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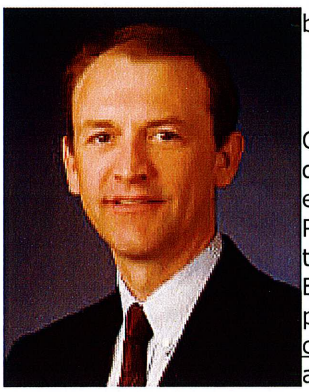
Tightening Power Regs Demand Careful Power IC Selection



by Doug Bailey

Over the last decade, the rising cost of energy and the relentlessly escalating demand for power has driven government and industry organizations to establish new standards for power efficiency in electronics devices. Regulations enacted by the California Energy Commission (CEC), Energy Star, the Federal Energy Management Program (FEMP) and comparable agencies in Europe, Japan and China set maximum power consumption levels for external power supplies in both stand-by and active modes for a number of popular consumer products. While many of these standards are voluntary, some, such as the CEC, outline mandatory requirements or, like Energy Star proposals, have been so widely accepted that manufactures choose to accept them.

These new standards are encouraging system designers to re-evaluate their power systems and modify their designs to meet these higher power efficiency standards. Until recently consumer electronics designers had little incentive to build more efficient external power supplies. Cost considerations typically drove power supply design and, given their lower cost, many designers opted for less efficient linear transformer-based devices. Facing mandatory standards like the CEC and the rapidly increasing costs of copper and iron major constituents of line frequency transformers, however, designers are moving to switch-mode supplies which dramatically improve efficiency.

Most of the regulations introduced to date are targeted at fairly well-defined vertical applications. Government agencies or industry organizations have defined power standards for cell phones, DVD players, and computers, for example, but this often leaves designers confused about the applicable rules when they develop new products that integrate multiple functions or create new classes of products.

Horizontal Standards Coming

Those days are about to end. Realizing that in the fast-changing electronics industry, new technologies are constantly coming to market and redefining vertical markets, government and industry organizations have begun to formulate a new set of power standards that, instead of regulating products by narrow application, are targeted at broader classes of products. Led by agencies in the EU, these new "horizontal" regulations promise to encompass a wider category of products making the rules clearer and leveling the playing-field with respect to power supply efficiency and standby power usage for all system designers.

This new regulatory clarity offers product developers an ideal opportunity to reassess their power supply designs. Over the last few years the large majority of design teams have migrated from linear transformer-based to switch-mode based external power supplies to take advantage of higher efficiency. But other factors play a key role in power supply performance as well. As developers upgrade their systems to meet these new regulatory requirements, they must also consider how much power each particular switch-mode IC provides that can be used by their system when in standby mode. Some ICs, for example, feature on/off control schemes that reduce switching losses during periods of inactivity, while others utilize specialized PWM cycle skipping or burst modes to meet no-load and low load regulatory requirements.

Switch-mode ICs that deliver more output power for a budgeted input offer product developers increased design flexibility. Take, for example, two switch-mode ICs, one which offers a 70 percent conversion rate and a second which offers a 50 percent conversion rate at low load. Constrained by regulations to just 1W of input power in standby mode, the designers using the first IC will have 200 mW more in their power budget than their competitors using the second IC. That larger power budget may allow the product specifying team to add a clock to the design, use more embedded memory, or run a higher powered MPU and accelerate software performance. Ultimately those additional features

can differentiate an end product from its competitors and win market share.

Conclusion

Product developers get ready; the regulatory agencies are increasingly promoting the energy savings brought about by their rules directly to the public, and consumers are listening. Eco-efficiency is a market differentiator that developers will find it increasingly difficult to ignore. By carefully reviewing their power IC options, designers can use this opportunity to increase their power budget, maximize their product features and marketability.

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