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Evaluation Board User Guide
UG-315

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Evaluating the ±2 *g*, Dual Axis, PWM Output Accelerometer

GENERAL DESCRIPTION

The EVAL-ADXL212Z is a simple evaluation board that allows quick evaluation of the performance of the ADXL212 dual axis ±2 *g* accelerometer with PWM outputs. The user needs to add only three additional through-hole passive components, depending on the bandwidth required in the application. The EVAL-ADXL212Z has a 5-pin, 0.1 inch-spaced header for access to all power and signal lines that the user can attach to a prototyping board (breadboard) or wire using a standard plug. Two holes are provided for mechanical attachment of the EVAL-ADXL212Z to the application.

CIRCUIT DESCRIPTION

The schematic and parts list of the EVAL-ADXL212Z are shown in Figure 1 and Table 1, respectively. The minimal application circuit requires at least one resistor (R_{SET}) added to the board to set the PWM period (T2). Analog bandwidth can be set by adding Capacitors C2 and C3. See the ADXL212 data sheet for a complete description of the operation of the accelerometer.

The layout of the EVAL-ADXL212Z evaluation board is shown in Figure 2. The EVAL-ADXL212Z has two factory-installed 2200 pF capacitors (C1 and C4) at X_{FILT} and Y_{FILT} to satisfy the minimum filter capacitor specification for the ADXL212. Many applications require a narrower bandwidth (and lower noise), in which case the user can add a through-hole capacitor in parallel in the space provided at C2 and C3, respectively. When calculating the capacitance required to achieve the desired analog bandwidth, do not forget to subtract the 2200 pF already on the PCB.

The pin function descriptions for the EVAL-ADXL212Z are listed in Table 2.

SETTING THE PERIOD OF THE DUTY CYCLE MODULATOR

The DCM period is set by R_{SET}. Choose a value between 100 kΩ and 2 MΩ. See Table 3 for typical R_{SET} values.

SPECIAL NOTES ON HANDLING

Note that the EVAL-ADXL212Z is not reverse polarity protected. Reversing the power supply or applying inappropriate voltages to any pin (outside the absolute maximum ratings listed in the ADXL212 data sheet) may damage the EVAL-ADXL212Z.

Dropping the EVAL-ADXL212Z on a hard surface can generate several thousand *g* of acceleration, enough to damage the accelerometer. See the ADXL212 data sheet for information on shock survivability.

SCHEMATICS, LAYOUT, AND PARTS LIST

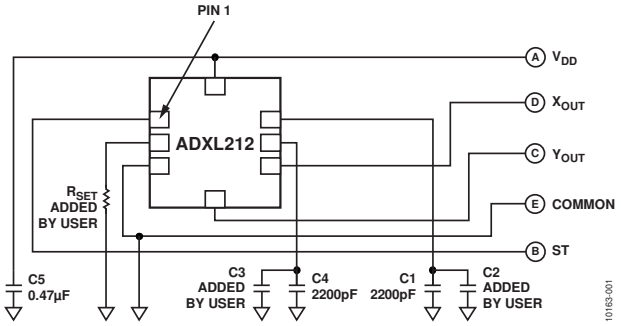

Figure 1. EVAL-ADXL212Z Schematic

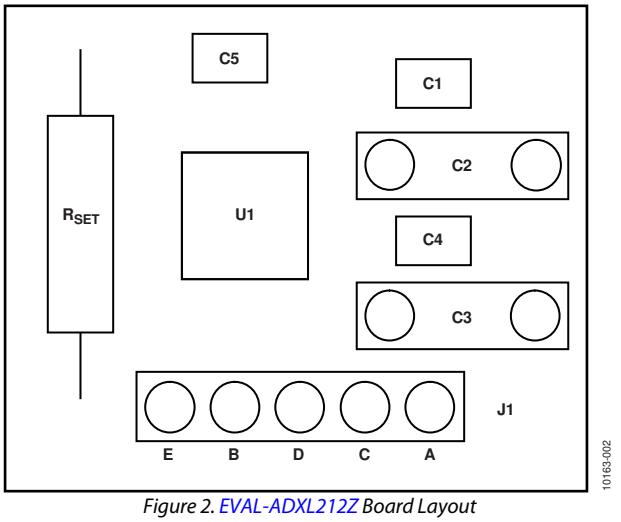

Figure 2. EVAL-ADXL212Z Board Layout

Table 1. EVAL-ADXL212Z Parts List

Reference	Value	Function
C1	2200 pF/25 V	X_{FILT}. Sets X axis analog bandwidth along with C2.
C2	Added by user	X_{FILT}. Sets X axis analog bandwidth along with C1.
C3	Added by user	Y_{FILT}. Sets Y axis analog bandwidth along with C4.
C4	2200 pF/25 V	Y_{FILT}. Sets Y axis analog bandwidth along with C3.
J1	Connector	All power and signal connection through J1.
R1	Added by user	R_{SET}. Sets the PWM period (T2).
U1	ADXL212	Dual axis ±2 *g* accelerometer.

Table 2. EVAL-ADXL212Z Pin Function Descriptions

Pin Reference	Function
E	Ground
B	Self-test input
D	X-axis duty cycle out
C	Y-axis duty cycle out
A	+V supply (3 VDC to 5.25 VDC)

Table 3. DCM Period vs. R_{SET} Value

T2 Period	R_{SET}
1 ms	124 kΩ
2 ms	248 kΩ
5 ms	620 kΩ
10 ms	1.24 MΩ