MINIATURE HEPTODE FREQUENCY CHANGER

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Miniature heptode, primarily intended as frequency changer in battery-operated receivers, and suitable for A.V.C.

FILAMENT

This valve is suitable for d.c. operation only.

\[
\begin{align*}
V_f & \quad 1.4 \quad \text{V} \\
l_f & \quad 0.05 \quad \text{A}
\end{align*}
\]

CAPACITANCES

\[
\begin{align*}
C_{g5-a11} & \quad 7.0 \quad \mu\mu\text{F} \\
C_{a-a11} & \quad 7.5 \quad \mu\mu\text{F} \\
C_{g1-a11} & \quad 3.8 \quad \mu\mu\text{F} \\
C_{g5-a} & \quad \angle 0.4 \quad \mu\mu\text{F} \\
C_{g5-e1} & \quad \angle 0.2 \quad \mu\mu\text{F} \\
C_{a-e1} & \quad \angle 0.1 \quad \mu\mu\text{F}
\end{align*}
\]

OPERATING CONDITIONS

\[
\begin{align*}
V_a & \quad 45 \quad 67.5 \quad 90 \quad 90 \quad \text{V} \\
V_{g5+e4} & \quad 45 \quad 67.5 \quad 45 \quad 67.5 \quad \text{V} \\
V_{g5} & \quad 0 \quad 0 \quad 0 \quad 0 \quad \text{V} \\
R_{e1} & \quad 100 \quad 100 \quad 100 \quad 100 \quad \text{K}\ \Omega \\
R_b & \quad 600 \quad 500 \quad 800 \quad 600 \quad \text{K}\ \Omega \\
g_e & \quad 235 \quad 280 \quad 250 \quad 300 \quad \mu\text{A/V} \\
V_{g5} (g_e=5 \ \mu\text{A/V}) & \quad -9 \quad -14 \quad -9 \quad -14 \quad \text{V} \\
l_e & \quad 0.7 \quad 1.4 \quad 0.8 \quad 1.6 \quad \text{mA} \\
l_{g5+e4} & \quad 1.9 \quad 3.2 \quad 1.9 \quad 3.2 \quad \text{mA} \\
l_{e1} & \quad 150 \quad 250 \quad 150 \quad 250 \quad \mu\text{A} \\
l_k & \quad 2.75 \quad 5.0 \quad 2.75 \quad 5.0 \quad \text{mA}
\end{align*}
\]

OSCILLATOR SECTION

\[
\begin{align*}
V_{e1} &= V_{g5} \\
V_{g2} &= V_{g4} = V_a \\
g_m &= (k_1 - k_2 - k_4 + \beta)
\end{align*}
\]

\[
\begin{align*}
V_{e1} & \quad 0 \quad \text{V} \\
V_{g2} & \quad 67.5 \quad \text{V} \\
g_m & \quad 1.4 \quad \text{mA/V}
\end{align*}
\]

LIMITING VALUES

\[
\begin{align*}
V_a \text{ max.} & \quad 90 \quad \text{V} \\
V_{g5+e4(b)} \text{ max.} & \quad 90 \quad \text{V} \\
V_{g5+e4} \text{ max.} & \quad 67.5 \quad \text{V} \\
V_{g5} \text{ max.} & \quad 0 \quad \text{V} \\
l_k(\text{max}) & \quad 5.5 \quad \text{mA}
\end{align*}
\]
CIRCUITS

Frequency changer circuits employing the DK91, for a medium and long wave receiver and for an all-wave receiver are given on page 3.

In these circuits—

\( C \) designates a decoupling capacitor.

\( L_c \) is a filament choke of 12 \( \mu \)H inductance and with a d.c. resistance of less than 0.5 \( \Omega \).

\( L_b \) is the booster coil which should be designed to resonate in conjunction with its associated capacitor at a frequency just below the lower limit of the short wave band. For a receiver covering the range 5.8 to 18.7 Mc/s and having an intermediate frequency of 465 kc/s the booster circuit should resonate at 4.75 Mc/s. Suitable values are: \( C = 100 \mu \mu \text{F}, L_b = 11 \mu \text{H} \).

\( L_d \) is the short wave coil and should have a Q of approximately 115 at 6.5 Mc/s.
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CIRCUIT FOR MEDIUM AND LONG WAVE RECEIVER

CIRCUIT FOR ALL WAVE RECEIVER

O63
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ANODE CURRENT PLOTTED AGAINST ANODE VOLTAGE