

PMBus Power Modules Deliver High Power Density For FPGAs, DSPs, ASICs And Memory

[Renesas Electronics](#) has announced a pair of encapsulated hybrid digital dc-dc PMBus power modules, the 10-A ISL8280M and 15-A ISL8282M. According to the company, these power modules offer best-in-class power density of 115 mA/mm² in a 12-mm x 11-mm package, with up to 95% peak efficiency. They are complete single-channel, synchronous stepdown regulated power supplies that operate over a wide input range of 5 V to 16 V (see the figure).

The company has also introduced two analog power modules, the ISL8210M and ISL8212M, in the same pin-to-pin compatible 12-mm x 11-mm package and also with 10-A and 15-A of output current, respectively. The hybrid digital and analog power modules provide point-of-load (POL) conversion for advanced FPGAs, DSPs, ASICs and memory used in servers, storage, optical networking, telecom, and a broad range of space-constrained industrial applications. Each device integrates a PWM controller, MOSFETs, and inductor inside a new thermally optimized, Grid High Density Array (GHDA) encapsulated module. To complete the power supply, designers add input and output ceramic capacitors.

The ISL828xM hybrid digital and ISL821xM analog power modules feature integrated LDOs that enable single-supply operation. They leverage Renesas' patented R4 high-speed control loop architecture with inherent line voltage feed-forward, providing designers a unique combination of ultra-fast load transient response and high noise immunity. According to the vendor, their proprietary Grid HDA package offers unmatched electrical and thermal performance through a single-layer conductive package substrate that efficiently transfers heat from the module to the system board, and dissipates it without requiring airflow or heatsinks—even under heavy load conditions.

"Our newest power modules expand Renesas' growing portfolio, adding new capabilities to our performance analog module family and bridging the gap between them and our full digital power modules," said Philip Chesley, vice president, Industrial Analog and Power Business Division, Renesas Electronics. "The new hybrid digital power modules offer class-leading power density and efficiency not achievable with discrete components. Compared to competitors' module designs, the new Grid HDA package makes it easier for customers to mount the module on their circuit board."

Key features of the ISL828xM hybrid digital and ISL821xM analog power modules include

- 4.5-V to 16.5-V single rail input voltage, and 0.5-V to 5-V output voltage settings
- ±1.5% output voltage accuracy over line, load, and temperature with remote sense
- 256 output voltage options configurable through a simple pin-strap resistor setting
- SMBus/I²C/PMBus v1.3 compatibility up to 1.25 MHz (hybrid digital modules)
- Seven switching frequency options from 300 kHz to 1 MHz
- Selectable PFM/light load efficiency mode
- Comprehensive fault protection with voltage, temperature and current protections.

Renesas offers two power supply design tools that aid in the selection and application of these power modules. The PowerCompass tool helps users quickly identify the right power modules and other parts that match their specific requirements. Multiple power rails can be set up for more than 200 FPGAs, and designers can perform high-level system analysis and generate custom reference design files in minutes. The PowerNavigator tool works with PMBus, allowing power architects to set up hybrid digital power module telemetry, sequencing, and run-time configuration, while each module's pin-strap configuration allows for standalone operation.

The ISL828xM hybrid digital power modules and ISL821xM analog power modules are available now from Renesas Electronics' worldwide distributors with pricing as listed in the table below.

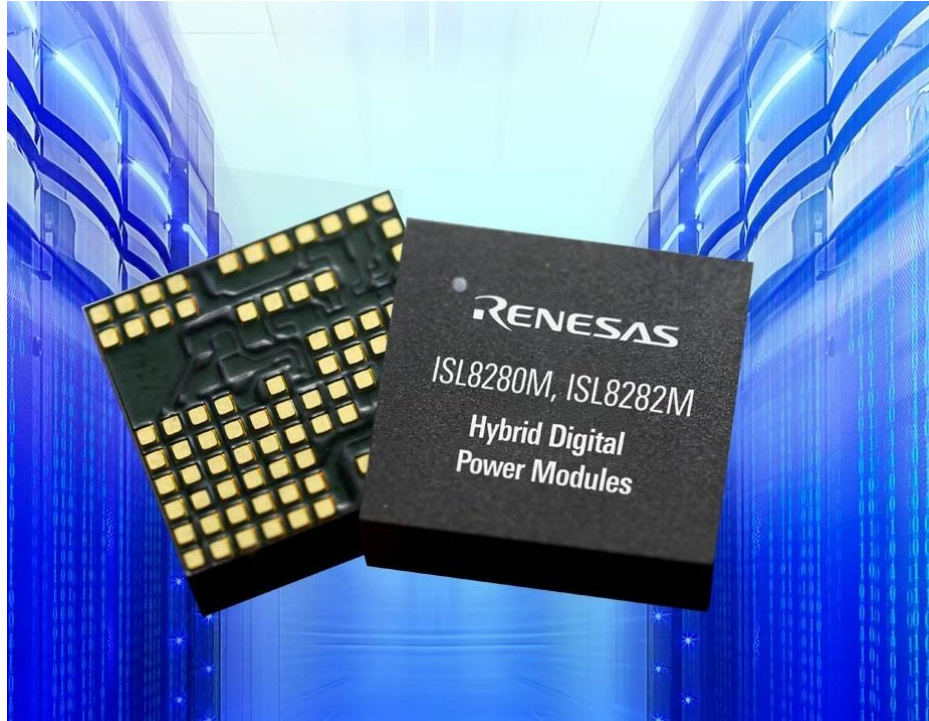


Figure. The 10-A ISL8280M and 15-A ISL8282M hybrid digital power modules are said to offer best-in-class power density of 115 mA/mm² in a 12-mm x 11-mm package, with up to 95% peak efficiency. The company also offers lower-cost, analog versions of these modules, the ISL8210M and ISL8212M, in the same pin-to-pin compatible 12-mm x 11-mm package.

Table. Key features and pricing for ISL828xM and ISL821xM power modules.

Product	Output Current	PMBus Interface	Grid HDA Package	Pricing (1k units)
ISL8282M	15A	Yes	12mm x 11mm x 5.3mm	\$13.73 USD
ISL8280M	10A	Yes	12mm x 11mm x 5.3mm	\$10.63 USD
ISL8212M	15A	No	12mm x 11mm x 5.3mm	\$12.51 USD
ISL8210M	10A	No	12mm x 11mm x 5.3mm	\$ 9.41 USD