Towards higher power density amplifiers

This paper proposes a new switching strategy for switch-mode power audio amplifiers beneficial for the power dissipation in the switching devices of the power stage. The strategy is based on a thorough analysis of the loss mechanism and operating conditions of the power stage and how they relate to the audio input. The strategy utilizes a high ripple current combined with full state control improve soft switching capabilities. This result in a shift of losses from switching devices to filter inductors which are less sensitive to loss variations due to a larger form factor. Measured results on 100 W test amplifiers show that the proposed strategy reduces the power dissipation within the switches causing up to 45°C temperature reduction locally in the switches and up to 35°C globally in the amplifier. THD+N levels are down to 0.03 % and power density of implemented amplifiers are 6 W/cm³.

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