ModusToolbox™ Power Suite GUI user guide

ModusToolbox™ Power Suite GUI version 1.0.0

About this document

Scope and purpose

ModusToolbox™ Power Suite GUI is a tool provided as part of the Power Suite ecosystem. The tool helps power systems engineers quickly evaluate, run, and optimize power conversion solutions.

Intended audience

This document helps design engineers and power systems developers understand how to use the Power Suite GUI as part of creating their Power Suite Power Conversion Library-based solutions in a Modus Toolbox™ environment.

Document conventions

Convention	Explanation
Bold	Emphasizes heading levels, column headings, menus and sub-menus
Italics	Denotes file names and paths.
`Courier New`	Denotes APIs, functions, interrupt handlers, events, data types, error handlers, file/folder names, directories, command line inputs, code snippets
File > New	Indicates that a cascading sub-menu opens when you select a menu item

Abbreviations and definitions

The following define the abbreviations and terms used in this document:

- ADC – analog-to-digital conversion
- Application – One or more projects related to each other.
- COM – communication port
- Configurator – A GUI-based tool used to configure a resource.
- CSV – comma separated values
- Dongle – Communication interface: USB to I2C converter
- GUI – graphical user interface
- MCU – microcontroller unit
- OSC – Oscilloscope
- PMB – Power Management Bus (PMBus)
- RMS – root-mean square
- USB – universal serial bus

Reference documents

Refer to the following documents for more information as needed:

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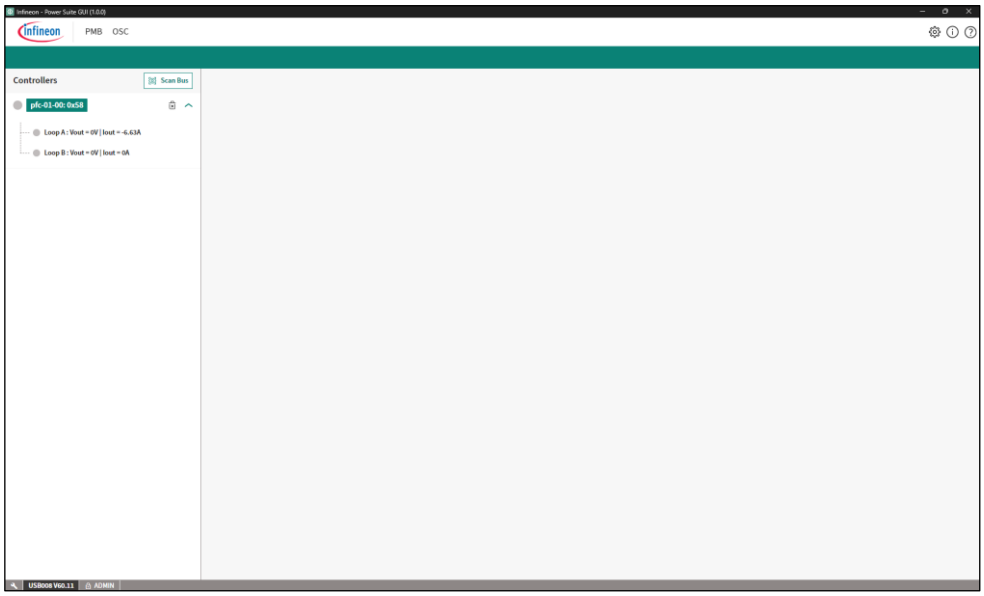
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1 Power Suite GUI overview

ModusToolbox™ Power Suite GUI is a graphical user interface with parameters configuration for Power Suite Power Conversion Library-based applications. The GUI is designed to configure, tune, and test the Power Suite Power Conversion Library features on supported power boards.



Main features

- Command Display and Description – Access descriptions of different commands and see their values.
- Command Management – Read and write command values for different loops.
- Command Live Reading – Activate live reading to periodically read the values of different commands.
- Integrated Oscilloscope – Monitor selected signals in real-time using the built-in oscilloscope, which enables the users to visualize and analyze signal behavior.
- Communication Protocol Support – Leverage support for PMBus communication ensuring the compatibility with a range of devices and systems.

Power Suite GUI digital tools

- PMBus
- Oscilloscope

1.1 Supported middleware

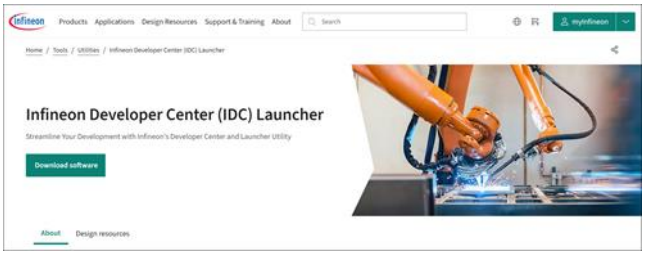
https://github.com/Infineon/mtb-example-pwrlib-pfc/html/group__group__pfc__pmbus__general.html

2 Launch the Power Suite GUI

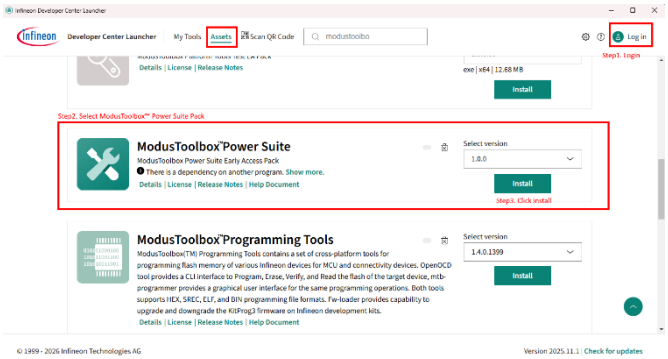
1. Install the Infineon Developer Center (IDC) Launcher:

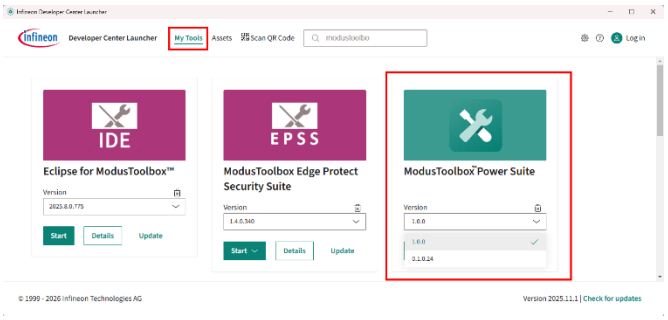
   https://www.infineon.com/design-resources/development-tools/utilities/infineon-developer-center-idc-launcher

2. Open the launcher and log in with "mynfineon" account.



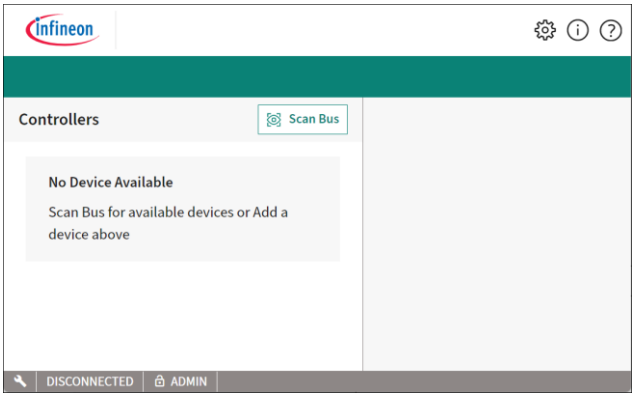
3. Select "Assets", search for and install the “ModusToolbox™ Power Suite Pack”.





4. Click **Start** to open the EXE file to launch the GUI.

5. For the first time, the Power Suite GUI opens without any settings configured.



6. Connect a supported device to see the device utility tools on the toolbar.

   The tool automatically detects the supported device and it displays on the Controllers panel.

   If the tool does not detect the device automatically, use the **Scan Bus** button.

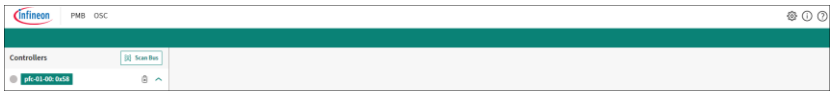
3 GUI description

The Power Suite GUI contains the various parts to configure the settings and the status bar to provide information and indications.

The following chapters describe the Power Suite GUI parts:

- Device utility toolbar
- Hotbar Manager
- About
- Help
- Controllers panel
- Status bar

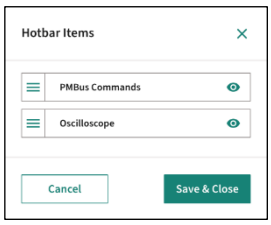
3.1 Device utility toolbar



- The left side of the bar displays the **PMB** and **OSC** device utility tools if the Power Suite GUI is connected to a supported device. They allow the user to communicate, debug, and configure the selected device.
- The right side of the bar displays the **Hotbar Manager**, **About**, and **Help** icons.

3.1.1 Hotbar Manager

Click the  icon to open the **Hotbar Items** window.



You can modify the way the **Hotbar** displays its items. The icons  are used to show/hide;  – pull up/down to change the icons order.

3.1.2 About

Click the  icon to see the License information and version in the modal window.

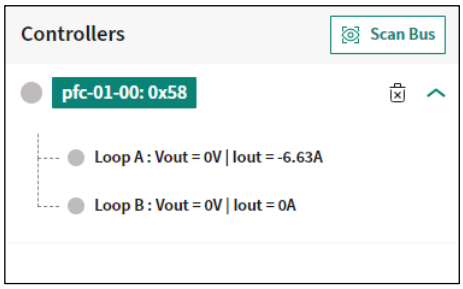


3.1.3 Help

Click the  icon to see this document in the browser window.

3.2 Controllers panel

The **Controllers** pane displays information about the selected device. Use the  icons to remove or collapse the device.



3.2.1 Scan Bus

When the Power Suite GUI detects a dongle, the Scan Bus automatically scans the PMBus address and adds the device. Otherwise, it displays an error.



3.3 Status bar

Before connecting to the device:

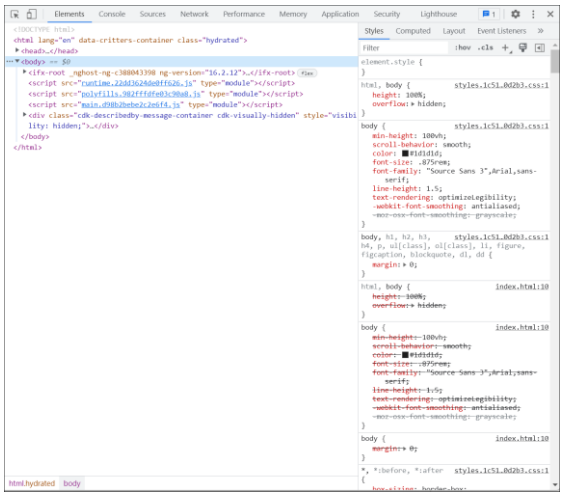


After connecting to the device, the dongle name displays:



3.3.1 Developer tools

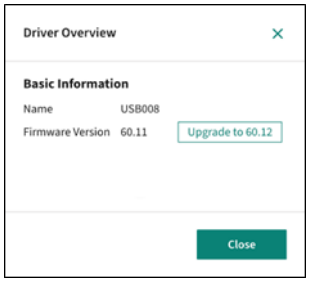
Click  to display the developer tools panel.



3.3.2 Driver Overview

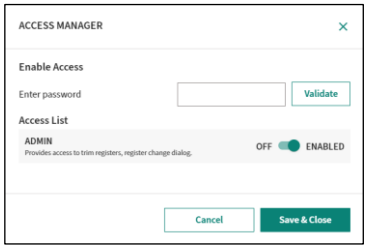
Click 

to see the **Driver Overview** modal. It displays the connected device **Basic Information**, **Name**, and **Firmware Version**. The Power Suite GUI can detect the dongle version and allow the user to update it automatically.



3.3.3 ACCESS MANAGER

Click **ADMIN** to open the **ACCESS MANAGER** modal.



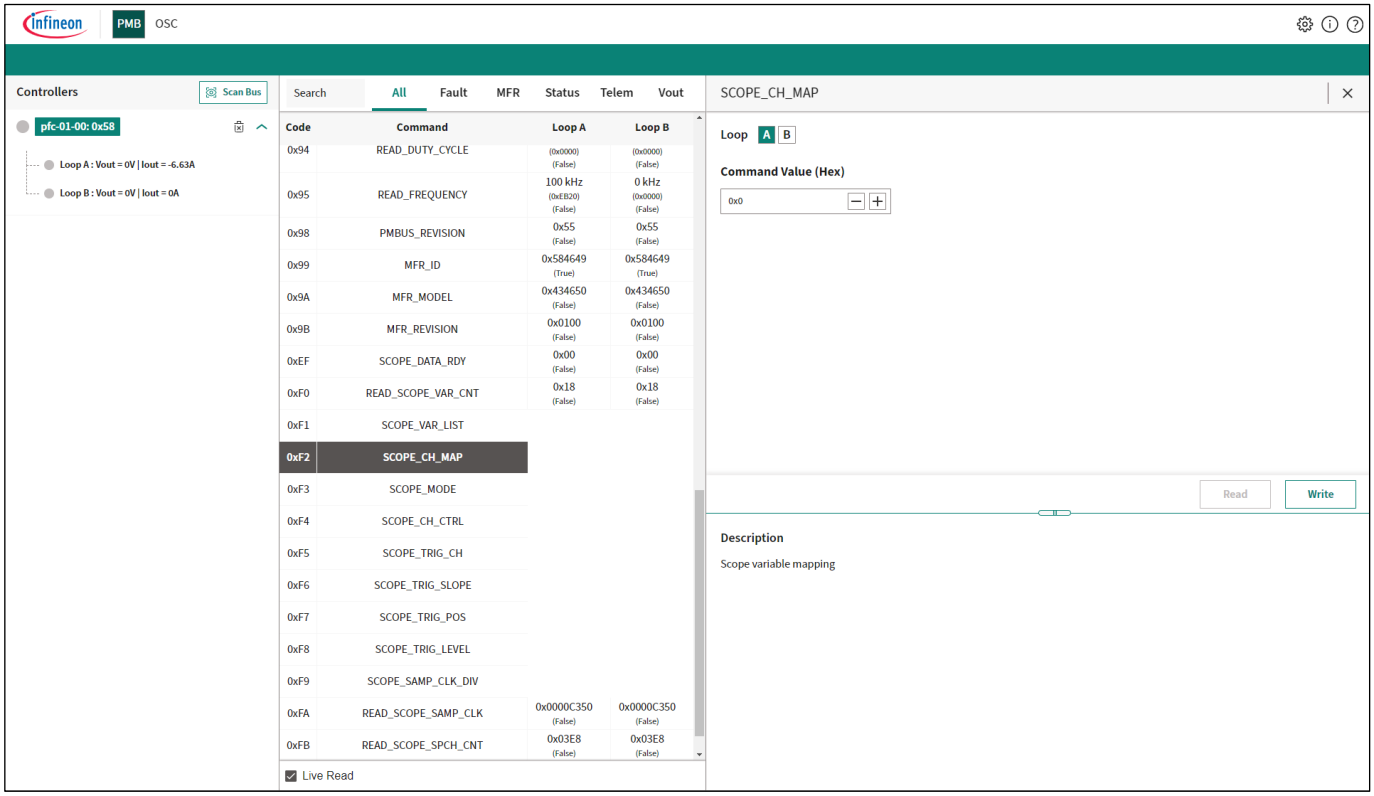
Enter the password and **Validate**.

The **ADMIN** role also has access to opening the developer tools.

4 PMBus

The **PMBus** is part of the ModusToolbox™ Power Suite GUI with a list of configured commands.

Click **PMB** to launch the tool.



PMBus main features

- This open standard protocol defines a means of communicating with power devices. Go to https://pmbus.org/ to see the protocol documentation and specifications.
- Designed to simplify the configuration PMBus target devices.
- Generates a comprehensive data structure that facilitates efficient middleware configuration.

4.1 PMBus Commands

PMBus commands are used for Oscilloscope. The user can read and write all configured commands manually.

When the PMBUs is run for the first time, all read commands execute automatically and continue so on every scroll. To stop this behavior, uncheck the **Live Read** checkbox.

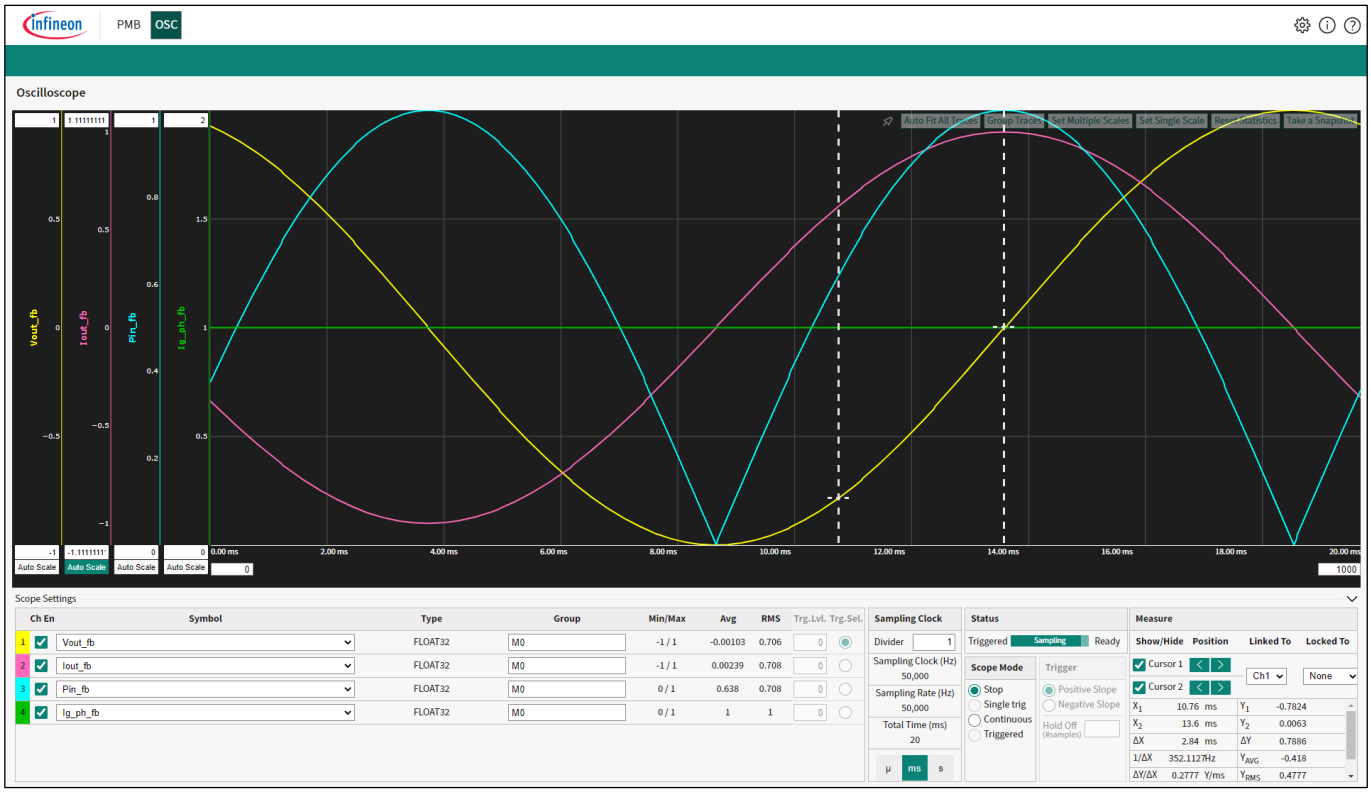
The right side of the panel displays the information on the selected command and available actions:

- **Loop** – Selects which loop command to read or write.
- **Command Value (Decimal)** – Displays in the **.hex* format. You can input a value or increment/decrement it by buttons **+**/**-**. The maximum value depends on the configured command size in bytes. If the input value is bigger, it will be set as the maximal allowed (e.g, **hFF** for 1 byte).
- **Read**/**Write** – Used to read or write the command value. Some commands are allowed only to read, some – only to write, some – read and write.
- **Description** – Displays the command description after it is configured.

5 Oscilloscope

The **Oscilloscope** is part of the Power Suite GUI with signal display and scope settings. It reads signal values from a connected Power Suite Power Conversion Library-based device via PMBus in the Power Suite GUI.

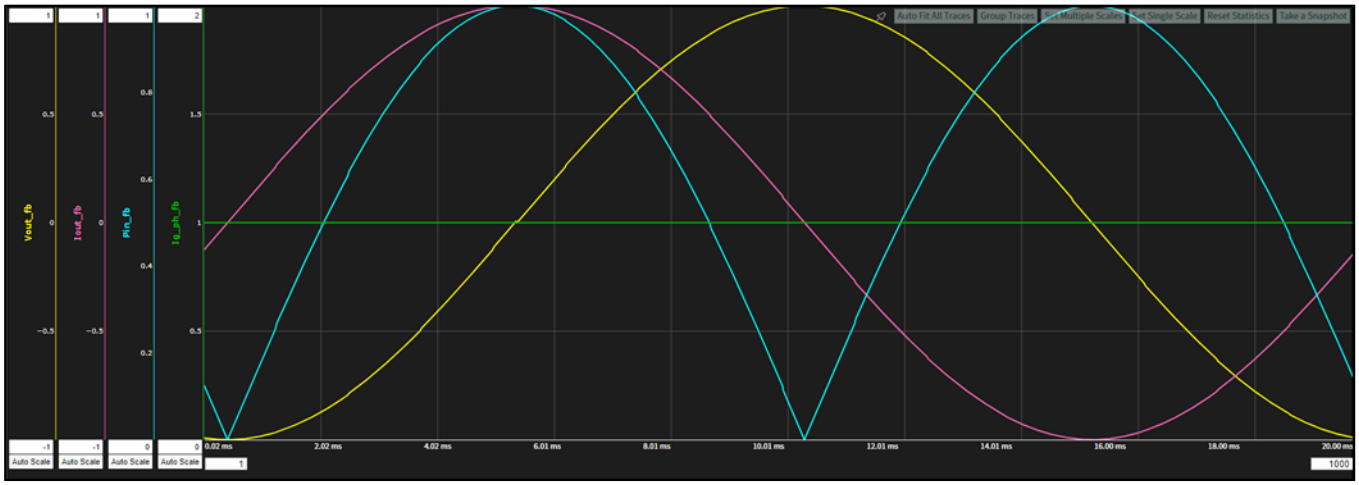
Click **OSC** to launch the tool.



Oscilloscope main features

- Trace display for the selected channels in a visual chart
- Controls and buttons to rescale the axes for the traces
- Trace assignment to different channels
- Real-time trace statistics display
- Sample rate changing with divider input
- Scope modes to stop or control the sampling procedure
- Measurement with cursors

5.1 Trace display for selected signals (chart)

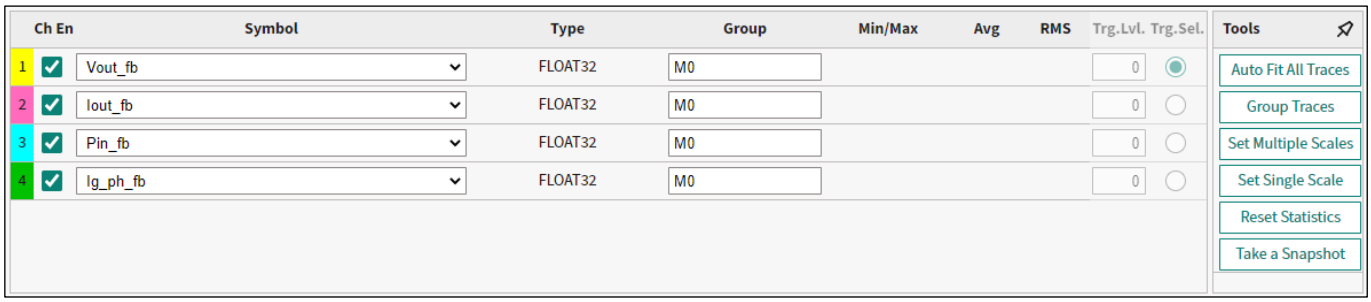


The tool periodically gathers sampling data for the selected signals. The chart displays traces for all channels. Each set of samples contains 1000 data points by default – configured in the board firmware, can be different than 1000.

5.1.1 Tools (quick action buttons)



Use the  button to pin the quick actions to the Scope Settings sections.

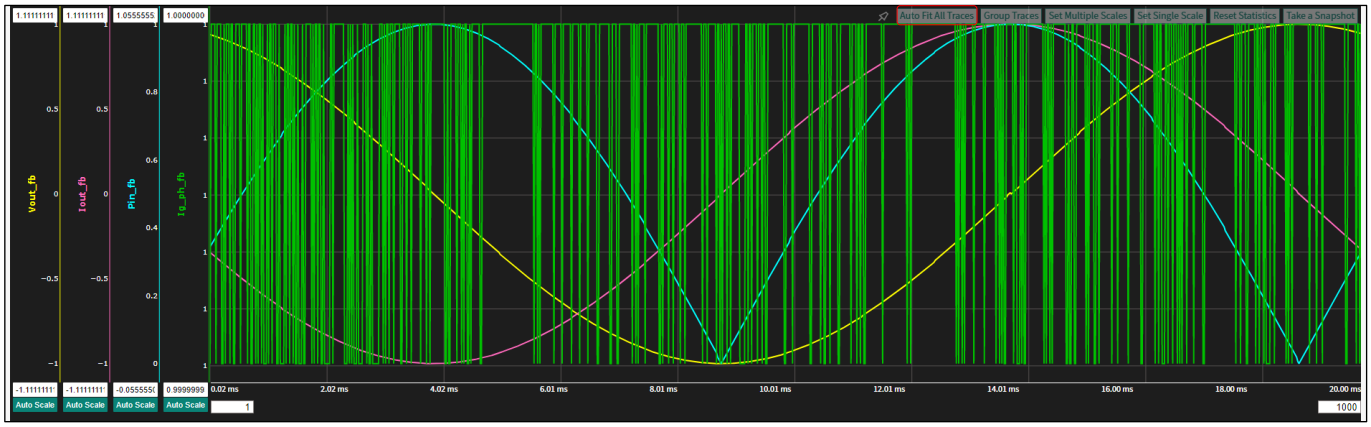


The following chapters describe the quick action buttons usage:

- Auto Fit All Traces
- Group Traces
- Set Multiple Scales
- Set Single Scale
- Reset Statistics
- Take a Snapshot

5.1.1.1 Auto Fit All Traces

Use this button to auto-fit all traces to the chart window so that traces do not overlap. Each vertical axis is used independently within the vertical domain assigned to them. The traces never overlap visually.



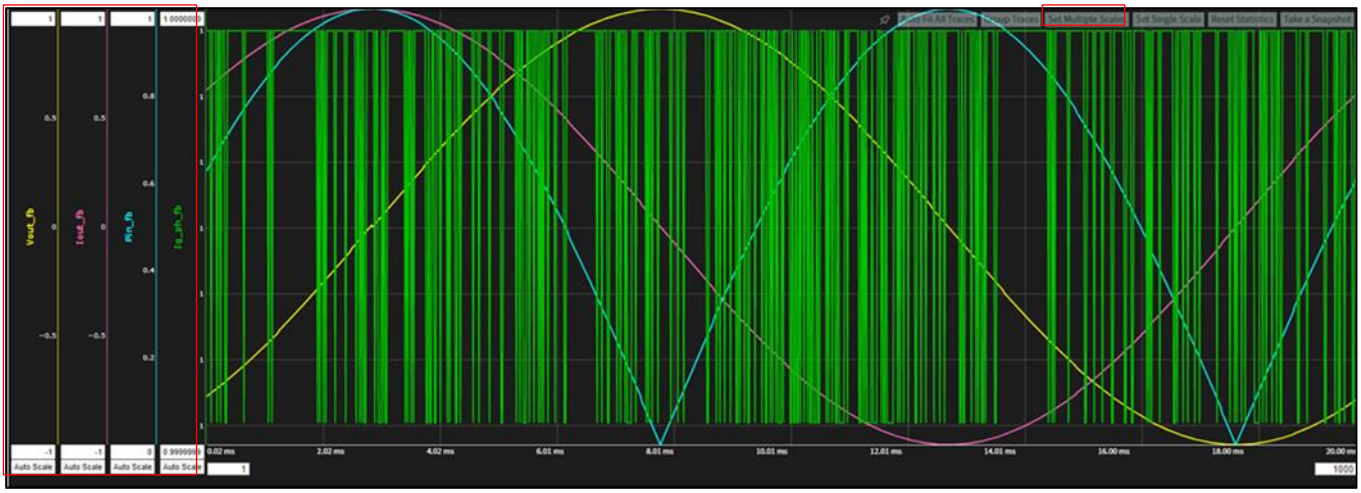
5.1.1.2 Group Traces

Use the group inputs on the channel settings panel to group traces and assign groups names. This button works similar to **Auto Fit All Traces** but it allows you to decide which traces will share the chart domain assigned to the group.



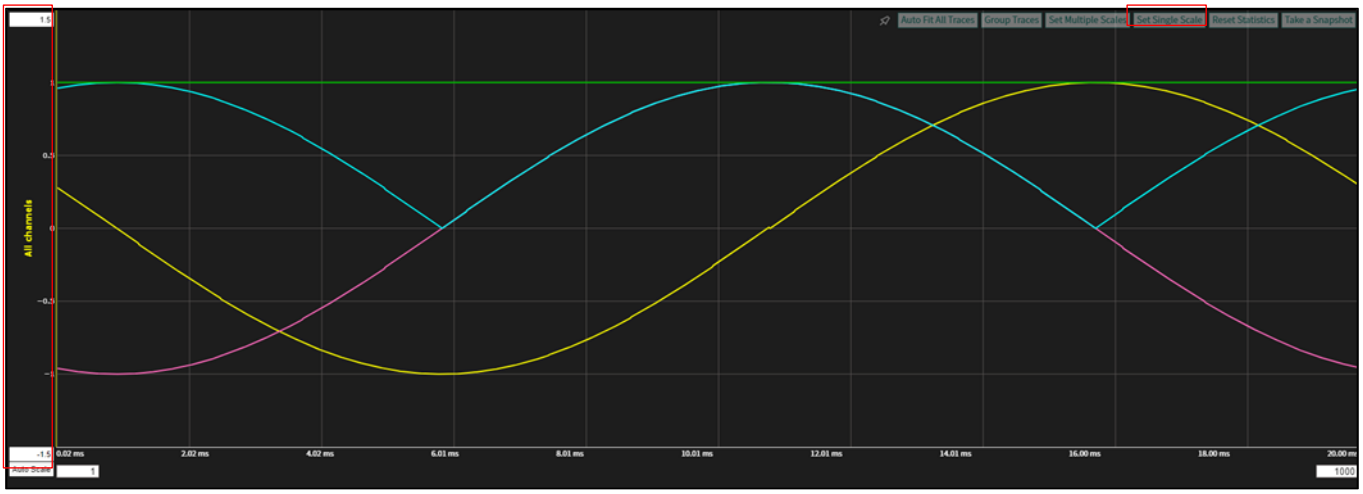
5.1.1.3 Set Multiple Scales

Use this button to fit traces independently to the chart area in the whole vertical domain. Each trace uses the available space to display the maximum detail.



5.1.1.4 Set Single Scale

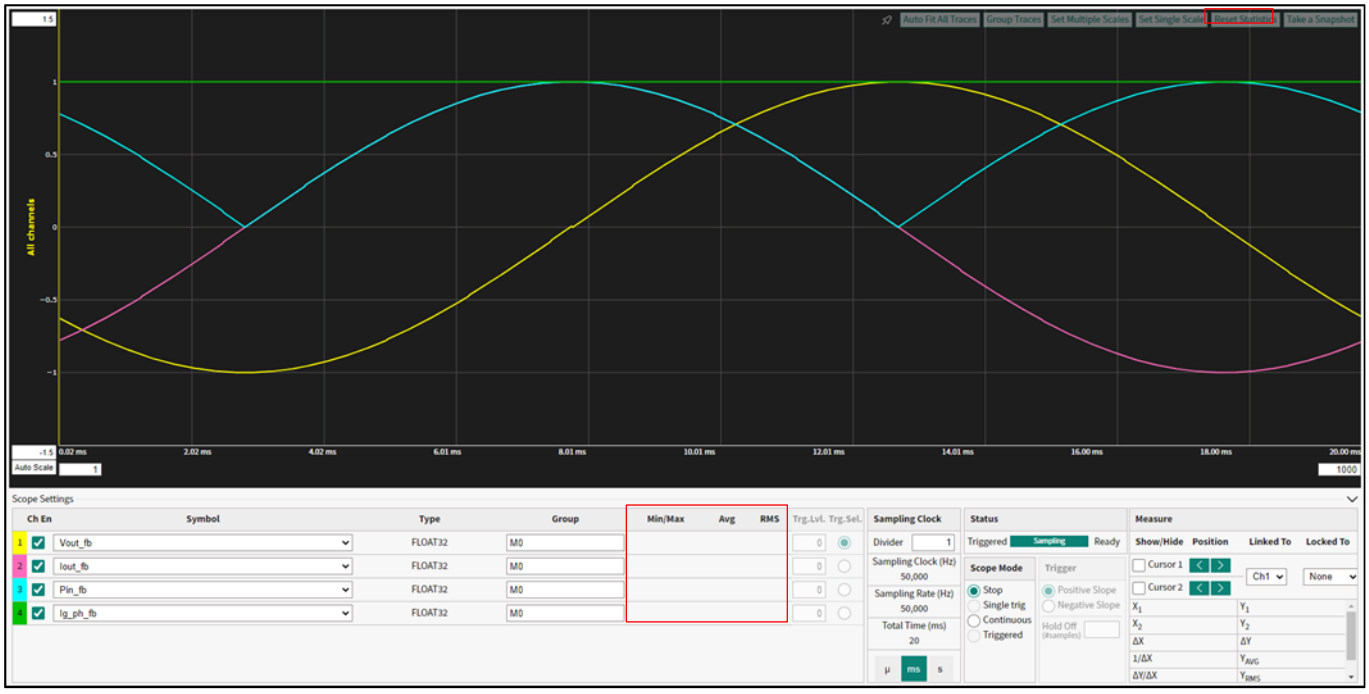
Use this button to position traces so that all vertical axes use the same scale. You can compare the signals data by using the same scale.



5.1.1.5 Reset Statistics

Minimum, maximum, average statistics and the root mean square are updated after every new set of data samples. The minimum and maximum are global, so they reflect the whole sampling history.

Retrieving data for a long time increases the [min, max] range, and the **Set Multiple Scales** scaling becomes less efficient due to the past outlier values. Click **Reset Statistics** and **Set Multiple Scales** to re-adjust the scaling and display more details on the chart.

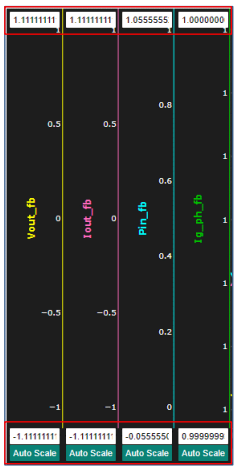


5.1.1.6 Take a Snapshot

Use this button to capture the latest frame on the chart and save it as a PNG image file.

5.1.2 Other controls

Also, there are more controls, which can be used to scale a single vertical axis.



5.1.2.1 Auto Scale buttons

Use these toggle buttons to auto scale the corresponding axis using the signal range. When activated, the panel turns green. After every new sampling, the scale is updated using the upper and lower boundaries of the latest sampling.

5.1.2.2 Scale inputs

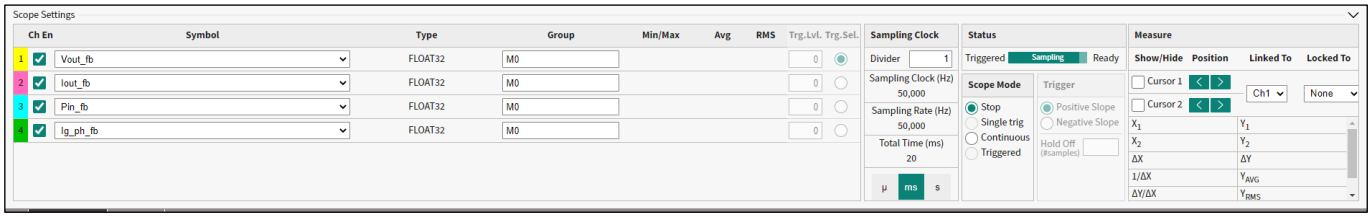
Used to apply custom limits to the corresponding axis. The top and lower inputs display respectively the upper and lower bounds of the axis range. Both inputs can be used to modify the selected axis scale.

5.1.2.3 Horizontal axis

The horizontal axis shows the time scale with the active time unit from the scope settings time-based configuration panel. The input boxes can be used to set the lower and upper bounds of the horizontal axis similar to vertical axes. Note that these inputs display the sampling index, not the time. Assign a value within the range of the number of samples.



5.2 Scope Settings



Use the scope settings to adjust the settings for channels, trigger options, and measurements.

The following chapters describe the groups of the **Scope Settings** panel:

- Channel settings
- Sampling Clock

- Status
- Scope Mode
- Trigger
- Measure

5.2.1 Channel settings

	Ch En	Symbol	Type	Group	Min/Max	Avg	RMS	Trg.Lvl.	Trg.Sel.
1	☑	Vout_fb	FLOAT32	M0	-1 / 1	-0.000956	0.706	0	◉
2	☑	Iout_fb	FLOAT32	M0	-1 / 1	0.00257	0.708	0	○
3	☑	Pin_fb	FLOAT32	M0	0.000000521 / 1	0.637	0.708	0	○
4	☑	Ig_ph_fb	FLOAT32	M0	1	1	1	0	○

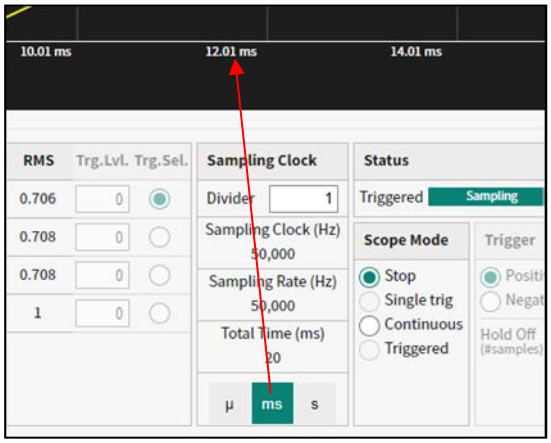
On this panel, you can:

- Enable/disable a channel, check/uncheck the **Ch En** checkbox
- Assign a new signal to the channel, select a signal name from the list of symbols on the **Symbol** select box
- Set the trigger channel and the trigger level
- Assign a group name to the display groups.

The rest of the columns are the variable type information of the selected signal and statistics about the data samplings. Max and Min values are calculated based on all previous samplings while average and root mean squared are calculated based on the latest data set.

Note: Disabling channel 3 removes the signal and axis.

5.2.2 Sampling Clock (time-based configuration)



Use this time-based configuration pane to update the sampling rate:

- Change the divider value – enter a number between 1 and 200
- This updates the sampling rate value and the frequency of the data sampling changes
- Observe the results on the chart.

Also, you can change the time units (**µs**, **ms**, **s**.) used in the oscilloscope. Default – **ms**. After changing the value, the axis ticks the horizontal axis to update all-time values and units (information boxes, measures…etc.)

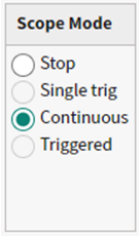
5.2.3 Status (trigger status)



The trigger status indicator displays the sampling state using a progress bar animation:

- If Single trigger or Triggered mode is selected but the trigger conditions are not met, the progress bar stops at 100%.
- If the trigger conditions are met and new data is sampled for Single trigger mode, the mode changes to **Stop** state and the progress bar turns grey.
- In the same scenario for Trigger mode, the animation continues for each new sampling.

5.2.4 Scope Mode



Scope modes:

- **Stop** – Stops new data sampling.
- **Single trig** – Data is sampled only if the trigger conditions (trigger slope, trigger position…etc.) are met.
- **Continuous** – Samples new data continuously.
- **Triggered** – Works similar to **Single trig** mode but samples new data continuously if the trigger conditions are met.

The default trigger channel is channel 1, so **Single trig** and **Triggered** modes test the conditions only for channel 1. The trigger channel can be changed by selecting the **Trg.Sel.** checkbox for the other channels.

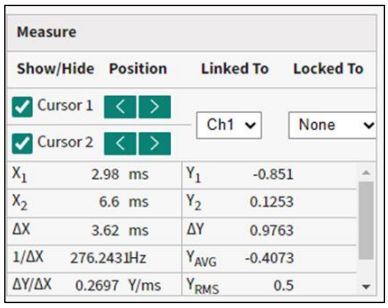
Note: ***The Single trig and Triggered*** *modes are not available for this version of the GUI.*

5.2.5 Trigger Slope and Hold Off

Note: *This part is not available for this version of the GUI. It will be implemented later.*

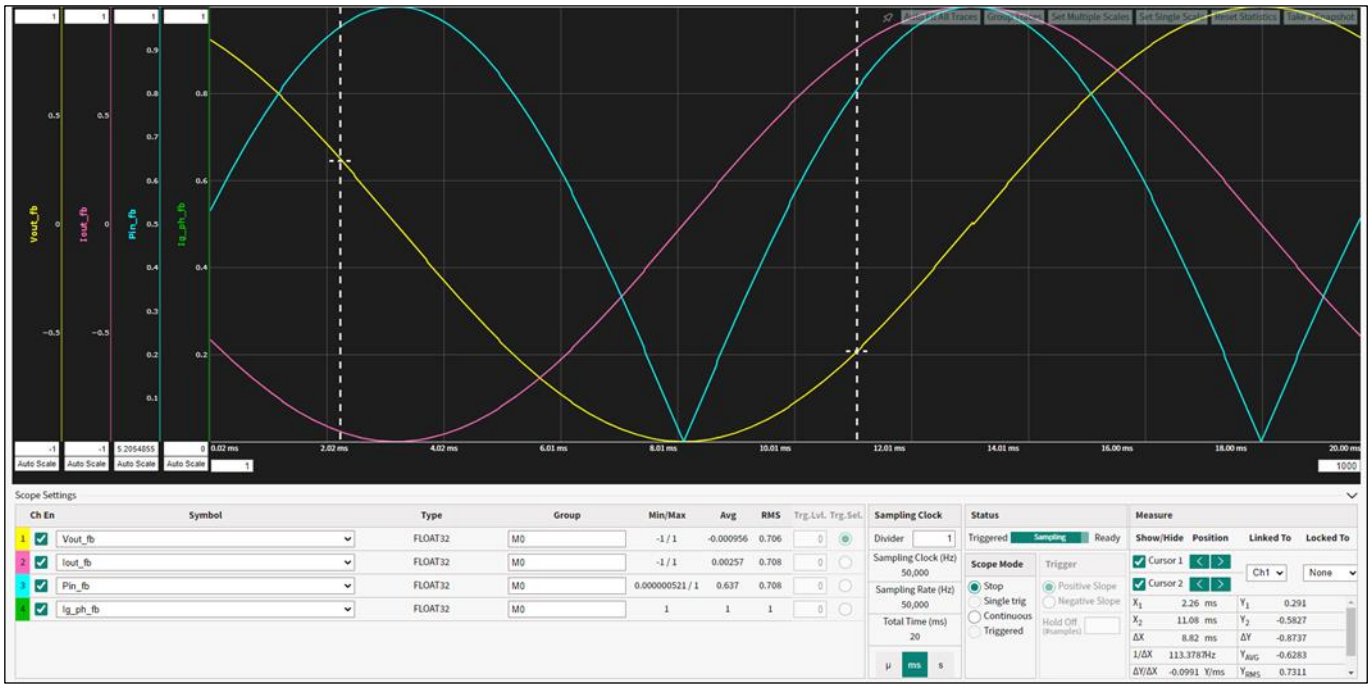
5.2.6 Measure

The **Measure** pane provides the tools to capture statistical data about the signals. Select **Stop** mode to activate the controls in this section.



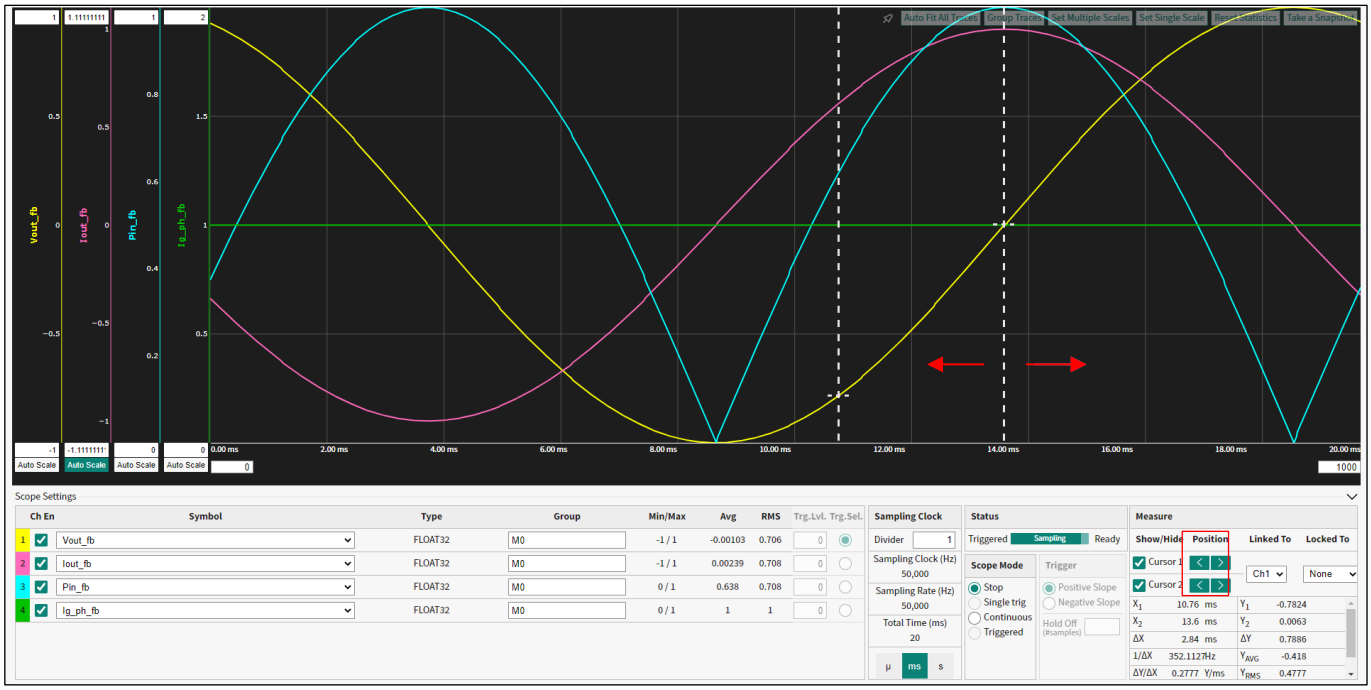
5.2.6.1 Activating both cursors

Activate one of the cursors or both of them by selecting the relevant checkbox under the **Show/Hide**. The cursors show the position for the linked channel signal.



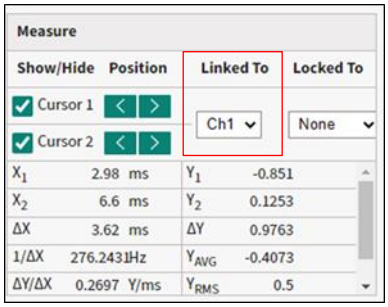
- The statistics are calculated and displayed in the statistics table below the measure controls.
- The statistics are the **X** and **Y** values of cursors and the difference between the two cursor positions. Also, the average, min, max and RMS values of the **Y** values between the cursors are displayed in this table.
- Change the cursors positions either by using the arrow keys in the position column or by dragging the cursors in the chart area.

5.2.6.2 Moving the cursors

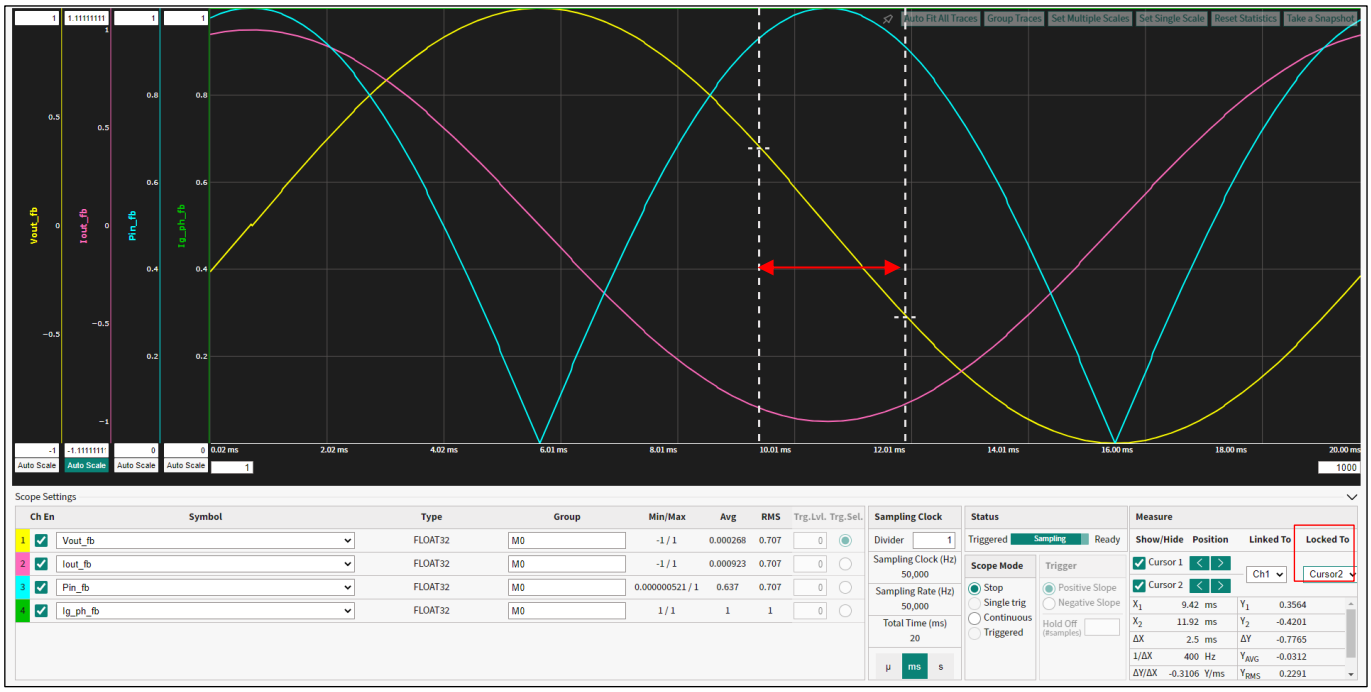


5.2.6.3 Linking a channel to cursors

Link the cursors to different channels. To select a different channel to link the cursors, select the channel name from the **Linked To** box.



Lock the cursors so that the distance between the cursors is preserved. If cursor 2 is locked, moving cursor 1 updates the cursor 2 position. The distance between the cursors is always preserved. To change the distance, change the locked cursor position. If the cursor 2 position is changed when it is locked, the cursor 1 position does not change.



The distance between the cursors remain the same when positioning cursor 1 while it is locked.

6 Version changes

This section lists and describes the changes for each version of this tool.

Version	Change descriptions
1.0	New tool.

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Editio 2026-02-25
Published by
Infineon Technologies AG
81726 Munich, Germany

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Document reference
002-42743 Rev. **

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