



Introduction

The EK3L02AL is an Evaluation Kit designed to provide the user with a complete, ready-to-use platform for the evaluation of the LIS3L02AL, a low-power 3-Axis linear capacitive accelerometer that includes a sensing element and an IC interface able to take information from the sensing element and to provide an analog signal to the external world.

Besides the MEMS sensor, the system mounts a linear voltage regulator and a rail to rail Low noise Quad amplifier configured as non-inverting buffer thus making both direct sensor outputs and buffered sensor outputs available to the user.

The kit provides also an easy way to control its Self-Test (ST) pin.

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1 Evaluation Kit Description

The EK3L02AL is an Evaluation Kit designed to provide the user with a complete, ready-to-use platform for the evaluation of the LIS3L02AL 3-axis analog output linear accelerometer. The block diagram of the evaluation kit and the top silk-screen of the board are shown respectively in *Figure 1* and *Figure 2* while the photo of the full board is given in *Figure 3*.

Figure 1. Evaluation Board Block Diagram

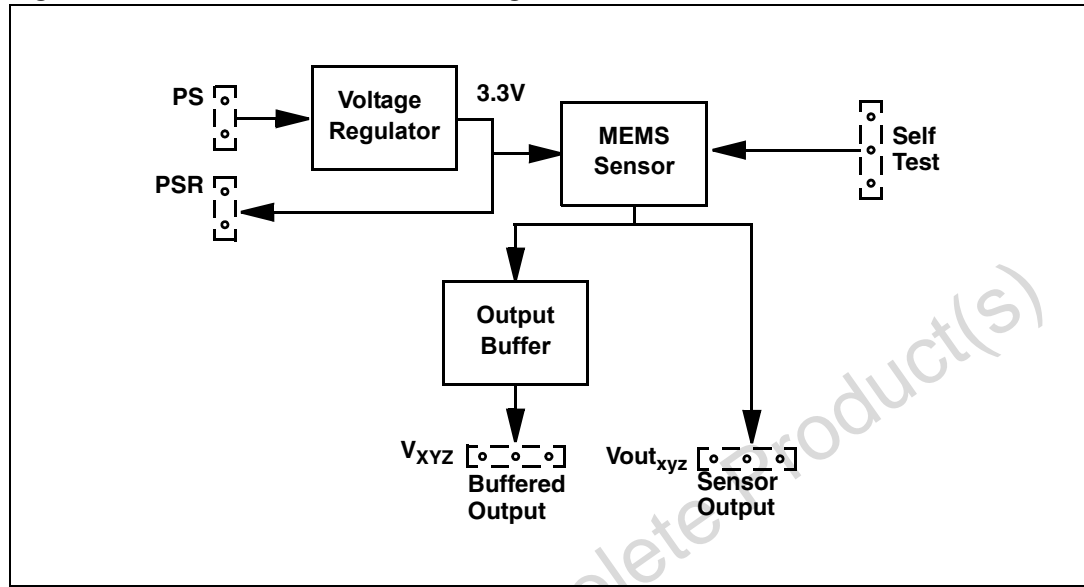


Figure 2. Top silk-screen for EK3L02AL board layout

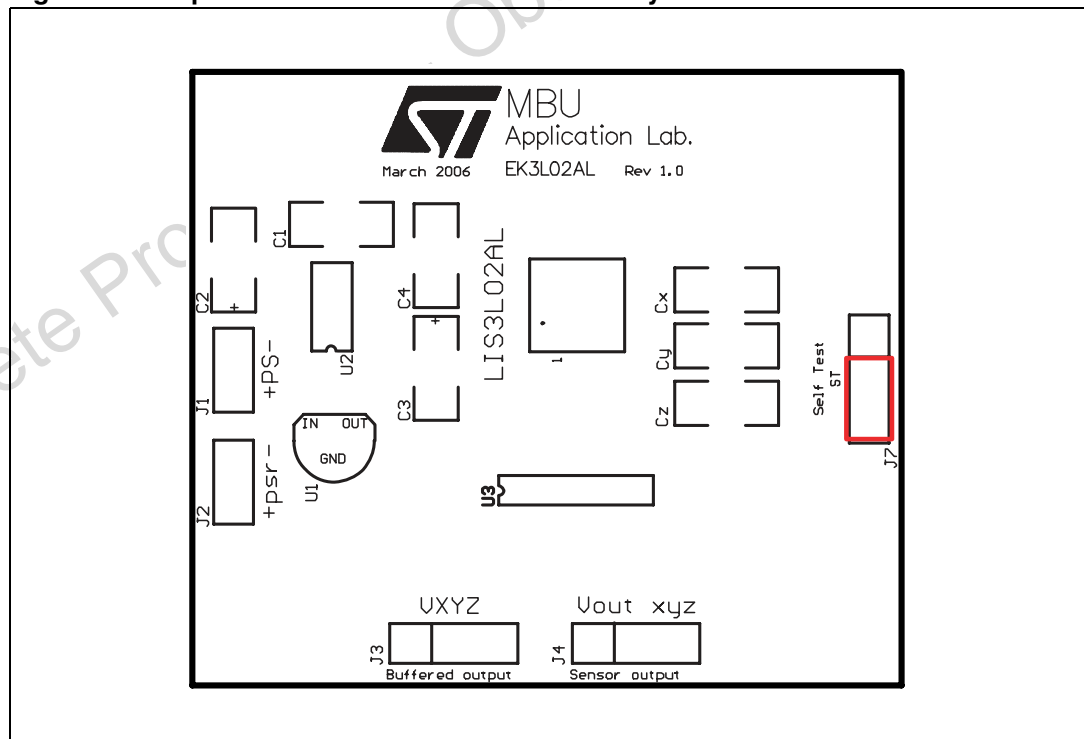
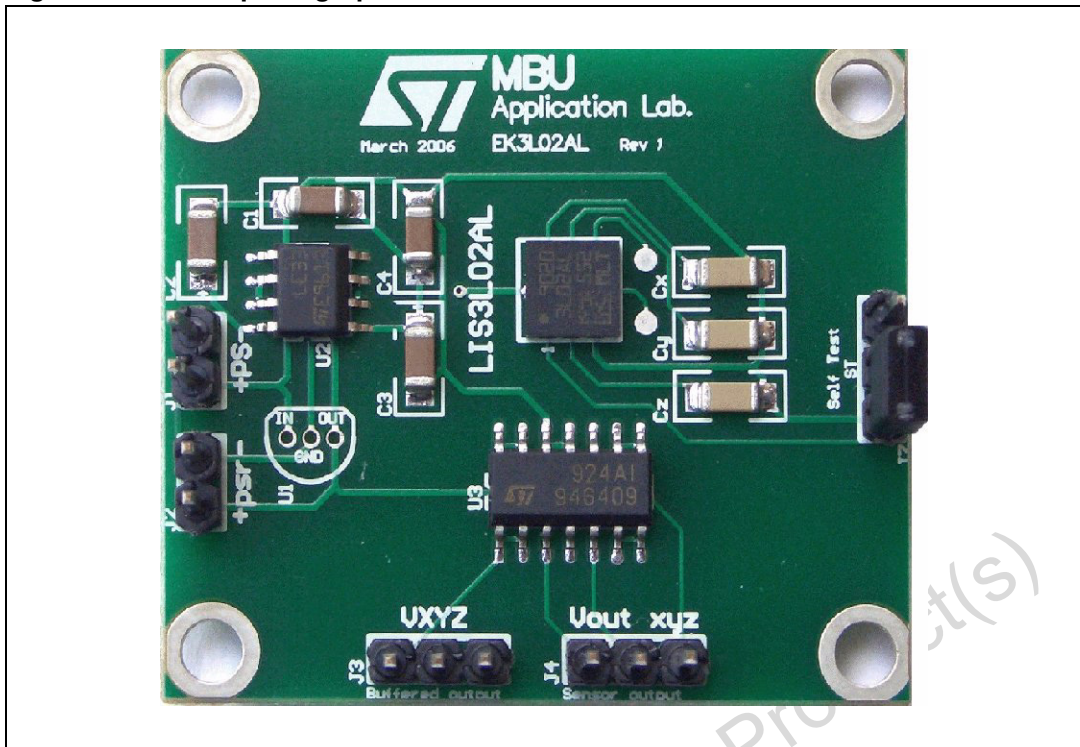


Figure 3. Board photograph



1.1 Operating the Evaluation Kit

To operate the evaluation kit it is necessary to supply it through the connector marked as J1 (PS) with a dc voltage comprised between 3.7V and 18V. The suggested supply voltage is 5V. The typical current consumption of the LIS3L02AL MEMS sensor is 0.85 mA while the typical current consumption of the whole board is in the range of 6 mA.

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

The outputs (Voutx, Vouty and Voutz) of the LIS3L02AL linear accelerometer are band limited through the usage of three capacitors Cx, Cy and Cz of 1.5nF which, together with the output resistance $R_{out}=110K\Omega$ of the sensor, create a single-pole low-pass filter having a cut-off frequency of about 1KHz.

In case a different cut-off frequency f_t is required, the above capacitances must be replaced by the users with other components having the value given by the following formula:

$$C(x, y, z) = \frac{1}{2 \cdot \pi \cdot R_{out} \cdot f_t}$$

As anticipated above, the EK3L02AL makes both the direct sensor outputs and the buffered signals available to the outside through two different connectors which are named respectively J4 (Sensor output) and J3 (Buffered output). In particular the three channels are made available going from the left to right of the board in the order Vout_x, Vout_y and Vout_z.

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

1.2 Driving ST signal

The board allows to control ST (Self Test) signal through the usage of a test point (marked J7) and a jumper.

1.2.1 Self-Test

When the jumper related to J7 (ST) is either inserted as marked highlighted by the red box in [Figure 2](#) or completely removed from the board the self-test feature is disabled.

In order to activate the self-test feature the afore said jumper must be into J7 so to short-circuit its central and upper pins.

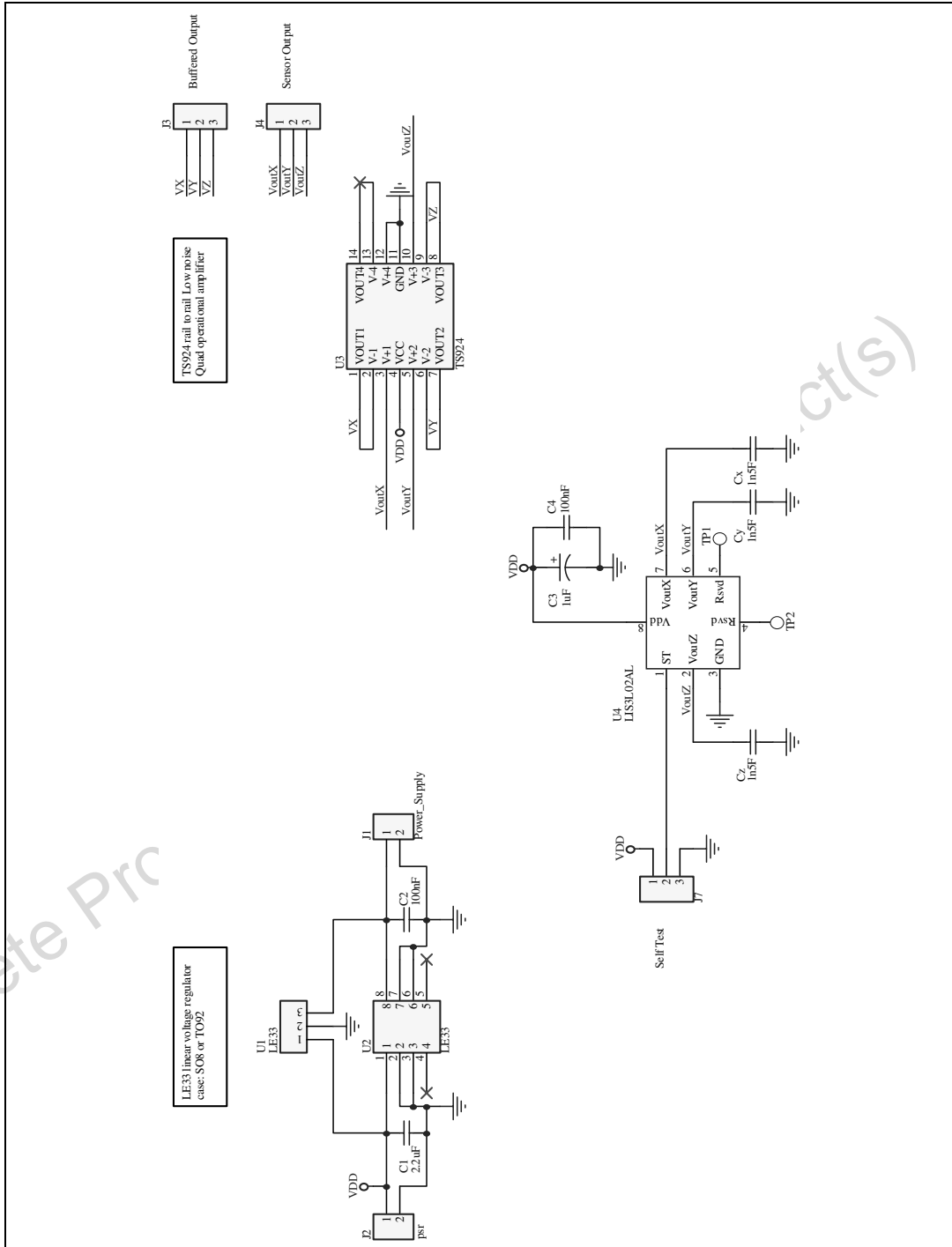
When this function is activated the seismic mass of the sensor is moved by means of an electrostatic test-force simulating a definite input acceleration. Under these conditions the sensor outputs will exhibit a voltage change in their DC levels as specified in the datasheet of the LIS3L02AL sensor.

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2 Schematic Diagram

The schematic diagram of the EK3L02AL evaluation kit is shown in [Figure 4](#).

Figure 4. Schematic diagram for EK3L02AL board



3 Bill Of Material

The Bill of Material for EK3L02AL evaluation kit is given in [Table 1](#)

Table 1. Bill Of Material

| Item | Quantity | Reference | Value |
|------|----------|-----------|-----------|
| 1 | 2 | C2,C4 | 100nF |
| 2 | 1 | C1 | 2.2uF |
| 3 | 3 | Cx,Cy,Cz | 1.5nF |
| 4 | 1 | C3 | 1uF |
| 5 | 2 | J1,J2 | CON2 |
| 6 | 3 | J3,J4,J7 | CON3 |
| 7 | 1 | U2 | LE33 |
| 8 | 1 | U3 | TS924 |
| 9 | 1 | U4 | LIS3L02AL |

4 Revision History

Table 2. Document revision history

| Date | Revision | Changes |
|-------------|----------|------------------|
| 07-Jun-2006 | 1 | Initial release. |

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