

Wideband Transformer Characteristics

Application Note

AN/152

After deciding which of the configurations is required, major characteristics of wideband transformers are:

Input and Output Impedances

Impedances are determined by the source and load impedances to be interfaced by the transformer. Inasmuch as the transformer is essentially a loss less device, terminal voltages and impedance levels are ideally related as $\sqrt{Z_{in}/Z_{out}}$.

Bandwidth

Usually defined by the high and low frequencies where the amplitude response drops 3 dB below that at mid-frequency. Bandwidth may also be defined at the high end, as that frequency where a specified value of VSWR is not exceeded. A typical specification value would be 1.25:1 (-19 dB return loss).

Insertion Loss

Usually specified at mid-band, and typically on the order of 0.2 to 0.5 dB, depending on bandwidth and center frequency.

Power Level

Maximum input that the transformer must handle without saturation, distortion or overheating.

Flatness

In some applications, the transformer insertion loss over a specified band must be held within certain limits. This tolerance value defines the flatness of response.

Return Loss (VSWR)

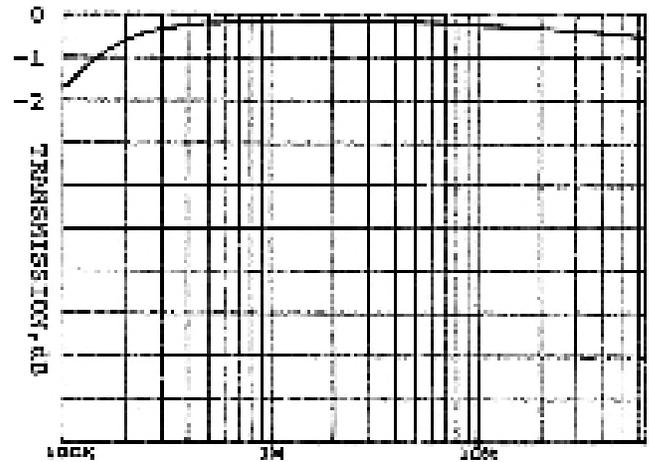
This is the ratio, in dB, of reflected to incident power, and is essentially a measure of the quality of the transformer's specified match to source or load impedance.

Signal Balance in dB

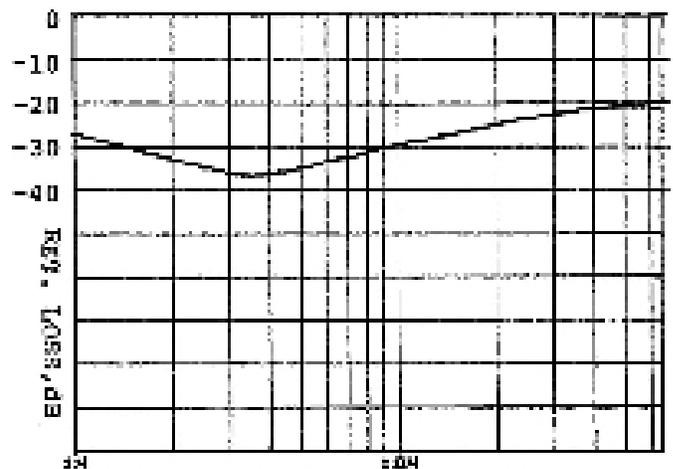
Specified for balanced output windings. Alternately a Common Mode Rejection (CMR) may be specified.

Isolation

Most requirements dictate dc isolation between windings. Exceptions are devices such as coaxial adapters and phase inverters.



Transmission (.1 - 65 MHz)



Return Loss/VSWR (1.0 - 65 MHz)



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