Special Problem II.A-30

A SPDT microwave switch is constructed with 2 identical **PIN diodes**.

These diodes are either **forward** biased such that there junction (i.e., small-signal) **resistance is 5Ω**, or **reversed** biased such that their junction **capacitance is 0.1 pf**.

The diodes are biased such that port 1 is **connected** to port 3.

The signal **frequency** is 1 GHz.

a) Determine the **ratio** of the **power** delivered to the matched load at port 3 to the power delivered to the matched load at port 2. Hint: determine power in terms of voltage v_1.

b) Determine the **input impedance** at port 1.

c) Determine the **insertion loss** of the switch. Recall insertion loss is the ratio of the power delivered to the switch (into port 1) to the power delivered to a connected matched load (at port 3), expressed in dB.

c) Does this seem to be a very good switch design?