APPLICATION NOTE 959

Dual 600mA Buck Converter for Logic Supply and Core Supply at 1V or Less

Feb 06, 2002

Abstract: This application note shows how to reconfigure the MAX1970 2.5V buck converter for logic and core supplies less than 1V. Schematic is shown. Data for load, line, and cross regulation are given.

The MAX1970 was developed as a dual 600mA buck converter for input voltages as low as 2.6V and output voltages down to 1.2V. However, many current generation CPUs require core supplies of 1V or less. The MAX1970 can be reconfigured with an alternate output feedback sensing circuit to meet this requirement with no sacrifice in regulation. Internally the non-inverting input of the MAX1970’s error amplifier is connected to 1.20V reference, which yields a feedback threshold of 1.20V. The circuit of Figure 1 uses the 2.5V logic supply (VOUT2) to bias the feedback divider resistor network, R2 and R3, enabling the other output voltage, VOUT1, to be set as:

\[ V_{OUT1} = 1.20V \times (V_{OUT2} - 1.20V) \times \left(\frac{R2}{R3}\right) \]

As seen from the equation above, VOUT2 must be greater than 1.20V for VOUT1 to be less than 1.20V. In Figure 1, R2 equals to 2K, hence VOUT1 = 1.0V. VOUT2 is internally programs to 2.5V via FBSEL2 (refer to the MAX1970 data sheet). Table 1 below shows the measured results of the line, load, and cross regulation of Figure 1.
As seen from Table 1, the worst-case voltage variation for \( V_{OUT1} \), the 1.0V output, is less than 0.3% for all combination of input voltages from 3.0V to 3.6V, and output currents from 10mA to 600mA.