

Difference between a voltage amplifier and power amplifier.

Voltage gain of an amplifier is

$$A_v = \beta \times \frac{R_L}{R_{in}}$$

A voltage amplifier features

(i) A Transistor with high β (> 100)

in the circuit for which base of Transistor must be thin

(ii) Low input resistance R_{in}

(iii) A Large Load Resistance R_L with

collector circuit for which I_c is

kept to be nearly 1 am.

A power amplifier features

(i) A power amplifier is to transfer large power across the load.

(ii) Transistor of large size so as to dissipate heat produced during its operation.

(ii) Transistor of low value of β for which its base must be thick

(iii) Transformer coupling for Impedance matching

[Comparison]

Quantity	Voltage amplifier	Power amplifier
(1) Current gain	High (> 100)	Low (≈ 20 to 50)
Load Resistance	High ($\approx 10^3$ k Ω)	Low ($\approx 20 \Omega$)
Coupling	R-C coupling	Transformer coupling
Input voltage	Low	High
Power output	Low	High
output Impedance	High (≈ 12 k Ω)	Low ($\approx 20 \Omega$)
Collector current (I_c)	Low (0.1 mA)	High (≈ 100 mA)