

## ISL6273EVAL1

### Evaluation Board Application Manual

AN1265  
Rev 0.00  
Aug 22, 2006

The ISL6273EVAL1 board provides a convenient platform to evaluate the performance of the ISL6273 low-quiescent high-efficiency step-down switching regulator. The ISL6273 is a 1.5MHz, 1.2A adjustable output voltage regulator. The output voltage is set by a resistor divider consisting of R1 and R2 on the board. The output voltage is set to 1.6V in the evaluation board but can be modified by changing the R2 value. The evaluation board also allows users to evaluate the forced PWM or PFM operation mode at light load and the behavior of the POR signal.

### ISL6273EVAL1 Evaluation Board

A photo of the ISL6273EVAL1 board is shown in Figure 1. The schematic, layout and bill-of-materials (BOM) are given at the end of this application note. The complete regulator is located at the center of the board. Various connectors and jumpers are provided for the convenience of the evaluation. On the left side of the board are the connectors for the input power source (Red: VIN; Black: GND). The output connectors are located on the right side (Red: VO; Black: GND). The two yellow test points are for the RSI and POR signals respectively, as labelled on the board. The RSI input needs either be driven to a low or a high logic input. **Do not leave the RSI input signal floating.** The open-drain POR signal is pulled up to VIN through a 100kΩ resistor (R3), as shown in the schematics. Jumper H1 allows the user to enable or disable the IC. Jumper H2 is the mode selection input. **Do not leave the EN or the MODE signal floating.** The settings for the two jumpers are shown in Figure 2. The evaluation board also offers two oscilloscope probe tip connectors to minimize the switching noise on the waveforms. TP1 is the connector for the output voltage and TP2 is the PHASE signal.

### Specifications

Table 1 shows the electrical specification of the regulator in the evaluation board.

TABLE 1. ELECTRICAL SPECIFICATIONS.

PARAMETER	MIN	TYP	MAX	UNIT
Input Voltage	2.7	-	5.5	V
Output Voltage (Note)	-	1.6	-	V
Output Current	1.2	-	-	A

NOTE: The output voltage can be set to other values by changing the R2 value.

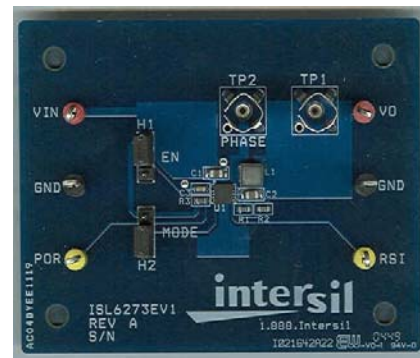


FIGURE 1. PHOTO OF THE ISL6273EVAL1 BOARD

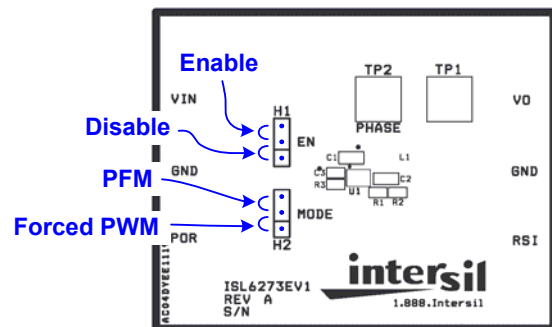


FIGURE 2. SETTINGS FOR JUMPERS H1 AND H2

### Evaluation Board Setup

The following are steps for setting up the evaluation board:

1. Connect Jumper H1 at the position of Enable.
2. Connect Jumper H2 either at the position of PFM or Forced PWM, but do not leave it floating.
3. Connect the RSI input to either ground or VIN. Do not leave it floating.
4. Connect a power supply with an output voltage between 2.7V to 5.5V to VIN and GND connectors. Make sure the power supply has enough current capability (1A recommended).
5. Connect the output to a load (resistor or electronic load).
6. Turn on the input power supply.

### Typical Operating Characteristics

This section shows typical waveforms and performance captured from the evaluation board.

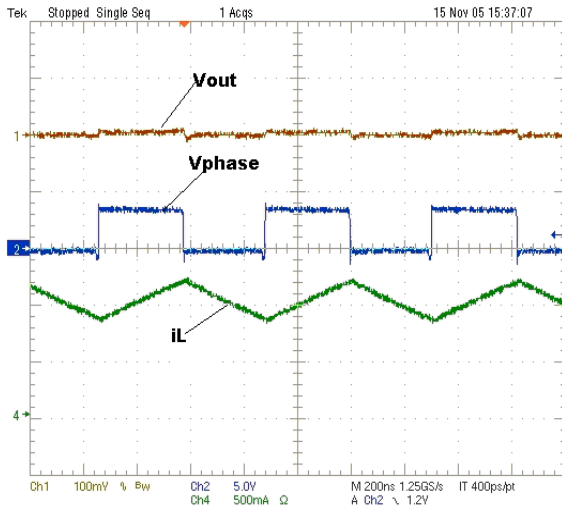


FIGURE 3. STEADY-STATE IN PWM MODE  
( $V_{IN} = 3.6V$ ;  $V_O = 1.6V$ ;  $I_O = 1A$ )

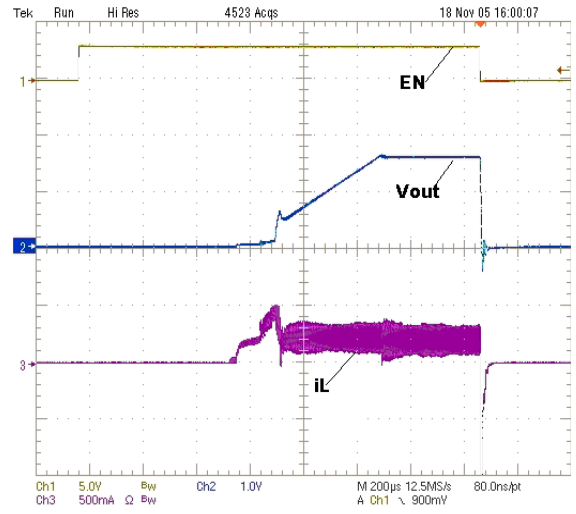


FIGURE 4. SOFT-START

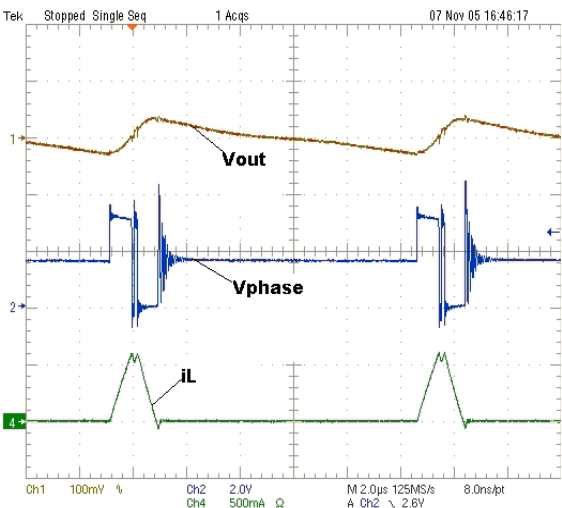


FIGURE 5. PFM MODE ( $V_{IN} = 3V$ ;  $V_O = 1.6V$ ;  $I_O = 50mA$ )

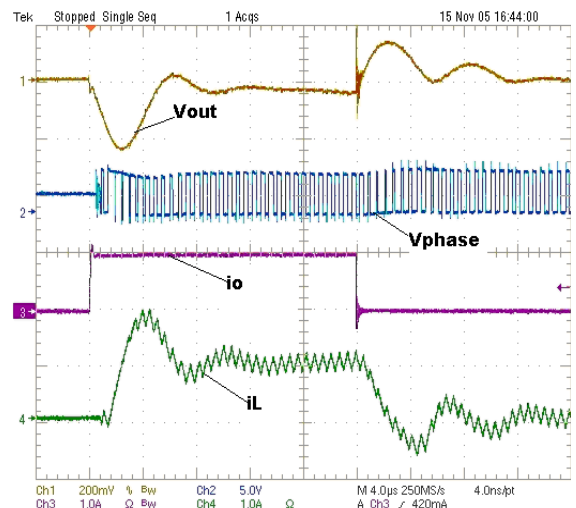


FIGURE 6. TRANSIENT LOAD TEST (PFM AND PWM)  
 $V_{IN} = 3.6V$ ;  $V_O = 1.6V$ ;  $I_O = 0A-1A$

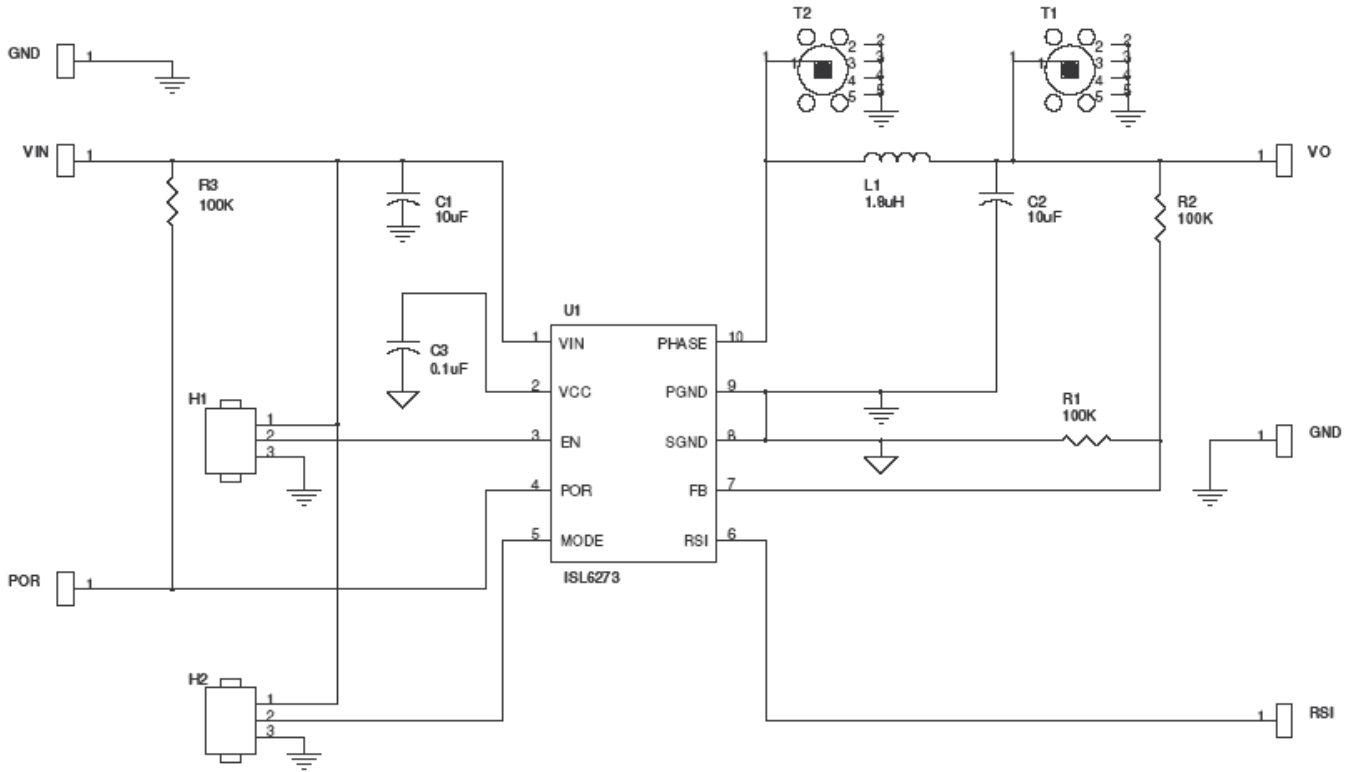
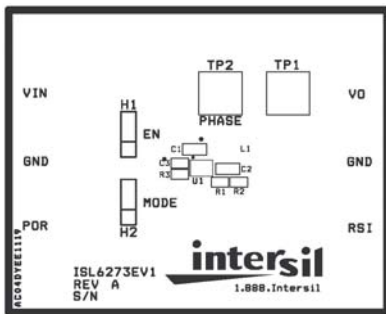
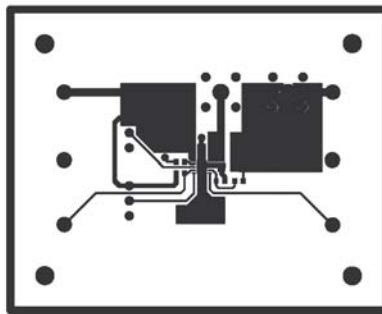


FIGURE 7. SCHEMATIC OF THE ISL6273EVAL1 EVALUATION BOARD

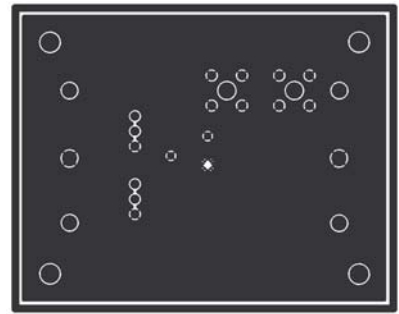
**PCB Layout**



SILK SCREEN



TOP LAYER



BOTTOM LAYER

FIGURE 8. LAYOUT OF THE ISL6273EVAL1 BOARD

TABLE 2. BILL OF MATERIALS

ITEM	QTY	REF	DESCRIPTION	VENDOR	PART NUMBER	PACKAGE
1	2	C1, C2	Capacitor, SMD, 10 $\mu$ F, 6.3V, 10%, X5R	Any		0805
2	1	C3	Capacitor, SMD, 0.1 $\mu$ F, 6.3V, 10%, X5R	Any		0603
3	1	L1	Inductor, 1.8 $\mu$ H, Coilcraft 1008PS Series	Coicraft	1008PS-182K	
4	3	R1, R2, R3	Resistor, SMD, 100k, 1%	Any		0603
5	6	T1-T6	Circuit Pin Prntd 0.050"D 0.082"L	Mill-Max	3156-2-00-21-00-00-08-0	
6	2	TP1, TP2	Conn-Gen, Scope Probe Test PT, Compact	TEKTRONICS	131-5031-00	
7	2	H1, H2	Conn-Header, 1x3, Brkawy 1X36, 2.54mm, ST	BERG/FCI	68000-236-1X3	
8	1	U1	ISL6273 DFN-10 Package	Intersil	ISL6273	3X3 DFN-10

## Notice

1. Descriptions of circuits, software and other related information in this document are provided only to illustrate the operation of semiconductor products and application examples. You are fully responsible for the incorporation or any other use of the circuits, software, and information in the design of your product or system. Renesas Electronics disclaims any and all liability for any losses and damages incurred by you or third parties arising from the use of these circuits, software, or information.
2. Renesas Electronics hereby expressly disclaims any warranties against and liability for infringement or any other claims involving patents, copyrights, or other intellectual property rights of third parties, by or arising from the use of Renesas Electronics products or technical information described in this document, including but not limited to, the product data, drawings, charts, programs, algorithms, and application examples.
3. No license, express, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of Renesas Electronics or others.
4. You shall not alter, modify, copy, or reverse engineer any Renesas Electronics product, whether in whole or in part. Renesas Electronics disclaims any and all liability for any losses or damages incurred by you or third parties arising from such alteration, modification, copying or reverse engineering.
5. Renesas Electronics products are classified according to the following two quality grades: "Standard" and "High Quality". The intended applications for each Renesas Electronics product depends on the product's quality grade, as indicated below.  
"Standard": Computers; office equipment; communications equipment; test and measurement equipment; audio and visual equipment; home electronic appliances; machine tools; personal electronic equipment; industrial robots; etc.  
"High Quality": Transportation equipment (automobiles, trains, ships, etc.); traffic control (traffic lights); large-scale communication equipment; key financial terminal systems; safety control equipment; etc.  
Unless expressly designated as a high reliability product or a product for harsh environments in a Renesas Electronics data sheet or other Renesas Electronics document, Renesas Electronics products are not intended or authorized for use in products or systems that may pose a direct threat to human life or bodily injury (artificial life support devices or systems; surgical implantations; etc.), or may cause serious property damage (space system; undersea repeaters; nuclear power control systems; aircraft control systems; key plant systems; military equipment; etc.). Renesas Electronics disclaims any and all liability for any damages or losses incurred by you or any third parties arising from the use of any Renesas Electronics product that is inconsistent with any Renesas Electronics data sheet, user's manual or other Renesas Electronics document.
6. When using Renesas Electronics products, refer to the latest product information (data sheets, user's manuals, application notes, "General Notes for Handling and Using Semiconductor Devices" in the reliability handbook, etc.), and ensure that usage conditions are within the ranges specified by Renesas Electronics with respect to maximum ratings, operating power supply voltage range, heat dissipation characteristics, installation, etc. Renesas Electronics disclaims any and all liability for any malfunctions, failure or accident arising out of the use of Renesas Electronics products outside of such specified ranges.
7. Although Renesas Electronics endeavors to improve the quality and reliability of Renesas Electronics products, semiconductor products have specific characteristics, such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Unless designated as a high reliability product or a product for harsh environments in a Renesas Electronics data sheet or other Renesas Electronics document, Renesas Electronics products are not subject to radiation resistance design. You are responsible for implementing safety measures to guard against the possibility of bodily injury, injury or damage caused by fire, and/or danger to the public in the event of a failure or malfunction of Renesas Electronics products, such as safety design for hardware and software, including but not limited to redundancy, fire control and malfunction prevention, appropriate treatment for aging degradation or any other appropriate measures. Because the evaluation of microcomputer software alone is very difficult and impractical, you are responsible for evaluating the safety of the final products or systems manufactured by you.
8. Please contact a Renesas Electronics sales office for details as to environmental matters such as the environmental compatibility of each Renesas Electronics product. You are responsible for carefully and sufficiently investigating applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive, and using Renesas Electronics products in compliance with all these applicable laws and regulations. Renesas Electronics disclaims any and all liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.
9. Renesas Electronics products and technologies shall not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable domestic or foreign laws or regulations. You shall comply with any applicable export control laws and regulations promulgated and administered by the governments of any countries asserting jurisdiction over the parties or transactions.
10. It is the responsibility of the buyer or distributor of Renesas Electronics products, or any other party who distributes, disposes of, or otherwise sells or transfers the product to a third party, to notify such third party in advance of the contents and conditions set forth in this document.
11. This document shall not be reprinted, reproduced or duplicated in any form, in whole or in part, without prior written consent of Renesas Electronics.
12. Please contact a Renesas Electronics sales office if you have any questions regarding the information contained in this document or Renesas Electronics products.  
(Note 1) "Renesas Electronics" as used in this document means Renesas Electronics Corporation and also includes its directly or indirectly controlled subsidiaries.  
(Note 2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics.

(Rev.4.0-1 November 2017)



### SALES OFFICES

Renesas Electronics Corporation

<http://www.renesas.com>

Refer to "<http://www.renesas.com/>" for the latest and detailed information.

**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