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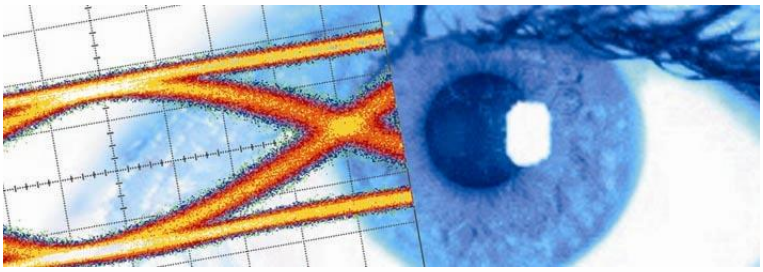
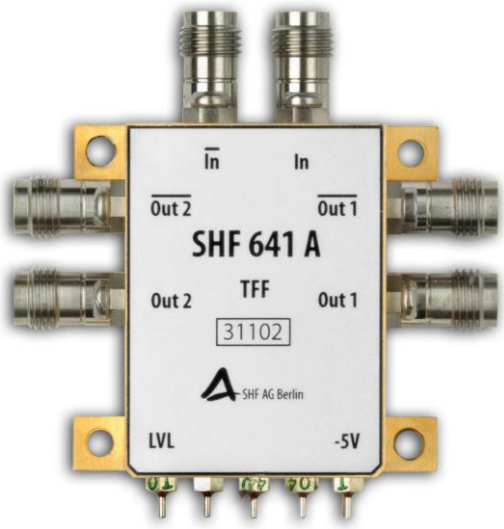


Datasheet

SHF 641 A

56 GHz T Flip-Flop (TFF)

1:2 Frequency Divider



Description

The SHF 641 A is a T Flip-Flop (TFF) module capable of broadband operation up to 56 GHz using a sinusoidal input signal. A frequency of half the input frequency is provided at the outputs. It offers high sensitivity and high quality output signals together with a compact size and ease of operation.

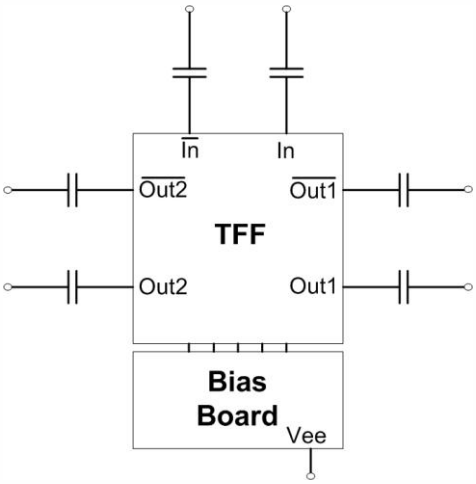
Features

- Broadband operation up to 56 GHz
- Two differential output ports with 90° phase shift between the outputs
- 800 mV_{pp} single ended output swing
- Single ended or differential operation (either In or In! or both can be used)
- Output Level Control
- Bias Board

Applications

- 100G Ethernet development and prototyping
- OC-768 / STM-256 applications
- Telecom transmission
- Fibre Channel®
- Broadband test and measurement equipment

Block Diagram



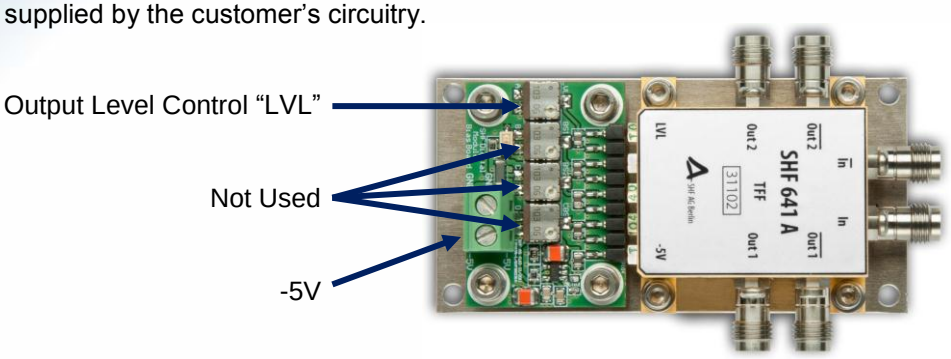
® Fibre Channel is a registered trademark of the Fibre Channel Industry Association

Bias Board

At delivery, the bias board is mounted on a common base plate, together with the SHF 641 A TFF. When using the bias board only one supply voltage of -5V needs to be applied; the output level control voltage “LVL” will be provided by the bias board.

In factory setting the bias voltage is set to maximum output voltage. However, if wanted the customer can adjust the output level “LVL” with the appropriate trim potentiometer on the bias board.

For system applications it is easily possible to remove the bias board. In that case the operating voltages have to be supplied by the customer’s circuitry.



Specifications

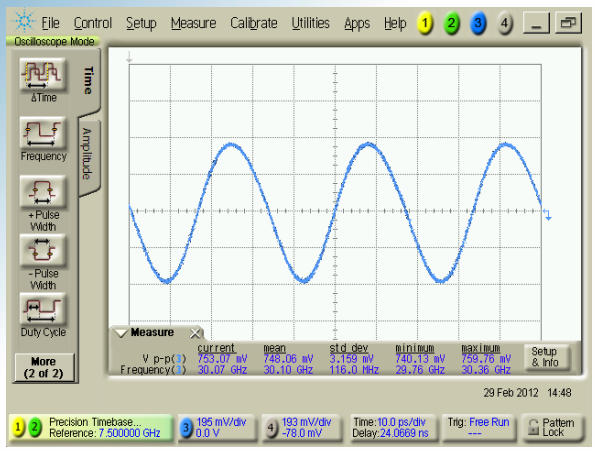
Parameter	Unit	Symbol	Min.	Typ.	Max.	Comment
Input Parameters						
Minimum Input Frequency[1]	GHz	$f_{in,min}$		1	2	@ 500mV input amplitude, see page 8
Maximum Input Frequency	GHz	$f_{in,max}$	56	60		@ 500mV input amplitude, see page 8
Input Voltage	mV	V_{in}	500		1000[2]	Single ended, peak-to-peak, see page 8
Output Parameters						
Output Voltage	mV	V_{out}	600	800	1000	Single ended, peak-to-peak, see page 8
Power Requirements						
Supply Voltage	V	V_{ee}	-5.2	-5	-4.8	
Supply Current	mA	I_{ee}		300	330	
Power Dissipation	mW	P_d		1500		@ V_{EE} = -5V; incl. Bias Board
Bias Voltages						
Output Level Adjust	V	LVL	-3.3		0	if not used, connect to gnd
Conditions						
Operating Temperature	°C	$T_{ambient}$	15		35	

[1] Theoretical limit is DC, practical limit depends on slew rate of input signal

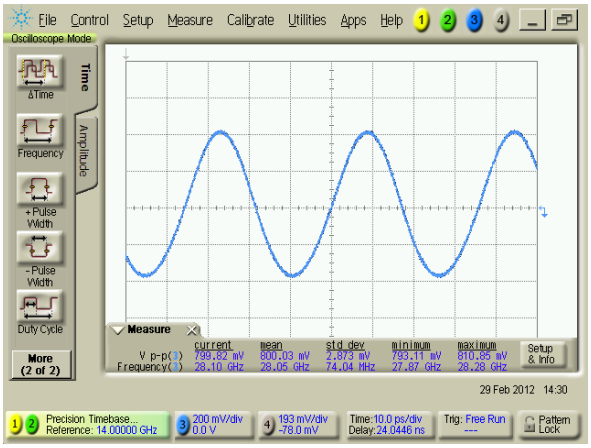
[2] corresponds to a maximum sinusoidal input signal of +4dBm

Typical Output Waveforms

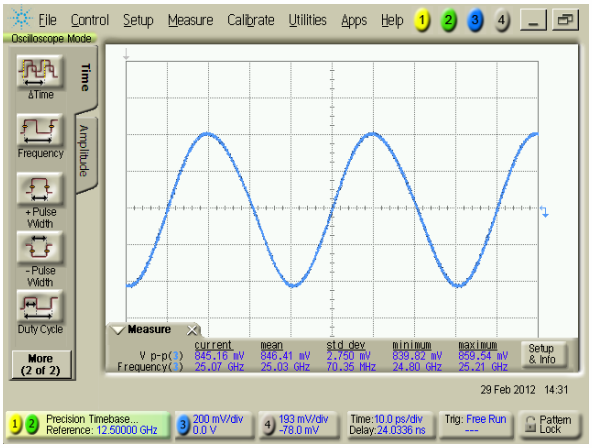
The measurements below had been performed using an Agilent 86100D DCA with Precision Time Base Module (86107A) and 70 GHz Sampling Head (86118A). The output of the TFF had been connected directly to the DCA input.



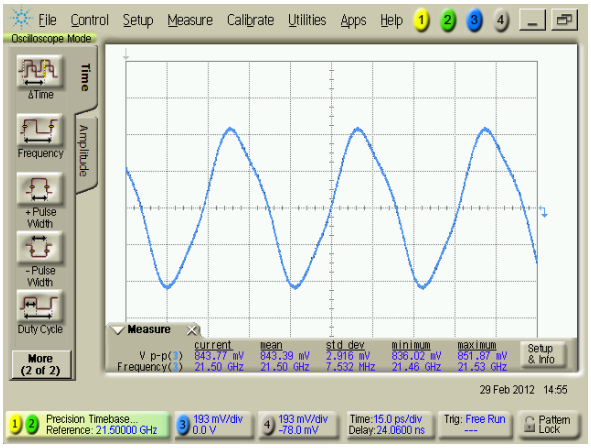
Output signal @ f_{out} = 30 GHz



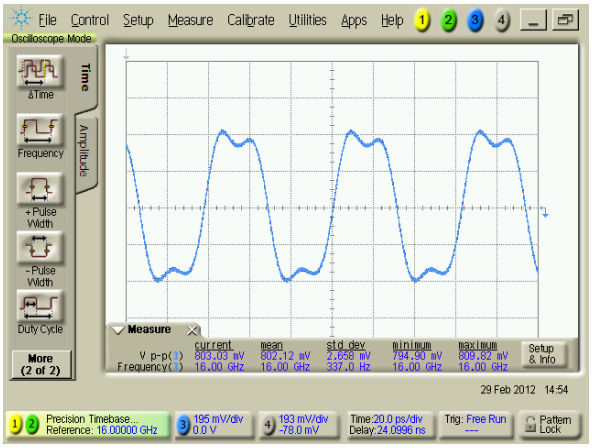
Output signal @ f_{out} = 28 GHz



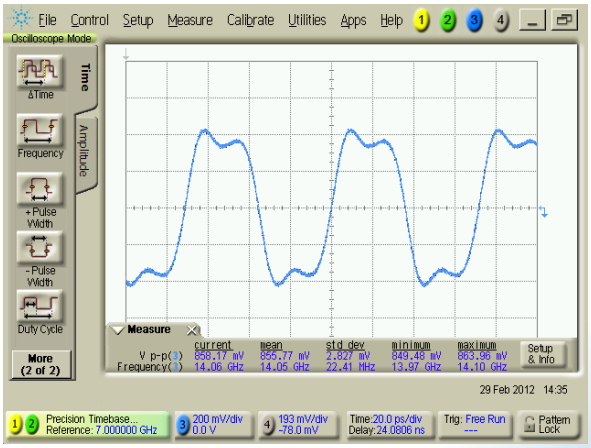
Output signal @ f_{out} = 25 GHz



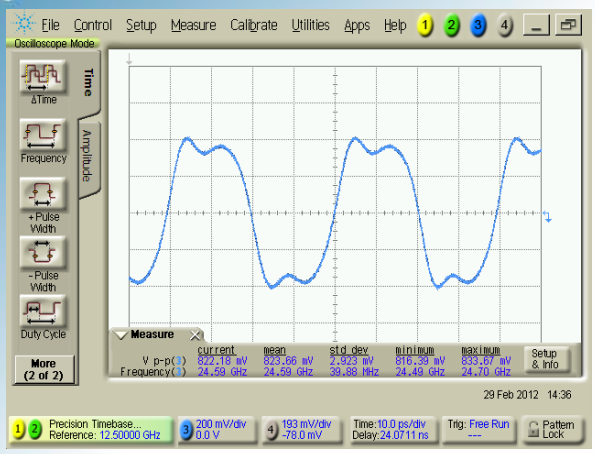
Output signal @ f_{out} = 21,5 GHz



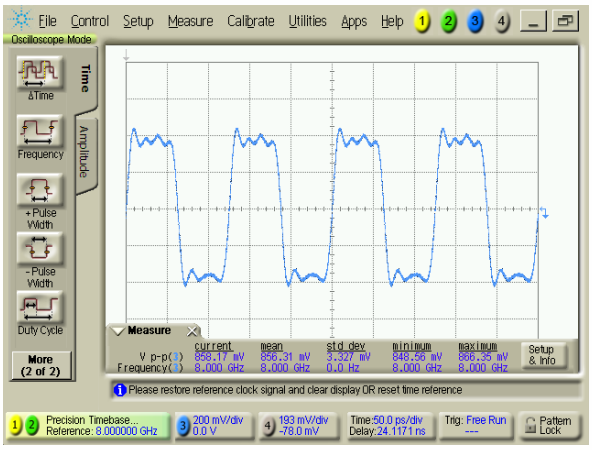
Output signal @ f_{out} = 16 GHz



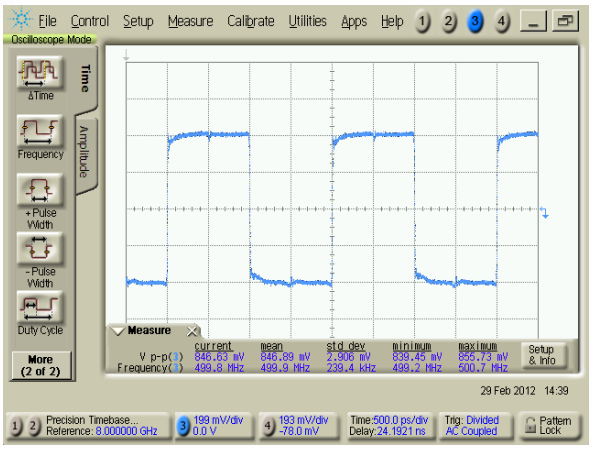
Output signal @ f_{out} = 14 GHz



Output signal @ f_{out} = 125 GHz



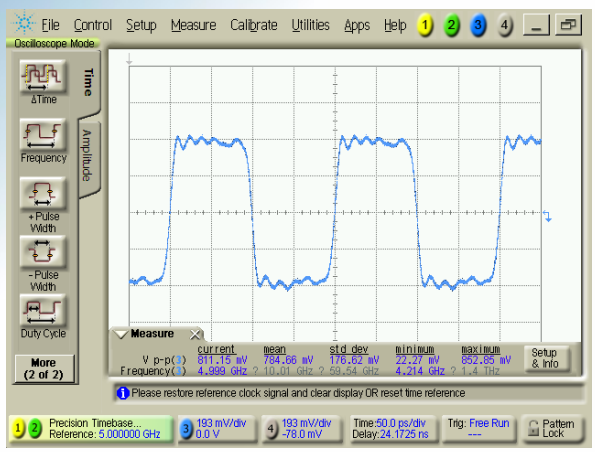
Output signal @ f_{out} = 8 GHz



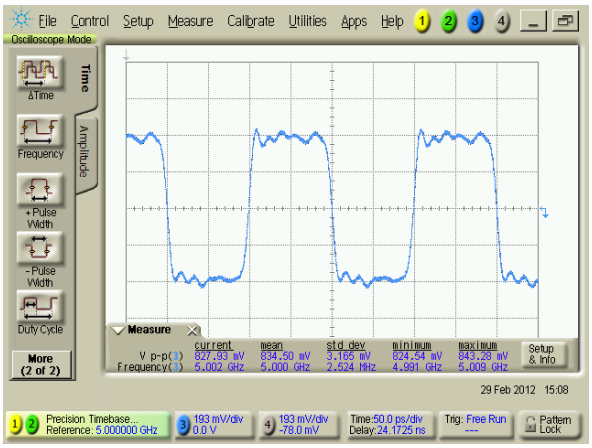
Output signal @ f_{out} = 0.5 GHz

Output Signal Timing

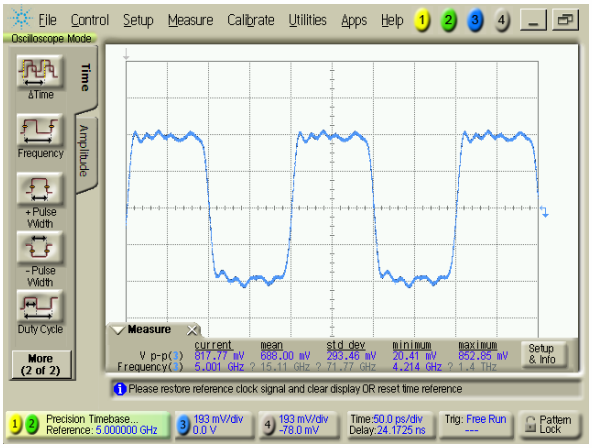
The measurements had been performed using an Agilent 86100B DCA with Precision Time Base Module (86107A) and 70 GHz Sampling Head (86118A). The output of the TFF had been connected directly to the DCA input. The screenshots shown below describe the phase relation between the 2 differential output signals with its 90° phase shift between output port 1 and output port 2.



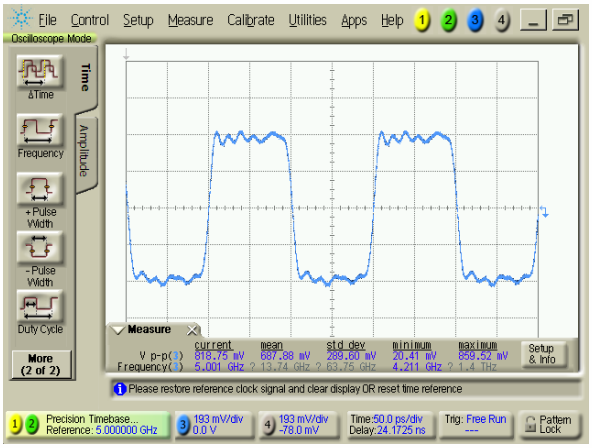
Out1 @ f_{out} = 5 GHz



Out1 inverted @ f_{out} = 5 GHz

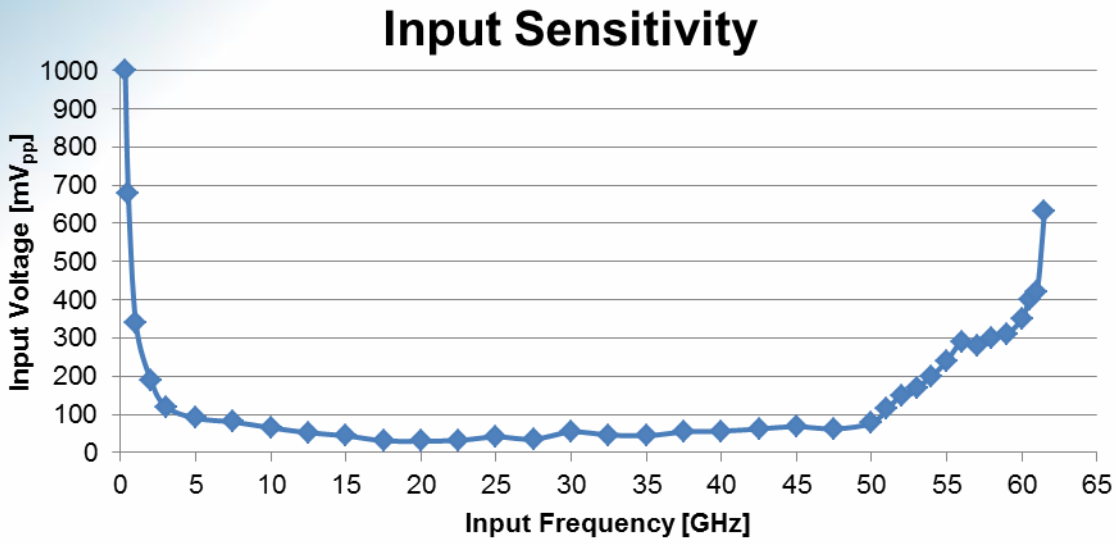


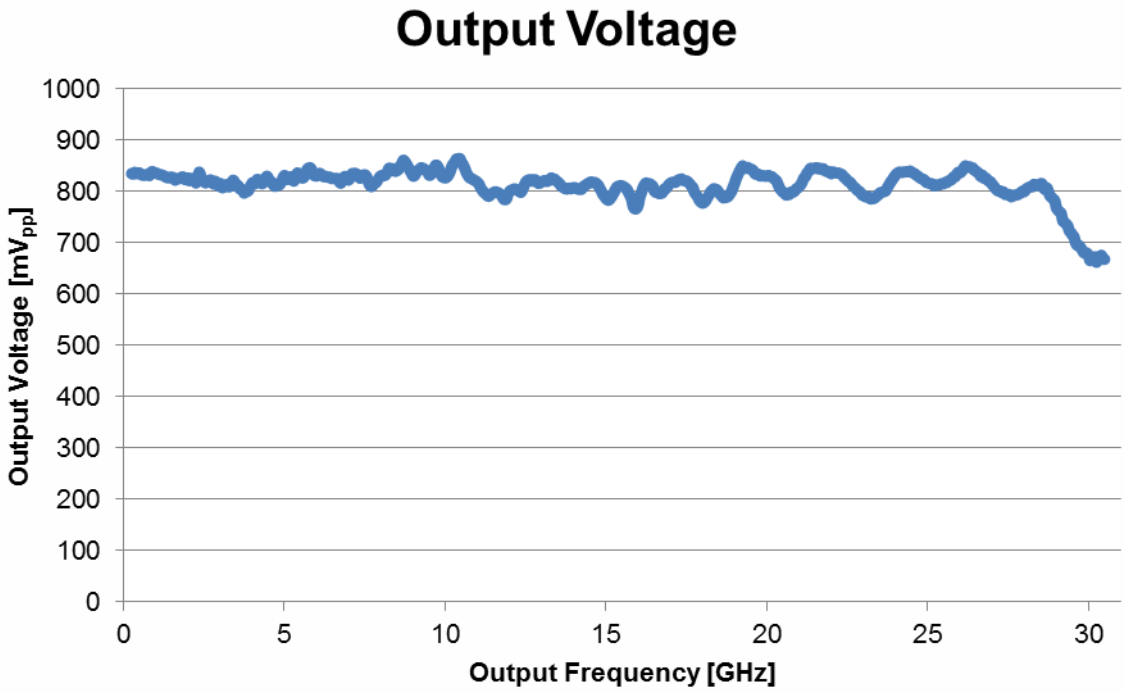
Out2 @ f_{out} = 5 GHz



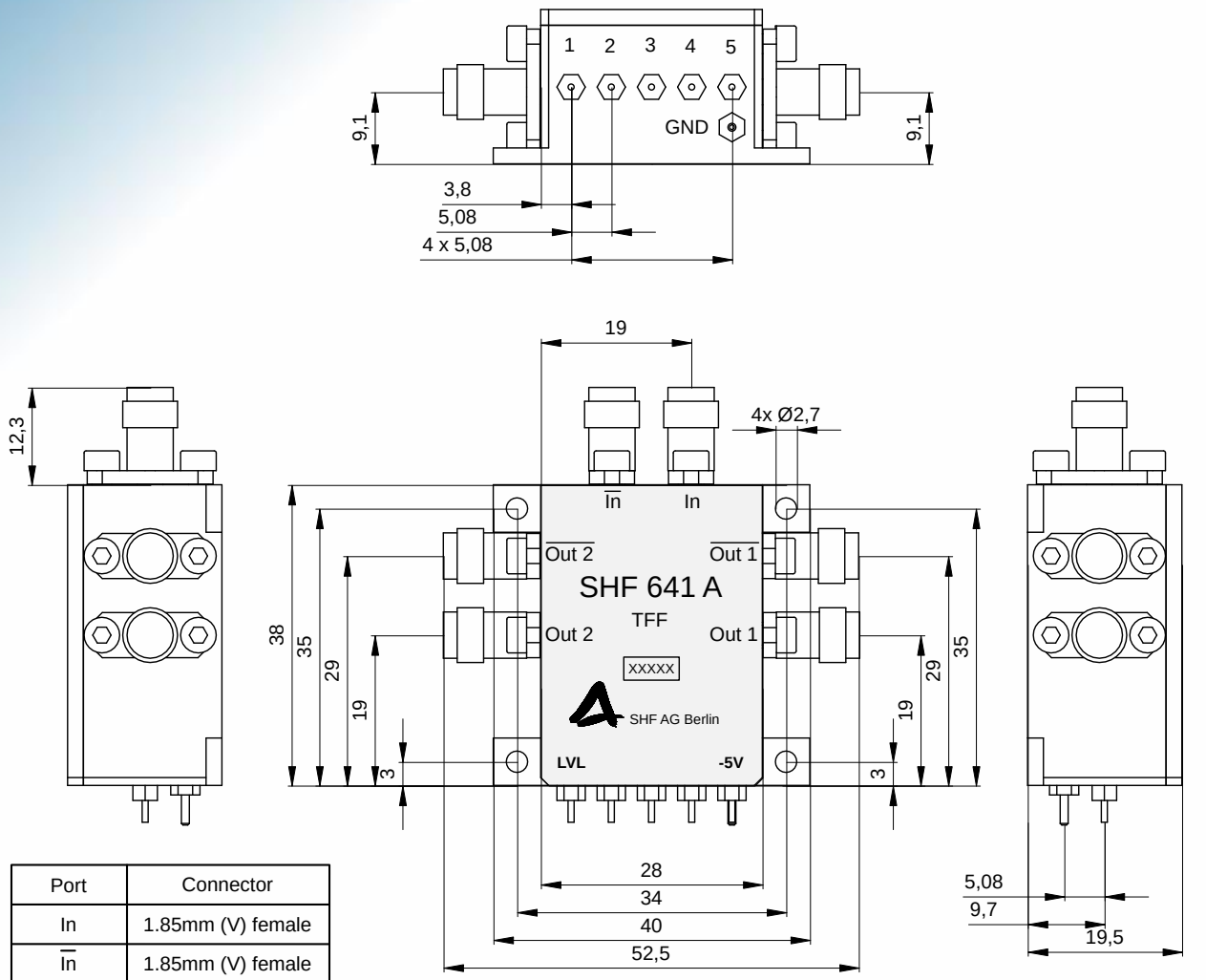
Out2 inverted @ f_{out} = 5 GHz

Typical Results





Outline Drawing



Port	Connector
In	1.85mm (V) female
$\overline{\text{In}}$	1.85mm (V) female
Out 1	1.85mm (V) female
$\overline{\text{Out 1}}$	1.85mm (V) female
Out 2	1.85mm (V) female
$\overline{\text{Out 2}}$	1.85mm (V) female

Pin	Designation
1	Level (LVL)
2	nc
3	nc
4	nc
5	-5V