Technical Support | Reduced Time to Market | Wide Input Range | High Efficiency

Autonomous Underwater Vehicle

Facilitating Battery Upgrade to Extend Range

The Customer's Challenge

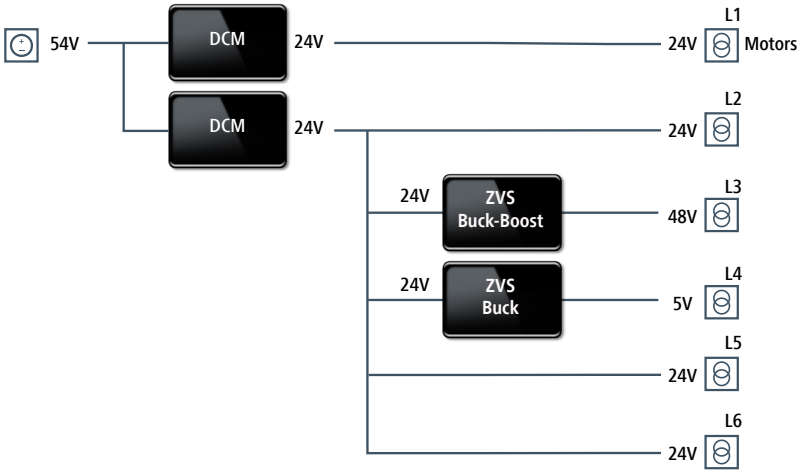
Designing autonomous vehicles to work in the harsh environment of the deep ocean comes with a wide range of challenges, with performance and reliability fundamental requirements. A customer was exploring how they could utilize new battery technology to develop their next gen vehicles, improving performance and range within the same constrained space. The new AUVs needed to be developed and on the market quickly to maintain competitive advantage.

The change to the new battery technology demanded a redesign of the power solution to accommodate it. The company recognized the need to augment their specialist in-house AUV design team with the necessary power expertise to maximize the opportunities available. Our local applications engineering team worked with the engineering team to design and optimize the power supply to meet the new system's requirements quickly.

The Solution

A thermally-adept DCM DC-DC converter in a VIA package isolated and stabilized the battery voltage and provided the bulk power conversion. A second DCM drove the secondary rails. ZVS Buck and Buck-Boost converters provided regulation for the lower power loads.

Link to Whiteboard »



The Results

The complex six-load, 344W system measured just 20 cm^2. And as the DCM and ZVS regulators provide high efficiency, simplified conduction cooling and improved system power density, there was no issue fitting the complete power solution into the small space available. The wide input voltage range of the DCM allowed full utilization of the energy in the battery, extending the range of the AUV.

Product Family Key Specifications	
Cool-Power ZVS Buck Switching Regulators	
Input Voltages	12V, 24V, 48V (Nominal)
Output Voltage	Wide output range (1 – 16V)
Output Current	8A, 9A, 10A, and 15A versions
Efficiency	Up to 96.5% Light load and full load High efficiency performance
Dimensions	LGA SiP: 10 x 14 x 2.56 mm LGA SiP: 10 x 10 x 2.56 mm
Cool-Power ZVS Buck-Boost Switching Regulators	
Input Voltages	16 – 34V, 21 – 60V
Output Voltages	12 – 34V, 21 – 36V, 36 – 54V
Output Power	Up to 240W continuous
Efficiency	Over 98% efficiency at >800 kHz FSW
Dimensions	LGA SiP: 10 x 14 x 2.5 mm
DCM™ DC-DC Converter Module	
Input Voltages	9 – 50V_{DC}, 16 – 50V_{DC}, 18 – 36V_{DC}, 36 – 75V_{DC}, 120 – 420V_{DC}, 160 – 420V_{DC}, 200 – 420V_{DC}
Output Voltages	5V, 12V, 13.8V, 15V, 24V, 28V, 36V, 48V
Output Power	4623 ChiP: Up to 600W 3623 ChiP: Up to 320W 3714 VIA: Up to 600W 3414 VIA: Up to 320W
Efficiency	Up to 93%
Dimensions	4623 ChiP: 47.91 x 22.8 x 7.26 mm 3623 ChiP: 38.72 x 22.8 x 7.26 mm 3714 VIA: 95.3 x 35.6 x 9.4 mm 3414 VIA: 85.9 x 35.6 x 9.4 mm