User's Manual

ISL80410EVAL1Z

User's Manual: Evaluation Board

Industrial Analog and Power

Rev 0.00 Jan 2018

1. Overview

The ISL80410EVAL1Z evaluation board is designed to demonstrate the performance of the ISL80410 high voltage linear regulator. The evaluation board is available with jumpers to set the output voltage from 2.5V to 12V by configuring a single resistor. The evaluation board can also be configured to give a specific output voltage.

1.1 Key Features

- Wide V_{IN} range of 6V to 40V
- Adjustable output voltage from 2.5V to 12V
- I_{OUT} is 150mA
- Ultra low 18µA typical quiescent current
- ±1% accurate voltage reference
- Overcurrent protection
- Over-temperature/thermal protection

1.2 Specifications

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

- V_{IN} = 6V to 40V
- V_{OUT} = 2.5V to 12V
- I_{OUT} maximum is 150mA
- Selectable output by setting jumper pins JP2 through JP8
- JP1 for setting custom output voltage

1.3 Ordering Information

Part Number	Description
ISL80410EVAL1Z	40V Linear Regulator, 150mA evaluation board

1.4 Related Literature

- For a full list of related documents, visit our website
  - ISL80410 product page

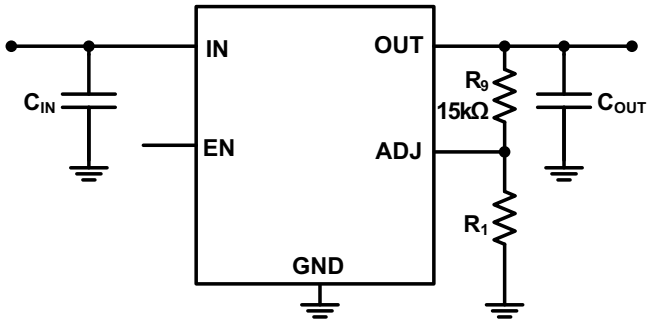

Figure 1. ISL80410EVAL1Z Block Diagram

2. Functional Description

The ISL80410EVAL1Z provides a simple platform to evaluate the performance of the ISL80410, a high input voltage, low quiescent current linear regulator. The ISL80410 can provide 150mA current with only 18µA typical quiescent current. The regulator features a wide input voltage range of 6V to 40V. The output voltage is adjustable from 2.5V to 12V through a feedback resistor divider. The ISL80410 is ideal for applications that need the load to operate under "always-on" or "stay alive" conditions of a high input voltage or under load dump conditions in which the system voltage may peak much higher than normal. In addition, the low dropout performance and high PSRR make this regulator a good choice as a post regulator for a noisy voltage bus.

The ISL80410EVAL1Z evaluation board is set up so that the user can easily configure the device for a specific output voltage with a single jumper. Jumper pins JP4 through JP7 set the output voltage through a discrete range of 2.5V to 12V. When jumper JP1 is set, the user must populate R_1 with a resistor to get a custom output voltage.

The regulator uses a voltage divider to set the feedback reference for setting output voltage. The voltage at the output of the linear regulator when setting a custom output voltage is defined by Equation 1. R_9 is set on the evaluation board at 15kΩ. Rearranging for R_1 yields Equation 2.

(EQ. 1) $$V_{OUT} = 1.223V \times \left(\frac{R_9}{R_1} + 1\right)$$

(EQ. 2) $$R_1 = \frac{18.3k\Omega}{V_{OUT} - 1.223}$$

Table 1. Evaluation Board Output Voltage

V_{OUT} (V)	RSET	Jumper Setting
2.5	14kΩ	JP4
3.3	8.66kΩ	JP5
5	4.75kΩ	JP6
12	1.65kΩ	JP7
Custom	R_1 = 18.3kΩ/(V_{OUT} - 1.223V)	JP1

2.1 Quick Start Guide

(1) Set the appropriate jumper for the desired output voltage.

(2) Set jumper JP9, shorting pins 1 and 2, to enable the device.

(3) Connect a supply of +6V to +40V to the VIN and GND terminals.

(4) Connect VOUT to a load or a multimeter to evaluate the output.

3. PCB Layout Guidelines

Good PCB layout is important to achieve expected performance. Take care when placing the components and routing the trace to minimize the ground impedance and keep the parasitic inductance low. The input and output capacitors should have a good ground connection and be placed as close to the IC as possible. The ADJ feedback trace should be away from other noisy traces. Connect the exposed pad to the ground plane using as many vias as possible within the pad for the best thermal relief.

3.1 ISL80410EVAL1Z Evaluation Board

Figure 2. ISL80410EVAL1Z Evaluation Board (Top)

3.2 ISL80410EVAL1Z Schematic

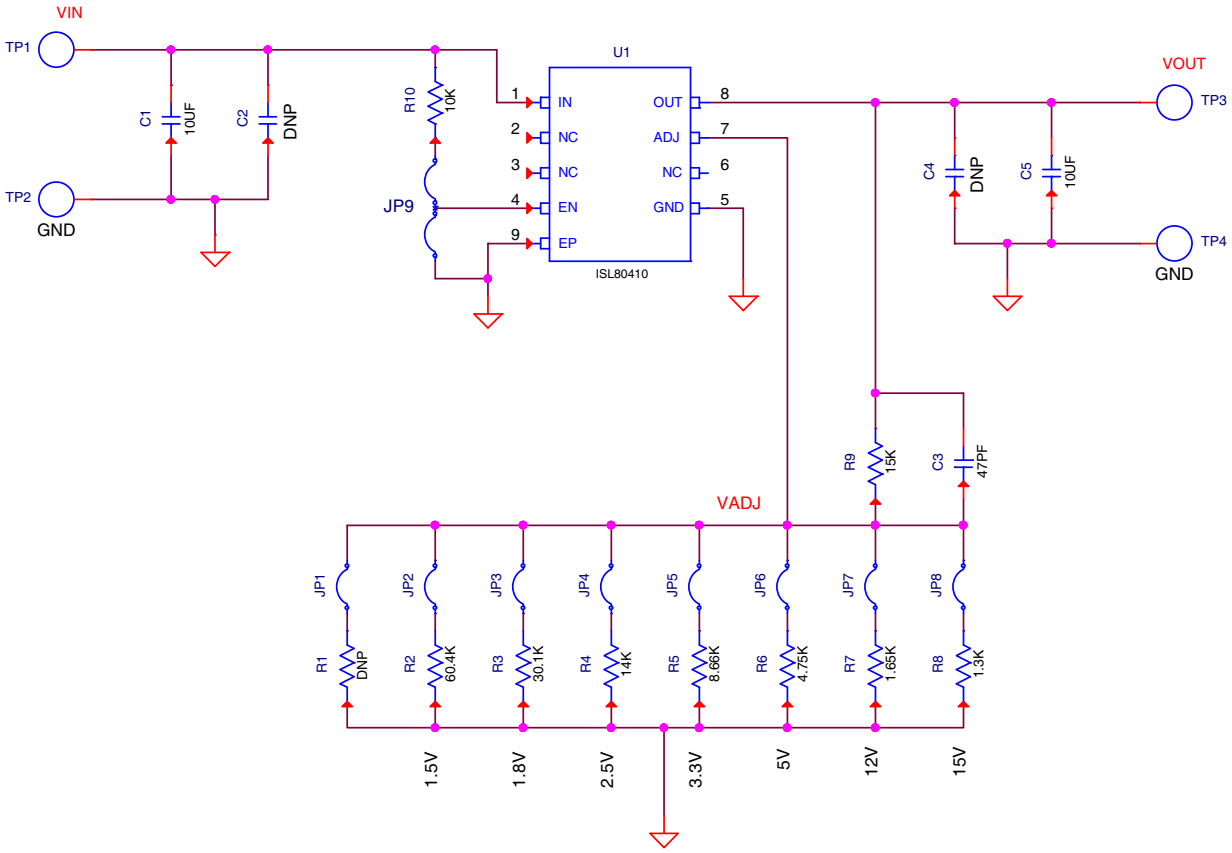

Figure 3. Schematic

3.3 Bill of Materials

Qty	Reference Designator	Description	Manufacturer	Manufacturer Part Number
1	C3	CAP, SMD, 0603, 47pF, 50V, 5%, C0G, NP0, ROHS	AVX	06035A470JAT2A
4	C1, C2, C4, C5	CAP, SMD, 1206, 10µF, 50V, 10%, X5R, ROHS	TDK	C3216X5R1H106K
4	TP1, TP2, TP3, TP4	CONN-TURRET, TERMINAL POST, TH, ROHS	Keystone	1514-2
1	JP9	CONN-HEADER, 1x3, BREAKAWY 1x36, 2.54mm, ROHS	Berg/FCI	68000-236HLF
8	JP1, JP2, JP3, JP4, JP5, JP6, JP7, JP8	CONN-HEADER, 1X2, RETENTIVE, 2.54mm, 0.230x 0.120, ROHS	Berg/FCI	69190-202HLF
2	JP6, JP9-Pins 1 and 2	CONN-JUMPER, SHORTING, 2PIN, BLACK, GOLD, ROHS	Sullins	SPC02SYAN
1	U1	IC-40V LDO ADJ. LINEAR REGULATOR, 8P, EPSOIC, ROHS	Renesas	ISL80410
1	R10	RES, SMD, 0603, 10k, 1/10W, 1%, TF, ROHS	KOA	RK73H1JT1002F
1	R8	RES, SMD, 0603, 1.3k, 1/10W, 1%, TF, ROHS	Vishay/Dale	CRCW06031K30FKTA
1	R4	RES, SMD, 0603, 14k, 1/10W, 1%, TF, ROHS	Venkel	CR0603-10W-1402FT
1	R9	RES, SMD, 0603, 15k, 1/10W, 1%, TF, ROHS	Panasonic	ERJ-3EKF1502V
1	R7	RES, SMD, 0603, 1.65k, 1/10W, 1%, TF, ROHS	Panasonic	ERJ-3EKF1651V
1	R3	RES, SMD, 0603, 30.1k, 1/10W, 1%, TF, ROHS	Venkel	CR0603-10W-3012FT
1	R6	RES, SMD, 0603, 4.75k, 1/10W, 1%, TF, ROHS	Venkel	CR0603-10W-4751FT
1	R2	RES, SMD, 0603, 60.4k, 1/10W, 1%, TF, ROHS	Yageo	RC0603FR-0760K4L
1	R5	RES, SMD, 0603, 8.66k, 1/10W, 1%, TF, ROHS	Panasonic	ERJ-3EKF8661V
0	R1	RES, SMD, 0603, DNP-PLACE HOLDER, ROHS		

3.4 Board Layout

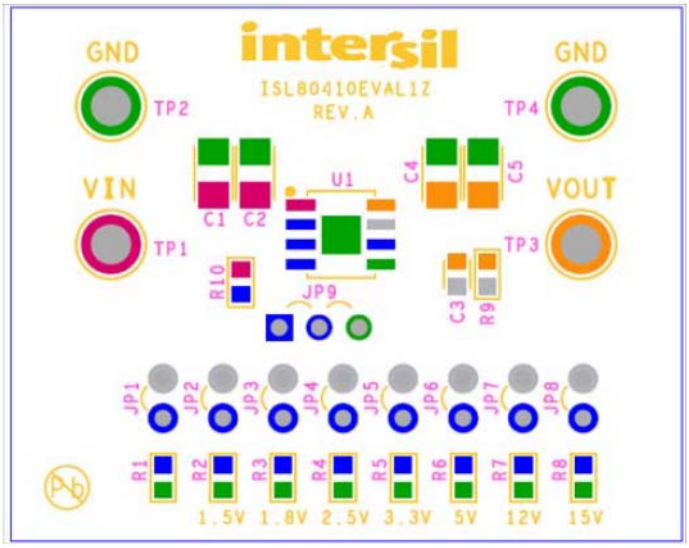

Figure 4. ISL80410EVAL1Z Silkscreen Top

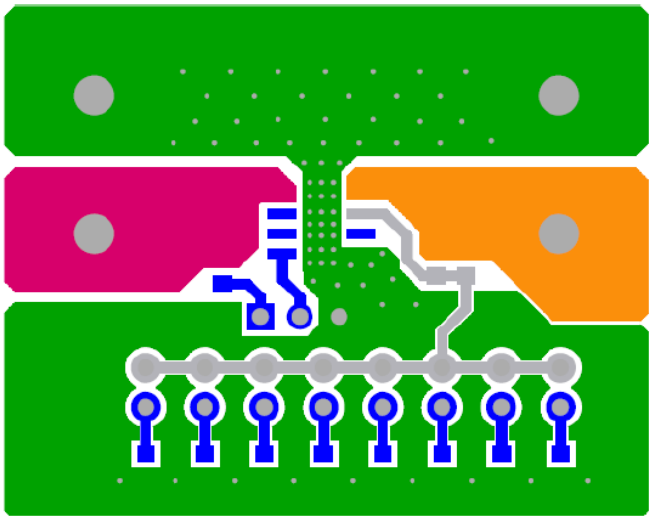

Figure 5. ISL80410EVAL1Z Top

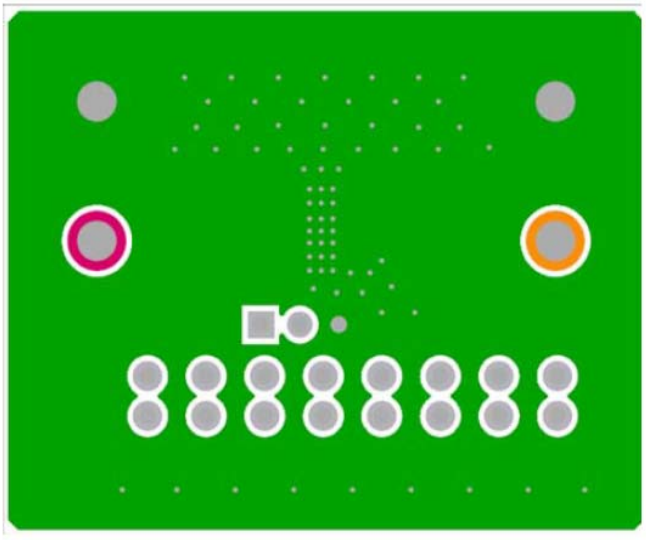

Figure 6. ISL80410EVAL1Z Bottom

4. Typical Performance Curves

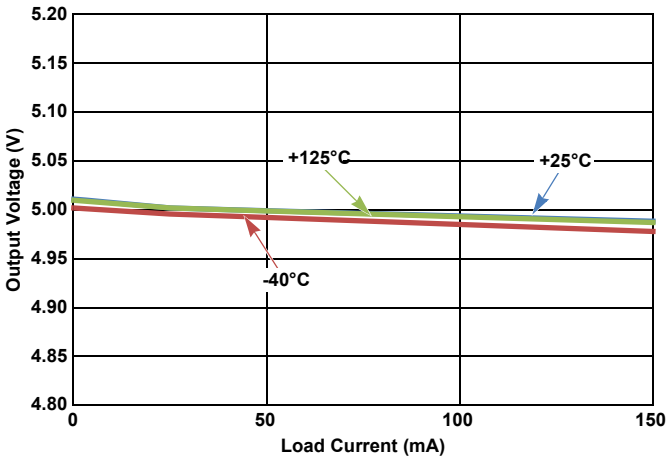

Figure 7. ISL80410 Output Voltage vs Load Current

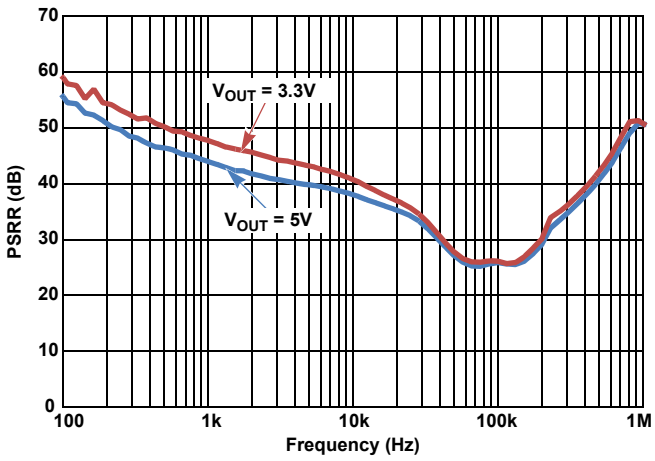

Figure 8. ISL80410 PSRR vs Frequency for Various Output Voltages, (Load = 150mA)

5. Revision History

Rev.	Date	Description
0.00	Jan 18, 2018	Initial release

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