

## **Techniques available for improving power efficiency in wireless designs**

In the DC/DC converter design arena, there are two key areas for consideration when it comes to maximizing power efficiency: conversion efficiency and thermal management.

In an ideal situation, the input voltage range would be tailored to be as close to the output voltage as possible in order to achieve optimal efficiency. In reality, system designers are often challenged to develop a system solution that can be implemented globally, where different BUS voltages such as 3.3V, 5V, 9.6V or 12V may be present. Today, designers can typically choose from modules that have relatively wide input ranges of either 2.4V to 5.5V or 8.4V to 14V, but these only address limited nominal input voltages. In the near future, Murata Power Solutions will begin to offer devices with an even wider input voltage range of 4.5V to 14V thereby enabling coverage of 5V, 9.6V and 12V nominal input voltages with one DC/DC converter.

Having widened the input voltage range, Murata Power Solutions is still able to minimise conversion losses – and therefore maximise efficiency - by using ‘dead time control’ also sometimes known as ‘adaptive gate drive’. This technique uses precise control circuitry to minimise the delay (to the sub nano-second region) between when the rectifier MOSFET turns off and the main switch turns on and vice-versa – a basic function of most DC/DC converters. By keeping dead time to a minimum, the voltage and current spikes that are contributors to poor efficiency are also minimized. This technique brings an additional benefit: improved EMI performance of the DC/DC converter.

Last but certainly not least is the application of sound thermal management techniques. As form factors continue to shrink, designers face the challenge of dissipating power via increasingly smaller surface areas. Industry leaders such as Murata Power solutions employ novel thermal management techniques to maximize the available surface area for heat transfer. By optimising the conversion efficiency of the DC/DC and making best use of the available surface area for conduction cooling, improved derating performance at high ambient temperatures can be achieved.

## **About Murata Power Solutions**

Murata Power Solutions ([www.murata-ps.com](http://www.murata-ps.com)) is headquartered in Mansfield, Massachusetts, with over 1,300 employees, and locations in the USA, Canada, England, France, Germany, Singapore, Japan and China. Murata Power Solutions designs, manufactures and distributes DC/DC Converters, AC/DC Power Supplies, Magnetics, Data Acquisition devices and Panel Meters, and offers these products in custom, standard and modified-standard variations. These products, which are built to exacting requirements in ISO9000:2000-approved facilities, are typically used worldwide within telecommunications, computing, industrial and other high-tech applications.

## **About Murata**

Based in Kyoto Japan, Murata Manufacturing Company Ltd is one of the world's leading providers of ceramic based components, sensors, and AC/DC and DC/DC power solutions. Founded in 1950, the company has over 34,000 employees worldwide, and over \$6.3 billion US in consolidated annual sales (as of March 31, 2008). Everywhere in the world, wherever you can reach, Murata's electronic components are always at work.

