empty L_1 of i_L

$$\frac{V_0}{L} = \frac{di}{dt}$$

fill L_1 with i_L

$$\frac{V_1 - V_0}{L} = \frac{di}{dt}$$

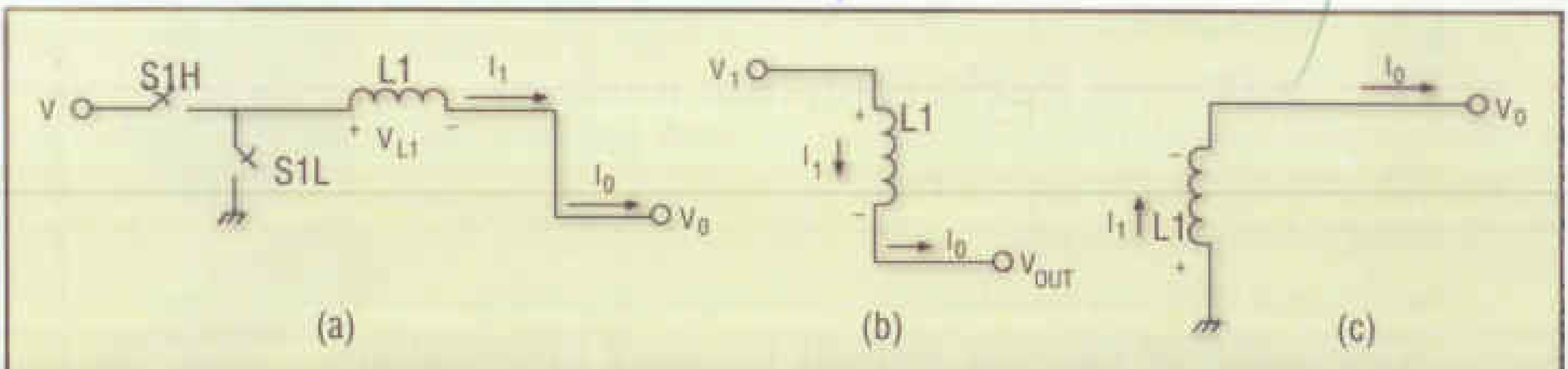


Fig. 1. *A simplified schematic of a single-phase buck regulator (a) illustrates its two states of operation. In state one, S1H is closed and S1L is open, so that the input sources energy to the output and L1 stores energy (b). In state two, S1L is closed and S1H is open, so that L1 sources energy to the load (c).*

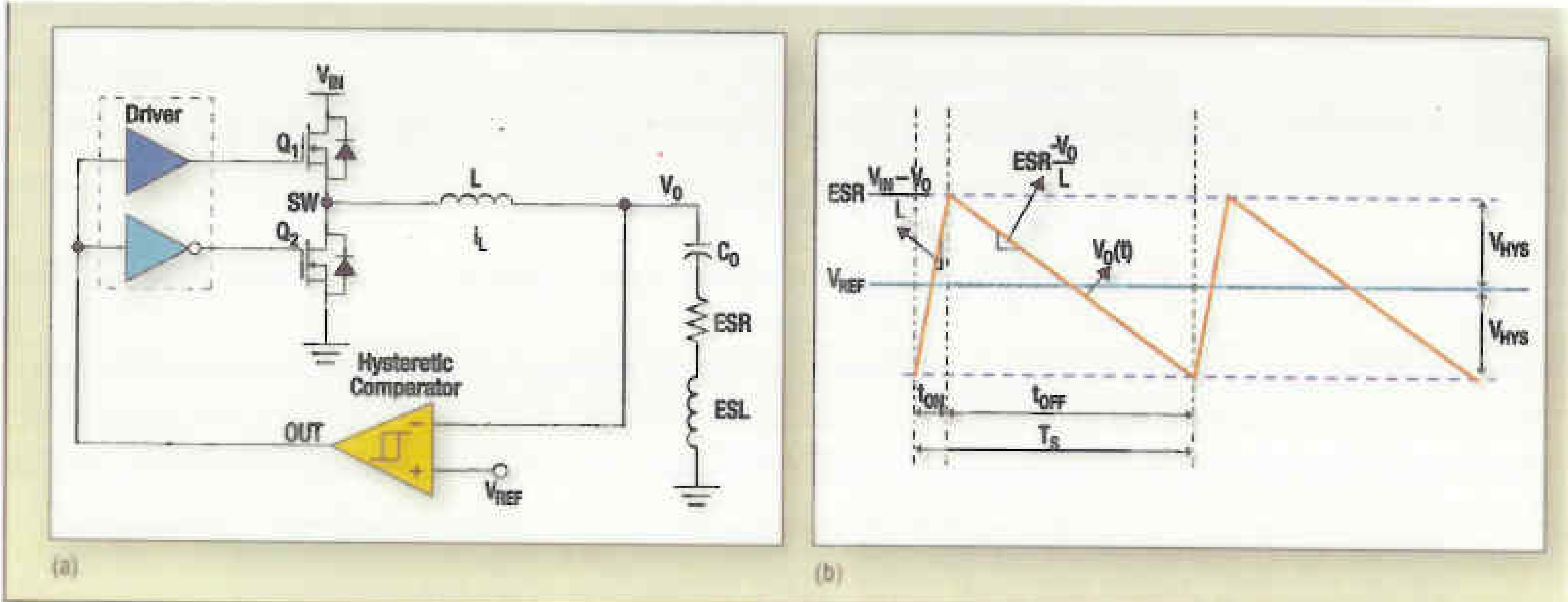


Fig. 1. *A simplified schematic demonstrates operation of the hysteretic voltage-mode voltage regulator (a) with waveforms (b) depicting ideal operation.*

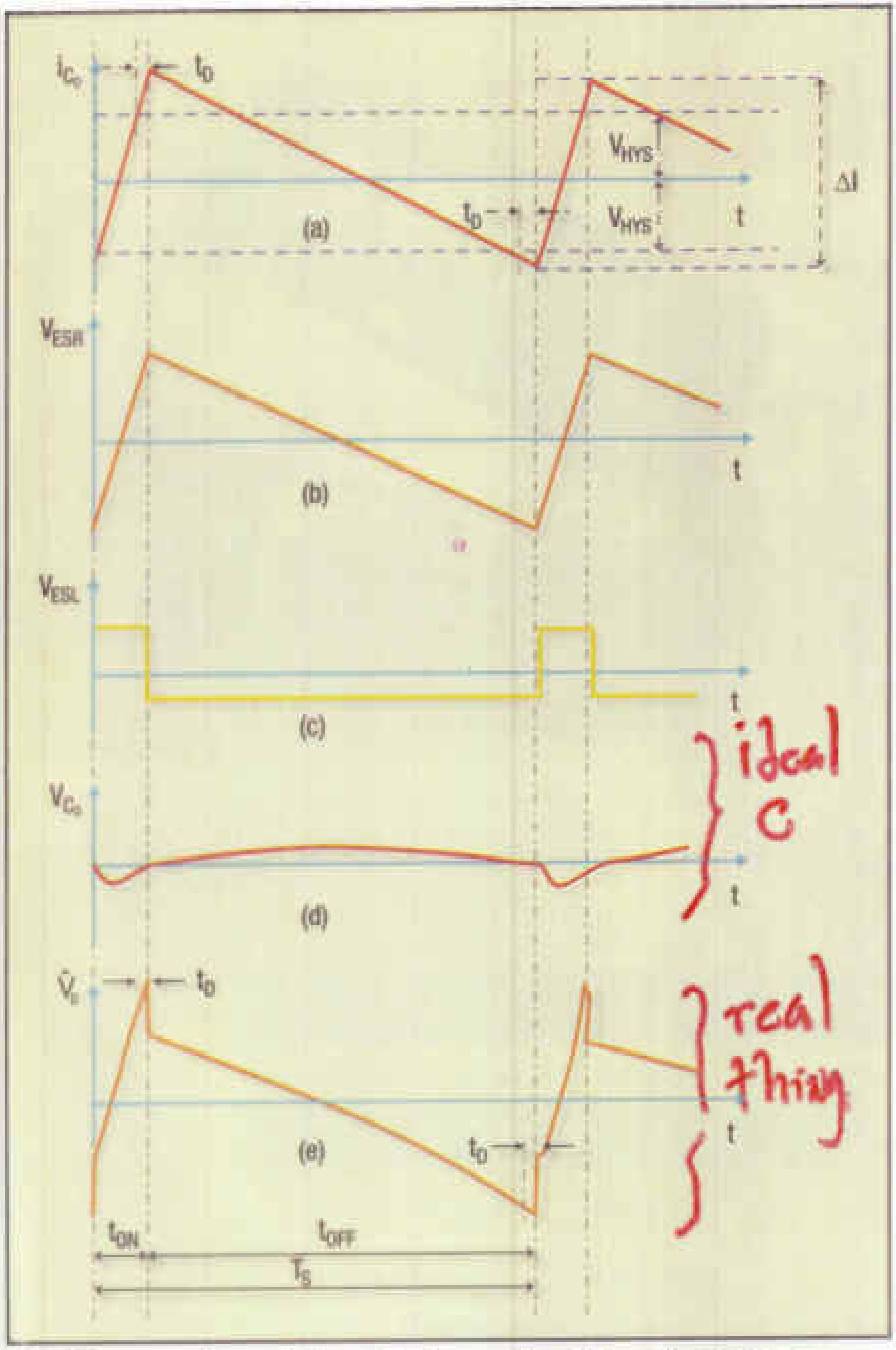
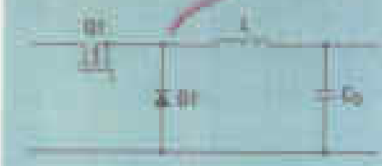


Fig. 2. *A current through the output capacitor (a) produces three separate ripple voltage waveforms—the voltage across the ESR (b), the voltage across the ESL (c) and the voltage across an ideal capacitor with an initial value at the beginning of the high-side Q1 on-time (d). The sum of these three voltages is the composite output voltage ripple (e).*

BUCK



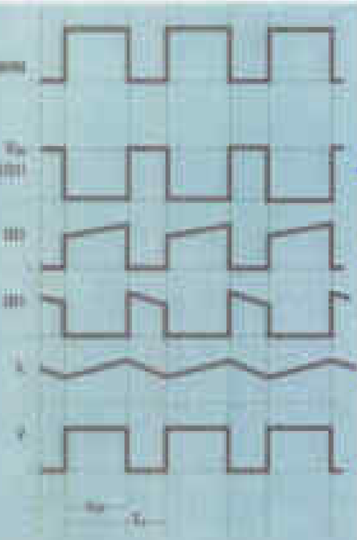
$$\frac{V_{OUT}}{V_{IN}} = \left(\frac{t_{ON}}{T_P}\right) = D$$

$$I_{Q1}\,(max) = I_{OUT}$$

$$VDS = V_{IN}$$

$$I_{D1} = I_{OUT} \times (1-D)$$

$$V_{D1} = V_{IN}$$



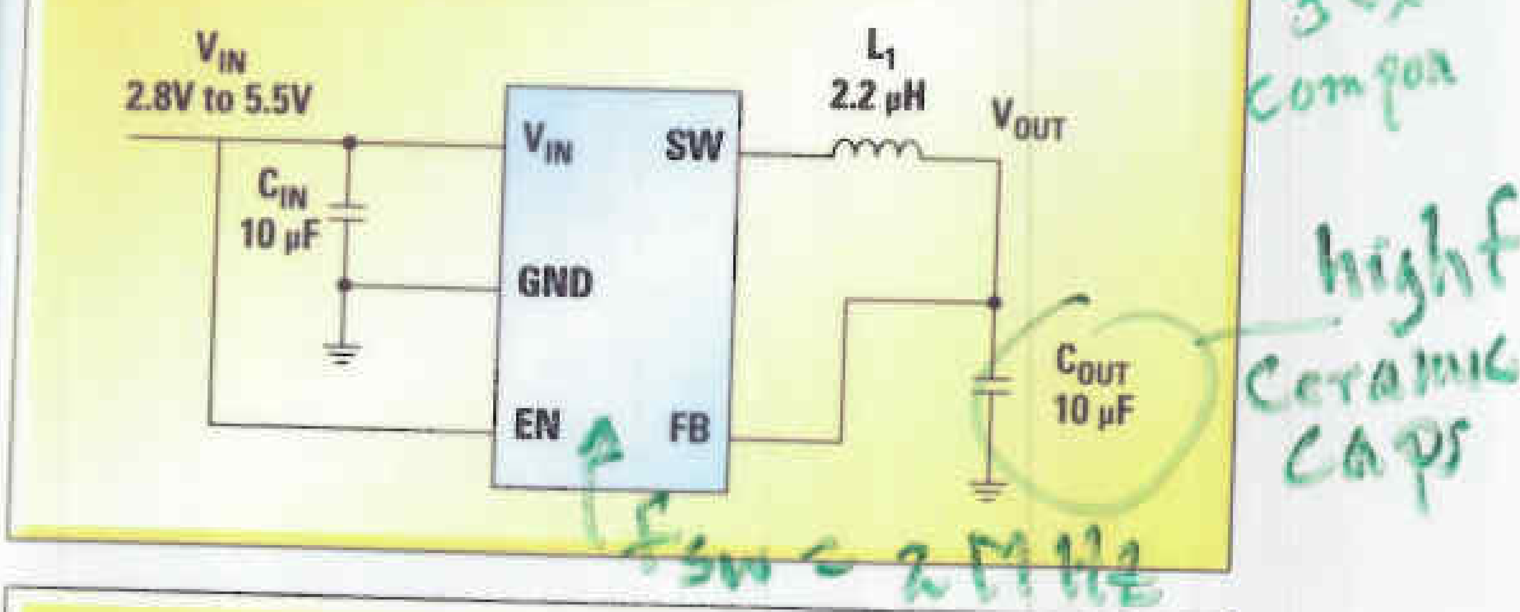
Application Notes

Understanding Buck Power Stages in Switchmode Power Supplies	(SLVA057)
Predictive Gate Drive Boosts Converter Efficiency	(SLUA281)

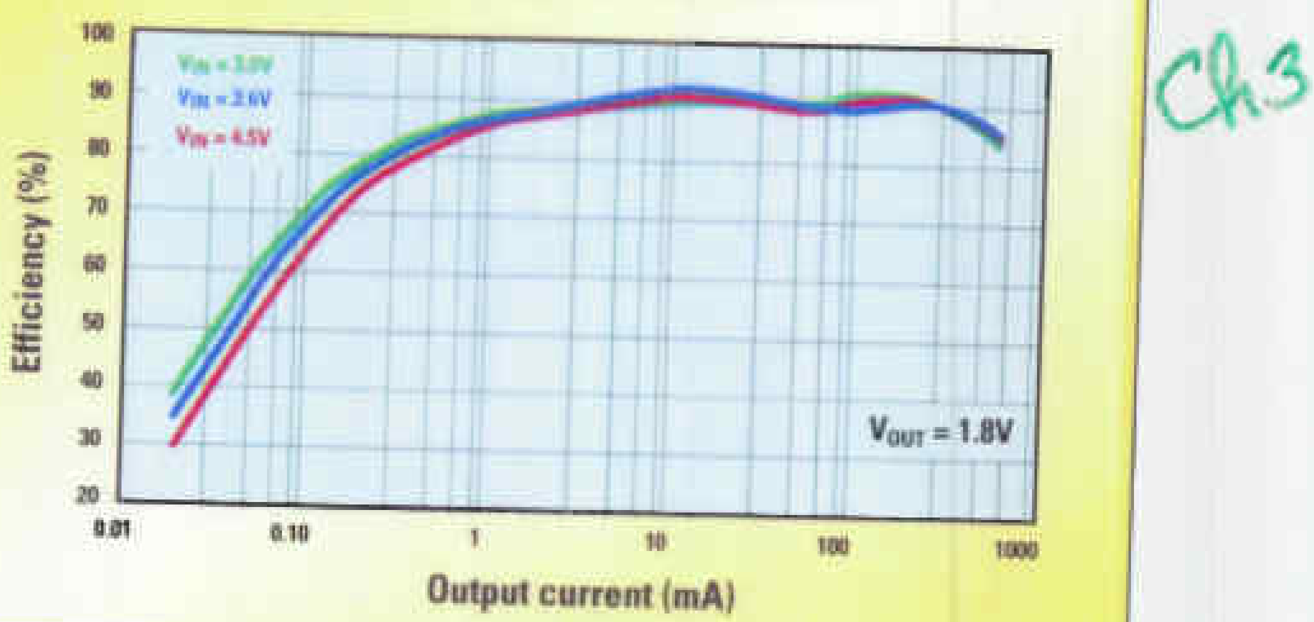
Controllers

TPS40000	TPS40050
TPS62000	TPS62040
TPS54910	TPS54350

LM3671 Typical application circuit



LM3671 Efficiency vs. load current



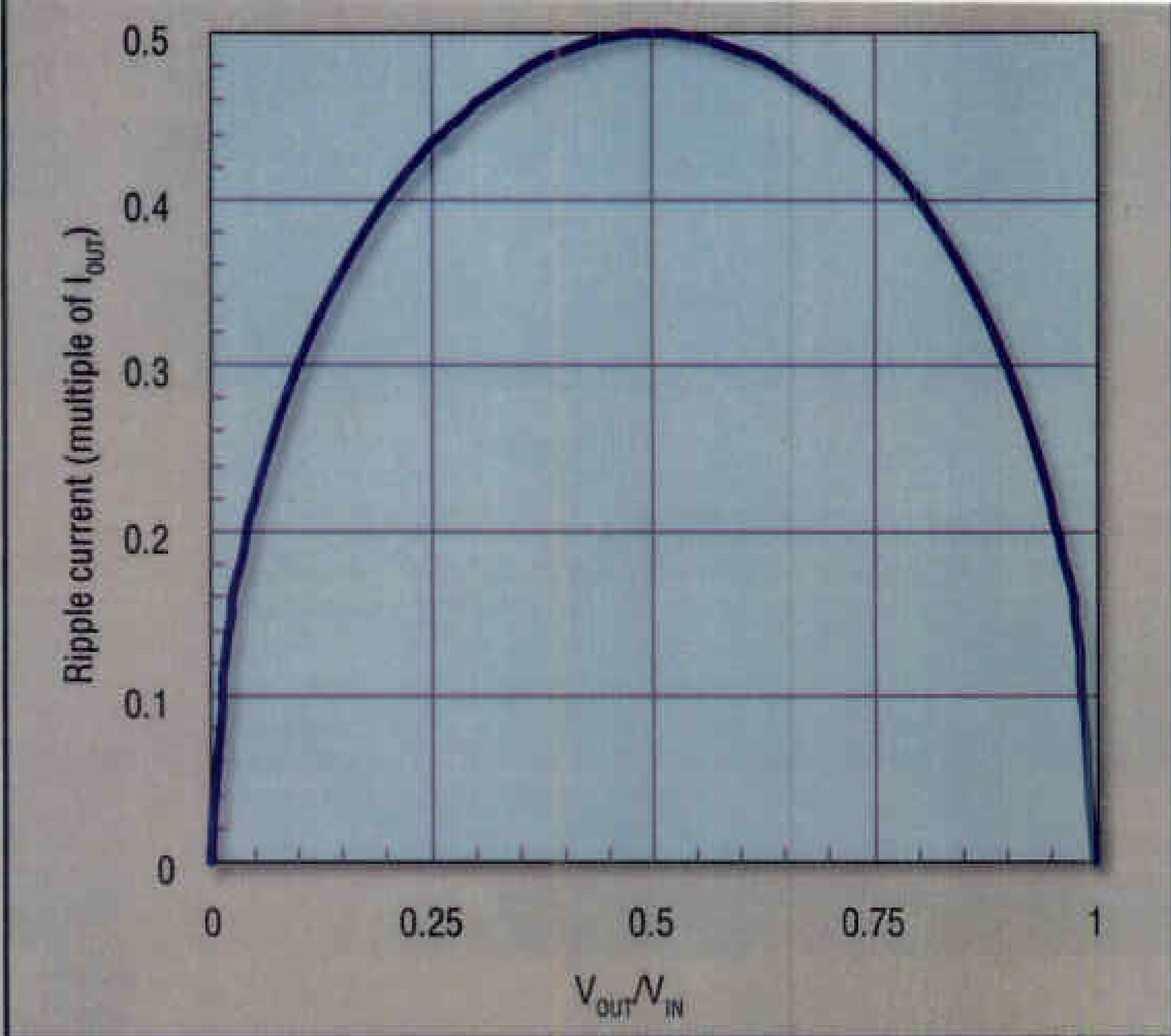


Fig. 4. *Ripple current for the input capacitors reaches a worst case of $I_{OUT}/2 = 0.5$ when the variable input voltage equals twice the fixed output voltage.*