27MHz AM-Sender

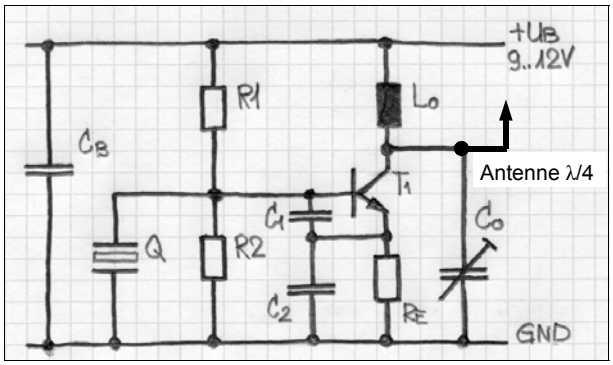
HF-Technik: Praktikum

Für einen Testsender soll ein Quarzoszillator im Bereich von 27MHz gebaut werden. Mit einer geeigneten Schaltung soll dieser Oszillator Amplitudenmoduliert werden. Dies kann erreicht werden, indem die Amplitude der Versorgungsspannung im Rhythmus der NF im Bereich zwischen ca. 7..12V verändert wird.

Hinweise für die Dimensionierung:

Lo und Co müssen mit ihrer Resonanzfrequenz fo der Quarzfrequenz Q entsprechen.

Ure	ca.	3V
Ic	ca.	1mA
Iq durch R1,R2	ca.	0.5mA
C1, C2	ca.	82pF
Cb	ca.	100nF
Co	ca.	100pF
T1		BF 199 oder ähnlich



NPN medium frequency transistor **BF199**

PINNING

PIN	DESCRIPTION
1	base
2	emitter
3	collector

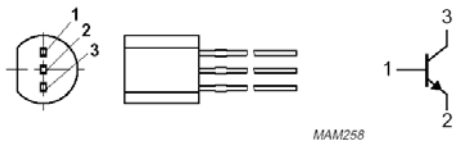


Fig.1 Simplified outline (TO-92; SOT54) and symbol.

Calculating Inductance

The approximate inductance of single-layer air-core coils may be calculated from the simplified formula

$$L\ (\mu H) = \frac{a^2 n^2}{9a + 10b}$$

where L = inductance in microhenrys
a = coil radius in inches
b = coil length in inches
n = number of turns

The notation is explained in Fig. 19. This formula is a close approximation for coils having a length equal to or greater than 0.8a.

Example: Assume a coil having 48 turns wound 32 turns per inch and a diameter of 3/4 inch. This a = 0.75/2 = 0.375, b = 48/32 = 1.5, and n = 48. Substituting,

$$L = \frac{.375 \times .375 \times 48 \times 48}{(9 \times .375) + (10 \times 1.5)} = 17.6\ \mu H$$

To calculate the number of turns of a single-layer coil for a required value of inductance,

$$n = \frac{\sqrt{L(9a + 10b)}}{a}$$

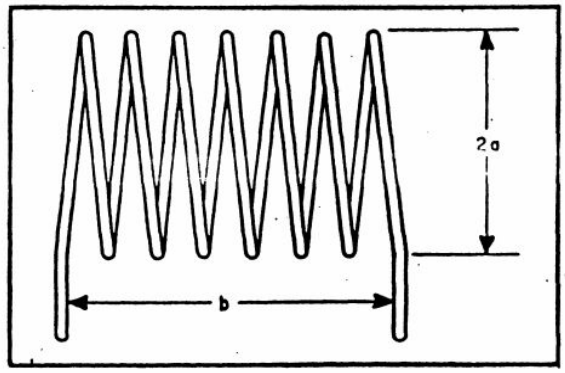


Fig. 19 — Coil dimensions used in the inductance formula. The wire diameter does not enter into the formula. The spacing has been exaggerated in this illustration for clarity. The formula is for closewound coils.