Remote Radio Unit – AC-DC

Keeping One Step Ahead in a Fast Changing Market

The Customer’s Challenge

As the volume of mobile data communications continues to grow exponentially, fueled by smart phones and video content usage, radio network service providers need to provide the increased bandwidth to support it. A common trend is to reduce base station cell sizes to better distribute the traffic. The increased number of sites required means that locations previously thought to be less than ideal are being used. Difficult-to-access sites, or those in exposed positions subject to lightning and other transient power surges, provide some tough environmental conditions and design challenges. Power supplies need to reduce in size, and efficiency improvements are needed to ease the thermal management, all while operating under fault conditions and complying with stringent EMI standards.

The Solution

Using the PFM isolated AC-DC converter and ZVS regulators to provide the low voltage 24V and 5V rails and a PRM regulator and VTM current multiplier to provide the higher power 48V rail the customer was able to shrink the size of the system by combining the power supply into the system board.

The Results

This solution provided a space saving of over 60% compared to the previous power supply design and it utilized conduction cooling of the system to further improve system reliability. Support in meeting global standards was provided by local Vicor applications engineers and the solution was prototyped very quickly using Vicor’s standard evaluation boards.

Product Family Key Specifications

**PFM™ Isolated AC-DC Converters with PFC**

- **Input Voltages**: Universal rectified: 85 – 264V<sub>PMS</sub>
- **Output Voltages**: 24V and 48V isolated and regulated outputs
- **Output Power**: 400W
- **Efficiency**: Up to 92%
- **Dimensions**: PFM 4414: 111 x 36 x 9.4mm
  - PFM 4914: 125 x 36 x 9.4mm

**Cool-Power® ZVS Buck Regulator Module**

- **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 2.56mm
  - LGA SiP: 10 x 10 x 2.56mm

**Cool-Power® ZVS Buck-Boost Regulator Module**

- **Input Voltages**: 16 – 34V, 21 – 60V
- **Output Voltage**: 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 2.5mm

**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 6.73mm

**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 6.73mm