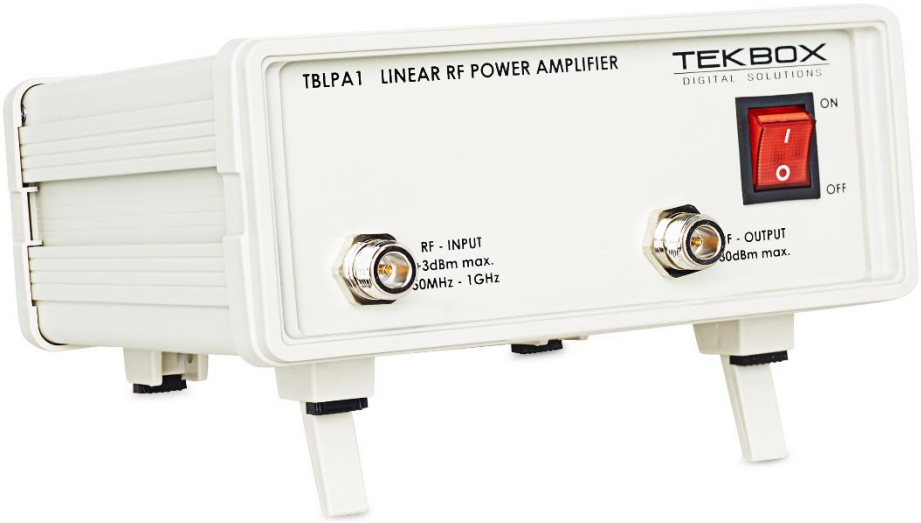
Linear Wideband RF Power Amplifier

1 Introduction

The TBLPA1 linear wideband power amplifier is a general purpose RF amplifier for test and measurement applications. It has an output power capability of up to 1W and can be used in the frequency range from 10 MHz to 1 GHz and with reduced output power capability even beyond.



Picture 1 – TBLPA1 linear RF power amplifier, front view

Picture 2 – TBLPA1 TBMDA1 linear RF power amplifier, rear view

Application:

General-purpose RF power amplifier

Linear Wideband RF Power Amplifier

2 Electrical Specifications

Technical Data:

Input / Output: 50 Ohm, N female

Supply Voltage range: 110 V…240 V

Supply power consumption: 15 W

Operating temperature range: -20°C to 60°C

Frequency range: 50 MHz – 1 GHz, (3MHz – 1.3GHz with reduced output power capability)

Gain: 36dB typ., see table 1 for details

1dB output compression point @ 10MHz: +29.5 dBm typ.

1dB output compression point @ 100 MHz: +30.9 dBm typ.

1dB output compression point @ 500 MHz: +31.3 dBm typ.

1dB output compression point @ 1 GHz: +28.7 dBm typ.

Noise figure: 2.5 dB typ.

2^{nd} harmonic, 50MHz, Pout=30dBm: < - 50 dBc typ

2^{nd} harmonic, 200MHz, Pout=30dBm: < - 40 dBc typ

3^{rd} harmonic, 50MHz, Pout=30dBm: < - 30 dBc typ

3^{rd} harmonic, 200MHz, Pout=30dBm: < - 25 dBc typ

Total harmonic distortion:

0.85% @200MHz, Pout=27dBm typ.

1.13% @200MHz, Pout=28dBm typ.

2.33% @200MHz, Pout=29dBm typ.

5.6% @200MHz, Pout=30dBm typ.

Third order intercept point:

+50dBm, @200MHz, Δ f = 200kHz typ.

Input return loss:

50 MHz: 11dB typ.

800 MHz: 16dB typ.

Output VSWR:

50 MHz: 2.1:1

800 MHz: 1.4:1

Maximum ratings:

Maximum input power: -3 dBm

The output of the TBLPA1 is quite tolerant to output mismatch, however open or shorted load is not recommended, potentially can cause damage.

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Small Signal Gain (measured with Pin=-20 dBm):

3 MHz	5 MHz	10 MHz	25 MHz	50 MHz	100 MHz	200 MHz	300 MHz	400 MHz
16 dB	34 dB	43 dB	42 dB	41 dB	40 dB	39 dB	38.5 dB	38.3 dB

500 MHz	600 MHz	700 MHz	800 MHz	900 MHz	1 GHz	1.1 GHz	1.2 GHz	1.3GHz
38 dB	37.8 dB	37 dB	35.4 dB	36.5 dB	36.2 dB	35.5 dB	33.7 dB	32.1 dB

Linear output power:

3 MHz	5 MHz	10 MHz	25 MHz	50 MHz	100 MHz	200 MHz	300 MHz	400 MHz
16 dBm @Pin= +1 dBm	25.2 dBm @Pin= -8 dBm	28.5 dBm @Pin= -15 dBm	28.8 dBm @Pin= -13 dBm	29.6 dBm @Pin= -11 dBm	30.6 dBm @Pin= -8 dBm	30.2dBm @Pin= -8 dBm	30.2 dBm @Pin= -8 dBm	30.2 dBm @Pin= -8 dBm

500 MHz	600 MHz	700 MHz	800 MHz	900 MHz	1 GHz	1.1 GHz	1.2 GHz	1.3GHz
30 dBm @Pin= -8 dBm	29.7 dBm @Pin= -8 dBm	29 dBm @Pin= -8 dBm	27.4 dBm @Pin= -8 dBm	28.4 dBm @Pin= -8 dBm	28 dBm @Pin= -8 dBm	27.4 dBm @Pin= -8 dBm	25dBm @Pin= -9 dBm	23.2dBm @Pin= -9 dBm

1dB compression point:

3 MHz	5 MHz	10 MHz	25 MHz	50 MHz	100 MHz	200 MHz	300 MHz	400 MHz
17 dBm @Pin= +3 dBm	26.1 dBm @Pin= -6 dBm	29.5 dBm @Pin= -13 dBm	30.1 dBm @Pin= -11 dBm	30.3 dBm @Pin= -9 dBm	30.9 dBm @Pin= -7 dBm	30.9dBm @Pin= -7 dBm	31.1 dBm @Pin= -6 dBm	31.5 dBm @Pin= -6 dBm

500 MHz	600 MHz	700 MHz	800 MHz	900 MHz	1 GHz	1.1 GHz	1.2 GHz	1.3GHz
31.3 dBm @Pin= -6 dBm	30.5 dBm @Pin= -6 dBm	29.5 dBm @Pin= -6 dBm	28 dBm @Pin= -6 dBm	28.5 dBm @Pin= -6 dBm	28.7 dBm @Pin= -6 dBm	27.7 dBm @Pin= -7 dBm	25.5dBm @Pin= -7.5 dBm	23.9dBm @Pin= -7 dBm

Table 1 – TBLPA1 gain & output power

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WARNING:

Never connect the output of the TBLPA1 directly to the input of a spectrum analyzer. Check the maximum input ratings of the spectrum analyzer and protect it with an appropriate attenuator.

Open or shorted load is not recommended, potentially can cause damage.

Example:

Rigol DSA815 – maximum input power rating: +20dBm

3 Ordering Information

Part Number	Description
TBLPA1	Linear wideband power amplifier, 2 pcs 75cm N-male to N-male cables, 1 pc 30dB / 10W attenuator with N-connectors, power cord

Table 5 – Ordering Information

4 History

Version	Date	Author	Changes
V1.0	6.9.2018	Mayerhofer	Creation of the document
V1.1	17.9.2018	Mayerhofer	Corrected maximum input power

Table 6 – History

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