

Directional Couplers



Low Frequency

Surface Mount, .3-2000 MHz
 Connectorized, .01-2000 MHz

High Frequency

6-8 dB, 0.5-26.5 GHz
 10-16 dB, 0.5-26.5 GHz
 20 dB, 0.5-26.5 GHz
 30 dB, 0.5-26.5 GHz
 Dual Couplers, 0.5-18 GHz

Dual High Power

50-2500 watts, 0.5-1000 MHz

Pulsar has developed a very large number of customized directional couplers. Towards this end, Pulsar utilizes various technologies such as lumped elements, air line, short couplers and stripline circuits.

For low power surface mount requirements with frequencies up to 2000 MHz, lumped elements are used since the losses are good and the dimensions are much smaller than either air line, short couplers and stripline circuits. Two package sizes are available, one of them 0.38 X 0.50 X 0.20 inches and the second 0.25 X 0.31 X 0.20 inches. Coupling values are between 6.5 and 30 dB and power handling is generally 1-3 watts.

All of the surface mount directional couplers are available also in connectorized packages with options of SMA, Type N, BNC and in some cases, F connectors. With the ability to utilize heat sinking techniques, power handling for selected units is now increased to 10-25 watts for some units.

In order to reach higher power handling capability in the connectorized units in the frequency range up to 2000 MHz, it is now necessary to use large ferrites for the lower frequencies and short coupler designs for the higher frequencies. The ferrite approach yields power levels up to 2500 watts with coupling values between 30 and 50 dB whereas the short coupler handles power levels up to 600 watts with the same values.

Directional Coupler Specifications

Coupling

The attenuation of a signal injected into the input port as seen at the coupled port.

Coupling Flatness

The maximum variation in the coupling value over a specified frequency range.

Insertion Loss

The loss of unrecoverable power dissipated within the unit.

Coupling Loss

Power lost from the input signal due solely to the power transferred to the coupling arm of the device.

Mainline Loss

The difference in power between the input signal and the output signal. It is the sum of the Insertion Loss and Coupling Loss.

Directivity

The level of output power at the coupled port when a signal is injected into the unit in the desired direction minus the level of output power at the coupled port when the same signal is injected in the opposite direction. In a bi-directional unit, it is the difference in output power between the two coupled ports as seen from a constant signal in the same direction

VSWR

The VSWR (Voltage Standing Wave Ratio) at any given port (with all other ports terminated) defines the degree of mismatch between the input signal and the input port and thus is a measure of the loss of input signal at that port.

Coupling Value	Coupling Loss (dB)
6 dB	1.2
10 dB	0.46
15 dB	0.14
20 dB	0.04
30 dB	0.004

