1-Phase Thyristor Converter

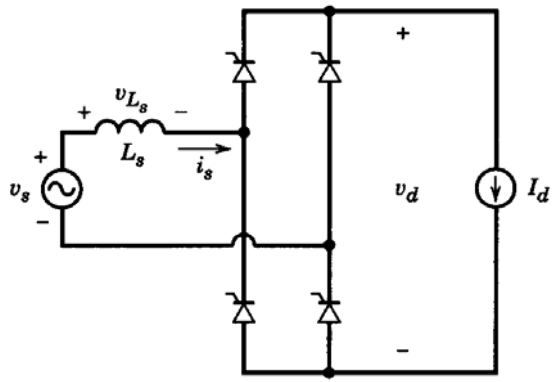


Figure 6-9 Single-phase thyristor converter with a finite L_s and a constant dc current.

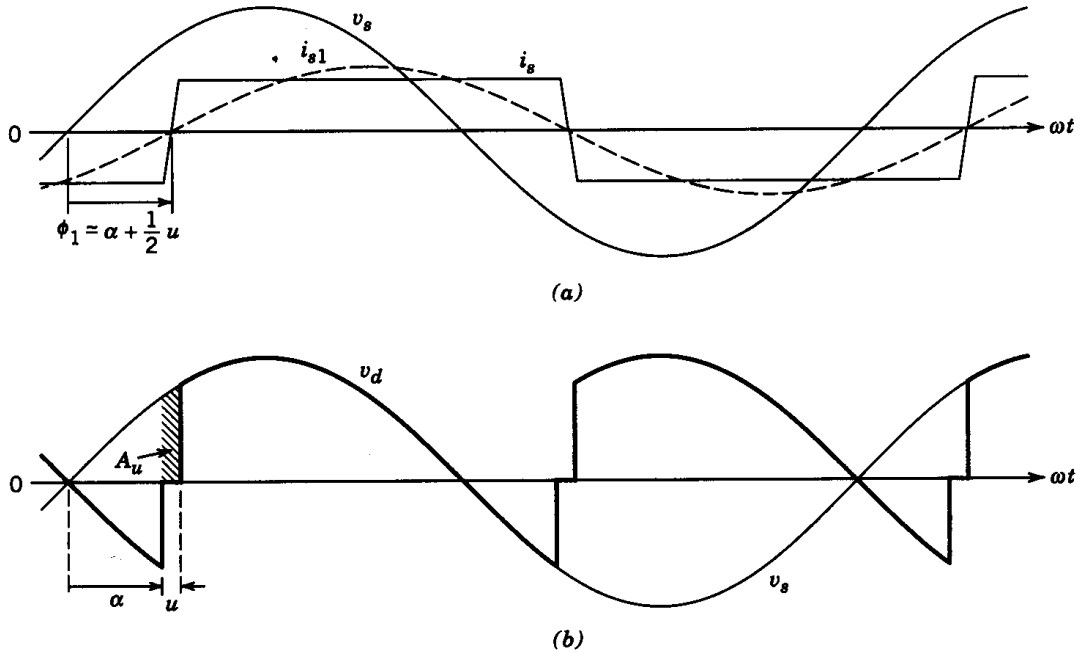
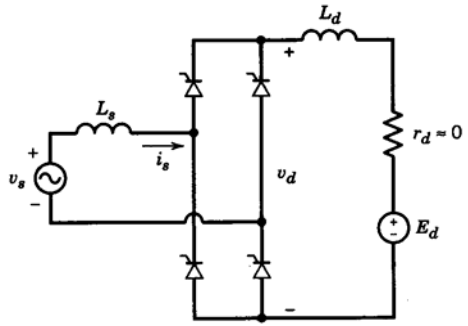


Figure 6-10 Waveforms in the converter of Fig. 6-9.

Thyristor Converter: Discontinuous Mode



(a)

Figure 6-11 (a) A practical thyristor converter.

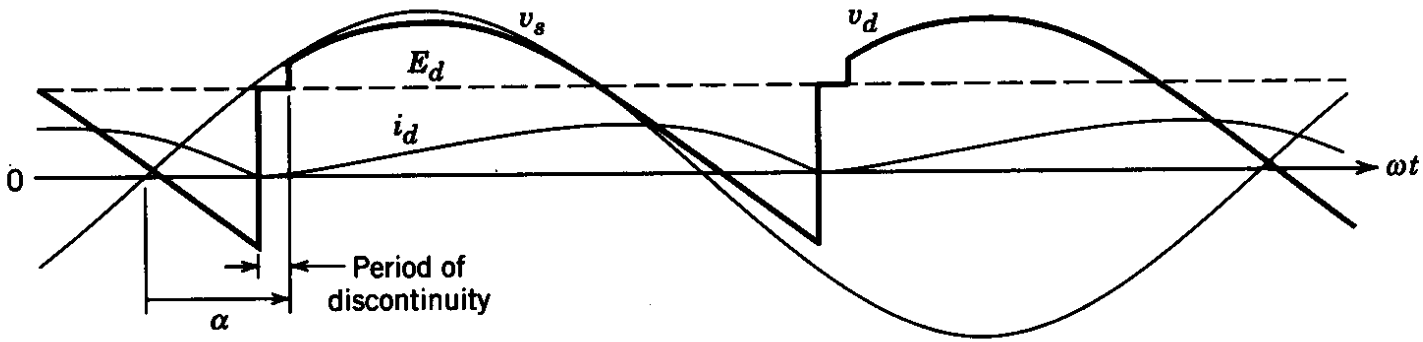


Figure 6-13 Waveforms in a discontinuous-current-conduction mode.

- This mode can occur in a dc-drive at light loads

DC Voltage versus Load Current

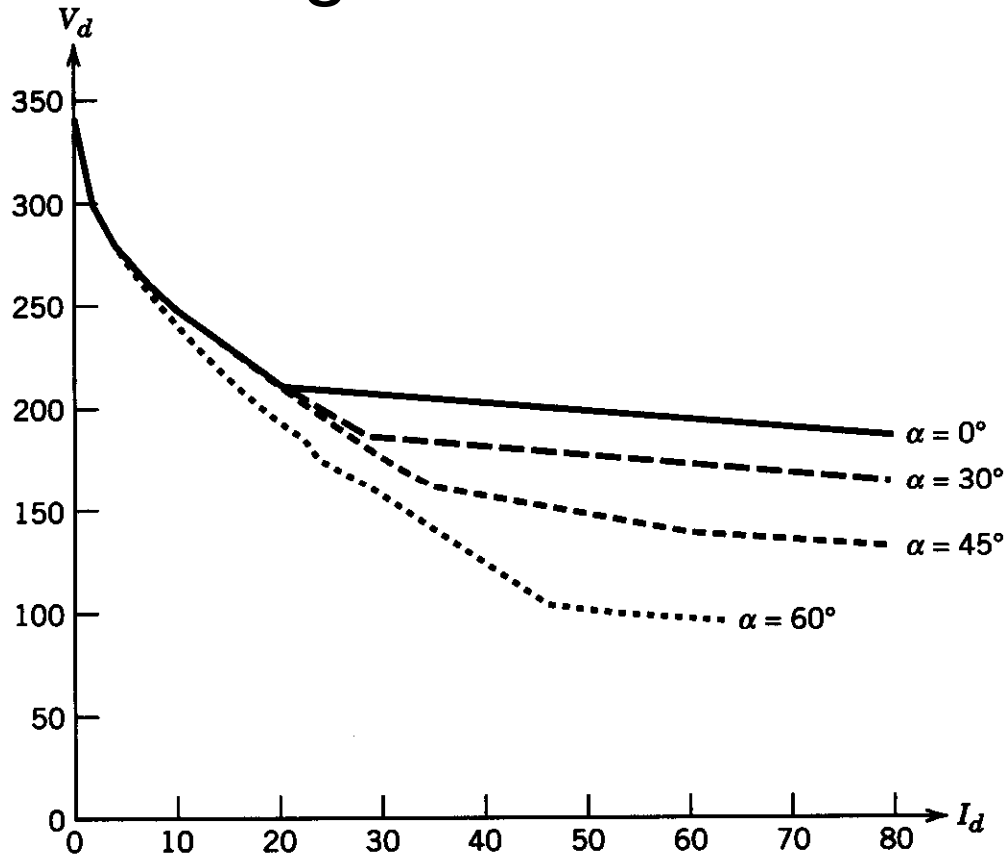


Figure 6-14 V_d versus I_d in the single-phase thyristor converter of Fig. 6-11*a*.

- Various values of delay angle

Thyristor Converters: Inverter Mode

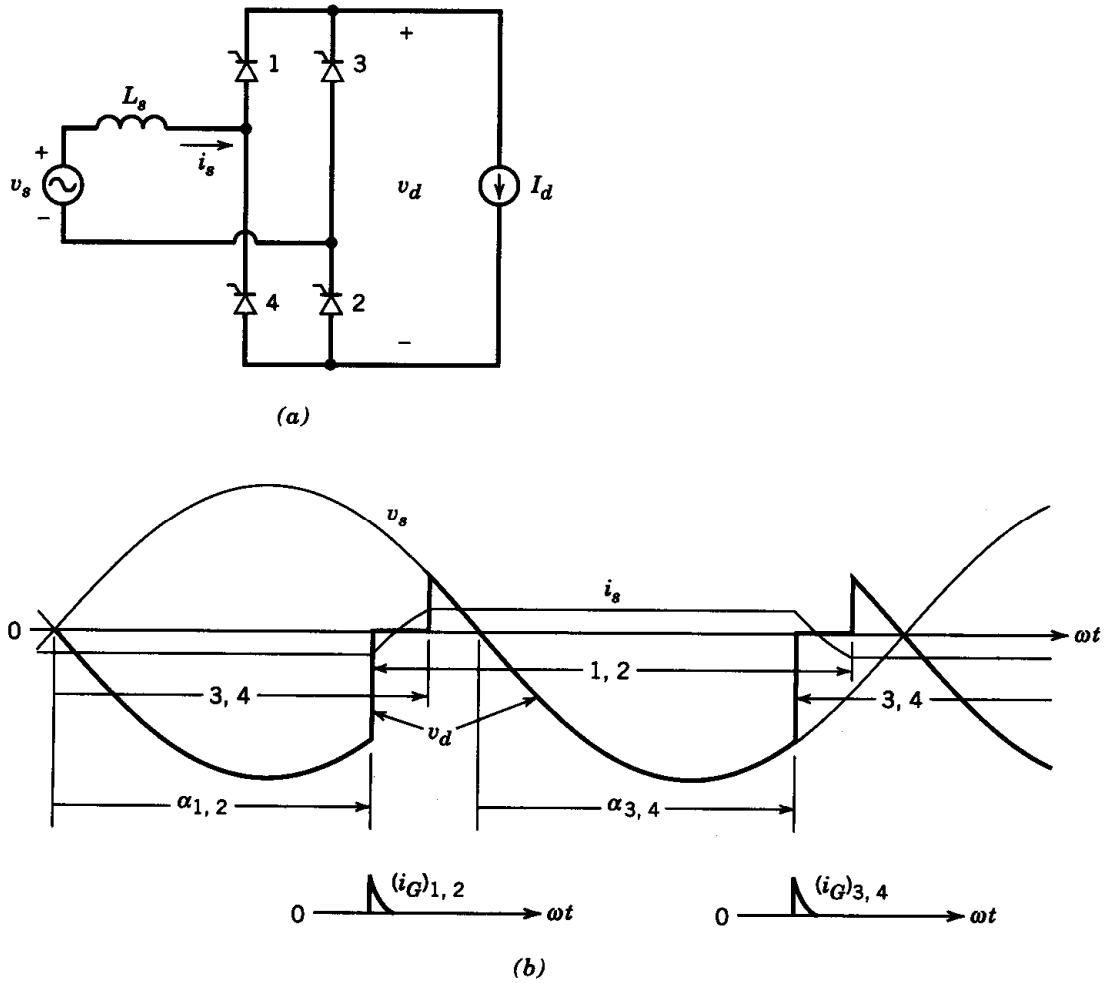


Figure 6-15 (*a*) Inverter, assuming a constant dc current. (*b*) Waveforms.

- Assuming the ac-side inductance to be zero

Thyristor Converters: Inverter Mode

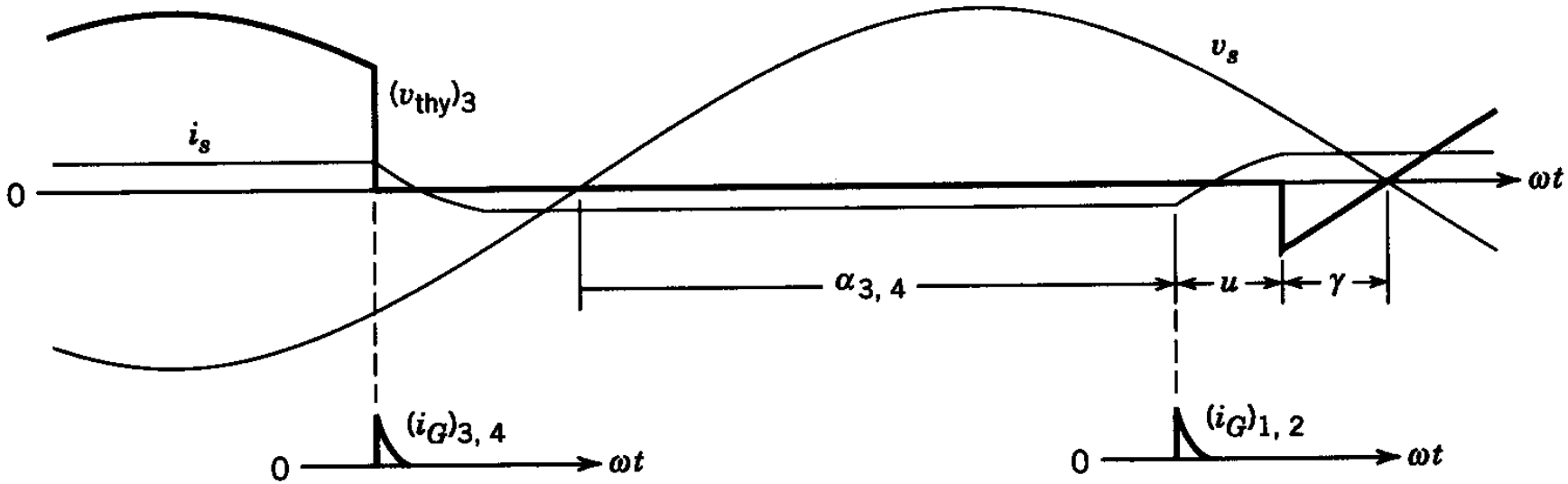


Figure 6-17 Voltage across a thyristor in the inverter mode.

- Importance of extinction angle in inverter mode

3-Phase Thyristor Converters

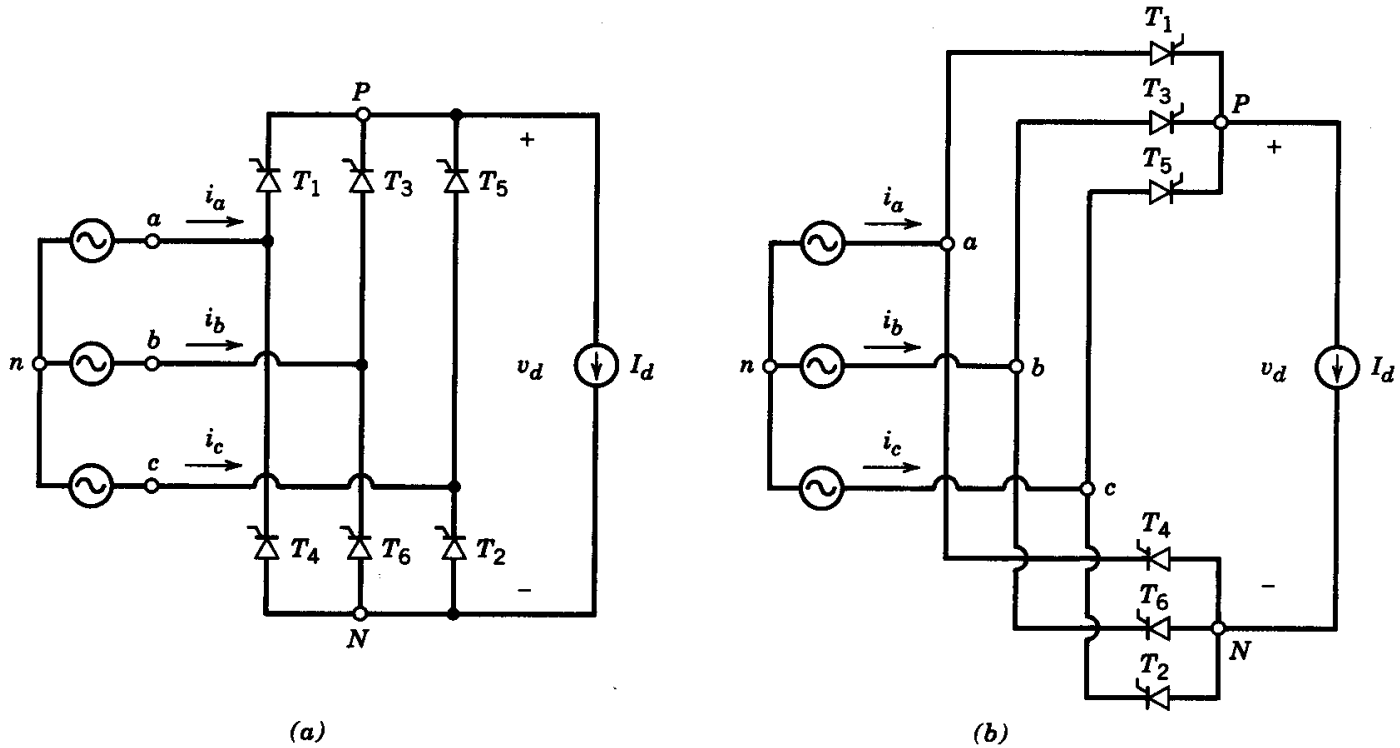


Figure 6-19 Three-phase thyristor converter with $L_s = 0$ and a constant dc current.

- Two groups of three thyristors each

3-Phase Thyristor Converter Waveforms

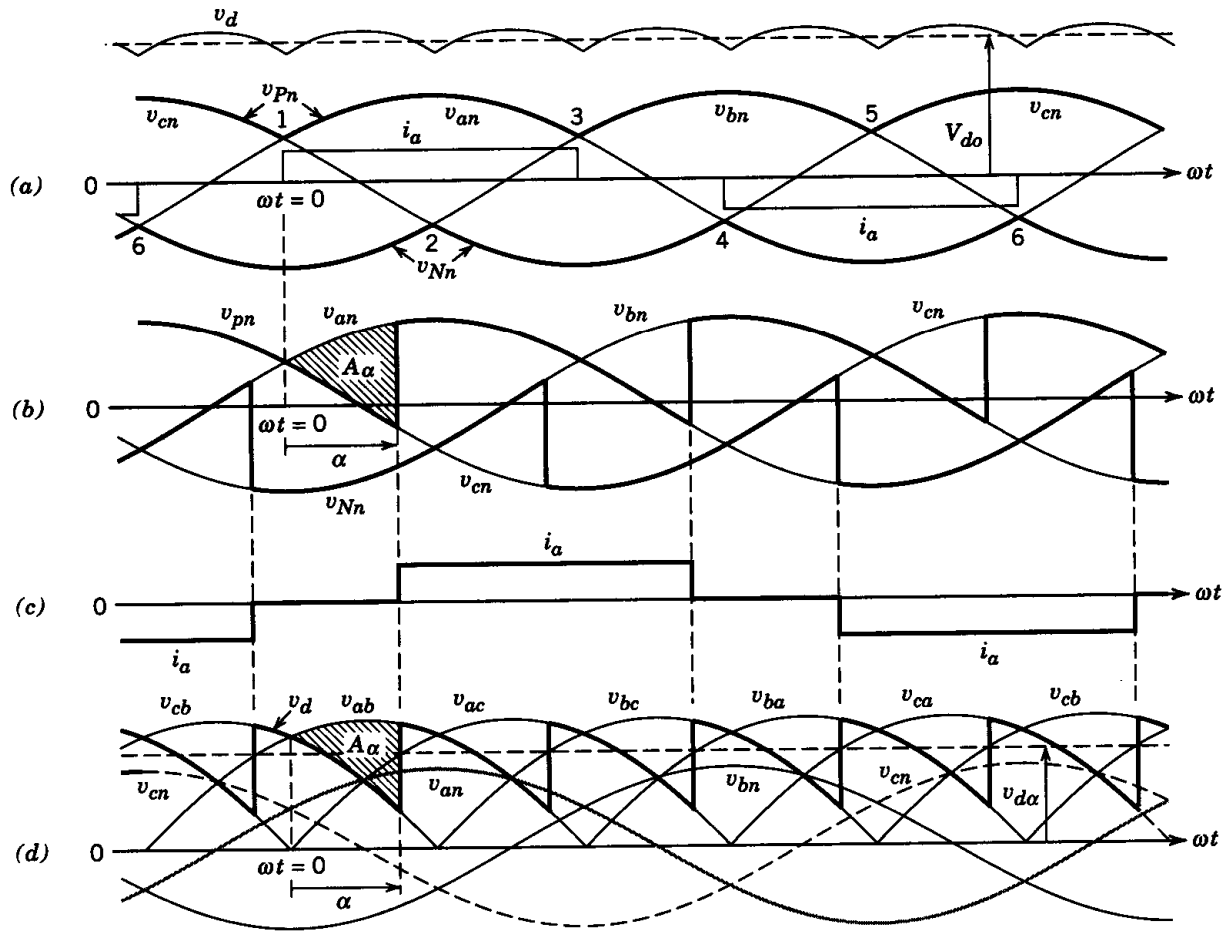


Figure 6-20 Waveforms in the converter of Fig. 6-19.

- Zero ac-side inductance; purely dc current

Waveforms assuming zero ac-side inductance

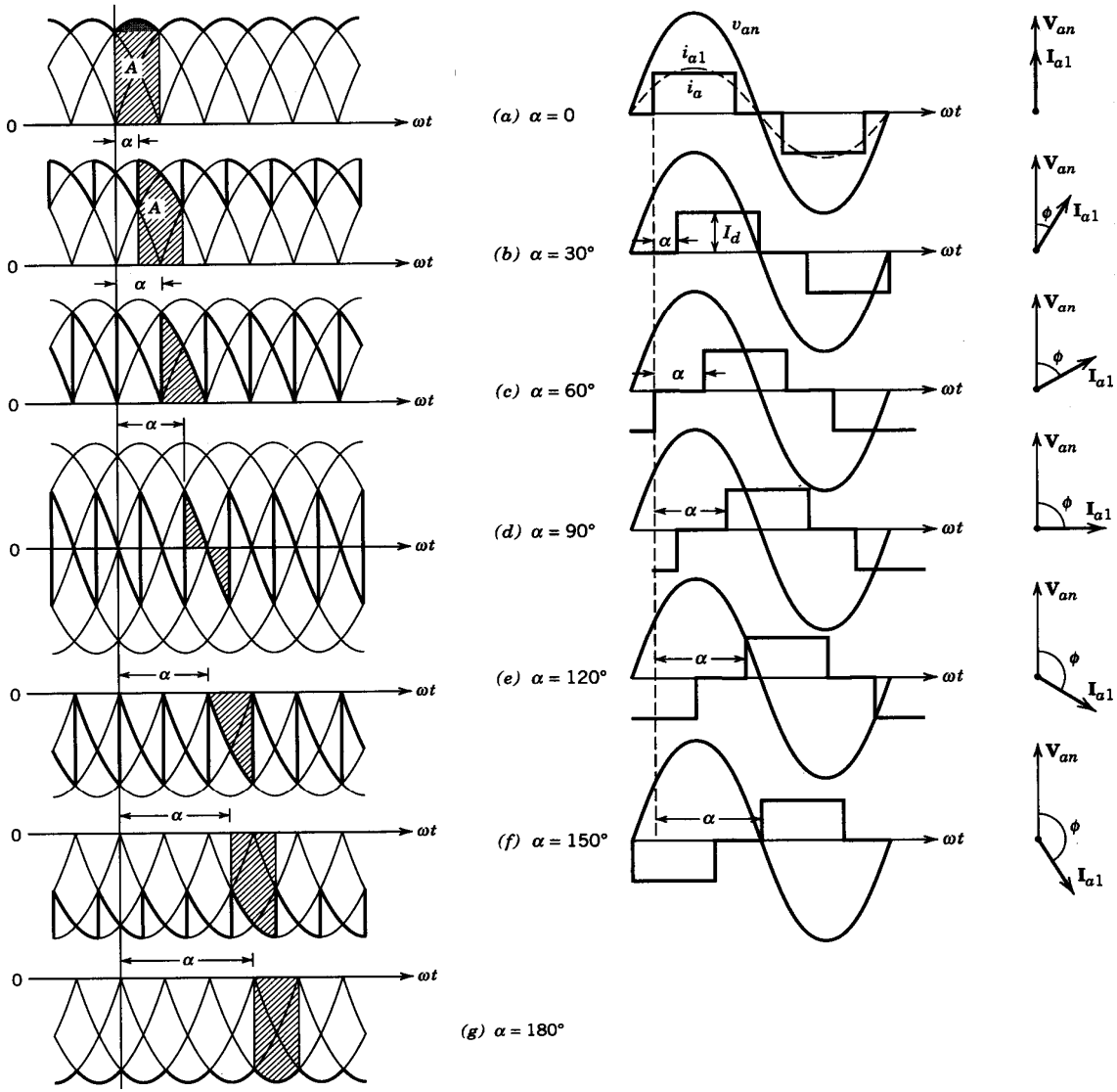


Figure 6-21 The dc-side voltage waveforms as a function of α where $V_{d\alpha} = A/(\pi/3)$. (From ref. 2 with permission.)

Figure 6-23 Line current as a function of α. (With permission from ref. 2.)

Input Line-Current Waveform

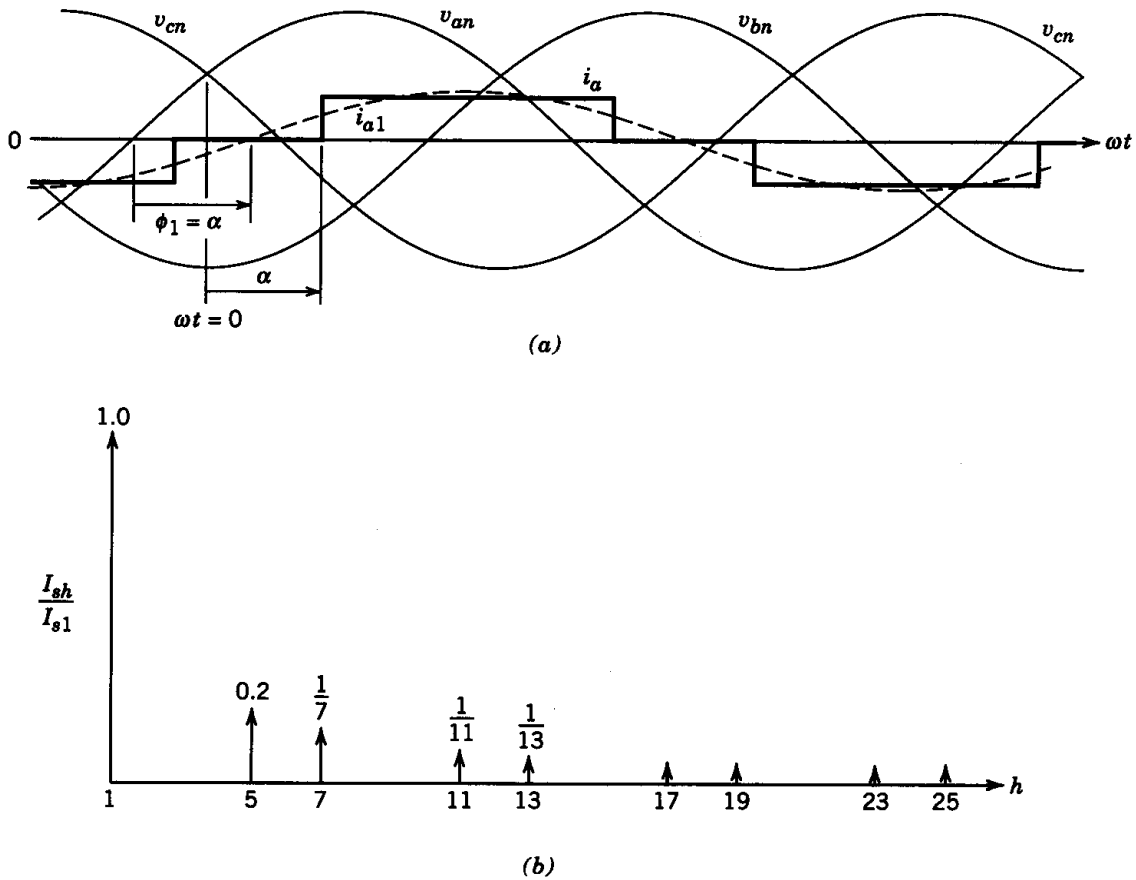


Figure 6-22 Line current in a three-phase thyristor converter of Fig. 6-19.

- Zero ac-side inductance

Three-Phase Thyristor Converter

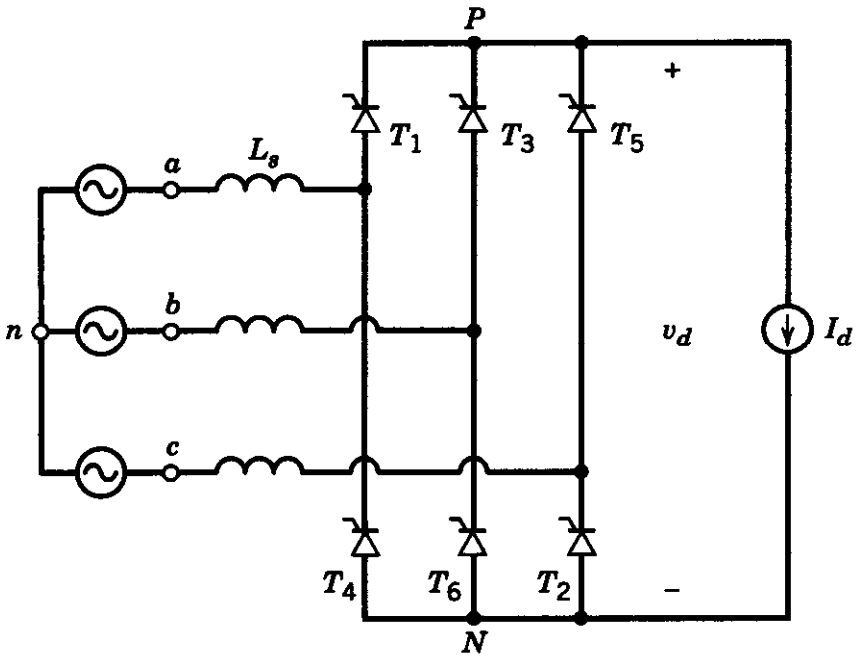


Figure 6-24 Three-phase converter with L_s and a constant dc current.

- AC-side inductance is included

Current Commutation Waveforms

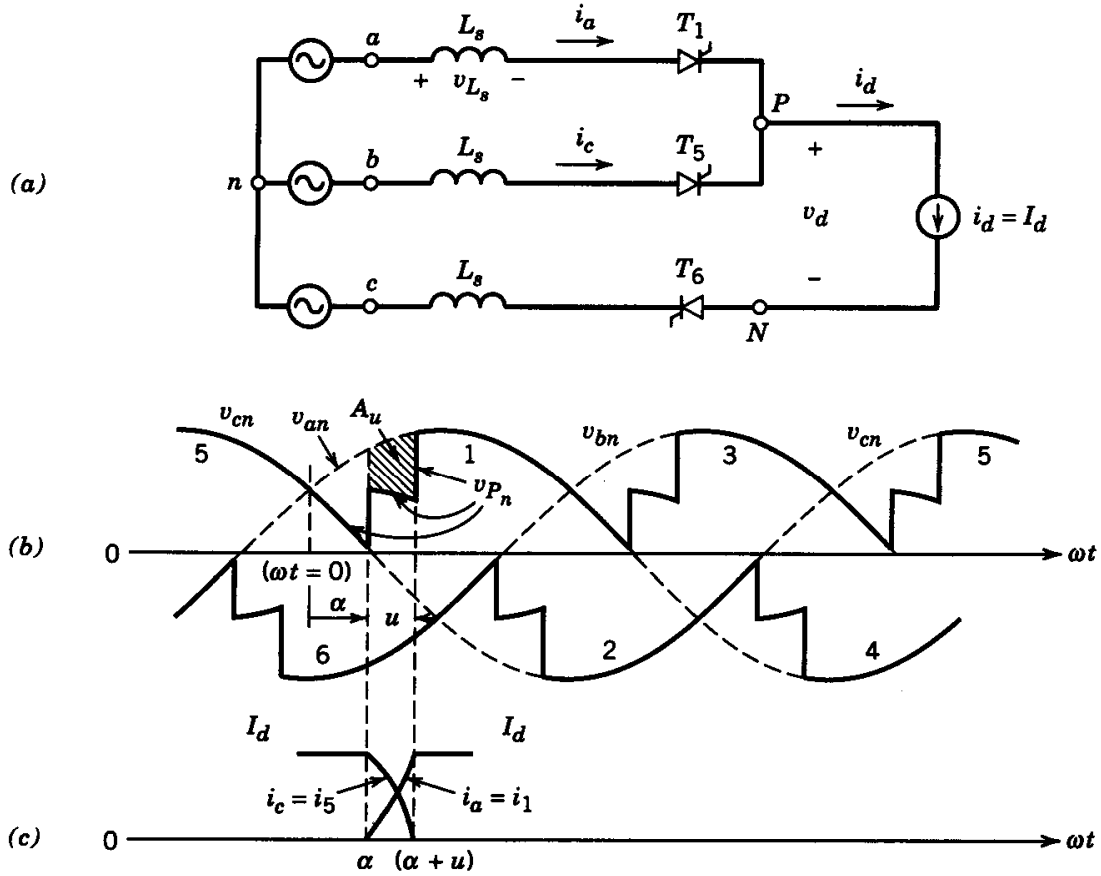


Figure 6-25 Commutation in the presence of L_s.

- Constant dc-side current

Input Line-Current Waveform

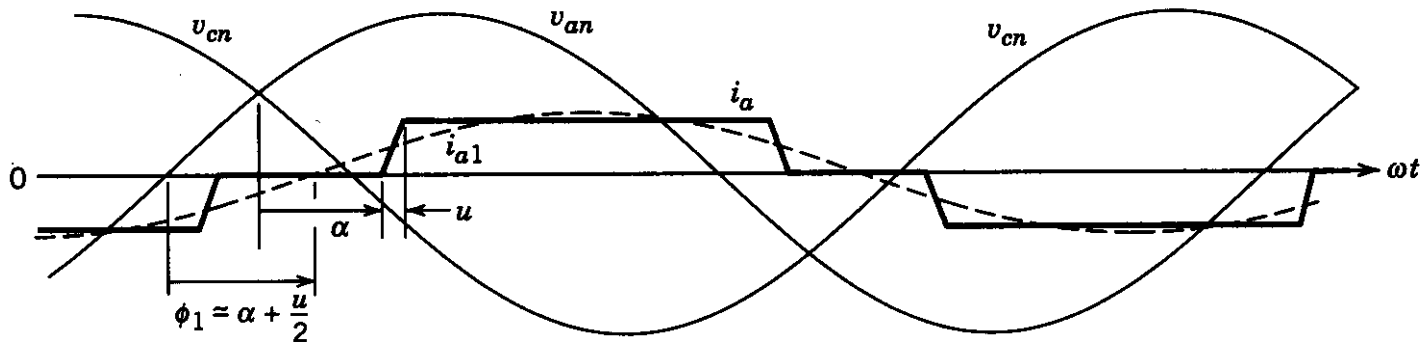


Figure 6-26 Line current in the presence of L_s.

- Finite ac-side inductance