# Calculation

- Input Voltage - 0.2 to 0.5 volt, That is peak to peak Voltage.

- NE555 set as astable mode for 100 kHz freqn.

$$C = 1nf$$
$$R_1 = 2.2 k\Omega$$
$$R_2 = 5 k\Omega$$

- Because $T = 0.7 (R_1 + 2R_2) \times C$

  Need $f = 100 kHz$ ∴ $T = 10^{-5} sec$

- For Intigrator

  $$Gain = \frac{1}{j2\pi f. R_1.cf}$$

  Gain = 1 hence,
  $$R_1.Cf = 1.59 \times 10^{-5} s$$
  $$R_1 = 10 k\Omega$$
  $$Cf = 1.2 nf.$$

- For MOSFET Need
  - $V_{gs} > V_{th}$ Need.

  For that → $V_{gs} = V_{gate} - V_{source}$

  For <u>high side</u> N-MOSFET
  $$V_{source} = output = 0 \text{ to } 12 \text{ volt}$$

  For that high side N-MOSFET Need to $V_{gs}$ Voltage higher than 12 Volt.
  That's why we added Bootstrap Circuit.

Make gate Voltage Greater than 12v.

Add Bootstrap.

- Low pass filter -

  $F_{pwm} = 100kHz$    But After low pass filter

  we get $f_c = 30kHz$ , $R_L = 8\Omega$

  then    $L = \dfrac{R_L}{2\pi f_c}$

  $L = 42 \cdot 44 \mu H$             $L \cong 47 \mu H$

  $\oint$

  $C = \dfrac{1}{2\pi f_c R_L}$

  $C = 2 \cdot 2 \mu F$

  Hence we get   5(Watt)  output.