

Extremely Compact High Power Density Linear PSU

Low noise, high current multi-rail linear power supply for airborne applications

Project Background

With a challenging development timescale and faced with a competitive product bid process our client, Teledyne Defence and Space, were under pressure to deliver a prototype system that required an extremely compact and high density power supply unit.

With a requirement to generate multiple linear supplies with high output currents, the PSU design was a key element of the overall product.

Design Implementation

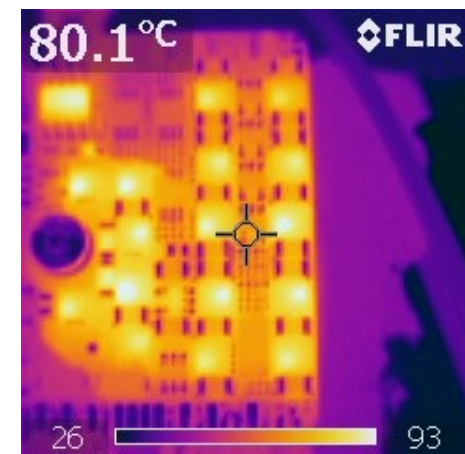
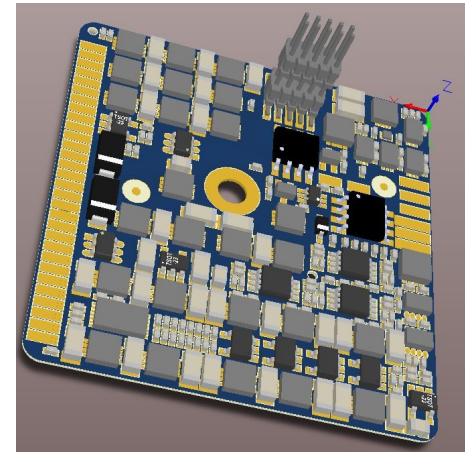
Using Linear Technology devices, Slipstream Engineering Design answered the design challenge by exploiting the power sharing features of the LT3080EDD. Taking the design to the extremes, the 30-35V supply uses an array of 16 devices whilst the 8V supply user an array of 9 devices. This was coupled with cutting edge bare PCB technology (HDI class 6). An arrangement of blind and buried stacked micro vias with copper fill were shown by simulation to fulfil the challenging thermal dissipation requirements.

Outcome

From concept to completed PCB layout, Slipstream Engineering Design completed the major design activity within 4 weeks. Testing of the PSU (following successful and straight forward integration into the product) demonstrated the expected performance, especially from a thermal management perspective. The PSU was shown to operate over a temperature range of -40 to 80°C.

Design Challenge

- Linear supply with high output current of 12A @30-35V
- Multiple supplies to be generated (4 in total)
- Very high power density of 7W/ cm³
- Permitted PSU footprint of 1mm X 43mm
- Total permitted ceiling height 5mm
- Significant heat generation (25°C rise above ambient)
- Conduction cooling through base only



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About Slipstream Design

Slipstream Design is a consultancy with a passion for RF and Electronic design.

The company provides design services and customisable modules to fast track product development within the aerospace, communications and defence sectors.

A young and growing company, Slipstream Design is building a strong customer base because of its flexible approach. The company's clients include major defence and telecommunication OEM's as well as up-and-coming SME's with fantastic technologies. With experience of major defence projects, Slipstream Design has a number of UK SC cleared engineers and is based in Yorkshire, UK.

Facilities

We have a fully equipped RF and electronic laboratory ready to carry out design simulations, prototyping and environmental testing. Design tools commonly used include: Microwave office, CST, Altium, LT Spice, Lattice CPLD, Labview, Solidworks and Microsoft visual studio.

We pride ourselves in the provision of high quality services and bring together first class design expertise, skilled project management with a certified ISO 9001 management system.



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