T-43.21

LC4077B

3003A CMOS Standard Logic LC4000B Series

Quad 2-Input Exclusive NOR Gate

The LC4077B is a quad 2-input Exclusive-NOR Gate IC (equivalent to B series) having such features as wide operating voltage range, high noise margin, low power dissipation.

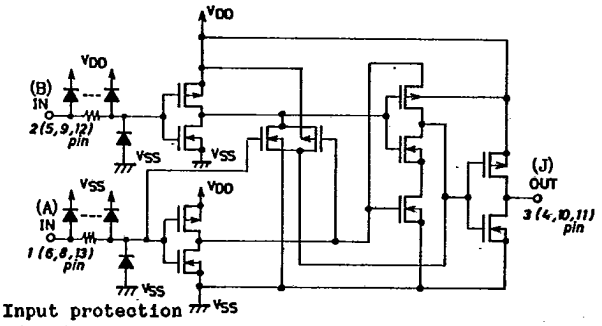
Absolute Maximum Ratings at Ta=25°C, V_{SS}=0V

				unit
Maximum Supply Voltage	V_{DD} max		V_{SS}-0.5 to V_{SS}+20	V
Input Voltage	V_{IN} max		V_{SS}-0.5 to V_{DD}+0.5	V
Output Voltage	V_{OUT} max		V_{SS}-0.5 to V_{DD}+0.5	V
Input Current	I_{IN}		±10	mA
Allowable Power Dissipation	Pdmax	Ta≦85°C	300	mW
Lead Temperature and Time	Tsol	t=10sec	260	°C
Operating Temperature	Topg		-40 to +85	°C
Storage Temperature	Tstg		-65 to +150	°C

Allowable Operating Conditions at Ta=-40 to +85°C

			unit
Supply Voltage	V_{DD}	3 to 18	V
Input Voltage	V_{IN}	0 to V_{DD}	V

Equivalent Circuit(1/4 LC4077B)



Input protection circuit

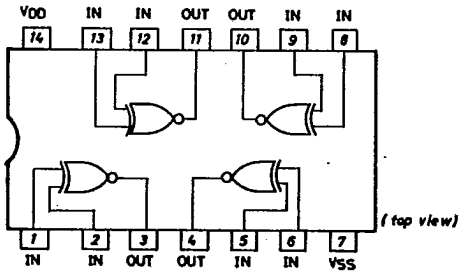
Truth Table

1 of 4 Gates

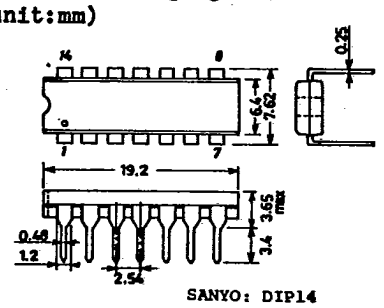
A	B	J
0	0	1
1	0	0
0	1	0
1	1	1

1 : HIGH LEVEL
0 : LOW LEVEL
J : $\overline{A \oplus B}$

Pin Assignment



Case Outline 3003A-D14IC
(unit:mm)



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Electrical Characteristics at Ta=25°C, V_{SS}=0V

			min	typ	max	unit
"H" Level Output Voltage	V_{OH}	V_{DD}=5V, I_{OUT} <1uA, Vin=V_{SS}, V_{DD}	4.95	5.00		V
		V_{DD}=10V, " "	9.95	10.00		V
		V_{DD}=15V, " "	14.95	15.00		V
"L" Level Output Voltage	V_{OL}	V_{DD}=5V, I_{OUT} <1uA, Vin=V_{SS}, V_{DD}		0.00	0.05	V
		V_{DD}=10V, " "		0.00	0.05	V
		V_{DD}=15V, " "		0.00	0.05	V
"H" Level Output Current	I_{OH}	V_{DD}=5V, Vo=4.6V, Vin=V_{SS}, V_{DD}	-0.44	-0.88		mA
		V_{DD}=10V, Vo=9.5V, "	-1.1	-2.25		mA
		V_{DD}=15V, Vo=13.5V, "	-3.0	-8.8		mA
"L" Level Output Current	I_{OL}	V_{DD}=5V, Vo=0.4V, Vin=V_{SS}, V_{DD}	0.44	0.88		mA
		V_{DD}=10V, Vo=1.0V, "	1.1	2.25		mA
		V_{DD}=15V, Vo=1.5V, "	3.0	8.8		mA
"H" Level Input Voltage	V_{IH}	V_{DD}=5V, Vo=0.5Vor4.5V, I_{OUT} <1uA	3.5	2.75		V
		V_{DD}=10V, Vo=1.0Vor9.0V, "	7.0	5.5		V
		V_{DD}=15V, Vo=1.5Vor13.5V, "	11.0	8.25		V
"L" Level Input Voltage	V_{IL}	V_{DD}=5V, Vo=0.5Vor4.5V, I_{OUT} <1uA		2.25	1.5	V
		V_{DD}=10V, Vo=1.0Vor9.0V, "		4.5	3.0	V
		V_{DD}=15V, Vo=1.5Vor13.5V, "		6.75	4.0	V
"H" Level Input Current	I_{IH}	V_{DD}=18V, Vin=18V		10	0.3	uA
"L" Level Input Current	I_{IL}	V_{DD}=18V, Vin=0V		-10	-0.3	uA
Quiescent Device Current	I_{DD}	V_{DD}=5V, Vin=V_{SS}, V_{DD}		0.001	1.0	uA
		V_{DD}=10V, "		0.001	2.0	uA
		V_{DD}=15V, "		0.001	4.0	uA
Input Capacitance	C_{IN}			5	7.5	pF

Electrical Characteristics at Ta=-40°C, V_{SS}=0V

			min	typ	max	unit
"H" Level Output Voltage	V_{OH}	V_{DD}=5V, I_{OUT} <1uA, Vin=V_{SS}, V_{DD}	4.95			V
		V_{DD}=10V, " "	9.95			V
		V_{DD}=15V, " "	14.95			V
"L" Level Output Voltage	V_{OL}	V_{DD}=5V, I_{OUT} <1uA, Vin=V_{SS}, V_{DD}			0.05	V
		V_{DD}=10V, " "			0.05	V
		V_{DD}=15V, " "			0.05	V
"H" Level Output Current	I_{OH}	V_{DD}=5V, Vo=4.6V, Vin=V_{SS}, V_{DD}	-0.52			mA
		V_{DD}=10V, Vo=9.5V, "	-1.3			mA
		V_{DD}=15V, Vo=13.5V, "	-3.6			mA
"L" Level Output Current	I_{OL}	V_{DD}=5V, Vo=0.4V, Vin=V_{SS}, V_{DD}	0.52			mA
		V_{DD}=10V, Vo=1.0V, "	1.3			mA
		V_{DD}=15V, Vo=1.5V, "	3.6			mA
"H" Level Input Voltage	V_{IH}	V_{DD}=5V, Vo=0.5Vor4.5V, I_{OUT} <1uA	3.5			V
		V_{DD}=10V, Vo=1.0Vor9.0V, "	7.0			V
		V_{DD}=15V, Vo=1.5Vor13.5V, "	11.0			V
"L" Level Input Voltage	V_{IL}	V_{DD}=5V, Vo=0.5Vor4.5V, I_{OUT} <1uA			1.5	V
		V_{DD}=10V, Vo=1.0Vor9.0V, "			3.0	V
		V_{DD}=15V, Vo=1.5Vor13.5V, "			4.0	V
"H" Level Input Current	I_{IH}	V_{DD}=18V, Vin=18V			0.3	uA
"L" Level Input Current	I_{IL}	V_{DD}=18V, Vin=0V			-0.3	uA
Quiescent Device Current	I_{DD}	V_{DD}=5V, Vin=V_{SS}, V_{DD}			1.0	uA
		V_{DD}=10V, "			2.0	uA
		V_{DD}=15V, "			4.0	uA

Electrical Characteristics at Ta=85°C

			min	typ	max	unit
"H" Level Output Voltage	V_{OH}	V_{DD}=5V, $\|I_{OUT}\|$<1uA, Vin=V_{SS}, V_{DD}	4.95			V
		V_{DD}=10V, " "	9.95			V
		V_{DD}=15V, " "	14.95			V
"L" Level Output Voltage	V_{OL}	V_{DD}=5V, $\|I_{OUT}\|$<1uA, Vin=V_{SS}, V_{DD}			0.05	V
		V_{DD}=10V, " "			0.05	V
		V_{DD}=15V, " "			0.05	V
"H" Level Output Current	I_{OH}	V_{DD}=5V, Vo=4.6V, Vin=V_{SS}, V_{DD}	-0.36			mA
		V_{DD}=10V, Vo=9.5V, "	-0.9			mA
		V_{DD}=15V, Vo=13.5V, "	-2.4			mA
"L" Level Output Current	I_{OL}	V_{DD}=5V, Vo=0.4V, Vin=V_{SS}, V_{DD}	0.36			mA
		V_{DD}=10V, Vo=1.0V, "	0.9			mA
		V_{DD}=15V, Vo=1.5V, "	2.4			mA
"H" Level Input Voltage	V_{IH}	V_{DD}=5V, Vo=0.5Vor4.5V, $\|I_{OUT}\|$<1uA	3.5			V
		V_{DD}=10V, Vo=1.0Vor9.0V, "	7.0			V
		V_{DD}=15V, Vo=1.5Vor13.5V, "	11.0			V
"L" Level Input Voltage	V_{IL}	V_{DD}=5V, Vo=0.5Vor4.5V, $\|I_{OUT}\|$<1uA			1.5	V
		V_{DD}=10V, Vo=1.0Vor9.0V, "			3.0	V
		V_{DD}=15V, Vo=1.5Vor13.5V, "			4.0	V
"H" Level Input Current	I_{IH}	V_{DD}=18V, Vin=18V			1.0	uA
"L" Level Input Current	I_{IL}	V_{DD}=18V, Vin=0V			-1.0	úA
Quiescent Device Current	I_{DD}	V_{DD}=5V, Vin=V_{SS}, V_{DD}			7.5	uA
		V_{DD}=10V, "			15.0	uA
		V_{DD}=15V, "			30.0	uA

Note) Current direction: +, no sign : Flowing into device
- : Flowing out of device.

Switching Characteristics at Ta=25±2°C, V_{SS}=0V, C_L=50pF

			min	typ	max	unit
Output Rise Time	t_r (t_{TLH})	V_{DD}=5V		100	200	ns
		V_{DD}=10V		50	100	ns
		V_{DD}=15V		40	80	ns
Output Fall Time	t_f (t_{THL})	V_{DD}=5V		100	200	ns
		V_{DD}=10V		50	100	ns
		V_{DD}=15V		40	80	ns
"H" Level Propagation Delay Time	t_{PLH}	V_{DD}=5V		175	350	ns
		V_{DD}=10V		75	150	ns
		V_{DD}=15V		50	100	ns
"L" Level Propagation Delay Time	t_{PHL}	V_{DD}=5V		175	350	ns
		V_{DD}=10V		75	150	ns
		V_{DD}=15V		50	100	ns

Switching Time Test Circuit and Waveforms