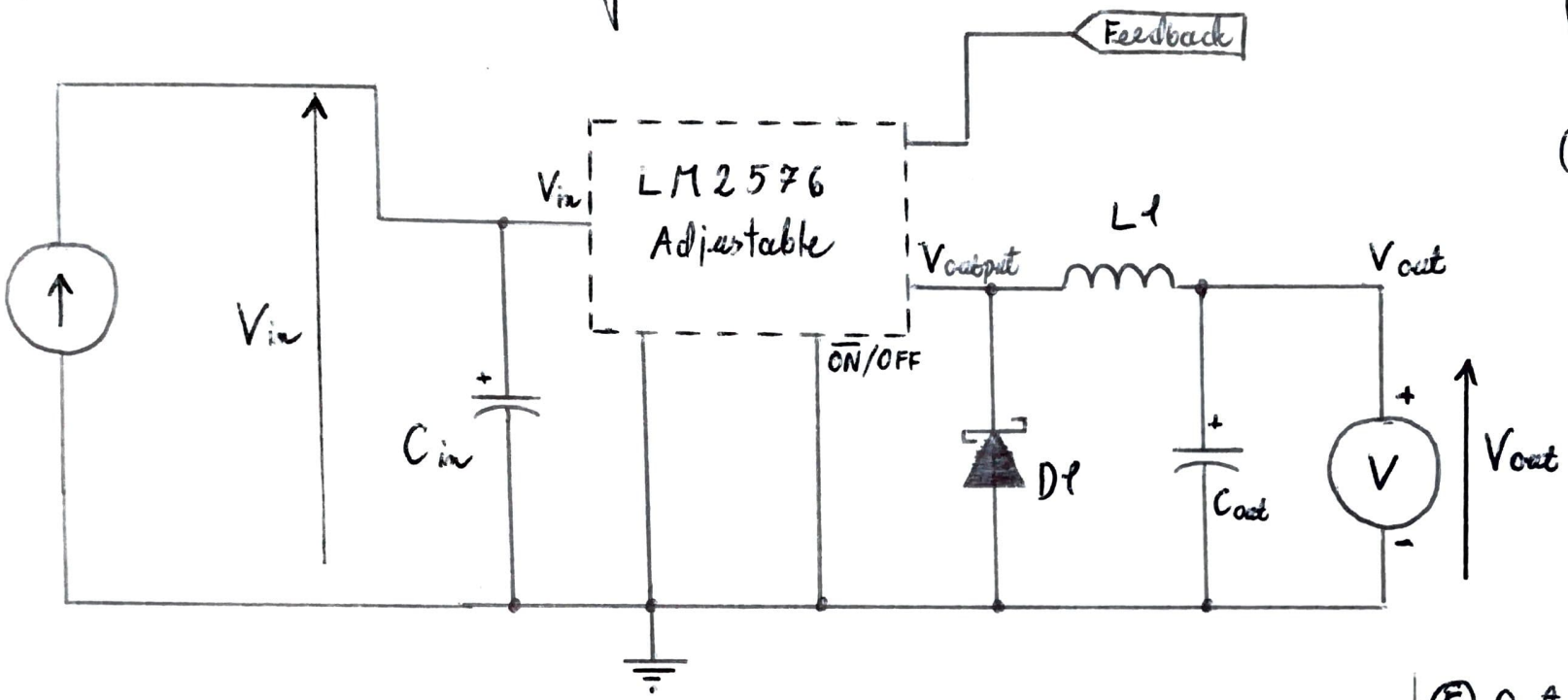
Buck converter design



(1) $d = \frac{V_{out}}{V_{in}}$ $V_{out} = V_{bat}$

(2) $V_{in} = \frac{V_{out}}{d}$

$$V_{in}(d) = \frac{V_{bat}}{d}$$

$V_{out} = 12.0 - 15.0\ V$
$V_{in(max)} = 19.0\ V$
$I_{load(max)} = 0.8\ A$
} Given parameters

① Feedback voltage

$V_{feed} = V_e + 1.23\ V$ V_e - expected volt.

② Input capacitor

e.g. $C_{in} = 100\ \mu F$ (150 V) aluminium electrolitic Low ESR

③ Catch diode (D1)

$I_{D1} > 1\ A$ $V_{D1} > 25\ V$

Schottky diode

④ Inductor (L1)

$$E \times T = (V_{in} - V_{out}) \frac{V_{out}}{V_{in}} \times \frac{10^6}{F[Hz]} [V \times \mu s]$$

$E \times T = 85\ [V \times \mu s]$ (18 - 90 $V \times \mu s$)

L -> H330

$L = 330\ \mu H$ (> 1A)

⑤ Output capacitor (C_{out})

$$C_{out} \geq 13300 \cdot \frac{V_{in\,max}}{V_{out} \cdot L[\mu H]} [\mu F]$$

$C_{out} \geq 65\ \mu F$

e.g. $C_{out} = 330\ \mu F$ (100 V)