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论文

ECL集成电路的四值接口技术

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摘要
本文介绍了适用于多值ECL电路设计的差动电流开关理论。在该理论中, 分别用开关变量和四值信号变量来描写ECL电路中差动晶体管对的开关状态和信号, 并引入此两类变量之间的联结运算, 以描写电路内部开关元件与信号的相互作用过程。基于该理论, 本文对两种接口电路——2-4编码器和4-2译码器进行了设计。应用SPICE程序对设计电路的计算机模拟表明, 两种电路均具有正确的逻辑功能、理想的DC转移特性和瞬态特性。由于该接口电路具有与二值电路兼容的集成工艺、电源设备、逻辑级差和瞬态特性, 因此它可用作现有二值ECL集成电路的输入输出接口, 从而达到减少芯片的引脚数和片间连接的目的。

关键词 多值逻辑 ECL 接口电路

分类号

THE QUATERNARY INTERFACE TECHNIQUE IN ECL INTEGRATED CIRCUITS

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Abstract
The theory of differential current switches which applies to the designof multivalued ECL circuits is introduced. In this theory, the switching state of differential transisror pair and signal in ECL circuits are described by switching variable and quaternary signal variable, respectivcly. The connection opemtions bctween the two kinds of variables are introduced to describe the action process between switching element and signal in the circuits.Based on this theory, two kinds of interface circuits--2-4 encoder and 4-2 decoder are de-
signed. The computer simulation for the designed circuits by using SPICE program confirm
that both circuits have correct logic functions, desired DC transfer characteristics and transi-
ent characteristics. These interface circuits are compatible with binary circuits in the integra-
ted process, the power supply equipment, the logic stage and the transient characteristic. Therefore, they can be used as input-output interface of the existing binary ECL integrated
circuits so as to decrease the number of pins of a chip and the connections between chips.

Key words Multivalued logic ECL Interface circiut

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