General Description:

Resistive power divider characteristics are excellent choice for certain applications but are unusable for others. Figure 1 shows the Schematic of a simple 2-Way resistive power divider. Zo is the characteristic impedance of the system. Here are some advantages and disadvantages of the resistive divider:

Advantages:

* Resistive dividers are small because they are constructed utilizing lumped elements or small distributed networks.
* These dividers can be very broadband and are the only type of dividers that operate from DC up to very high frequencies.

Disadvantages:

* Resistive dividers have low power handling capability, limited by the power capability of the resistors.
* Larger resistors may be used but will have an adverse effect on frequency bandwidth due to parasitic capacitance.
* Resistive dividers also have poor isolation from port-to-port and high insertion loss, considering them to be a less likely choice for applications where insertion loss and isolation are important.

Considerations:

Resistive dividers have a power ratio of \((1/N)^2\) (where \(N\) is the number of outputs) where a reactive power divider which has a power ratio of \(1/N\). This means for a 2-Way divider with 1 watt input power, a reactive divider output port will have 0.5 watts which is 50% or a loss of 3 dB of power at each port, a resistive divider’s output will have 0.25 watts which is 25% or a loss of 6 dB at each port. For reference Figure 2 represents a 5-way divider. A Resistive divider’s loss includes distribution loss and resistive loss, unlike the “lossless” reactive divider which only has distribution loss. So as a general rule insertion loss of a resistive power divider is twice that of a reactive unit (see Table 1). A resistive power divider’s insertion loss also equals the isolation from port-to-port.