15 kV 50 Ω Load Termination Resistor HVLTR-50-15-100-B

Advanced TLP/HMM/HBM Solutions

1 Features

- Load resistor for 50 Ω transmission lines
- Impedance matched ceramic resistor
- 15 kV pulsed operation at 100 W average power
- DC to 3.5 GHz (VSWR < 1.2)
- 7-16 connector, modified for high voltage
- Passive cooling
- Size: Ø 74 mm x 552 mm
- Weight: 4.9 kg

2 Description

The HVLTR-50-15-100-B is used for load termination of 50 Ω transmission lines. For optimum cooling, the resistor should be mounted vertical with the 7-16 connector on the bottom side and the back side of the device (hot zone) on top. The built-in 7-6 receptacle has been modified to withstand 15 kV. It must be ensured that also the external 7-16 plug and the cable assembly can withstand 15 kV. The maximum average power dissipation must not exceed 100 W for continuous operation.

3 Characteristics

Nominal impedance	50^{+5}_{-5}	Ω
Frequency range [1) 5)]	DC to 3.5	GHz
VSWR	< 1.2	
Return loss	> 20	dB
Max. peak pulse voltage [2)]	15	kV
Max. average power dissipation [3)]	100	W
Max. peak pulse power [2)]	4.5	MW
Max. single pulse energy [2) 4)]	3200	J
Max. TM frequency [5)]	8.9	GHz
Max. EM frequency [5)]	3.5	GHz

[1)] limited by the VSWR performance
[2)] limited by the breakdown voltage of the 7-16 interface
[3)] continuous operation, vertical position backside up, free air, max. 40 °C ambient
[4)] max. 10 ms pulse width
[5)] higher modes can be generated beyond this frequency and consequently the VSWR increases

The average power dissipation P_{avg} for continuous operation can be evaluated with the pulse voltage V_p, pulse on-time t_{on}, pulse off-time t_{off}, duty cycle k or pulse frequency f, as follows:

$$P_{avg} = \frac{V_p^2}{50} \cdot k = \frac{V_p^2}{50} \cdot \frac{t_{on}}{t_{on} + t_{off}} = \frac{V_p^2}{50} \cdot t_{on} \cdot f \leq 100\,\text{W}$$

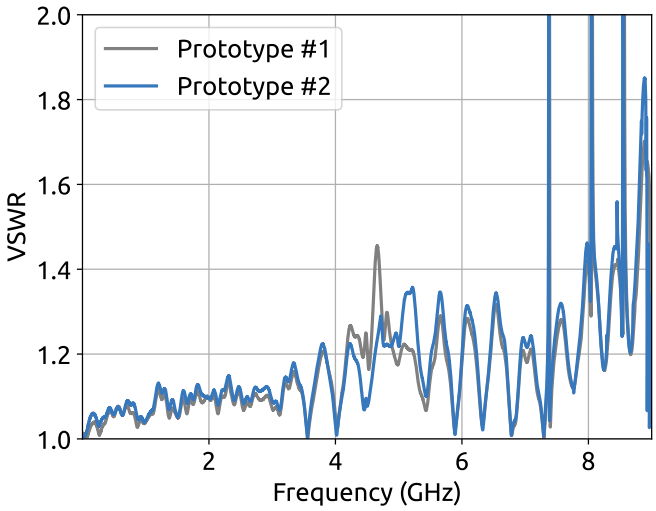

Figure 1: Measured VSWR versus frequency

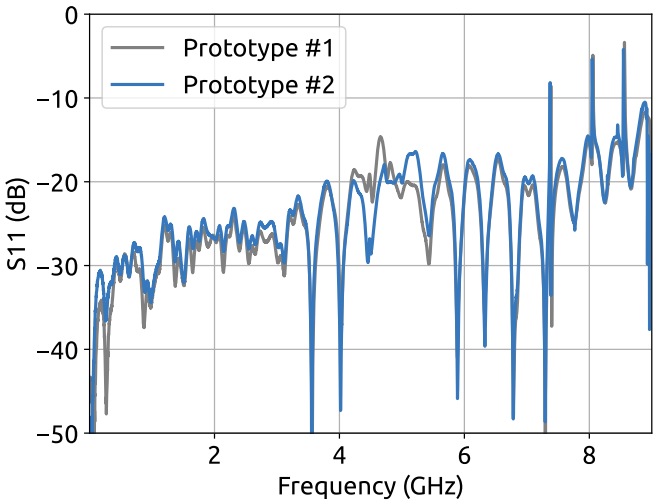

Figure 2: Measured S11 versus frequency

Fig. 1 and Fig. 2 show measured VSWR and S11 of two manufactured prototypes. Both devices agree very good, which is a result of low assembly tolerances.

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3.1 Measurement and Calibration

Measurement equipment: Keysight ENA Network Analyzer 300 kHz to 9 GHz, E5080A, MY55100160, A.12.60.03. Fig. 3 shows the cascaded adapters from SMA to N to 7-16. The network analyzer has been calibrated using a Keysight N4433A 300 kHz to 9 GHz electronic calibration module (e-CAL) at the reference plane shown in Fig. 3.

Therefore, the measurement results presented in Fig. 1 and Fig. 2 include potential mismatch of the cascaded adapters, especially in the frequency range above 4 GHz.

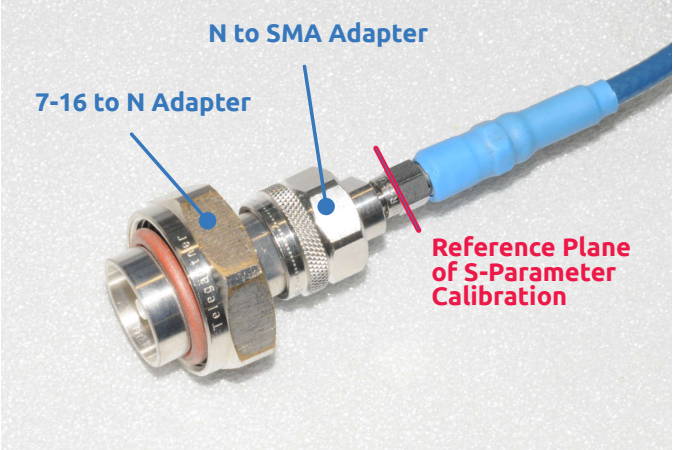

Figure 3: S-Parameter reference plane and SMA to N to 7-16 adapter

4 Physical Dimensions

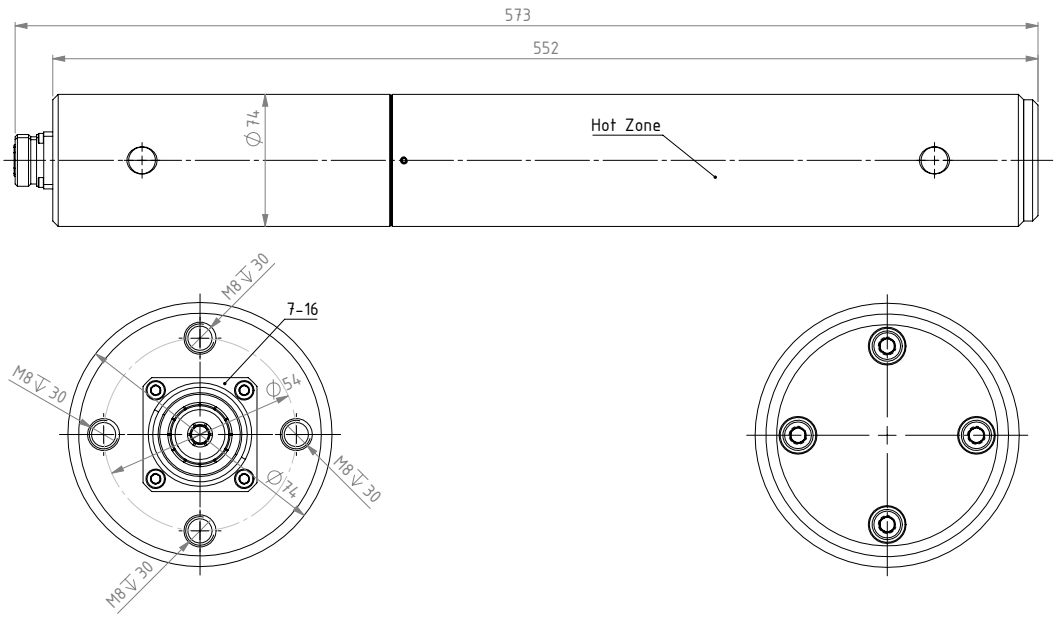

Figure 4: Dimensions [mm]

5 Ordering Information

Pos.	Description	Part No.
01	15 kV 50 Ω Load Termination Resistor	HVLTR-50-15-100-B

General

The product data contained in this data-sheet is exclusively intended for technically trained staff. You and your technical departments will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to such application. Our products are solely intended to be commercially used internally and should not be sold to consumers. This data-sheet is describing the specifications of our products for which a warranty is being granted by HPPI GmbH. Any such warranty is granted exclusively pursuant the terms and conditions of the respective supply agreement. There will be no guarantee of any kind for the product and its specifications. For further information on technology, specific applications of our product, delivery terms, conditions and prices please contact HPPI:

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