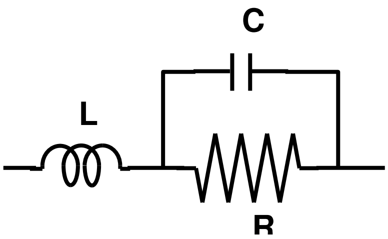
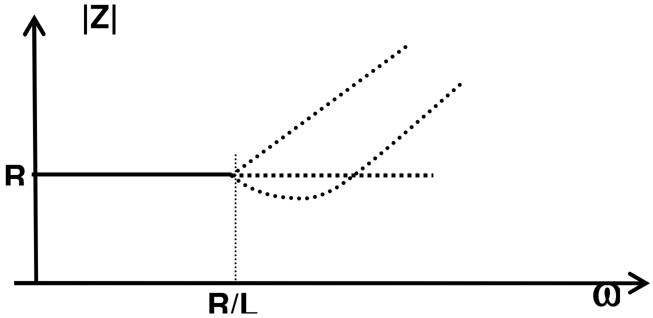
COMPONENTES:

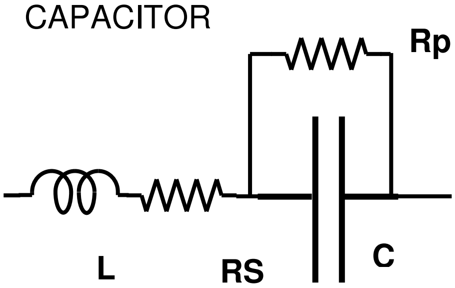
RESISTOR



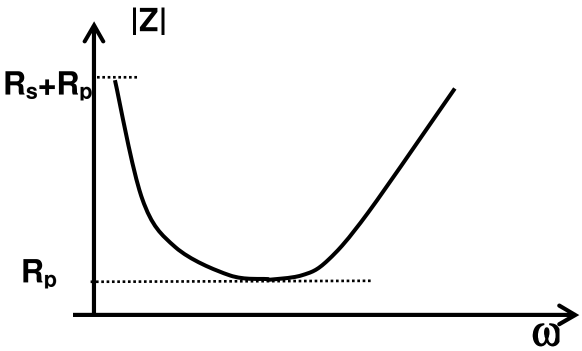
$$Z = \frac{(R-\omega^2 LCR)(1+j\omega\frac{L}{R(1-\omega^2 LC)}}{1+j\omega CR}$$



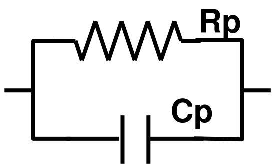
CAPACITOR



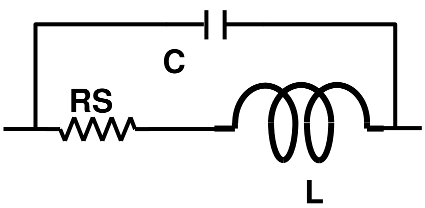
$$Z = \frac{(R_s+R_p-\omega^2 LCR_p)[1+j\omega\frac{LCR_pR_s}{R_s+R_p-\omega^2 LCR_p}]}{1+j\omega CR_p}$$



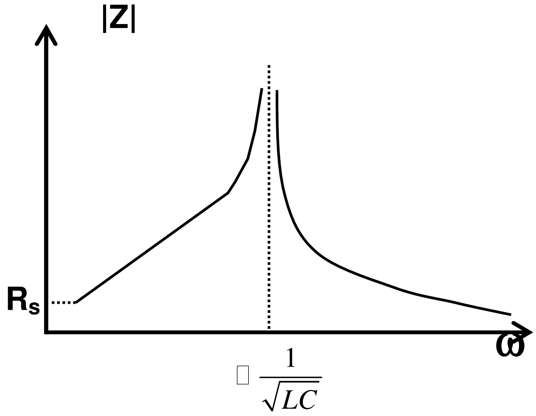
$$D = \frac{1}{\omega C_p R_p}$$



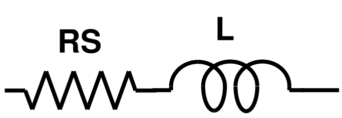
INDUCTOR



$$Z = \frac{Rs + j\omega L}{\left(1-\omega^2 LC\right)\left[1+j\omega\frac{CR_s}{\omega^2 LC}\right]}$$



$$Q = \frac{\omega L}{R_s}$$



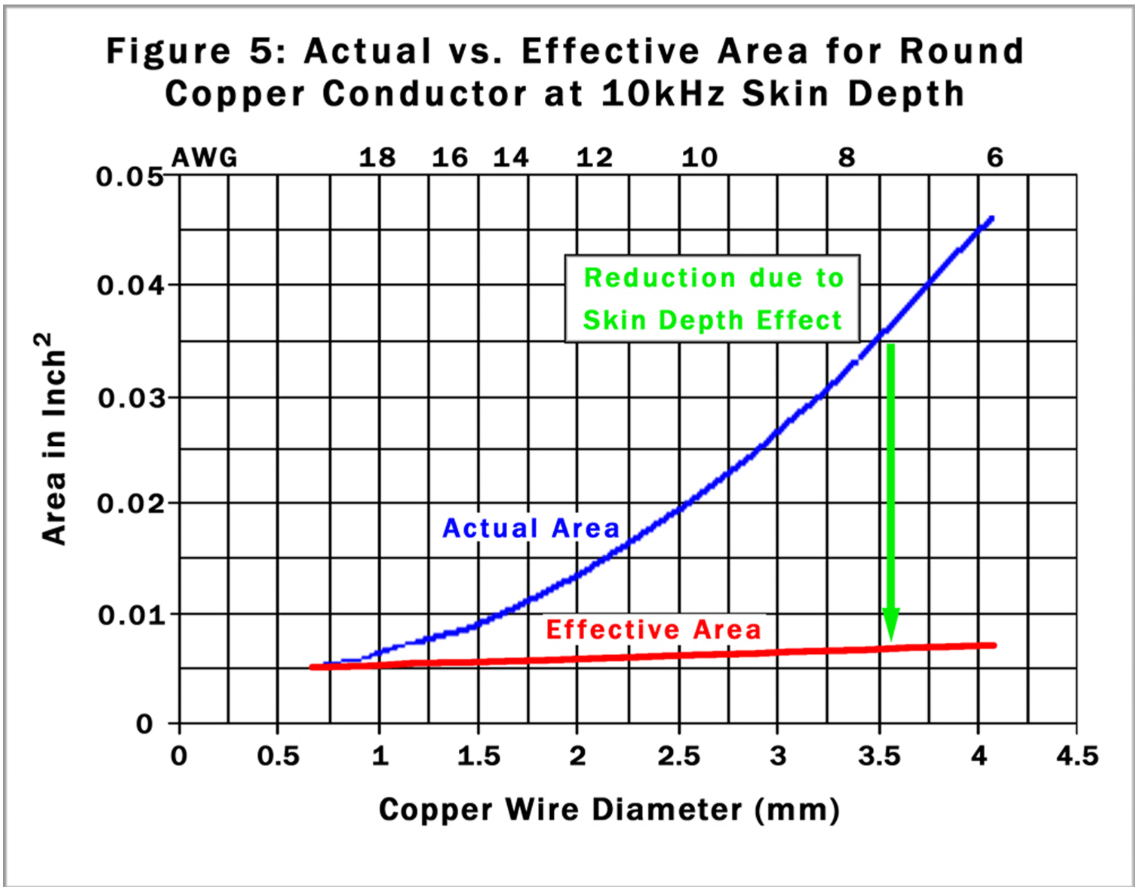


Table 3: Skin Depth

Frequency	inches	mm
60 Hz	0.335	8.5
10 kHz	0.026	0.66
100kHz	0.008	0.206
1MHz	0.0026	0.065

Table 4: Wire Impedance at 10kHz

		Length			
		1m (39")		5m (197")	
AWG	**Diameter**	μH	Ω	μH	Ω
18	1.0 mm	1.97	0.12	11.5	0.72
6	4.1 mm	1.67	0.10	10.0	0.62

Typical ESL Values for Capacitors

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Type of Capacitor	Residual inductance (ESL)
Leaded disc ceramic capacitor (0.01 μF)	3.0 nH
Leaded disc ceramic capacitor (0.1 μF)	2.6 nH
Leaded monolithic ceramic capacitor (0.01 μF)	1.6 nH
Leaded monolithic ceramic capacitor (0.1 μF)	1.9 nH
Chip monolithic ceramic capacitor (0.01 μF, Size: 2.0 x 1.25 x 0.6 mm)	0.7 nH
Chip monolithic ceramic capacitor (0.1 μF, Size: 2.0 x 1.25 x 0.85 mm)	0.9 nH
Chip aluminum electrolytic capacitor (47 μF, Size: 8.4 x 8.3 x 6.3 mm)	6.8 nH
Chip tantalum electrolytic capacitor (47 μF, Size: 5.8 x 4.6 x 3.2 mm)	3.4 nH

The above table shows typical residual inductances (ESL) values for capacitors, which are calculated from the impedance curves shown on the previous page.
The residual inductance varies depending on the type of capacitor. It can also vary in the same type of capacitor, depending on the dielectric material and the structure of the electrode pattern.

[Notes]

Insertion Loss Characteristics of Typical Two-terminal Capacitors

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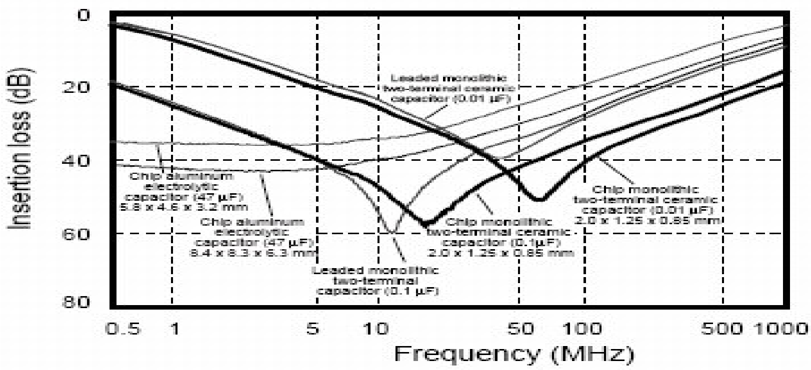

The above drawing shows examples of insertion loss measurements of typical capacitors. For leaded capacitors, the insertion loss is measured with the lead wires cut to 1 mm.

[Notes]