TPS63036 Transition between “Power Save Mode” and PWM Mode

TM-Nano sn 45160067701460

Input 5 Volts

Output 3.3 Volts nominal

Resistive loads, various resistance from 120 to 7 ohms.

PS/SYNC = Low

Text:

I see your note about the jump in the green trace of TPS63036 Data Sheet figure 5. That very much looks like the jump from power save to PWM happens between 200 mA and 250 mA.

The main main concern is: Are devices that exhibit the transition from power save to PWM at significantly higher than "about 100 mA" defective or have latent damage? It appears not, but I'd like to here a representative from TI say "These devices are not defective." I do wish that TI had put a specification on this parameter, because without a specification how does one decide?

We are changing our control to set PS/SYNC high to force PWM and remove the variability of the power save to PWM transition. Ripple when in PWM is fine and only 2 to 5 mVpp in this design.

I have collected the resistive load data as you suggest. I used the unit I believe has highest transition to PWM. Plot attached (I hope!). Clipping in resistor I'm in PWM until above 250 mA. At 290 mA to 370 mA the unit has a preference for power save mode (because I clip in various resistances always rising current form the open circuit side of the graph). The circuit can be tricked into PWM mode by reducing the input voltage (to increase the input current level), and then returning the input voltage to 5 volts. Average Load currents above 370 mA are required to guarantee PWM mode. From the schematic design values I estimate the inductor ripple current is also about 374 mA, which implies a maximum and minimum forced inductor current of Iave +/- (Iripple/2) = 557mA max, 183 mA min.

So 183 mA is 80% larger than the "about 100 mA" forced inductor current, the current required to guarantee PWM with PS/SYNC=low. Normal process variation or damaged component?

Calculating the max and min forced current, and finding the minimum of 183 mA does feel a lot better than thinking in terms of the 370 mA average.