Setting output voltage:

$$\frac{R_1}{R_2} = \frac{V_{OUT}}{V_{REF}} - 1$$

$V_{REF} = 800\ mV$ from datasheet

$V_{OUT} = 4\ V$

$$\frac{R_1}{R_2} = \frac{4}{0.8} - 1 = 4$$

Maximum recommended value for $R_2 = 400\ k\Omega$

$\therefore$ Take $R_2 = 300\ k\Omega \Rightarrow R_1 = 1.2\ M\Omega$

Inductor selection:

$$I_{L(DC)} = \frac{V_{OUT} \times I_{OUT}}{V_{IN} \times \eta}$$

$I_{OUT} = 600\ mA$

$V_{IN} = 0.8\ V$ – for the worst case scenario

$\eta = 0.9$

$$\therefore I_{L(DC)} = \frac{4 \times 0.6}{0.8 \times 0.9} = 3.33\ A$$

$$I_{L(P-P)} = \frac{V_{IN} \times D}{L \times f_{SW}}$$

For the worst value: $V_{IN} = 1.3\ V$

$$\therefore D = 1 - \frac{V_{IN} \times \eta}{V_{OUT}} = 1 - \frac{1.3 \times 0.9}{4} = 0.7075$$

$f_{SW} = 1\ MHz$ as $V_{IN} < 1.5\ V$ from datasheet

$$\therefore I_{L(P-P)} = \frac{1.3 \times 0.7075}{L \times 10^6}$$

$I_{L(P-P)} < 0.4 \times I_{L(DC)}$ from datasheet

$$\therefore L_{MIN} = \frac{1.3 \times 0.7075}{0.4 \times 3.33 \times 10^6} = 0.69\ \mu H$$

From Table 2 (suggested inductors): XFL4020-102ME: $\underline{L = 1\ \mu H}$

Capacitors:

$V_{RIP\_MAX} = 20\ mV$

$$\therefore C_{2\_MIN} = \frac{I_{OUT} \times D}{f_{SW} \times V_{RIP\_MAX}} = \frac{0.6 \times 0.7075}{10^6 \times 0.02} = 21\ \mu F$$

$\therefore$ Take $C_2 = 100\ \mu F$

$$C_3 = \frac{1}{2\pi \times f_{FFZ} \times R_1}$$

$f_{FFZ} = 5\ kHz$ as $C_2 > 40\ \mu F$

$$\therefore C_3 = \frac{1}{2\pi \times 5 \times 10^3 \times 1.2 \times 10^6} = 26.5\ pF\ \approx 22pF$$

$C_1 = 10\ \mu F$ – from datasheet