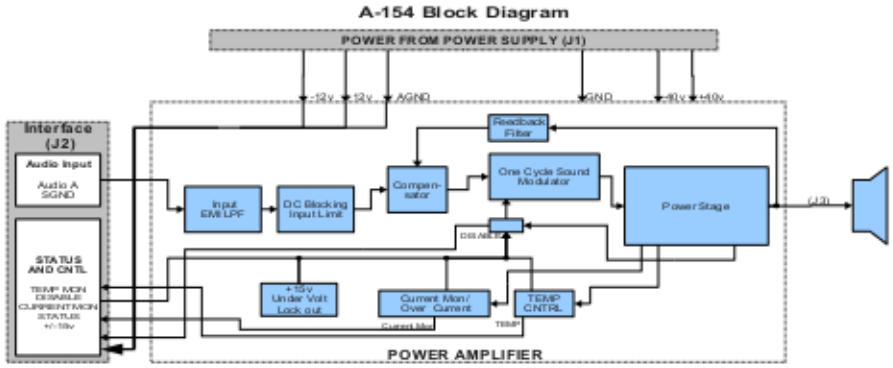
Features

- One Channel Amplifier 1x150 watts
- Patented "One Cycle Sound" Control
- 117dBA dynamic Range
- THD+N < 0.05%, 0.1W – Rated Power
- Amplifier Efficiency > 95%
- Damping Factor > 375@ 100Hz 4 Ohms
- DC offset < 25mV
- Remote Disable
- Over Current Protection to Ground Short
- Over Current Protection to Speaker Short
- Click-less Turn-on
- Temperature Protection and Monitor
- Output current monitor
- Synchronizeable Switching Frequency
- Power Supply Under Voltage Lockout

Product Description:

Based on the PowerPhysics' proprietary "One Cycle Sound" control method, the A-154 provides One channel of 150 Watts into 4 ohm speakers. Outputs include temperature and current monitoring ideally suited for off board analysis. The amplifier is fully protected against any type of thermal overload, output short or speaker fault to provide robust, long term operation.



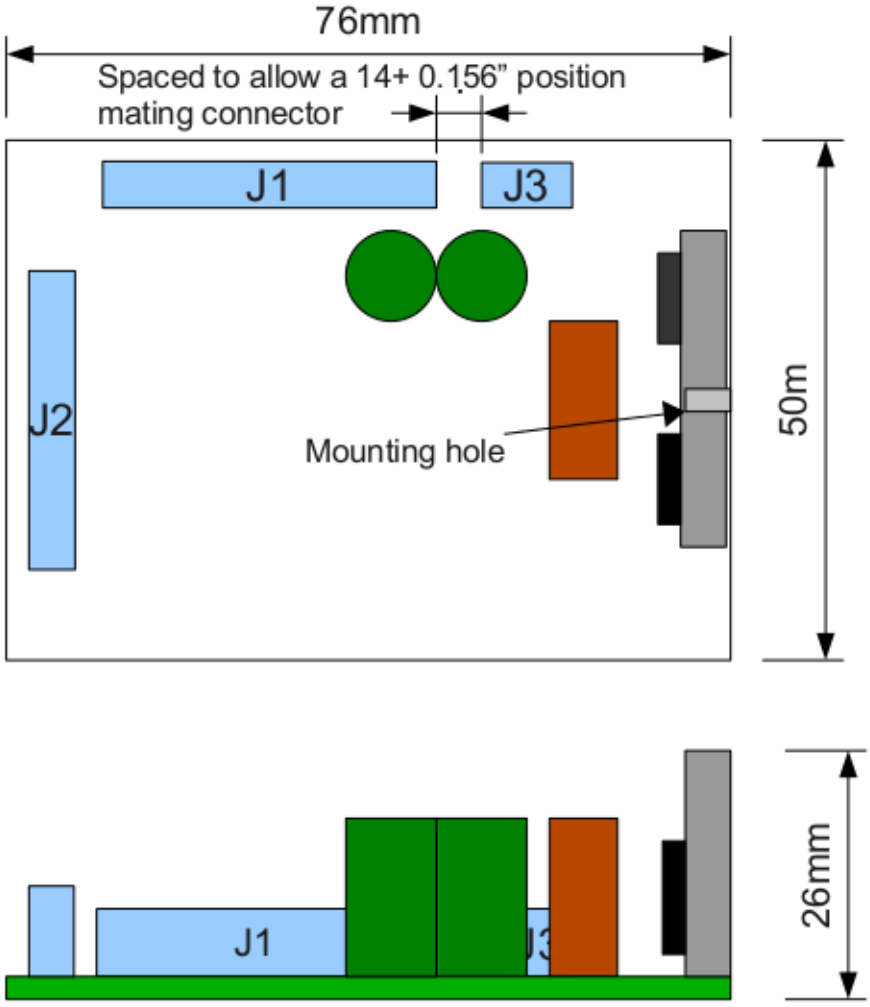


Figure 1: Amplifier Outline and Mounting Hole Locations

A-154 Amplifier Specifications:

Unless otherwise specified, One channel driven, f = 1kHz, R_L=4Ω, Ta=25 ºC, Vb = +/- 44V

Parameters	*Symbols*	*Test Condition/ Comment*	*Min*	*Typ*	*Max*	*Unit*
Load Resistance	R_L		2.5	-	-	Ω
Max Output Power	P_{max}	f=20Hz-20KHz (1% THD)		160	-	W
Ouput Power	Po	f=20Hz-20kHz (0.1% THD)	-	150	-	W
Sensitivity	Vsen	Input Signal to Po	-	3.5	-	Vrms
Input Impedance	Zin			4.2K		Ω
Gain	A		16.5	17	17.5	dB
Distortion	THD+N	10Hz< f <20kHz, 100mW< Pout < Po	-	.03	0.08	%
Freq. Response	f	20Hz-20kHz	-	+/- 0.5	-	dB
Noise Floor	V_{NF}	Input Shorted, A-weighted	-	25	35	µV
Maximum Current	I_{max}		18	20	25	A
Damping Factor	DF	R_L = 4 ohms @ 100 Hz	-	375	-	Ω/Ω
Power Bandwidth	BW_{pw}	Output Power: P_{max}	-	60k	-	Hz
Small Signal Bandwidth	BW_{sm}	Output Power: 1Watt	-	90k	-	Hz
Signal to Noise	SNR		117	-	-	dB
Turn off threshold for the +15v input	UVLO		-	14	-	V
Turn on threshold for the +15v input	Von_15	Above this level, the amp will start operating	-	14.5	-	V
Startup Delay	Tstart		.5	-	1.2	Sec

Power Supply Requirements:

Voltage	Normal Op Current	Disable mode Current	Minimum	Maximum
+12v	75mA	~0mA	+10v	+12.5v
-12v	50mA	~0mA	-12.5v	-10v
+/-40v	65mA @ idle 2A @ P_{max}	0mA	+/-25	+/-44

Performance Graphs:

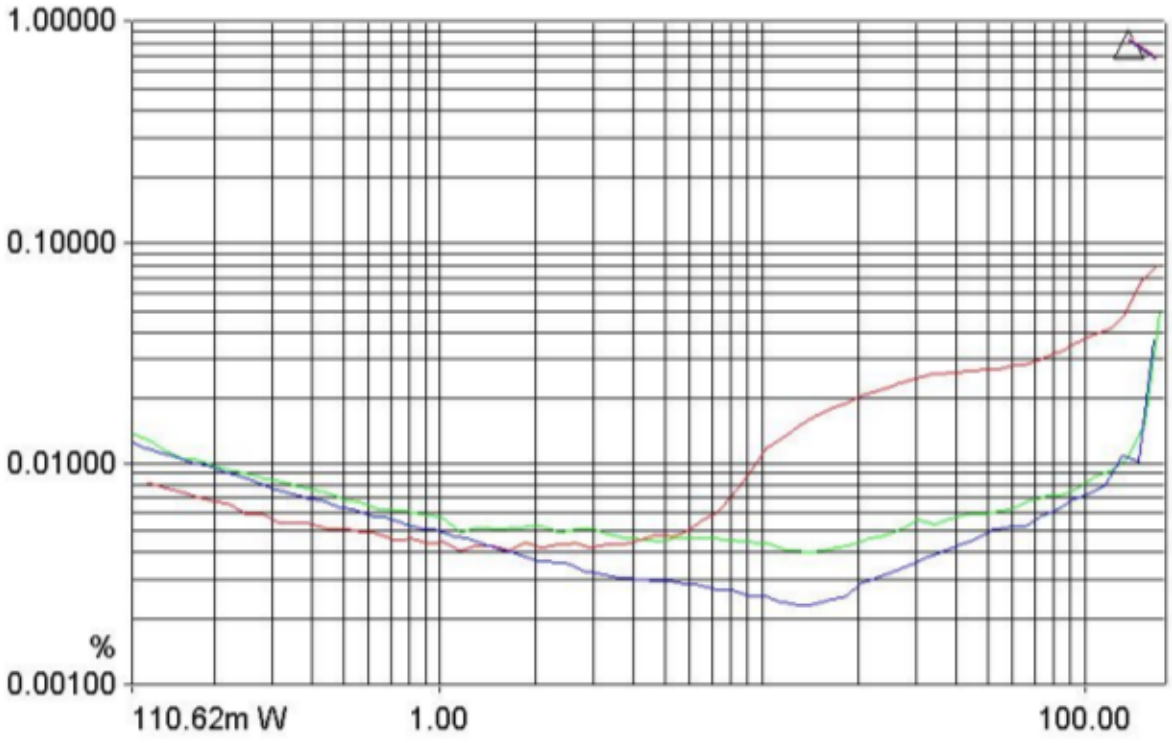


Figure 2: THD+N versus Power

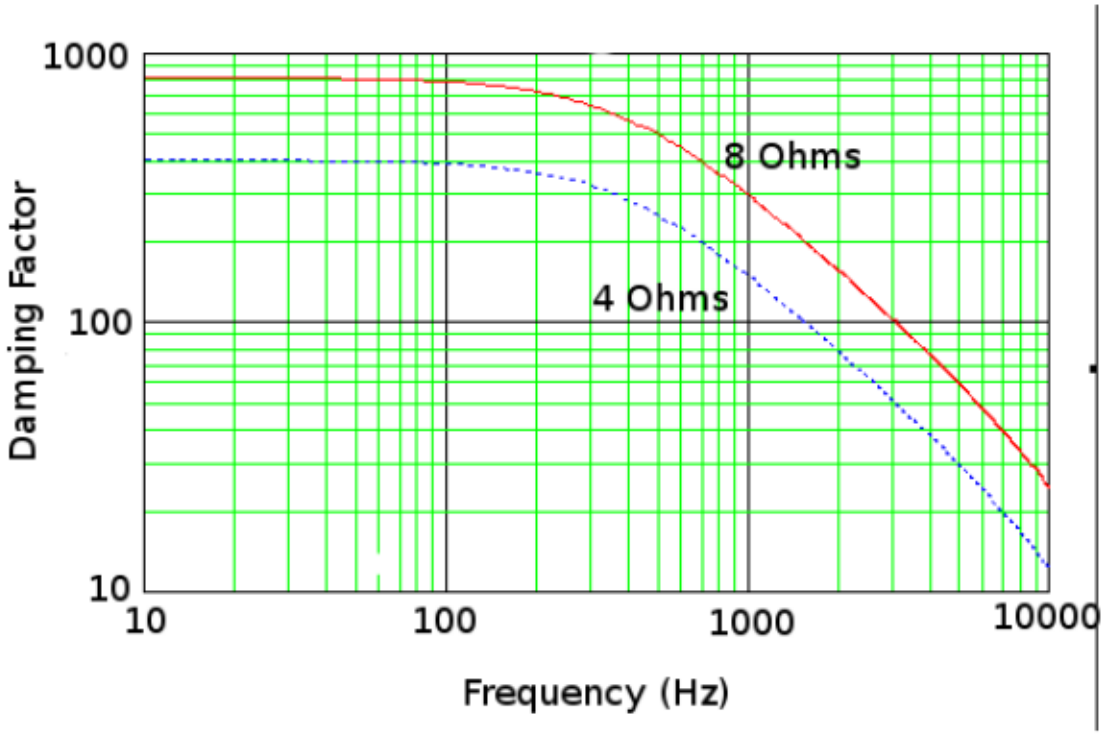


Figure 3: Theoretical Damping Factor versus 4 and 8 ohms.

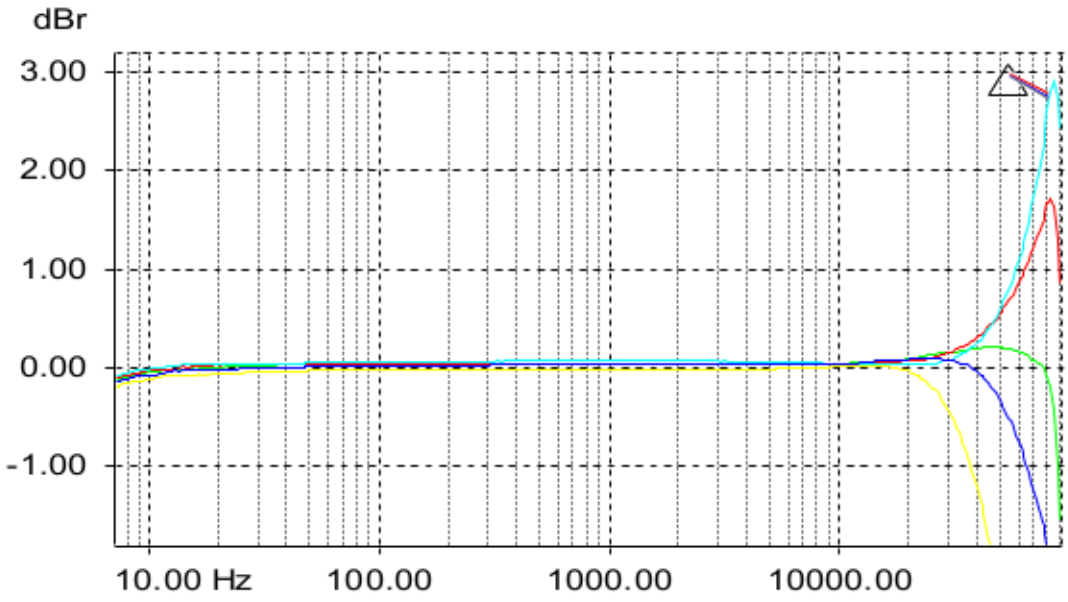


Figure 4: Frequency Response

1.5ohm, 2.25ohm, 4ohm, 8ohm, Open Loop. While Stable at 1.5ohms, the recommended minimum load is 2.5ohms.

CONNECTOR PINOUT:

	SIGNAL	DESCRIPTION
1	Output	Output to speaker
2	Output	
3	Ground	
4	Ground	
5	+V Bus	Bus Voltage. See power supply requirements for more details
6	-V Bus	
7	+12 Vdc	
8	-12 Vdc	
9	Current Monitor	
10	Synchronize	Clock signal input to synchronize amplifier switching
11	Temp Monitor	Output to preamp for control of limiting as a function of temperature
12	Status	Amplifier status. See detailed information below.
13	Audio Input	Audio input signal. See specifications table for more information.
14	Ground	
15	Ground	
16	Disable	

Amplifier Operation:

STATUS INDICATOR:

The amplifier STATUS pin is an active pull down signal that indicates when the amplifier is in Protect Mode. This occurs during the following conditions:

1. When the amplifier is in temperature protection mode and is limiting the maximum output power.
2. When the amplifier has reached peak current limiting and is limiting current. During this condition the STATUS indicator will be triggered many time a second as the output current is being limited.

To sense this signal, an external 10k ohm pull up resistor to 5v is needed. (see Figure 5).

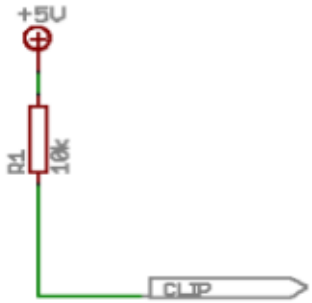


Figure 5: Status Signal External Pull Resistor

DISABLING THE AMPIFIER:

The amplifier can be disabled by pulling up the disable pin above 2.5v. This completely turns off the amplifier and drops the amplifier supply current, both the main power and bias power to zero amps. When this signal is released, the amplifier will turn on after a one second delay.

TEMPERATURE PROTECTION AND MONITORING:

Temperature protection will NOT turn off the amplifier, it will still play when over 100% thermal capacity. During this over temperature mode high output power peaks will be limited. Limiting will continue until the temperature drops below 100%.

The A-154 TEMP MONITOR on the AUDIO INTERFACE outputs the MOSFET temperature. The figure below plots the TEMP MONITOR output voltage versus thermal capacity. The amplifier will go pull the STATUS pin low and limit the amplifiers output power if the sensed temperature goes above 100%.

NOTE: The TEMP MONITOR pin is directly connected to the amplifier thermistor circuitry. High in input impedance (> 100k Ohms) sense circuitry is required, or the temperature monitoring circuit will be affected.

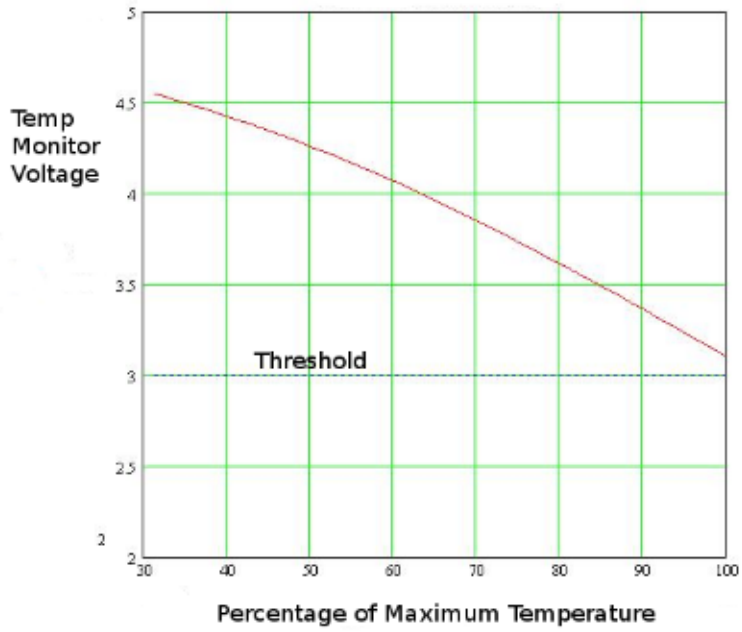


Figure 6: Voltage versus Sensed Temperature

OVER CURRENT OPERATION:

The amplifier will limit current if the current monitor signal goes higher than

approximately 1.85volts. While the amplifier is limiting current the status pin will be toggling on/off rapidly.

CURRENT MONITORING OPERATION:

The output current of each amplifier is monitored by the CURRENT MON pin. The voltage on the CURRENT MON pin represents the output current by the following equation:

$$V_{currentmonitor} = 0.163 I_{out} + Fs_{NOISE}$$

The voltage on the CURRENT MON pin is a differential signal (+3.25 to -3.25v max range). A current monitor voltage above |3.25v| signifies the over current limit threshold. There is also a small amount of switching frequency noise on this signal (Fs_{noise}). While this switching frequency noise is a small percentage of the full range signal, It can be a substantial amount of the signal when measuring low current applications and additional filtering may be required . The CURRENT MONITOR pin is directly connected to the amplifier current monitoring circuitry. Any sensing of this pin must be high in impedance (i.e. Greater than 100k) or the current monitoring and over current protection levels will be effected.

AMPLIFIER STARTUP POWER SEQUENCE:

The amplifier will start operation as long as the +15v is above 14.5v and the bus voltages are above 15v. It is assumed that the -15v supply magnitude will match the +15v supply during this startup. To increase this time the DISABLE pin is pulled high.

SYNCRONIZED CLOCK FREQUENCIES:

The amplifier switching frequency cam be synchronized to an external clock frequency. To do this, an external 425kHz-440kHz sync signal can be supplied on the SYNC pin.

CONTACT INFORMATION:

For the most recent information please visit www.powerphysics.com

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