

64_bit_multiplier

2014011065 微电 41 程荆磊

1. 写出 64 位乘法器的结构图或设计思想

设计思想:利用 booth 编码产生部分积, 然后累加得到最后的结果。

仿真结果:

Objects				
Name	Value	Kind	Mode	
B	64'h0000000000000012c	Pack...	Internal	
A	64'h000000000000000c8	Pack...	Internal	
C	128'h00000000000000000000000000000000ea60	Net	Internal	

结果是 $200 \times 300 = 60000$

时延报告:

Point	Incr	Path
input external delay	0.00	0.00 f
in1[0] (in)	0.00	0.00 f
U1113/Y (INVX8)	0.03	0.03 r
U1115/Y (NAND2X4)	0.07	0.10 f
U1026/Y (INVX8)	0.08	0.19 r
U1027/Y (NAND2X2)	0.08	0.26 f
U1034/Y (INVX4)	0.09	0.35 r
U1035/Y (AND2X4)	0.19	0.55 r
U1037/Y (XOR2X4)	0.22	0.76 f
U266/Y (BUFEX12)	0.16	0.92 f
U275/Y (OAI21X4)	0.12	1.04 r
U1068/S (ADDFHX4)	0.47	1.51 f
U725/CO (ADDFHX2)	0.30	1.81 f
U594/S (ADDFHX2)	0.32	2.13 r
DP_OP_674J1_296_9245/U2446/S (ADDFHX2)	0.42	2.54 r
DP_OP_674J1_296_9245/U2439/S (ADDFHX2)	0.32	2.86 r
U370/CO (ADDFHX4)	0.43	3.29 r
U11232/CO (ADDFHX4)	0.42	3.71 r
U11779/CO (ADDFHX4)	0.45	4.16 r
U11723/S (ADDFHX4)	0.36	4.52 f
U277/Y (NOR2X4)	0.13	4.65 r
U278/Y (OAI21X4)	0.08	4.73 f
U281/Y (AOI21X2)	0.13	4.86 r
U1098/Y (OAI21X2)	0.13	4.99 f
U1099/Y (AOI21X4)	0.14	5.13 r
U1139/Y (OAI21X4)	0.11	5.24 f
U1101/Y (INVX4)	0.09	5.33 r
U1102/Y (INVX4)	0.09	5.42 f
U1109/Y (AOI21X1)	0.16	5.58 r
U1112/Y (XOR2X1)	0.25	5.83 r
out[124] (out)	0.00	5.83 r
data arrival time		5.83
max_delay	1.00	1.00
output external delay	0.00	1.00
data required time		1.00
data required time		1.00
data arrival time		-5.83
slack (VIOLATED)		-4.83

面积报告:

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Number of ports:          256
Number of nets:           22491
Number of cells:          20706
Number of references:     154

Combinational area:       515139.610666
Noncombinational area:    0.000000
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功耗报告:

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Global Operating Voltage = 1.62
Power-specific unit information :
    Voltage Units = 1V
    Capacitance Units = 1.000000pf
    Time Units = 1ns
    Dynamic Power Units = 1mW      (derived from V,C,T units)
    Leakage Power Units = 1pW

    Cell Internal Power   = 206.7939 mW      (70%)
    Net Switching Power   =  87.2528 mW      (30%)
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    Total Dynamic Power    = 294.0467 mW      (100%)

    Cell Leakage Power     =  59.2239 uW
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