

$$\frac{V_{out}(s)}{V_{in}(s)} = \frac{V_{out}}{V_{in}} \frac{\left(1 + \frac{s}{\omega_{z1}}\right)}{\left(1 + \frac{s}{\omega_{p1}}\right)} \quad (2A-4)$$

$$K_1 = \frac{2(1-M)}{2-M} \sqrt{\frac{1-M}{K}} \quad \text{with } K = \frac{2L}{RT_{sw}}$$

$$\omega_{z1} = \frac{1}{r_{cf}C}$$

$$\omega_{p1} = \frac{2-M}{1-M} \frac{1}{RC}$$

Current-mode, CCM:

Reference 1 equations:

(2A-1)

$$\frac{V_{out}(s)}{V_{err}(s)} \approx \frac{R}{R_i} \frac{\left(1 + \frac{s}{\omega_{z1}}\right)}{\left(1 + \frac{s}{\omega_{p1}}\right)} \frac{1}{1 + \frac{s \left[\left(1 + \frac{S_a}{S_1}\right) D' - 0.5 \right]}{F_{sw}} + \frac{s^2}{(\pi F_{sw})^2}} \quad (2A-5)$$

(2A-2)

$$\frac{V_{out}(s)}{V_{in}(s)} = 0 \quad (2A-6)$$

$$\omega_{z1} = \frac{1}{r_{cf}C}$$

$$\omega_{p1} = \frac{1}{RC}$$

for $S_a = 50\% S_2$.

Reference 2 equations:

$$\frac{V_{out}(s)}{V_{err}(s)} \approx \frac{R}{R_i} \frac{1}{1 + \frac{RT_{sw}}{L} [m_c D' - 0.5]} F_p(s) F_h(s) \quad (2A-7)$$

$$\frac{V_{out}(s)}{V_{in}(s)} \approx \frac{D \left[m_c D' - \left(1 - \frac{D}{2}\right) \right]}{\frac{L}{RT_{sw}} + [m_c D' - 0.5]} F_p(s) F_h(s) \quad (2A-8)$$

(2A-3)

$$F_p(s) = \frac{1 + \frac{s}{\omega_{z1}}}{1 + \frac{s}{\omega_{p1}}}$$