A 300-μW Audio ΔΣ Modulator With 100.5-dB DR Using Dynamic Bias Inverter

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Dynamic Bias Inverter

- High $g_m/I$, Slew rate $\rightarrow$ Power efficient
- Floating Current Source $\rightarrow$ PVT Tolerance
Conventional Dynamic Bias Scheme

- Settling time of dynamic bias voltage \((\tau = \frac{C_P}{I_B})\)
- Limiting operating frequency (<1MHz)
Proposed Dynamic Bias Scheme

- Dynamic compensation between $C_P$ and $C_{CP}$
- Increasing operating frequency up to x10
Measurement Result

- 3rd order CIFF Audio-band DSM @ 6.1MS/s
- Achieves 178.7dB FoM_S with PVT tolerance

\[ \text{FoM}_S = \text{DR} + 10 \log (\text{BW/Power}) \]