POWER ALONG A LOSSLESS TRANSMISSION LINE

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VARIATION OF THE TRANSMITTED POWER WITH LENGTH

Consider the following lossless transmission line circuit.



where Z_0 is the characteristic impedance of the transmission line, Γ is the reflection coefficient at the load, and V_0^+ is the incident voltage.

Let $Z_0 = 50 \Omega$ and $V_S = 3.3$ V. For a given operating frequency, the transmitted power varies with length as follows.



It is confirmed that:

- a) Maximum power is transmitted when both source and load are matched.
- b) Power transmitted is independent from the TL length if either the source or the load is matched.
- c) If both the source and load are mismatched to the TL, power varies with length.