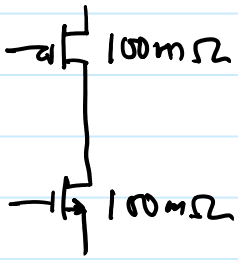
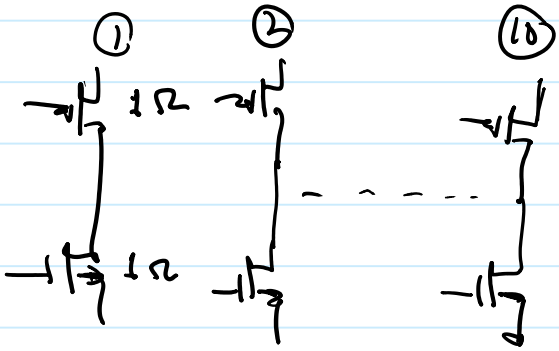
Segmented Power FETs

$P_{sw\_loss\_gate} = CV^2f$

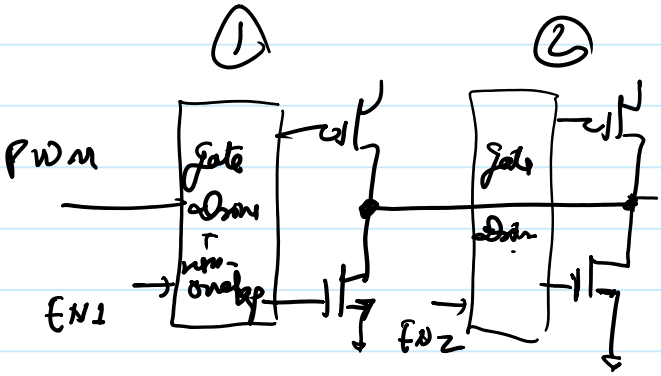
in PFM we reduce F_{sw} to get high η



segmented FET

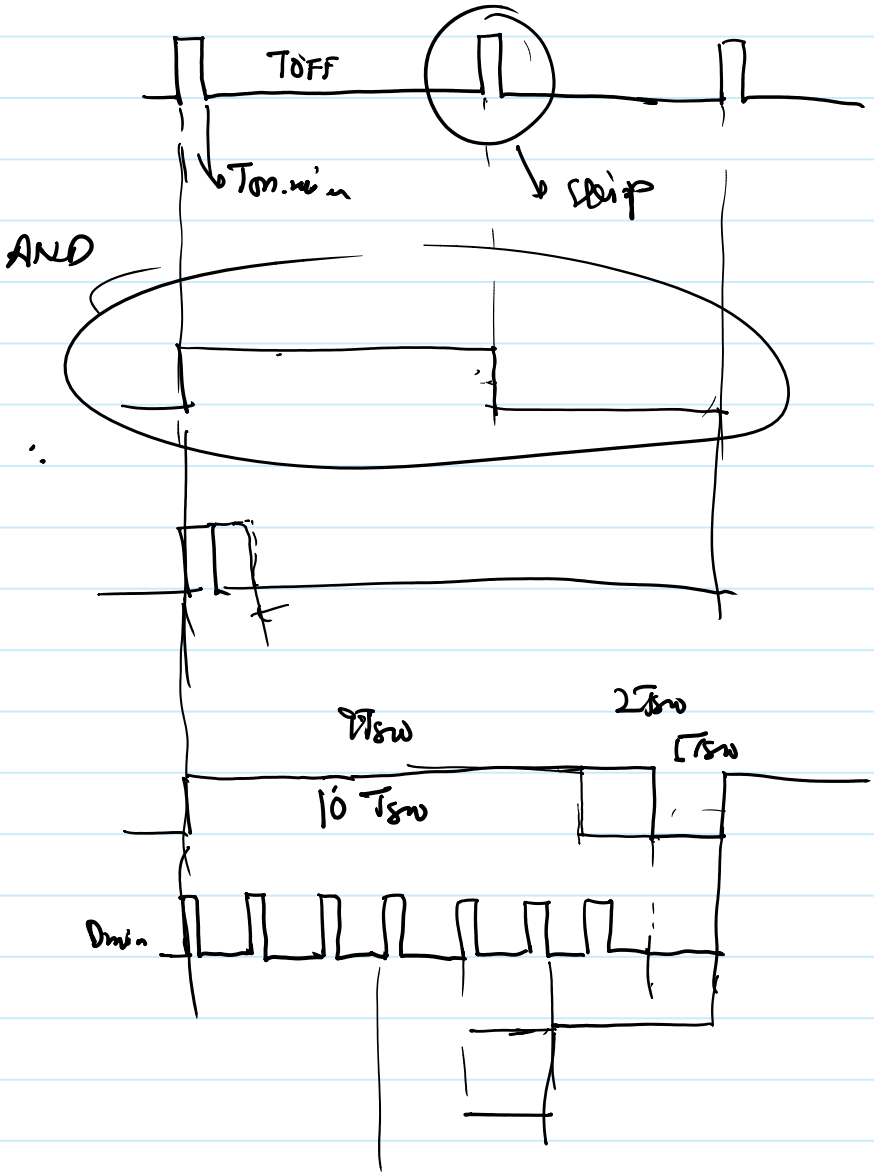


N → depend upon Iload

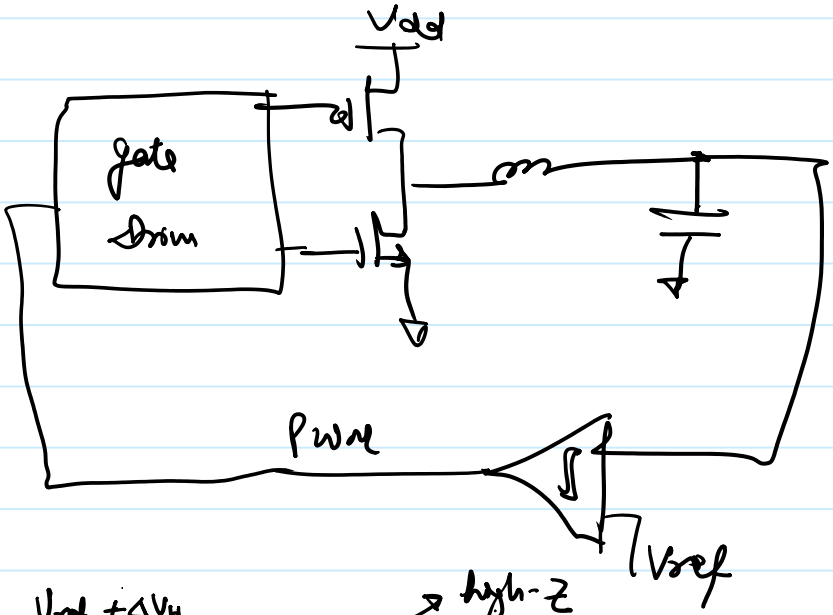


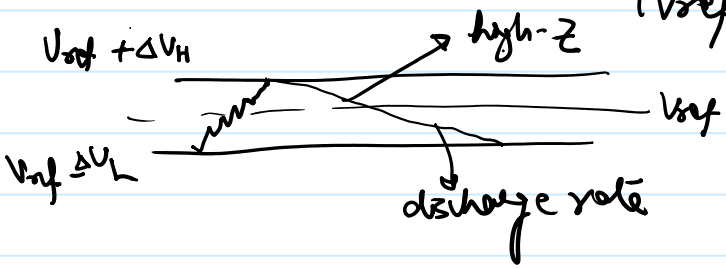
PSM and PFM Mode

PSM → Pulse Skip Mode



PFM Mode



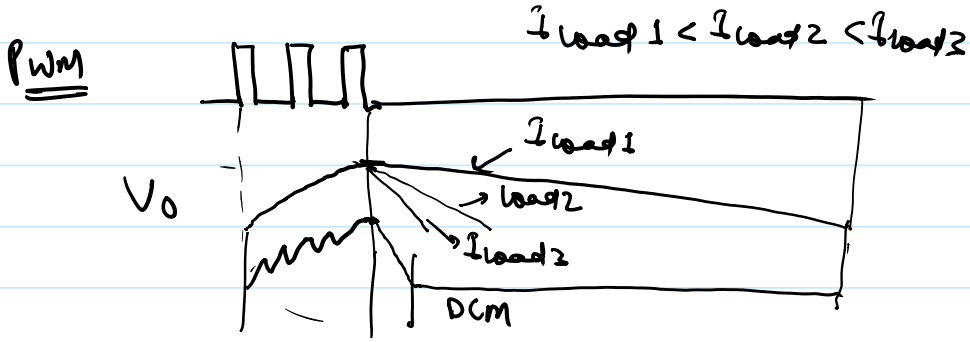


$$I = C\frac{dV}{dt} \rightarrow \Delta V_H \qquad C = C_0$$

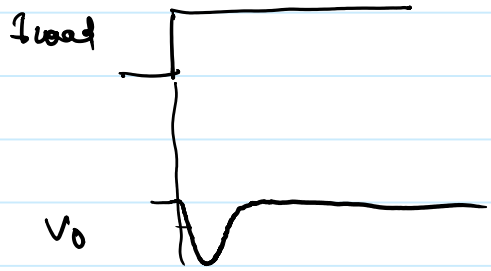
$$I = I_{load}$$

$$dt = \frac{C_0 \times \Delta V_H}{I_{load}}$$

$\propto T_{sw}$

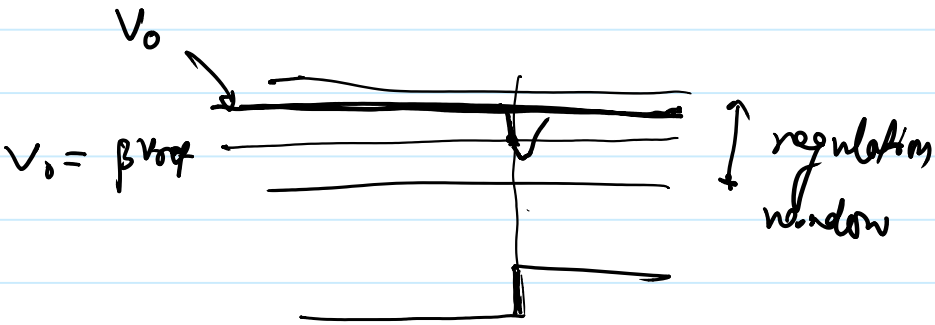


Exiting PFM Mode



(1) V_o is regulated at slightly higher voltage (droop compensation). Exit PFM mode and enter PWM mode if $V_o < \beta V_{ref}$.
or $V_{FB} < V_{REF}$

In PFM, regulate V_o at $V_o + \Delta V$



(2) Output of zero cross comparator (ZXD) can also be used to exit PFM mode as converter will operate in CCM in case of high load.