SHF Communication Technologies AG

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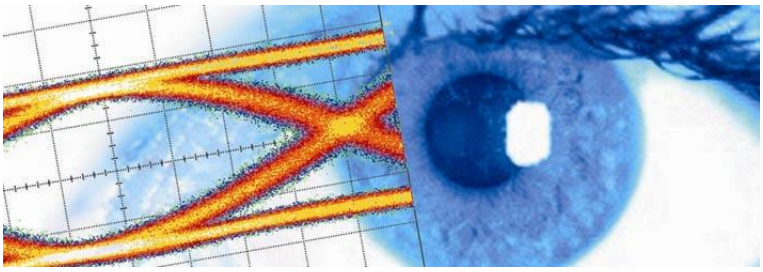


Datasheet

SHF DX45R

Diplexer

Description

The SHF DX45R diplexer is the RoHS compliant successor of the SHF DX45. A diplexer is essentially a bias tee with a certain bandwidth in the low frequency path to combine or separate high frequency and low frequency signals into or from a single line.

Any existing DC content is blocked from its HF input. Based on SHF's air line construction, it offers resonance-free transmission up to 45 GHz. In addition to the low insertion loss, all products have an extremely low group delay ripple.

Applications

- Optical Communications
- High-Speed Pulse Experiments
- Satellite Communications
- Research and Development
- Antenna Measurements
- Data Transmission

Configurations

- A - HF port: 2.92 mm male, HF+LF port: 2.92 mm female
- B - HF port: 2.92 mm female, HF+LF port: 2.92 mm male
- C - HF port: 2.92 mm male, HF+LF port: 2.92 mm male
- D - HF port: 2.92 mm female, HF+LF port: 2.92 mm female

One of above configurations has to be chosen. For more information, please be referred to the mechanical drawing on the last page of this data sheet. For Option X01 and X02 is configuration B not available. The low frequency port is always SMA female.

Options

- HVC50/1000 - High Voltage & Current (maximum voltage extended to ±50 V and maximum LF current extended to ±1 A)
- HVC100/2000 - High Voltage & Current (maximum voltage extended to ±100 V and maximum LF current extended to ±2 A)
- X01 - High Voltage & Current (maximum voltage extended to ±50 V and maximum LF current extended to ±1 A); Crossover Frequency at ~ 1 GHz
- X02 - High Voltage & Current (maximum voltage extended to ±50 V and maximum LF current extended to ±1 A); Crossover Frequency at ~ 2 GHz

Specifications - SHF DX45R

Parameter	Unit	Symbol	Min	Typ	Max	Conditions
Absolute Maximum Ratings for SHF DX45R without Option						
Maximum HF Input	dBm	$P_{in\ max}$			30	average power of a continuous [1] signal, 50 Ω load and f ≥ 2 x f_{Low}
Maximum Voltage	V				±20	voltage across the coupling capacitor between HF and HF+LF port and between ports and GND
Maximum LF Current	mA				±400	
Case Temperature	T_{case}	°C	10	25	50	
Electrical Characteristics SHF DX45R-A without Option (At 25°C case temperature)						
High Frequency 3 dB Point HF-Path	GHz	f_{HIGH}	45			reference is insertion loss at 0.5 GHz
Low Frequency 3 dB Point HF-Path	MHz	f_{LOW}			90	reference is insertion loss at 0.5 GHz
High Frequency 3 dB Point LF-Path	MHz	f_{HIGH}	25			reference is insertion loss at 0.5 GHz
Low Frequency 3 dB Point LF-Path	Hz	f_{LOW}			0	DC [2]
Insertion loss	dB	HF+LF/HF			1.5	>0.5 GHz <40 GHz
Reflection	dB	HF			-10 -8	>1 GHz <35 GHz <45 GHz
	dB	HF+LF			-10 -8	>40 MHz <35 GHz <45 GHz
	dB	LF			-10	<100 MHz
Group Delay Ripple	ps				±50	1 GHz … 40 GHz, 160 MHz Aperture
DC Resistance	Ω			1		LF to HF+LF Port

[1] 30 dBm (1 W) equals 20 V peak to peak for continuous sinusoidal signals. A pulsed excitation with an average of 1 W and thus having significantly higher peaks may be possible. The maximum RF input power does not change in case a signal is applied to the LF port.

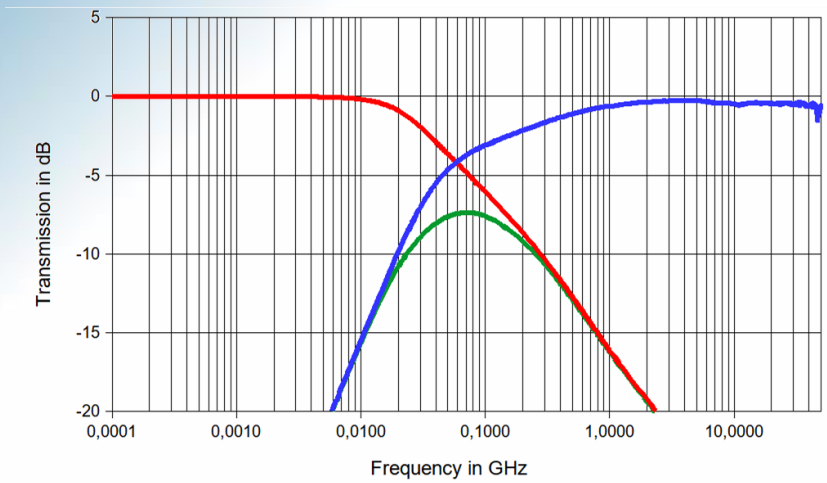
[2] For resonance-free transmission the LF port requires a 50 Ω termination.

Parameter	Unit	Symbol	Min	Typ	Max	Conditions
Mechanical Characteristics						
Connector HF ; HF+LF LF	Ω			50		 2.92mm SMA
Dimensions	mm					please see page 8
Weight	g			22		

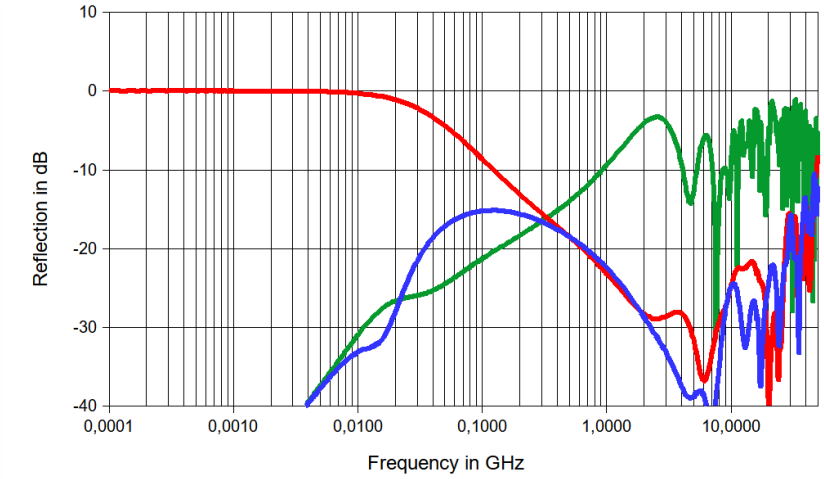
In case an option is chosen the following variations to above specifications apply:

Parameter	Unit	No option	HVC 50/1000	HVC 100/2000	X01	X02
Maximum Voltage	V	±20	±50	±100	±50	±50
Maximum LF Current	A	±0.4	±1	±2	±1	±1
Min. High Frequency 3 dB Point of HF-Path	GHz	45	45	45	32	40
Max. Low Frequency 3 dB Point of HF-Path	MHz	90	100	100	1200	3000
Min. High Frequency 3 dB Point of LF-Path	MHz	25	25	25	600	1000
Low Frequency 3 dB Point of LF-Path	Hz	0	0	0	0	0
Typical LF Resistance	Ω	1	1	1	1	1

Typical S-Parameters for a DX45R without Option

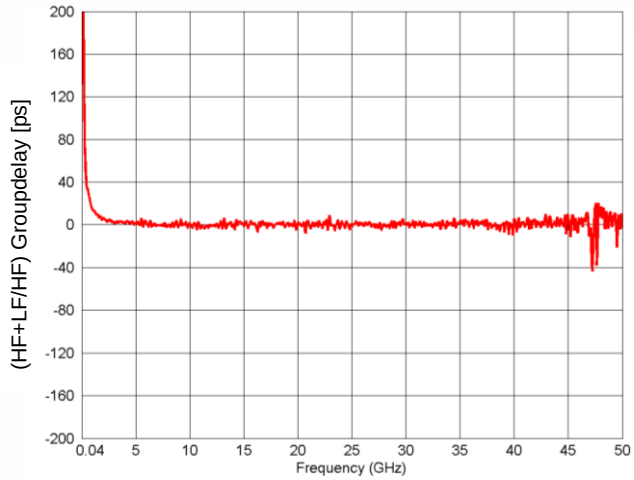


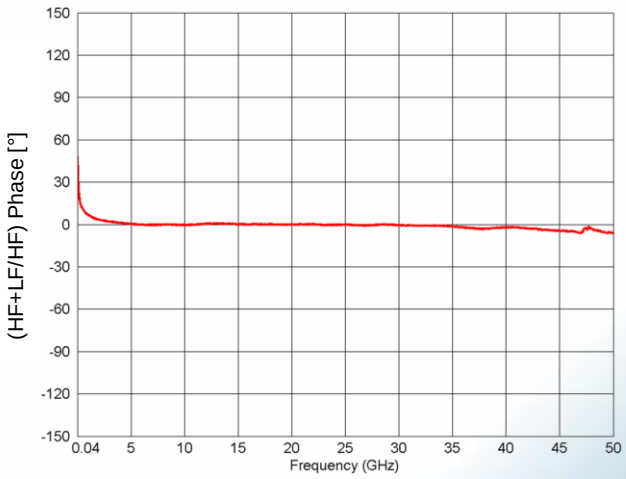
HF+LF/HF: blue ; ***HF+LF/LF:*** red ; ***HF/LF:*** green



HF+LF: blue ; ***HF:*** red ; ***LF:*** green

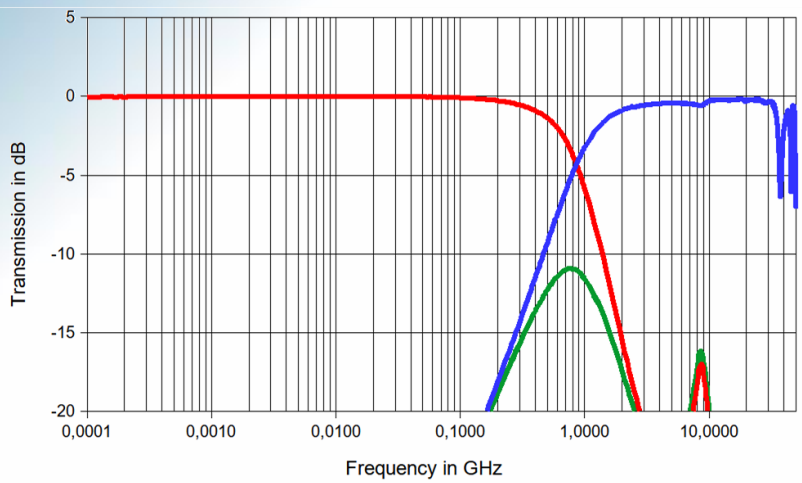
Please refer to the mechanical drawing for the pin assignment.



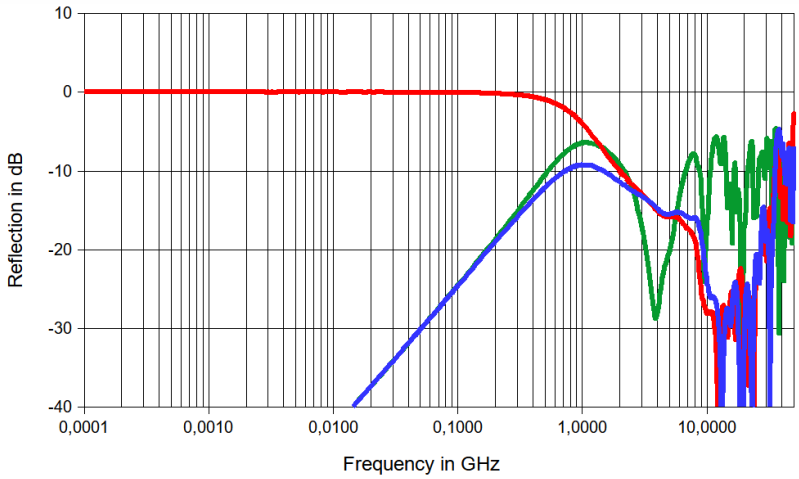


Aperture of group delay measurement: 160 MHz
Phase measurement has been compensated by propagation delay to visualize phase linearity.

Typical S-Parameters for a DX45R with Option X01

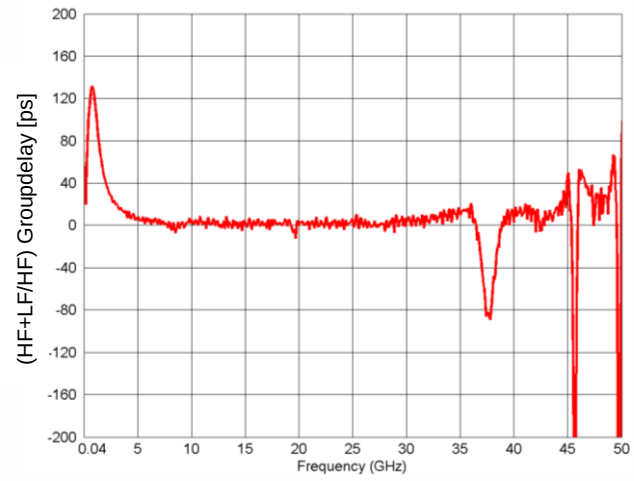


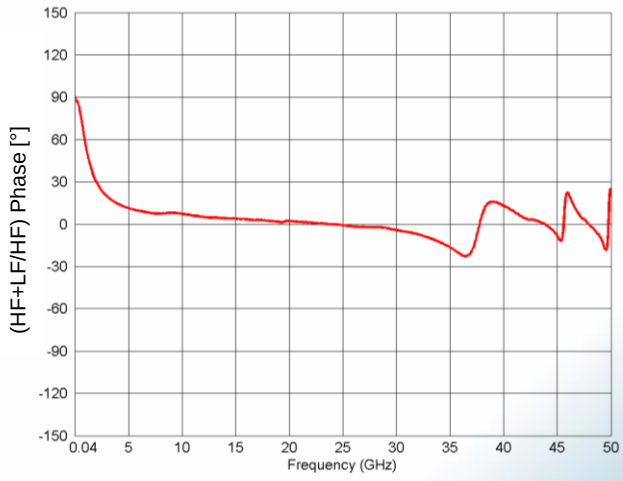
HF+LF/HF: blue ; ***HF+LF/LF:*** red ; ***HF/LF:*** green



HF+LF: blue ; ***HF:*** red ; ***LF:*** green

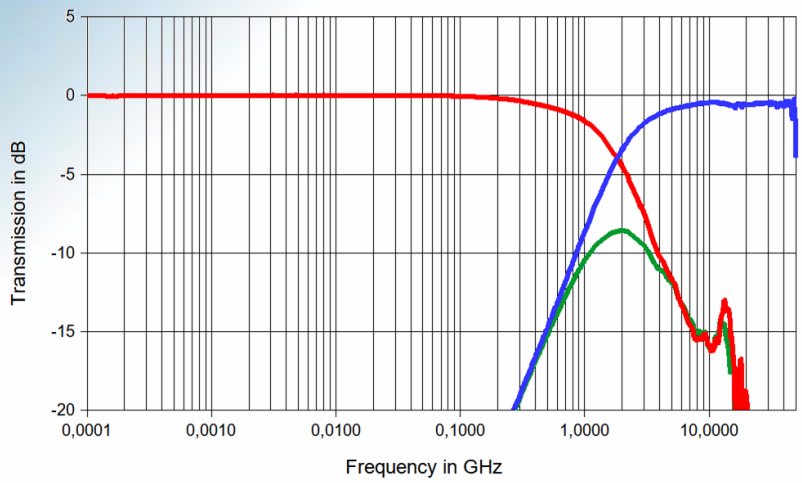
Please refer to the mechanical drawing for the pin assignment.



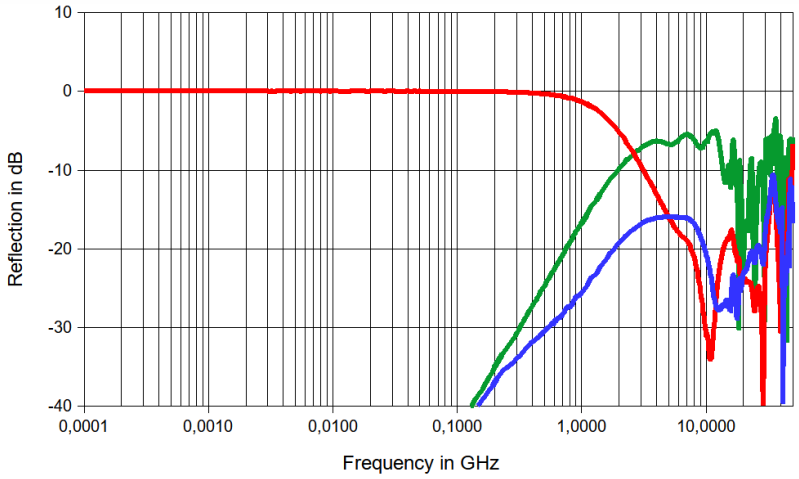


Aperture of group delay measurement: 160 MHz
S21 phase measurement has been compensated by propagation delay to visualize phase linearity.

Typical S-Parameters for a DX45R with Option X02

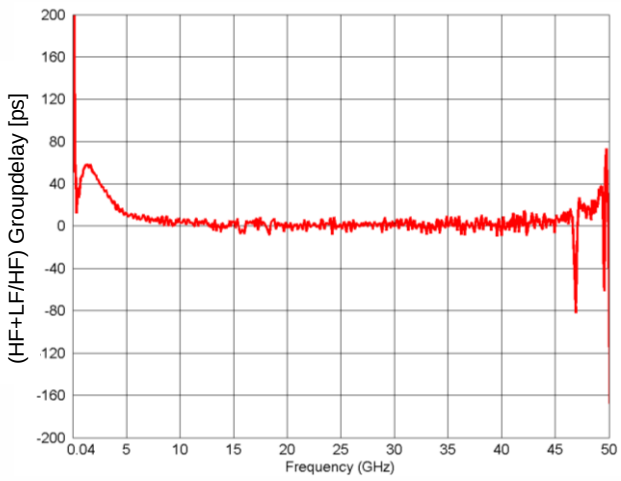


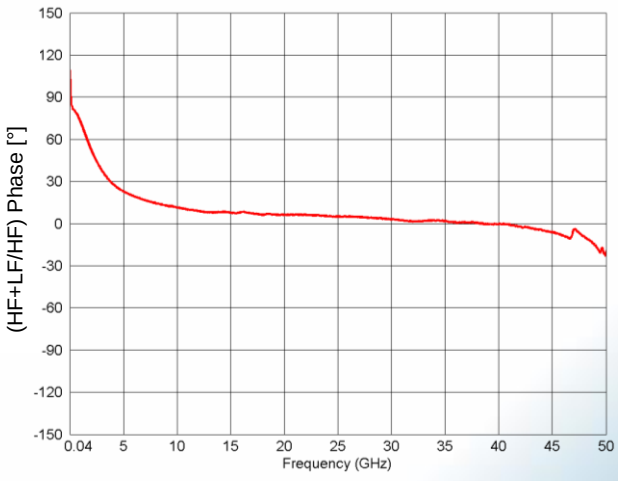
HF+LF/HF: blue ; ***HF+LF/LF:*** red ; ***HF/LF:*** green



HF+LF: blue ; ***HF:*** red ; ***LF:*** green

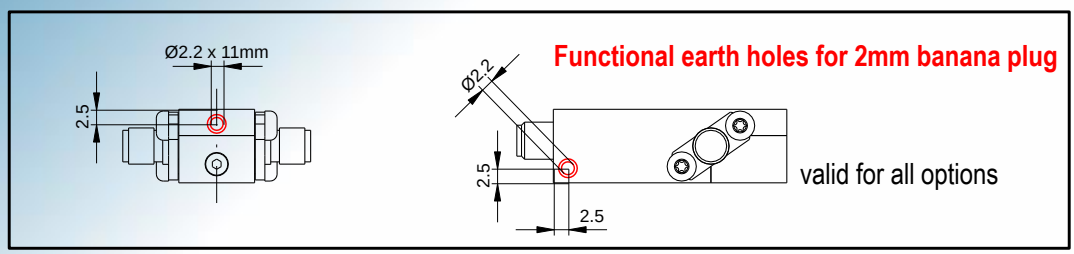
Please refer to the mechanical drawing for the pin assignment.

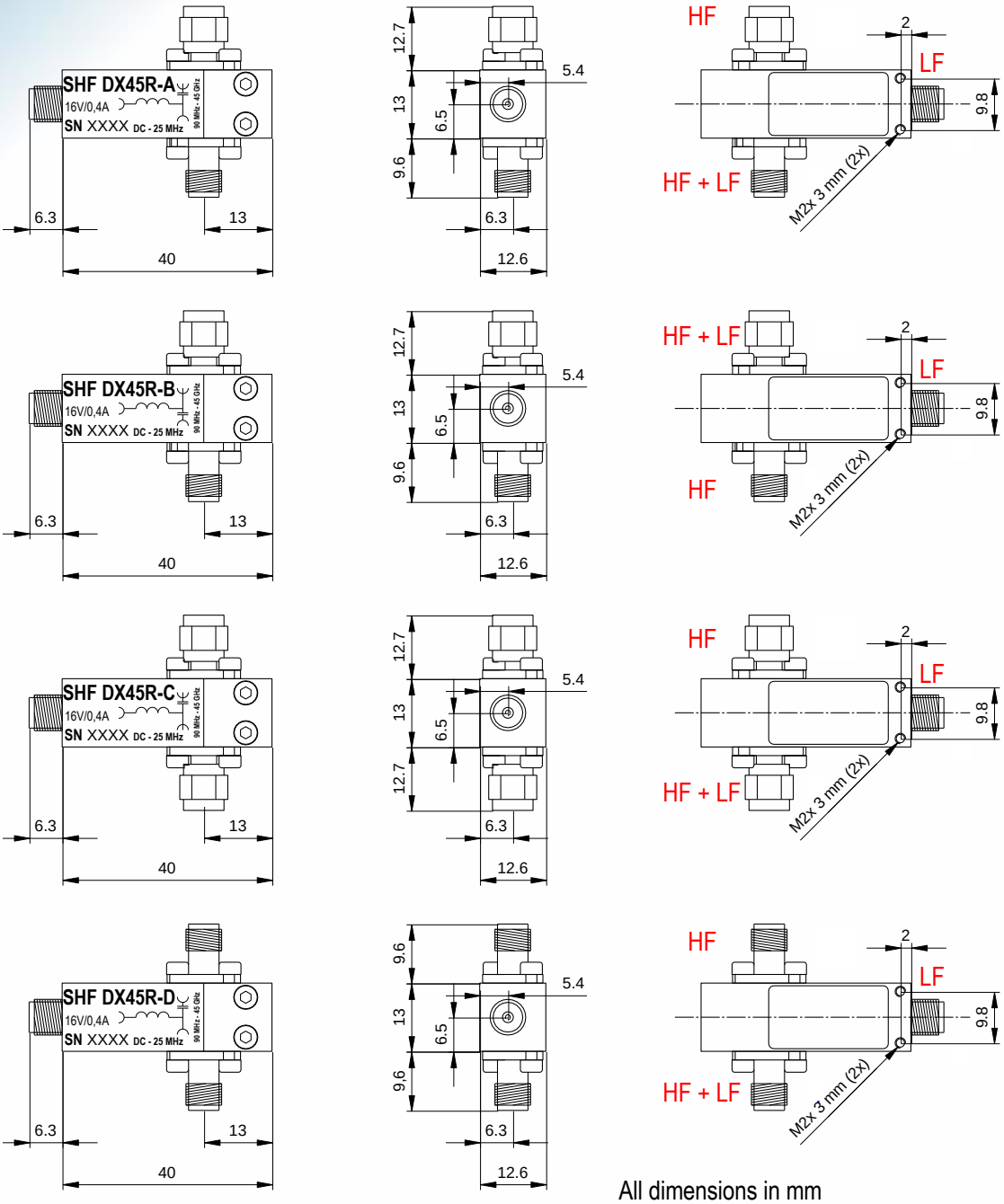




Aperture of group delay measurement: 160 MHz
S21 phase measurement has been compensated by propagation delay to visualize phase linearity.

Mechanical Drawing





All dimensions in mm