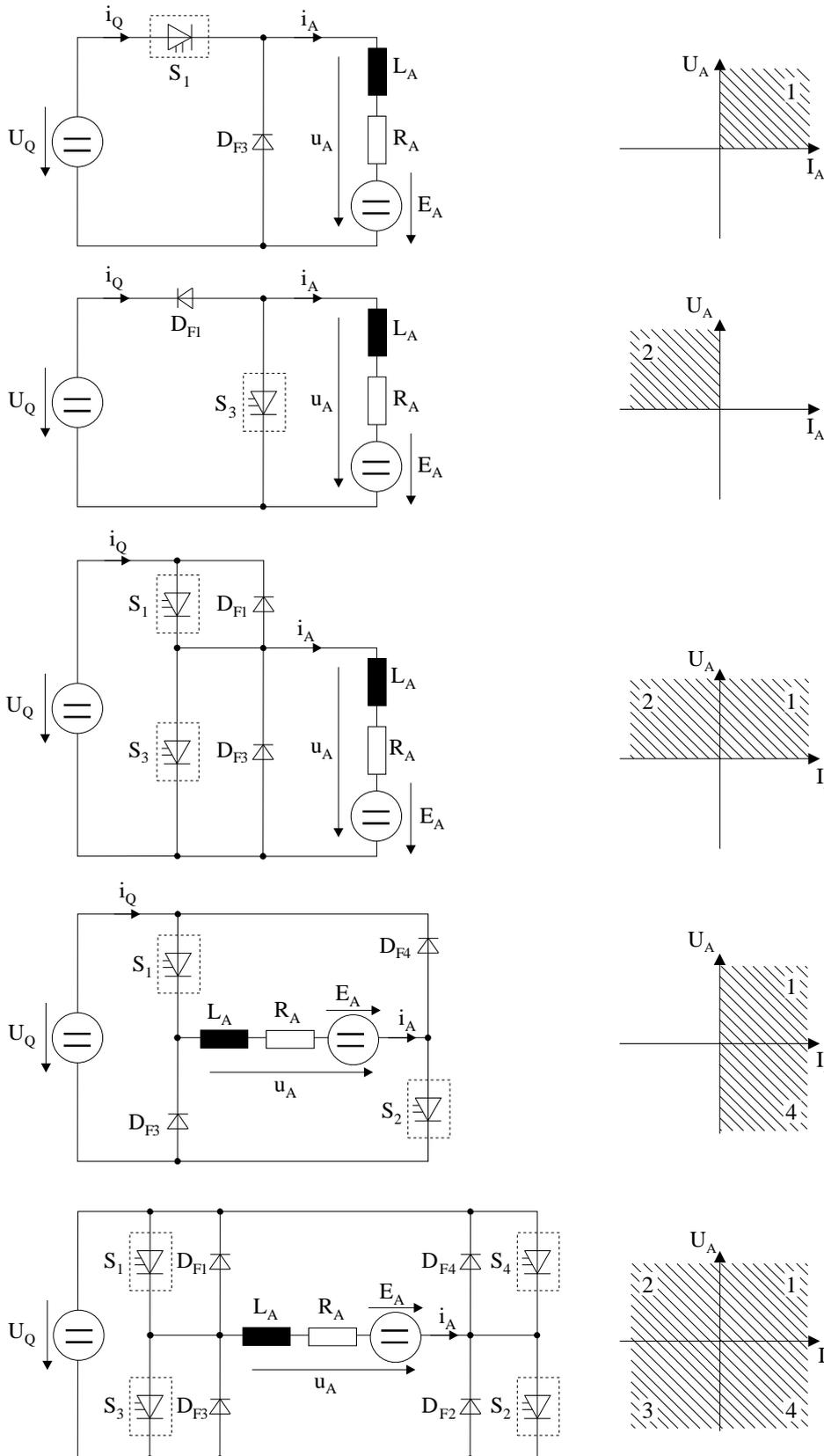
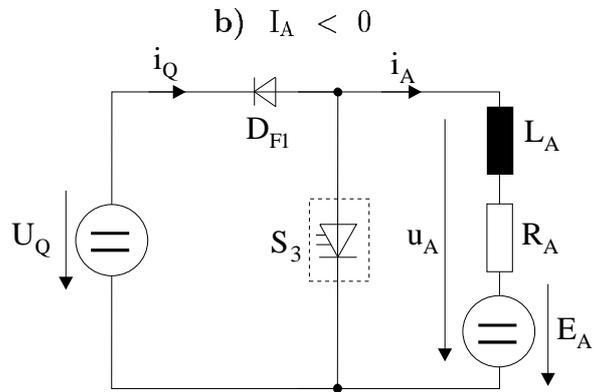
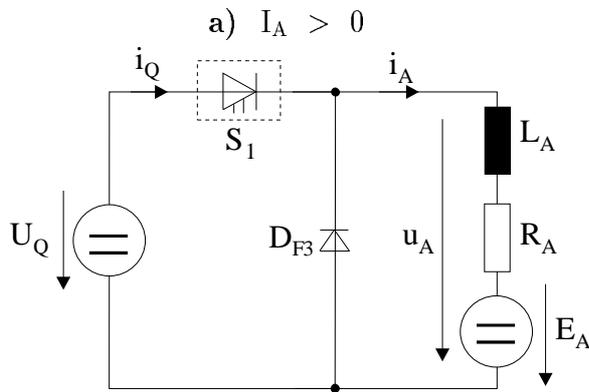


# Gleichstromsteller-Schaltungen für Ein- und Mehr-Quadrant-Betrieb





Ein-Quadrant-Schaltungen



$$I_A = \frac{U_A - E_A}{R_A} > 0$$

$$a = t_e/T$$

$$U_A = a \cdot U_Q > 0$$

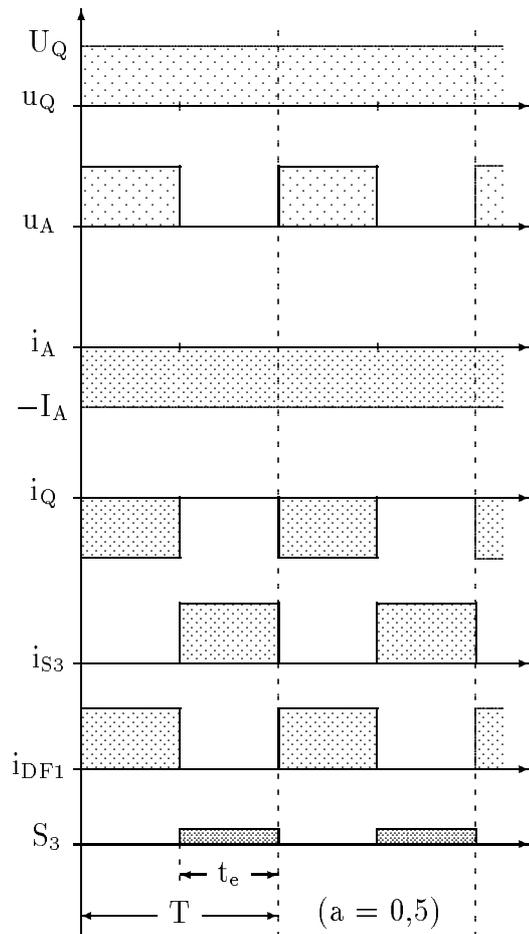
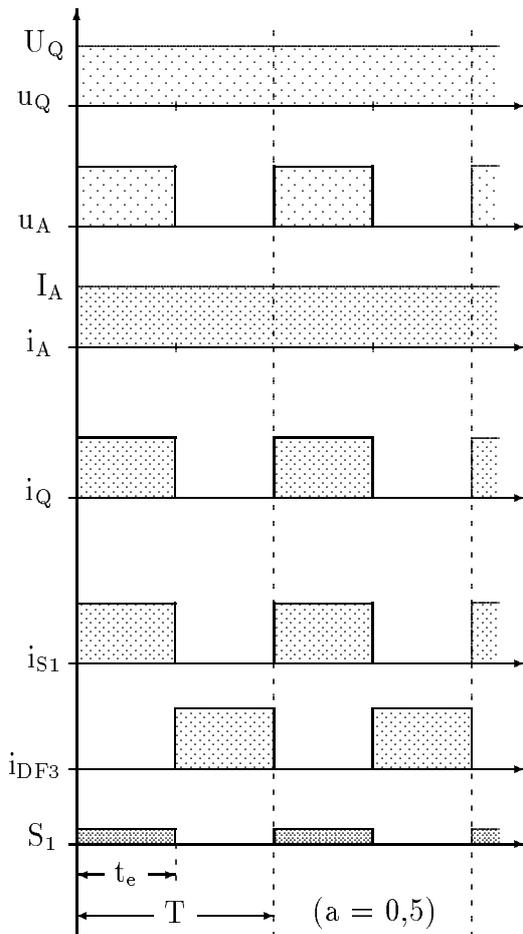
$$E_A < U_A$$

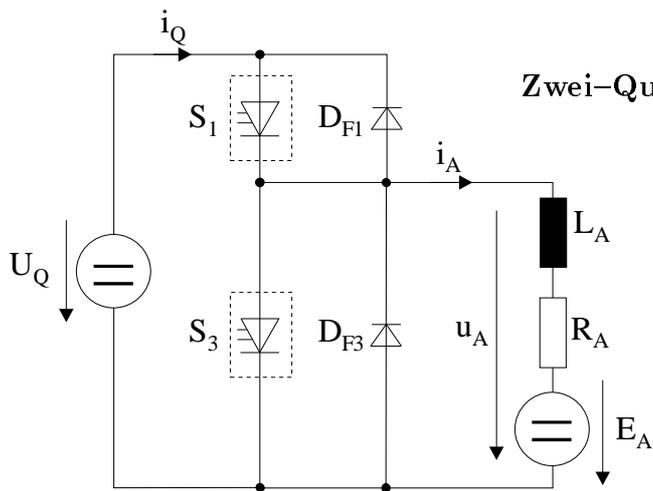
$$I_A = \frac{U_A - E_A}{R_A} < 0$$

$$a = t_e/T$$

$$U_A = (1 - a) \cdot U_Q > 0$$

$$E_A > U_A$$

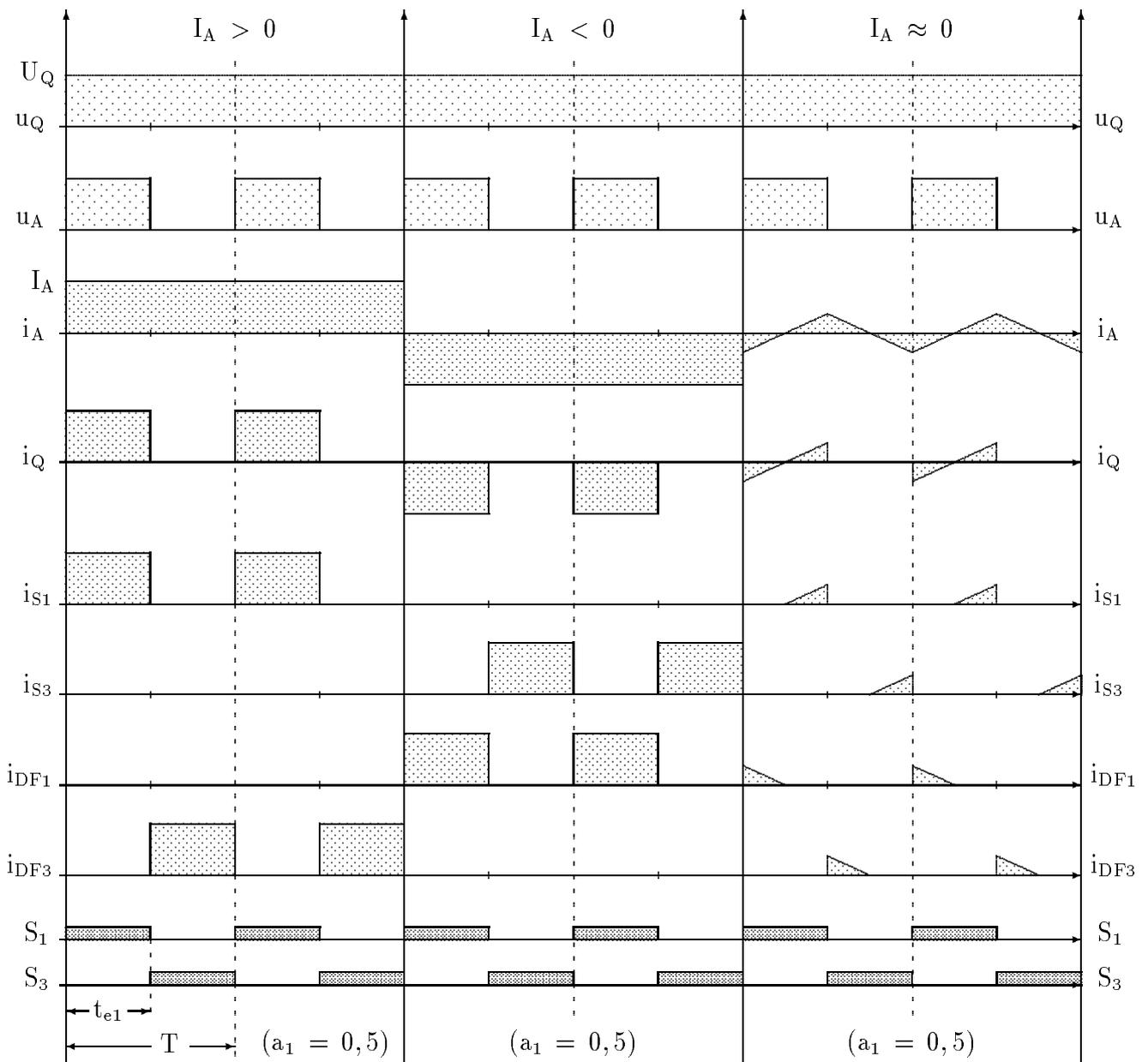




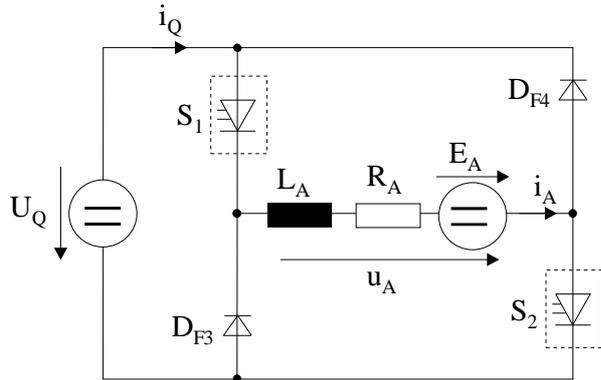
$S_1, S_3$  entgegengesetzt getaktet

$$a_1 = t_{e1}/T; \quad a_3 = 1 - a_1$$

$$U_A = a_1 \cdot U_Q \geq 0$$



Zwei-Quadrant-Schaltung mit Spannungsumkehr (1)



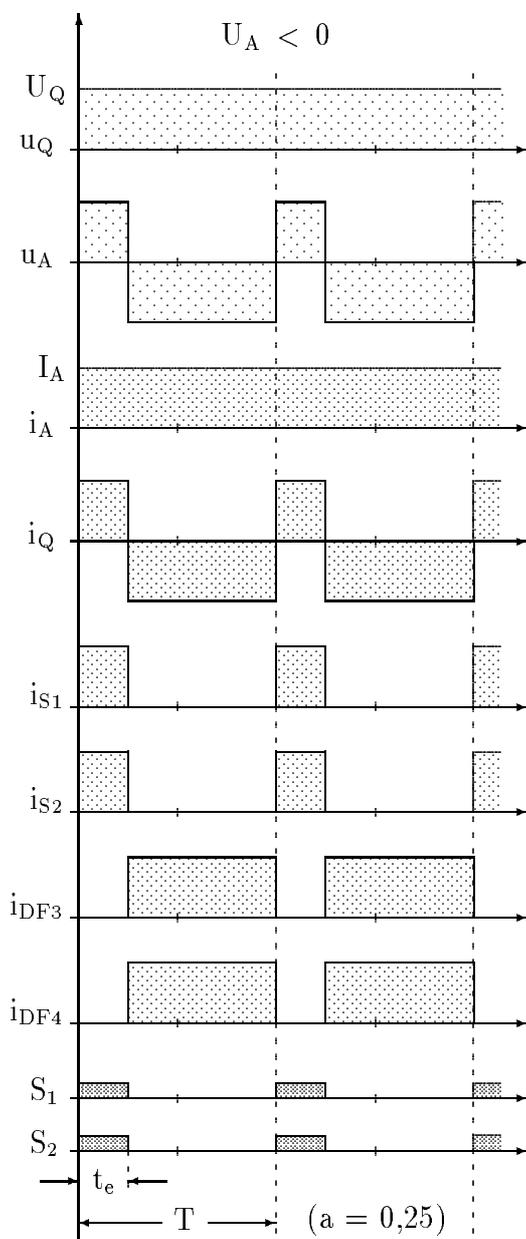
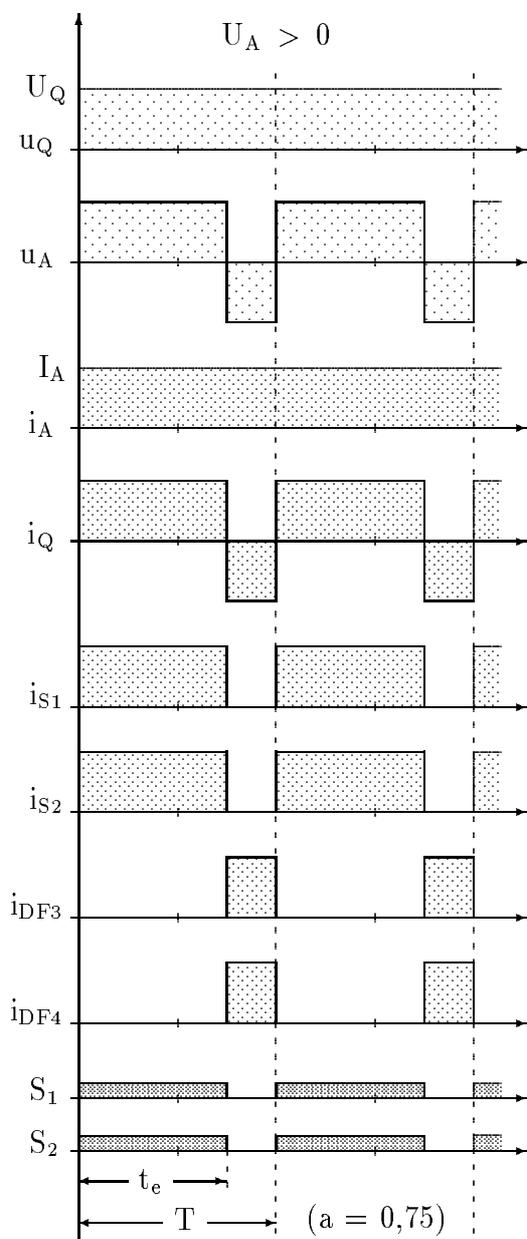
$S_1, S_2$  synchron getaktet

(kein Freilauf)

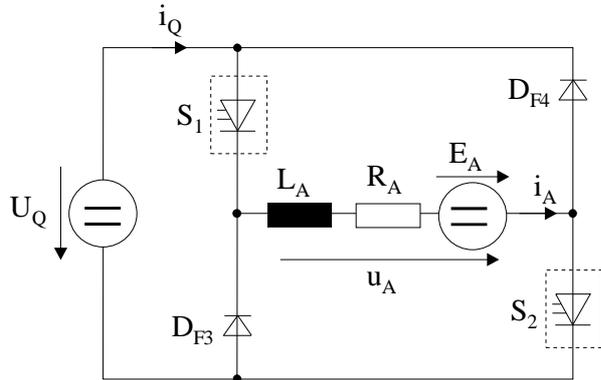
$$a = t_e / T$$

$$U_A = a \cdot U_Q - (1 - a) \cdot U_Q$$

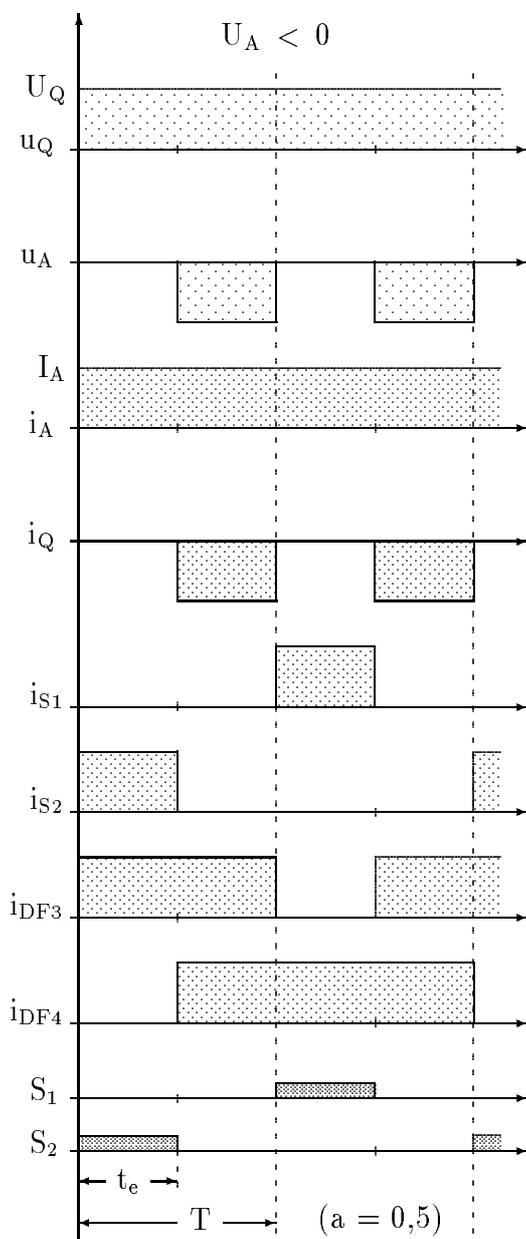
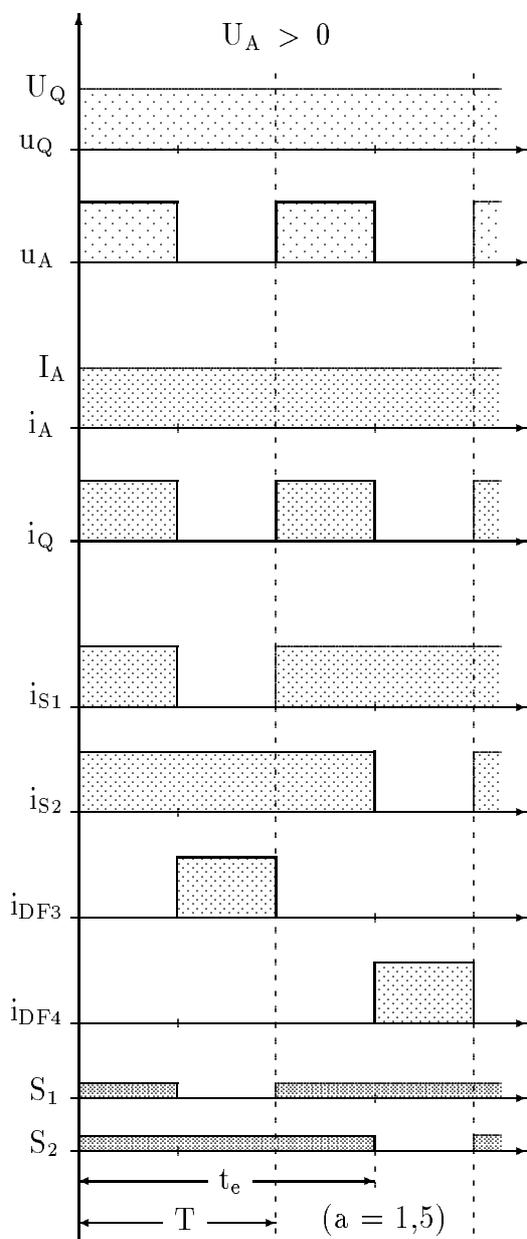
$$= (2a - 1) \cdot U_Q$$



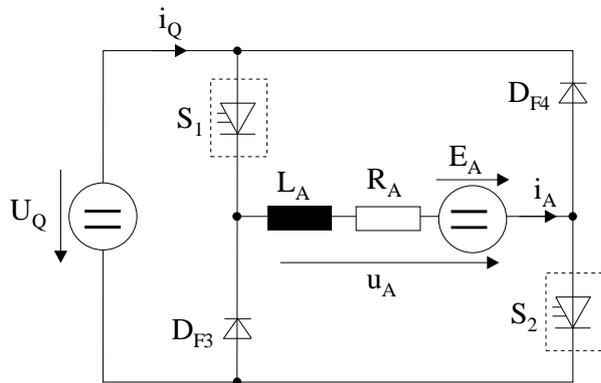
Zwei-Quadrant-Schaltung mit Spannungsumkehr (2)



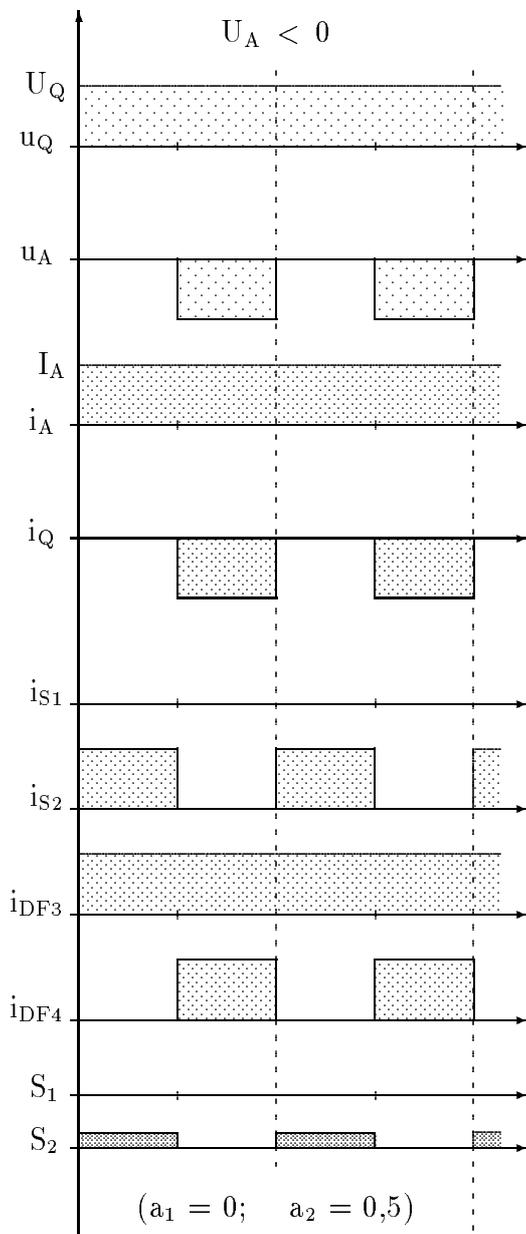
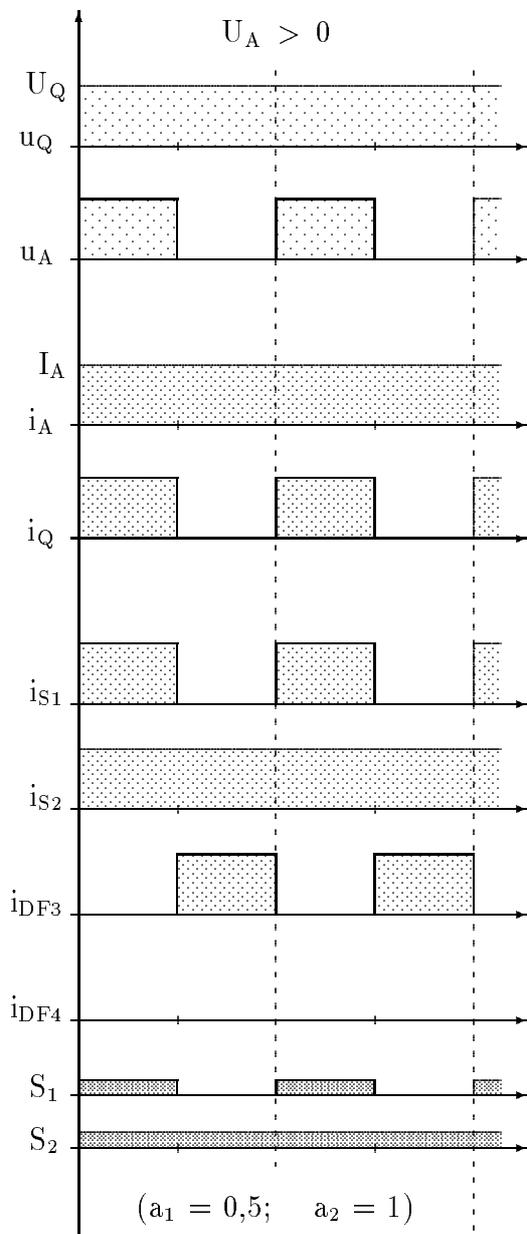
$S_1, S_2$  versetzt getaktet  
 (Freilauf oben/unten)  
 $a = t_e/T \quad (0 \leq a \leq 2)$   
 $U_A = (a - 1) \cdot U_Q$



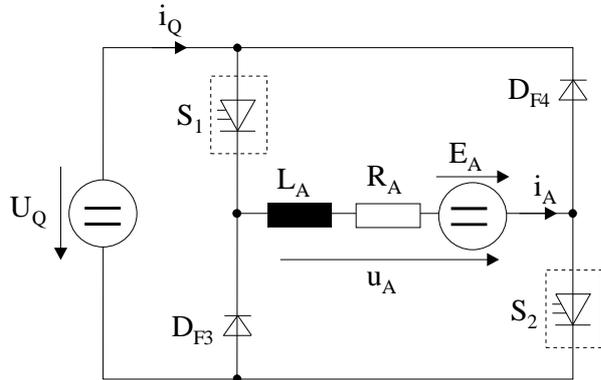
Zwei-Quadrant-Schaltung mit Spannungsumkehr (3)



$S_2$  immer EIN bei  $U_A > 0$   
 $S_1$  immer AUS bei  $U_A < 0$   
 (Freilauf nur unten)  
 $a_1 = t_{e1}/T$ ;  $a_2 = t_{e2}/T$   
 $U_A = (a_1 + a_2 - 1) \cdot U_Q$



Zwei-Quadrant-Schaltung mit Spannungsumkehr (4)



$S_1$  immer EIN bei  $U_A > 0$   
 $S_2$  immer AUS bei  $U_A < 0$   
 (Freilauf nur oben)  
 $a_1 = t_{e1}/T$ ;  $a_2 = t_{e2}/T$   
 $U_A = (a_1 + a_2 - 1) \cdot U_Q$

