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120-W DC-DC Converter Family Addresses Deep Space, New Space, And Defense Requirements

Crane Aerospace & Electronics' Interpoint xMOR 120-W family of power conversion products features four dc-dc converters with a shared core architecture, each tailored to address different aerospace and defense market needs. The xMOR product family includes the cMOR (hi-rel COTS), hMOR (class H high-reliability), sMOR (class K deep space) and rMOR ("new space") power converters (see the figure).

The cMOR is a high-reliability, commercial off-the-shelf offering for aerospace and defense applications tested to MIL-STD 883. It features synchronous rectification and soft start. The hMOR converter is designed for mission-critical defense applications, is MIL-PRF 38534 Class H certified and features high efficiency, low ripple and light weight. It supports fast start-up for quick boot-up systems.

The sMOR converter supports deep space applications with radiation performance guaranteed for a TID of 100 krads and 86 MeV, is class K certified and features high performance and a 19-V to 50-V input range. Finally, the rMOR is designed to support the rapidly growing new space market—featuring up to 92% efficiency in a radiation-tolerant design tested to 30 krad and 43 MeV.

The xMor family is novel in a number of ways. First, it extends the power capability of the company's hybrid-style converters from 100 W in previous Class K products to 120 W. Secondly, it extends the input voltage range on the Class H and K converters from the 16 V to 40 V of the company's 100-W class k converter to the 19- to 50-V range of hMOR and sMOR converters.

This increase in the voltage range accommodates the trend among customers to migrate to higher bus voltages to deliver more power without having to increase conductor size and thus cable weight. Note that the low end of the voltage range was increased from 16 V to 19 V in the new converters in order to achieve higher efficiency, which was a goal in development of all four xMOR converters.

Beyond these changes, Crane's cMOR and rMOR products represent the company's first introductions of non-hybrid-style converters for military and space applications. Both cMOR and rMOR use conventional, pc-board construction, which brings down cost versus the traditional hermetic, hybrid products. As a result, the cMOR and rMOR converters can provide similar or better electrical performance than the hybrids, at the lower cost points desired in COTS and new space applications. Use of pc boards is permissible because of the relaxed environmental specs that are acceptable in COTS and new space applications.

The cMOR and rMOR converters also benefit from the use of GaN power devices and synchronous rectification, which boost efficiency, while also permitting use of the full, extended input range of 16 V to 50 V. In contrast, Crane maintains more of the traditional build using silicon MOSFETs in its class K and H products in order to meet DLA requirements.

Overall, the most significant aspect of this product launch is that it provides footprint- and pinout-compatible converters with similar voltage ranges for the four different product classes. This allows Crane's customers to develop power system designs that can be migrated from one product platform to another. For example, a system design developed using the sMOR converter for a deep space application could easily be adapted for use in a similar system design for a LEO application by switching to the rMOR converter.

"We are proud to build from the rich heritage of our Interpoint brand and offer a new range of innovative solutions with our new xMOR product family," said Ashley Smith, Crane A&E vice president & GM, Modular Power. For more information, see the xMOR product family page.

Figure. "As the space and defense markets continue to evolve, customers are looking for improved capabilities specifically designed for their applications and missions. We have introduced this new family of highly efficient 120-W converters to allow customers to choose solutions that best meet the needs of their missions—solutions that feature Interpoint's known quality, reliability, and patented technology. We've designed this new product line to enable customers to leverage similar power system designs across platforms via our family architecture that delivers high reliability power converters with the same size packaging and pin for pin capability," said Ashley Smith, Crane A&E vice president & GM, Modular Power.