

ISL8018DEMO1Z Demonstration Board User Guide

Description

The ISL8018DEMO1Z is intended for use by individuals with requirements for point-of-load applications sourcing from 2.7V to 5.5V. The ISL8018DEMO1Z simple smallest factor demonstration board is used for a quick and easy demonstration of the performance of the [ISL8018](#) low quiescent high efficiency synchronous buck regulator.

The ISL8018DEMO1Z is a 20.07mmx16.51mm 4-layer FR4 board with 2oz copper in all layers. The complete converter occupies 115.613mm² area.

References

[ISL8018](#) Datasheet

Key Features

- High efficiency synchronous buck regulator with up to 97% efficiency
- ±10% output voltage margining
- Adjustable current limit
- Start-up with prebiased output
- Internal soft-start - 1ms or adjustable
- Soft-stop output discharge during disabled
- Adjustable frequency from 500kHz to 4MHz - default at 1MHz
- External synchronization up to 4MHz - master to slave phase shifting capability

Ordering Information

PART NUMBER	DESCRIPTION
ISL8018DEMO1Z	Demonstration board

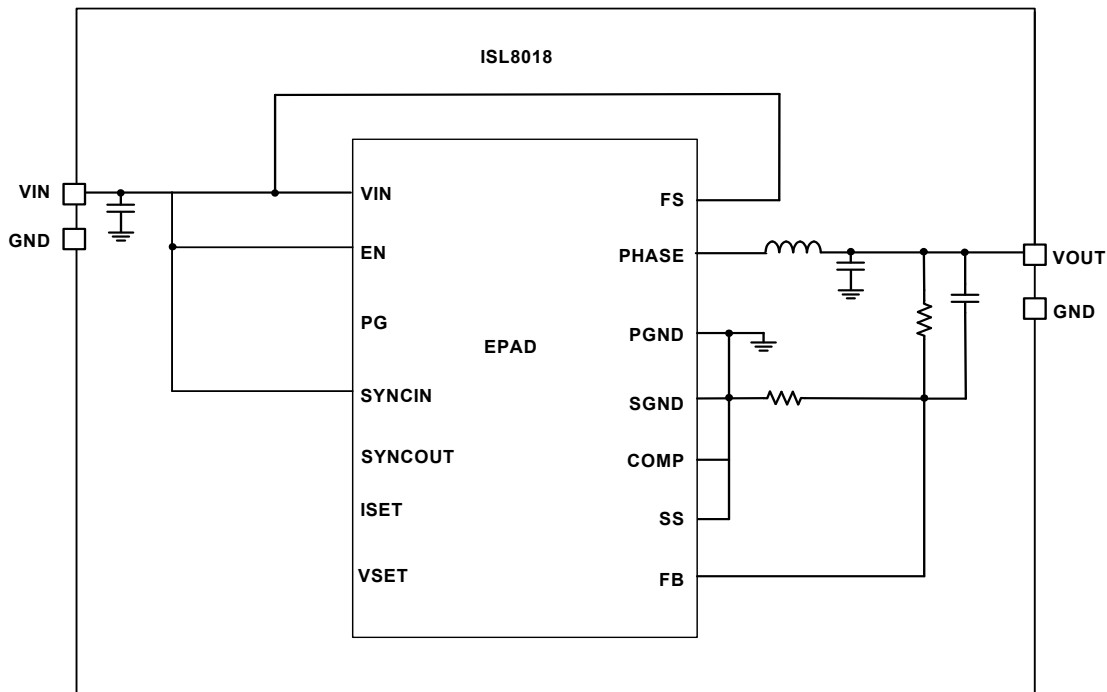


FIGURE 1. ISL8018DEMO1Z BLOCK DIAGRAM

Recommended Equipment

The following materials are recommended to perform testing:

- 0V to 10V power supply with at least 15A source current capability or 5V battery
- Electronic loads capable of sinking current up to 10A
- Digital Multimeters (DMMs)
- 100MHz quad-trace oscilloscope
- Signal generator

Quick Setup Guide

1. Ensure that the circuit is correctly connected to the supply and loads prior to applying any power.
2. Connect the bias supply to VIN, the plus terminal to VIN and the negative return to PGND.
3. Connect the output load to VOUT, the plus terminal to VO and the negative return to PGND.
4. Verify the output voltage is 1.8V for VO.

Functional Description

The ISL8018DEMO1Z board provides a simple platform for the ISL8018.

This device is a monolithic, synchronous step-down DC/DC converter that can deliver up to 8A of continuous output current from 2.7V to 5.5V input supply. It uses peak current mode control architecture to allow low duty cycle operation. The device operates at 1MHz switching frequency.

PCB Layout Guidelines

The PCB layout is a very important converter design step to make sure the designed converter works well. For ISL8018, the power loop is composed of the output inductor L's, the output capacitor C_{OUT}, the PHASE pins and the PGND pin. It is necessary to make the power loop as small as possible and the connecting traces among them should be direct, short and wide. The switching node of the converter, the PHASE pins and the traces connected to the node are very noisy, so keep the voltage feedback trace away from these noisy traces. The input capacitor should be placed as close as possible to the VIN pin and the ground of the input and output capacitors should be connected as close as possible. The heat of the IC is mainly dissipated through the thermal pad. Maximizing the copper area connected to the thermal pad is preferable. In addition, a solid ground plane is helpful for better EMI performance. It is recommended to add at least 5 vias ground connection within the pad for the best thermal relief.

ISL8018DEMO1Z Demonstration Board

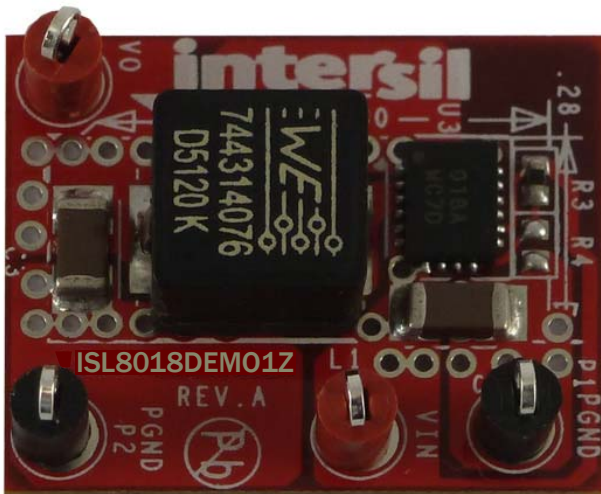


FIGURE 2. TOP SIDE

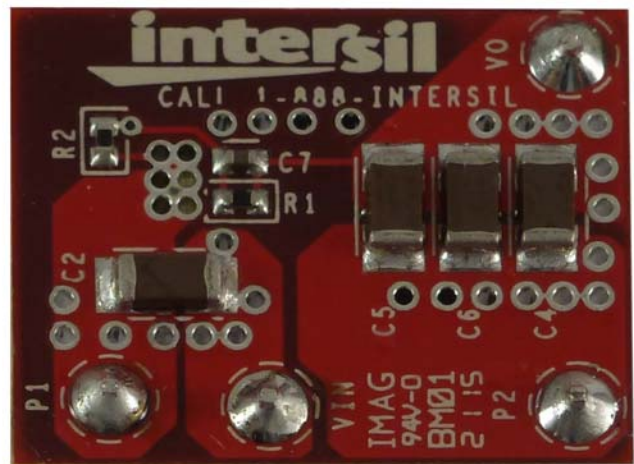


FIGURE 3. BOTTOM SIDE

ISL8018DEM01Z Schematic

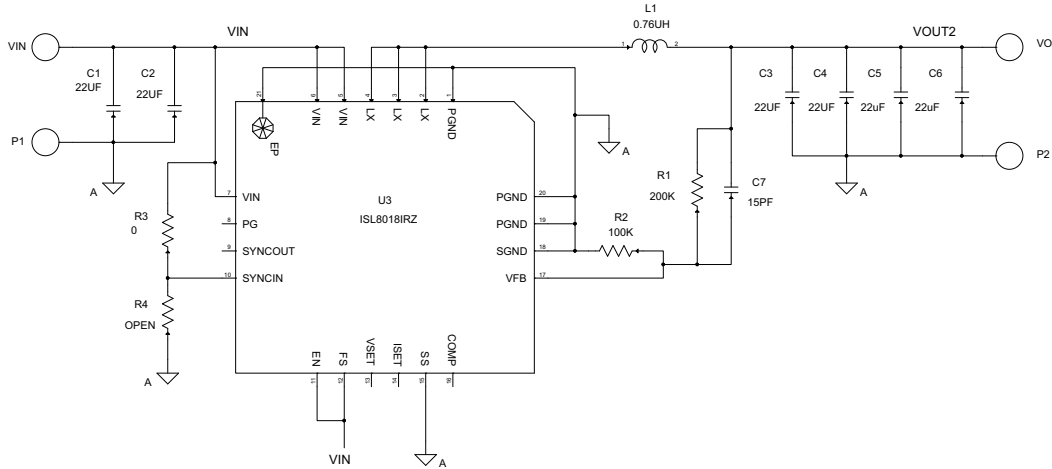


FIGURE 4. ISL8018DEM01Z SCHEMATIC

Bill of Materials

REFERENCE DESIGNATOR	QTY	UNITS	DESCRIPTION	MANUFACTURER	MANUFACTURER PART
	1	ea	ISL8018DEM01ZPCB	IMAGINEERING INC.	ISL8018DEM01ZPCB
C7	1	ea	CAP, SMD, 0402, 15pF, 50V, 5%, NP0, ROHS	MURATA	GRM36COG150J050AQ
C1, C2, C3, C4, C5, C6	6	ea	CAP, SMD, 1206, 22μF, 6.3V, 20%, X5R, 1.6mm Height, ROHS	TDK	C3216X5R0J226M160AA
L1	1	ea	COIL-PWR INDUCTOR, SMD, 7x6.9, 0.76μH, 20%, 15.5A, 2.25mΩ, ROHS	Würth Electronics	744314076
VO, VIN	2	ea	CONN-MINI TEST PT, VERTICAL, RED, ROHS	KEYSTONE	5000
P1, P2	2	ea	CONN-MINI TEST PT, VERTICAL, BLK, ROHS	KEYSTONE	5001
U3	1	ea	IC-ADJ. 8A BUCK REGULATOR, 20P, QFN, 3X4, ROHS	INTERSIL	ISL8018IRAJZ
R3	1	ea	RES, SMD, 0402, 0Ω, 1/16W, 5%, TF, ROHS	VENKEL	H2510-00R00-1/16W-T
R2	1	ea	RES, SMD, 0402, 100k, 1/16W, 1%, TF, ROHS	PANASONIC	ERJ2RKF1003
R1	1	ea	RES, SMD, 0402, 200k, 1/16W, 1%, TF, ROHS	ROHM	MCR01MZPF2003
R4	0	ea	RES, SMD, 0402, DNP, DNP, DNP, TF, ROHS		

Board Layout

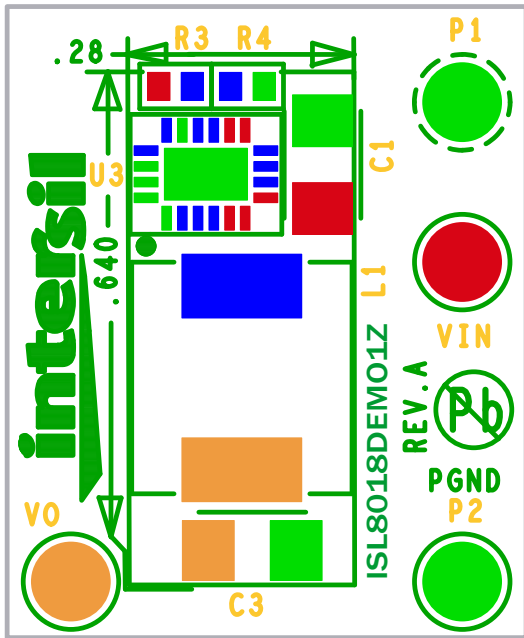


FIGURE 5. TOP COMPONENTS

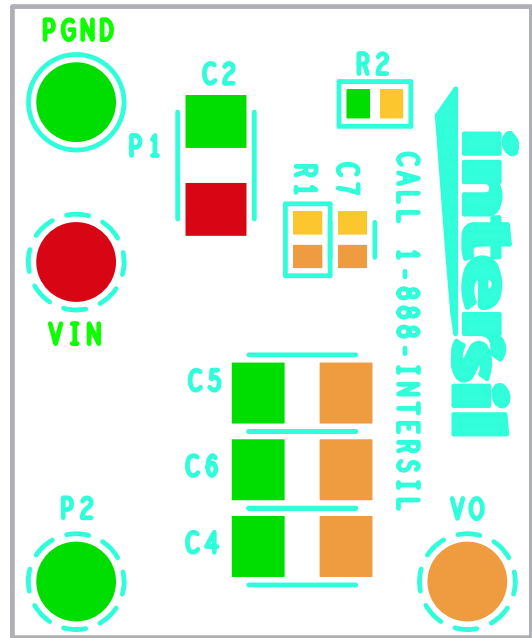


FIGURE 6. BOTTOM SILK SCREEN

Typical Performance Curves $V_{IN} = 5.5V$, $V_{OUT} = 1.8V$, $I_{OUT} = 8A$

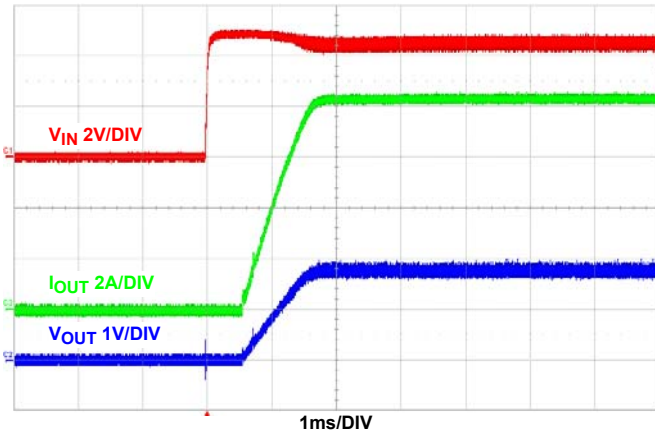


FIGURE 7. V_{IN} AT FULL LOAD

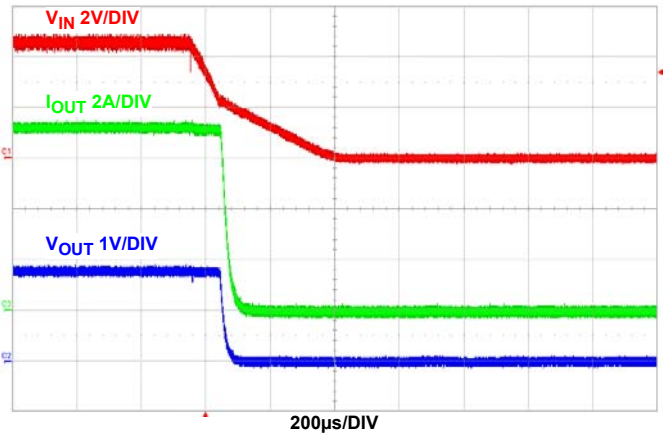


FIGURE 8. SHUTDOWN WITH V_{IN} AT FULL LOAD

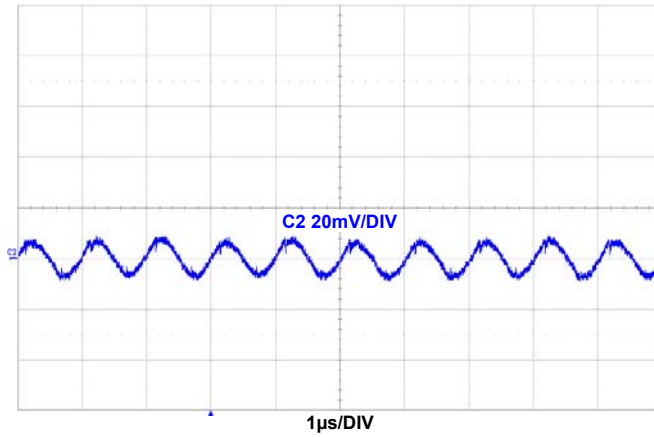


FIGURE 9. V_{OUT} RIPPLE ACROSS THE OUTPUT CAPS

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