ISL68134-31P-EV1Z

Evaluation Board Quick Start User Guide

UG095
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Description

The ISL68134-31P-EV1Z evaluation board provides users a method of evaluating the ISL68134 digital multiphase device. Included on the board is a high-performance transient load generator capable of replicating the type of high di/dt loads typical of today's high current ASICs.

The ISL68134 is combined with the ISL99227 Smart Power Stage (SPS) to provide a highly efficient power solution capable of delivering up to 135A.

While the user may opt to evaluate the solution based on the Intersil default configuration, custom configurations are easily created using PowerNavigator™.

Specifications

This board has been configured and optimized for the following operating conditions:

- 0.6V to 1.8V output range. Up to 3.05V with BOM change
- 3+1 phase: 135A + 30A
- Input range from 5V to 16V

Key Features

- 0.5% V_{OUT} regulation accuracy
- PMBus interface, AVSBus interface
- 3% I_{OUT} telemetry accuracy
- Onboard transient load to facilitate testing
- ATX or bench supply connections for input sources

Related Literature

- For a full list of related documents please visit our website
  - ISL68134 product page

Ordering Information

PART NUMBER	DESCRIPTION
ISL68134-31P-EV1Z	ISL68134 evaluation board, 3+1 dual output (EVB, PMBus adapter, AVSBus adapter, two USB cables)

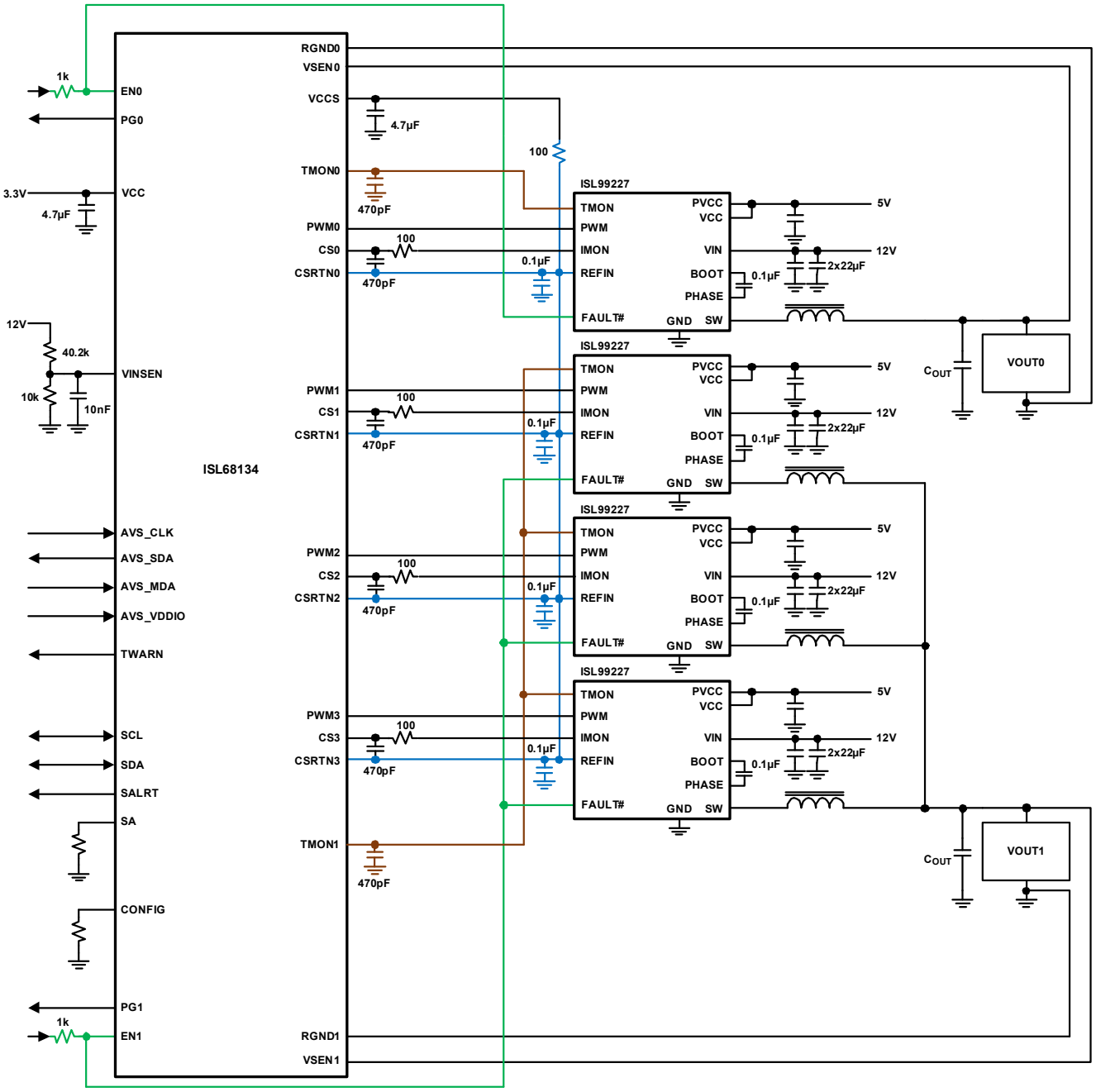

FIGURE 1. ISL68134-31P-EV1Z BLOCK DIAGRAM

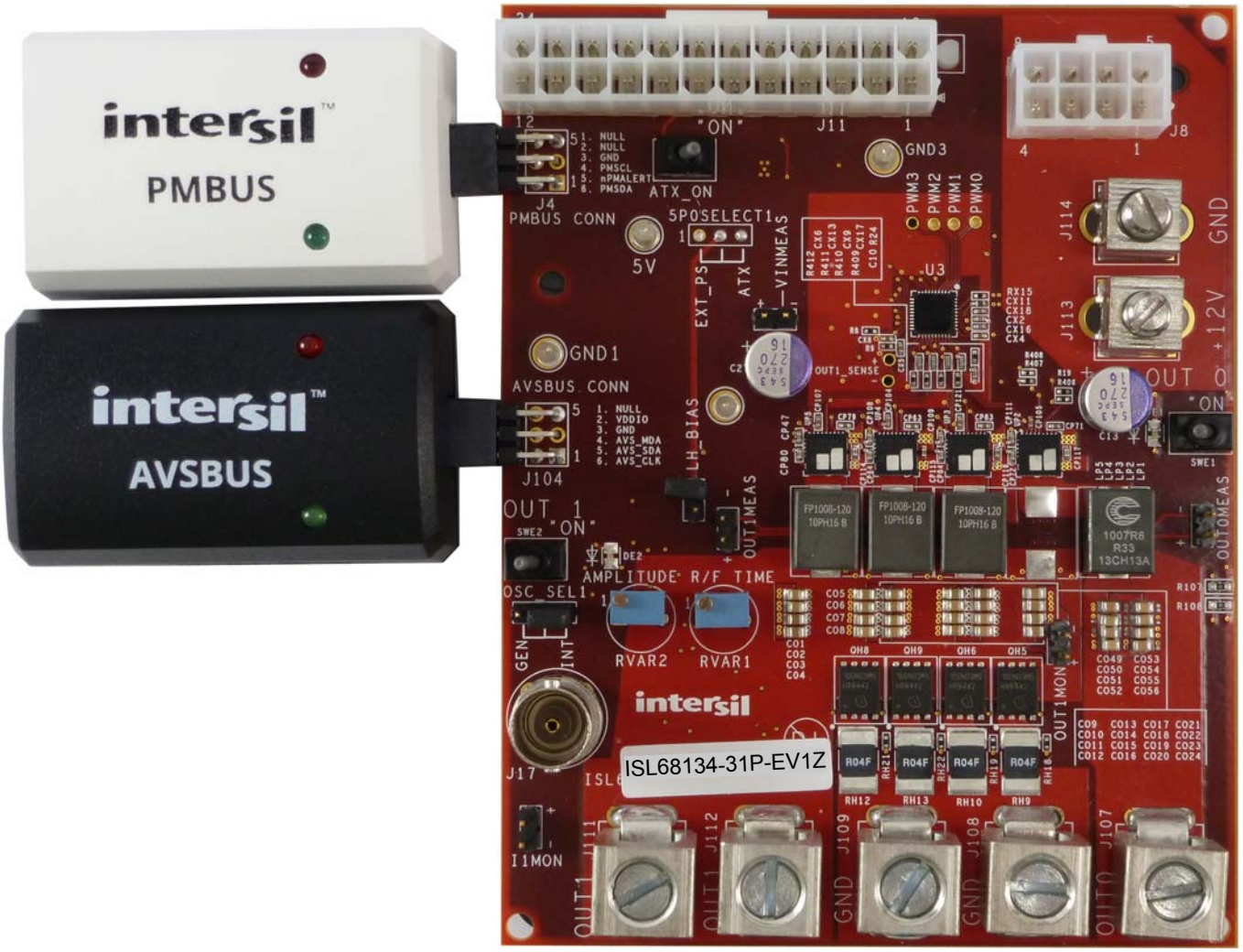

FIGURE 2. CONNECTIONS

Functional Description

The ISL68134-31P-EV1Z provides a convenient method to evaluate the performance of Intersil's family of digital multiphase devices and the onboard transient load provides a realistic way to exercise the regulators outstanding transient performance. IC details are described in the ISL68134 datasheet.

The ISL68134-31P-EV1Z Evaluation Board is shown in Figures 8 and 9. The hardware enables are controlled by toggle switches (SWE1 and SWE2). J4 is provided to interface directly with the Intersil USB to PMBus dongle provided with the evaluation board. J104 provides an interface to the Intersil USB to AVSBus dongle.

Input voltage is supplied via the ATX connectors or via bench supplies using the input connectors provided (J113, J114, 5V). High current output test lugs allow external loading.

Test points are provided to make efficiency data collection easy. VINMEAS, OUT0MEAS, and OUT1MEAS provide convenient points to acquire input and output voltage measurements (Figure 3).

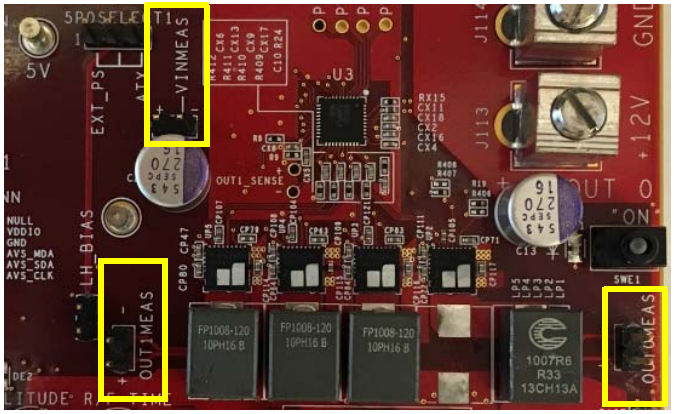

FIGURE 3. TEST POINTS

Figures 11 through 15 show performance data typical of the digital multiphase devices.

Operating Range

This evaluation board is configured to support up to 135A on the three phase output and up to 30A on the single phase output. Input voltage range is from 5V to 16V.

Transient Load

The transient load on this board is attached to VOUT1 and is capable of >100A and >200A/µs for output voltage down to 1V. It is enabled by installing a jumper on the LH_BIAS header. Transient load current may be monitored from the I1MON header at 10mV/A. Note that while the generator is capable of very high currents, managing the total thermal load is critical. For this reason, it is advised that the duty cycle of the load is kept <5% or the temperature on the load generation components is monitored. Use of a fan will extend the capability of the load.

Transient load waveforms may be controlled using an internal oscillator or an external oscillator on J17. When using the internal oscillator, RVAR1 is used to adjust slew rate and RVAR2 is used to adjust amplitude of the transient load current.

OUT1MON provides a measurement point for Output 1 during transient load operation. Note that due to proximity to the power inductor, some oscilloscope probes may pick up a stray magnetic field. Care must be taken to ensure accurate measurement of the true output voltage (Figure 4).

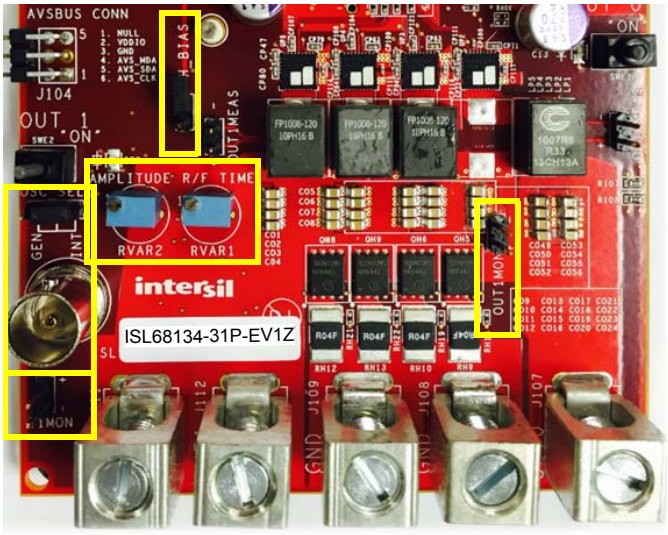

FIGURE 4. MEASUREMENT POINTS

Schematic and PCB Layout Guidelines

Intersil provides both a schematic checklist and PCB layout guide for the digital multiphase IC family. These are available at the ISL68134 product page. In addition, full schematics, PCB files and BOM are provided for this evaluation board.

PowerNavigator™

PowerNavigator™ is required for proper evaluation of the digital multiphase devices. Power Navigator and its User Guide are provided for download at PowerNavigator™.

Default Configuration Settings

Intersil's default configurations for this board are provided via the Intersil website at the ISL68134 product page and as part of the PowerNavigator™ GUI installation.

Power-Up Guide

1. Set SWE1-SWE2 to the OFF position.
2. Connect PMBus dongle to PC and J4.
3. AVSBus functionality is desired, connect AVSBus dongle to PC and J104.
4. Connect input supply and load cables. If using bench supplies, connect both 5V and 12V.
5. Enable input supplies. If an ATX is used, this is accomplished with the ATX_ON switch.
6. Launch PowerNavigator™. Device should be discovered by PowerNavigator™. Select "Open Existing Project" (Figure 5).

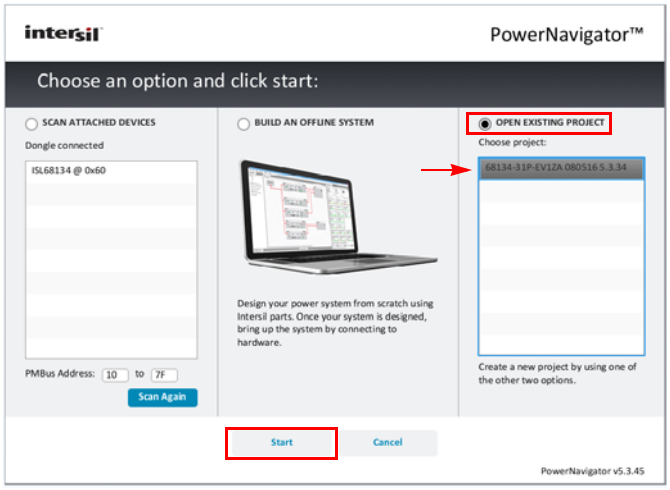

FIGURE 5. LAUNCH PowerNavigator™

7. Select ISL68134-31P-EV1Z and then click "START".
8. Wait until PowerNavigator™ Power Map is populated and the telemetry meters are displayed (Figure 6).

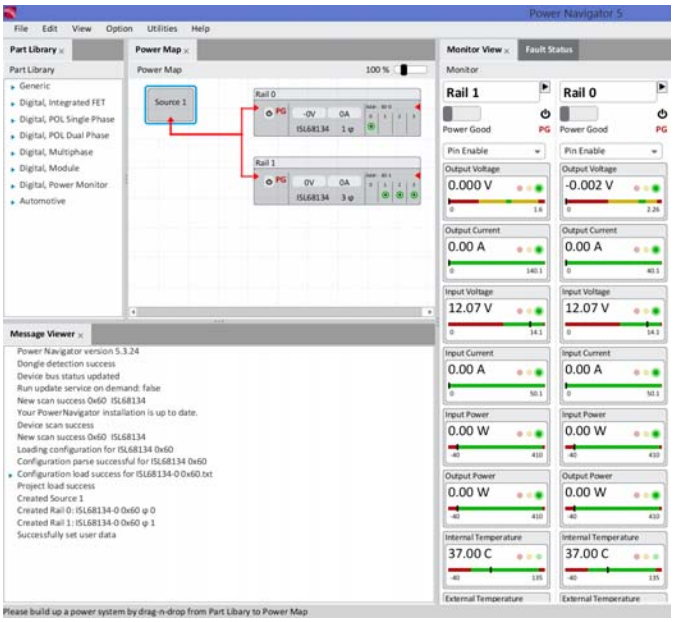

FIGURE 6. POWER NAVIGATOR DEFAULT VIEW

9. Use SWE1 and SWE2 to enable desired output (Figure 7).

FIGURE 7. POWER MAP

10. Begin Testing.

ISL68134-31P-EV1Z Evaluation Board

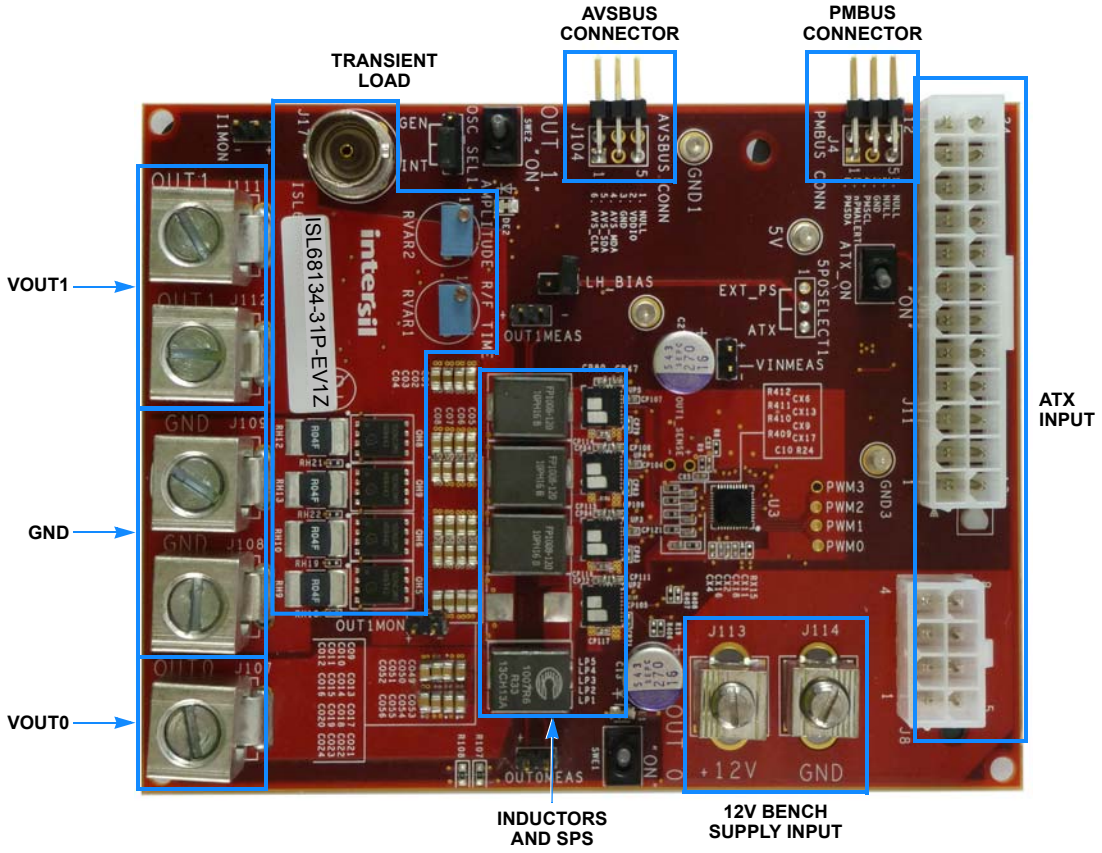

FIGURE 8. TOP SIDE

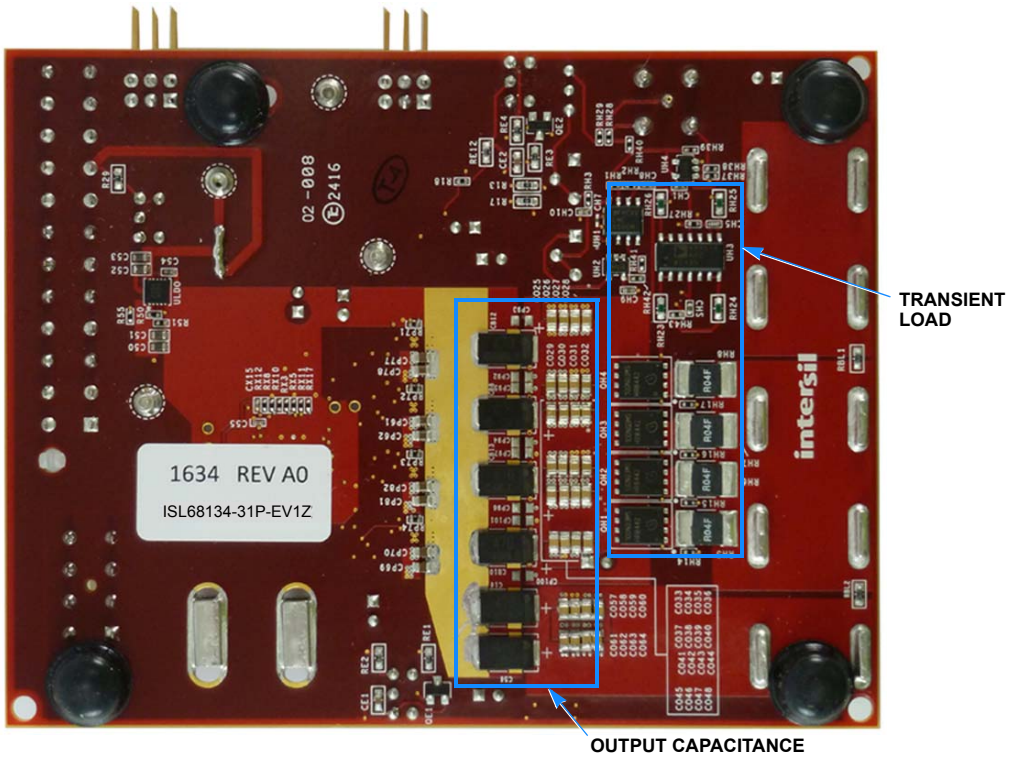

FIGURE 9. BOTTOM SIDE

Typical Performance Curves

Unless otherwise noted: V_{IN} = 12V, f_{SW} = 500kHz, APD disabled, T_A = +25°C

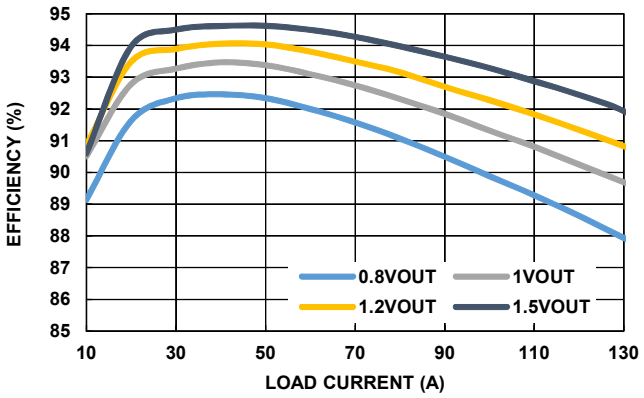

FIGURE 10. 3-PHASE EFFICIENCY

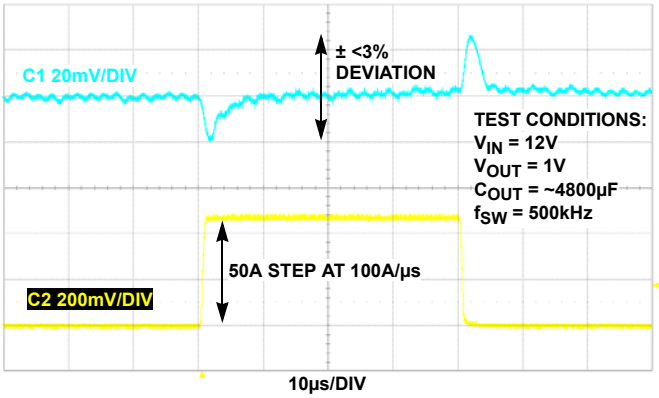

FIGURE 11. DYNAMIC LOAD STEP, 0A TO 50A, di/dt = 100A/µs

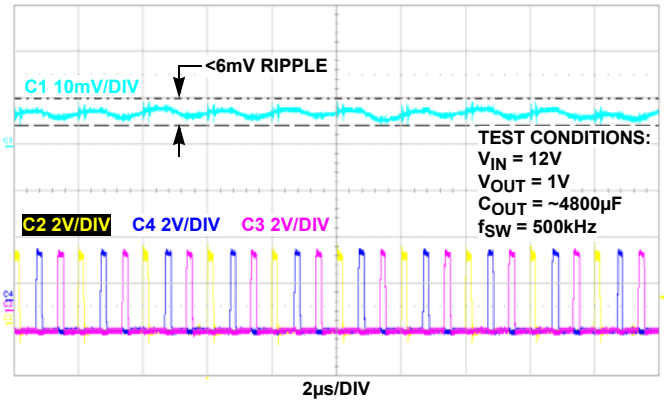

FIGURE 12. V_{OUT} RIPPLE, 3-PHASE INTERLEAVE

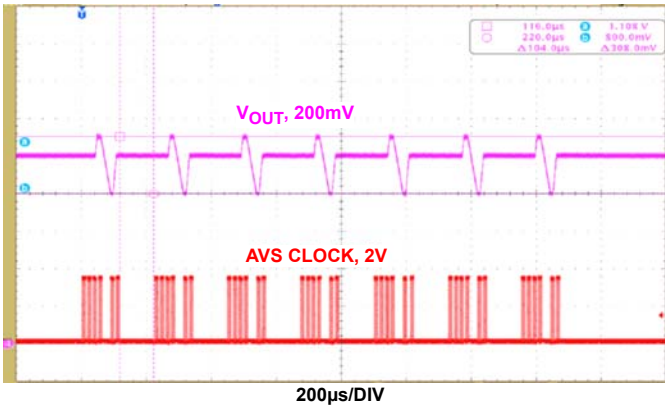

FIGURE 13. AVSBus DYNAMIC V_{OUT} TRANSITIONS

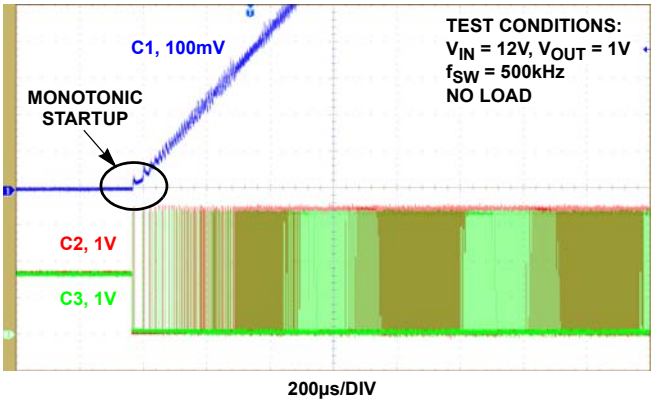

FIGURE 14. SOFT-START RAMP INITIATION

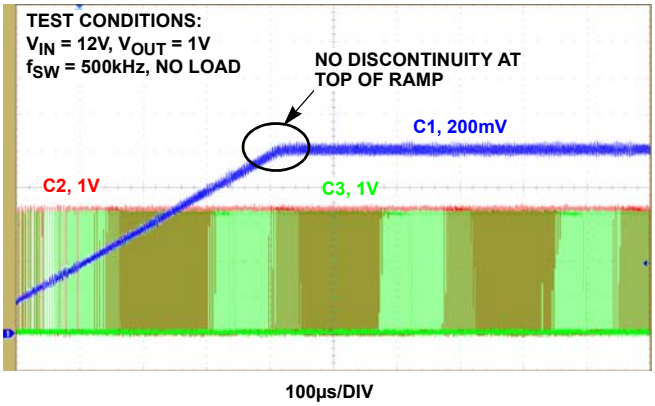

FIGURE 15. SOFT-START RAMP COMPLETION