



Introduction

The STEVAL-MKI023V1 is a demonstration kit designed to provide the user with a complete, ready-to-use platform for the evaluation of the LISY300AL. The LISY300AL is a low-power single-axis yaw rate sensor. It includes a sensing element and an IC interface able to provide the measured angular rate to external applications through an analog output voltage.

In addition to the MEMS sensor, the system includes a linear voltage regulator and a rail-to-rail low noise dual amplifier configured as a non-inverting buffer, making both direct sensor outputs and buffered sensor outputs available to the user.

The kit also provides a simple means of controlling the Self-test and Power-down pins.

1 Demonstration kit description

The block diagram of the demonstration kit and the layout of the board are shown in [Figure 1](#) and [Figure 2](#), respectively, while the full board photo is provided in [Figure 3](#).

Figure 1. STEVAL-MKI023V1 demonstration kit block diagram

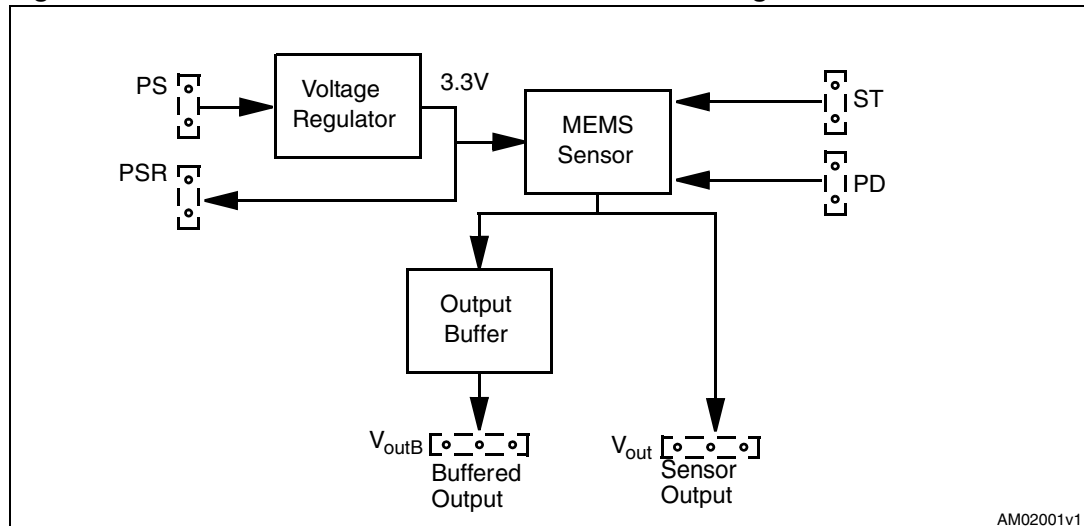


Figure 2. Top silk-screen for the STEVAL-MKI023V1 board layout

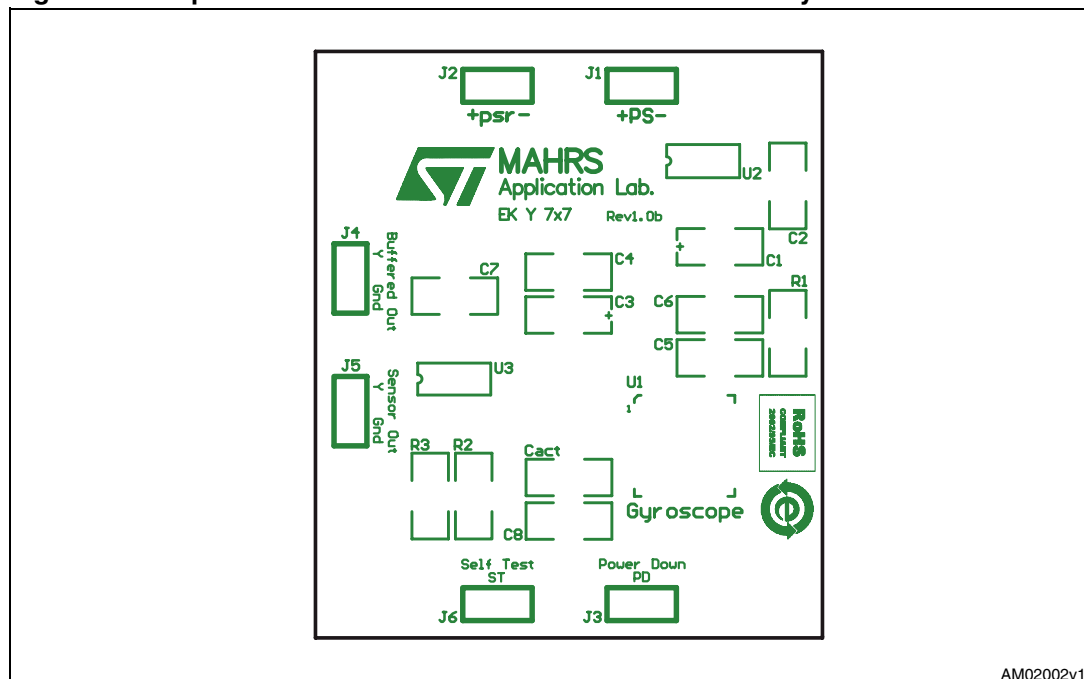
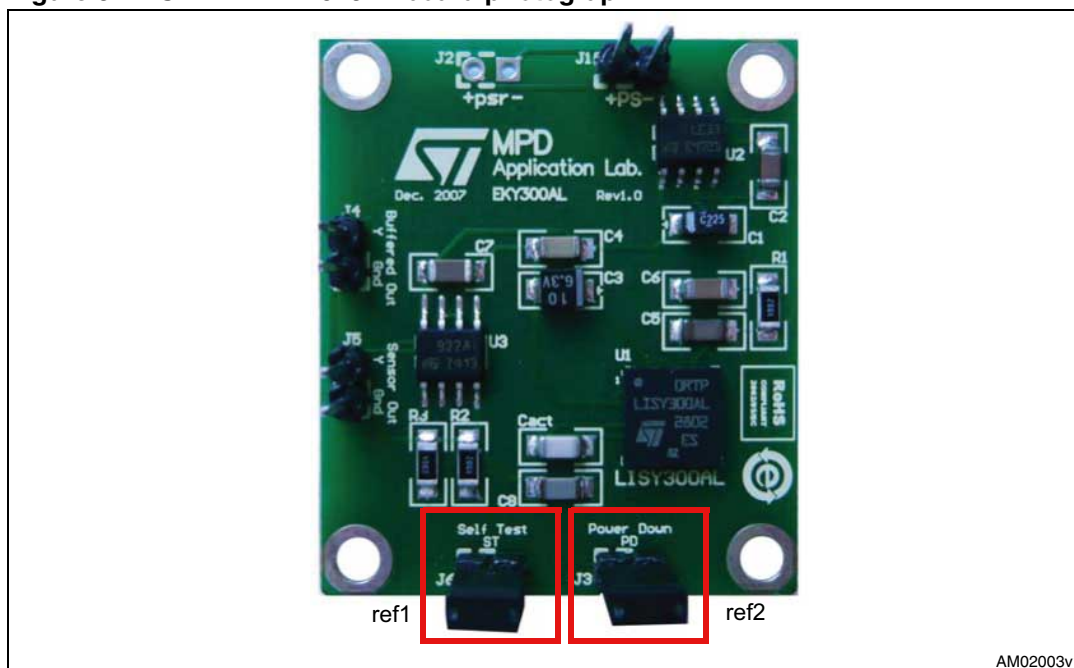


Figure 3. STEVAL-MKI023V1 board photograph



1.1 Operating the demonstration kit

To operate the STEVAL-MKI023V1 demonstration kit it is necessary to supply it through the connector marked J1 (PS) with a dc voltage between 3.7 V and 18 V. The suggested supply voltage is 5 V. The typical current consumption of the LISY300AL MEMS sensor is 4.8 mA, while the typical current consumption of the whole board is in the range of 10 mA.

The voltage applied to the board is then regulated through a linear voltage regulator which supplies the MEMS sensor at 3.3 V.

The output (ANALOG OUTPUT) of the LISY300AL angular rate sensor is band-limited through the use of two first-order on-chip filters: a switched capacitor low-pass filter with 400 Hz -3 dB bandwidth, in combination with an active low-pass filter. The active filter with -3 dB nominal frequency (f_t) is set through the internal 180 Ω resistor R_{ACT} and the external 10 nF capacitor C_{ACT} (added between C_{ACT} pin #5 and analog output pin #6) to approximately 88 Hz.

If a different cut-off frequency f_t is required, the user should replace the above capacitors with components having values derived using the following formula:

Equation 1

$$C_{ACT} = \frac{1}{2 \cdot \pi \cdot R_{ACT} \cdot f_t}$$

As mentioned above, the STEVAL-MKI023V1 makes both the direct sensor output and the buffered signal available through two separate connectors: J5 (sensor output) and J4 (buffered output).

The buffering of the sensor outputs is achieved through the use of a rail-to-rail low-noise quad amplifier configured as a non-inverting buffer.

1.2 Driving Power-down and Self-test signals

The board allows the control of the Power-down and Self-test signals through the use of test points (marked J3 and J6, respectively) and jumpers.

1.2.1 Power-down

When the jumper is removed from J3 (Power-down, [Figure 3](#), ref1) the MEMS sensor is in Normal mode, otherwise it is in Power-down mode.

1.2.2 Self-test

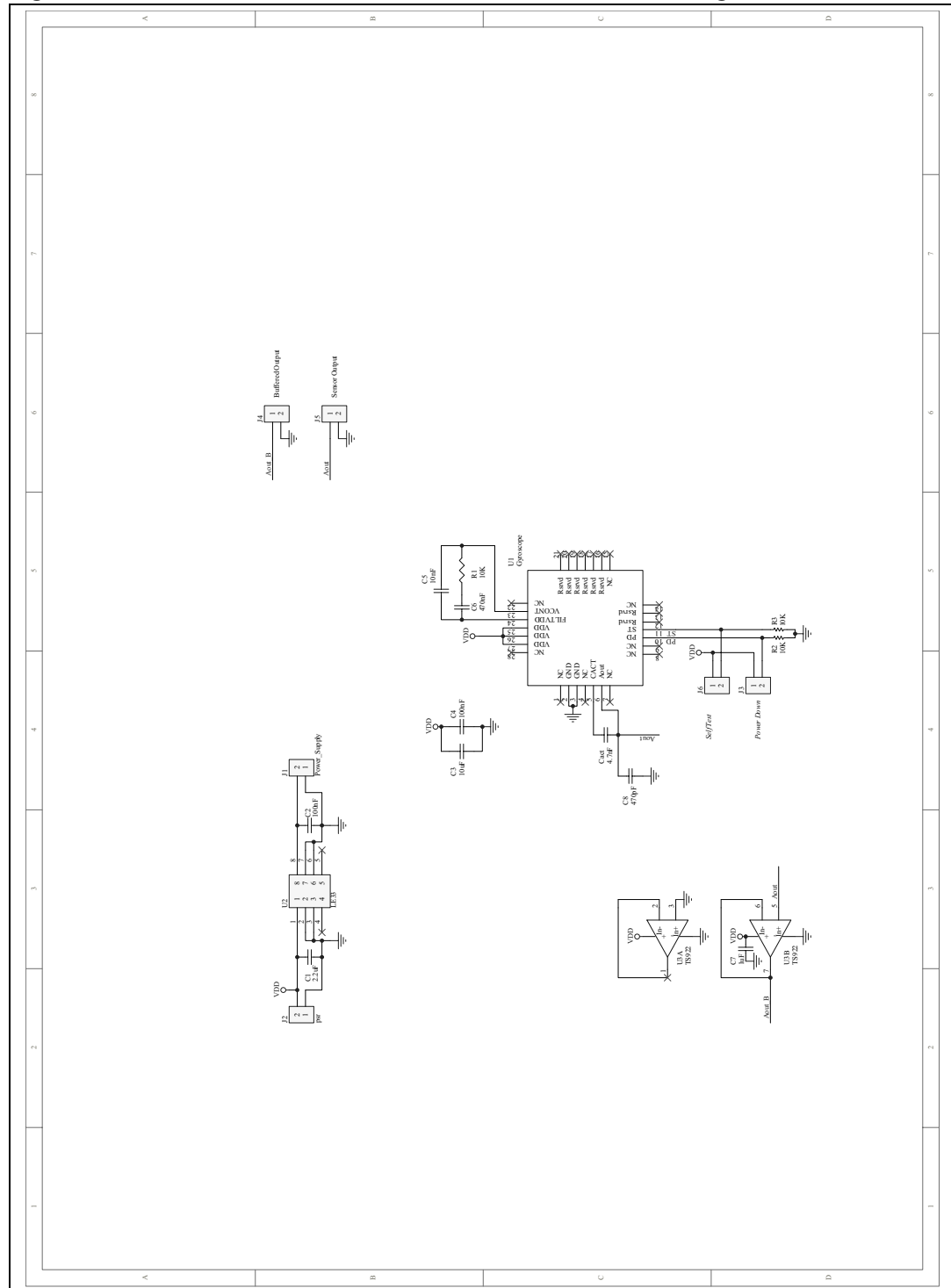
When the jumper is removed from J6 (Self-test, [Figure 3](#), ref2) the Self-test feature is disabled. To activate the Self-test feature, the jumper must be inserted into J6.

When this function is activated, the seismic mass of the sensor is moved by means of an electrostatic test-force, simulating a definite coriolis force. Under these conditions the sensor output will exhibit a voltage change in its dc levels as specified in the datasheet for the LISY300AL sensor.

2 Schematic diagram

The schematic diagram of the STEVAL-MKI023V1 demonstration kit is shown in [Figure 4](#).

Figure 4. STEVAL-MKI023V1 demonstration kit schematic diagram



3 Bill of materials

The bill of materials for the STEVAL-MKI023V1 demonstration kit is provided in [Table 1](#).

Table 1. Bill of materials

Item	Quantity	Reference	Value
1	2	C2, C4	100 nF
2	1	C1	2.2 μ F
3	2	C5, C _{ACT}	10 nF
4	1	C3	10 μ F
5	1	C6	470 nF
6	1	C7	1 μ F
7	1	C8	470 pF
8	3	R1, R2, R3	10 k Ω
9	6	J1, J2, J3, J4, J5, J6	CON2
10	2	U1	LISY300AL
11	1	U2	LE33AB
12	1	U3	TS922

4 Revision history

Table 2. Document revision history

Date	Revision	Changes
11-Mar-2009	1	Initial release

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