

amplifiers based on discrete components.

Matched dual transistors, $Tr_{1,2}$ and $Tr_{3,4}$, a decoupling capacitor C_r , and equal values for R_b and R_f are used to minimise the DC offset.

A problem with power transistors driven by a current source is that there is no turn-off resistor for them. Under high-frequency, high-amplitude drive there will be a tendency for the effective bias current to rise dynamically.

By using HF power transistors with an f_T of 80MHz, this bias current rise is reduced to 60% at 20kHz at full drive.

Summary of measurements

The DC offset is 3.5mV and the slew rate 7V/ μ s. Distortion curves are presented in **Fig. 11**. Photographs of the square-wave response, in **Fig. 12**, demonstrate the amplifier's stability.

In the THD waveform at 30W, 20kHz, **Fig. 13**, no switching distortion occurs. The residual signal only contains low harmonics which are not very audible. Overdrive and recovery at 5kHz are shown in **Fig. 14**.

Thermal performance has been tested with an output power of 100W using a 1kHz sine wave and 2Ω load, which is 2.5 times the nominal value.

After two hours, the bias current rise was limited to 44 %, mainly due to the temperature coefficient of the current gain of the output transistors. This test confirms the thermal stability of the amplifier.

Table 1 is showing approximately equal results for PSpice simulations and measurements.

In summary

This class-AB common-emitter power amplifier incorporates a new current-mode class AB driver circuit to obtain good thermal stability of the quiescent current in the output stage. It also guarantees non-zero currents in the output transistor that is conducting the residual current, avoiding HF switching distortion.

Maximum output voltage is near to the rail-to-rail limit. Saturation in power transistors is avoided, resulting in fast

recovery from clipping. The circuit has an excellent stability due to a phase margin of 85° with a β 1/34.

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References

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