

DC-coupled Impedance Converter

1 Introduction

The TBLNA-110M-HZ is a DC-coupled Impedance Converter from 1 M Ω to 50 Ohm with a flat response in the frequency range from DC to 110MHz and a 3 dB bandwidth from DC to 500 MHz. One of the impedance converter's two separate outputs has a gain of 0 dB, while the other has a gain of 20 dB. When the TBLNA-110M-HZ is used with a 1:10 oscilloscope probe, this corresponds to a gain of -20 dB or 0 dB.

Application:

In-circuit measurements in 50 Ohm systems, using standard oscilloscope probes.

High impedance frontend for spectrum analyzers and other RF-equipment with 50 Ohm inputs.



2 Specification

General specification

Flat frequency range:	DC – 110 MHz, typ.
3 dB frequency range:	DC – 500 MHz, typ.
Usable frequency range:	DC – 1 GHz
Gain:	0 dB, 20 dB
RF-connectors:	BNC-female

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Input specification

Input impedance:	1 M Ω // 20 pF
Input Noise Voltage:	> 2 MHz: typ. <10 nV/ $\sqrt{\text{Hz}}$; for details see chapter 3.3
Maximum input level for linear output:	150 mVpp for output saturation at the 20 dB gain output, 1:1 1.5 Vpp for output saturation at the 20 dB gain output, 1:10 1.5Vpp for output saturation at the 0 dB gain output, 1:1 15Vpp for output saturation at the 0 dB gain output, 1:10
Maximum ratings:	50Vpp AC

Output specification

Output impedance:	50 Ω , detailed plots in chapter 3.2
Output return loss:	> 25 dB, detailed plots in chapter 3.2
P1dB _{out} :	+8.6 dBm ($\triangleq$ 1.7 V _{pp}), 20 dB gain output +8.6 dBm ($\triangleq$ 1.7 V _{pp}), 0 dB gain output
IP3 _{out} :	+19 dBm, 20 dB gain output +19 dBm, 0 dB gain output
DC offset:	< 10mV output offset

Supply specification

Power-connector:	Coaxial power socket; 2 mm / 5.5 mm; positive center conductor
Indicator LEDs:	Power ON, Power Good
Operating voltage:	12 V; external power supply 100 V – 240 V, 50/60 Hz
Current consumption:	275 mA

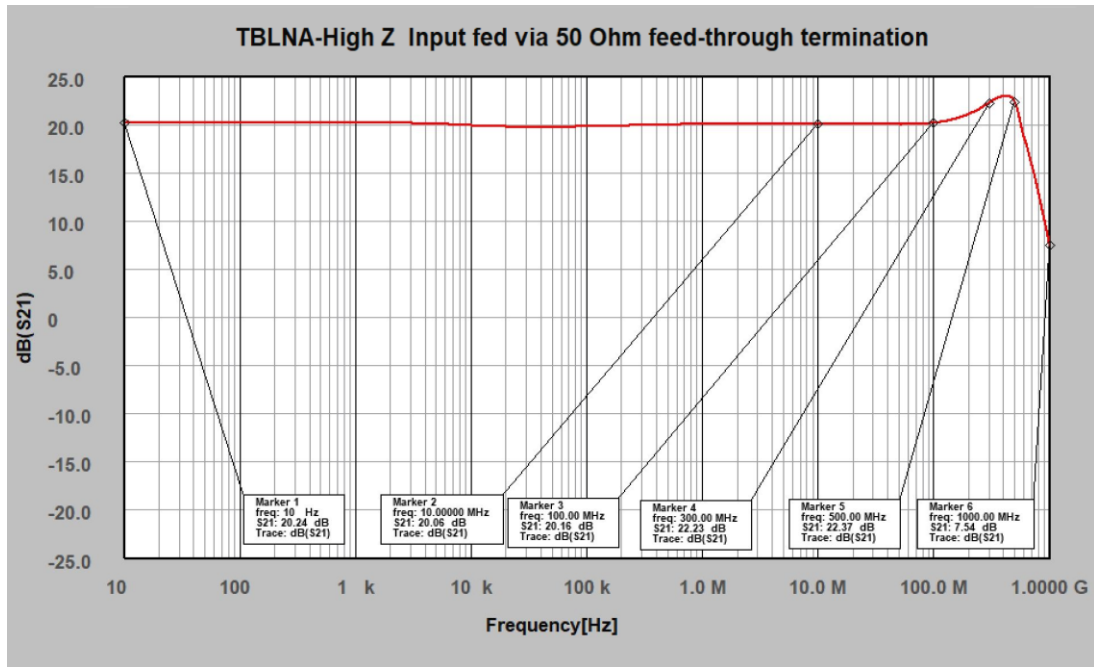
Operating temperature range:	-20°C to +50°C
Dimensions:	W 135 mm x H 40 mm x L 110 mm;
Weight:	350 g



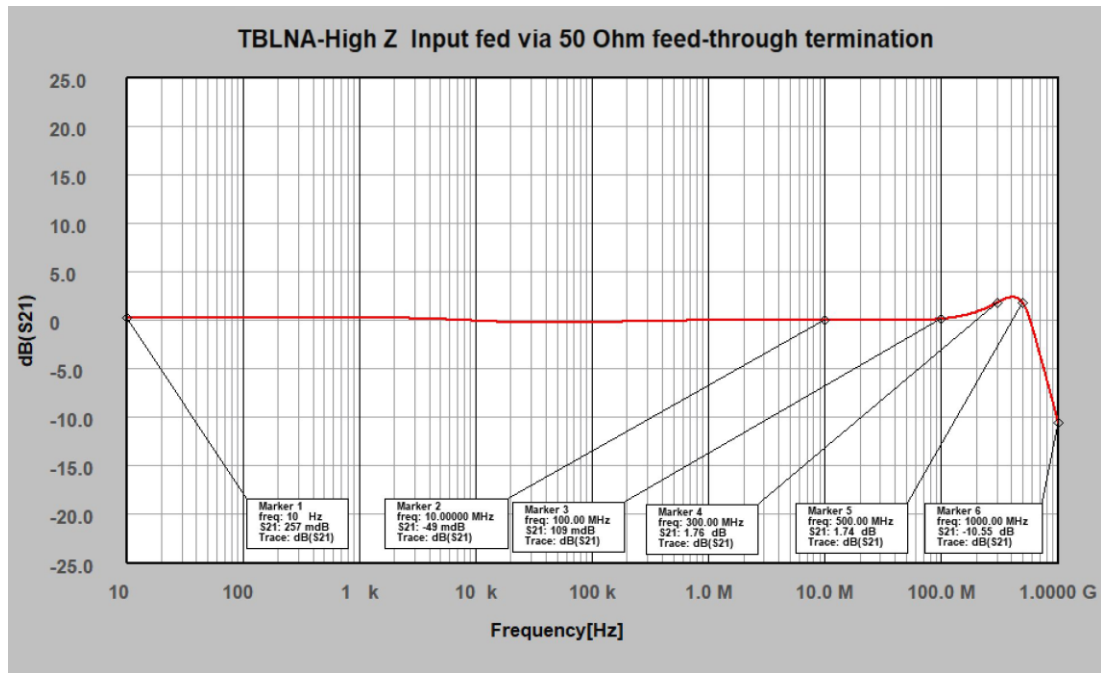
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3 Measurement Plots

3.1 Gain

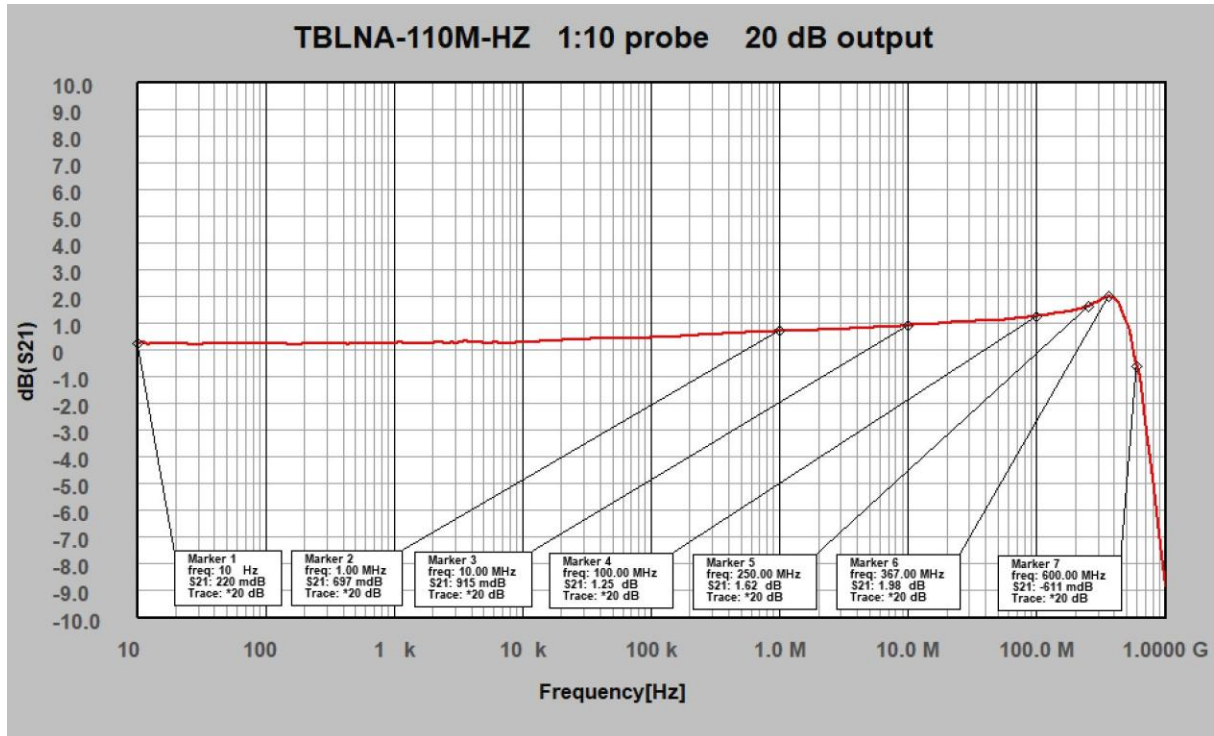


TBLNA-110M-Hz, Gain, 20 dB Output, typ.

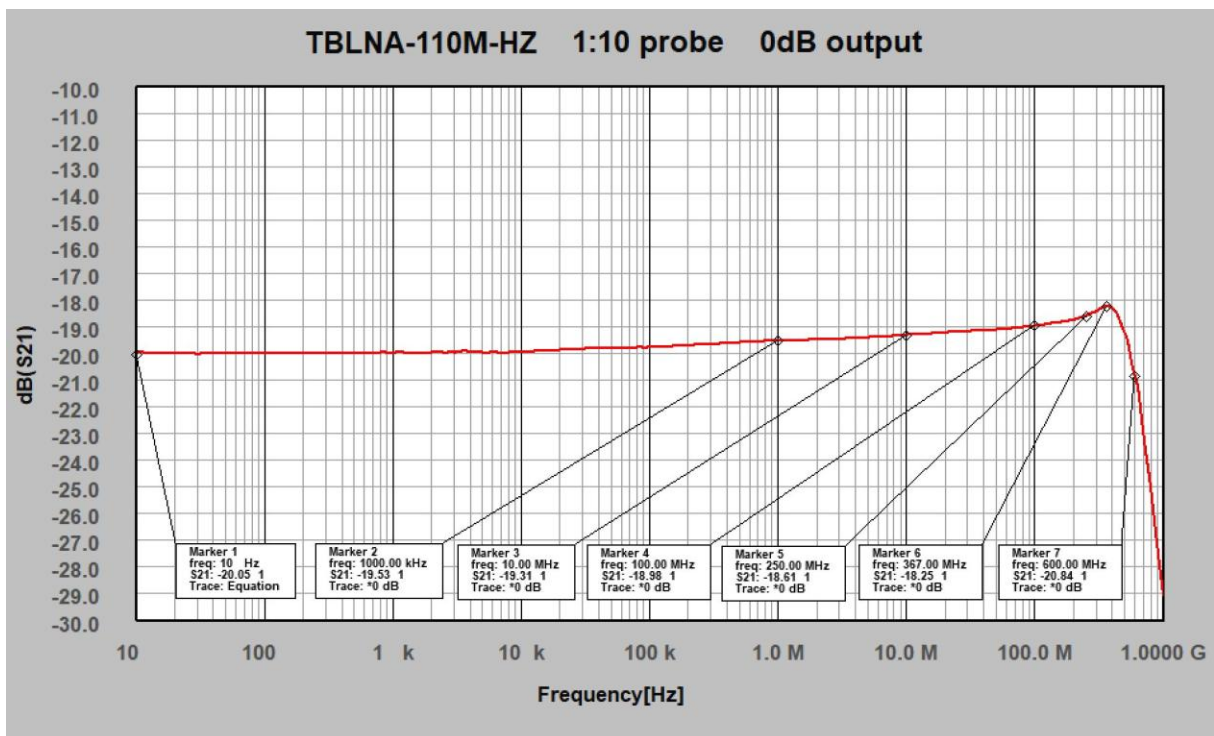


TBLNA-110M-Hz, Gain, 0 dB Output, Input fed via 50 Ohm feed-through termination typ.

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TBLNA-110M-HZ, Gain, 20 dB Output, input fed via 1:10 probe, typ.

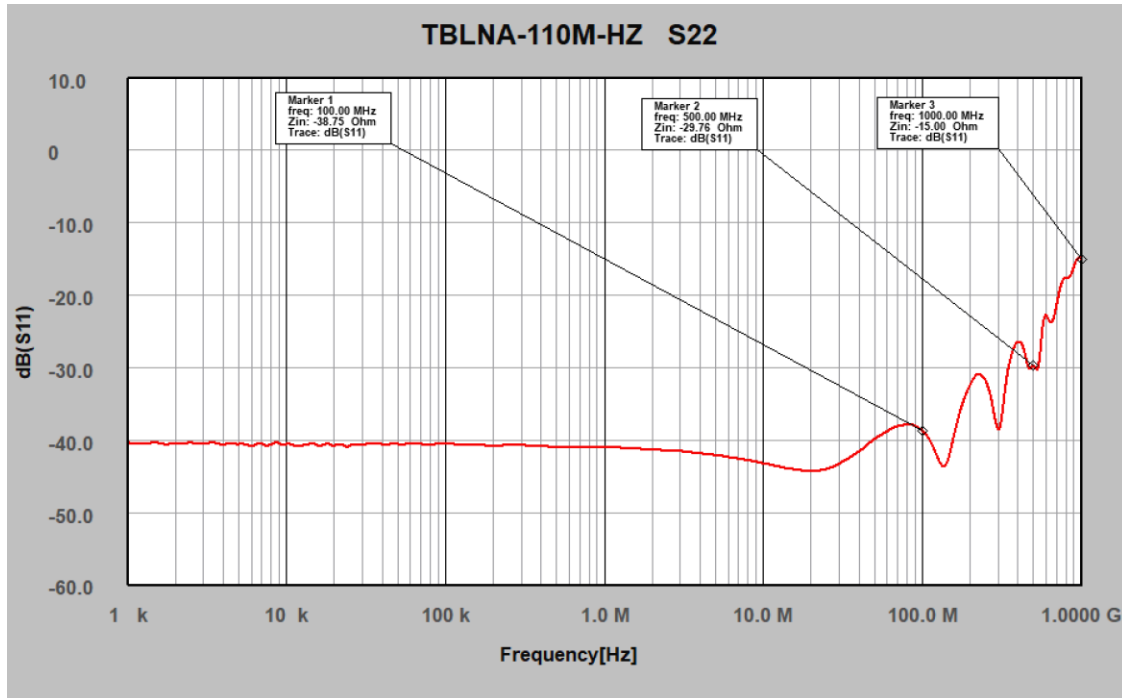


TBLNA-110M-HZ, Gain, 0 dB Output, input fed via 1:10 probe, typ.

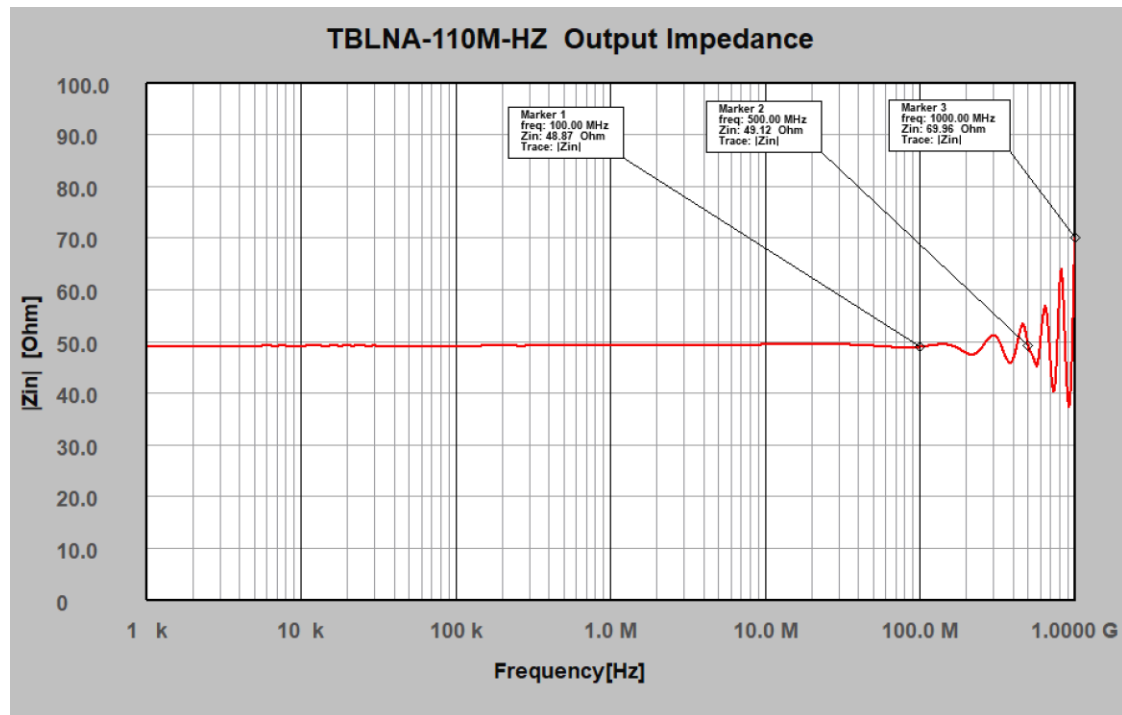


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3.2 Output return loss and impedance



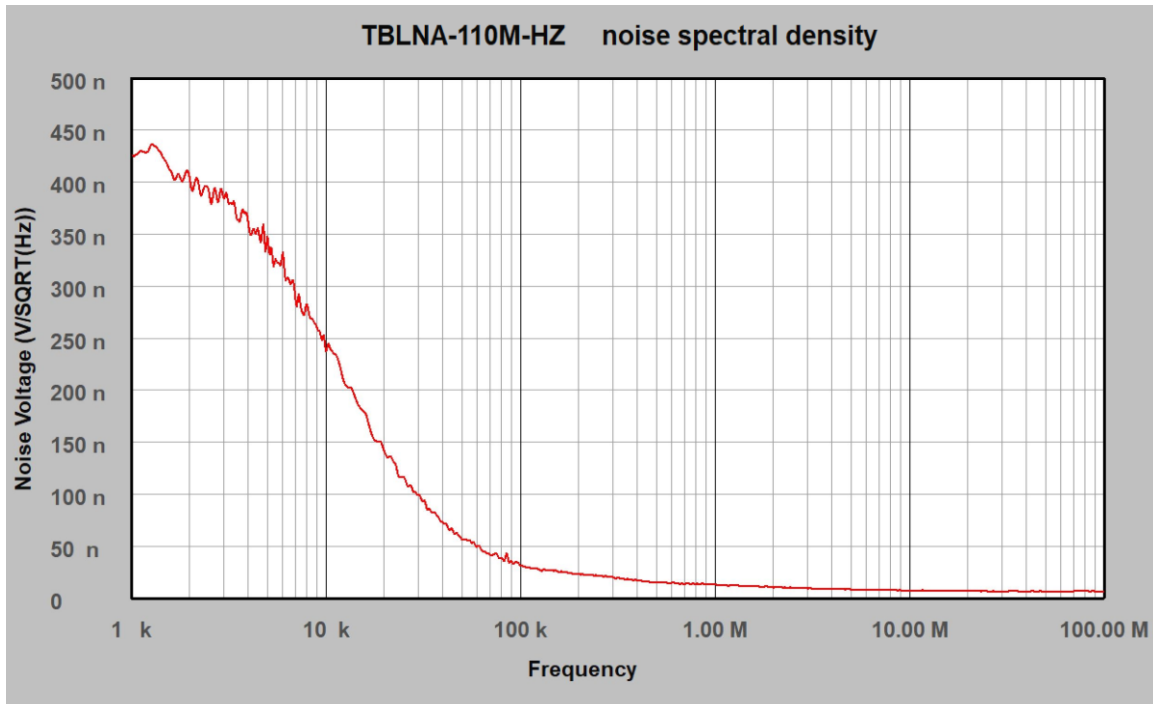
TBLNA-110M-HZ, S22, 1 kHz – 1 GHz, typ.



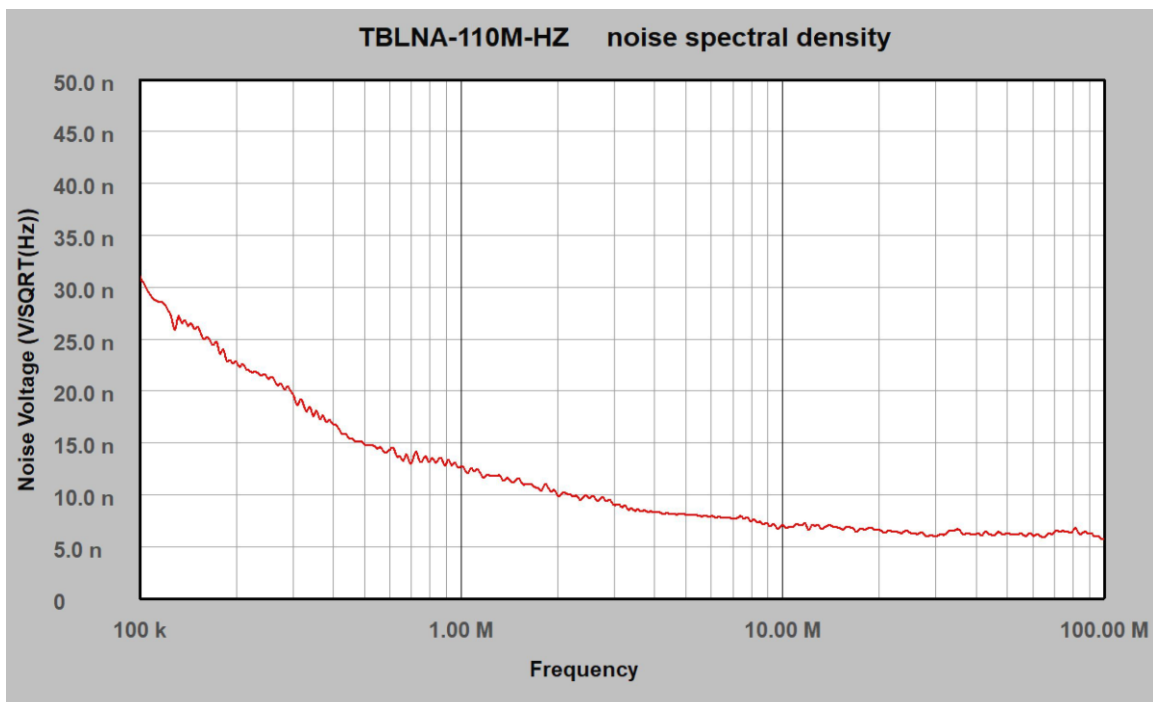
TBLNA-110M-HZ, Output Impedance, 1 kHz – 1 GHz, typ.

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3.3 Noise Spectral Density



TBLNA-110M-HZ, Input referred noise density versus frequency, 1 kHz – 110 MHz, typ.



TBLNA-110M-HZ, Input referred noise density versus frequency, 100 kHz – 110 MHz, typ.

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4 Ordering Information

Part Number	Description
TBVNA-110M-HZ	DC-coupled impedance converter, 110V-240V power supply

5 History

Version	Date	Author	Changes
V1.0	14.8.2025	Mayerhofer	Creation of the document