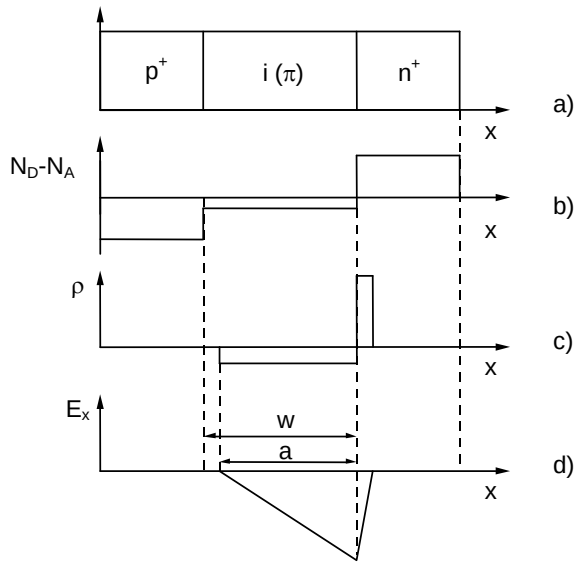
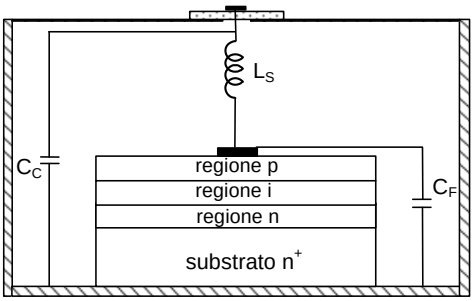
DIODI PIN

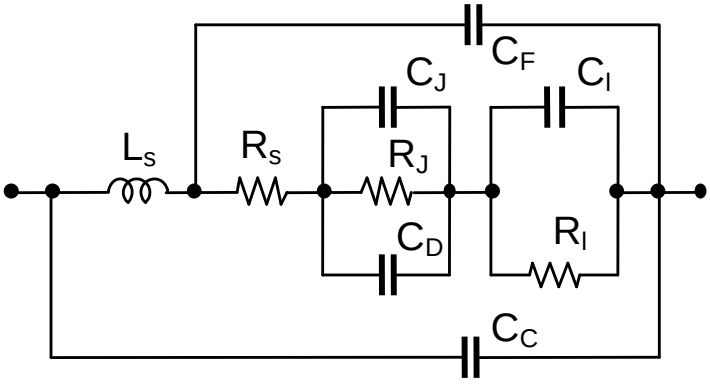
GEOMETRIA



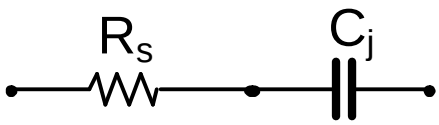
CASE



MODELLO

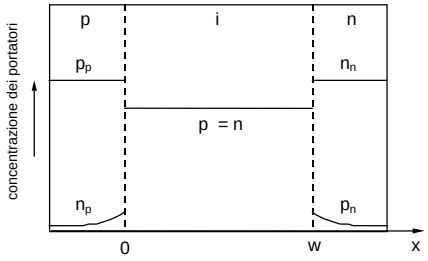


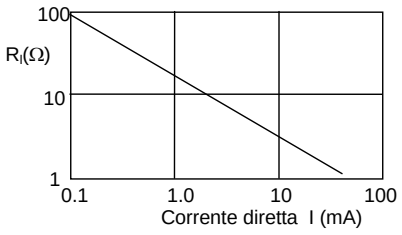
POLARIZZAZIONE INVERSA SPINTA

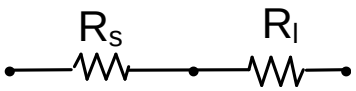


Se si considera ad esempio la frequenza di 1 GHz con $C = C_J = 0.2$ pF si ha $X \approx 800\ \Omega$.
Questa impedenza è maggiore dell'impedenza delle comuni linee di trasmissione (50 Ω) per cui in queste condizioni il PIN si comporta come un circuito aperto

POLARIZZAZIONE DIRETTA



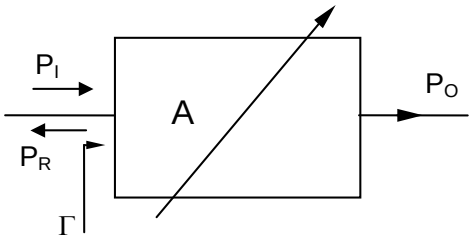




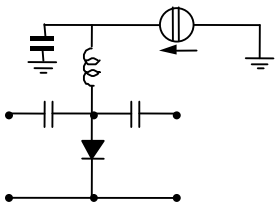
$R_I\ I = 50$ mV

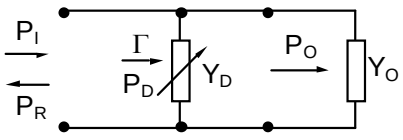
I = 10 mA -> $R_I = 5\ \Omega$
I = 1 mA -> $R_I = 50\ \Omega$
I = 0.1 mA -> $R_I = 500\ \Omega$

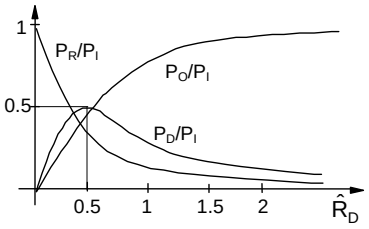
ATTENUATORI VARIABILI



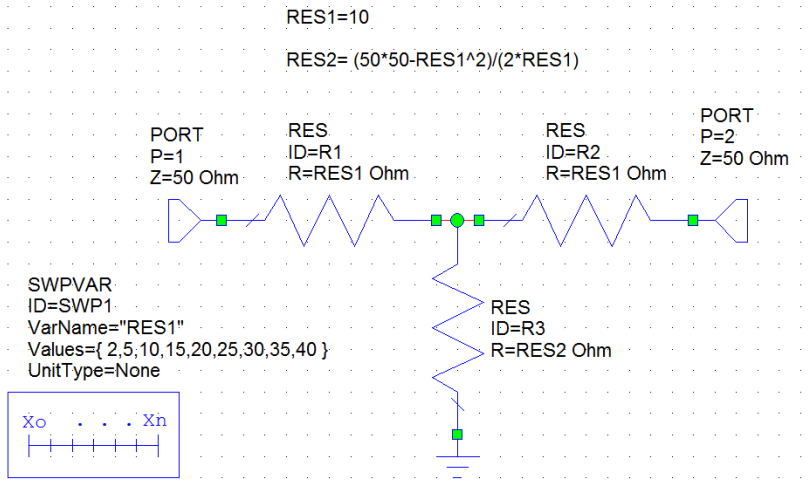
ATTENUATORE A SINGOLO DIODO

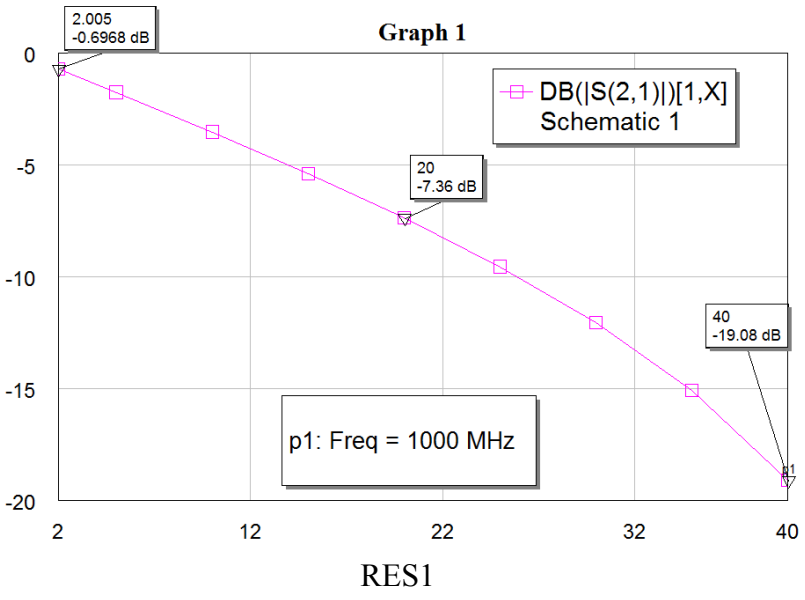




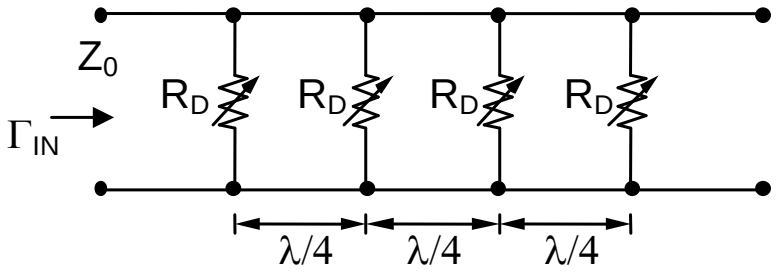


ATTENUATORE A TRE DIODI

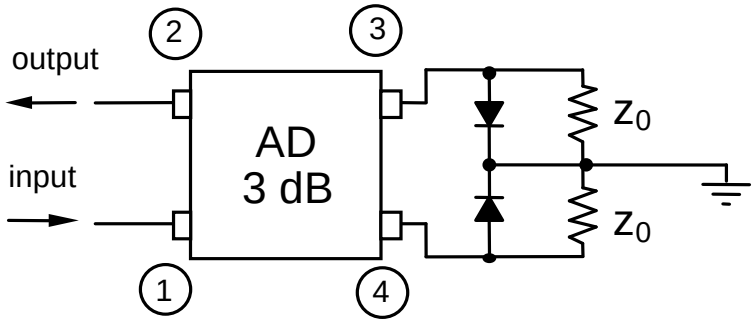




ATTENUATORE A TRASFORMATORE



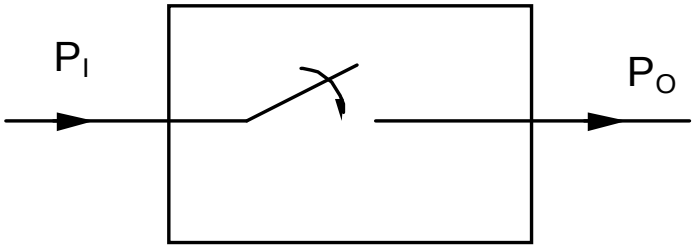
ATTENUATORE CON AD a 90°



$$\mathbf{b}_2 = \frac{-j}{\sqrt{2}}\mathbf{a}_3 + \frac{-1}{\sqrt{2}}\mathbf{a}_4 = \frac{j}{\sqrt{2}}\Gamma_D(-\mathbf{b}_3 + j\mathbf{b}_4) = \frac{j}{\sqrt{2}}\Gamma_D\left(\frac{1}{\sqrt{2}}\mathbf{a}_1 + \frac{1}{\sqrt{2}}\mathbf{a}_1\right) = j\Gamma_D\mathbf{a}_1$$

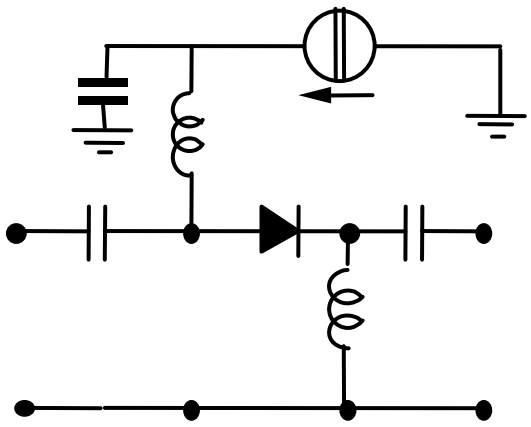
$$\mathbf{b}_1 = \frac{-1}{\sqrt{2}}\mathbf{a}_3 + \frac{-j}{\sqrt{2}}\mathbf{a}_4 = \frac{1}{\sqrt{2}}\Gamma_D(-\mathbf{b}_3 - j\mathbf{b}_4) = \frac{1}{\sqrt{2}}\Gamma_D\left(\frac{1}{\sqrt{2}}\mathbf{a}_1 - \frac{1}{\sqrt{2}}\mathbf{a}_1\right) = 0$$

INTERRUTTORE (SPST)

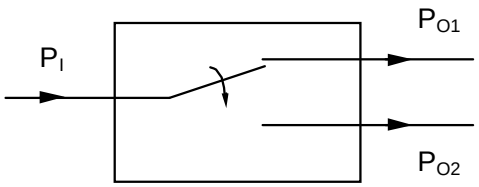


Lo schema logico di un interruttore con un ingresso ed un'uscita (Single Pole Single Throw)

SCHEMA CIRCUITALE

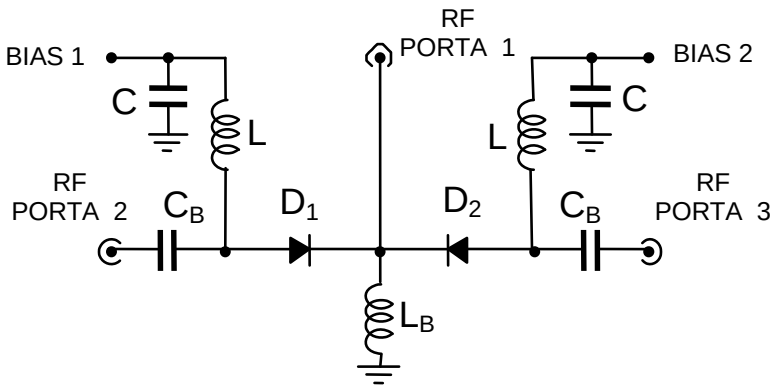


DEVIATORE (SPDT)

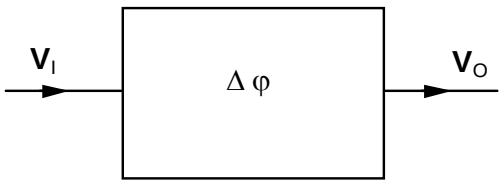


deviatore con un ingresso e due uscite (Single Pole Double Throw).

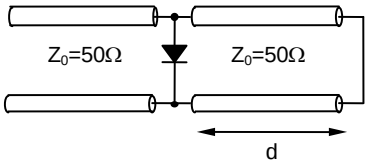
SCHEMA CIRCUITALE

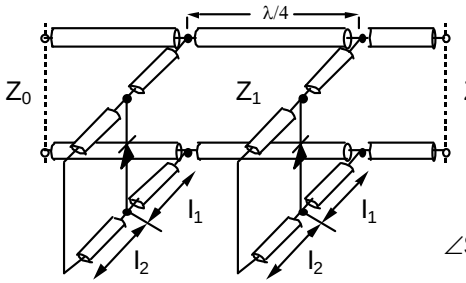


SFASATORI



SFASATORE A DOPPIO STUB

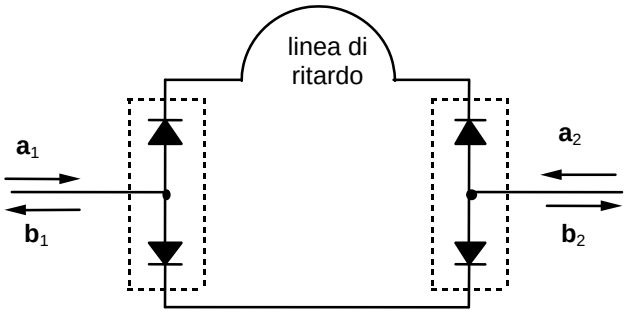




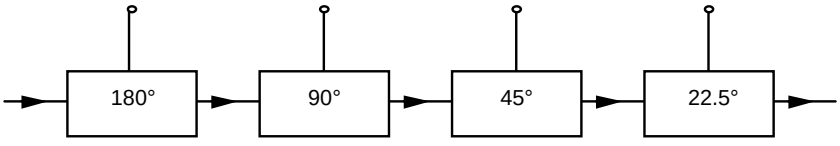
$$S_{21}=\left(\frac{\mathbf{b}_2}{\mathbf{a}_1}\right)_{\mathbf{a}_2=0}=\frac{\mathbf{V}_B}{\mathbf{V}_A}=\frac{-j\sqrt{2}(1\mp j)}{2}$$

$$\angle S_{21}=-90°\mp a\tan(1)=-90°\mp 45°$$

SFASATORE A LINEA DI RITARDO



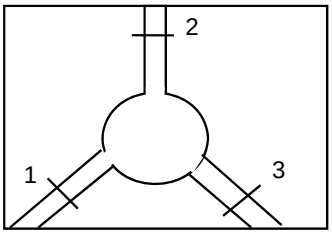
SFASATORE A 4 bit



0, 22.5, 45, ……360

Circolatori
e
Isolatori

Circolatore a ferrite

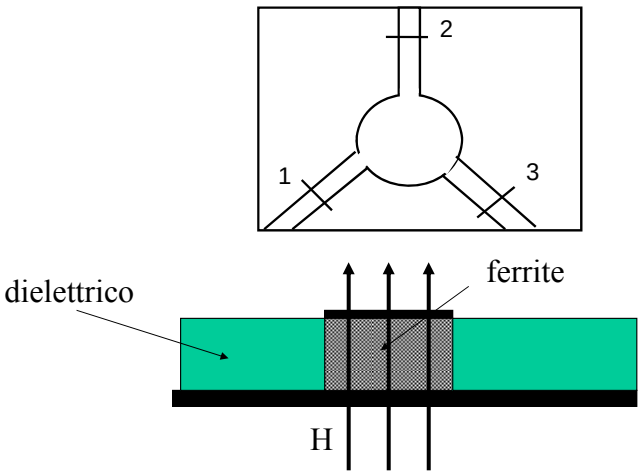


$$[S]=\begin{bmatrix}0 & 0 & 1\\ 1 & 0 & 0\\ 0 & 1 & 0\end{bmatrix}$$

I circolatori sono spesso utilizzati nei sistemi ricetrasmittenti per separare il canale di ricezione da quello di trasmissione

operando come isolatori, possono essere collocati all'uscita degli oscillatori per evitare che la potenza riflessa dal carico interferisca con le oscillazioni

Realizzazione su microstriscia



Isolatori

$$[S]=\begin{bmatrix} 0 & 0 \\ 1 & 0 \end{bmatrix}$$