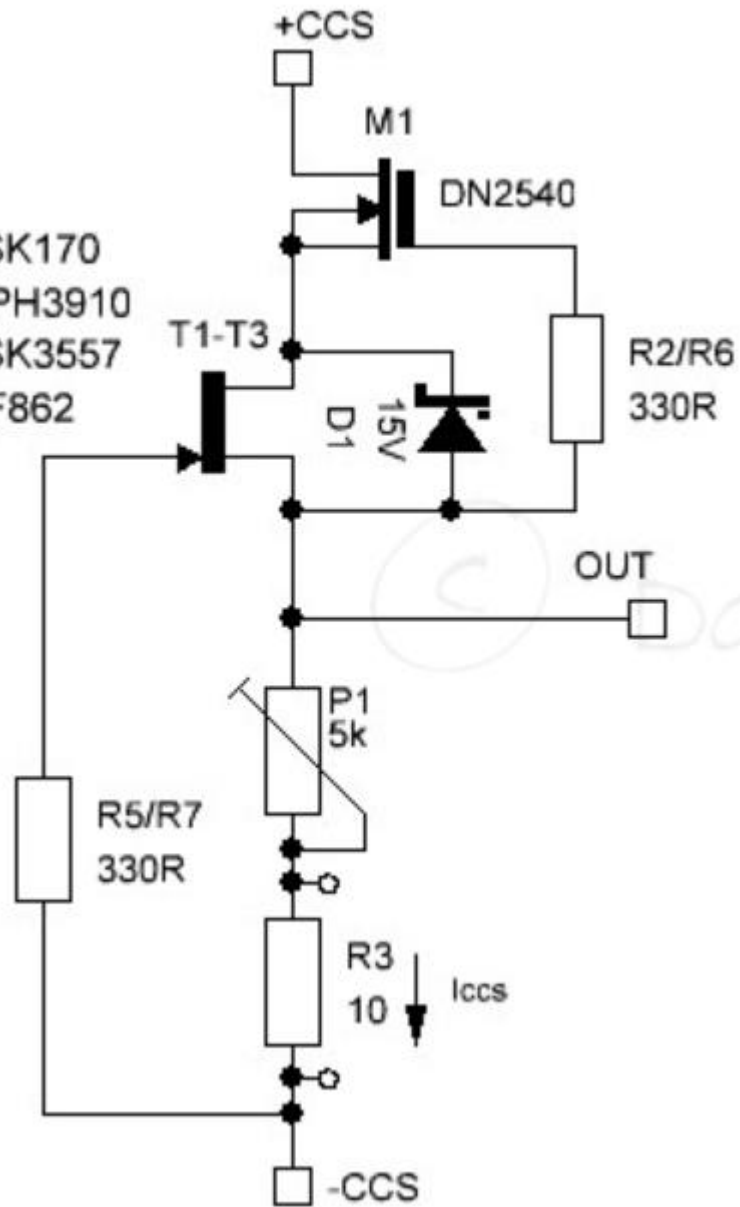


# Top Cap Improvements

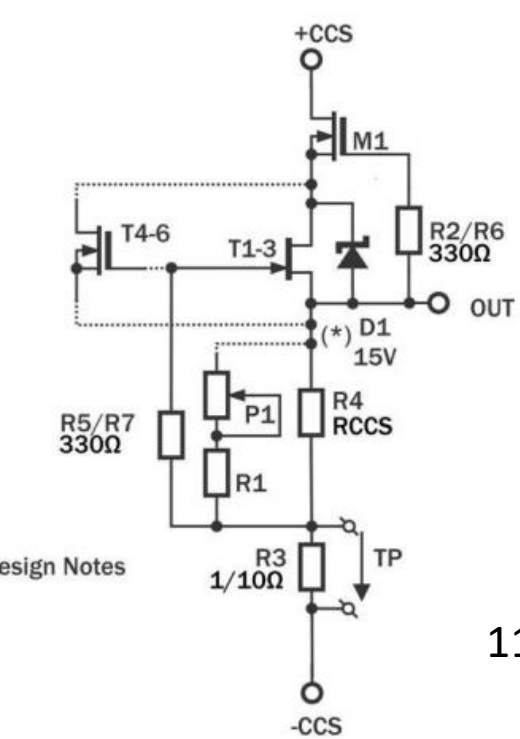
*Mono Bill's Topcap*



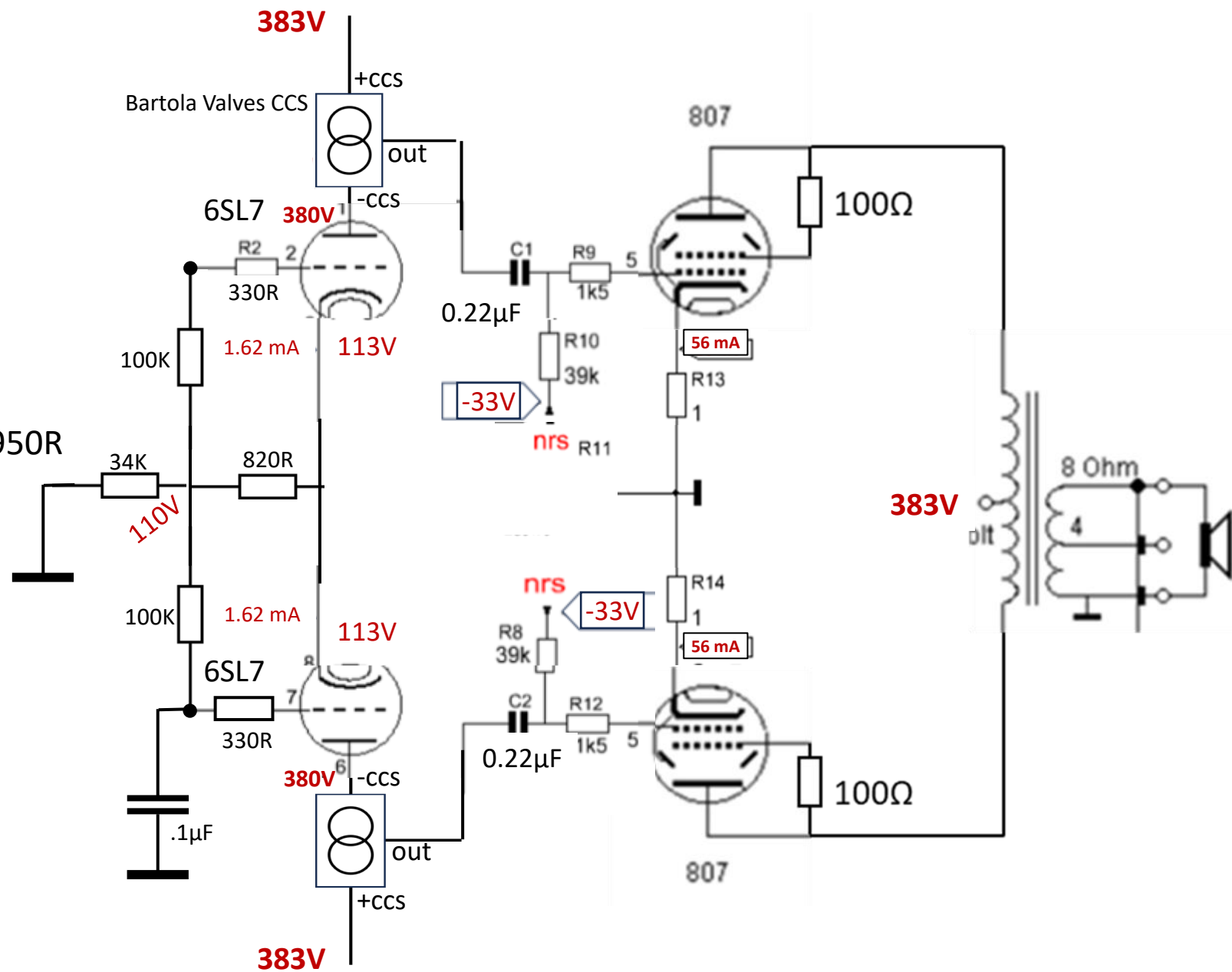
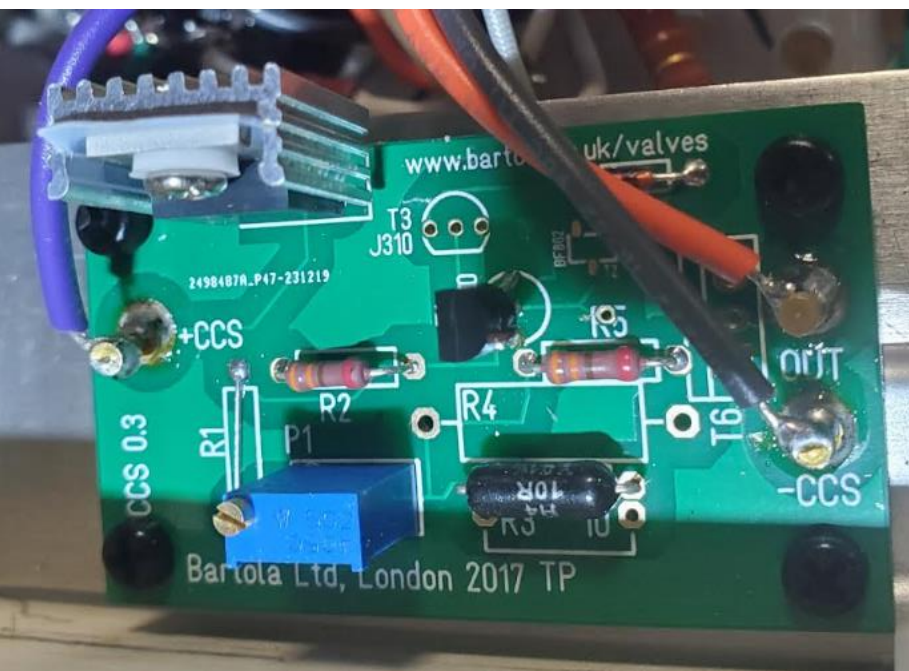
2SK170  
CPH3910  
2SK3557  
BF862



The diagram shows a differential amplifier circuit. At the top, a high voltage (HV) source is connected to a common rail. A capacitor C2 (100nF) is connected between this rail and ground. Two CCS PCBs, labeled CCS1 and CCS2, are connected to this rail. Each CCS PCB has a +CCS and -CCS terminal. The -CCS terminal of each CCS PCB is connected to the top of an IHT (V1 and V2 respectively). The +CCS terminal of each CCS PCB is connected to the output of the IHT. The output of each IHT is connected to a resistor (R3 and R4) which is then connected to ground. The input of each IHT is connected to a resistor (R2 and R5) which is then connected to the input signal. A resistor R1 (100K) is connected between the input signal and ground. A resistor R6 (100K) is connected between the output of the second IHT and ground. A resistor Rk1 is connected between the bottom of the two IHTs and ground. The circuit is powered by a positive supply (HV) and a negative supply (ground).

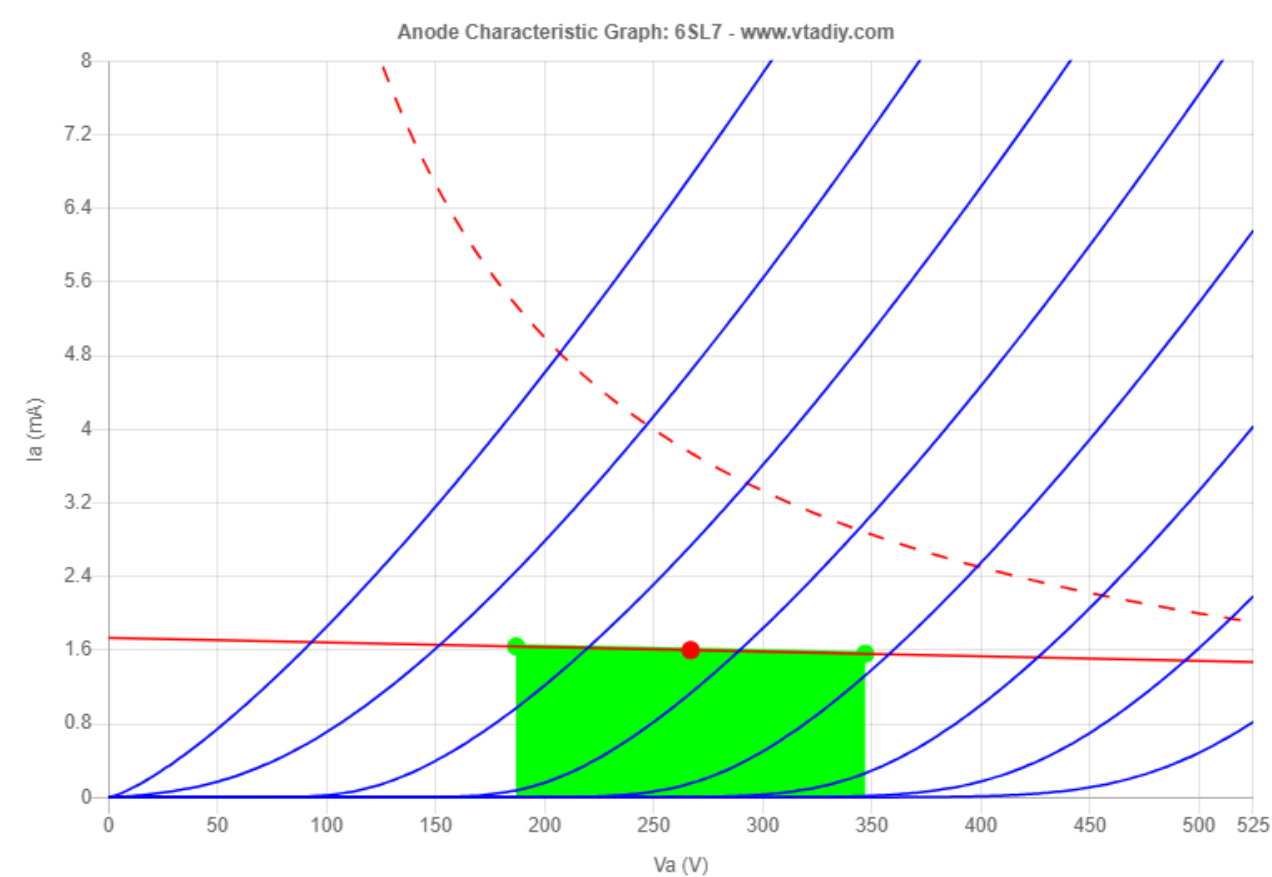


$$110V \div 0.00324A = 33,950R$$



Select a Tube: 6SL7  Check full list of [available tubes](#)

Operating mode:	<input type="radio"/> Ultralinear <input type="radio"/> Pentode <input checked="" type="radio"/> Triode	PP/SE:	<input type="radio"/> PP <input checked="" type="radio"/> SE
V+ (V):	<input type="text" value="267"/>	Grid Bias Voltage (V):	<input type="text" value="-2.66"/>
Quiescent Operating Point:	Iq(mA): <input type="text" value="1.64"/> Vq(V): <input type="text" value="267.00"/>	Output Power (W):	at max g1:0.01 at g1=0:0.01 at class A/A2:2.69 at headroom:0.00
Load (Ohm): <input type="radio"/> Resistive <input checked="" type="radio"/> Reactive	<input type="text" value="2000000"/>		
Next stage AC Impedance (Ohm):	<input type="text"/>	HD%:	2nd:0.04 3rd:0.10 4th:0.0 THD:0.11
Screen Voltage (V):	<input type="text"/>		
UltraLinear tap (%):	<input type="text" value="0"/>		
Out. headroom (+/-V):	<input type="text" value="80"/>		



$$2.68V \div (2 \times 0.00164)A = 210.97\Omega$$
$$R_k = 809\Omega$$

Select a Tube: 807  Check full list of [available tubes](#)

Operating mode: ☐ Ultralinear ☐ Pentode ☒ Triode

PP/SE: ☒ PP ☐ SE

V+ (V):

Grid Bias Voltage (V):

Quiescent Operating Point:

Iq(mA):

Vq(V):

Output Power (W):

at max g1:25.49  
at g1=0:10.20  
at class A/A2:15.68  
at headroom:10.12

Load (Ohm):

☐ Resistive ☒ Reactive

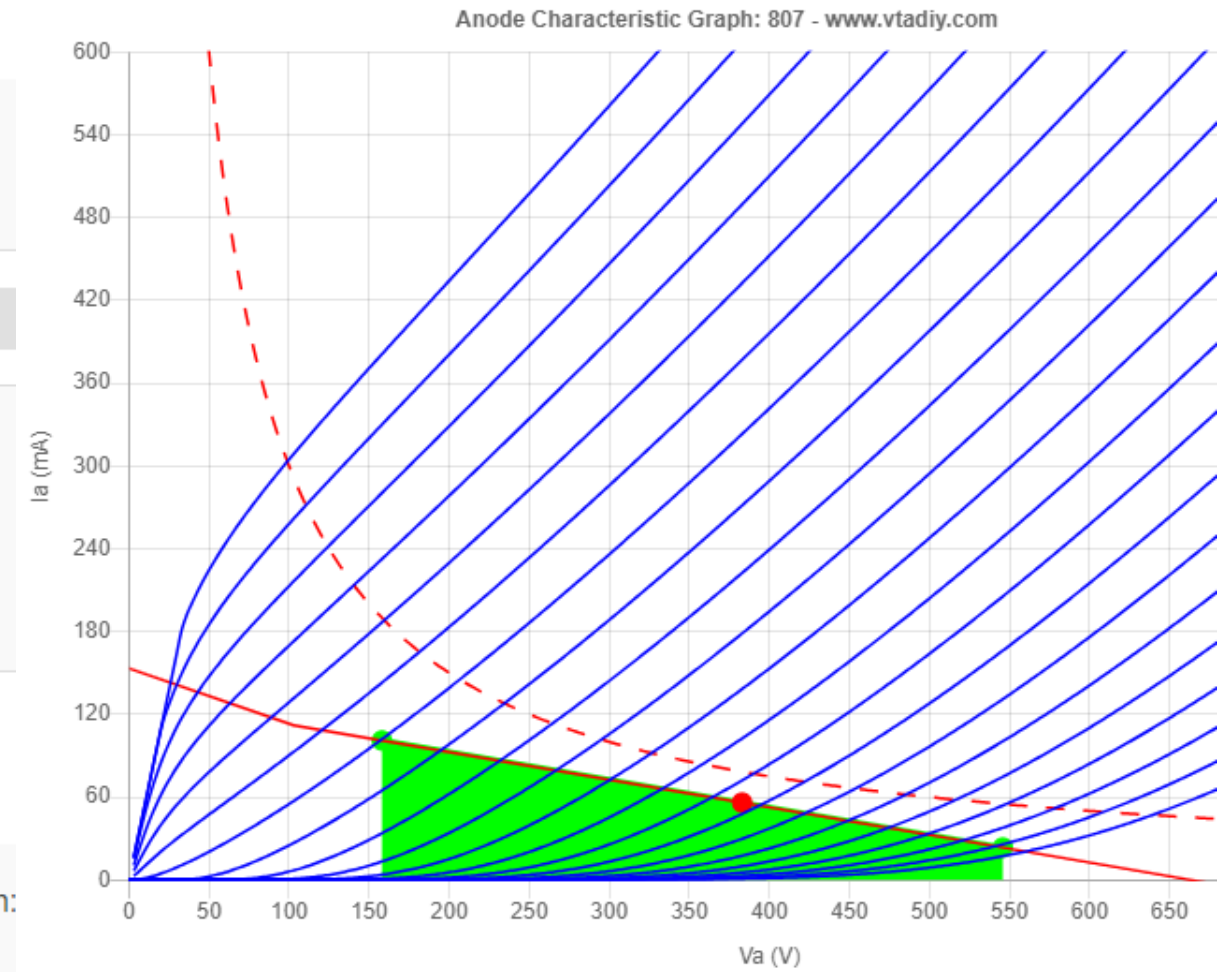
Next stage AC Impedance (Ohm):

HD%: 2nd:0.00 3rd:0.17 4th:  
THD:0.17

Screen Voltage (V):

UltraLinear tap (%):

Out. headroom (+/-V):



## Transformer Impedance Reflection

The impedance reflected from the secondary to the primary is determined by the turns ratio and the load connected to the secondary. The relationship is:

$$Z_{\text{primary}} = Z_{\text{secondary}} \times \left( \frac{N_{\text{primary}}}{N_{\text{secondary}}} \right)^2$$

However, when you're using fixed taps like 16 ohms, you can directly calculate the reflected impedance by the ratio of actual load to the rated load.

## Calculating the Reflected Impedance

Given:

- **Transformer Rated Primary Impedance:** 10,000 ohms for the 16-ohm tap
- **Speaker Impedance:** 12 ohms connected to the 16-ohm tap

To find the new reflected primary impedance, use the formula:

$$\text{Reflected Primary Impedance} = \text{Rated Primary Impedance} \times \left( \frac{\text{Actual Speaker Impedance}}{\text{Rated Secondary Impedance}} \right)$$

$$\text{Reflected Primary Impedance} = 10,000 \text{ ohms} \times \left( \frac{12}{16} \right) = 10,000 \times 0.75 = 7,500 \text{ ohms}$$



Select a Tube:   [Check full list of available tubes](#)

Operating mode: ☐ Ultralinear ☐ Pentode ☒ Triode PP/SE: ☒ PP ☐ SE

V+ (V):  Grid Bias Voltage (V):

Quiescent Operating Point:  Iq(mA):  at max g1:32.48  
Vq(V):  Output Power (W): at g1=0:11.99  
at class A/A2:10.93  
at headroom:11.76

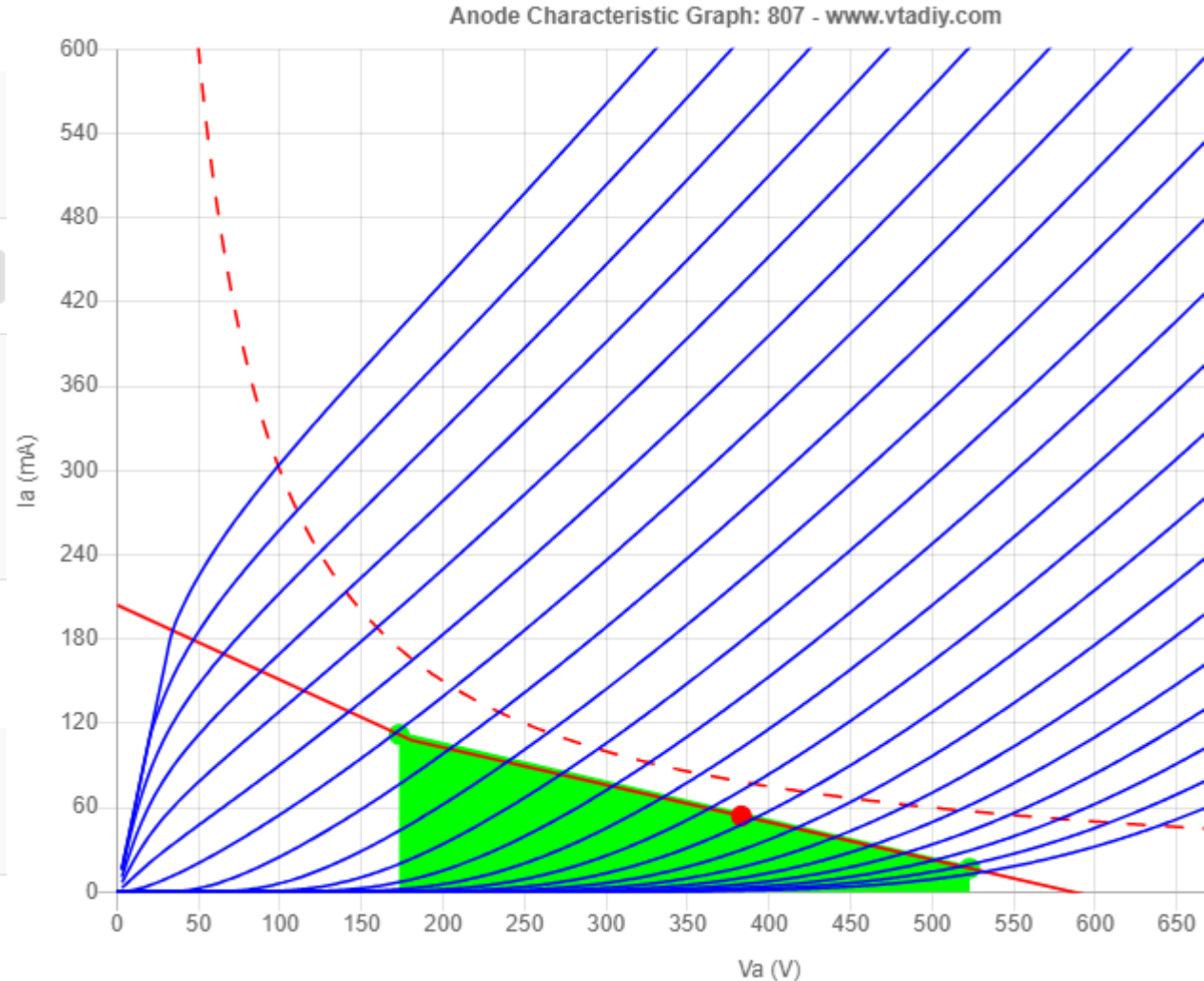
Load (Ohm): ☐ Resistive ☒ Reactive

Next stage AC Impedance (Ohm):  HD%: 2nd:0.00 3rd:0.09 4th:0.00  
THD:0.09

Screen Voltage (V):

UltraLinear tap (%):

Out. headroom (+/-V):



Using the 16 ohm tap with the 12-ohm speakers  
Gives the 10K transformer an actual primary  
Impedance of 7K5. And more amplification!



Select a Tube:   [Check full list of available tubes](#)

Operating mode: ☒ Ultralinear ☐ Pentode ☐ Triode PP/SE: ☒ PP ☐ SE

V+ (V):  Grid Bias Voltage (V):

Quiescent Operating Point:  Iq(mA):  at max g1:32.50  
Vq(V):  at g1=0:26.28  
Output Power (W): at class A/A2:11.76  
at headroom:25.62

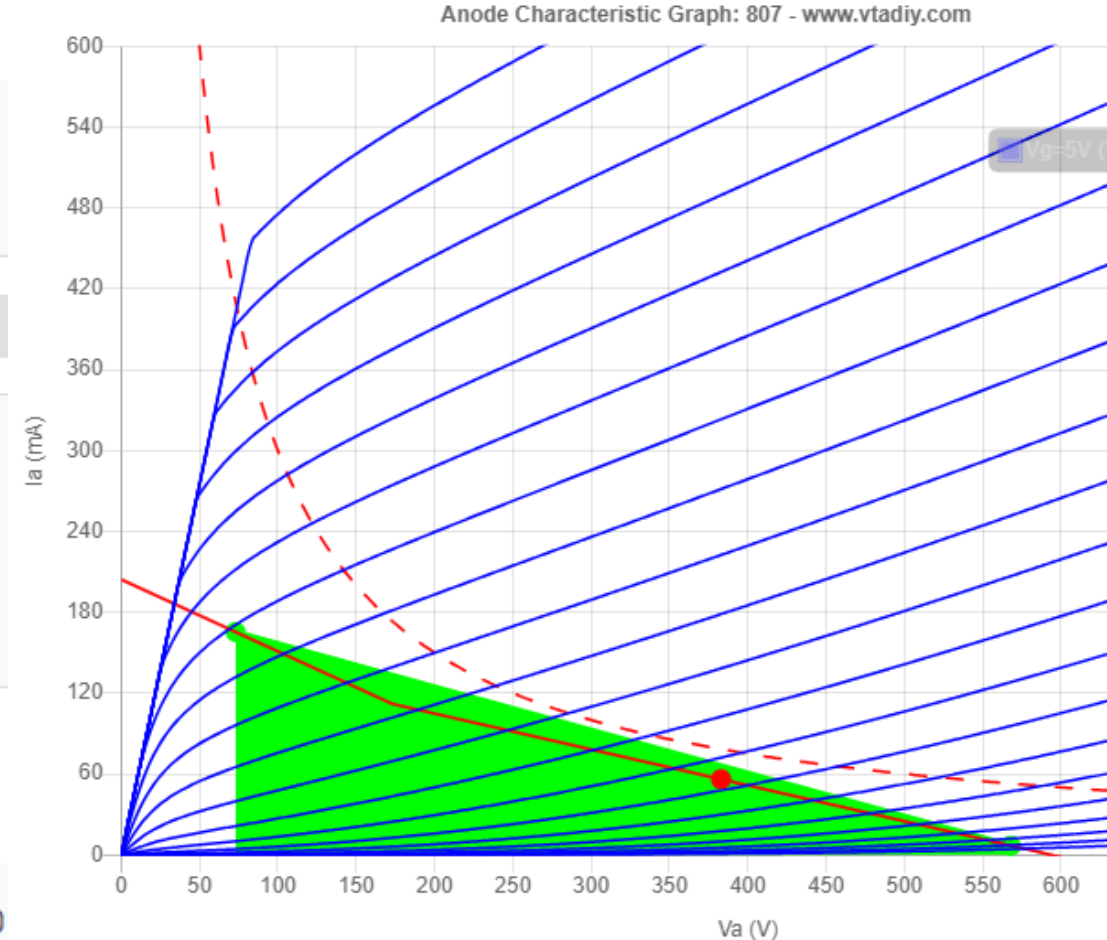
Load (Ohm):  ☐ Resistive ☒ Reactive

Next stage AC Impedance (Ohm):  HD%: 2nd:0.00 3rd:0.40 4th:0.00  
THD:0.40

Screen Voltage (V):

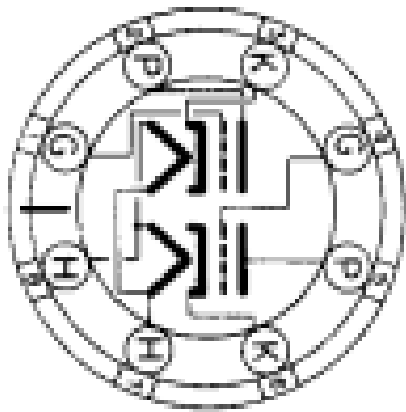
UltraLinear tap (%):

Out. headroom (+/-V):



## Ultralinear Connection

BOTTOM VIEW  
INTERMEDIATE SHELL  
OCTAL 8 PIN BASE



Negative Bias Supply

