A 50-MHz 98-dB Dynamic-Range dB-Linear Programmable-Gain Amplifier with 2-dB Gain Steps for 3-V Power Supply

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A programmable-gain amplifier (PGA) circuit introduced in this paper has a dynamic gain range of 98-dB with 2-dB gain steps and is controlled by 6-bit gain control bits for a 3-V power supply. It has been fabricated in a 0.5-µm 15-GHz $f_T$ Si BiCMOS process and draws a constant current of 13-mA, independent of the gain settings. The active die area taken up by the circuit is 400-µm × 1170-µm. A noise figure (NF) of 5-dB was measured at the maximum gain setting.