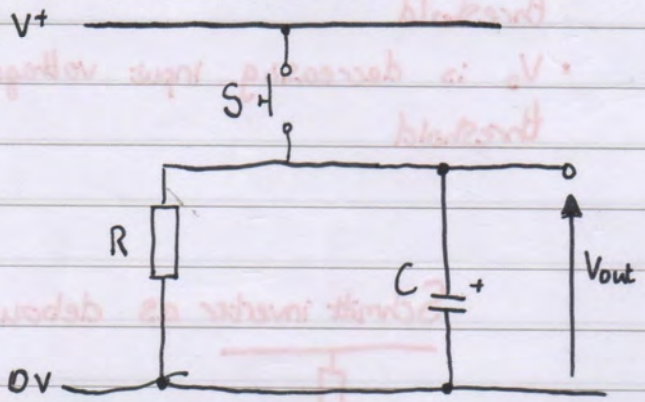
www.cwthompson.com

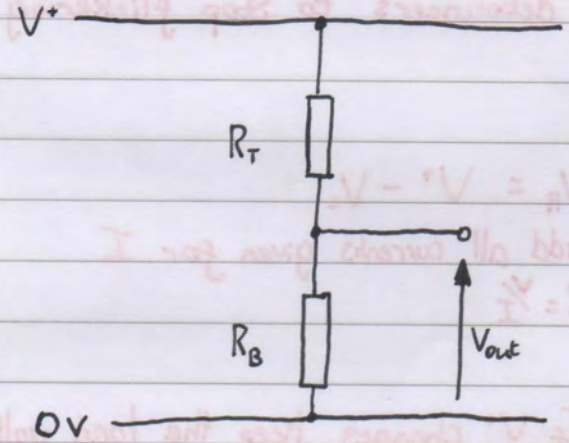
ET2 Questions



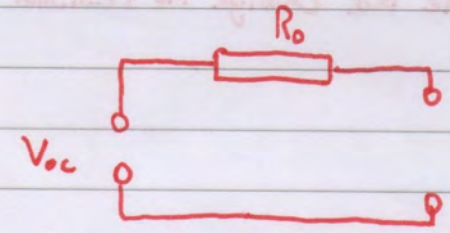
- If charging, 0.63 V+ gives RC
- If discharging, 0.37 V+ gives RC
- V+ reaches 0V at approximately 5RC

K	$\times 10^3$	m	$\times 10^{-3}$
M	$\times 10^6$	μ	$\times 10^{-6}$
G	$\times 10^9$	n	$\times 10^{-9}$

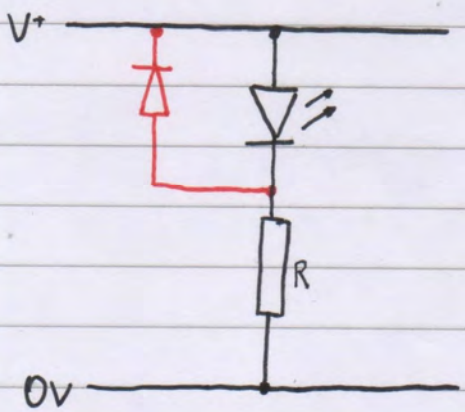
- The time constant is equal to RC
- 0.69 RC / gives $\frac{1}{2}$ V+



- $I = \frac{V^+}{R_T + R_B}$
- $V_{oc} = I \times R_B$
- $I_{sc} = V^+ / R_T$
- $R_o = V_{oc} / I_{sc}$

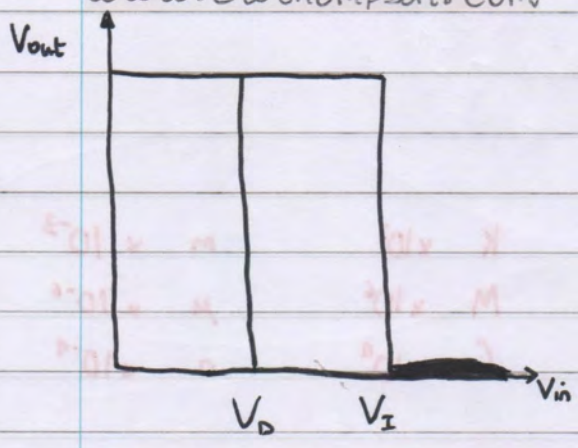


- You will usually need to draw the Thevenin equivalent



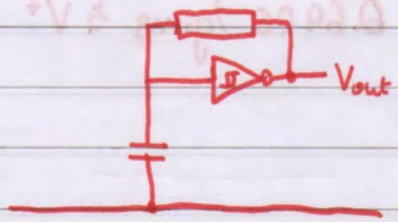
- This always assumes 2V used across LED
- $R = \frac{V^+ - 2}{I}$
- Diode (in red) protects from reverse polarity of AC supply
- $\frac{1}{2}$ R is resistance for AC circuit

www.cwthompson.com

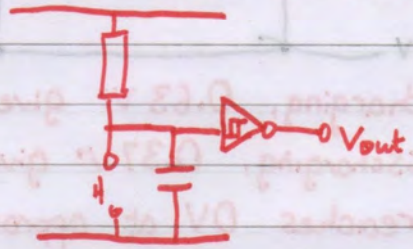


- V_I is increasing input voltage threshold
- V_D is decreasing input voltage threshold

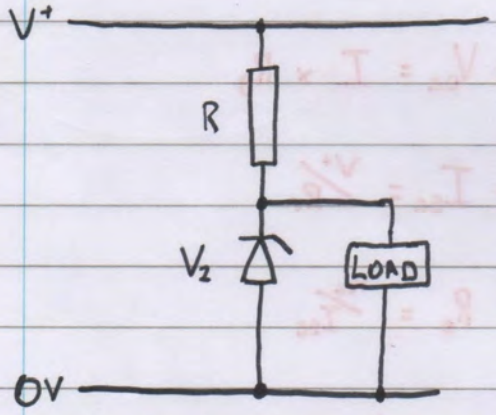
Schmitt inverter as astable



Schmitt inverter as debouncer



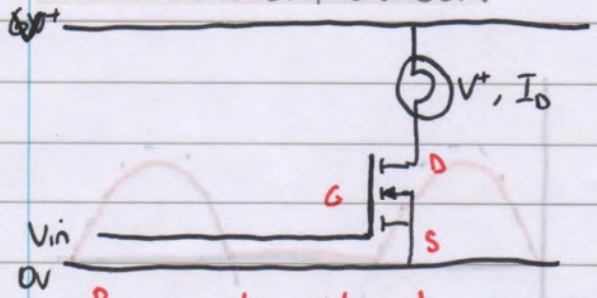
- Schmitt inverters can be used as debouncers to stop flickering



- $V_R = V^+ - V_z$
- Add all currents given for I
- $R = V/I$

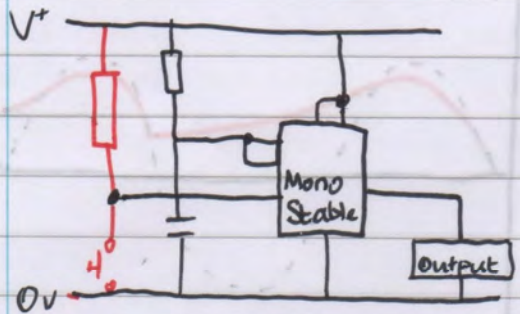
- If V^+ changes, keep the load voltage the same but change the resistor voltage

www.cwthompson.com

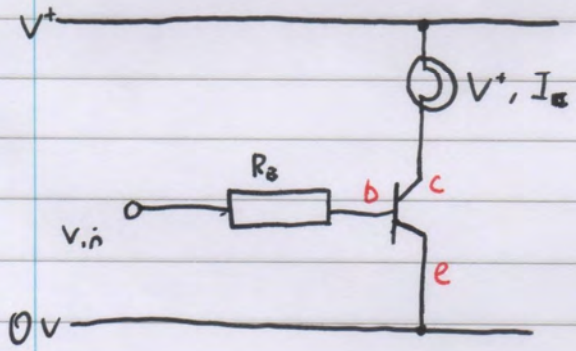


- V_{GS} is input voltage
- V_{GS} or G_m will be given to you
- $I_D = V_{GS}\ G_m$

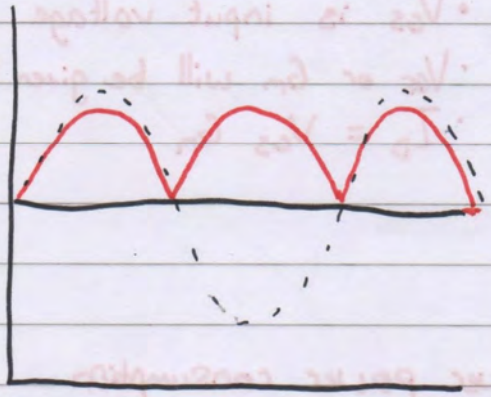
- R_{DS} is the internal resistance
- Power = $I_D \times R_{DS}$
- MOSFETs need a low r_{DS} for lower power consumption
- Estimate gate current will be 0A



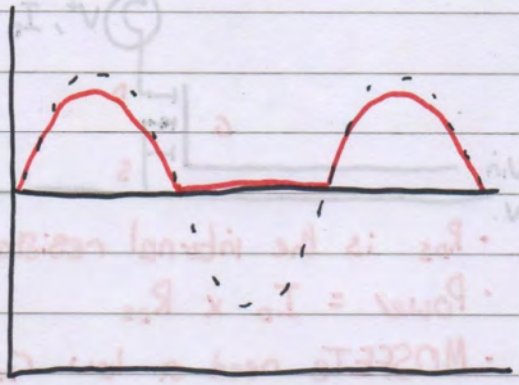
- To make the 555 negative-edge triggered, add resistor on top and switch on bottom
- Resistor on top and capacitor on bottom for capacitance.
- T = 1.1 RC



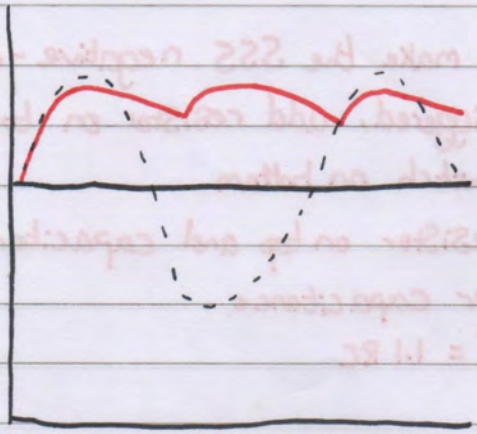
- $I_C = I_B\ h_{fe}$
- $R_B = \frac{V_{in} - 0.7}{I_B}$
- Power = $I_C \times V_{out}$



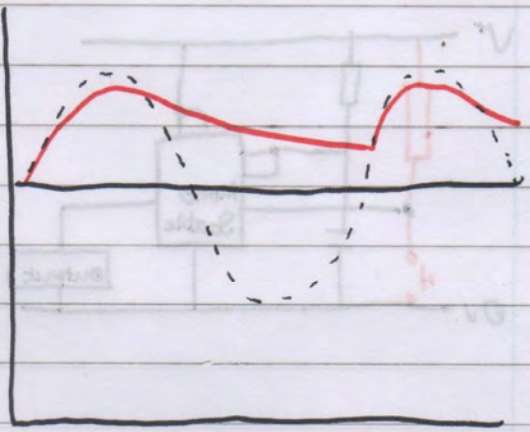
Unsmoothed Full-Wave



Unsmoothed Half-Wave



Smoothed Full-Wave



Smoothed Full-Wave