Electrical Circuit (1)

Maximum Power Transfer (week10 class1)

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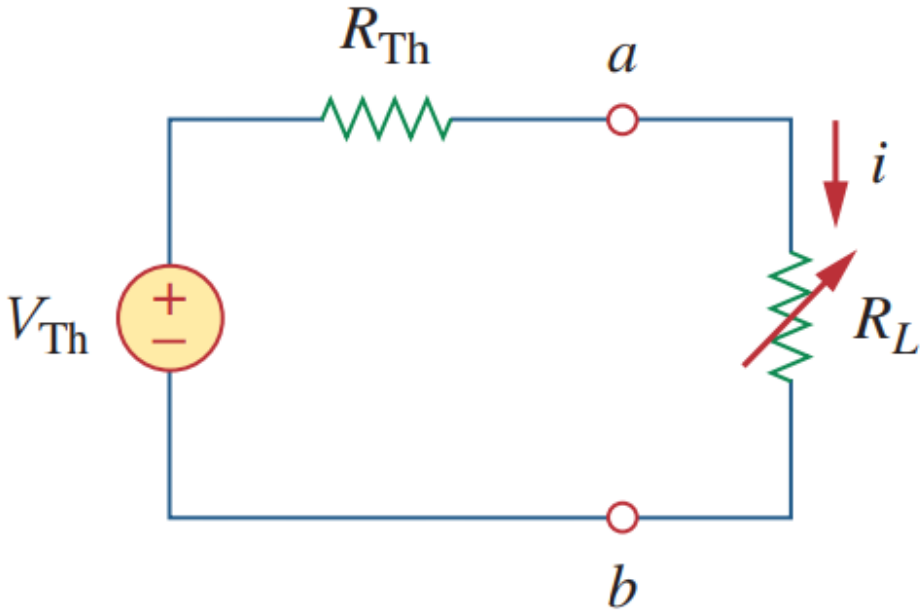
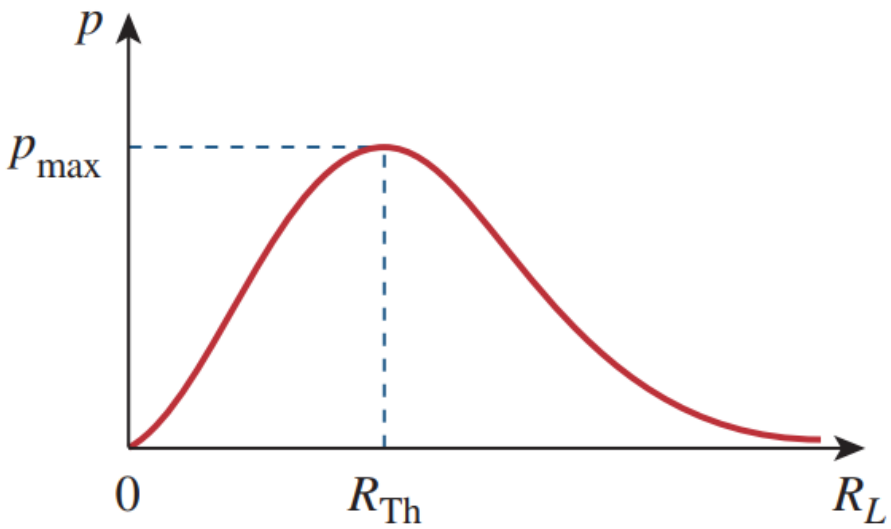
Maximum Power Transfer

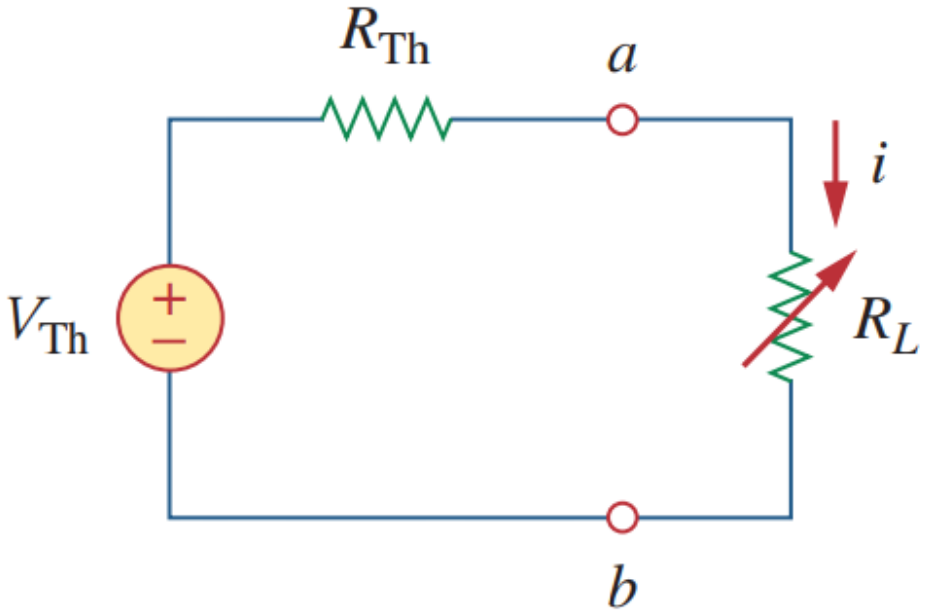


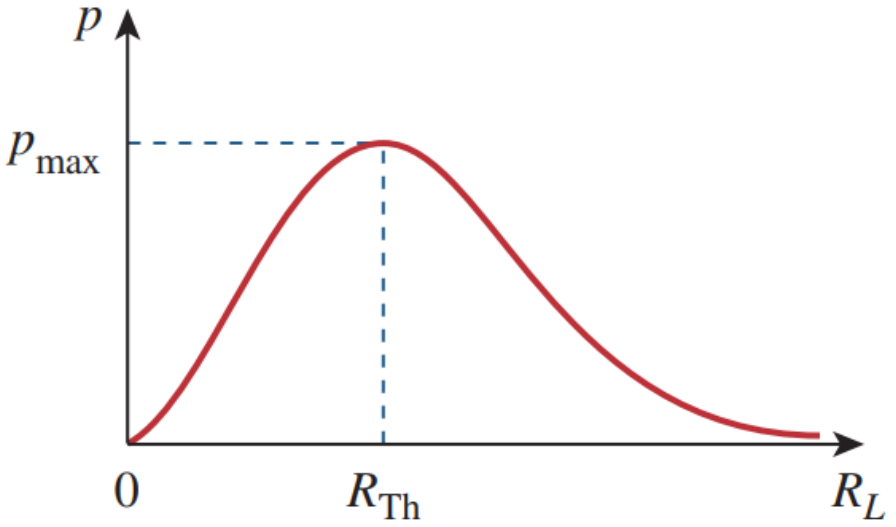


$$p = i^2 R_L = \left(\frac{V_{\text{Th}}}{R_{\text{Th}} + R_L} \right)^2 R_L$$

$$p_{\text{max}} = \frac{V_{\text{Th}}^2}{4R_{\text{Th}}}$$

Maximum Power Transfer



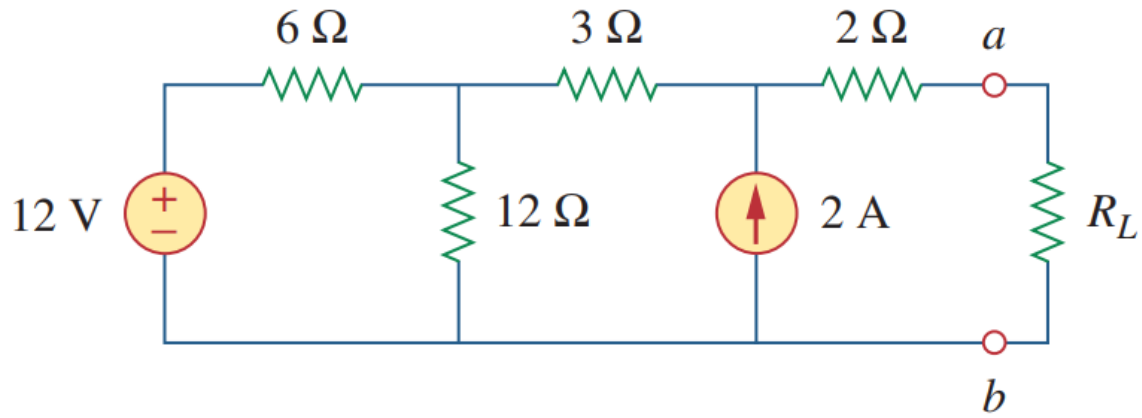


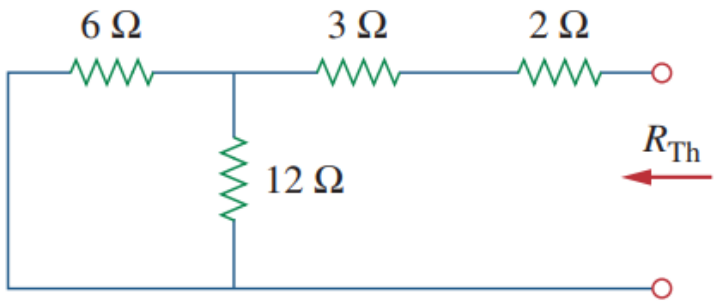
$$p = i^2 R_L = \left(\frac{V_{Th}}{R_{Th} + R_L} \right)^2 R_L$$

$$p_{max} = \frac{V_{Th}^2}{4R_{Th}}$$

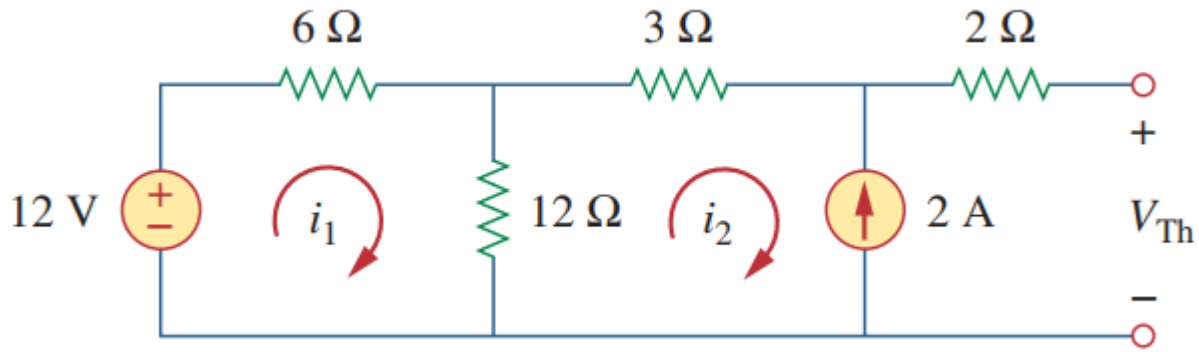
V_{TH}	R_{TH}	R_{LOAD}	P_{LOAD}
4	3	1	1
4	3	2	
4	3	3	1.3
4	3	4	
4	3	5	1.25
4	3	6	
4	3	7	

Maximum Power Transfer





$$R_{Th} = 2 + 3 + 6 \| 12 = 5 + \frac{6 \times 12}{18} = 9\ \Omega$$



$$V_{Th} = 22\ \text{V}$$

$$R_L = R_{Th} = 9\ \Omega$$

$$p_{max} = \frac{V_{Th}^2}{4R_L} = \frac{22^2}{4 \times 9} = 13.44\ \text{W}$$