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(54) **ANALOG TO DIGITAL CONVERTER AND A METHOD FOR ANALOG TO DIGITAL CONVERSION**

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(57) **ABSTRACT**

An analog to digital converter (ADC) receives first and second analog input signals. A charge sampling demultiplexer includes multiple capacitors that sample the first and second analog input signals, and generates multiple input samples representative of charge stored on the capacitors. A plurality of sub-ADCs each include first and second charge-to-time converters, which receive from the charge sampling demultiplexer respective first and second input sample of the first and second analog input signals and output respective first and second pulse-width-modulated (PWM) signals responsively to the respective first and second input samples. Temporal processing circuitry processes the PWM signals to generate a digital value indicative of a temporal difference between the first and second PWM signals. Output reordering circuitry receives the digital value from each of the sub-ADCs and generates a digital output indicative of a difference between the first and second analog input signals.