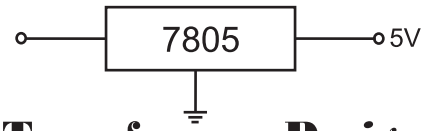
Power Supply Component Design

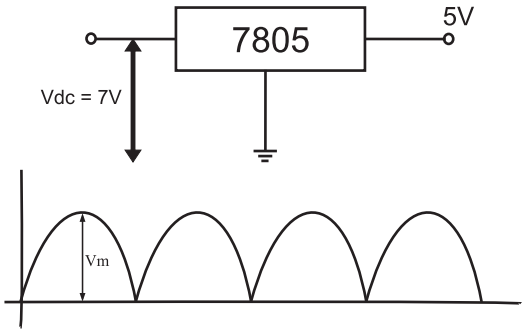


Transformer Design

We require +5V o/p.
The drop-out voltage of regulator is 2V (As per datasheet).

Vdc = 5+2 = 7V

So at the regulator input minimum 7V should be applied.



According to formula,
Vdc= 2Vm / pi.
Assuming there is no Ripple Capacior
From
Vm = Vdc . pi / 2
= 7 x 3.14 / 2
= 10.99V

Vm = 10.99V

During one cycle, two diode are conducting.

Drop of volatge of one diode = 0.7V

Drop of volatge of two diode = 1.4V

Vim = Vm + 1.4V

Vim = 10.99 + 1.4 = 12.39V

Vim = 12.39V

Vrms = Vim / Sqrt (2)
=12.39 / Sqrt (2)
= 8.76V

Vrms = 8.76V

So we select transformer of 9V

Similarly Im = Idc x pi / 2.
Im = 400m x 3.14 / 2
= 628mA

Irms = Im / Sqrt (2)
= 628m / Sqrt (2)
= 444.06 mA

Irms = 444.06mA

So we select transformer with current rating of 500mA.

Considering voltage and current transformer we take **0-9V / 500mAmp**

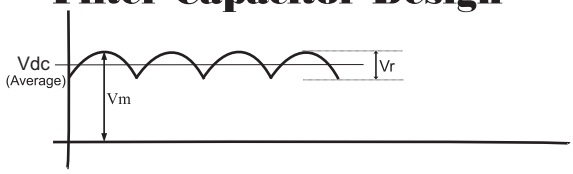
Transformer - 0-9V / 500mA Step down transformer

Rectifier Design

PIV of diode = Vm = 12.39 V

Im = 628 mAmp
So we select bridge IC of 1 Ampere rating.

Filter Capacitor Design



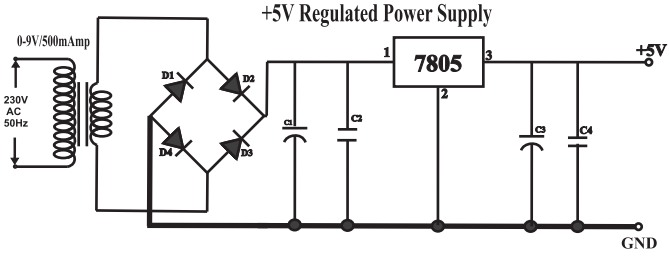
R = Vdc / Idc
= 7 / 400m
= 17.5 Ohms

Vr = 2 (Vim - Vdc)
= 2(12.39 - 7)
= 10.78V

C = Vdc / (FxRxVr)
= 7 / (100x17.5x10.78)
=371.05uF

So for safe working we select capacitor 0f 1000uF

C = 1000uF / 35V



C1 - 1000uF/35V - Electrolytic Capacitor
C2,C4 - 0.1uF Ceramic Capacitor
C3 - 220uF/25V Electrolytic Capacitor