

Audio amplifier test report		
Brand	Breeze Audio	Freeword notes: By Ffcossag - https://youtube.com/user/Ffcossag Efficiency tests performed with a lab power supply and external metering. Out-of-band noise measured with Rigol DS1102E set up with a digital filter of 25 kHz - 1 MHz. Amplifier top case was removed during 4 Ohm testing to prevent sporadic overheating; continuous 4 Ohm performance with the case on is thermally limited and not tested.
Model	TPA3116	
Topology	Class D BTL stereo	
Rated power 8Ω	21 W/ch	
Rated power 6Ω	W/ch	
Rated power 4Ω	32 W/ch	
Rated power 2Ω	W/ch	
Rated THD @ Power / Ω	1.00 % / 8 Ω	
	% / 6 Ω	
	1.00 % / 4 Ω	
	% / 2 Ω	
Rated frequency range (tolerance)	20 Hz - 20 kHz	
Rated damping factor		
Rated output impedance		
Rated noise floor	65 μV / -80 dB A-wtd.	
Rated SNR		
Rated power consumption		
Test conditions		
Distortion meter	HP 339A	
Voltmeter	Brymen MB869	
Load	Switchable 4/8 Ω resistive	
Input level	0,775 V RMS unless otherwise noted	
Weighting	Flat with 30 kHz LPF unless otherwise noted	
Optional info	Amplifier powered by a 19 V, 90 W HP laptop PSU	

Executive summary			
Values averaged across channels where applicable.			
Spec	Value	Comment	
Noise floor	457.5 μV (-66.8 dBV)	POOR; Amplifier is "hissy"	
Out-of-band noise	50 mV @ 25-1000 kHz	GOOD; Will not damage speakers	
SNR	89.2 dB	ACCEPTABLE; Value typical of device class	
Gain	31.6 dB	HIGH; Low input signal generates high output.	
Damping factor @ 8Ω (output impedance)	30 (266 mΩ)	POOR	
Frequency response	9 - 42000 Hz	Very high distortion at >10 kHz	
Worst-case channel mismatch	0.3 dB	ACCEPTABLE	
Efficiency			
	@ ½ power	88.54 %	EXCELLENT
	@ rated power	91.10 %	EXCELLENT
Power output 8 Ω, both channels driven		Operates well under full continuous power output	
	@ spec. THD+N	21.64 W	GOOD
	@ 0.3 % THD+N	20.965 W	GOOD
	@ 1 % THD+N	21.65 W	GOOD
	@ 10 % THD+N	26.6225 W	GOOD
Power output 4 Ω, both channels driven		Max. Continuous average power <20 W/ch.	
	@ spec. THD+N	36.475 W	OVERHEAT
	@ 0.3 % THD+N	26.92 W	OVERHEAT
	@ 1 % THD+N	36.5 W	OVERHEAT
	@ 10 % THD+N	44.244 W	OVERHEAT

THD+N vs. output power	
L-CH, 1 kHz, 30 kHz HPF, 8 Ω	
Pout	THD+N (%)
50 mW / 633 mV	0.045
100 mW / 894 mV	0.038
500 mW / 2 V	0.028
1 W / 2.83 V	0.04
2 W / 4 V	0.067
3 W / 4.9 V	0.095
4 W / 5.66 V	0.105
5 W / 6.32 V	0.113
10 W / 8.94 V	0.14
20 W / 12.65 V	0.175
21 W / 12.96 V	0.43
22 W / 13.27 V	1.6
23 W / 13.57 V	3.2
24 W / 13.86 V	5.3
25 W / 14.14 V	7.4
80 W / 25.30 V	
100 W / 28.28 V	
110 W / 29.66 V	
120 W / 30.98 V	
140 W / 33.47 V	
160 W / 35.78 V	

Percentage of the signal that is distorted by imperfections in the amplifier; lower is better.

High distortion at low power indicates a "hissy" amplifier.

High distortion at high power levels indicates that an amplifier is approaching its maximum power.

THD+N vs. output power	
R-CH, 1 kHz, 30 kHz HPF, 8 Ω	
Pout	THD+N (%)
50 mW / 633 mV	0.045
100 mW / 894 mV	0.037
500 mW / 2 V	0.026
1 W / 2.83 V	0.024
2 W / 4 V	0.03
3 W / 4.9 V	0.035
4 W / 5.66 V	0.042
5 W / 6.32 V	0.048
10 W / 8.94 V	0.064
20 W / 12.65 V	0.115
21 W / 12.96 V	0.33
22 W / 13.27 V	1.6
23 W / 13.57 V	3.3
24 W / 13.86 V	5.2
25 W / 14.14 V	7.3
80 W / 25.30 V	
100 W / 28.28 V	
110 W / 29.66 V	
120 W / 30.98 V	
140 W / 33.47 V	
160 W / 35.78 V	

*Notes about testing go here

Distortion at rated power	
Left channel	
8 Ω, 1 kHz, 21 W	
0.4 % THD+N	

Distortion at rated power	
Right channel	
8 Ω, 1 kHz, 21 W	
0.4 % THD+N	

Distortion at rated power	
Left channel	
4 Ω, 1 kHz, 32 W	
0.3 % THD+N	

Distortion at rated power	
Right channel	
4 Ω, 1 kHz, 32 W	
0.2 % THD+N	

Power at rated distortion	
Left channel	
8 Ω, 1 kHz, 1 % THD+N	
21.6 W	

Power at rated distortion	
Right channel	
8 Ω, 1 kHz, 1 % THD+N	
21.7 W	

Power at rated distortion	
Left channel	
4 Ω, 1 kHz, 1 % THD+N	
36.5 W	

Power at rated distortion	
Right channel	
4 Ω, 1 kHz, 1 % THD+N	
36.5 W	

Clipping power, both channels driven	
Left channel	
8 Ω, 0.3 % THD+N	
20.9 W	
8 Ω, 1 % THD+N	
21.6 W	
8 Ω, 10 % THD+N	
26.6 W	

Grid voltage variations during testing may affect these measurements.

Amplifiers with overheating issues may produce inconsistent numbers in these tests.

Clipping power, both channels driven	
Right channel	
8 Ω, 0.3 % THD+N	
21.0 W	
8 Ω, 1 % THD+N	
21.7 W	
8 Ω, 10 % THD+N	
26.6 W	

Clipping power, both channels driven	
Left channel	
4 Ω, 0.3 % THD+N	
18.3 W	
4 Ω, 1 % THD+N	
36.5 W	
4 Ω, 10 % THD+N	
44.0 W	

Clipping power, both channels driven	
Right channel	
4 Ω, 0.3 % THD+N	
35.5 W	
4 Ω, 1 % THD+N	
36.5 W	
4 Ω, 10 % THD+N	
44.5 W	

Output impedance	
Left channel, ½ power, 8 Ohm	
Loaded voltage	Voltage differential
8.92	0.290
Output impedance	
0.269 Ω	
Damping factor	
30	

The amplifier is set to put out half power into a dummy load, and the voltage differential when the load is switched off is noted. The damping factor and output impedance can be calculated from this value.

Output impedance	
Right channel, ½ power, 8 Ohm	
Loaded voltage	Voltage differential
8.91	0.28
Output impedance	
0.26 Ω	
Damping factor	
30	

Output impedance	
Left channel, ½ power, 4 Ω	
Loaded voltage	Voltage differential
7.98	0.51
Output impedance	
0.275 Ω	
Damping factor	
15	

Output impedance	
Right channel, ½ power, 4 Ω	
Loaded voltage	Voltage differential
7.98	0.51
Output impedance	
0.275 Ω	
Damping factor	
15	

Unweighted noise floor, Left channel	
30 kHz HPF, input shorted, vol = -inf.	
250.00 μV (-72.04 dBV)	
30 kHz HPF, input shorted, vol = FS	
480.00 μV (-66.38 dBV)	

In the second test, the volume is set to the level required for full output power at the input level used at the rated power test.

Unweighted noise floor, Right channel	
30 kHz HPF, input shorted, vol = -inf.	
220.00 μV (-73.15 dBV)	
30 kHz HPF, input shorted, vol = FS	
435 μV (-67.23 dBV)	

Unweighted SNR, 8 Ω, Left channel	
30 kHz HPF, input shorted, vol = -inf	
94.41 dB	
30 kHz HPF, input shorted, vol = FS	
88.75 dB	

SNR as it is usually rated: The ratio of the shorted input noise to the full-scale power.

Unweighted SNR, 8 Ω, Right channel	
30 kHz HPF, input shorted, vol = -inf.	
95.55 dB	
30 kHz HPF, input shorted, vol = FS	
89.63 dB	

Out-of-band noise, Left channel	
Amplitude, input shorted	
15.00 mVpp	
Frequency	
400.00 kHz	

Inaudible high-frequency switching noise indicates a poor output filter in class D amplifiers.

Out-of-band noise, Right channel	
Amplitude, input shorted	
11.00 mVpp	
Frequency	
400.00 kHz	

Gain, Left channel	
Volume set to 0 dB or maximum	
31.60 dB	
Fixed attenuator attenuation	
dB	

Gain, Right channel	
Volume set to 0 dB or maximum	
31.60 dB	
Fixed attenuator attenuation	
dB	

-3 dB point	
Left channel, ½ power (Hz)	
Low, 8 Ω	High, 8 Ω
9	42000
Low, 4 Ω	High, 4 Ω
9	13000

The -3 dB point specifies where the amplifier starts to roll off in the extremes of its frequency range.

-3 dB point	
Right channel, ½ power (Hz)	
Low, 8 Ω	High, 8 Ω
9	42000
Low, 4 Ω	High, 4 Ω
9	13000

Frequency response				
Left channel, ½ power, 8 Ω, THD+N in parentheses, 80 kHz HPF				
20 Hz	100 Hz	1000 Hz	10 000 Hz	20 000 Hz
-0.8 dB (0.12)	0 dB (0.12)	0 dB (0.12)	0 dB (0.76)	0 (1.3)
Right channel, ½ power, 8 Ω, THD+N in parentheses, 80 kHz HPF				
20 Hz	100 Hz	1000 Hz	10 000 Hz	20 000 Hz
-0.8 (0.051)	0 dB (0.053)	0 (0.6)	0 (0.76)	0 (1.27)

Channel gain mismatch			
8 Ω, 1 kHz, variable input level, non-clipping			
Worst case		Best case	
0.30	dB		dB
	Knob position		Knob position

Efficiency	
8 Ω, 1 kHz, variable input level, power according to 0.3 % THD+N result	
Efficiency at ½ power (10.48 W/ch.)	Efficiency at maximum non-clipping power (20.97 W/ch.)
19.10 V input	19.05 V input
1.24 A input	2.416 A input
23.68 W input	46.02 W input
88.54 % efficiency	91.10 % efficiency