

ISL70003SEH iSim:PE Model

Introduction

The ISL70003SEH is a radiation and SEE hardened synchronous buck regulator capable of operating over an input voltage range of 3.0V to 13.2V. The ISL70003SEH uses voltage mode control architecture with feed-forward and switches at a selectable frequency of 500kHz or 300kHz. Loop compensation is externally adjustable to allow for an optimum balance between stability and output dynamic performance. With integrated MOSFETs and class leading radiation performance, this highly efficient single chip power solution is an ideal choice in many space applications.

The iSim:PE model for the ISL70003SEH was developed to help system designers evaluate the operation of this IC prior to or in conjunction with proto-typing a system design. This model accurately simulates typical performance characteristics such as loop analysis, transient analysis, start-up and steady state analysis at room temperature (+25 °C).

Reference Documents

- ISL70003SEH Data Sheet; [FN8604](#)
- ISL70003SEH SMD [5962-14203](#)

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Schematic File

The schematic file: **ISL70003SEH.sxsch** is the main application schematic to be used in the iSim:PE simulator. The schematic mimics the evaluation board and is designed for 12V input to 3.3V output conversion, see Figure 1. The simulation profile is set up to run an AC and 3A load transient test. Figure 2 through 13 show a comparison of the simulation results for various operating conditions versus actual bench validation data. For more information on iSim:PE visit the [iSim](#) online home page.

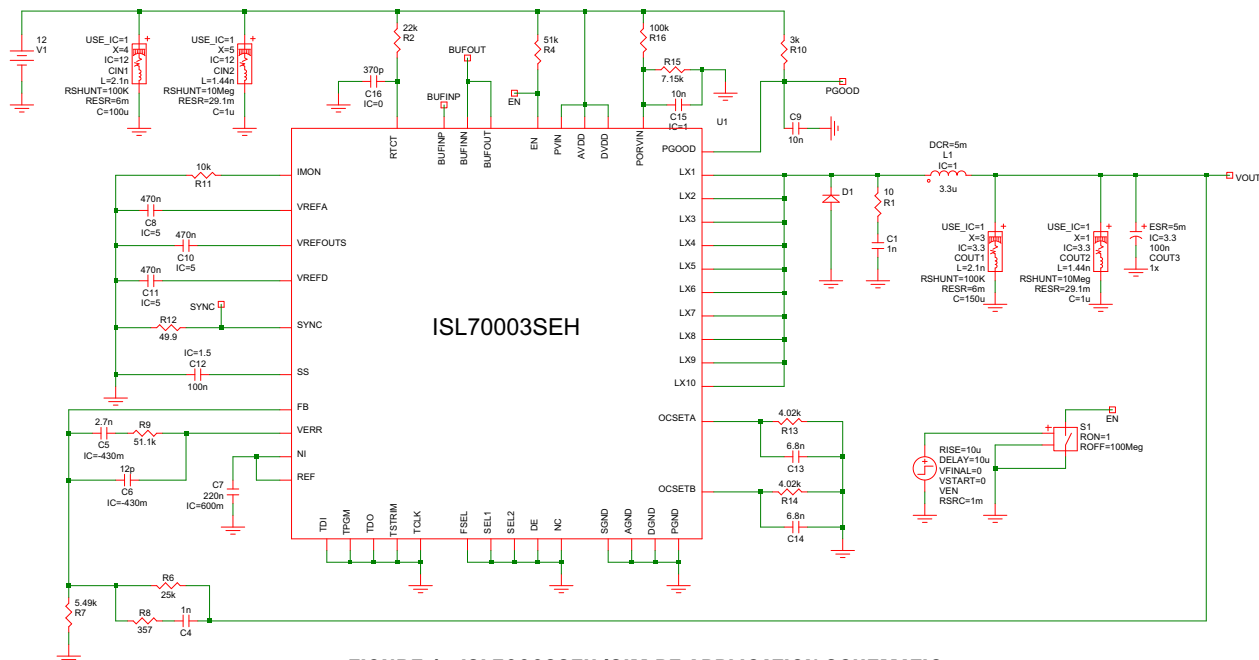


FIGURE 1. ISL70003SEH iSIM:PE APPLICATION SCHEMATIC

Simulation Performance Curves

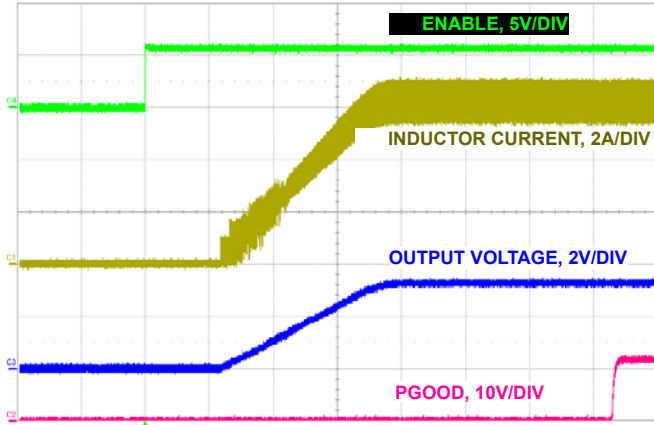


FIGURE 2. CHARACTERIZED SOFT-START WITH 6A LOAD

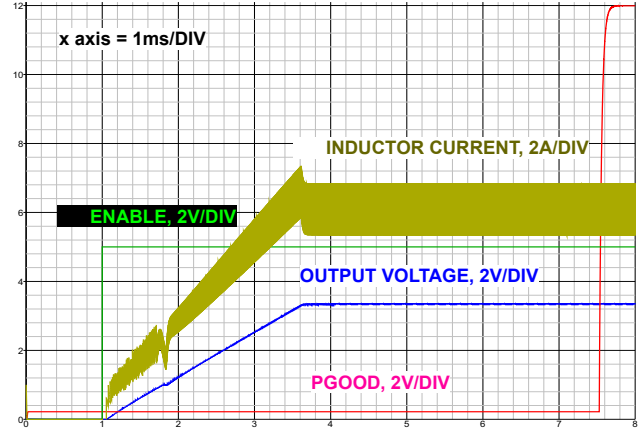


FIGURE 3. SIMULATED SOFT-START WITH 6A LOAD

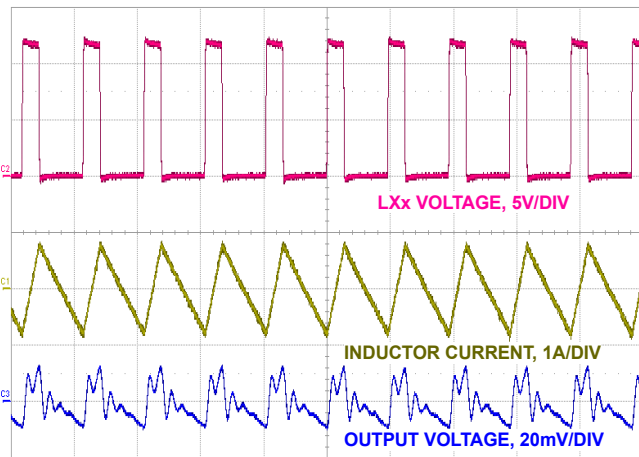


FIGURE 4. CHARACTERIZED FREQUENCY RESPONSE vs GAIN

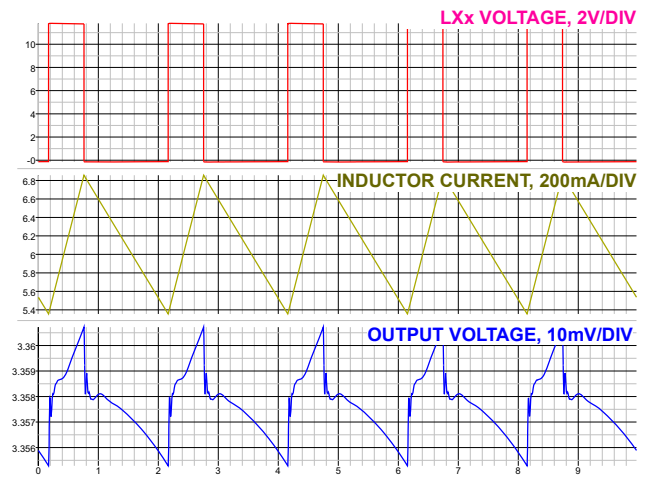


FIGURE 5. SIMULATED FREQUENCY RESPONSE vs GAIN

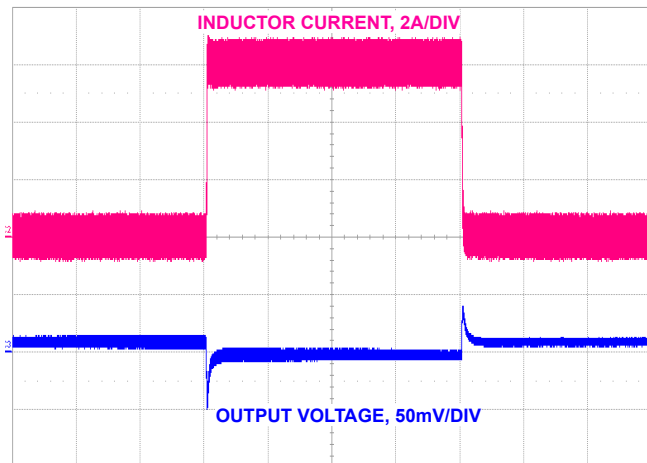


FIGURE 6. CHARACTERIZED 6A LOAD TRANSIENT RESPONSE

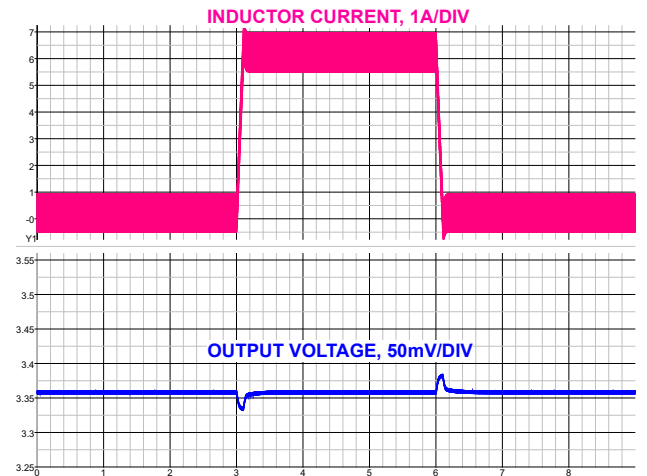


FIGURE 7. SIMULATED 6A LOAD TRANSIENT RESPONSE

Simulation Performance Curves (Continued)

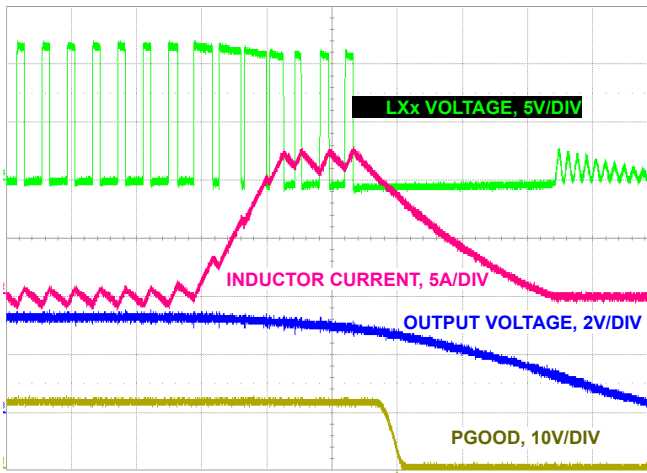


FIGURE 8. CHARACTERIZED OVERCURRENT RESPONSE

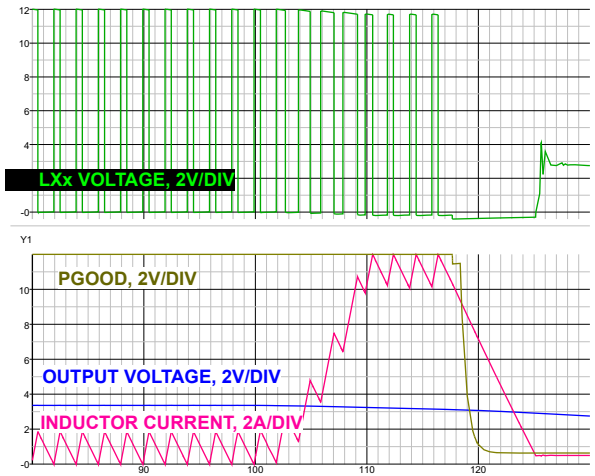


FIGURE 9. SIMULATED OVERCURRENT RESPONSE

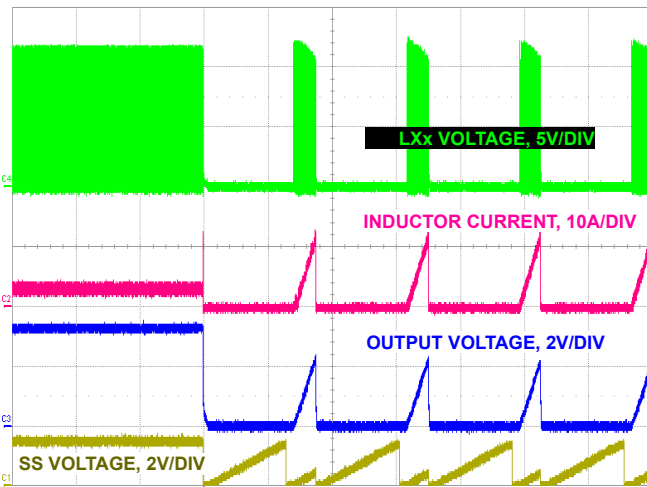


FIGURE 10. CHARACTERIZED HICCUP RESPONSE IN OCP

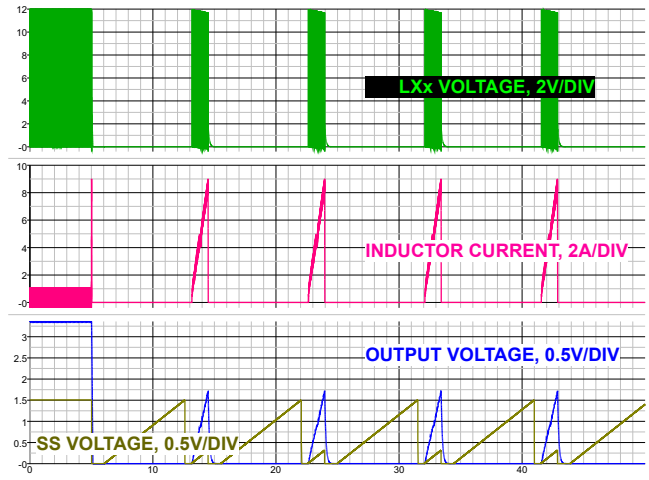


FIGURE 11. SIMULATED HICCUP RESPONSE IN OCP

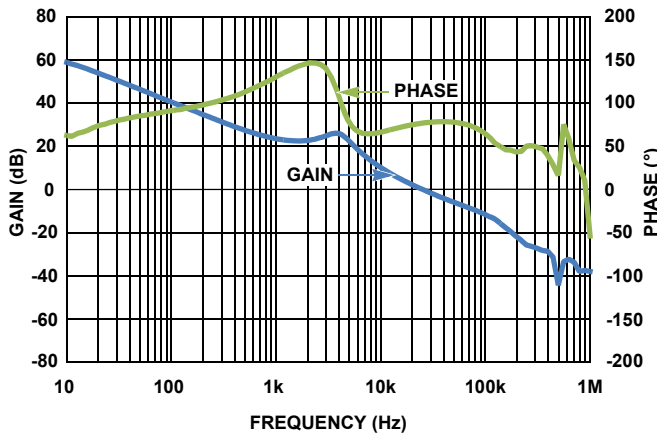


FIGURE 12. CHARACTERIZED LOOP RESPONSE

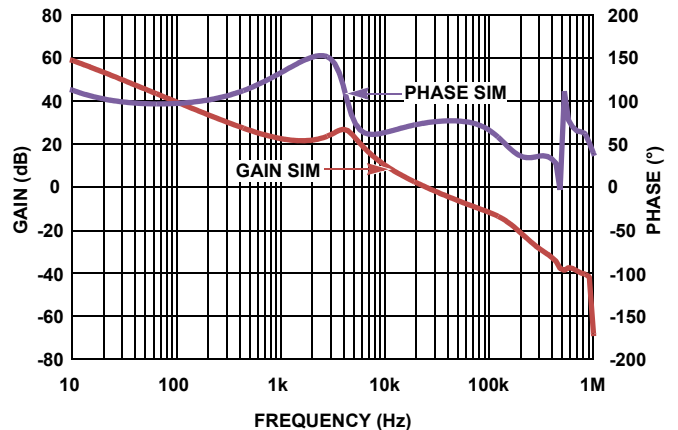


FIGURE 13. SIMULATED LOOP RESPONSE

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