An EMI-Reduction design with Charge Pump Circuit and Hybrid Modulation Technology for a Motor Driver Applications in 0.18um BCD process

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Abstract

An EMI-reduction charge pump circuit with hybrid modulation is proposed for the motor driver circuits. Periodic modulation technique changes the range of spread spectrum as coarse modulation. Random modulation technique, as fine-tuning, changes its edge delay to slow the speed of switch-edge. Simultaneously, the proposed buffer circuit can limit the charge and discharge current of the charge pump and reduces the variation of the current peak. Compared with the circuit without modulation, EMI is reduced by up to 28dB. The proposed design fabricated in a 0.18um BCD process occupies an area of 0.173mm$ˆ{2}$, and its power consumption is 5.677mW.

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