

RDFC topology Efficiency & No-load Gains



A cost-effective and efficient solution for off-line power conversion

- Improves operating efficiency
- Lowers no-load power usage at linear power supply costs or less
- Exceeds ENERGY STAR requirements

Overview

Energy consumption is a major environmental and social issue, requiring urgent global government action.

As a result, a series of worldwide and regional regulatory requirements and codes of conduct are emerging that set targets for energy consumption of consumer products.

For the electronics industry, a major implication of this legislation is that the traditional cheap and simple linear power supply is now considered too inefficient, both in operation and on no-load.

Although more complex flyback power supplies can meet the efficiency levels now demanded, they come with a significant cost premium.

CamSemi's novel topology for offline power conversion is a Resonant Discontinuous Forward Converter (RDFC) power supply. In conjunction with the new C2470 controller series it enables the first low cost solution that exceeds today's new efficiency requirements.

Topology

Figure 1 illustrates a simple and efficient RDFC circuit suitable for a variety of applications from 3 W to 60 W.

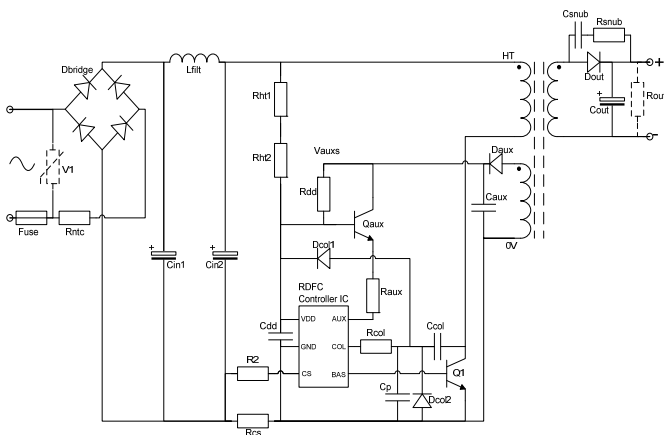


Figure 1: Schematic diagram of an RDFC application

ENERGY STAR



The CamSemi controller, used in conjunction with the RDFC topology exceeds ENERGY STAR targets for efficiency and no-load power.

Features and Benefits

Converter Efficiency

The RDFC circuit efficiency comes from a number of features, the most effective is zero voltage switching.

- The bipolar transistor switch is turned off when the voltage across it is zero – minimising losses in the power switch.

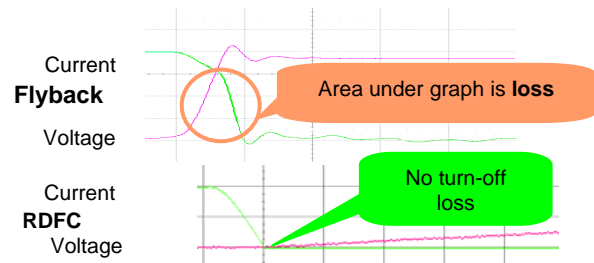


Figure 2: Zero voltage switching improves efficiency

Low No-load Power

The CamSemi controller achieves low no-load power by:

- Reducing power at low loads, by progressively reducing the on-time and then increasing the off-time as the load decreases.
- The use of a low voltage 3.3 V CMOS process for the IC means that the power consumption of the controller is low.
- The supply voltage for the controller is derived from the auxiliary winding and associated components.

Efficiency

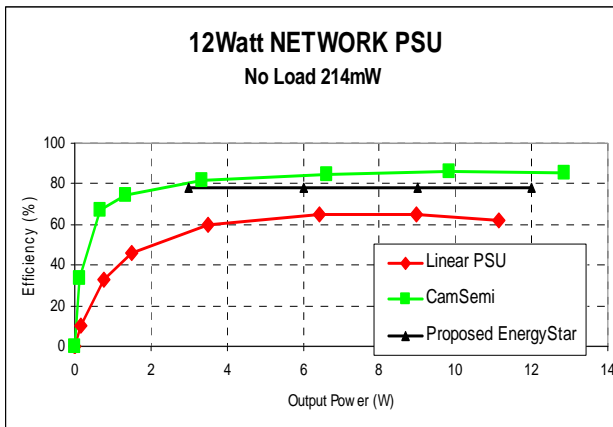


Figure 3: Efficiency and no-load power for a 12 W Modem/Router PSU.

The 60% efficiency of the product's original linear power source is well below the new ENERGY STAR 2.0 requirement of 78%.

However, an average of >85% efficiency level is achieved using the RDFC topology.

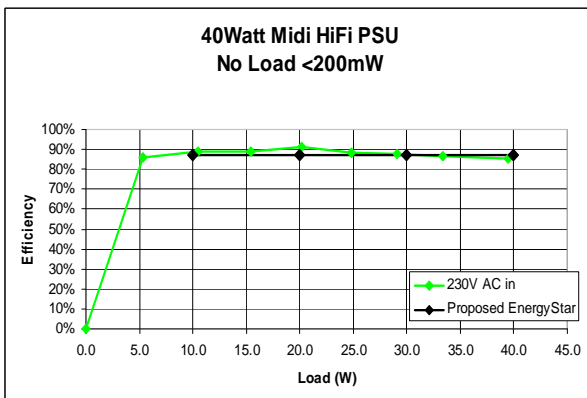


Figure 4: High efficiency and low No-load for a 40 W midi music system

Efficiency is above new ENERGY STAR 2.0 requirements of 87%.

Applications

Target applications for the RDFC include any device using a linear power supply that must now meet new efficiency regulations. For example:

- Cordless Phones
- Modems
- Domestic Appliances
- Hubs
- Digital Picture Frame
- DVD/VCR/STB
- Printers
- Home audio

Various Standards Compliance

- US Executive Order 13222, 1-Watt No-load order
- Australia Greenhouse Office (AGO; Australia)
- Blue Angel (Germany)
- California Energy Commission (USA)
- China Standard Certification Center (CSC; China)
- EU Code of Conduct (EU)
- Energy Star – international (numerous global)
- GEEA (EU countries)
- Nordic Swan (EU)
- Top Runner (Japan)
- Energy Saving Office Equipment & home electronics (Korea)
- EU Eco-label (EU)

Controller Series

The following controller options are available:

Part Number	Package
C2471LX2	SOT23-6
C2472PX2	SOT23-6

For more Information

For details of our channel partners and information on future product, technology or corporate announcements, visit www.camsemi.com

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