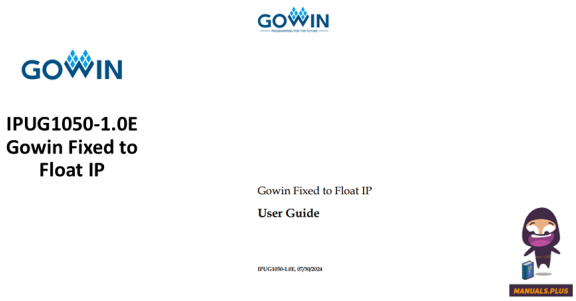


IPUG1050-1.0E Gowin Fixed to Float IP User Guide

Contents

IPUG1050-1.0E Gowin Fixed to Float IP

Gowin Fixed to Float IP

User Guide

IPUG1050-1.0E, 07/30/2024

About This Guide

Purpose

Gowin Fixed to Float IP User Guide mainly includes the description of the functions, features, ports, timing, configuration and call, and reference design, etc. It helps users quickly understand the features and usage of Gowin Fixed to Float IP. The software screenshots and the supported products listed in this manual are based on Gowin Software 1.9.9 Beta-3. As the software is subject to change without notice, some information may not remain relevant and may need to be adjusted according to the software that is in use.

Related Documents

The latest user guides are available on the GOWINSEMI website. You can find the related documents at www.gowinsemi.com

- DS100, GW1N series of FPGA Products Data Sheet
- DS117, GW1NR series of FPGA Products Data Sheet
- DS821, GW1NS series of FPGA Products Data Sheet
- DS861, GW1NSR series of FPGA Products Data Sheet
- DS102, GW2A series of FPGA Products Data Sheet
- DS226, GW2AR series of FPGA Products Data Sheet
- DS971, GW2AN-18X & 9X Data Sheet
- DS976, GW2AN-55 Data Sheet
- SUG100, Gowin Software User Guide

Terminology and Abbreviations

The terminology and abbreviations used in this manual are as shown in Table 1-1.

Table 1-1 Terminology and Abbreviations

Terminology and Abbreviations	Meaning
ALU	Arithmetic Logical Unit
IP	Intellectual Property
LUT	Look-up Table

Support and Feedback
Gowin Semiconductor provides customers with comprehensive technical support. If you have any questions, comments, or suggestions, please feel free to contact us directly using the information provided below.
Website: **www.gowinsemi.com**
E-mail: **support@gowinsemi.com**

Overview

Gowin Fixed to Float IP is designed to perform fixed-point to single-precision floating-point conversion operations using fewer logic resources. It can convert the input fixed-point numbers to single-precision floating-point format, and supports configurable the integer width of fixed-point numbers.

Table 2-1 Gowin Fixed to Float IP

Gowin Fixed to Float IP	
Logic Resource	See Table 2-2.
Delivered Doc.	
Design Files	Verilog
Reference Design	Verilog
TestBench	Verilog
Test and Design Flow	
Synthesis Software	GowinSynthesis
Application Software	Gowin Software (V1.9.9.Beta-3 and above)

Note!
For the devices supported, you can click here to get the information.

1. Features

   The integer width of fixed-point numbers supports 1~ 32.
2. Max. Frequency

   The maximum frequency of Gowin Fixed to Float IP is mainly determined by speed grade of the selected devices.
3. Latency

   The latency of Gowin Fixed to Float IP is determined by the configuration parameters.

Resource Utilization

Gowin Fixed to Float IP can be implemented by Verilog. Its performance and resource utilization may vary when the design is employed in different devices, or at different densities, speeds, or grades. Taking Gowin GW2A-55 series of FPGA as an instance, the resource utilization is as shown in Table 2-2. For the resource utilization of other devices, please refer to later release information.

Table 2-2 Resource Utilization

Device	Speed Grade	Resource Name	Resource Utilization
GW2A-55	C8/I7	Registers	33
		LUTs	235
		ALUs	0
		I/O Buffer	70

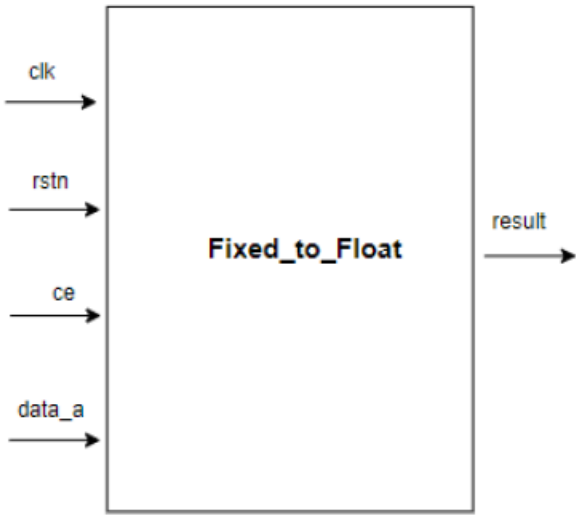
Functional Description

Gowin Fixed to Float IP enables the conversion of fixed-point to single-precision floating-point numbers. Users can configure parameters according to their requirements when generating this module.

Port List

The details of Gowin Fixed to Float IP IO port are shown in Table 4-1, and the port diagram is as shown in Figure 4-1.

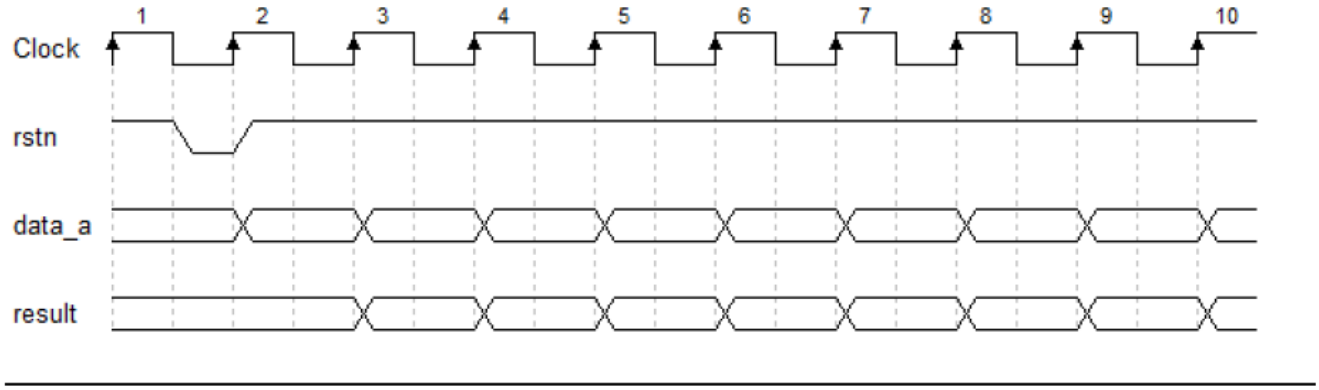
Figure 4-1 Gowin Fixed to Float IP IO Port Diagram



Signal	I/O	Description
clk	Input	Clock signal
rstn	Input	Reset signal, active-low
ce	Input	Clock enable signal, active-high (optional)
data_a	Input	Input “a”
result	Output	Output result

Timing Description

This section describes the timing of Gowin Fixed to Float IP. The timing of Gowin Fixed to Float IP is as shown in Figure 5-1.
Figure 5-1 Gowin Fixed to Float IP Signal Timing



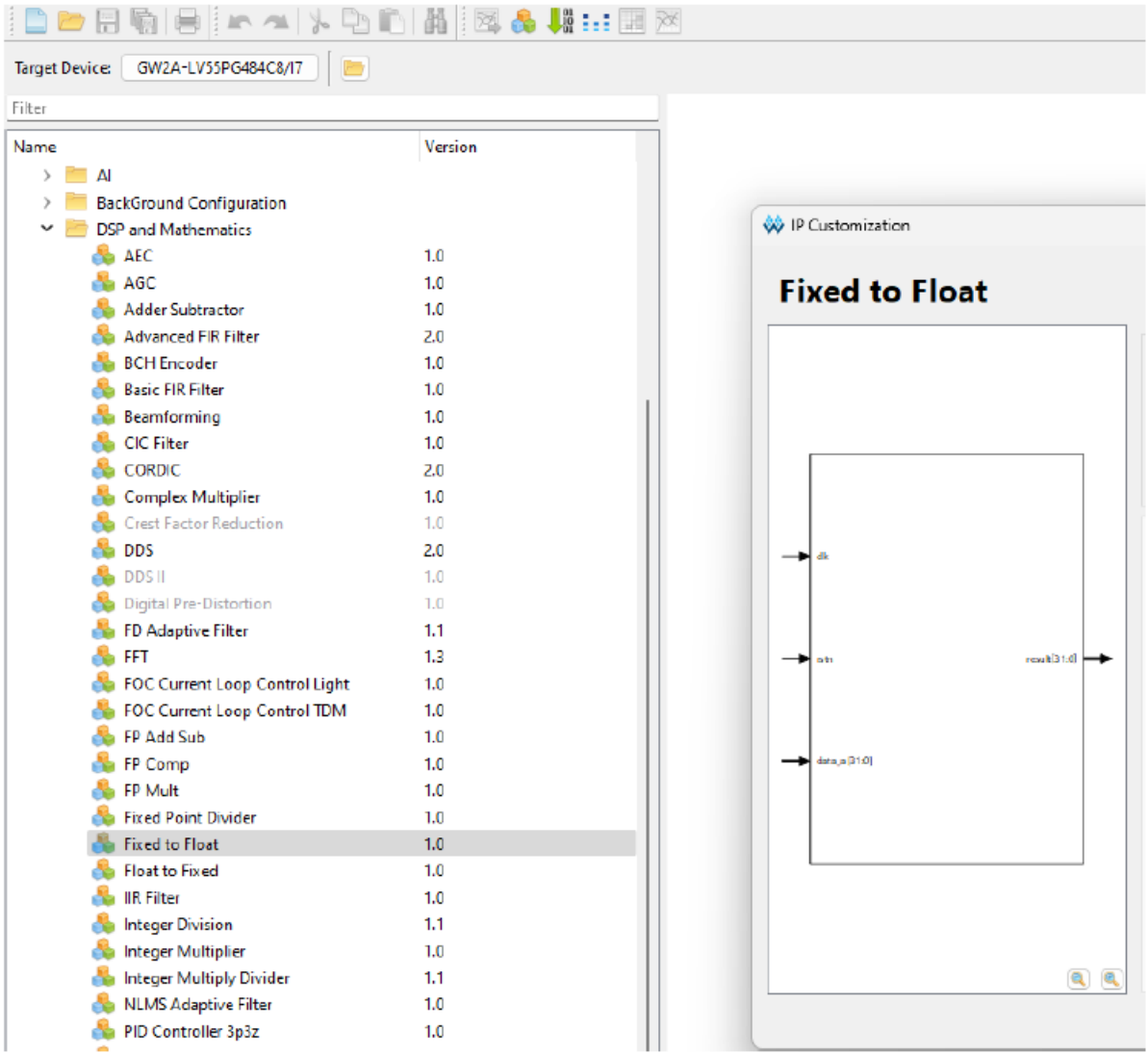
As shown in the figure above, after inputting a fixed-point number, the converted single-precision floating-point number is output with a delay of 1 clock cycle.

GUI Configuration

IP Generation

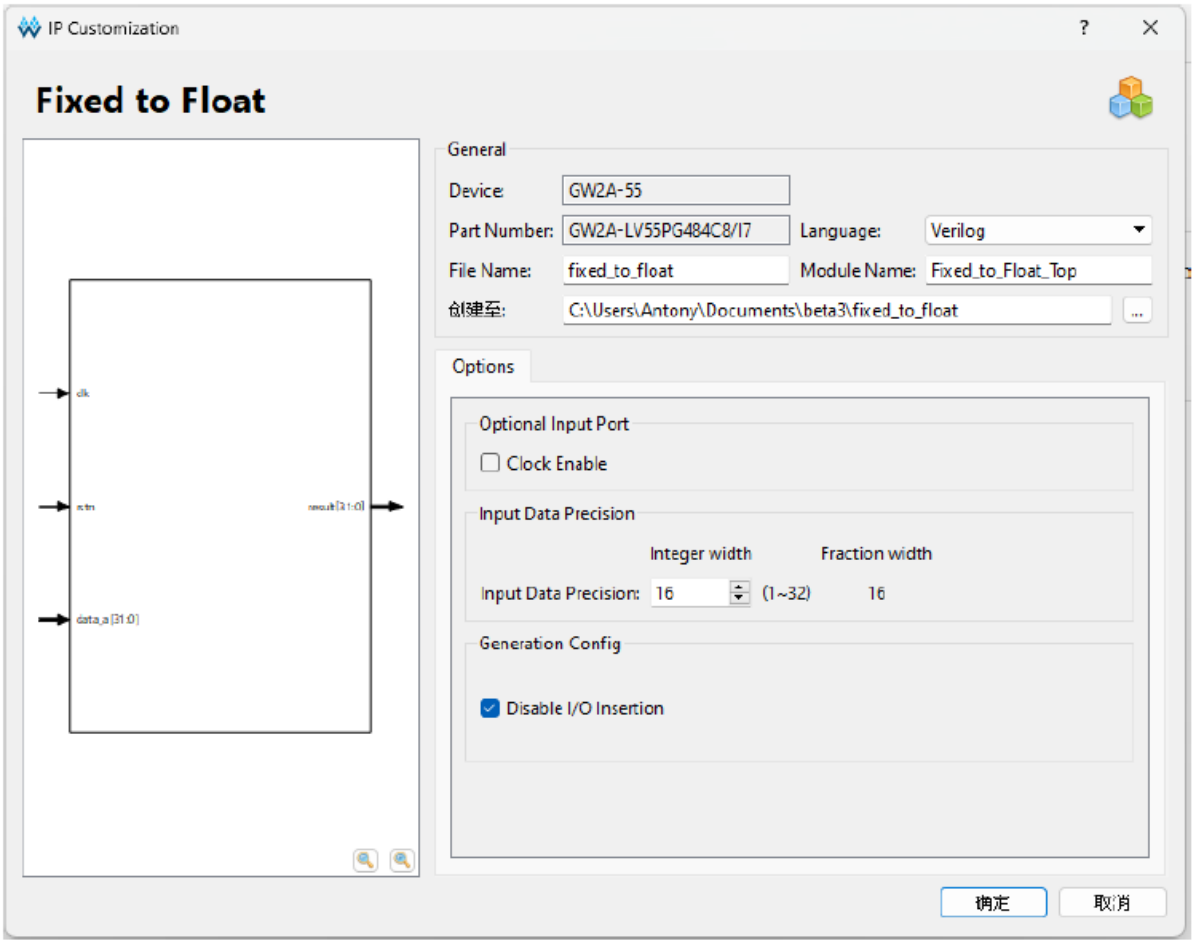
Click “Tools > IP Core Generator > DSP and Mathematics” to call and configure Fixed to Float; toolbar icon is also available to open the IP as shown in Figure 6-1.
Figure 6-1 Open GUI via Icon

Figure 6-1 Open GUI via Icon



Configuration Interface

The configuration interface of Gowin Fixed to Float IP is as shown in Figure 6-2.
Figure 6-2 Gowin Fixed to Float IP Configuration Interface



This manual takes GW2A-LV55PG484C8/I7 part number as an example.

- You can configure the path of generated IP core folder in the “Create In” text box.
- You can configure the generated IP file name in the “File Name” text box.
- You can configure the generated IP module name in the “Module Name” text box.

Reference Design

Please see Gowin Fixed to Float IP Reference Design for details at Gowinsemi website.

File Delivery

The delivery file of Gowin Fixed to Float IP includes documentation and reference design.

Documentation
The folder mainly contains the user guide in PDF version. Table 8-1 Document List

Name	Description
IPUG1050, Gowin Fixed to Float IP User Guide	Gowin Fixed to Float IP User Guide, namely this one

Reference Design
The Ref. Design folder contains the netlist file, user reference design, constraints file, top-level file, and the project file, etc.
Table 8-2 Gowin Fixed to Float IP RefDesign Folder Content List

Name	Description
top.v	The top module of reference design
Fixed_to_Float.cst	Project physical constraints file
Fixed_to_Float.sdc	Project timing constraints file
Fixed_to_Float.rao	Online logic analyzer file
fixed_to_float.v	Generates Fixed to Float IP top-level file, encrypted.

Documents / Resources

	GOWIN IPUG1050-1.0E Gowin Fixed to Float IP [pdf] User Guide IPUG1050-1.0E Gowin Fixed to Float IP, IPUG1050-1.0E, Gowin Fixed to Float IP, to Float IP, Float IP

References

- Home|GOWIN Semiconductor
- Home|GOWIN Semiconductor
- Home|GOWIN Semiconductor
- One moment, please...
- User Manual