## ISL26134AV28EV1Z

Evaluation Board User Guide

## General Description

The ISL26134AV28EV1Z provides a means to evaluate the functionality and performance of the ISL26134 A/D converter.

The board includes an AT90USB162 microcontroller with a USB interface. The microcontroller interfaces to the ISL26134 ADC through a galvanically-isolated interface and provides serial communication through the USB between the board and the PC.

Software for the PC provides a Graphical User Interface (GUI) that allows the user to perform data capture, and then to process and plot the results of the time domain analysis, the histogram analysis, and/or the frequency domain analysis on the captured data. The GUI also enables the user to save conversion data from the ADC to a file, or to save the results of the analyzed conversion data.

## Ordering Information

| PART NUMBER | DESCRIPTION |
|---|---|
| ISL26134AV28EV1Z | Evaluation Board |

## Related Literature

- For a full list of related documents, visit our website
  - ISL26134 product page

## Features

- Galvanically-isolated USB communication with PC
- On-board microcontroller
- On-board voltage reference
- Evaluation software
  - Time domain analysis
  - Noise histogram analysis
  - FFT analysis

## Hardware

The ISL26134AV28EV1Z evaluation board provides the user a means of evaluating the ISL26134 Analog-to-Digital Converter (ADC). The ISL26134 is a high performance 24-bit ADC that includes a very low noise programmable gain amplifier. The ISL26134 offers gain selections of 1x, 2x, 64x, and 128x. It offers word rates of 10Sps and 80Sps (clock = 4.9152MHz). Gain and word rate selections are made by pin function control through jumper selections.

The board comes with an ISL26134 soldered in place. This can be removed and an ISL26132 soldered in its place.
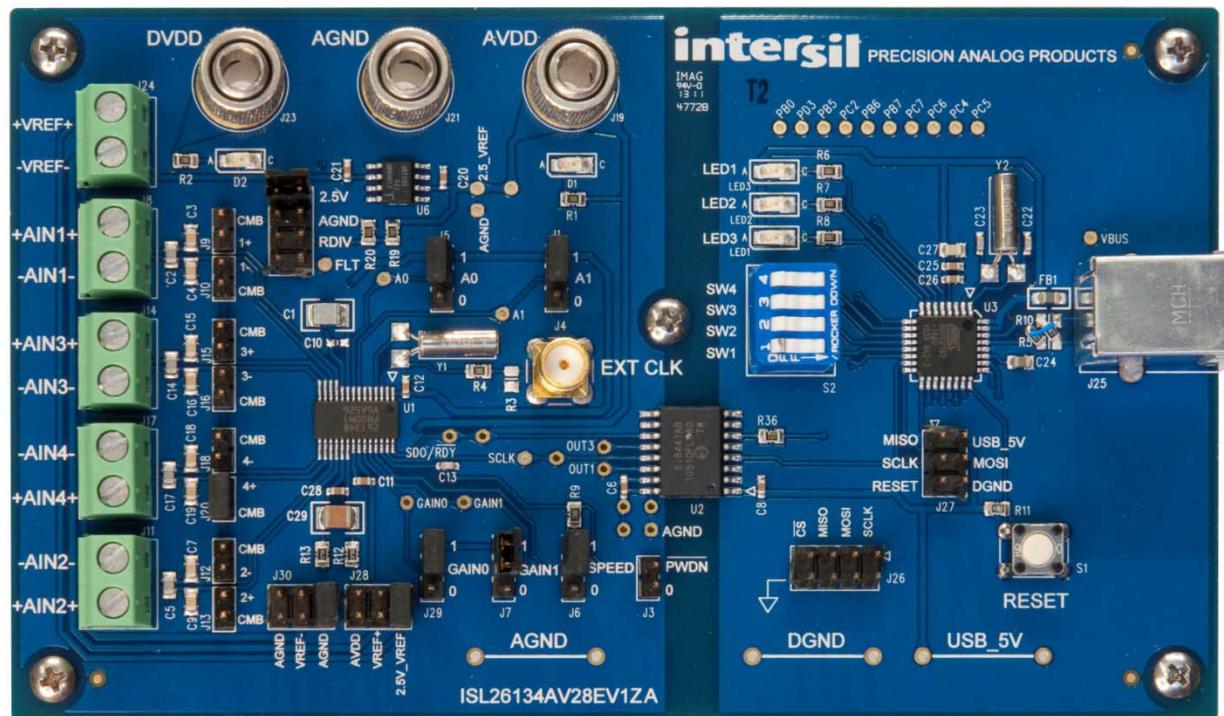


FIGURE 1. ISL26134 EVALUATION BOARD

## Evaluation Board Overview

The ISL26134AV28EV1Z evaluation board is segmented into two sections. These sections are galvanically isolated with a multi-channel isolation chip. The ISL26134 ADC and its associated circuitry (voltage reference and input signal components) are isolated from the microcontroller-USB interface to the PC. The ADC and its associated circuitry are powered by a laboratory supply. The microcontroller with its USB interface is powered from the USB connection. Galvanic isolation is not necessary in every application. The purpose of the isolation is to eliminate noise from the USB ground power connection from affecting the sensitive measurements made by the ADC when used in the 64X or 128X gain settings.

The ADC section of the evaluation board has three banana jack power connections. One of these is AGND which serves as the power supply ground connection for the ADC segment of the board. The DVDD jack supplies the digital side of the ADC (3.3V to 5V). The AVDD jack supplies the analog portion of the ADC (5V) and powers the voltage reference. The voltage reference is a ISL21090BFB825Z-TK 2.5V reference. A header is provided to also use an external voltage reference for the ADC.

The microcontroller provides the USB interface to the PC. A software GUI is available to communicate with the microcontroller and provides the means to collect and analyze data for the ADC.
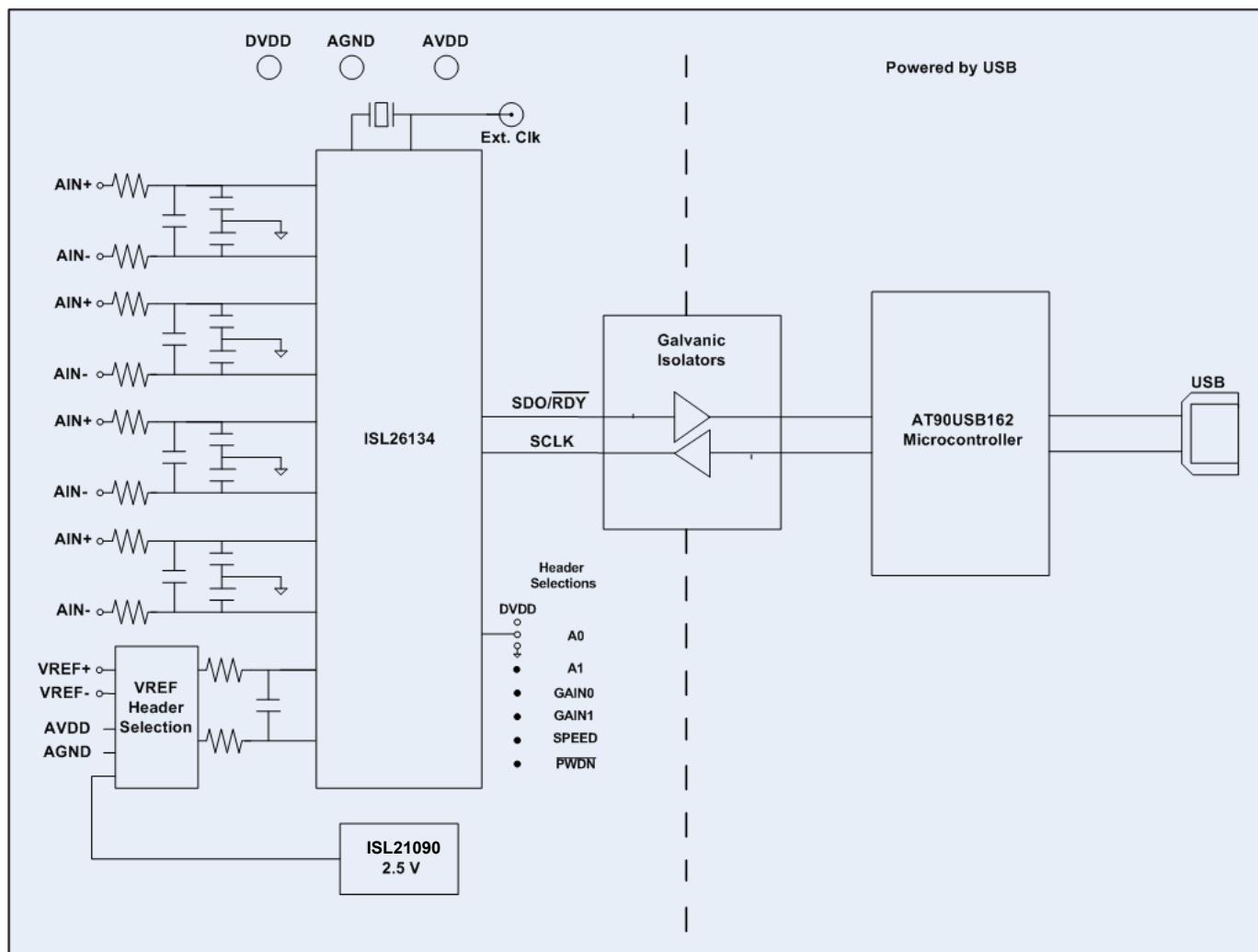


FIGURE 2. BLOCK DIAGRAM OF THE EVALUATION BOARD FOR THE ISL26134

# ADC Section

The ADC offers different sample rates, gain, and input channel options. These are selected by setting jumpers on headers (1 = positive supply; 0 = ground) as shown in the table on the bottom of Figure 3.

The ADC uses a 4.9152MHz crystal operating with an on-chip amplifier for its clock source. This can be disconnected and an external clock can be sourced to drive the clock input to the chip. Alternately, the XTALIN/CLOCK pin can be grounded and the ADC will operate from an on-chip RC type oscillator.

The board provides a 2.5V reference IC as the voltage reference for the ADC, or an external voltage can be connected to a terminal block and selected through jumpers on headers J28 and J30 as shown in Figure 5, on page 6. These headers also provide the option of selecting AVDD and AGND as the inputs to VREF+ and VREF- on the ADC.

The evaluation board provides separate terminal connections for each of the differential signals into the ADC. These terminals are in shown in Figure 4, on page 5. Be attentive of the labeling of the connections and their polarities when connecting external signals. The channel numbers on the terminal blocks are not in numeric order and some have their polarities labeled opposite of others.

Header connector J22 in Figure 4 allows the user to select one of the following options for the common-mode voltage: the 2.5V voltage reference output, ground (AGND), a voltage generated by a resistor divider that divides the AVDD supply using two 1kΩ resistors, or to a voltage determined by the user which must be connected to the hole next to the header connection labeled FLT (Floating Input).

Each of the input channels has jumpers to allow the user to connect the common-mode voltage to either the AIN+ or the AIN- input. This enables the external circuit to be biased to a common-mode value supplied by the board. If both jumpers are put in place, the inputs will be shorted to the common-mode voltage. This provides a means for testing the noise performance of the ADC with its inputs shorted.

The ADC interfaces to the microcontroller through the galvanic isolators. The ADC side of the isolator chip is powered by the same supply that powers the DVDD supply of the ADC.

Power from an external supply must be provided to the DVDD (3.3V to 5V), AVDD (5V), and AGND banana plug connectors for the ADC portion of the board to function. LEDs will be illuminated by DVDD and AVDD when they are powered. Note that these supplies can be applied and removed without regard to whether the USB interface is connected and powered.

# Microcontroller Section

Figure 6 illustrates the microcontroller circuitry. A reset button is provided, but it is seldom necessary because the microcontroller has its own power-on reset which will initialize the microcontroller when the USB interface is connected to a powered PC. Power for the microcontroller section comes from the USB interface. The microcontroller circuit includes a DIP switch and some LEDs. The board is shipped from the factory with four switches of the DIP switch set in the OFF position. This is required for normal operation.

The microcontroller circuit includes a header through which the flash memory on the microcontroller is programmed. A second header provides a means for the user to monitor the signals (SCLK and SDO/RDYb — on the J22 header these are labeled as MOSI and MISO [Master Out, Slave In and Master In, Slave Out], respectively) from the microcontroller that communicate with the ADC.

One LED lights up to indicate when power is applied to the USB interface. A second LED indicates when the microcontroller is available to collect data from the ADC. The microcontroller communicates with the ADC through the galvanic isolator chip. The microcontroller side of the isolator is powered by the voltage from the USB connection. The USB connection can be powered or unpowered without regard to the supplies to the ADC side of the board. There is no power sequence requirement between the two sections of the board.

ISL26134AV28EV1Z

# Schematics

| A0 | A1 | CHANNEL |
|----|----|---------|
| 0 | 0 | AIN1 |
| 1 | 0 | AIN2 |
| 0 | 1 | AIN3 |
| 1 | 1 | AIN4 |

| GAIN0 | GAIN1 | GAIN |
|-------|-------|------|
| 0 | 0 | 1 |
| 1 | 0 | 2 |
| 0 | 1 | 64 |
| 1 | 1 | 128 |

| SPEED | |
|-------|----|
| 0 | 10 |
| 1 | 80 |
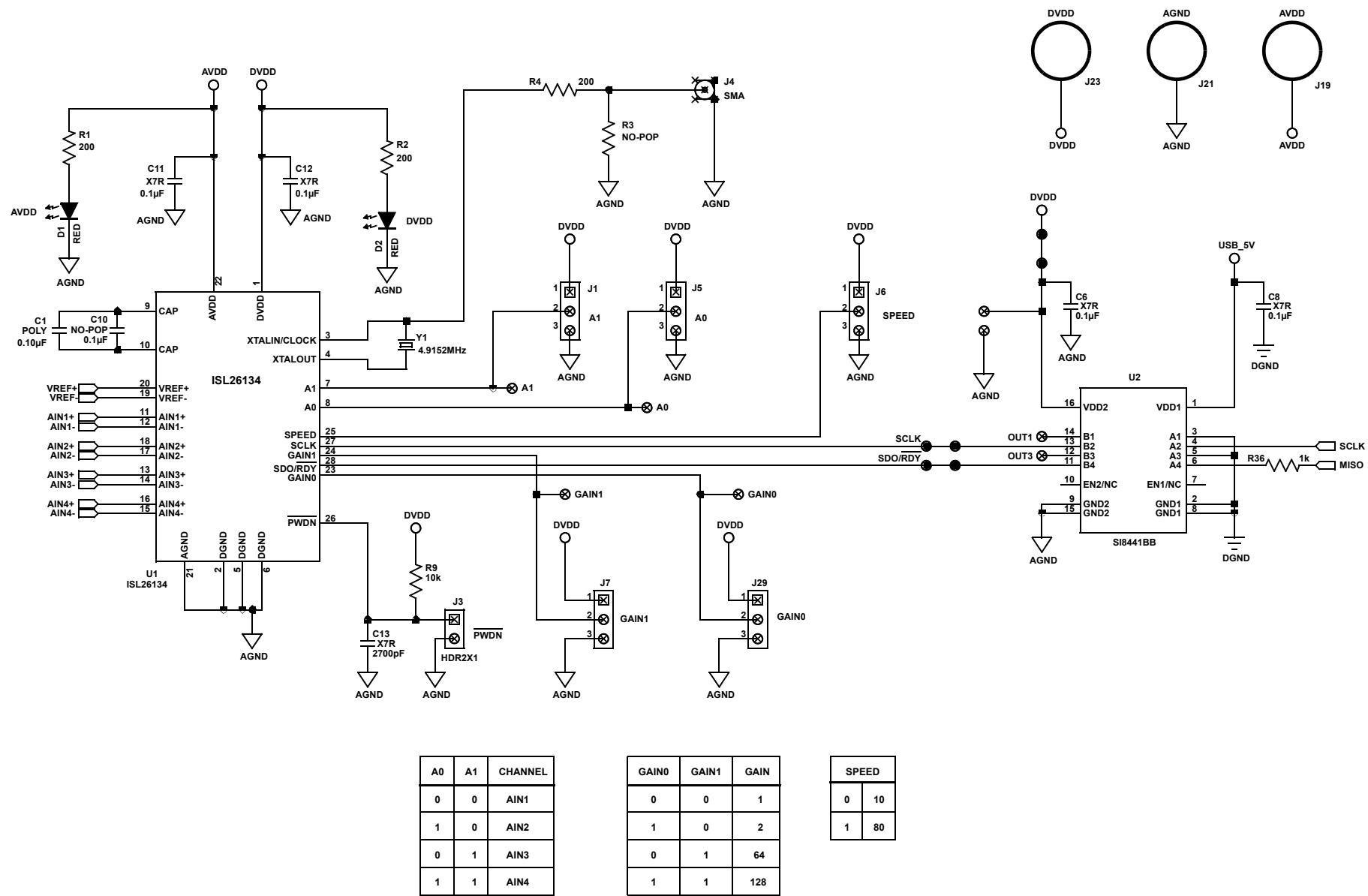
FIGURE 3.  ADC WITH POWER SUPPLY CONNECTIONS, JUMPER SELECTIONS, AND ISOLATOR INTERFACE

## Schematics (Continued)
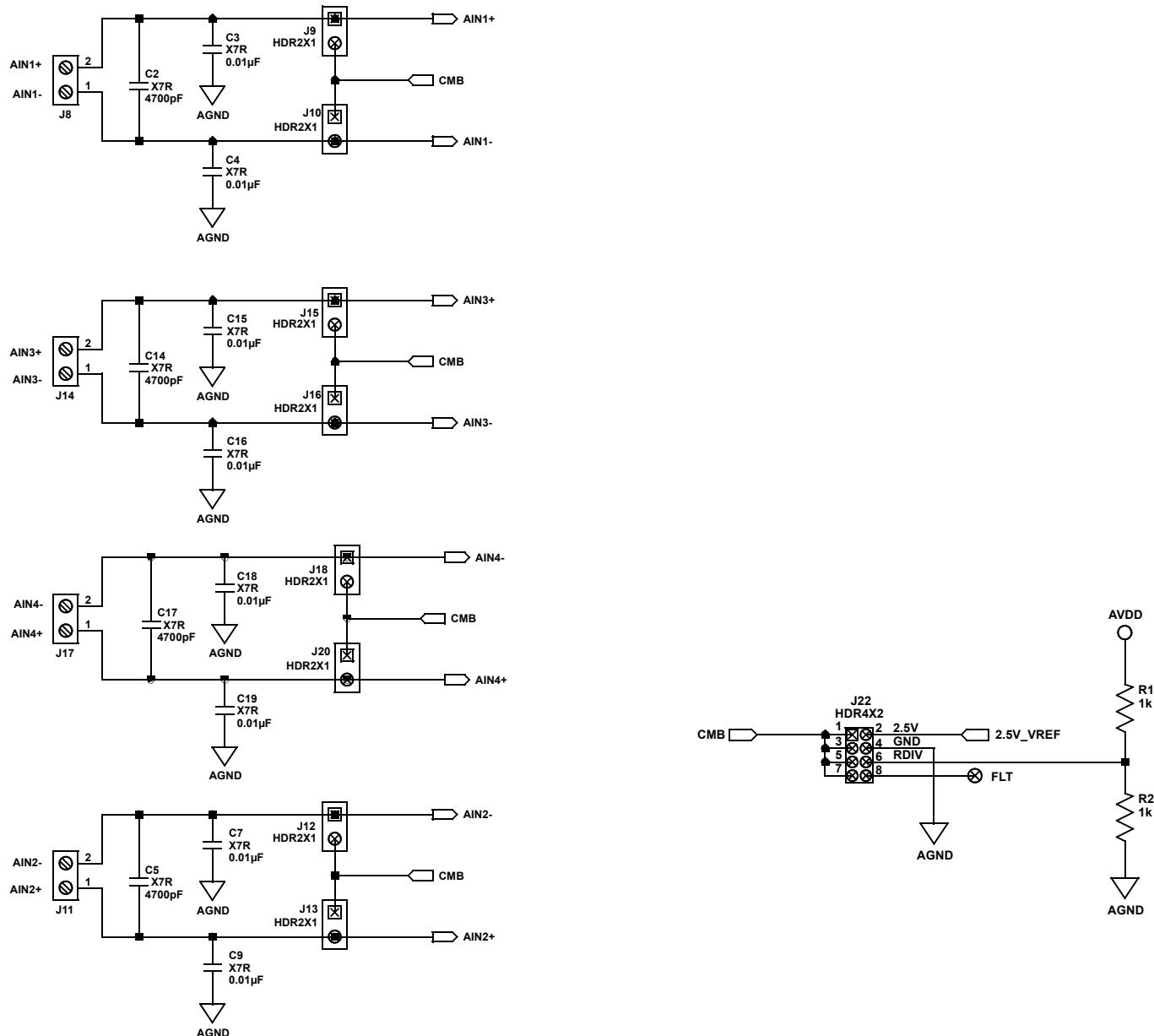


**FIGURE 4. ANALOG INPUTS AND COMMON MODE SELECTION SELECTIONS**

# Schematics (Continued)
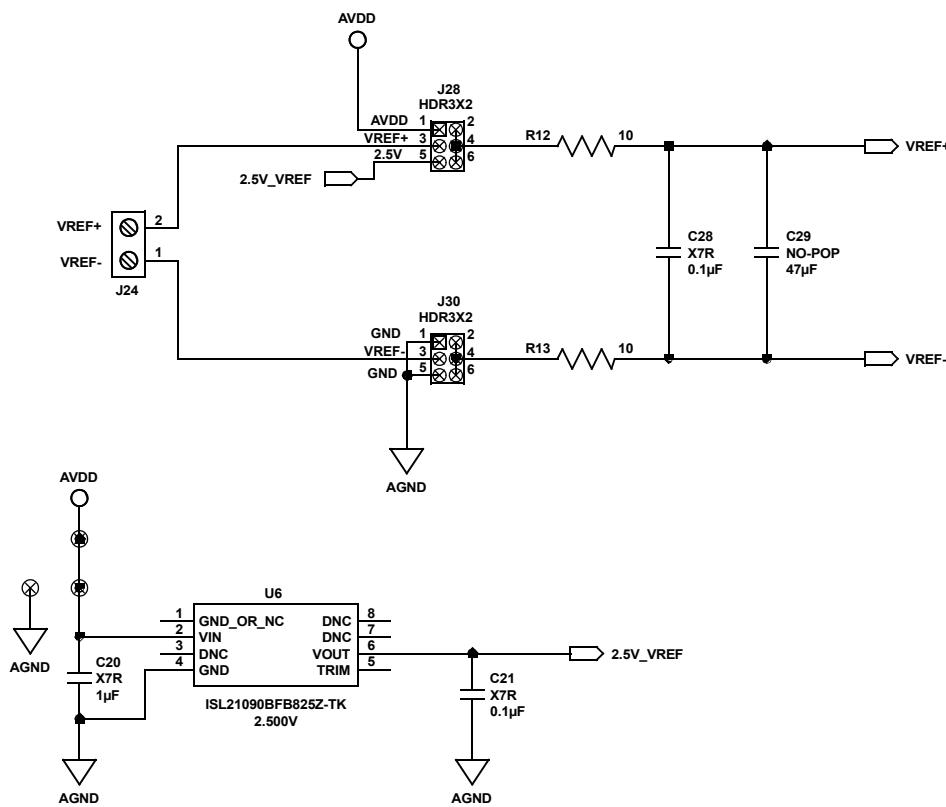


**FIGURE 5. VOLTAGE REFERENCE AND VOLTAGE REFERENCE SELECTION OPTIONS**

# Schematics (Continued)
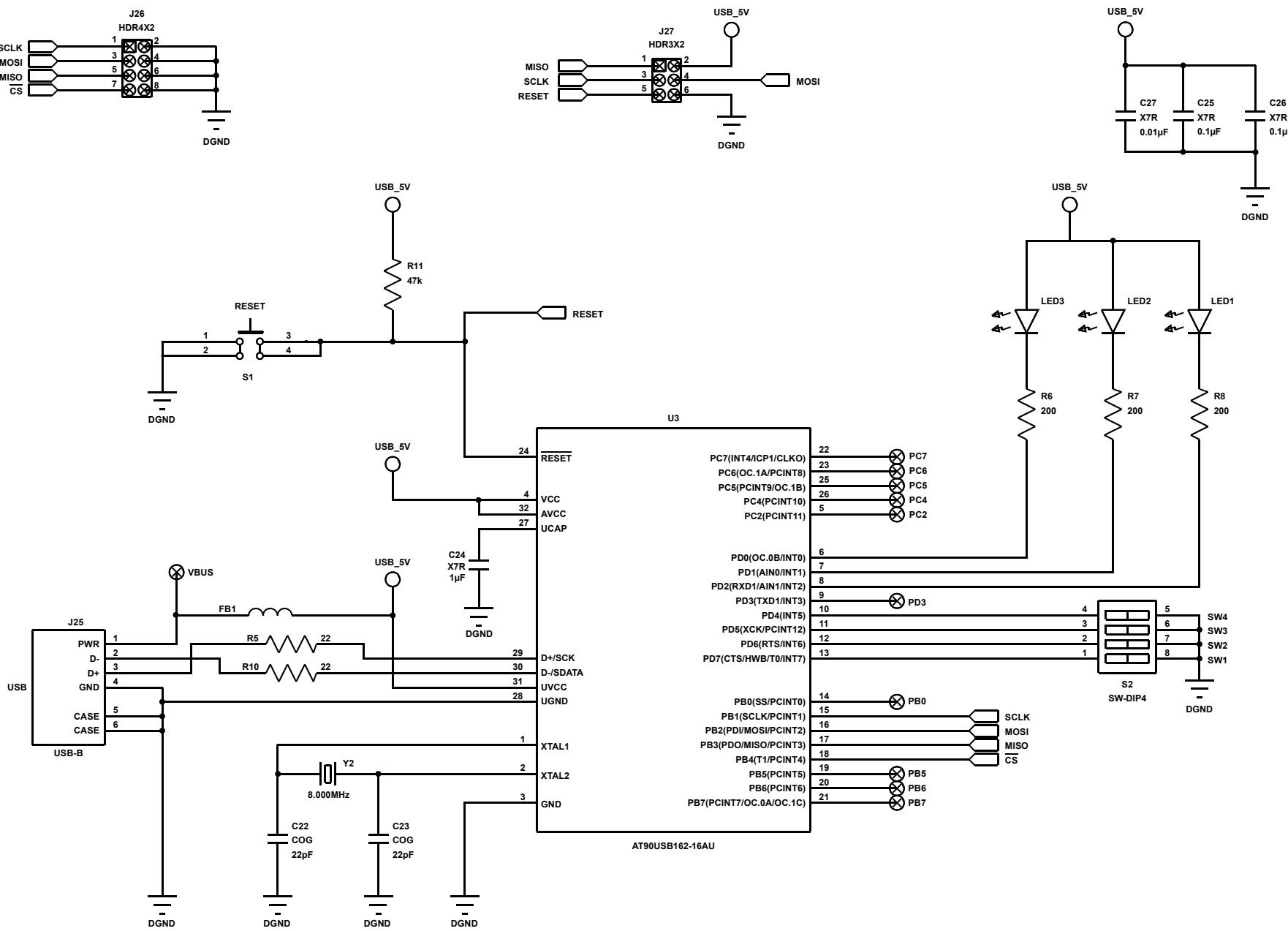


**FIGURE 6.  MICROCONTROLLER WITH USB INTERFACE**

# Software

The evaluation board has software available that runs on the PC. ISL26134AV28EVZ1 evaluation boards manufactured before June 2014, use different uC code (Version 5) and a different PC GUI (Version 1.1). Boards manufactured after June 2014, use uC code Version 7 and PC GUI Version 4.

The software (uC code Version 7 and PC GUI Version 4) is designed to operate under Windows XP or later.

Read "Appendix #1 How to Obtain and Install the GUI Software" on page 19 to obtain the internet link to download the GUI software.

Once the PC software is copied onto the PC, click on the **isl261xx_installer_v4.exe** file and follow the on screen instructions to load the software. Note that the software uses the USB interface to communicate with the evaluation board. The software uses the USB HID driver that is part of the Windows operating system so it is not necessary to load any other drivers for the USB interface.

## Running the GUI

Before starting the software, the evaluation board should be connected to the PC with a USB cable.

With the board connected by USB, run the GUI program by selecting Start → All Programs → Renesas → ISL261XX Evaluation Software => ISL261XX Evaluation Software.

If the software is started before the connection to the board is made, the GUI will output a message (USB Status: Not Connected) as shown in Figure 7.

If this occurs, connect the evaluation board to the PC with the USB cable. The message should automatically change as shown in Figure 8.

Note that the font of the text at the top of the GUI and the color of the top section and the trim of the GUI window is dictated by the Theme selection set in the Windows OS so it may have a different color on your computer display than what is shown in this document.

## Using the GUI Software

When the GUI software is started and the USB connection is established, the GUI will present a menu as shown in Figure 8. The **Initialize** button is colored red to indicate that it is waiting for a part number to be chosen in the **Device Selection** window.

The user must pick a part number from the Device Selection Window and click on the **Initialize** button. This causes the software GUI to be configured to support the selected device. There is no evaluation board for the ISL26132. Select ISL26134 to use the software GUI with the evaluation board referenced in this document.

Once the **Initialize** button is clicked with the ISL2613X selection, the screen will change slightly to indicate the output word rate options of the ISL2613X ADC. Note that the actual word rate used by the ADC is selected by a jumper on the evaluation board. The selection here in the Sample Frequency window only tells the GUI software which sample rate is to be used for the frequency axis when graphing the spectrum for the spectral (FFT) plot.

The top line of the menu page has two options, **File** and **About**. The **File** selection will be discussed after the **Time Domain**, **Histogram** and **Frequency Domain** windows are selected. When the GUI is started it sends a command to the evaluation board and tells the microcontroller to send back the version of the code that is in the microcontroller. If **About** is selected, the GUI will open a window that indicates the version number of the microcontroller code, and the version of the GUI software, as shown in Figure 10.
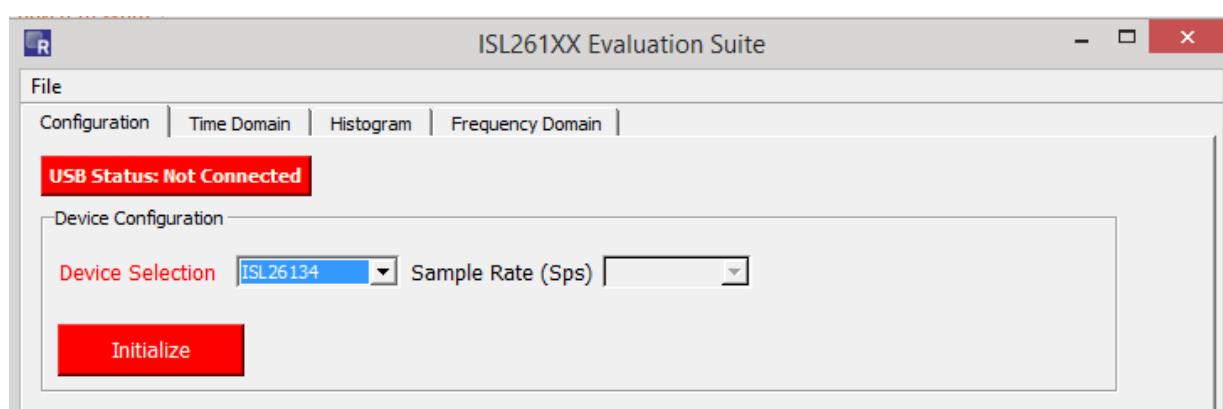


FIGURE 7. USB STATUS: NOT CONNECTED

RENESAS
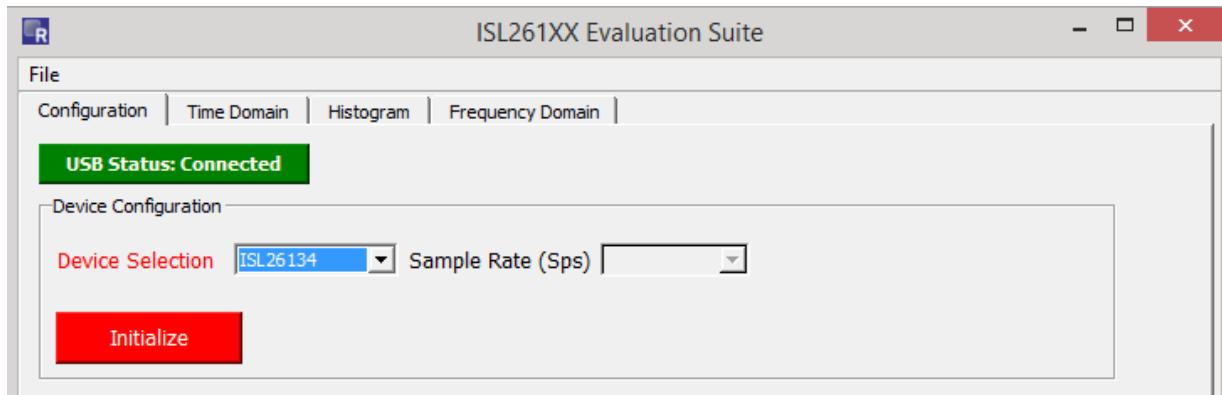
**FIGURE 8. USB STATUS: CONNECTED**
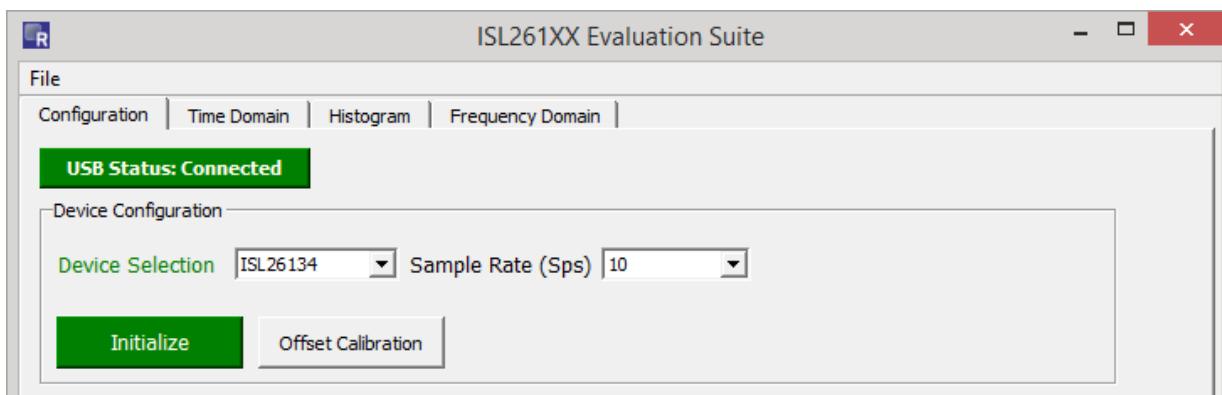


**FIGURE 9. USB STATUS**
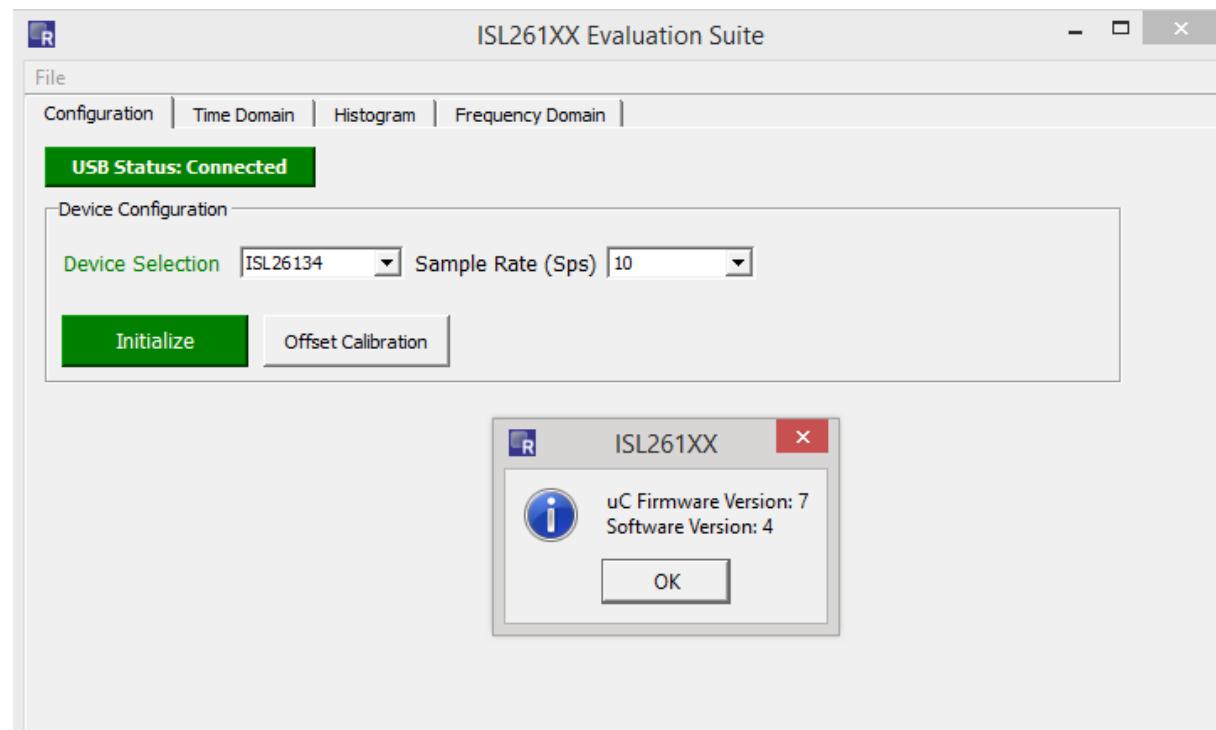


**FIGURE 10. About: FIRMWARE AND SOFTWARE VERSIONS**

# Time Domain Window

The **Time Domain** window allows the user to collect samples from the ADC on the evaluation board and display them in the time domain. The number of samples is initially defaulted at 64, but can be set in a pull-down window from 1 to 1048576. Realize the time involved if a large number of samples is requested on an ADC with a slow sample rate. When the **Acquire** button is clicked,

the samples will be collected and the samples up to 256 will be displayed in the graphing window. If greater than 256 samples are collected, then, after the samples are captured and the first 256 are displayed, the time plot of the entire sample set can be displayed by clicking on the **Pop Out** button. Figures 11 and 13 illustrate the capture of 4096 samples. The window in Figure 11 displays only the first 256 samples. Figure 13 illustrates the results when the **Pop Out** button has been selected.
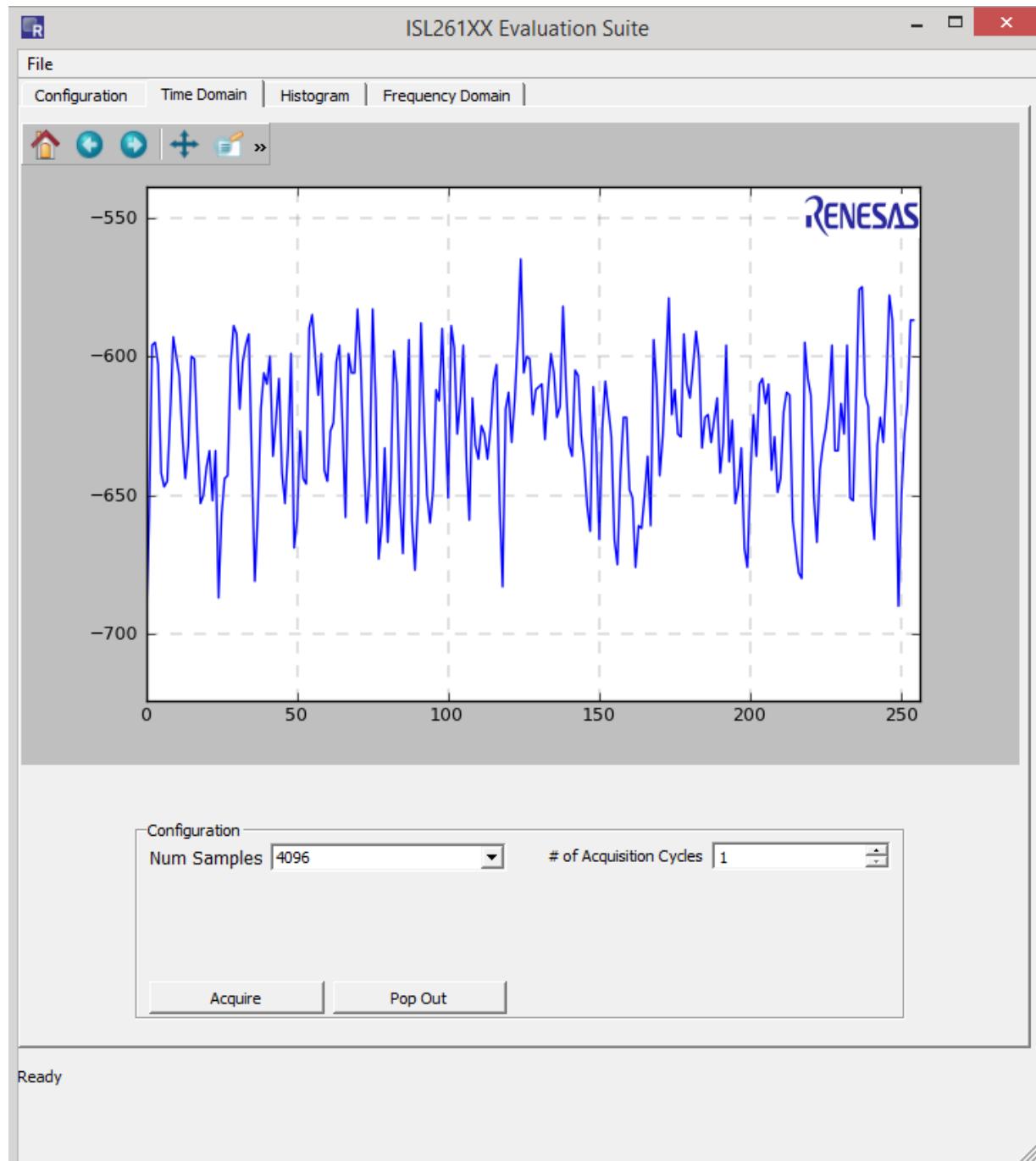


**FIGURE 11.  TIME DOMAIN WINDOW, "About" BUTTON RESULTS (256 SAMPLES)**

Buttons at the top of the plot provide several user graph tool functions as shown in Figure 12.

These are also available in the **Histogram** and **Frequency Domain** windows.

**House**: Zooms to the original zoom scale factor.

**Left/Right**: Goes back/forward 1 zoom command. If you zoom in twice and want to go back to the first zoom, click the left arrow.

**Four Points**: Moves the axes around.

**Magnifying Glass**: Zoom box.

**Scaling Icon (Up/down/left/right):** Changes the size of the plot in the window. You can scale the graph as large as the border.

**Check Box**: Allows customization of axis labels/plot title as shown in Figure 13.

**Disk**: Saves the plot as an image. When selected, a window will open that offers several image format options.

Once the data from the ADC has been captured, the data can be saved to a file. The histogram data and the spectrum data can also be saved. See "Appendix #2 Data File Formats" on page 19 for a discussion of the formats of the saved files. Note that the raw data (conversion words from the ADC) files can also be read back into the GUI once saved or, data collected from another source can be read into the GUI software for analysis if the proper data format is used. See "Appendix #2 Data File Formats" for details.



FIGURE 12. TOP OF PLOT GRAPH TOOLS
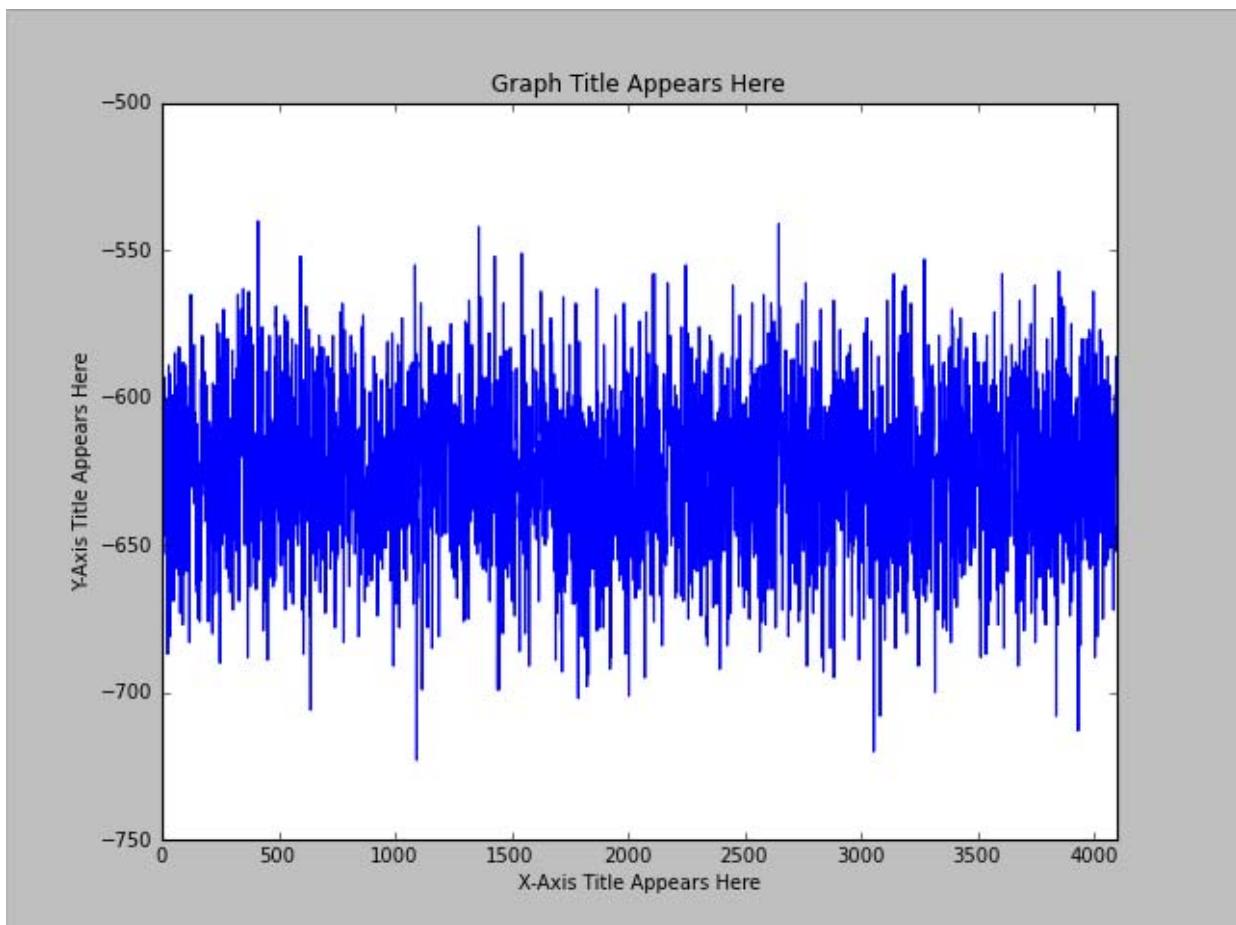


FIGURE 13. TIME DOMAIN WINDOW, "Pop Out" BUTTON RESULTS
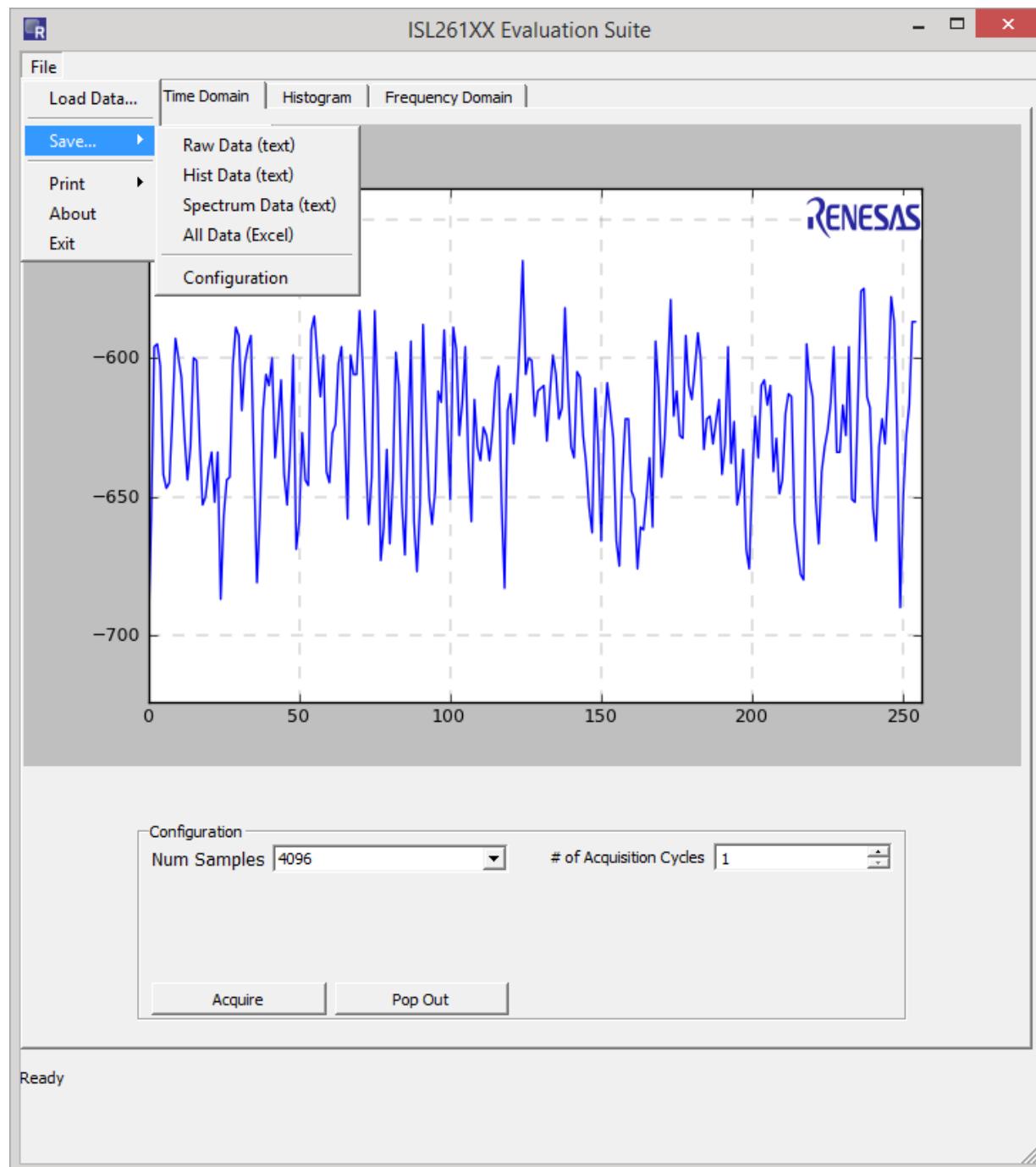
**FIGURE 14. "Save" OPTIONS**

## Histogram Window

If the user clicks on the histogram window after collecting data using the **Time Domain** window, the histogram of the time domain data will be plotted. Alternatively, the **Histogram** window provides the user options to set the number of samples to be collected and to acquire a new sample set based upon this selection. The **Bin Width** window allows the user to set the

number of converter codes that are counted in one bin of the histogram. This number is defaulted to "**1**".

When the histogram is plotted, the plot includes markers for the mean value (red vertical line) and for one standard deviation from the mean on each side (green dashed lines). Signal statistics are listed in the plot itself and in the text boxes below the graph. The **Pop Out** button shows the graph without the statistics listed.
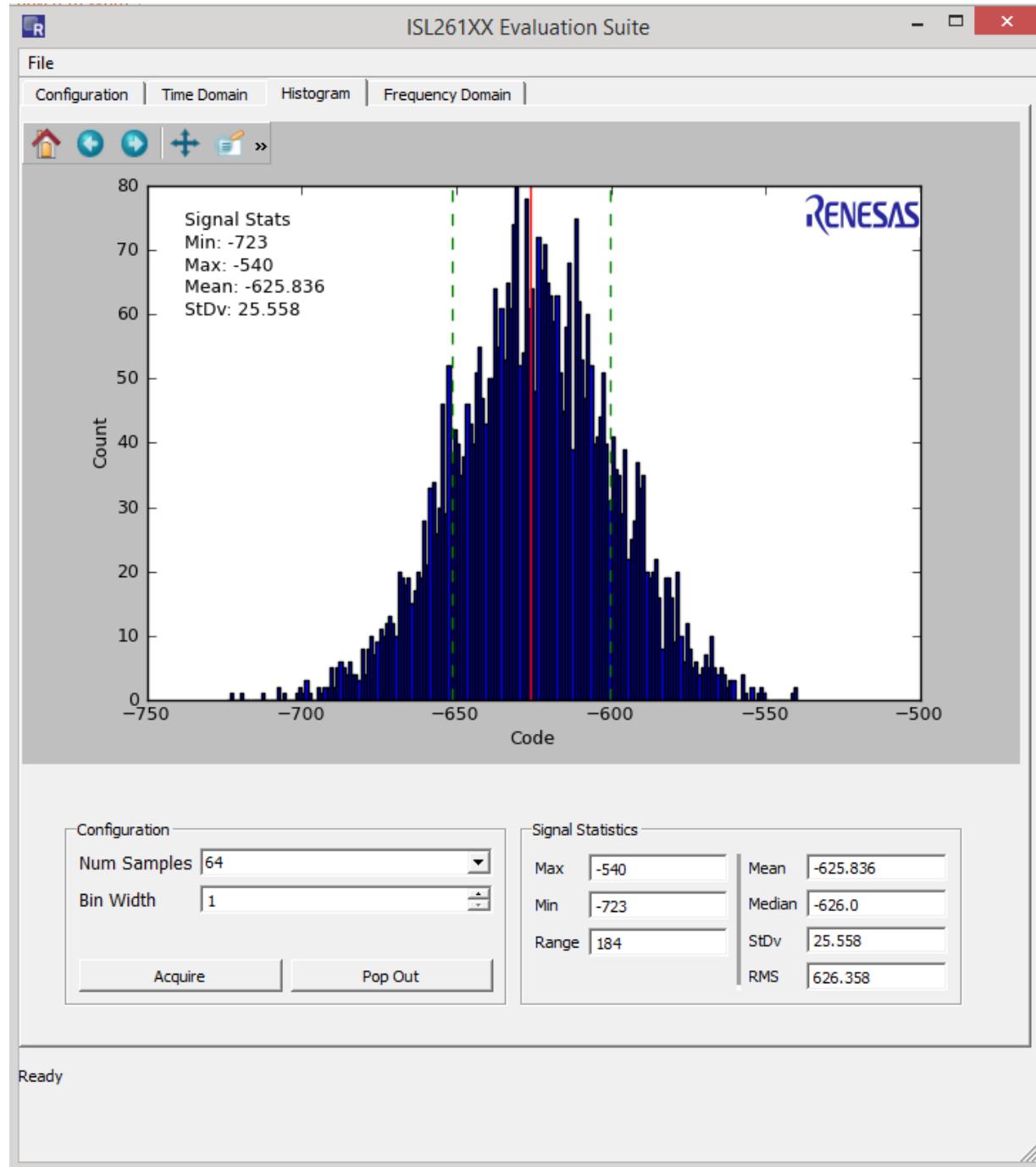


**FIGURE 15.  HISTOGRAM WINDOW**

# Frequency Domain

If the user has collected data in either the Time Domain window or the Histogram window, and then clicks on the Frequency Domain menu option, the data will be processed with the FFT algorithm and the resulting spectral information will be displayed, as shown in Figure 16. The red lines indicate harmonics. If no signal is present, the software assumes the highest point in the spectrum is the fundamental. If the **log(freq)** check box is checked, the spectral plot will be graphed with the frequency axis on a Log scale, as shown in Figure 19. If the **Grounded Input Test** check box is checked, and data is collected

with the input to the converter shorted, the GUI software will calculate the various parameters such as SNR (Signal-to-Noise Ratio) by computing the ratio of an artificial full-scale sine wave to the total noise in the bandwidth. The **Grounded Input Test** check box should only be checked if there is no actual signal input into the converter. Note that if the **Grounded Input Test** check box is not checked, the software will compute parameters such as SNR, by calculating the ratio of the largest magnitude component in the spectrum (other than the DC offset) to the noise.
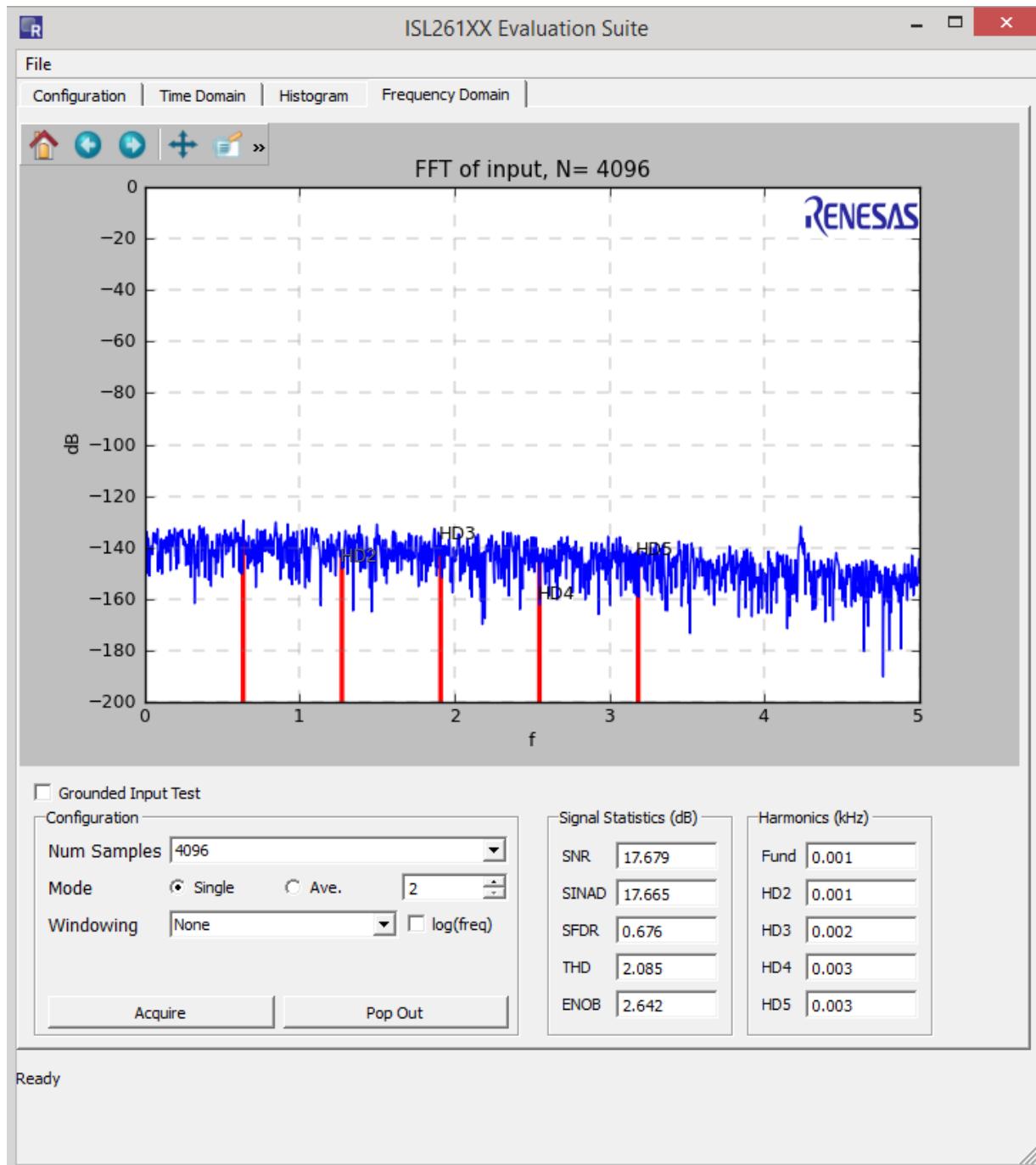


**FIGURE 16. FREQUENCY DOMAIN**

There are several different selectable options in the Frequency Domain window. The number of samples can be set up to 1048576 using a pull-down menu as shown in Figure 17. Note that the Frequency Domain software must have at least 1024 samples to compute a proper spectral plot.

The software also allows a number of different window functions to be used. The different windowing options can be selected in the Windowing pull-down menu as shown in Figure 18. These are normally used when testing is performed with a sine wave as the input signal.

Figure 19 illustrates the spectral plot of one data set of 4096 samples. The results of the FFT can be averaged by setting the Mode radio button option to Ave. and then using the window next to the "Ave." button to set the number of data sets to be averaged. When averaging is performed, the output results of many FFTs are averaged and produce a spectral plot with smoothed (averaged) spectrum as shown in Figure 20.

Remember that the spectrum plot data can be saved by clicking on the File → Save → Spectrum Data option at the top of the window.
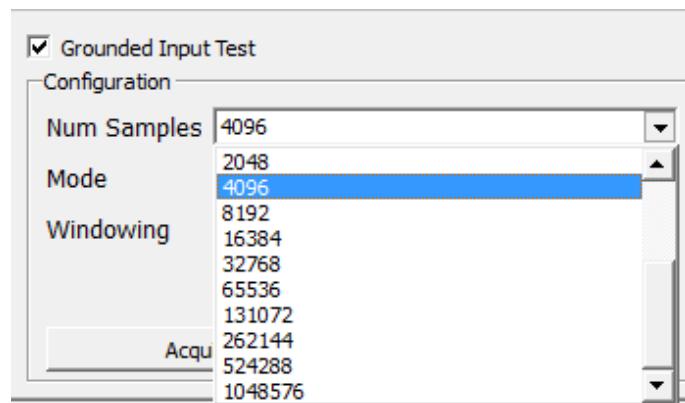


FIGURE 17. Num Samples PULL-DOWN WINDOW
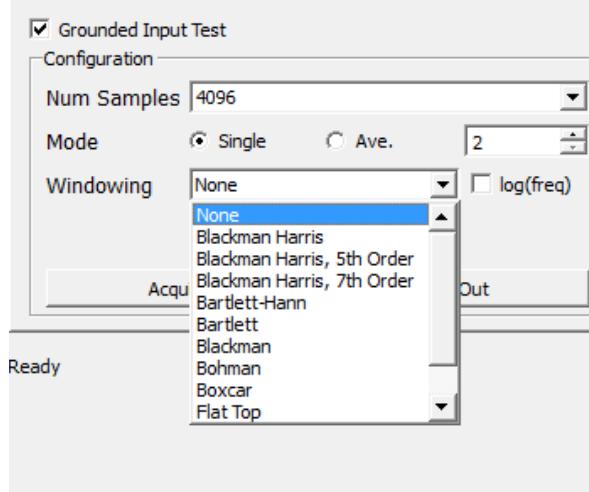


FIGURE 18. Windowing PULL-DOWN WINDOW
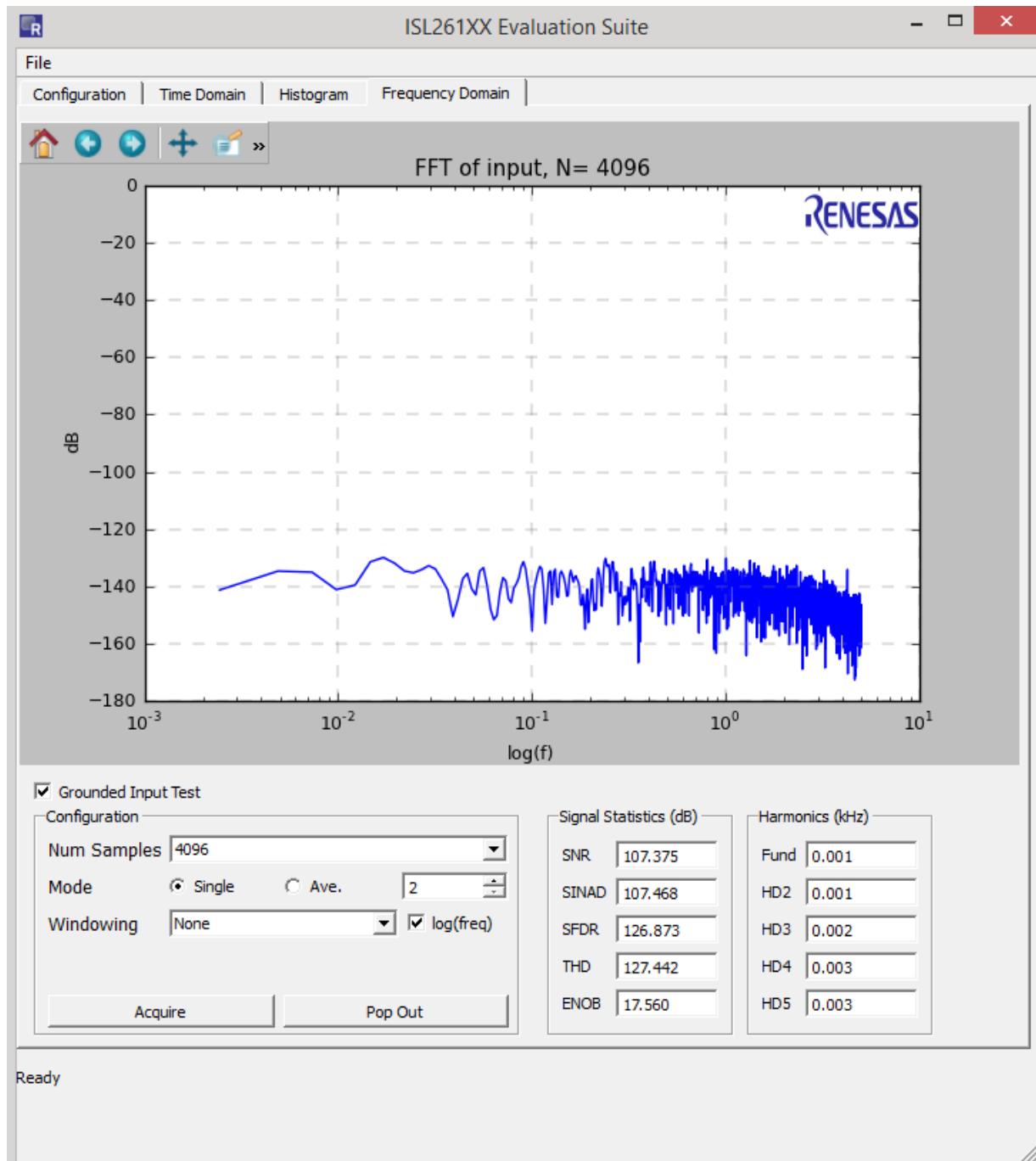
**FIGURE 19.**
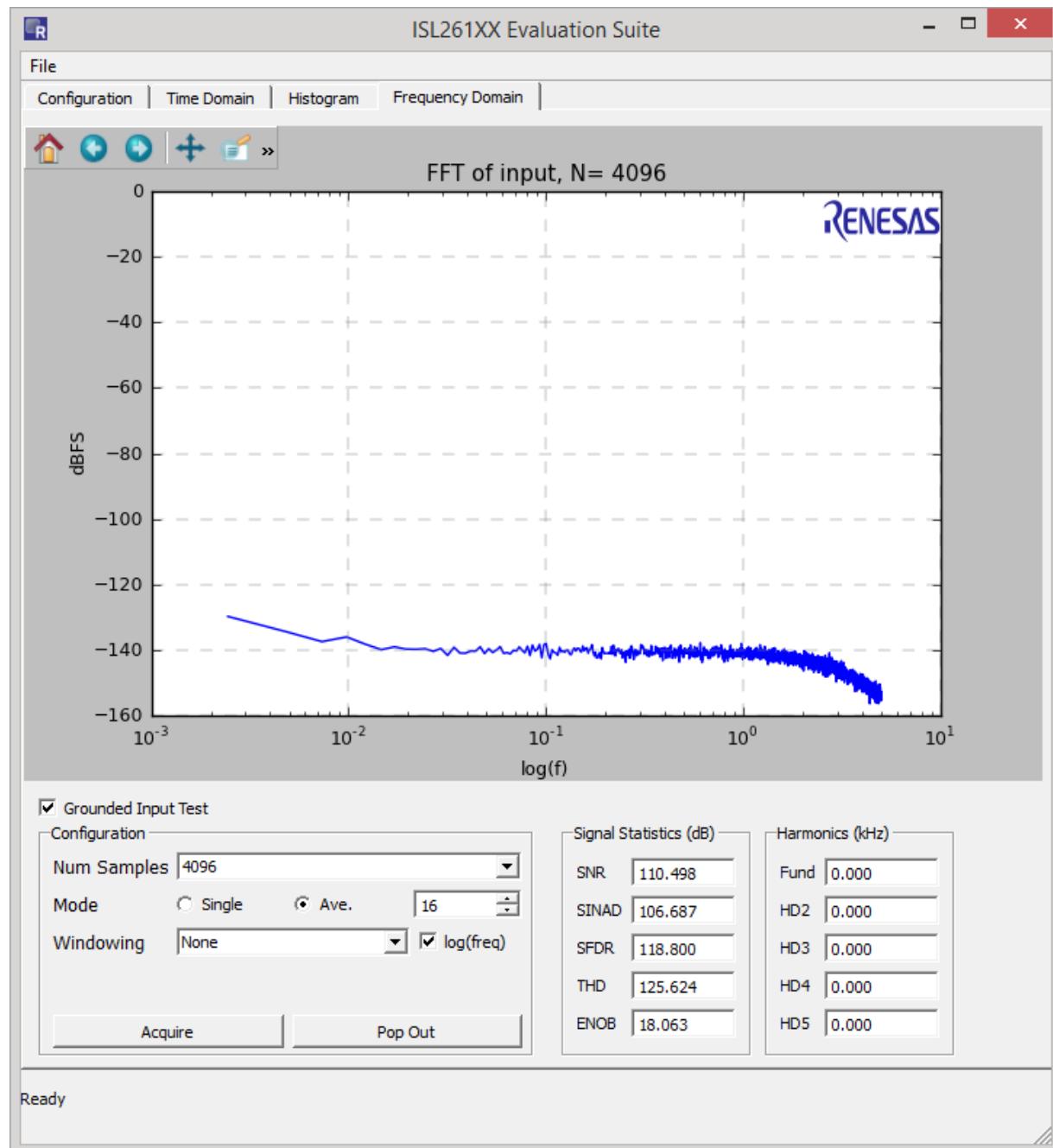
**FIGURE 20.**

# ISL26134AV28EV1Z Bill of Materials

| ITEM | QTY | REFERENCE | PART NUMBER | MANUFACTURER | DESCRIPTION | NOTES |
|------|-----|-----------|-------------|--------------|-------------|-------|
| 1 | 1 | C1 | ECH-U1C104JX5 | PANASONIC | CAP, 0.10µF, 5%, PPS FILM, 1210 | |
| 2 | 4 | C2, C5, C14, C17 | C0805C472J5RAC | KEMET | CAP, 4700pF, X7R, 0805, 50V, 5% | |
| 3 | 9 | C3, C4, C7, C9, C15, C16, C18, C19, C27 | C0805C103J5RAC | KEMET | CAP, 0.01µF, X7R, 0805, 50V, 5% | |
| 4 | 9 | C6, C8, C10, C11, C12, C21, C25, C26, C28 | C0603C104J3RACTU | KEMET | CAP, 0.1µF, X7R, 0603, 25V, 5% | |
| 5 | 1 | C13 | C0603C272J5RAC | KEMET | CAP, 2700pF, X7R, 0603, 50V, 5% | |
| 6 | 1 | C20 | C0603C105K4RACTU | KEMET | CAP, 1µF, X7R, 0603, 16V, 10% | |
| 7 | 2 | C22, C23 | C0603C220J5GAC | KEMET | CAP, 22pF, COG, 0603, 50V, 5% | |
| 8 | 1 | C24 | C0805C105J4RAC | KEMET | CAP, 1µF, X7R, 0805, 16V, 5% | |
| 9 | 1 | C29 | C1210C476M9RACTU | KEMET | CAP, 47µF, 20%, 6,3V, X7R, 1210 | |
| 10 | 5 | D1, D2, LED1, LED2, LED3 | SML-LX1206IC-TCR | LUMEX OPTO | LED, SMT 3216, RED | |
| 11 | 1 | FB1 | MI0805M221R-10 | LAIRD - SIGNAL INTEGRITY | FERRITE CHIP POWER 220Ω SMD | |
| 12 | 5 | J1, J5, J6, J7, J29 | TSW-103-07-G-S | SAMTEC | STAKE HEADER, 3x1, 0.1" CTR, GOLD | |
| 13 | 9 | J3, J9, J10, J12, J13, J15, J16, J18, J20 | TSW-102-07-G-S | SAMTEC | STAKE HEADER, 2x1, 0.1" CTR, GOLD | |
| 14 | 1 | J4 | 5-1814832-1 | TYCO | CONNECTOR, SMA, GOLD PLATED | |
| 15 | 5 | J8, J11, J14, J17, J24 | 1729128 | PHOENIX CONTACT | CONN TERM BLOCK 2POS 5.08MM | |
| 16 | 3 | J19, J21, J23 | 111-2223-001 | EMMERSON | BINDING POST, GROUNDED TYPE NICKEL PLATED | |
| 17 | 2 | J22, J26 | TSW-104-07-G-D | SAMTEC | STAKE HEADER, 4x2, 0.1" CTR, GOLD | |
| 18 | 1 | J25 | 67068-9000 | MOLEX | CONN USB RT ANG RECPT TYPE B WHT | |
| 19 | 3 | J27, J28, J30 | TSW-103-07-G-D | SAMTEC | STAKE HEADER, 3x2, 01." CTR, GOLD | |
| 20 | 6 | R1, R2, R4, R6, R7, R8 | CRCW08052000F | DALE | RES, 200Ω, 0805, 1/10W, 1%. 100ppm | |
| 21 | 1 | R3 | NP-RES-0805 | N/A | DO NOT POPULATE | |
| 22 | 2 | R5, R10 | CRCW0805220J | DALE | RES, 22Ω, 0805, 1/10W, 5%, 200ppm | |
| 23 | 1 | R9 | CRCW0805103J | VISHAY | RES, 10k, 0805, 1/10W, 5%. 200ppm | |
| 24 | 1 | R11 | CRCW0805473J | DALE | RES, 47k, 0805, 1/10W, 5%, 200ppm | |
| 25 | 2 | R12, R13 | CRCW0805100J | VISHAY | RES, 10Ω, 0805, 1/10W, 5%. 200ppm | |
| 26 | 3 | R19, R20, R36 | CRCW08051001F | DALE | RES, 1k, 0805, 1/10W, 1%. 100ppm | |
| 27 | 1 | S1 | B3F-1000 | OMRON | SWITCH. PUSHBUTTON SPST 6x6mm | INSTALL AFTER WASH PROCESS |
| 28 | 1 | S2 | 5435640-2 | TYCO | SWITCH DIP 4POS UNSEALED GOLD | |
| 29 | 1 | U1 | ISL26134AV28 | RENESAS | PRECISION ADC, TSSOP28 PKG | |
| 30 | 1 | U2 | SI8441BB | SILICON LABS | DIGITAL ISOLATOR, QUAD CHANNEL, SOIC16 WIDE BODY PKG | |
| 31 | 1 | U3 | AT90USB162-16AU | ATMEL | MICROCONTROLLER, USB CONTROLLER, 8-BIT, 16k FLASH, TQFN32 PKG | |
| 32 | 1 | U6 | ISL21090BFB825Z-TK | RENESAS | VOLTAGE REFERENCE, 2.5V, ±0.02%, 7ppm, SOIC8 | |
| 33 | 1 | Y1 | CMR309T-4.9152MABJ-UT | CITIZEN | CRYSTAL, 4.9152MHz, TUBULAR, MINIATURE | |
| 34 | 1 | Y2 | CMR309T-8.000MABJ-UT | CITIZEN | CRYSTAL, 8.000MHz, TUBULAR, MINIATURE | |
| 35 | 12 | | 881545-2 | TE CONNECTIVITY | SHUNT, LP W/HANDLE, 2 POS, 30AU | |
| 36 | 1 | | UB 12-03 | SF CABLES | CABLE, USB 2.0 A MALE TO B MALE, 3FT | |

# Appendix #1 How to Obtain and Install the GUI Software

The following is the web page link for the ISL26134 device:
http://www.intersil.com/products/ISL26134

Go to this link to find the tab where the PC GUI software installer can be downloaded. Note that the software installer does have a license agreement that will be presented when the software is loaded onto your PC.

# Appendix #2 Data File Formats

The GUI software allows the user to save data from the time domain (raw data), data from the histogram processing, and data from the spectrum processing segments of the software. It also allows raw data (time domain data) files to be read back into the GUI if they have the proper header and format.

## Raw Data

As an example, a time domain collection of only 8 samples has been collected and saved to a file. The content of the file that is saved has the following format:

```
ISL2613X
80.0
24
8
-394
-361
-405
-411
-397
-416
-423
-416
```

The file has a header that consist of the part number (ISL26134), the sample rate (80), the number of bits in the conversion word (24), and the number of samples in the file (8). The header is followed by the 8 conversion words in signed decimal format.

## Histogram Data

A data collection of 1024 data words was collected and the histogram performed. The histogram data was then saved into a file. The content of the file has the following format. The histogram statistics are listed first, followed by the converter codes and their respective histogram counts.

### Signal Statistics

```
Min: -486
Max: -462
Range: 25
Mean: -472.762
StDv: 3.631
```

```
Code          Hits
-488          0
-487          0
-486          1
-485          0
```

```
-484          0
-483          4
-482          4
-481          7
-480          15
-479          29
-478          47
-477          54
-476          79
-475          84
-474          96
-473          112
-472          107
-471          99
-470          87
-469          71
-468          57
-467          40
-466          14
-465          11
-464          2
-463          3
-462          1
-461          0
```

## Spectrum Data

A data set of 1024 points was collected at a sample rate of 80Sps. The FFT output will produce a spectrum plot with 512 Bins of magnitude data. Only the beginning and ending portion of the data file has been reproduced here. Note that the Bins start at 0 frequency and increase to one half the sample rate (40Hz). Note that the magnitude in dB is the magnitude of the noise in dB below full-scale rms but it is scaled based upon magnitude/$\sqrt{BIN}$, not magnitude/$\sqrt{Hz}$.

```
Freq                    Magnitude (dB)
0.0                     -152.176082921
0.078125                -150.765450438
0.15625                 -151.161495054
0.234375                -161.302103964
0.3125                  -152.403880548
0.390625                -153.371854853
0.46875                 -147.933929413
0.546875                -140.814871676
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
39.375                  -158.163736345
39.453125               -186.035243892
39.53125                -162.574730282
39.609375               -161.238997758
39.6875                 -160.482611598
39.765625               -157.776276313
39.84375                -156.626469649
39.921875               -158.855304029
```

## All Data (Excel)

The advantage of saving data with this option is that the raw data, the histogram data, and the spectrum data will all be saved on separate sheets of the spreadsheet, but the version of Excel that is supported only allows up to 32k samples.

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## Load Data Function

The GUI allows raw (time domain) data to be loaded back into the GUI. Alternately, the user might collect data in another system and import the conversion word data into the GUI to perform analysis. To be able to read the data the file must have the proper header (as discussed in "Raw Data" on page 19 of this appendix).

The header must have a header with a part number (this can be something other than a chip number), sample rate, number of bits in the converter, and the number of samples, followed by the data in decimal format. The largest value of any reading cannot exceed one half $2^n$ (n = number of bits in the converter). For example, if the number of bits in the converter is 12, then the largest reading can be no greater than $(2^{12})/2$ or 2048.

```
ISL2613X  > part number
80.0      > sample rate
24        > number of bits in the converter
8         > number of data samples in the file
-394      > conversion data in signed decimal
format
-361
-405
-411
-397
-416
-423
-416
```

## Appendix #3 Evaluation Board Factory Jumper Settings

Figure 21 indicates the position of the header shunts when the board is shipped from the factory.

Header J22 is connected with the 2.5V reference selected as the common mode voltage.

Headers J9 and J10 are shorted with shunts to connect the common mode voltage to the AIN1+ and AIN1- signals coming from the terminal block connector. This effectively shorts both inputs to channel 1 on the ADC to the common mode voltage and enables the ADC to be tested with a shorted input. One or both of these jumpers must be removed if the ADC is to measure a signal on this channel.

Headers J1 and J5: these are set to select logic 1, A0 = A1 = 0 => Channel = 1.

Headers J 29 and J7: These are set to select logic 1, Gain0 = Gain1 = 1 => => Gain = 128X.

Header J6: Set to select logic 1. Speed = 1 => 80Sps.

Headers J28 and J30: the 2.5V_VREF option is selected on J28. The AGND option is selected on J30. These enable to 2.5V voltage reference chip to be the voltage reference for the ADC.

DIP switch: Switches S2-1, S2-2, S2-3 and S2-4 cannot be in the closed (ON) position. With all four switches in this position the board is in a factory test mode and will not function properly with the PC software GUI. If the factory test mode is selected LED3 will be lighted.
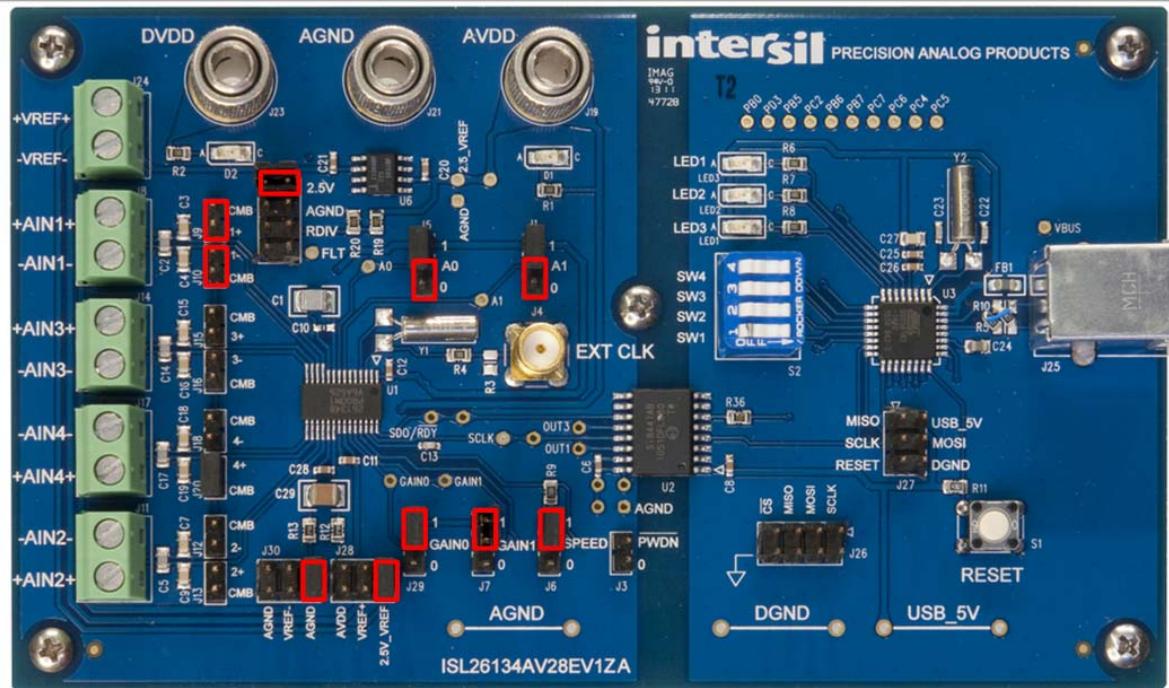


**FIGURE 21.  EVALUATION BOARD INDICATING HEADER SHUNT POSITIONS**

# Appendix #4 Evaluation Board Layout and Component Placement
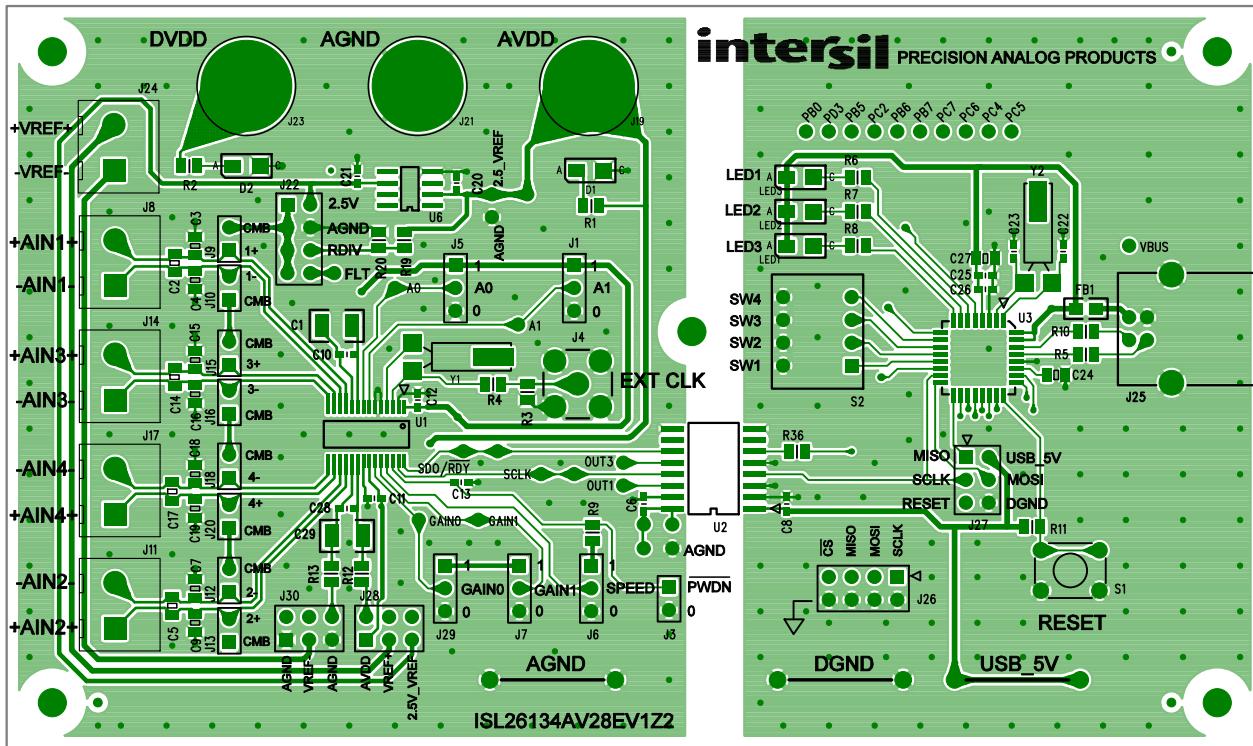


**FIGURE 22. TOP LAYER**
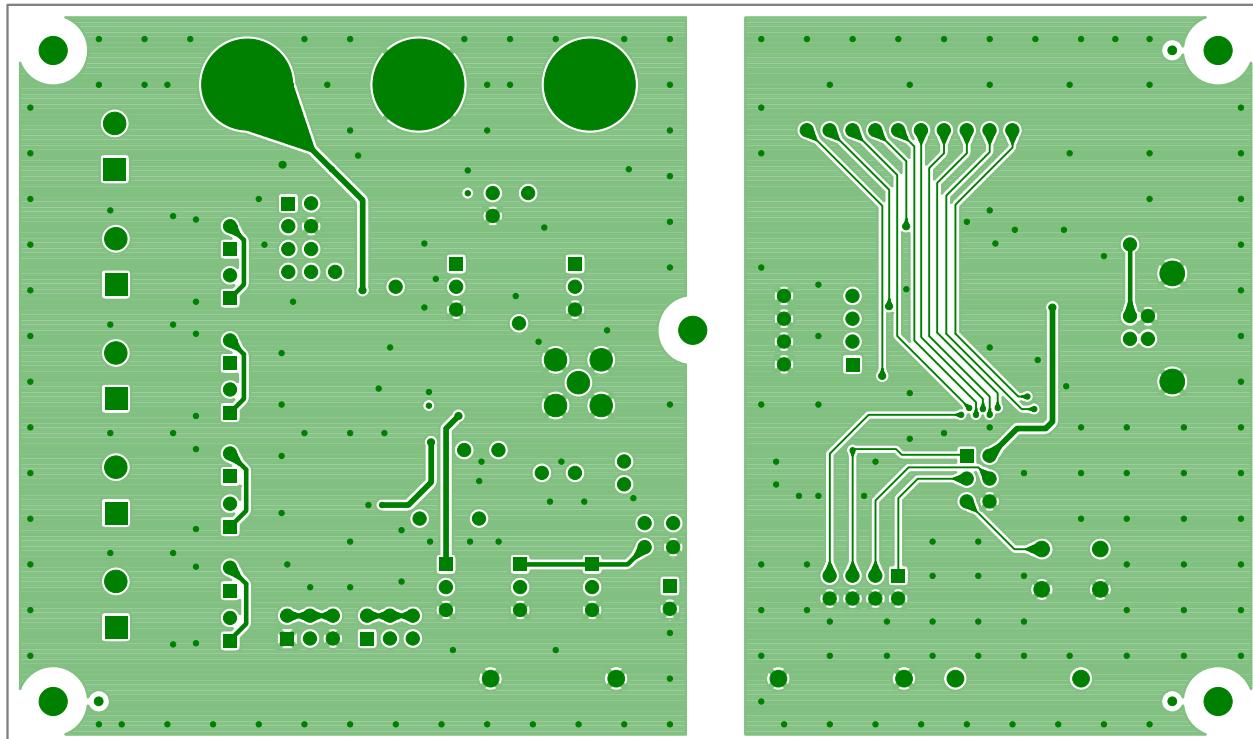


**FIGURE 23. BOTTOM LAYER**

# Appendix #4 Evaluation Board Layout and Component Placement (Continued)
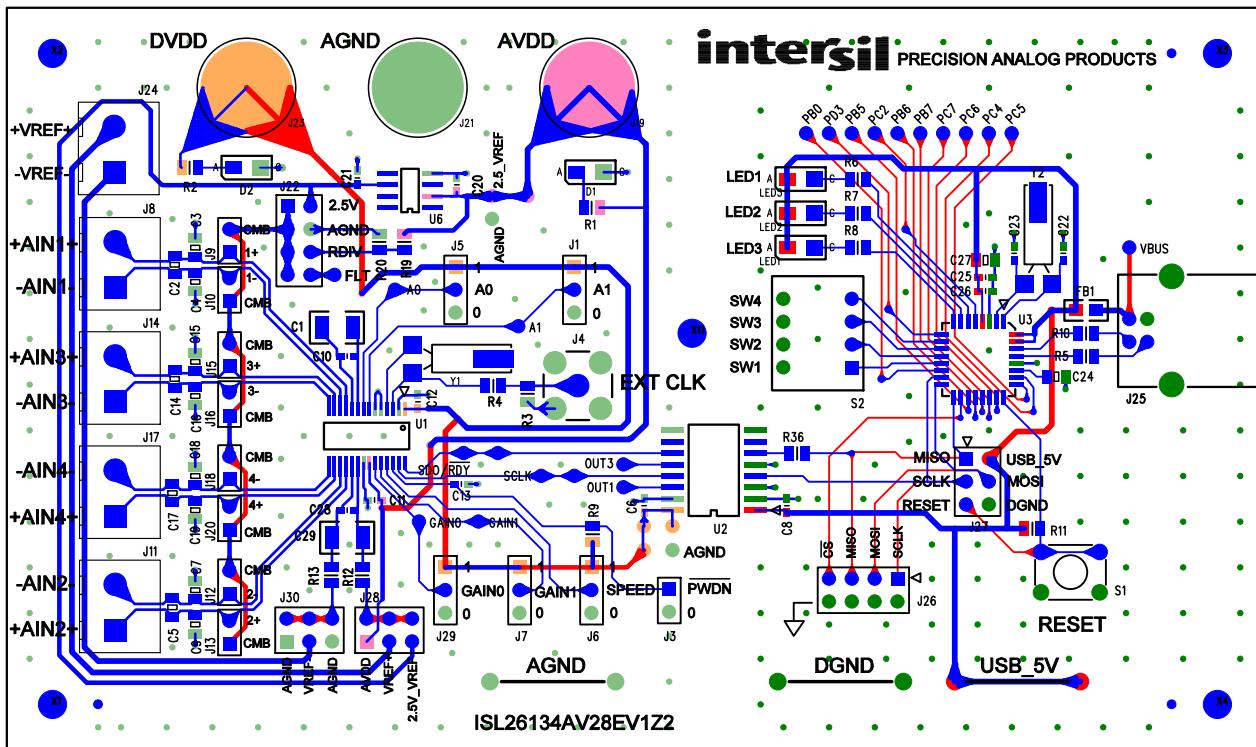


**FIGURE 24. COMPOSITE OF LAYERS**

# Notice

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- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.

- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
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- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
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