Pulsed Load | Small Size, Low Profile | Factorized Power | Conduction Cooling

Airborne Infrared Countermeasures

Pulsed Load Driver for Lasers

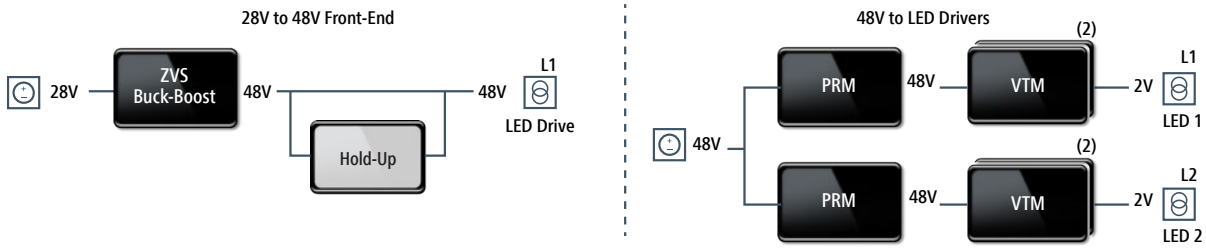
The Customer's Challenge

This airborne countermeasures system controls multiple lasers that fire energy pulses at incoming weapons in an attempt to confuse their guidance systems. One requirement of the design was that the pulsed energy demands of the system should be averaged out so as not to significantly vary the current demands on the power source, this was to avoid the system interfering with other sensitive electronics onboard the aircraft. The design is an upgrade to an existing system that required increased functionality and more power in the same available space, with no increase in weight.

The Solution

Storage of energy for the pulsed loads was provided by a large capacitor bank. Storing the energy in the capacitors at 48V (rather than at the input voltage of 28V) allowed smaller capacitors to be used, but did require an additional input voltage boost converter, achieved by using a ZVS Buck-Boost Regulator. Pairs of PRM Regulators and associated VTM Current Multipliers were used to provide regulated, high current outputs at 2V to drive the lasers. Configuring these PRMs in Remote Sense Mode allowed the magnitude of the output current pulses to be limited.

Link to Whiteboard »



The Results

Cold-wall cooling was used to remove heat from the low profile PRM/VTM converters. The products' high efficiency reduced waste heat and improved reliability. The Sine Amplitude Conversion (SAC) topology used within the VTMs provided a fast transient response and supported a high pulsed load output current, improving the effectiveness of the laser system.

Product Family Key Specifications	
PRM™ Regulator Module	
Input Voltages	48V, (36 – 75V)
Output Voltage	48V
Output Power	Up to 600W
Efficiency	Up to 97%
Dimensions	32.5 x 22.0 x 6.73 mm
VTM™ Current Multiplier	
Input Voltages	0 – 60V
Output Voltage	0 – 55V
Output Power	Up to 135A
Efficiency	Up to 96%
Dimensions	32.5 x 22.0 x 6.73 mm