VICOR

Case study: C5ISR Avionics computer



Simple, redundant power assures uninterrupted aircraft safety

Customer's challenge

Avionics navigational and control systems must function flawlessly, regardless of adverse conditions. To mitigate the risk of system failure, these systems must be designed to function simultaneously using different power sources, ensuring uninterrupted operation of critical systems. The power supply for the equipment also has to operate at high temperatures without using cooling fans, and it needs to be lightweight and physically small. The key challenges were:

- Provide extra redundancy for continuous operation
- Reliable operation at high temperatures
- Compact solution that fits the aircraft's weight and space limitations

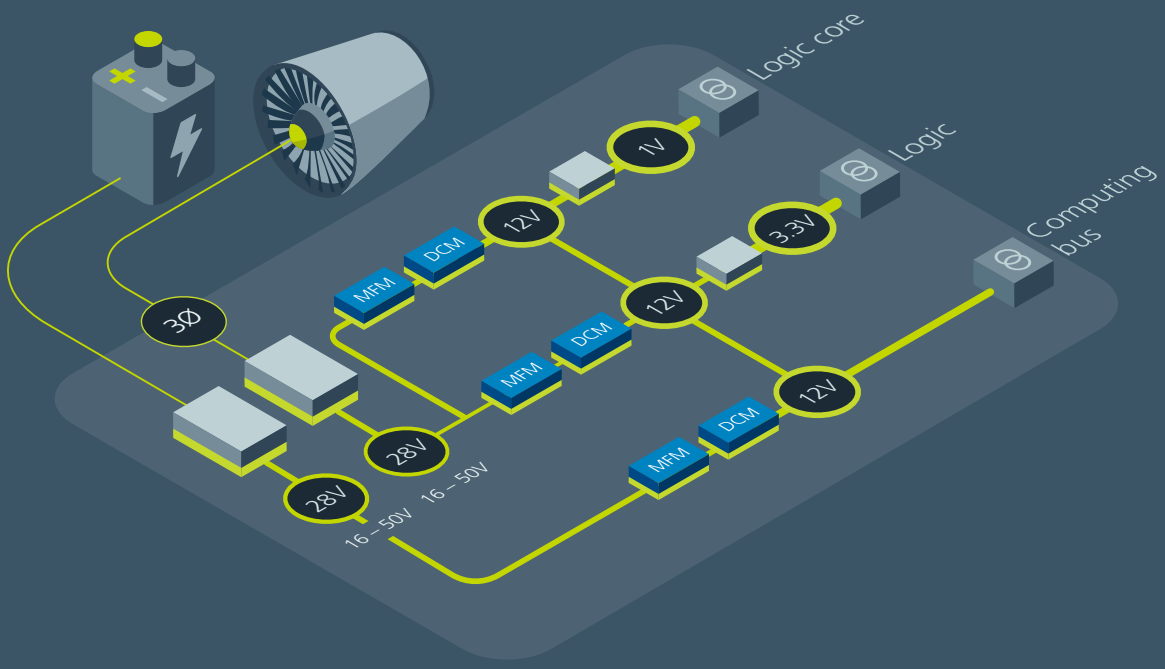
The Vicor solution

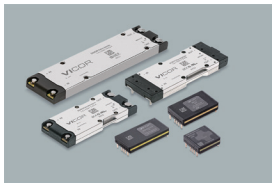
High density, high efficiency DCM™ DC-DC converters and ZVS buck regulators minimize complexity and maximize space utilization, enabling a very simple power configuration that makes implementation of the necessary redundant bus easy. The compliance of MIL-COTS DCMs with MIL-STD-810 standards for shock and vibration guarantees robust performance, simplifying and accelerating system compliance testing. The key benefits were:

- Simple implementation of the parallel redundant bus
- High power density provides redundancy within same available space
- High-efficiency and thermal adept packaging effectively dissipate heat, even in harsh environments

The power delivery network

Three MIL-COTS DCM™ DC-DC Converters are used in parallel to provide a common 12V internal redundant bus. Each converter can be operated from a different input power source, yet the converters are still able to provide power sharing between themselves to power the internal 12V bus from a MIL-STD-704 source. Buck regulators are used to provide the lower power, lower voltage 5.0V and 3.3V rails from the 12V bus. MFM™ DCM filters are DC front-end modules used in conjunction with DCMs and provide EMI filtering and transient protection to meet MIL standards.

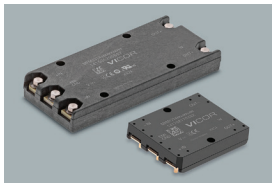




MIL-COTS DCM™ DC-DC converter

- Isolated regulated
- Input: 28, 30, 270V
- Output: 3.3, 5, 12, 15, 24, 28, 48V
- Power: Up to 1300W
- Peak efficiency: 96%
- As small as 0.98 x 0.90 x 0.28in

vicorpower.com/mil-cots-dcm



MIL-COTS MFM™ filter

- Input filter for DCMs
- Input: 28V (16 – 50V), 270V (160 – 420V)
- Current: Up to 22A
- As small as 44.6 x 35.5 x 9.2mm

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