LC4093B

T-43-21

3003A CMOS Standard Logic LC4000B Series

Quad 2-Input NAND Schmitt Trigger

The LC4093B is a quad 2-input NAND Schmitt trigger IC (B series) having such features as wide operating voltage range, high noise margin, and low power dissipation.

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

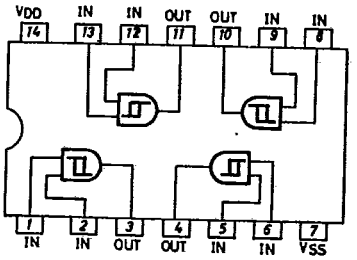
				unit
Maximum Supply Voltage	V_{DD} max		V_{SS}–0.5 to V_{SS}+20	V
Input Voltage	V_{IN} max		V_{SS}–0.5 to V_{DD}+0.5	V
Output Voltage	V_{OUT} max		V_{SS}–0.5 to V_{DD}+0.5	V
Input Current	I_{IN}		±10	mA
Allowable Power Dissipation	P_d max		300	mW
Operating Temperature	T_{opg}		–40 to +85	°C
Storage Temperature	T_{stg}		–65 to +150	°C
Lead Temperature and Time	T_{sol}	t=10sec	260	°C

Allowable Operating Conditions at T_a=–40 to +85°C

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

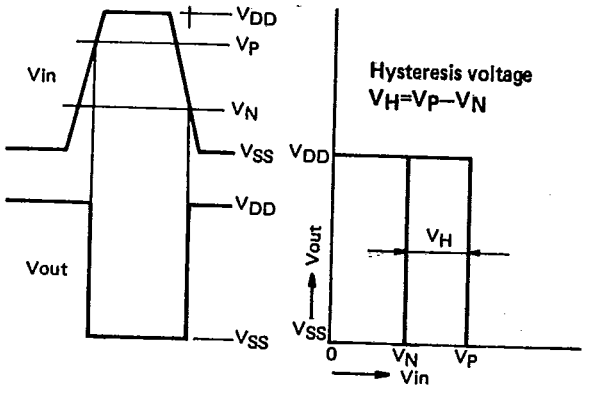
Logic Diagram

Pin Assignment

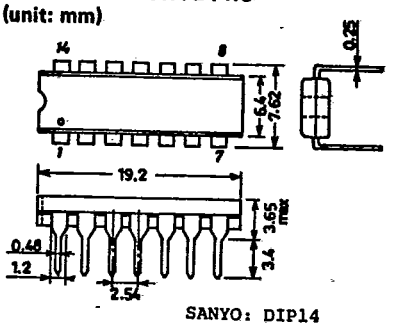


(top view)

Input/Output Characteristics



Case Outline 3003A-D14IC
(unit: mm)



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Electrical Characteristics T_a=+25°C, V_{SS}=0V

				Vcc	min	typ	max	unit
"H" Level Output Voltage	V_{OH}	|I_{OUT}|<1μA, V_{IN}=V_{SS}, V_{DD}		5	4.95	5.00		V
				10	9.95	10.00		V
				15	14.95	15.00		V
"L" Level Output Voltage	V_{OL}	|I_{OUT}|<1μA, V_{IN}=V_{SS}, V_{DD}		5		0.00	0.05	V
				10		0.00	0.05	V
				15		0.00	0.05	V
"H" Level Output Current	I_{OH}	V_{IN} =V_{SS}, V_{DD}	Vo=4.6V	5	-0.16	-0.5		mA
			Vo=9.5V	10	-0.4	-1.2		mA
			Vo=13.5V	15	-1.2	-6.0		mA
"L" Level Output Current	I_{OL}	V_{IN} =V_{SS}, V_{DD}	Vo=0.4V	5	0.44	1.5		mA
			Vo=0.5V	10	1.1	3.5		mA
			Vo=1.5V	15	3.0	15		mA
"H" Level Threshold Voltage ("H" Level Input Voltage)	V_P (V_{IH})	|I_{OUT}| <1μA	Vo=0.5or4.5V	5	2.0	2.8	3.8	V
			Vo=1.0or9.0V	10	4.0	5.8	7.6	V
			Vo=1.5or13.5V	15	6.0	8.8	11.4	V
"L" Level Threshold Voltage ("L" Level Input Voltage)	V_N (V_{IL})	|I_{OUT}| <1μA	Vo=0.5or4.5V	5	1.2	2.2	3.0	V
			Vo=1.0or9.0V	10	2.4	4.2	6.0	V
			Vo=1.5or13.5V	15	3.6	6.2	9.0	V
Hysteresis Voltage (Hysteresis Voltage Range)	V_H			5	0.3	0.55	0.8	V
				10	1.0	1.6	2.2	V
				15	1.4	2.6	3.8	V
"H" Level Input Current	I_{IH}	V_{IN}=18V		18		10^{-5}	0.3	μA
"L" Level Input Current	I_{IL}	V_{IN}=0V		18		-10^{-5}	-0.3	μA
Quiescent Device Current	I_{DD}			5		0.001	1.0	μA
				10		0.002	2.0	μA
				15		0.004	4.0	μA
Input Capacitance	C_{IN}					5	7.5	pF

Electrical Characteristics at T_a=−40°C, V_{SS}=0V

				Vcc	min	typ	max	unit
"H" Level Output Voltage	V_{OH}	|I_{OUT}|<1μA, V_{IN}=V_{SS}, V_{DD}		5	4.95			V
				10	9.95			V
				15	14.95			V
"L" Level Output Voltage	V_{OL}	|I_{OUT}|<1μA, V_{IN}=V_{SS}, V_{DD}		5			0.05	V
				10			0.05	V
				15			0.05	V
"H" Level Output Current	I_{OH}	V_{IN} =V_{SS}, V_{DD}	Vo=4.6V	5	-0.2			mA
			Vo=9.5V	10	-0.5			mA
			Vo=13.5V	15	-1.4			mA
"L" Level Output Current	I_{OL}	V_{IN} =V_{SS}, V_{DD}	Vo=0.4V	5	0.52			mA
			Vo=0.5V	10	1.3			mA
			Vo=1.5V	15	3.6			mA
"H" Level Input Current	I_{IH}	V_{IN}=18V		18			0.3	μA
"L" Level Input Current	I_{IL}	V_{IN}=0V		18			-0.3	μA
Quiescent Device Current	I_{DD}			5			1.0	μA
				10			2.0	μA
				15			4.0	μA

Electrical Characteristics T_a=+85°C, V_{SS}=0V

				Vcc	min	typ	max	unit
"H" Level Output Voltage	VOH	|IOUT|<1μA, VIN=VSS, VDD		5	4.95			V
				10	9.95			V
				15	14.95			V
"L" Level Output Voltage	VOL	|IOUT|<1μA, VIN=VSS, VDD		5			0.05	V
				10			0.05	V
				15			0.05	V
"H" Level Output Current	IOH	VIN=VSS, VDD	Vo=4.6V	5	-0.12			mA
			Vo=9.5V	10	-0.3			mA
			Vo=13.5V	15	-1.0			mA
"L" Level Output Current	IOL	VIN=VSS, VDD	Vo=0.4V	5	0.36			mA
			Vo=0.5V	10	0.9			mA
			Vo=1.5V	15	2.4			mA
"H" Level Input Current	IIH	VIN=18V		18			1.0	μA
"L" Level Input Current	IIL	VIN=0V		18			-1.0	μA
Quiescent Device Current	IDD			5			7.5	μA
				10			15.0	μA
				15			30.0	μA

Note) Current direction; +, no sign: Flowing into device
−: Flowing out of device

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

		V_{DD}	min	typ	max	unit
Output Rise Time	tr (tTLH)	5		100	200	ns
		10		50	100	ns
		15		40	80	ns
Output Fall Time	tf (tTHL)	5		100	200	ns
		10		50	100	ns
		15		40	80	ns
"H" Level Propagation Delay Time	tPLH	5		125	250	ns
		10		50	100	ns
		15		40	80	ns
"L" Level Propagation Delay Time	tPHL	5		125	250	ns
		10		50	100	ns
		15		40	80	ns

Switching Time Test Circuit and Waveforms