



EXPERIENCE. TRU INNOVATION.

DESIGN AIDS 1

Attenuation

$$\alpha = (k_1 \times \sqrt{f(\text{MHz})} + (k_2 \times f(\text{MHz}))) \text{ (dB/100ft)}$$

Wavelength

$$\lambda = \frac{11.8021 \times V_p}{f(\text{GHz})} \text{ (in)}$$

Length Given Delay

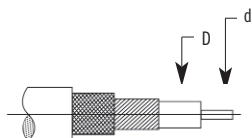
$$L = .9835 \times T \times V_p \text{ (ft)}$$

Characteristic Impedance

$$Z_0 = 60 \times V_p \times \ln\left(\frac{D}{d}\right) \text{ (ohms)}$$

Cut Off Frequency

$$f_{c0} = \frac{7.51 \times V_p}{D + d} \text{ (GHz)}$$



Phase Length

$$\phi = \frac{30.5 \times L(\text{in}) \times f(\text{GHz})}{V_p}$$

Time Delay

$$T = \frac{1.016}{V_p} \text{ (ns/ft)}$$

Capacitance

$$C(\text{pF/ft}) = \frac{16.97}{V_p^2 \ln\left(\frac{D}{d}\right)}$$

Velocity of Propagation

$$V_p = \frac{1}{\sqrt{\epsilon_r}}$$

CABLE/CONNECTOR DIELECTRIC MATERIALS

Material	Dielectric Constant (Nominal)	Temperature Ranges (°C)
Air	1.00	
Solid PTFE	2.10	-75 to +250
Low Density PTFE	1.60	-75 to +250
Cellular TFE	1.40	-75 to +250
PFA	2.10	-75 to +260
Flouroloy H.	2.43	-75 to +204
PE	2.30	-65 to +85
Foam PE	1.46	-95 to +100
Boron Nitride	4.00	-75 to +1800

TYPICAL AVERAGE POWER DERATING FACTORS

Temp °C	Derating Factor	Altitude x 1000 ft	Derating Factor
0	1.20	0	1.00
40	1.00	20	.80
80	.80	30	.70
120	.60	40	.60
160	.40	50	.50
200	.20	60	.40
240	.05	70	.30

TRU Corporation