

Single 2-input NAND gate

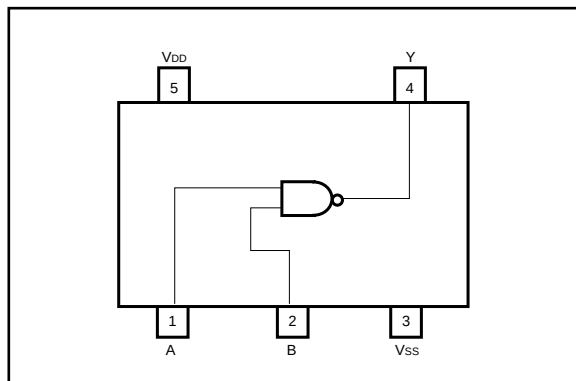
BU4S11

The BU4S11 is a dual-input positive logic NAND gate. This is an ultra-compact logic IC with one circuit of the BU4011B built into an SMP package.

●Features

- 1) Low current dissipation.
- 2) Super-mini mold package designed for surface mounting.
- 3) Wide range of operating power supply voltage.
- 4) Capable of driving two L-TTL inputs and one LS-TTL input directly

●Block diagram



●Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits	Unit
Power supply voltage	V_{DD}	$V_{SS} - 0.3 \sim V_{SS} + 18$	V
Power dissipation	P_d	170	mW
Input current	I_{IN}	± 10	mA
Operating temperature	T_{opr}	$-40 \sim +85$	°C
Storage temperature	T_{stg}	$-55 \sim +150$	°C
Input voltage	V_{IN}	$V_{SS} - 0.3 \sim V_{DD} + 0.3$	V

Note 1: These values indicate the range limits of the voltage that can be applied to each pin without destroying it. Operation cannot be guaranteed at these values.

Note 2: Power dissipation is reduced by 1.7mW for each increase in Ta of 1°C each 25°C.

●Recommended operating conditions (Ta = 25°C, Vss = 0 V)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power supply voltage	V_{DD}	3	—	16	V
Input voltage	V_{IN}	0	—	V_{DD}	V

●Electrical characteristics

DC characteristics (unless otherwise noted, $V_{SS} = 0V$, $T_a = 25^{\circ}C$)

Parameter	Symbol	Min.	Typ.	Max.	Unit	V _{DD} (V)	Conditions	Measurement circuit
Input high level voltage	V _{IH}	3.5	—	—	V	5	V _{OUT} = 0.5V V _{OUT} = 1.0V V _{OUT} = 1.5V	Fig.1
		7.0	—	—	V	10		
		11.0	—	—	V	15		
Input low level voltage	V _{IL}	—	—	1.5	V	5	V _{OUT} = 4.5V V _{OUT} = 9.0V V _{OUT} = 13.5V	
		—	—	3.0	V	10		
		—	—	4.0	V	15		
Input high level current	I _{IH}	—	—	0.3	μA	15	V _{IH} = 15V	
Input low level current	I _{IL}	—	—	− 0.3	μA	15	V _{IL} = 0V	
Output high level voltage	V _{OH}	4.95	—	—	V	5	I _{OUT} < 1μA V _{IN} = V _{SS}	
		9.95	—	—	V	10		
		14.95	—	—	V	15		
Output low level voltage	V _{OL}	—	—	0.05	V	5	I _{OUT} < 1μA V _{IN} = V _{DD}	
		—	—	0.05	V	10		
		—	—	0.05	V	15		
Output high level current	I _{OH}	− 0.51	—	—	mA	5	V _{OH} = 4.6V	
		− 2.1	—	—	mA	5	V _{OH} = 2.5V	
		− 1.3	—	—	mA	10	V _{OH} = 9.5V	
		− 3.4	—	—	mA	15	V _{OH} = 13.5V	
							V _{IN} = V _{SS}	
Output low level current	I _{OL}	0.51	—	—	mA	5	V _{OL} = 0.4V	
		1.3	—	—	mA	10	V _{OL} = 0.5V	
		3.4	—	—	mA	15	V _{OL} = 1.5V	
							V _{IN} = V _{DD}	
Static current dissipation	I _{DD}	—	—	0.25	μA	5	V _{IN} = V _{SS} , V _{DD}	
		—	—	0.5	μA	10		
		—	—	1.0	μA	15		

Switching characteristics (unless otherwise noted, $V_{SS} = 0V$, $T_a = 25^\circ C$, $C_L = 50\text{ pF}$)

Parameter	Symbol	Min.	Typ.	Max.	Unit	V _{DD} (V)	Conditions	Measurement circuit
Output rise time	t _{TLH}	—	70	—	ns	5	—	Fig.2
		—	35	—	ns	10		
		—	30	—	ns	15		
Output fall time	t _{THL}	—	70	—	ns	5	—	
		—	35	—	ns	10		
		—	30	—	ns	15		
Propagation delay time	t _{PLH}	—	85	—	ns	5	—	
		—	40	—	ns	10		
		—	30	—	ns	15		
	t _{PHL}	—	85	—	ns	5	—	
		—	40	—	ns	10		
		—	30	—	ns	15		
Input capacitance	C _{IN}	—	5	—	pF	5	—	—

● Measurement circuits

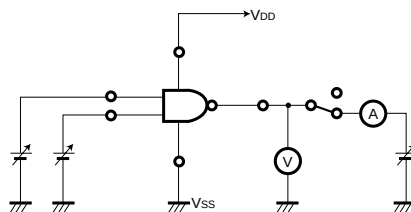


Fig.1 DC characteristics measurement circuit

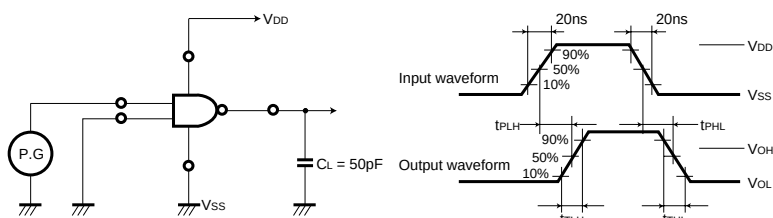
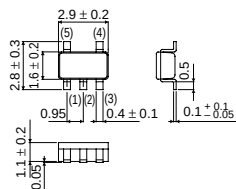


Fig.2 Switching characteristics measurement circuit

● External dimensions (Units: mm)



SMP5