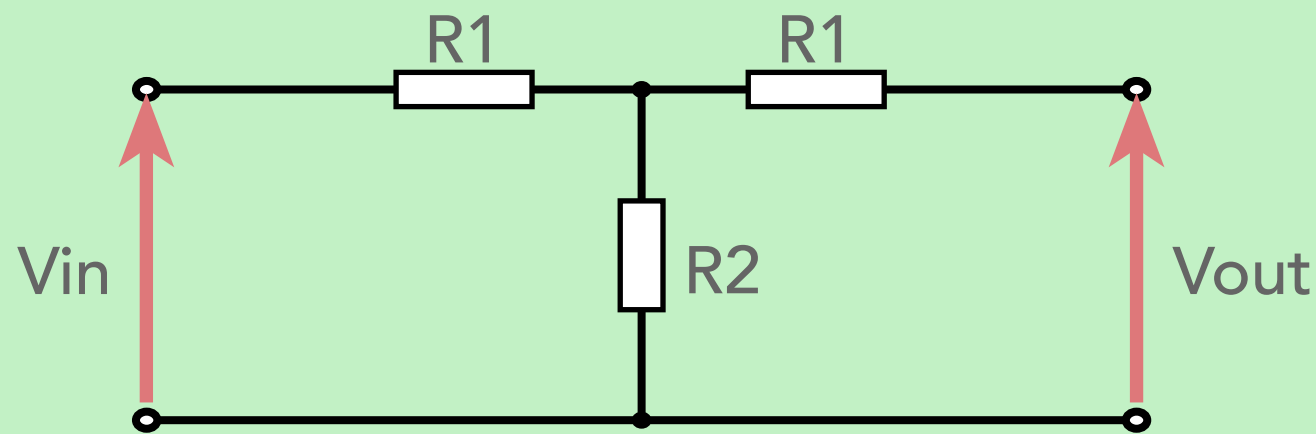# RF Resistive Attenuators:
Circuits & Calculations

There are two main types of resistive RF attenuator: T section and Pi section.

T-section
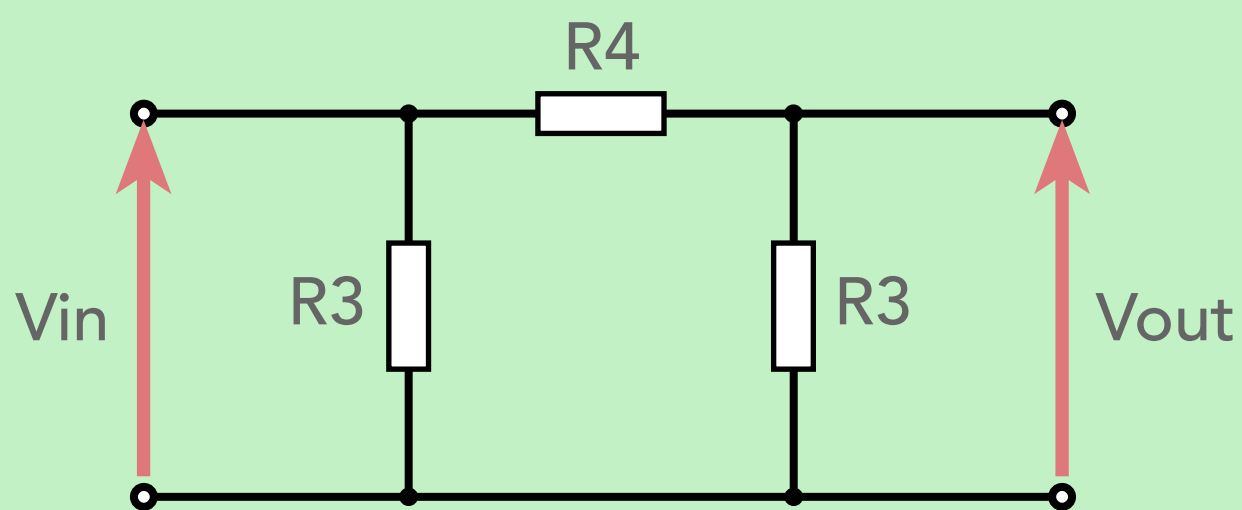
R1   R1

Vin   R2   Vout

$$N = \frac{Vin}{Vout}$$

$$R1 = R_0 \left(\frac{N - 1}{N + 1} \right)$$

$$R2 = R_0 \left(\frac{2N}{N^2 - 1} \right)$$

Pi-section

R4

Vin   R3   R3   Vout

$$N = \frac{Vin}{Vout}$$

$$R3 = R_0 \left(\frac{N + 1}{N - 1} \right)$$

$$R4 = R_0 \left(\frac{N^2 - 1}{2N} \right)$$

Resistor Values for Popular Attenuation Levels (50Ω System)

Loss dB	R1	R2	R3	R4
3	8.5	142	292	17.6
6	16.6	66.9	151	37.3
10	26	35.1	96.2	71.2
12	29.9	26.8	83.5	93.2
15	34.9	18.4	71.6	136
20	40.9	10.1	61.1	248