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Using the MMA7260Q Evaluation Board

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INTRODUCTION

This application note describes the Accelerometer Evaluation Board (Figure 2) for the MMA7260Q 3-axis low-g accelerometer. The Accelerometer Evaluation Board is a small circuit board intended to be used for evaluating the MMA7260Q and developing prototypes quickly without requiring a PCB to be designed to accommodate for the small profile QFN package. It also provides a means for understanding the best mounting position and location of an accelerometer in your product with provided board mounting points.

CIRCUIT DESCRIPTION

Figure 3 is a circuit schematic of the evaluation board. The recommended decoupling capacitor at the power source and recommended RC filter at the output, are included on the evaluation board. For a complete description of the operation of the accelerometer, refer to the MMA7260Q datasheet. There is an RC filter at each of the three accelerometer outputs in order to minimize clock noise that may be present from the switched capacitor filter circuit. No additional components are necessary to use the evaluation board.

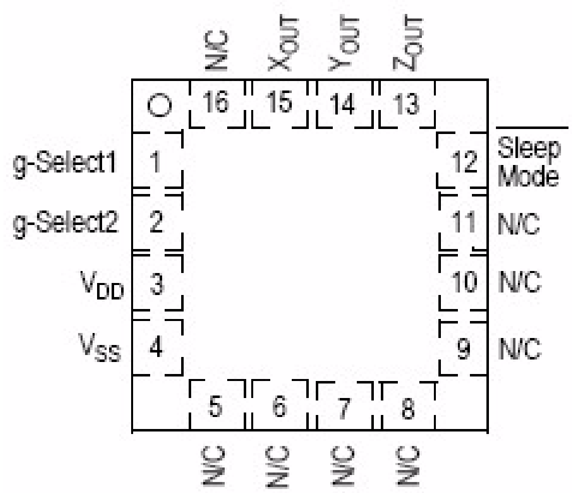

Figure 1. Pin Connections

Figure 2. Evaluation Board for MMA7260Q

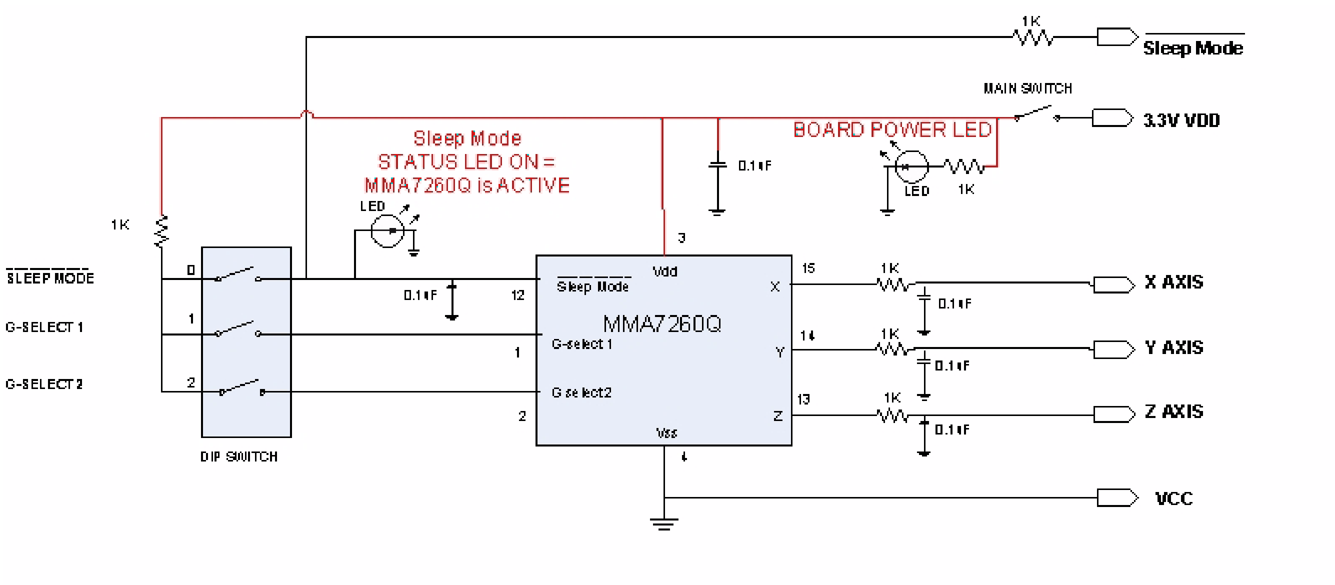

Figure 3. Circuit Schematic of the MMA7260Q Evaluation Board

Table 1. Description of Output/Input Pads

Output/Input Pads	Description
Sleep Mode	Used for an external source to enable/disable sleep mode
3.3V VDD	Input Voltage
X axis	Analog Voltage output of X axis
Y axis	Analog Voltage output of Y axis
Z axis	Analog Voltage output of Z axis

The evaluation board has pads for interfacing to a 3.3 volt power source or battery. The pads on the side of the board also provide a means for connecting to the accelerometer analog output by soldering a wire from the evaluation board to another breadboard or system. The ON/OFF switch provides power to the accelerometer and helps preserve battery life if a battery is being used as the power source. S1 must be set towards the ON position for the accelerometer to function. The green LED labeled PWR is lit when power is supplied to the accelerometer.

G-SELECT DIPSWITCH SETTINGS

The g-Select is a powerful features on the MMA7260Q allowing one device to measure 4 different ranges of acceleration. See Table 2. The g-Select allows one device to provide two different applications in one package. By adjusting the dip-switches on the evaluation board, the accelerometer can toggle between the different g-Ranges with the same accelerometer part. The following table outlines the g-Ranges that the toggle selections correspond to. The dip-switches on the evaluation board allow users to make selections without having to create the PCB board and define settings as in the finished product. A microcontroller in a finished product could also use this g-Select functionality of the MMA7260Q to adjust the g-Ranges of the device as needed by the end customer.

Table 2. g-Select pin Descriptions

g-Select2	g-Select1	g-Range	Sensitivity
0	0	1.5g	800mV/g
0	1	2g	600mV/g
1	0	4g	300mV/g
1	1	6g	200mV/g

SLEEP MODE FUNCTION

The MMA7260Q device features a sleep mode function, activated by a sleep mode option on the device's pinout. The sleep mode pin on the MMA7260Q is an active high pin, enabling the device 'on' when Vdd is applied to that particular Pin 12.

This is selectable on the evaluation board using either the INPUT/OUTPUT sleep mode Pad or the dip switch that is provided. When the dip switch is activated, the device is enabled. The same occurs with the Sleep Mode Pad. When the user attaches a 3.3 V or VDD voltage to this, the device will be enabled. A VCC connection to this pin will place the device in standby mode. If the device is enabled, the LED labeled sleep mode will be lit.

The sleep mode allows the MMA7260Q device to operate on standby at 5 µA supply current. Regular operation uses 500 µA of supply current.

MOUNTING CONSIDERATIONS

In Figure 4 there is a diagram of the evaluation board and the corresponding axes due to the orientation of the device. System design and sensor mounting can affect the response of a sensor system. The placement of the sensor itself is critical to obtaining the desired measurements. It is important that the sensor be mounted as rigidly as possible to obtain accurate results. Since the thickness and mounting of the board varies, parasitic resonance may distort the sensor measurement. Hence it is vital to fasten and secure to the largest mass structure of the system, i.e. the largest truss, the largest mass, the point closest to the source of vibration. On the other hand, dampening of the sensor device can absorb much of the vibration and give false readings as well. The evaluation board has holes in each of the four corners of the board for mounting. It is important to maintain a secure mounting scheme to capture the true motion.

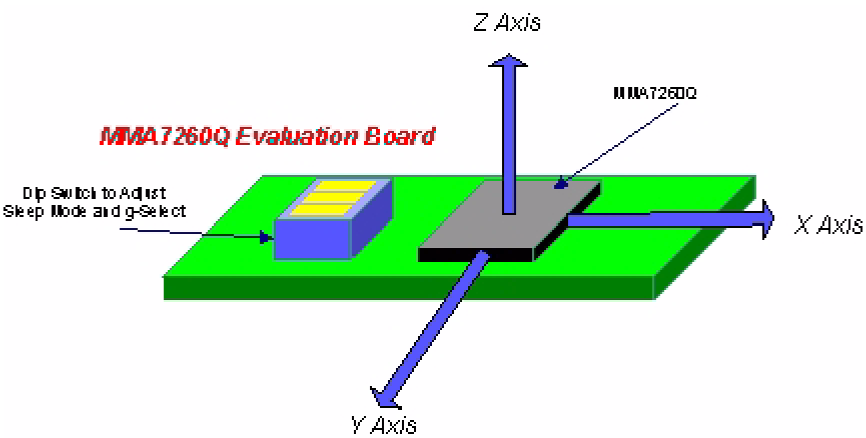

Figure 4. Board Orientation Corresponding to the Three Axes

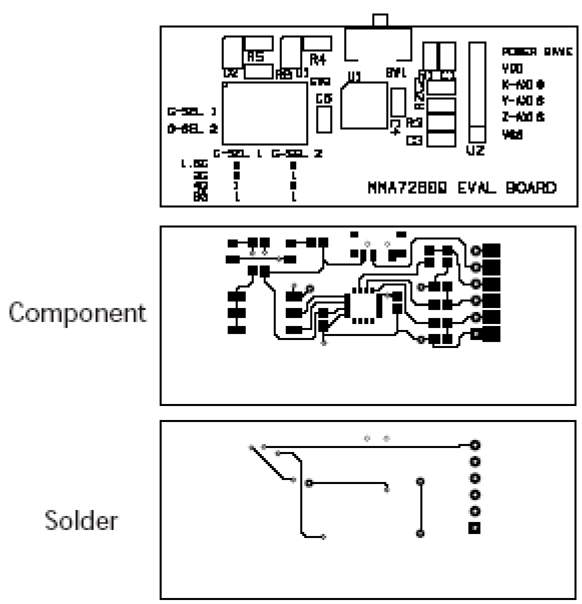

Figure 5. Board Layout for Component, Top Layer, and Bottom Layer

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