

Power Supplies 101

Part 1

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Use Case

- What do you want to power?
- Voltage and current requirements
- Variable or fixed?
- Mains powered or Battery powered?

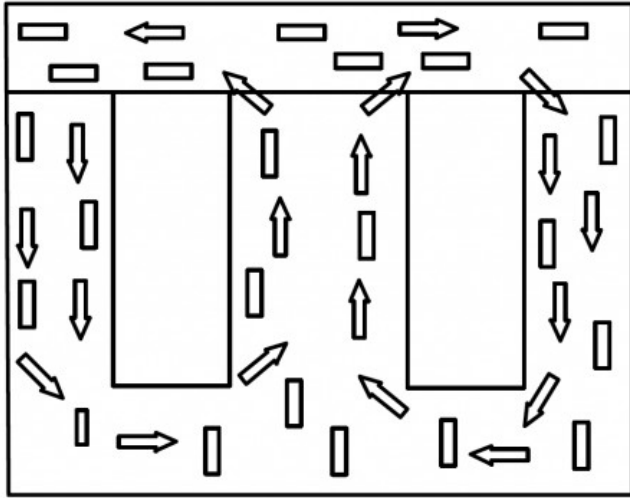
Linear Vs S.M.P.S

- Linear supplies are less efficient
- Switch Mode Power Supplies create “Noise”
- Switch Mode power supplies are much lighter
- Linear supplies are easier to repair (and safer)!

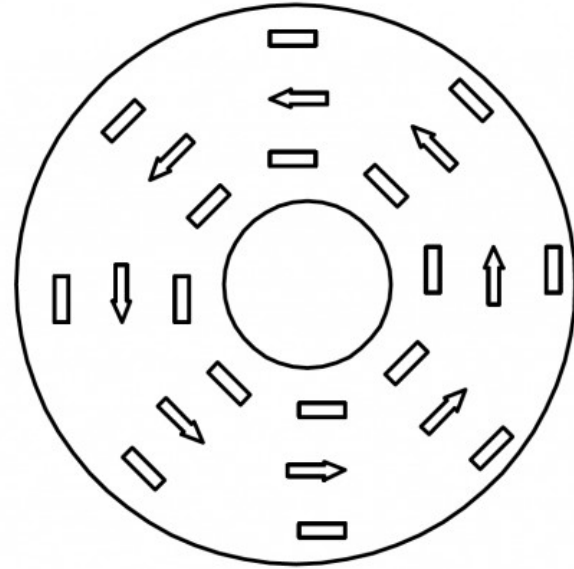
Which Transformer?

- Old skool – E I Transformer Core
- New Age - Toroidal

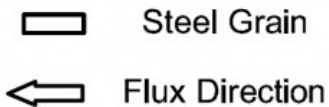
E I Transformer Core



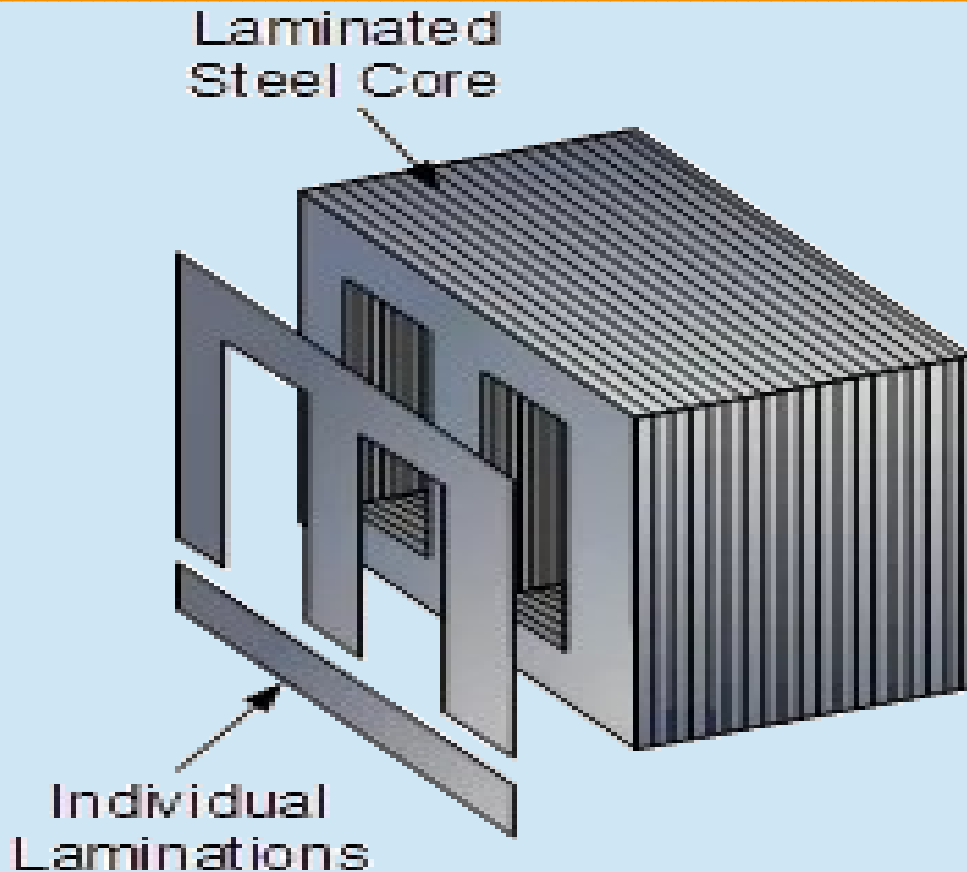
E-I Laminated Flux



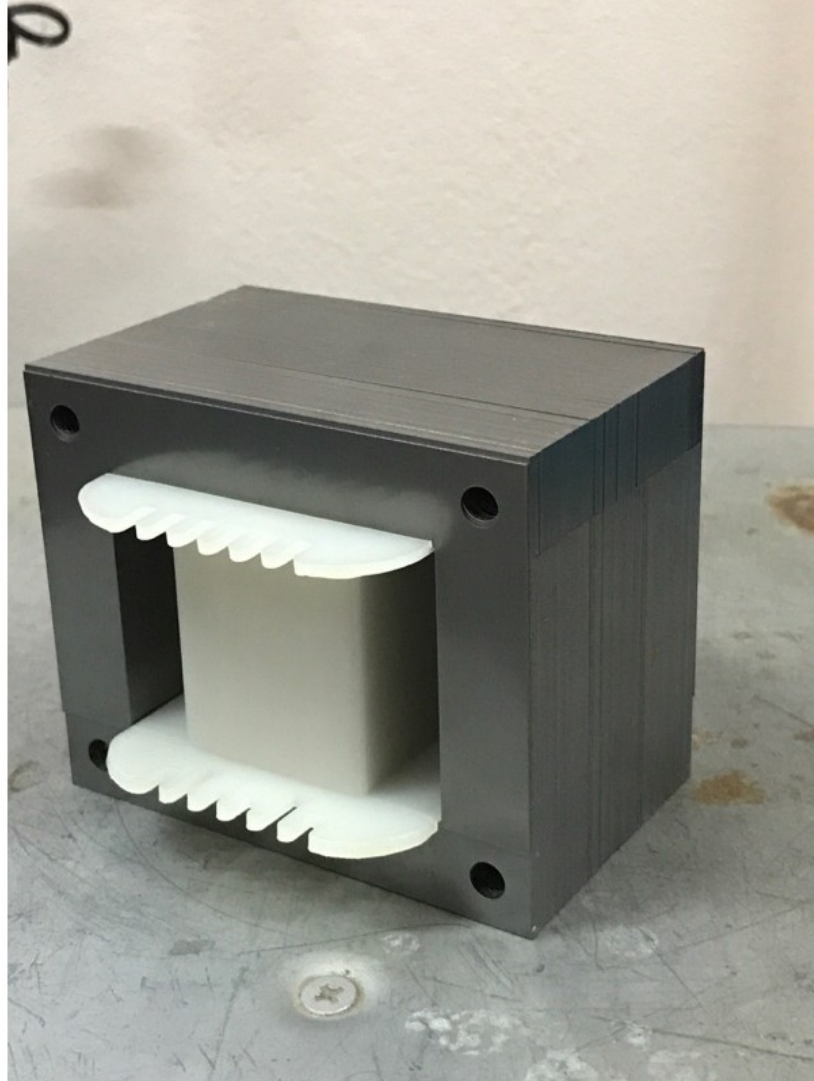
Toroid Flux



E I Transformer Core



E I Bobbin



Toroidal



Use what you have!

- Check old “wallwarts” for Voltage and Current ratings.
- Old laptop charger is good for 19V 5A !
- Salvage from old equipment
- Ebay “Spares or Repairs” can prove very handy.
- Charity shops often hold back broken electronics if you ask nicely and you get to donate something back!

Next :- Bridge Rectification



- We need to rectify the AC voltage at the secondary.
- This gives us something to use at DC
- We often use Full Wave Rectification instead of Half Wave
- Full Wave offers better Bang for Buck

Next :- Bridge Rectification



Standard Recovery Diode, 1 kV, 1 A, Single, 1 V, 30 A - 1N4007-T



Manufacturer:	DIODES INC.
Manufacturer Part No:	1N4007-T
Order Code:	SC14911
Product Range 	1N4007
Technical Datasheet:	 1N4007-T Datasheet

 [Add to compare](#)

[See all Technical Docs](#)

 254 In stock

£0.05 (£0.06 Inc. VAT)

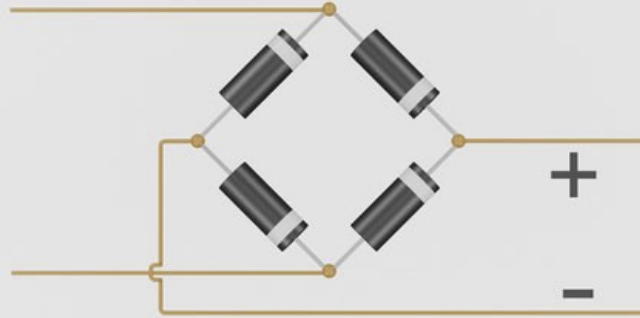
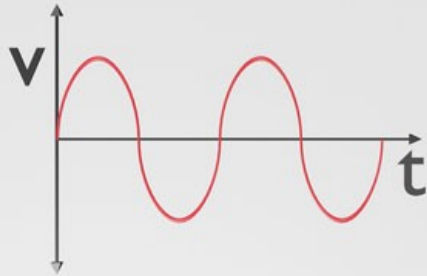
Price for: **Each**

Multiple: **10** Minimum: **10**

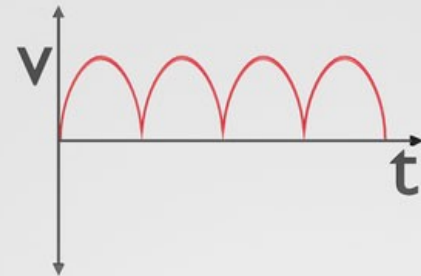
Quantity	Price
10+	£0.05 (£0.06)
100+	£0.03 (£0.04)
1000+	£0.02 (£0.02)

What IS Rectification?

AC
Alternating current



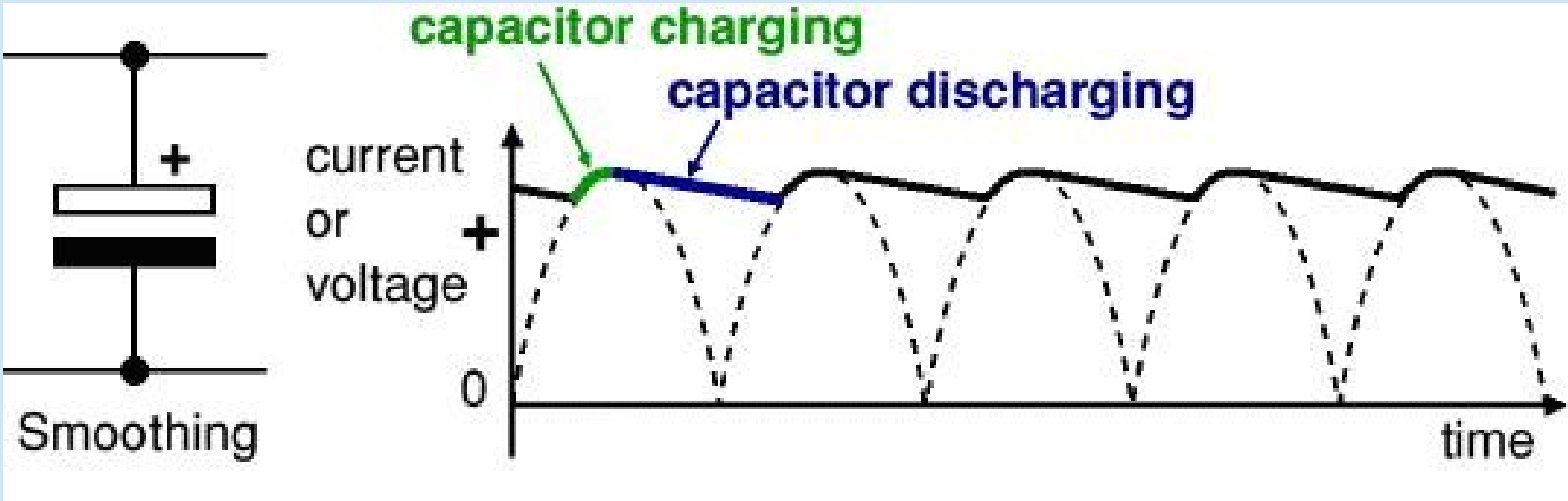
DC
Direct current



Ripple / Smoothing Cap

- A reasonable amount of voltage drop is apparent when the AC changes state from peak to fall.
- We need a Smoothing capacitor to “Smooth” the voltage output. This Capacitor will also be used to remove voltage spikes, Transients and Ripple.
- The better the DC, the less Noise will be in your circuit.

Ripple / Smoothing Cap



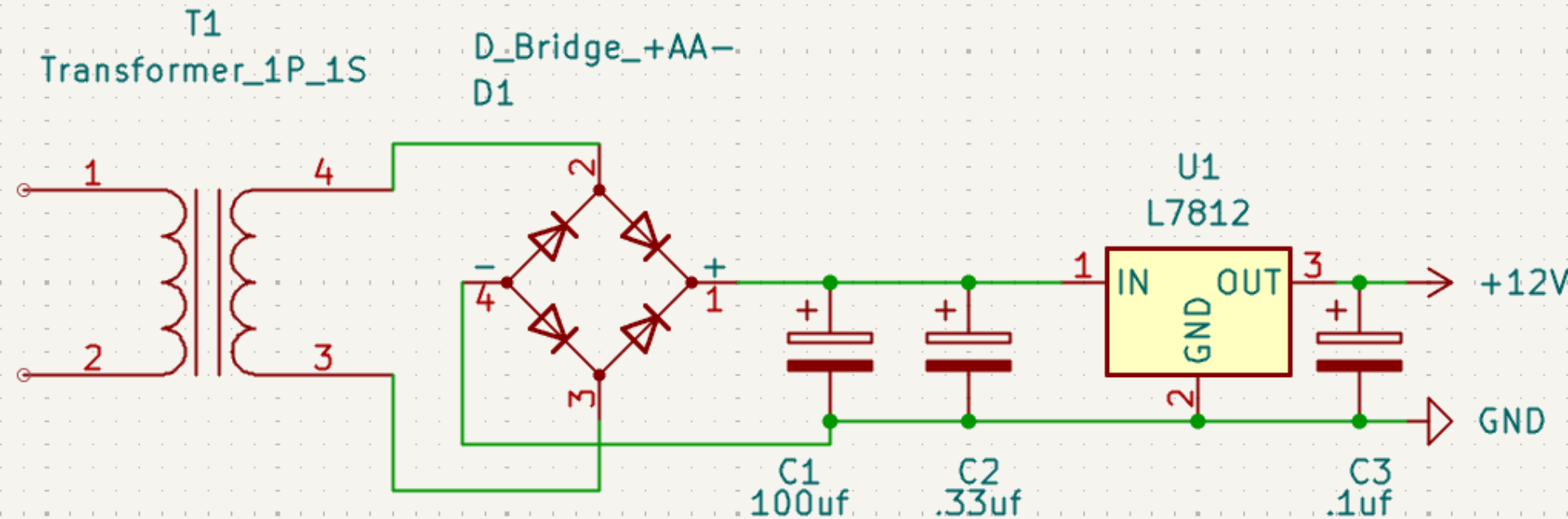
Regulation...

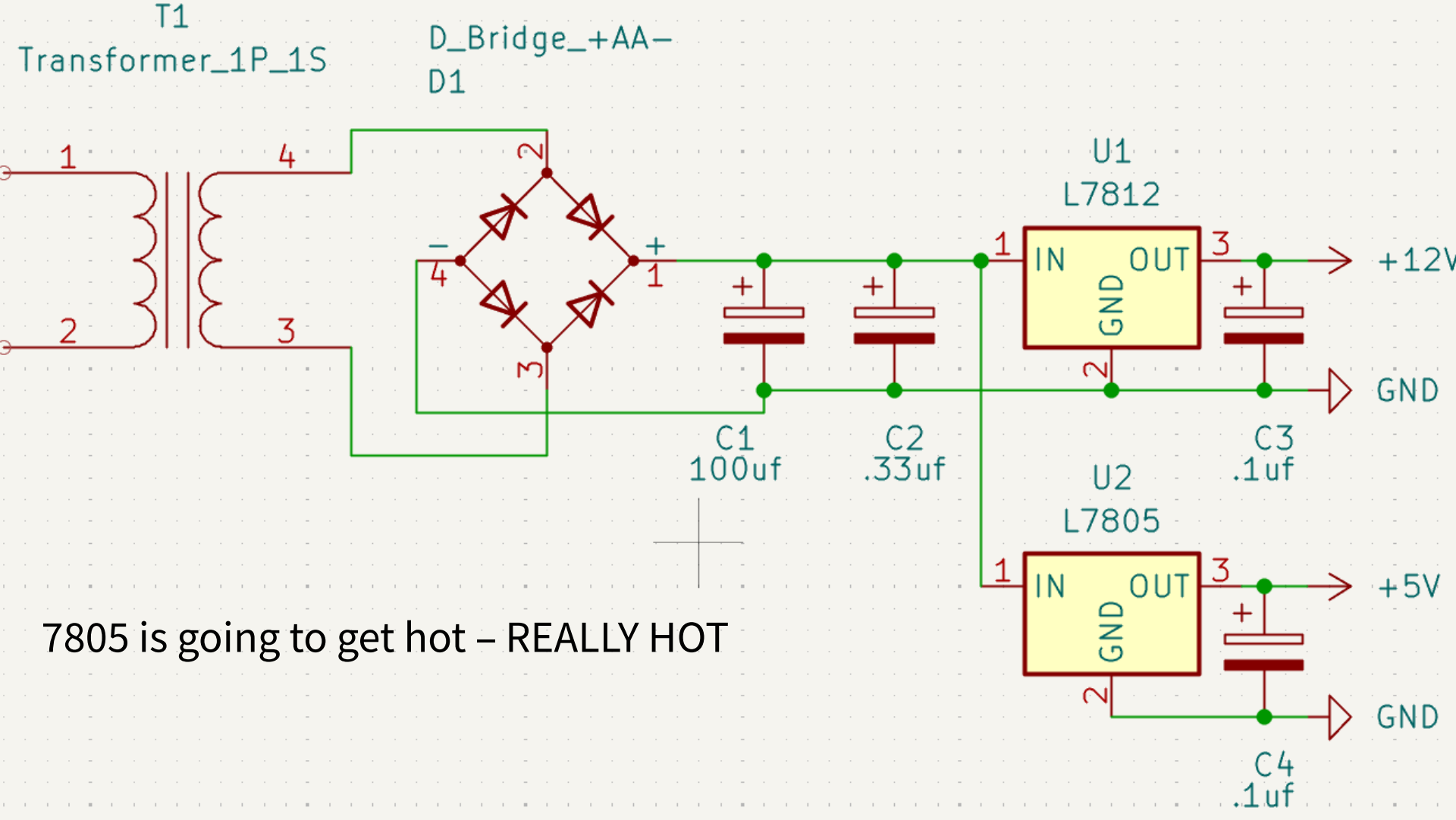
- We now have a good voltage conversion from AC to DC.
- How do we maintain a constant voltage?
- We need a Voltage Regulator

Introducing the 78xx

- The 78xx series of Voltage Regulators are cheap and popular.
- Most hobbyists utilise these for low power applications
- Ideal for single ended supplies
- Also available in 79xx versions too!
- Prefix 78 for Positive.
- Prefix 79 for Negative

The simple 12v 1A supply





7805 is going to get hot – REALLY HOT

