

ISL71091SEHXXEV1Z

Evaluation Board

AN1906
Rev.1.00
May 28, 2014

Introduction

The ISL71091SEHXXEV1Z evaluation boards are designed to measure the performance of the radiation hardened ultra low noise, high precision [ISL71091SEH](#) voltage reference family. There are four output voltage options in the reference family, and they have a wide input voltage range up to 30V and an initial accuracy of 0.05%. With ultra low voltage noise of 3.3 μ V_{P-P} in the 0.1Hz to 10Hz range (2.048V option), a maximum output voltage temperature coefficient of 6ppm/ $^{\circ}$ C, and excellent radiation performance, the ISL71091SEH is ideal for space applications.

Specifications

The boards are designed to operate at the following conditions:

- Input voltage range:
 - 2.048V option = 4.2V to 30V
 - 3.3V option = 4.6V to 30V
 - 4.096V option = 6V to 30V
 - 10V option = 12V to 30V
- Output current capability: Source 10mA, Sink 5mA
- Operating temperature range: -55 $^{\circ}$ C to +125 $^{\circ}$ C

Features

- Small, compact design
- Multiple connectors to easily monitor V_{IN} and V_{OUT}
- Four output voltage options

Reference Documents

- [ISL71091SEH20](#) Datasheet
- [ISL71091SEH33](#) Datasheet
- [ISL71091SEH40](#) Datasheet
- [ISL71091SEH10](#) Datasheet

Ordering Information

ORDERING NUMBER	OUTPUT VOLTAGE (V)	TYPE
ISL71091SEH20EV1Z	2.048	Evaluation Board
ISL71091SEH33EV1Z	3.3	Evaluation Board
ISL71091SEH40EV1Z	4.096	Evaluation Board
ISL71091SEH10EV1Z	10.0	Evaluation Board

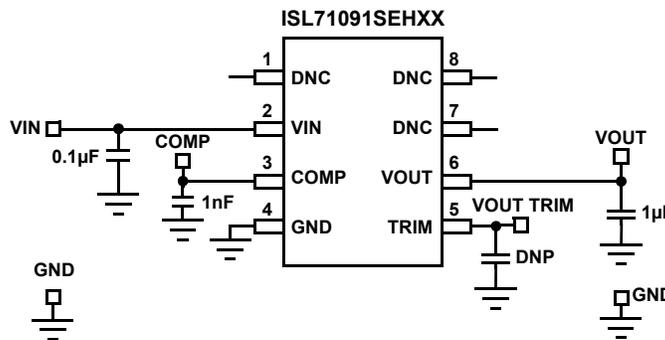


FIGURE 1. ISL71091SEHXXEV1Z BLOCK DIAGRAM

Functional Description

The schematic of the evaluation board is shown on [page 4](#). The ISL71091SEHXXEV1Z contains the ISL71091SEH voltage reference (U1), input decoupling capacitor (C₁), compensation capacitor (C₂), and load capacitor (C₄). Component values are listed in [Table 1](#).

The power supply leads attach to TP1 and TP2 (V_{IN}, GND). The output is measured at test points TP8 and TP9 (V_{OUT}, GND), and is best measured with a high quality voltmeter in DC conditions. In addition, there is a BNC connector on V_{OUT} to aid in taking measurements such as voltage noise. The SP1 (V_{IN}), SP2 (GND), and SP3 (V_{OUT}) are oscilloscope probe test points for easy connection to an oscilloscope. When testing the output voltage of the device under load, it is recommended to attach the load to the test point turret or BNC connector and monitor the voltage

from the oscilloscope test point. If smaller transient overshoot is desired, increase C₄ to 10μF and C₂ to 10nF. However, note that the settling time also increases.

TRIM 1-3

The TRIM1, TRIM2, and TRIM3 pins are for factory use only. Do not connect these to the circuit in any way. It will adversely effect the performance of the reference.

Device Performance

The following plots show the performance of the voltage reference that can be expected on the evaluation board. V_{IN} = 8V unless otherwise specified.

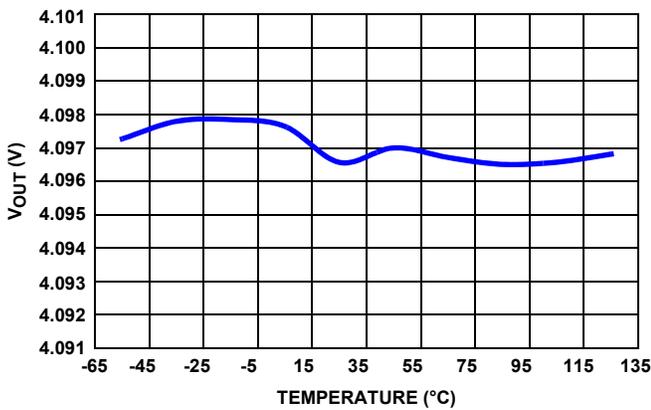


FIGURE 2. V_{OUT} vs TEMPERATURE

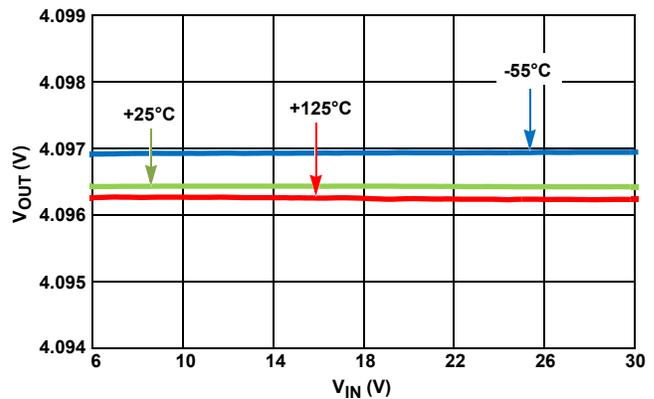


FIGURE 3. LINE REGULATION vs V_{OUT} OVER TEMPERATURE

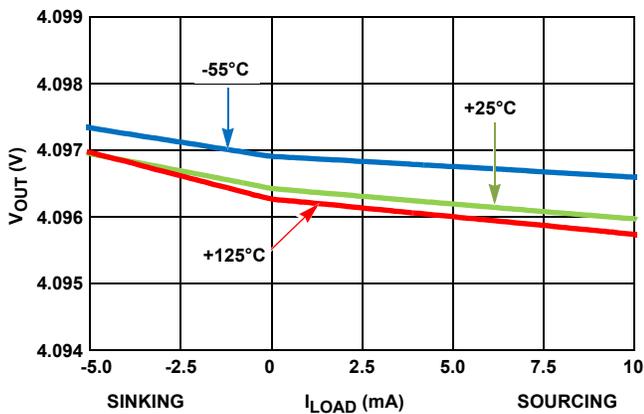


FIGURE 4. LOAD REGULATION vs V_{OUT} OVER TEMPERATURE

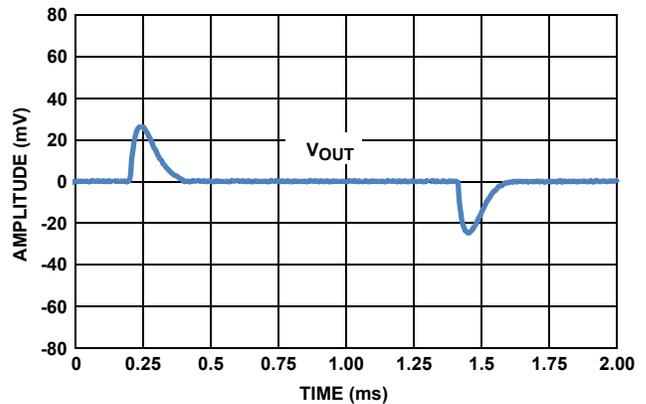


FIGURE 5. LOAD TRANSIENT (ΔI_L = 1mA)

TABLE 1. COMPONENTS PARTS LIST

REFERENCE	VALUE	DESCRIPTION
BNC1		Coaxial Cable PCB Mount Receptacle
C1	0.1 μ F	Bypass Capacitor 0805, X7R, 50V, 10%
C2	1nF	Compensation Capacitor 0805, X7R, 50V, 10%
C3	DNP	
C4	1 μ F	Load Capacitor 0805, X7R, 50V, 10%
SP1 - SP3		Scope Probe Test Point PCB Mount
TP1, TP2, TP4, TP5, TP8, TP9		1514-2 Test Point Turret
TP3, TP7, TP8	DNP	
U1	ISL71091SEHXX	Radiation Hardened Ultra Low Noise, Precision Voltage Reference

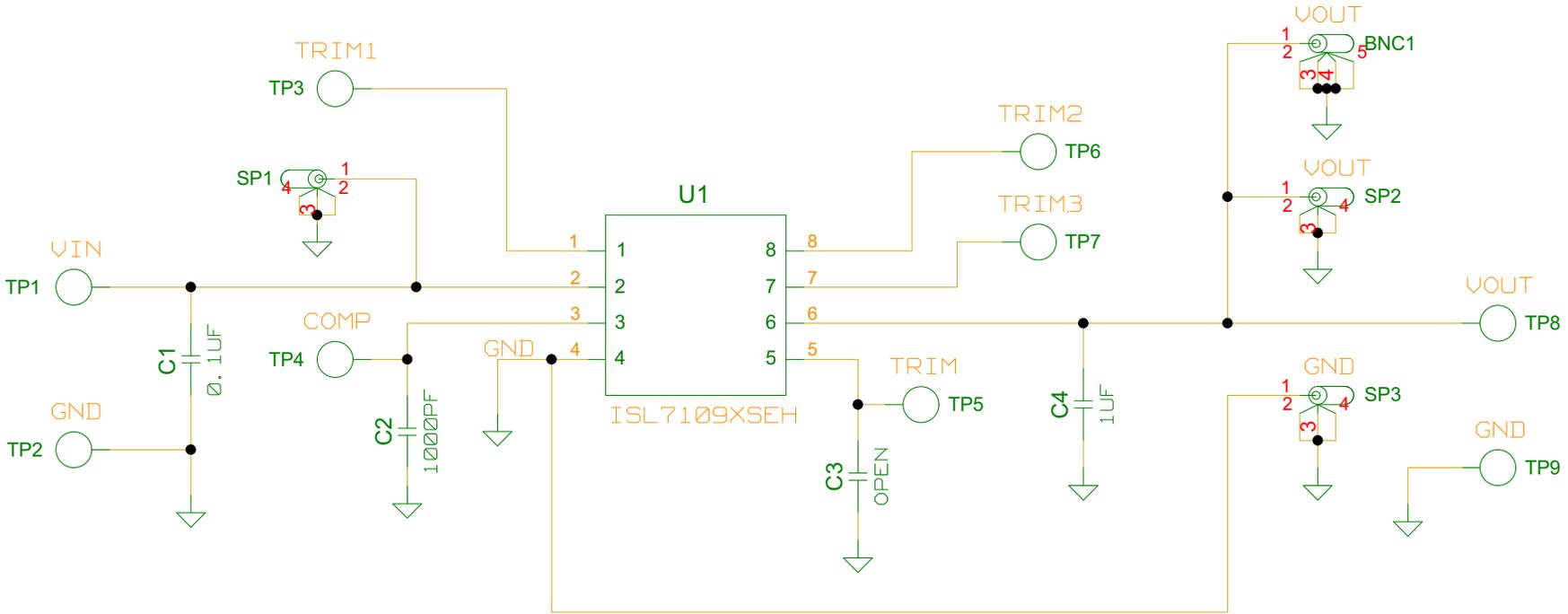


FIGURE 6. VOLTAGE REFERENCE EVALUATION BOARD (FRONT)



FIGURE 7. VOLTAGE REFERENCE EVALUATION BOARD (BACK)

ISL71091SEHXXEV1Z Schematic



Voltage Reference Evaluation Board Layout

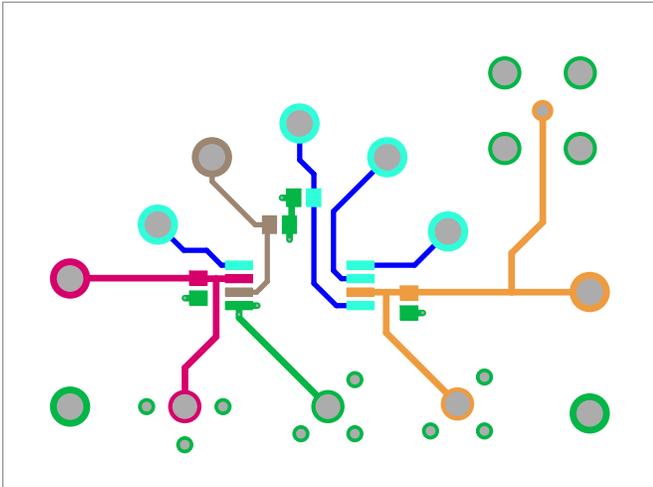


FIGURE 8. TOP LAYER

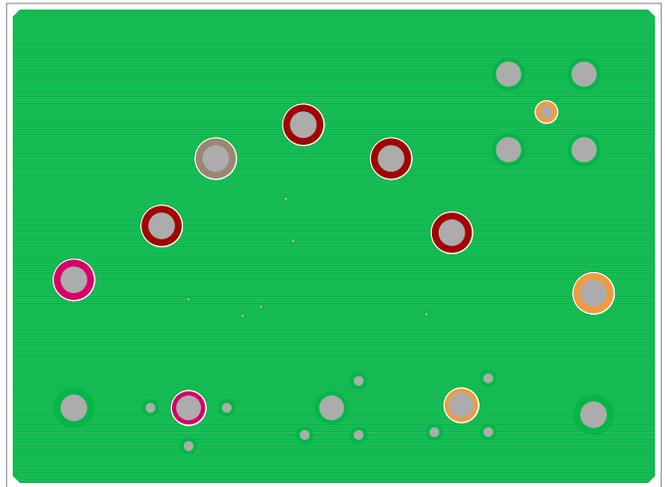


FIGURE 9. BOTTOM LAYER (VIEWED FROM TOP)

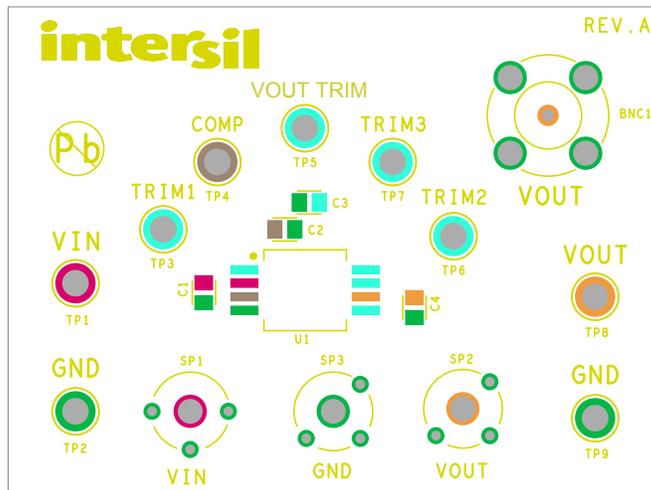


FIGURE 10. TOP SILKSCREEN

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Renesas Electronics America Inc.
1001 Murphy Ranch Road, Milpitas, CA 95035, U.S.A.
Tel: +1-408-432-8888, Fax: +1-408-434-5351

Renesas Electronics Canada Limited
9251 Yonge Street, Suite 8309 Richmond Hill, Ontario Canada L4C 9T3
Tel: +1-905-237-2004

Renesas Electronics Europe Limited
Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K
Tel: +44-1628-651-700, Fax: +44-1628-651-804

Renesas Electronics Europe GmbH
Arcadiastrasse 10, 40472 Düsseldorf, Germany
Tel: +49-211-6503-0, Fax: +49-211-6503-1327

Renesas Electronics (China) Co., Ltd.
Room 1709 Quantum Plaza, No.27 ZhichunLu, Haidian District, Beijing, 100191 P. R. China
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

Renesas Electronics (Shanghai) Co., Ltd.
Unit 301, Tower A, Central Towers, 555 Langao Road, Putuo District, Shanghai, 200333 P. R. China
Tel: +86-21-2226-0888, Fax: +86-21-2226-0999

Renesas Electronics Hong Kong Limited
Unit 1601-1611, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong
Tel: +852-2265-6688, Fax: +852-2886-9022

Renesas Electronics Taiwan Co., Ltd.
13F, No. 363, Fu Shing North Road, Taipei 10543, Taiwan
Tel: +886-2-8175-9600, Fax: +886-2-8175-9670

Renesas Electronics Singapore Pte. Ltd.
80 Bendemeer Road, Unit #06-02 Hyflux Innovation Centre, Singapore 339949
Tel: +65-6213-0200, Fax: +65-6213-0300

Renesas Electronics Malaysia Sdn.Bhd.
Unit 1207, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: +60-3-7955-9390, Fax: +60-3-7955-9510

Renesas Electronics India Pvt. Ltd.
No.777C, 100 Feet Road, HAL 2nd Stage, Indiranagar, Bangalore 560 038, India
Tel: +91-80-67208700, Fax: +91-80-67208777

Renesas Electronics Korea Co., Ltd.
17F, KAMCO Yangjae Tower, 262, Gangnam-daero, Gangnam-gu, Seoul, 06265 Korea
Tel: +82-2-558-3737, Fax: +82-2-558-5338