% peak efficiency

LGA50D and LGA80D Non-isolated Units

With a footprint of 1" (25.4 mm) by 0.5" (12.5 mm), the LGA family of the LGA80D and LGA50D represent some of the highest density current ratings available in the industry. These innovative units offers two independent outputs, which can either be configured as a single output or 2 completely independently controlled outputs. The LGA80D can be configured as two 40A outputs or one single 80A output, whereas the LGA50D can be configured as two 25 outputs or one single 50A output.

It is also possible to generate a higher current rated rail by connecting units in parallel: For example, by connecting four LGA80D units in parallel up to 320 amps can be supplied as a single power rail.

The LGA family units share all of the same control functionality and flexibility. The wide trim feature of the LGA's (from 0.6 to 5.2 volts) makes them suitable for use with a broad range of semiconductor devices. Both analog and digital control functions are enabled on this unit, which means the LGA's can be either controlled with a resistor or alternatively, be fully controlled and monitored by using the universally accepted industry-standard PMBus digital interface.

For designers using this category of product, critical parameters for consideration are efficiency and derating. The Artesyn LGA's offer class-leading efficiencies with very little or no derating factor applied to the power-limit of the LGA80D at 200W maximum (two 100W output channels) and LGA50D at 100W maximum (two 50W channels).

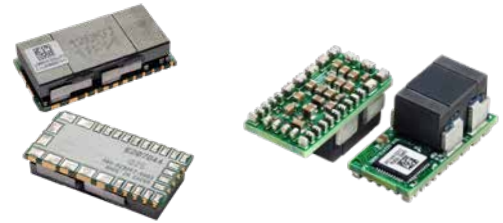
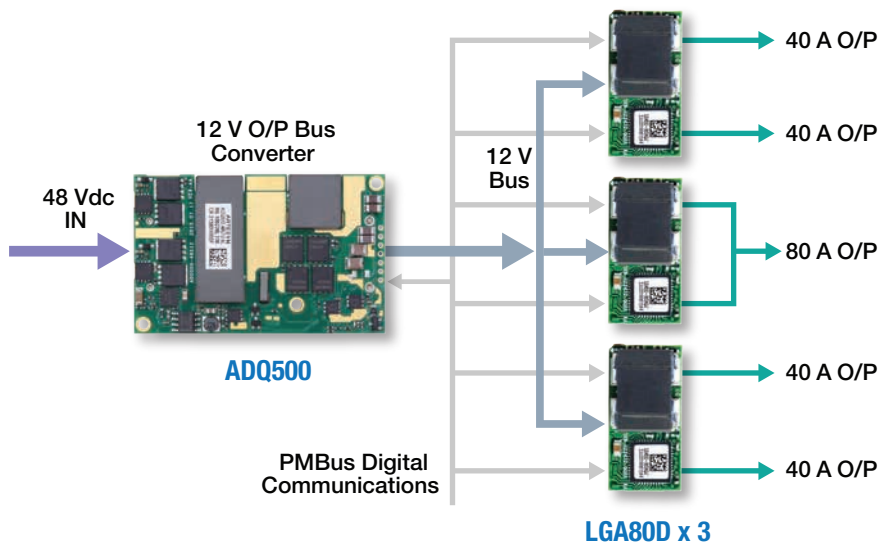
Evaluation Kits

Artesyn offers two evaluation kits for the range of digital DC-DC modules, to cover the isolated and non-isolated units. Using these evaluation kits, you can connect the demonstration board to a USB socket on a PC with the PMBus interface dongle and cable provided, and control and monitor the DC-DC modules as they would be used in an application.

There are hardware functions on the demonstration board that allow you to enable and select an output voltage by simple dip-switch settings, and the board provides voltage and ripple measurement points. The isolated demonstration board can be connected to the non-isolated board, enabling you to test the full DC-DC conversion process from 48 V DC input at the system level to the low voltages at the processor level, with digital control throughout.

The 1/8 brick and 1/4 brick units follow the industry standard PMBus interface DOSA footprints, giving you options to scale your power module with your application, from 300 to 700 watts.

Isolated and Non-isolated Converters in a Centrally Controlled Network



100 W
LGA50D

200 W
LGA80D

- 7.5 – 14 Vdc input voltage
- 0.6 – 5.2 V output voltage
- Up to 95.5% typical efficiency



Isolated: A single demonstration board can be used with all three isolated modules.



Non-isolated: The demonstration board is populated with two LGA80D modules, allowing you to test independent channel or stacked-module operation.



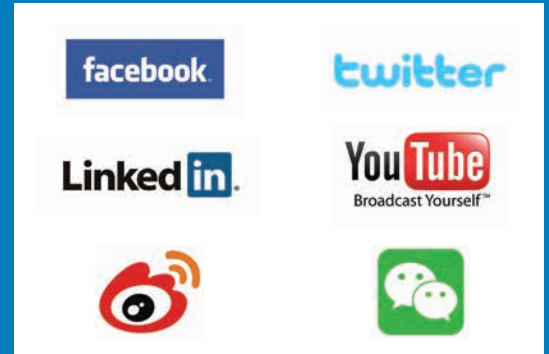
About Artesyn Embedded Power

Artesyn Embedded Power, an Advanced Energy company, is a global leader in the design and manufacture of highly reliable power conversion solutions for a wide range of industries including communications, computing, server storage, healthcare and industrial. For more than 40 years, customers have trusted Artesyn to help them accelerate time-to-market and reduce risk with cost-effective power conversion solutions. Artesyn has over 8,000 employees worldwide across multiple engineering centers of excellence, wholly-owned world-class manufacturing facilities, and global sales and support offices. Artesyn Embedded Power is a registered, assumed name of Artesyn Embedded Technologies, Inc., an Advanced Energy company.

About Advanced Energy

Advanced Energy (Nasdaq: AEIS) is a global leader in the design and manufacturing of highly engineered, precision power conversion, measurement and control solutions for mission-critical applications and processes. AE's power solutions enable customer innovation in complex applications for a wide range of industries including semiconductor equipment, industrial manufacturing, telecommunications, data center computing server storage and healthcare. With engineering know-how and responsive service and support around the globe, the company builds collaborative partnerships to meet technology advances, propel growth for its customers and innovate the future of power. Advanced Energy has devoted more than three decades to perfecting power for its global customers and is headquartered in Fort Collins, Colorado, USA. For more information, visit www.advancedenergy.com.

Advanced Energy | Precision. Power. Performance.



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