We want to design some logic that can implement and 2-input Boolean logic expression.

How many possible logic combinations.

$Y_N=F_N(A,B)$

2 inputs, $2^2=4$ input combinations, $4^2=16$ Possible Functions

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A	B	Y_0	Y_1	Y_2	Y_3	Y_4	Y_5	…	Y_{15}
0	0								
0	1								
1	0								
1	1								

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2 inputs, $2^2=4$ input combinations, $4^2=16$ Possible Functions

A	B	Y_0	Y_1	Y_2	Y_3	Y_4	Y_5	…	Y_{15}
0	0	0	1	0	1	0	1		1
0	1	0	0	1	1	0	0		1
1	0	0	0	0	0	1	1		1
1	1	0	0	0	0	0	0		1

$Y_N = F_N(A,B)$

2 inputs, $2^2=4$ input combinations, $4^2=16$ Possible Functions

A	B	Y_0	Y_1	Y_2	Y_3	Y_4	Y_5	Y_6	…	Y_{15}
0	0	0	1	0	1	0	1	0		1
0	1	0	0	1	1	0	0	1		1
1	0	0	0	0	0	1	1	1		1
1	1	0	0	0	0	0	0	0		1

$Y_0 = 0$

$Y_1 = /A\cdot/B$, NOR Gate

$Y_2 = /A\cdot B$

$Y_3 = /A\cdot/B + /A\cdot B = /A$

$Y_4 = A\cdot/B$

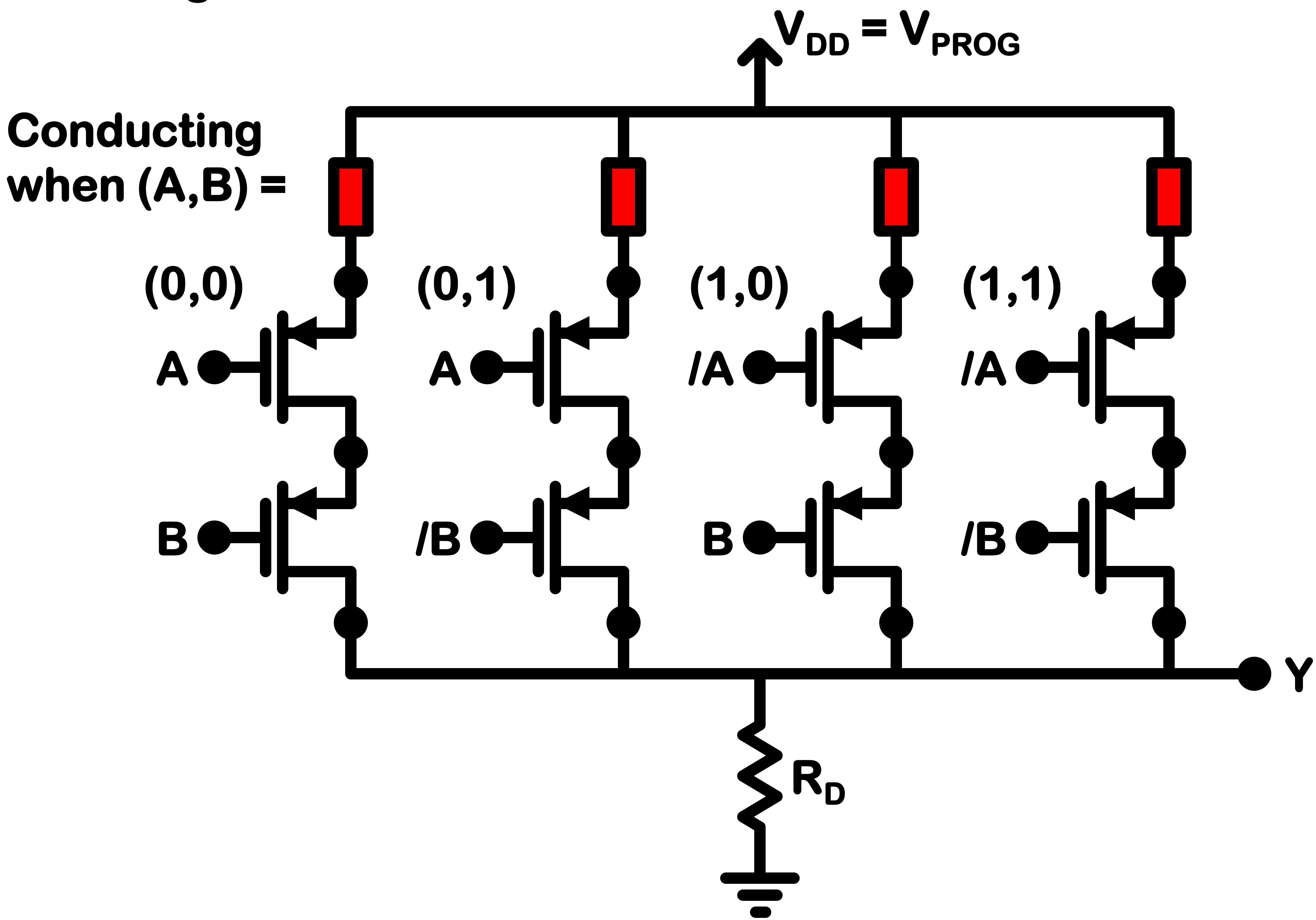
$Y_5 = /A\cdot/B + A\cdot/B = /B$

$Y_6 = /A\cdot B + A\cdot/B$, XOR Gate

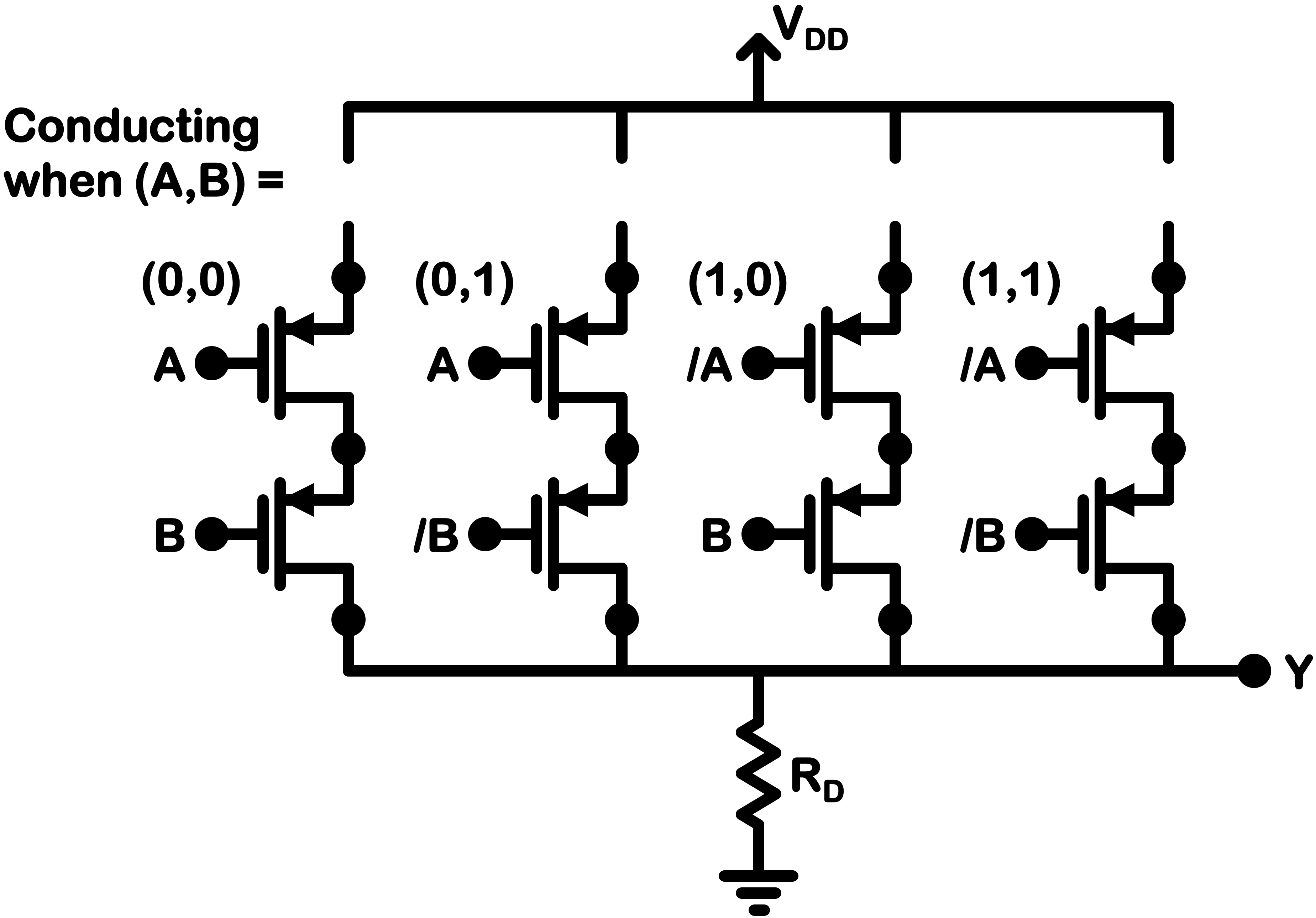
…

$Y_{15} = /A\cdot/B + /A\cdot B + A\cdot/B + A\cdot B = 1$

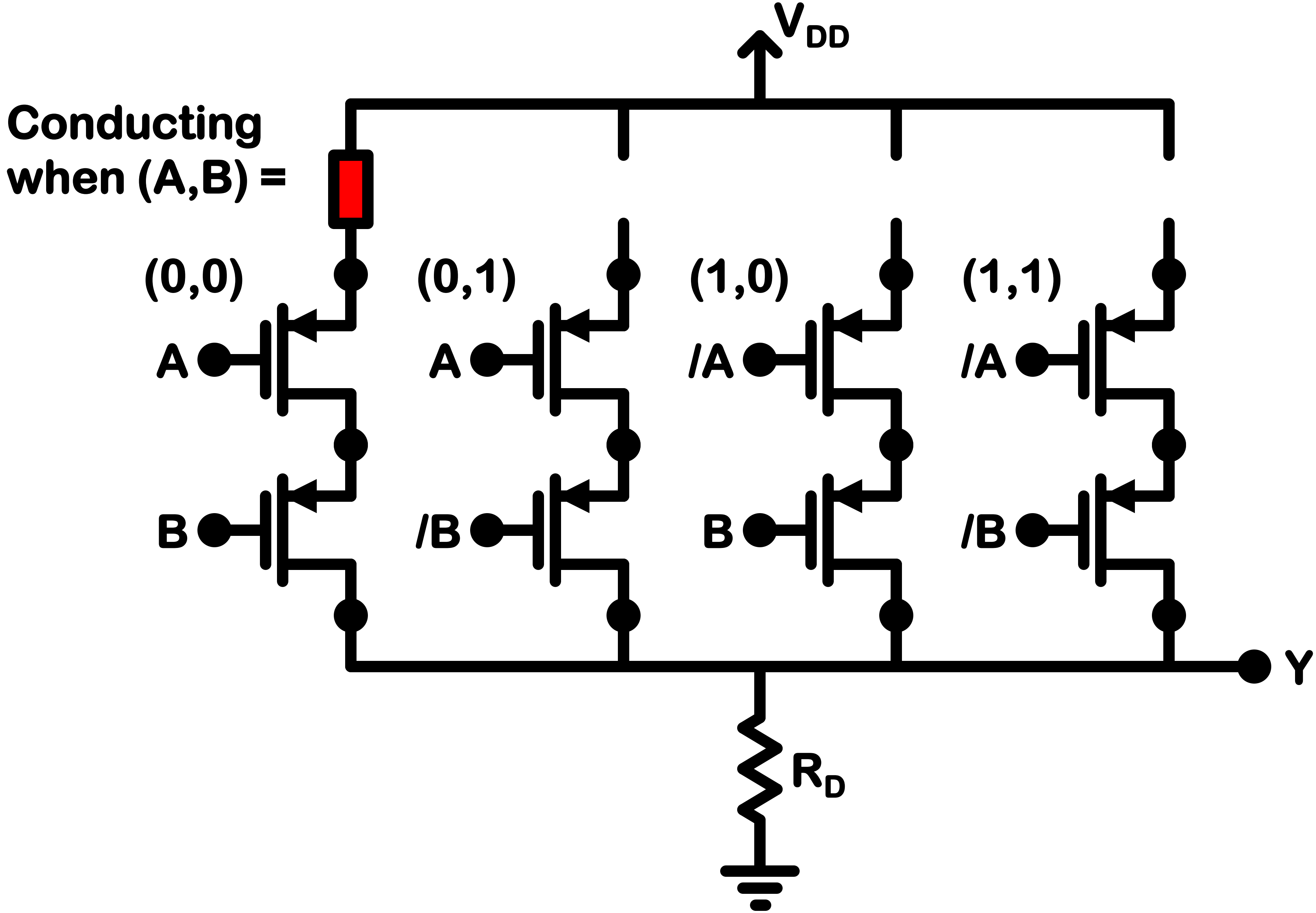
Fuse Programmable



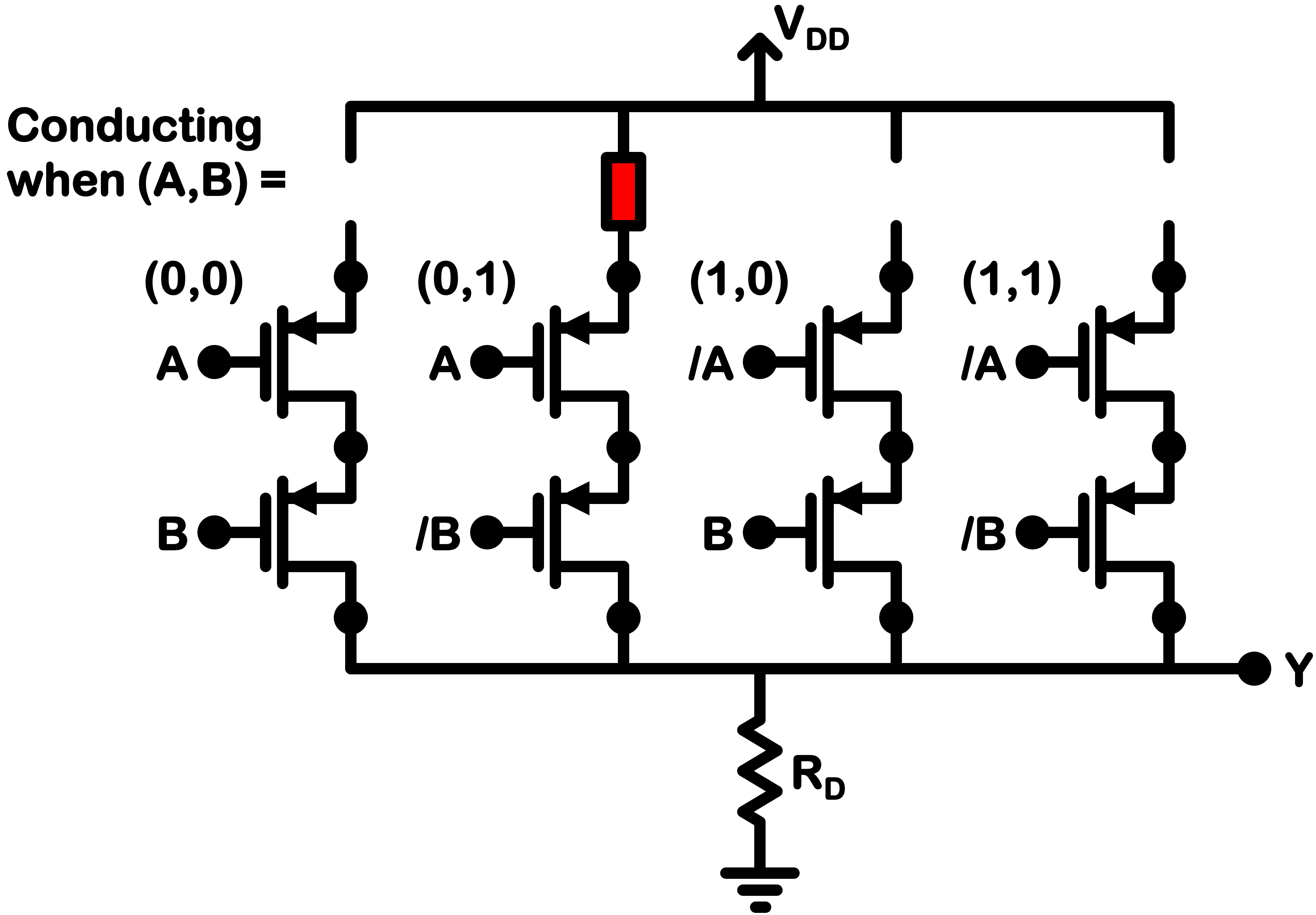
$Y_0 = 0$



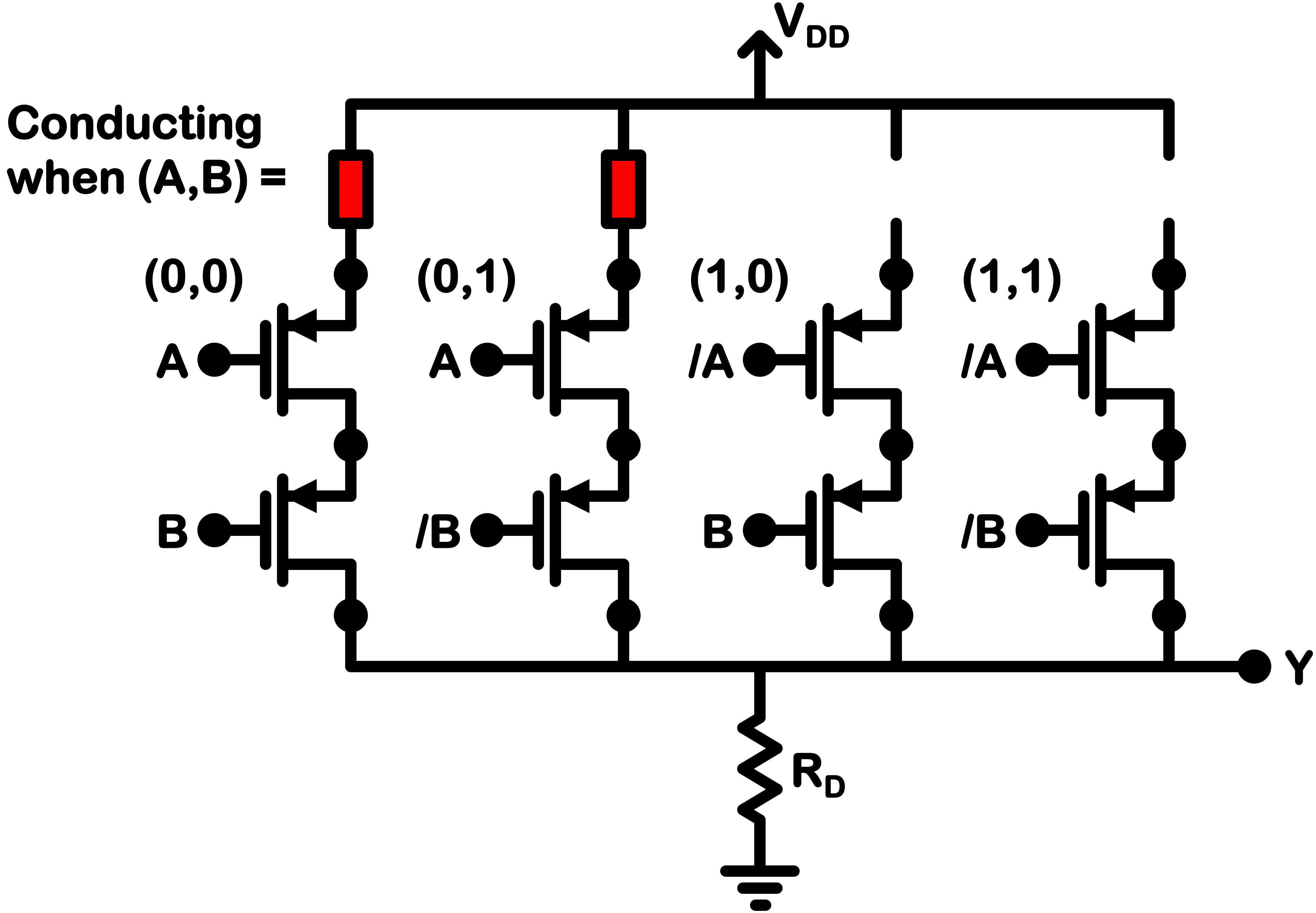
$Y_1 = /A \cdot /B$, express Y in terms of inverted inputs.



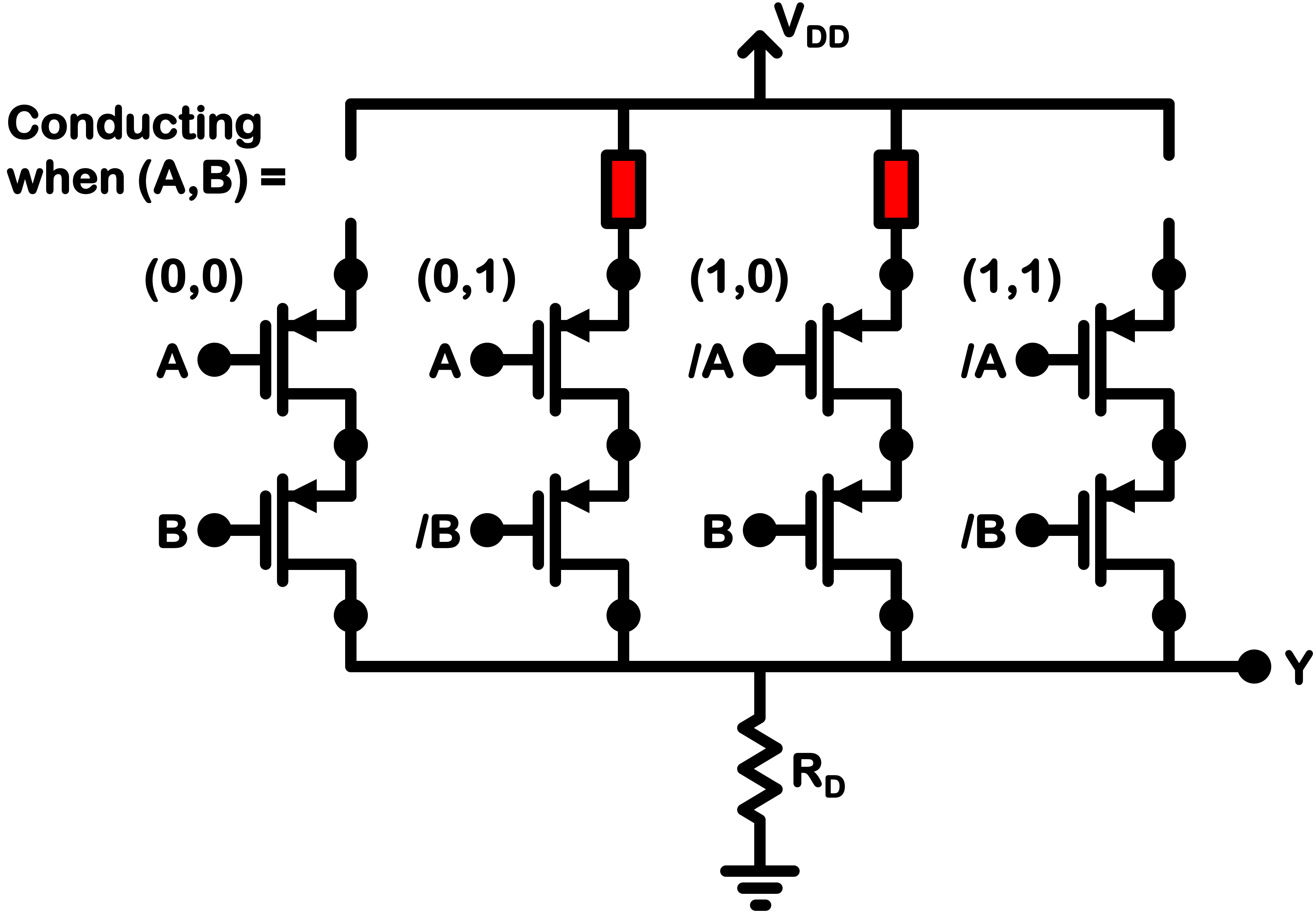
Y_2 = /A·B, express Y in terms of inverted inputs.



Y_3 = /A·/B + /A·B, express Y in terms of inverted inputs.



$Y_6 = A \cdot /B + /A \cdot B$, XOR, express Y in terms of inverted inputs.



$Y_N = F_N(A,B)$

2 inputs, $2^2=4$ input combinations, $4^2=16$ Possible Functions

A	B	Y_0	Y_1	Y_2	Y_3	Y_4	Y_5	Y_6	…	Y_{15}
0	0	0	1	0	1	0	1	0		1
0	1	0	0	1	1	0	0	1		1
1	0	0	0	0	0	1	1	1		1
1	1	0	0	0	0	0	0	0		1

$/Y_0 = /A\cdot/B + /A\cdot B + A\cdot/B + A\cdot B = 1$

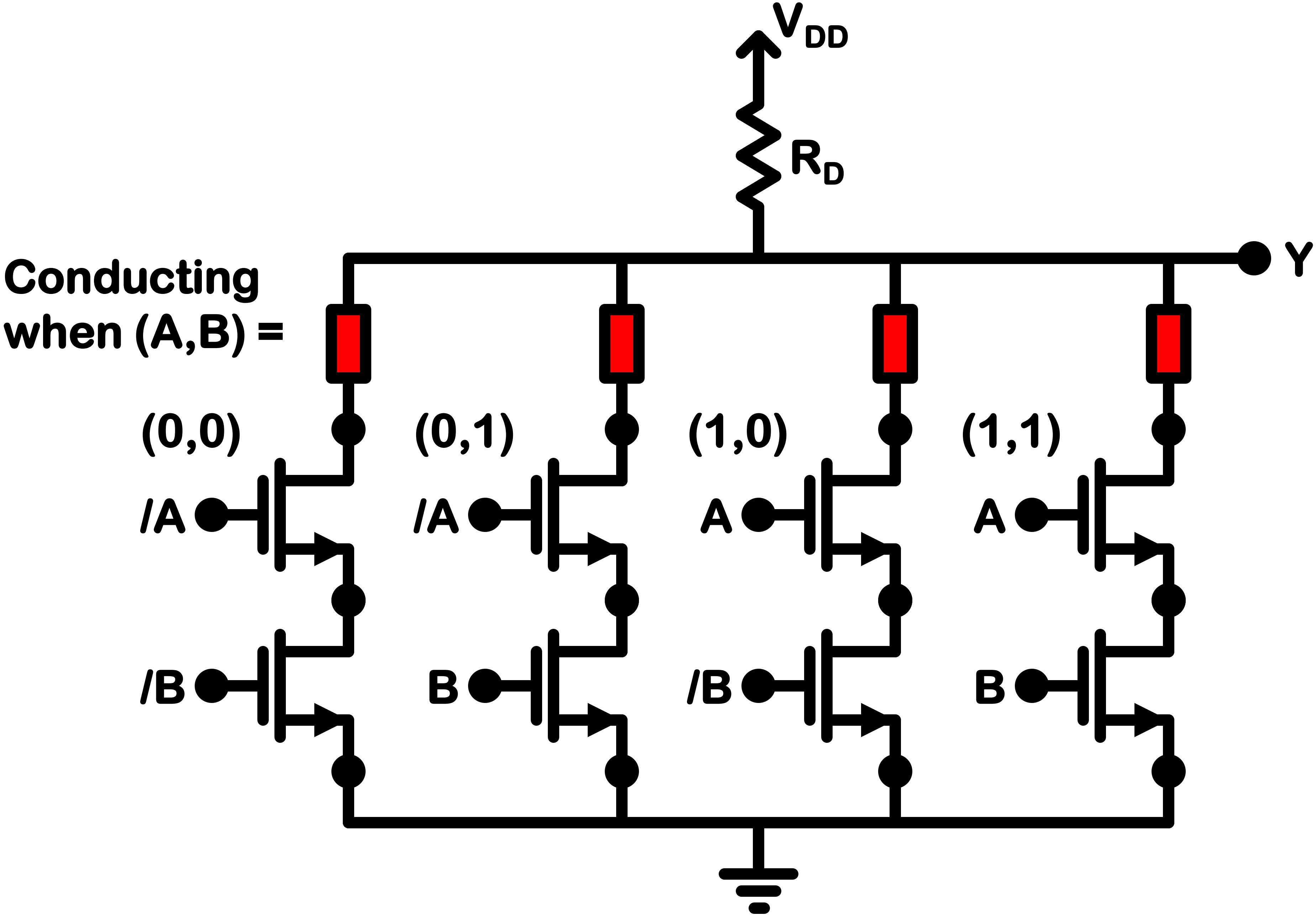
$/Y_1 = /A\cdot B + A\cdot/B + A\cdot B$, NOR Gate

…

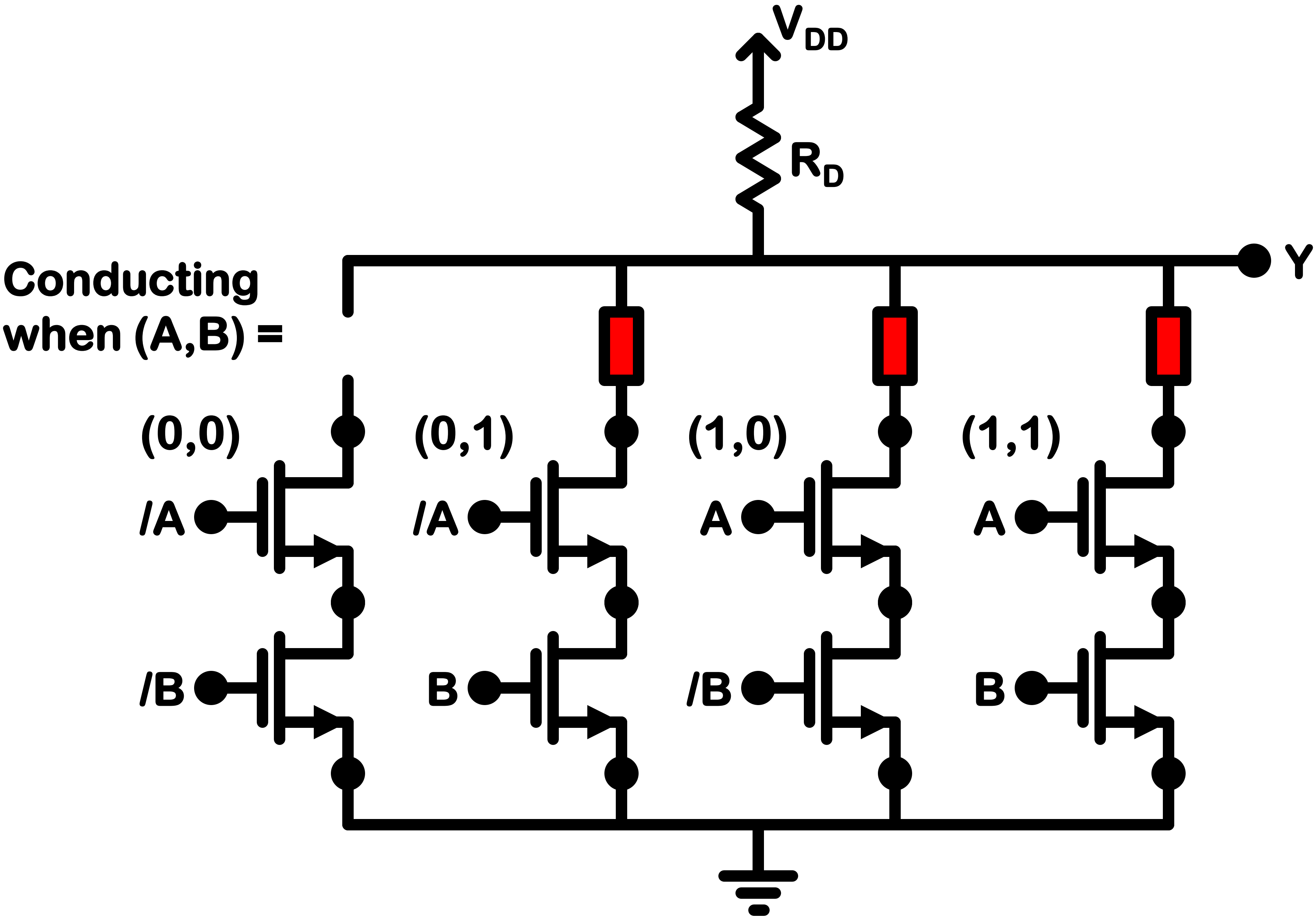
$/Y_6 = /A\cdot/B + A\cdot B$

…

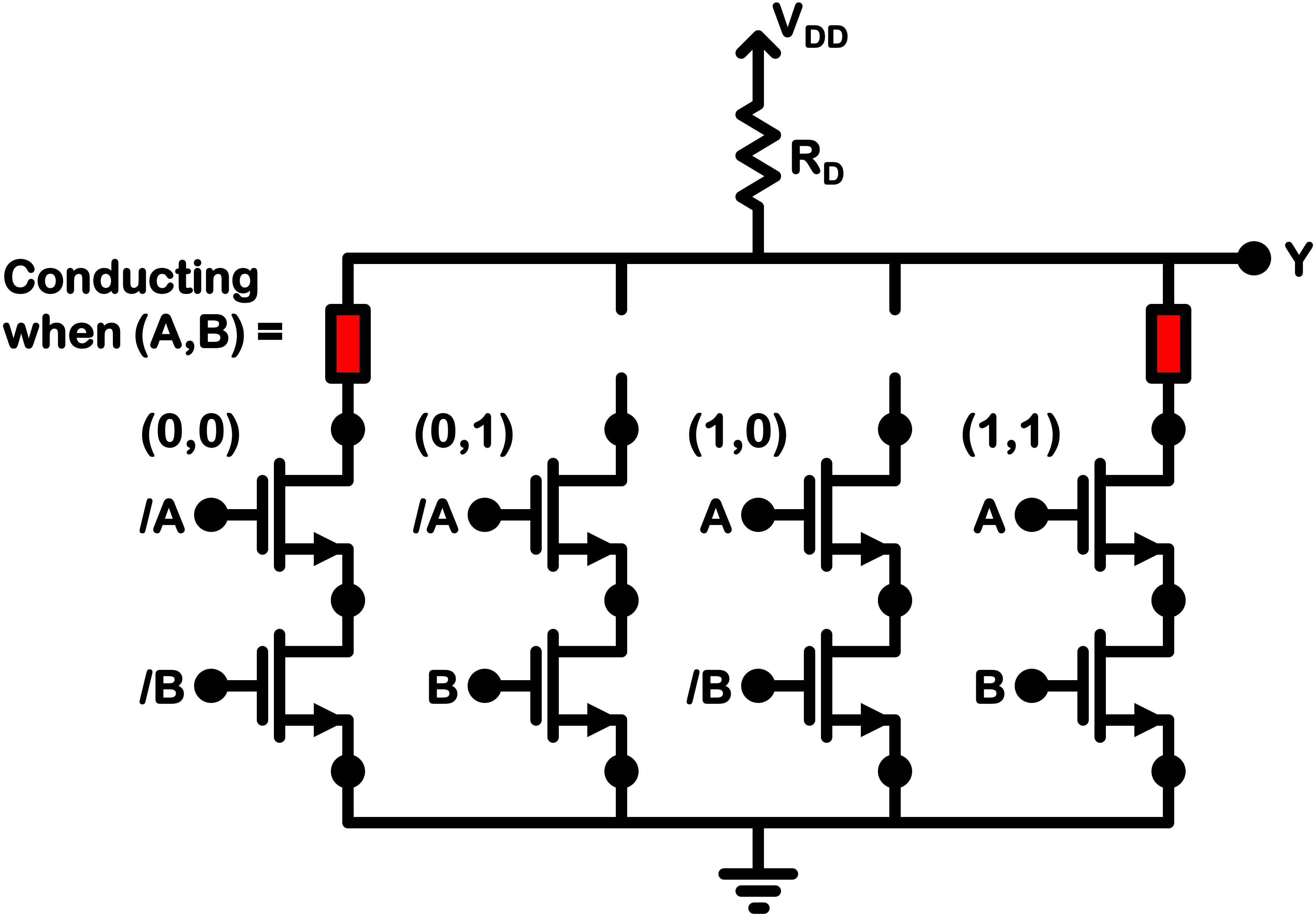
$/Y_0 = 1$, Same as $Y_0 = 0$



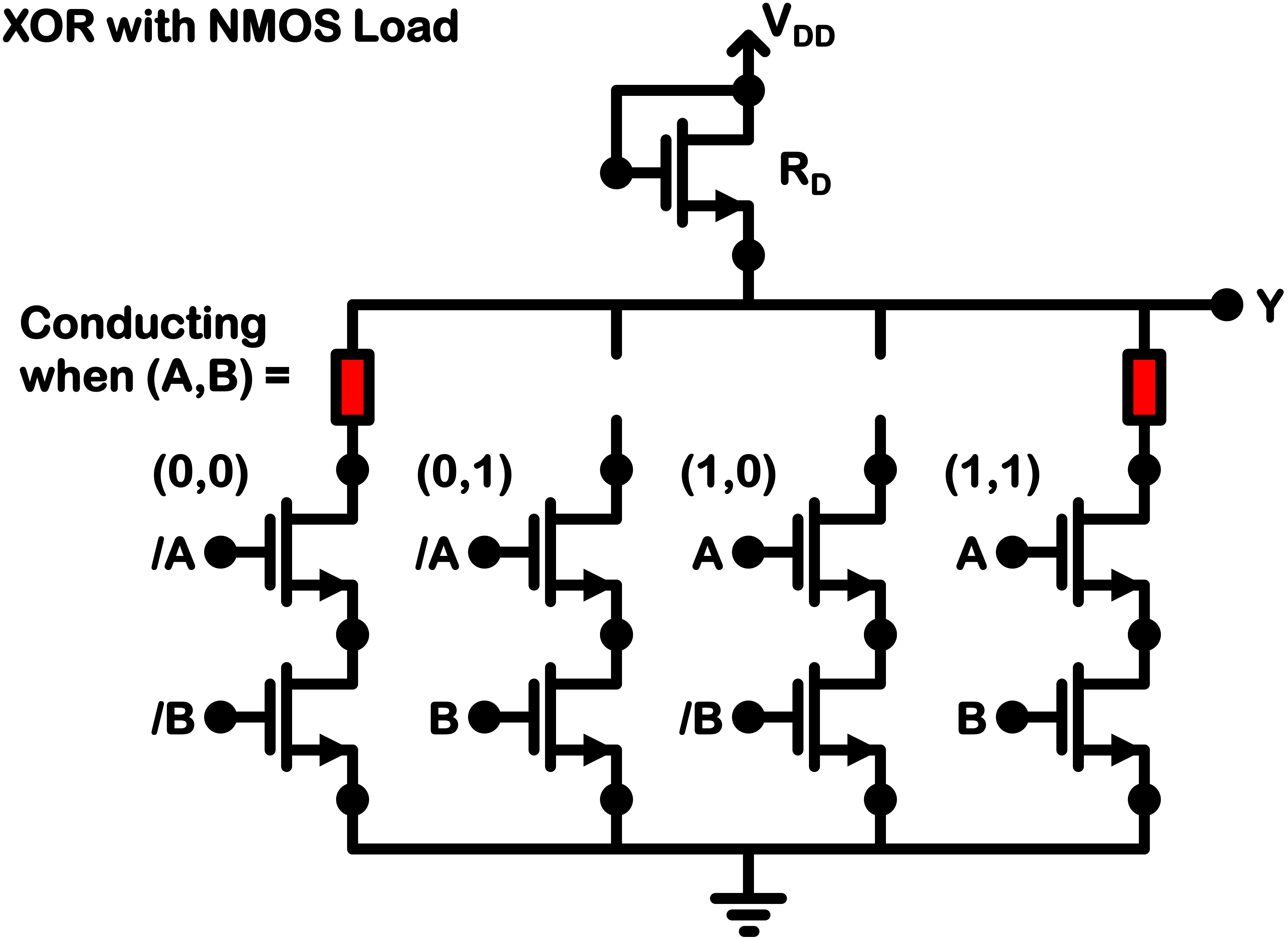
$/Y_1 = /A \cdot B + A \cdot /B + A \cdot B$



$/Y_6 = /A \cdot /B + A \cdot B$



XOR with NMOS Load



XOR with PMOS Load