

STEVAL-ISB013V1 demonstration board based on the STC3105 battery monitor IC with alarm output for gas gauge applications

Introduction

This user manual describes the STEVAL-ISB013V1, a demonstration board specifically designed for the STC3105 battery monitor IC.

The document provides:

- a brief description of the STC3105 device
- a description of the demonstration board
- a detailed bill of materials for the demonstration board
- the layout of the demonstration board

Figure 1. STEVAL-ISB013V1 demonstration board



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1 STC3105 overview

The STC3105 monitors the voltage and current of the battery and includes a Coulomb counter to keep track of the charge/discharge status. An alarm output signals a low State-Of-Charge (SOC) condition and/or a low battery voltage. In addition, a relaxation register starts to count when the gas gauge is in a specified light-load condition, indicating when an OCV (Open Circuit Voltage) measurement should be made for SOC correction.

Features of the STC3105 include:

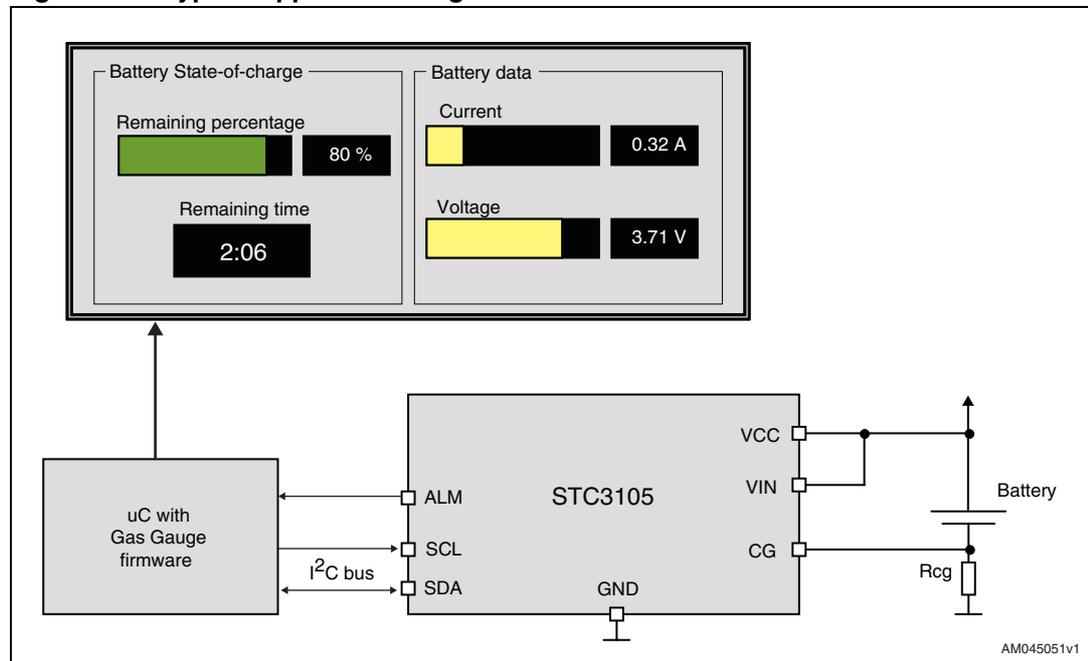
- Accurate battery voltage measurement
- Coulomb counter to keep track of the battery's SOC
- Internal 32.768 kHz time base
- Low-battery alarm output with programmable SOC and voltage thresholds
- Relaxation timer to track the load condition (user programmable load current threshold)
- I²C interface for battery monitoring and device control

Performance criteria of the device are:

- 0.5% battery voltage accuracy
- 1% Coulomb counter accuracy using an external sensing resistor
- Low power consumption: 100 μ A in active operating conditions, 50 μ A in power saving operating conditions, 2 μ A in standby mode and 1 μ A in power-down mode

The device is packaged in a TDFN8, 3 mm x 2 mm x 0.75 mm (pitch 0.65 mm) (as used in the demonstration board).

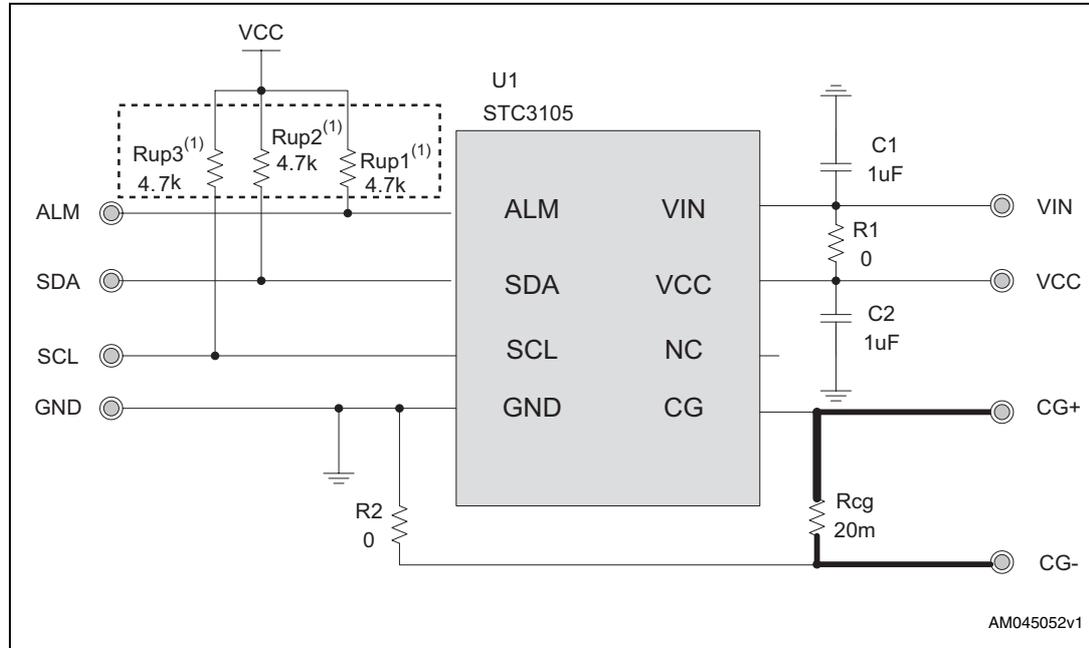
Figure 2. Typical application diagram for the STC3105



2 Demonstration board description

The STEVAL-ISB013V1 is a demonstration board designed to help the user evaluate the performance of the STC3105.

Figure 3. Demonstration board schematic



1. Pull-up resistors are not mounted on the board. The user must either mount them on the board to pull up to V_{CC} or pull up externally.

Table 1. Bill of materials

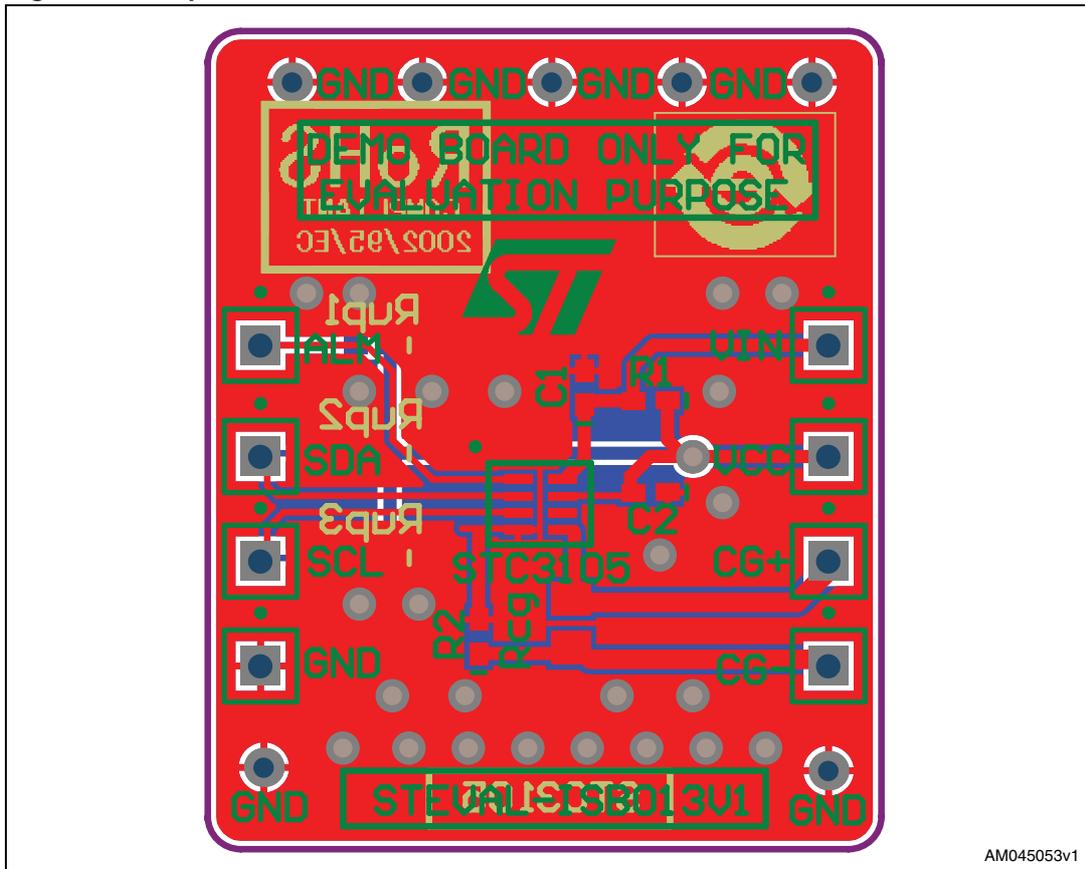
Reference	Part/value	Footprint	Description
U1	STC3105	TDFN8 3 mm x 2 mm	Battery monitoring integrated circuit from STMicroelectronics
R1	0 Ω	0402	Strap
R2	0 Ω	0402	Isolate current to GND plane. Not necessary on the user's PCB.
Rcg	20 mΩ / ±1%	0805	Shunt resistor
Rup1	4.7 k / ±5%	0402	Pull-up resistor is not mounted on the board (option for onboard pull-up to V _{CC}).
Rup2	4.7 k / ±5%	0402	Pull-up resistor is not mounted on the board (option for onboard pull-up to V _{CC}).
Rup3	4.7 k / ±5%	0402	Pull-up resistor is not mounted on the board (option for onboard pull-up to V _{CC}).
C1	1 µF / 16 V / X7R	0402	Optional filtering capacitor
C2	1 µF / 10 V / X7R	0402	Decoupling capacitor

3 Demonstration board layout

The printed circuit board of the demonstration board has the following characteristics:

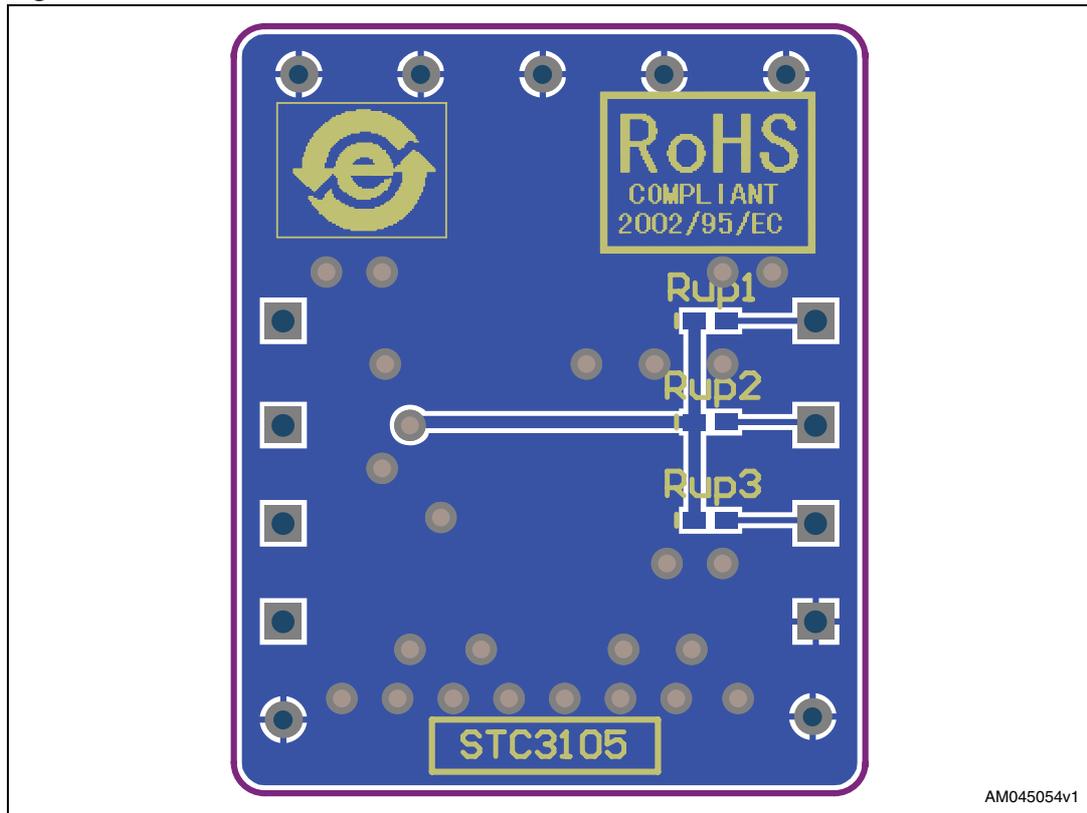
- Board dimensions: 23 mm x 18 mm
- 2-layer PCB
- Thickness of PCB: 1.5 mm
- FR4 material
- Thickness of copper: 35 μm

Figure 4. Top view of demonstration board



AM045053v1

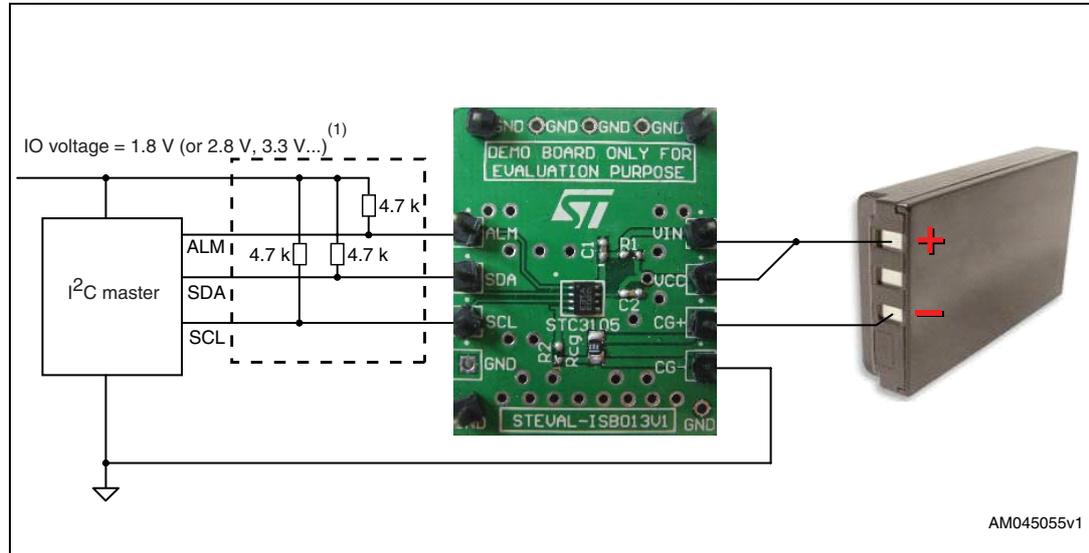
Figure 5. Bottom view of demonstration board



4 Demonstration board connections

The STC3105 demonstration board can be simply connected to a battery and interfaced with a digital controller as shown in [Figure 6](#).

Figure 6. Demonstration board connections with battery and microcontroller



1. The ALM, SDA, and SCL pins are pulled up to VCC through 4.7 kΩ resistors. In order to pull up these pins to external I/O voltage, the onboard pull-up resistors should be removed.

5 Ordering information

The STEVAL-ISB013V1 demonstration board can be ordered online at www.st.com (order code STEVAL-ISB013V1).

6 Revision history

Table 2. Document revision history

Date	Revision	Changes
05-Dec-2011	1	Initial release.

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