$$P = IV$$
$$= \frac{V^2}{R}$$

$$V = IR \rightarrow I = \frac{V}{R}$$

$$V_{oc} = \frac{R_L V_{Th}}{R_L + R_{Th}}$$

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

$$= \frac{V_{Th}^2 R_L}{R_L^2 + 2R_L R_{Th} + R_{Th}^2}$$

$$\frac{dP_{oc}}{dR_L} = 0 = \frac{V_{Th}^2 (R_{Th} - R_L)}{(R_L + R_{Th})^3}$$

$$V_{th}^2 (R_{Th} - R_L) = 0$$

$$R_{Th} - R_L = 0$$

$$R_{Th} = R_L$$

$$P_{max} = \frac{V_{th}^2 R}{R^2 + 2R^2 + R^2} = \frac{V_{th}^2 R}{4R^2} = \frac{V_{th}^2}{4R}$$