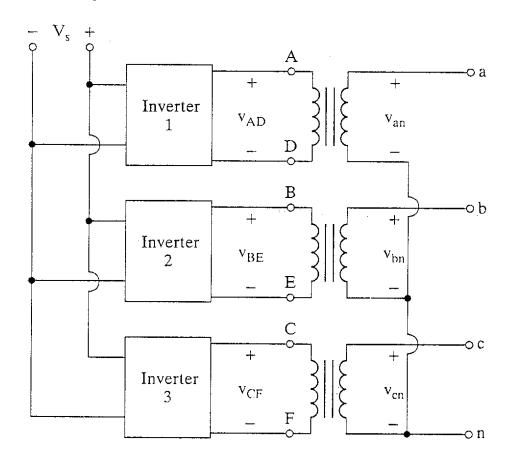
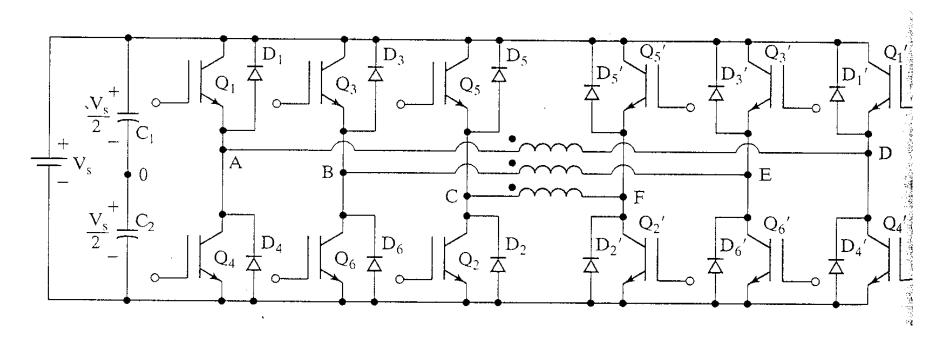
Three-Phase Inverters

Consider three single-phase inverters in parallel, driven 120° apart.



Three-Phase Inverter (continued)

Three single-phase full bridge inverters

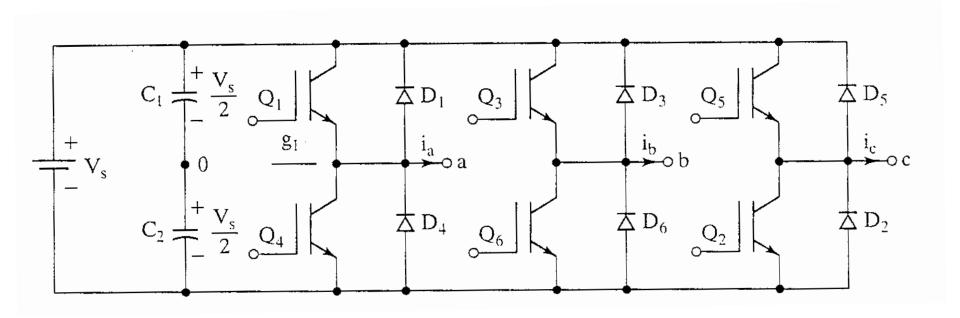


12 transistors, 12 diodes, 3 transformers

Could it be simpler?

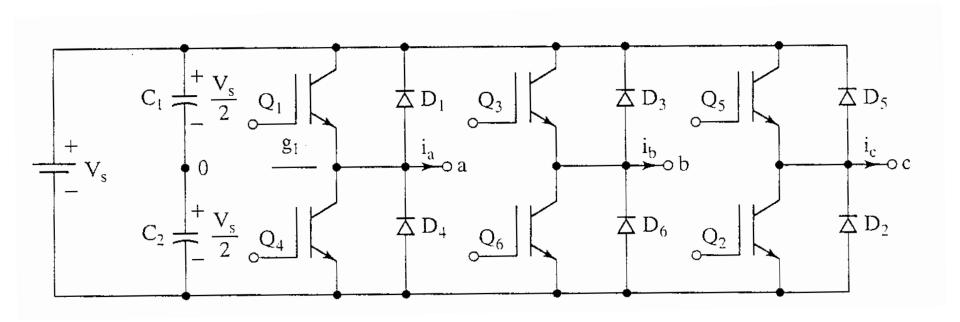
Alternative (Preferred) Configuration

6 transistors, 6 diodes for 120° or 180° conduction



180° Conduction

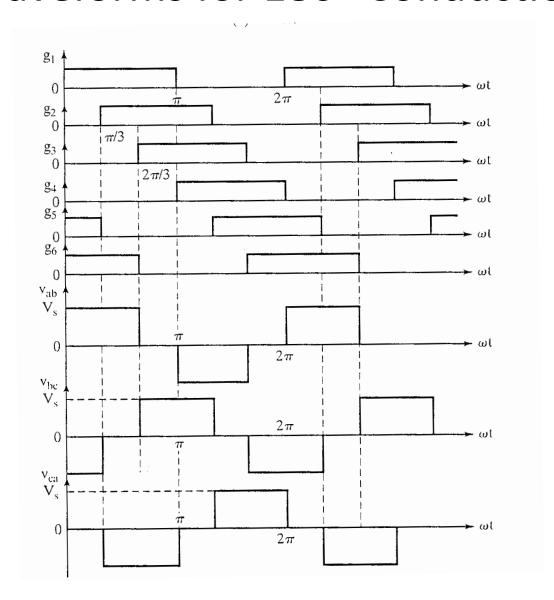
Three transistors ON at a time



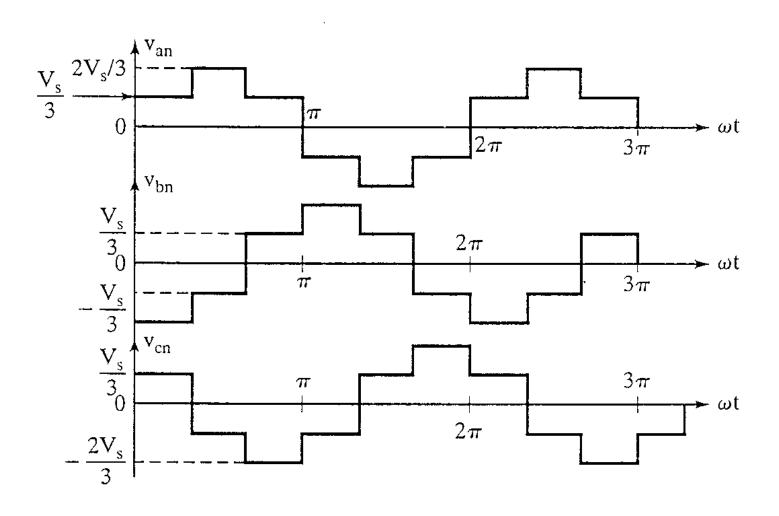
Summary Table

TABLE 6.2 Switch States for Three-Phase Voltage-Source Inverter (VSI)								
State	State No.	Switch States	v_{ab}	v_{bc}	v_{ca}			
S_1 , S_2 , and S_6 are on and S_4 , S_5 , and S_3 are off	1	100	V_S	0	$-V_S$			
S_2 , S_3 , and S_1 are on and S_5 , S_6 , and S_4 are off	2	110	0	$V_{\mathcal{S}}$	$-V_S$			
S_3 , S_4 , and S_2 are on and S_6 , S_1 , and S_5 are off	3	010	$-V_S$	$V_{\mathcal{S}}$. 0			
S_4 , S_5 , and S_3 are on and S_1 , S_2 , and S_6 are off	4	011	$-V_S$	0	V_{S}			
S_5 , S_6 , and S_4 are on and S_2 , S_3 , and S_1 are off	5	001	0	$-V_S$	$V_{\mathcal{S}}$			
S_6 , S_1 , and S_5 are on and S_3 , S_4 , and S_2 are off	6	101	V_{S}	$-V_S$	0			
S_1 , S_3 , and S_5 are on and S_4 , S_6 , and S_2 are off	7	111	0	0	0			
S_4 , S_6 , and S_2 are on and S_1 , S_3 , and S_5 are off	8	000	0	0	0			

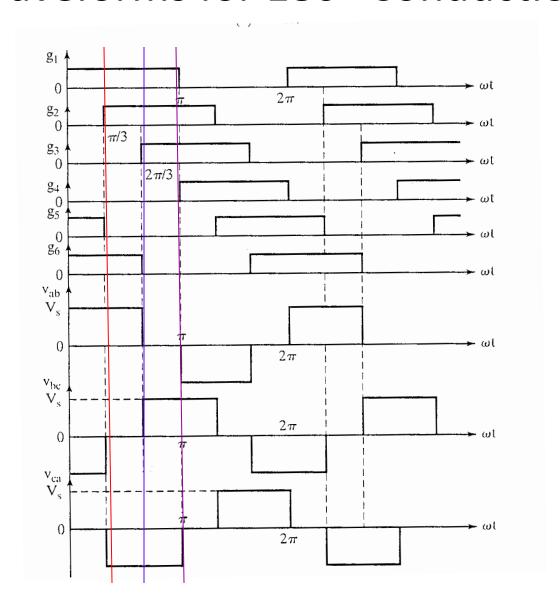
Waveforms for 180° Conduction



Phase Voltages for 180° Conduction



Waveforms for 180° Conduction



Summary Table

TABLE 6.2 Switch States for Three-Phase Voltage-Source Inverter (VSI)								
State	State No.	Switch States	v_{ab}	v_{bc}	v_{ca}			
S_1 , S_2 , and S_6 are on	1	100	$V_{\mathcal{S}}$	0	$-V_S$			
and S_4 , S_5 , and S_3 are off								
S_2 , S_3 , and S_1 are on	2	110	0	$V_{\mathcal{S}}$	$-V_S$			
and S_5 , S_6 , and S_4 are off								
S_3 , S_4 , and S_2 are on	. 3	010	$-V_S$	$V_{\mathcal{S}}$. 0			
and S_6 , S_1 , and S_5 are off								
S_4 , S_5 , and S_3 are on	4	011	$-V_{\mathcal{S}}$	0	$V_{\mathcal{S}}$			
and S_1 , S_2 , and S_6 are off								
S_5 , S_6 , and S_4 are on	5	001	0	$-V_S$	$V_{\mathcal{S}}$			
and S_2 , S_3 , and S_1 are off								
S_6 , S_1 , and S_5 are on	6	101	$V_{\mathcal{S}}$	$-V_S$	0			
and S_3 , S_4 , and S_2 are off								
S_1 , S_3 , and S_5 are on	7	111	0	0	0			
and S_4 , S_6 , and S_2 are off								
S_4 , S_6 , and S_2 are on	8	000	0	0	0			
and S_1 , S_3 , and S_5 are off								

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