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Abstract
We use ALU broadly in VLSI such as Digital Signal Processor (DSP), Image Processor, and Microprocessor. Adder, subtractor, and multiplicer, which are included full adder, are the most common operation units in ALU. We can use software to do most calculation but not use hardware. The most basic circuit doing calculation in the computer is binary adder. For example, we can use of addition to do subtracting, continuous adding to do multiplication, and continuous subtracting to do division. Thus, adder is very important in the ALU and also can influence the performance of system.

VLSI design has already entering into a portable SOC century, so low power consumption has become an important problem. We proposed three brand new full adders which is low power and realized in Bootstrapped Pass Transistor Logic. We also design a new XOR-XNOR, used in our full adder, which can generate full swing signal at the same time.
We proposed 8 kinds of full adder and all of them are realized in 4 bit ripple carry adder. We also use Hspice to simulate the performance of the circuit and also tapeout our circuit in TSMC 0.35μm Mixed-Signal 2P4M Polycide 3.3/5V process. After comparing with other circuit, we can find that our circuit is low power and high speed.
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