# LGA SERIES
# DIGITAL DC-DC CONVERTER MODULE

Advanced Energy's Artesyn LGA series of DC-DC converter modules are innovative non-isolated units that offer two independent and configurable outputs. You can combine the two outputs for a single configurable output and use multiple units in a multiphasic configuration to build a single, high current power-stage.

## Overview

The LGA50D modules share their footprint with the higher rated member of the digital POL family – the LGA80D. Both have a footprint of 25.4 x 12.5 mm (1 x 0.5 in). Though the LGA110D follows the same form-factor, the termination pin-out is slightly different to realize the higher functionality associated with the LGA110D.

Multiple mechanical mounting options are available for the LGA50D. One version offers the same termination as the LGA80D, whereas the other two versions offer either an LGA-termination type or an exceptionally low-profile version of just 5.5 mm in height.

Advanced Energy's Artesyn LGA products can also generate higher current rated rails by connecting up to four units in parallel:

- Four LGA50Ds can generate up to 200 A
- Four LGA80Ds can generate up to 320 A
- Four LGA110Ds can generate up to 440 A

The Artesyn LGA module series offers market-leading efficiency performance of 95.5% typical and power density of up to 220 A per square inch. Modules also include analog and digital control functions, enabling control with a resistor or controlled and monitored by using the industry-standard PMBus® digital interface.

Graphics, data, or video processing and high power devices such as server processors, FPGAs, supercomputers, network, storage, and telecom equipment, can benefit from the current density, efficiency and flexibility of control of Artesyn LGA digital DC-DC converters.

## Features

- Dual, single or multiphase configurations
- Digital or analog control
- Input 7 to 14 VDC
- Output 0.6 to 5.2 VDC
- LGA50D 50 A; LAG80D 80 A
  LGA110D 110 A

## ARTESYN LGA DIGITAL DC-DC CONVERTER MODULE

### The Demands of Non-Isolated POL Converters

As the circuit boards in telecom and data center systems have become more complex and densely populated, every component is required to provide maximum value with the additional target of reducing the physical size. The key is to increase the amps per square inch current density of non-isolated converters with the objective of freeing up space that can be used to increase the computing power of a board by reducing the amount of real estate used for power conversion.

### Technical Details

Advanced Energy's Artesyn LGA modules use a voltage mode dual phase synchronous buck topology. They can accommodate a wide range of ambient temperatures due to the excellent thermal management design along with an extremely high power conversion efficiency and resulting low power dissipation. The input and output voltage specifications remain the same in any configuration, so the input is defined as 7.5 to 14 V. The maximum output power that the module delivers will depend on a number of parameters, primarily the output voltage setting and ambient air temperature and velocity (forced airflow or natural convection).

In a dual output configuration, LGA modules can be controlled (by either PMBus® or external-resistor control) to supply half of the rated current per channel. In single output configuration, each module can support the full current rating. Combine this flexibility with the wide-range output adjustment, and a broad range of semiconductor devices and applications can be supported.

### LGA50D

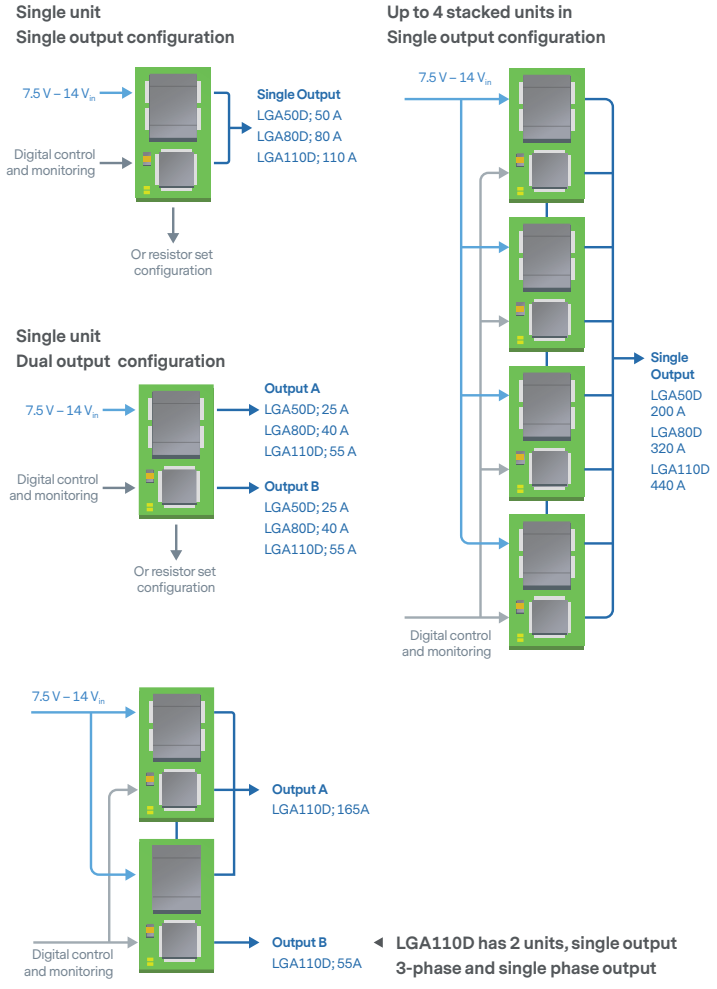
Each module offers two independent and configurable 25 A, 50 W outputs and can combine to form a single configurable 50 A, 100 W output. Connect up to four units in parallel to create a higher current rated single power rail of up to 200 A. The output voltage for the standard profile versions can be adjusted within the range of 0.6 V to 5.2 V while the low profile version can be adjusted within the range of 0.6 V to 3.3 V.

### LGA80D

Each module offers two independent and configurable 40 A, 100 W outputs and can combine to form a single configurable 80 A, 200 W output. Connect up to four units in parallel to create a higher current rated single power rail of up to 320 A. Adjust the output voltage for the standard profile version within a 0.6 V to 5.2 V range.

### LGA110D

Each module offers two independent and configurable 55 A, 175 W outputs and can combine to form a single configurable 110 A, 350 W output. Connect up to four units in parallel to create a higher current rated single power rail of up to 440 A. Adjust the output voltage for the standard profile version within a 0.5 V to 5.2 V range. However, the LGA110D also has the added advantage of phase flexibility so that odd numbers of outputs can be combined to be a single output and the remaining output from the module can still be considered an independent output. So, two units can be configured to be a 3-phase outputs for 165 A, with the remaining output rated at 55 A.



## Evaluation Kit

Advanced Energy's Artesyn LGA module evaluation kits give the ability to connect the demonstration board to a USB socket on a PC with the PMbus interface, dongle, and cable provided in the kit. Once connected, you can control and monitor the power converters as they would be used in an application.

The connections to the evaluation board are via M6 screws, with the only provision being that the input voltage is in the 7.5 to 14 V range. The output connections use the same M6 screws, however, if you want to connect the outputs in parallel or prefer to stack the modules, they are placed in such a way to make the operation of placing a link between them as easy as possible.

## Module Management GUI Software

The increasing functionality and performance of devices such as FPGAs has driven a need for more advanced power management functions. Digital conversion techniques implemented in the Artesyn LGA series of non-isolated modules offer an answer.

Digital and analog converters have much in common, such as similar power switching devices and magnetic structures (inductors and transformers), however, the inner control loop provides digital flexibility for tailoring power delivery to the application and enabling the power systems to dynamically adapt to changes in operating conditions in real time. Communications, monitoring and control are implemented over the industry standard PMBus.

For simple evaluation, configuration, and monitoring, Advanced Energy offers a PC-based graphical software package for all LGA class modules in conjunction with respective evaluation kits. Two intuitive tabs allow you to enter the required settings for individual converters and monitor the status and parameters. The demonstration board is fitted with two LGA class modules allowing you to test independent channel or stacked-module operation.

## 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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