

LC4082B



3003A

CMOS Standard Logic LC4000B Series

Dual 4-Input AND Gate

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The LC4082B is a 4-input AND logic IC (equivalent to B series) having such features as wide operating voltage range, high noise margin, low power dissipation.

Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$, $V_{SS} = 0\text{ V}$

Maximum supply voltage	V_{DD} max	-0.5 to +20	unit
Input voltage	V_{IN} max	-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	$^\circ\text{C}$
Storage temperature	T_{stg}	-65 to +150	$^\circ\text{C}$

 $T_a \leq 85^\circ\text{C}$ Allowable Operating Conditions at $T_a = -40$ to $+85^\circ\text{C}$, $V_{SS} = 0\text{ V}$

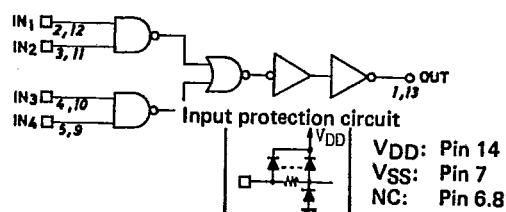
Supply voltage	V_{DD}	3 to 18	unit
Input voltage	V_{IN}	0 to V_{DD}	V

Electrical Characteristics at $T_a = -40$ to $+85^\circ\text{C}$, $V_{SS} = 0\text{ V}$

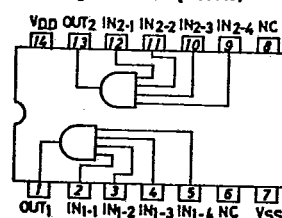
		min	type	max	unit
"H" Level Input Voltage	V_{IH}	$V_{DD} = 5\text{ V}, V_o = 4.5\text{ V}, I_o < 1\text{ }\mu\text{A}$	3.5		V
		$V_{DD} = 10\text{ V}, V_o = 9.0\text{ V}, I_o < 1\text{ }\mu\text{A}$	7.0		V
		$V_{DD} = 15\text{ V}, V_o = 13.5\text{ V}, I_o < 1\text{ }\mu\text{A}$	11.0		V
"L" Level Input Voltage	V_{IL}	$V_{DD} = 5\text{ V}, V_o = 0.5\text{ V}, I_o < 1\text{ }\mu\text{A}$		1.5	V
		$V_{DD} = 10\text{ V}, V_o = 1.0\text{ V}, I_o < 1\text{ }\mu\text{A}$		3.0	V
		$V_{DD} = 15\text{ V}, V_o = 1.5\text{ V}, I_o < 1\text{ }\mu\text{A}$		4.0	V

Equivalent Circuit

(1/2 LC4082B)

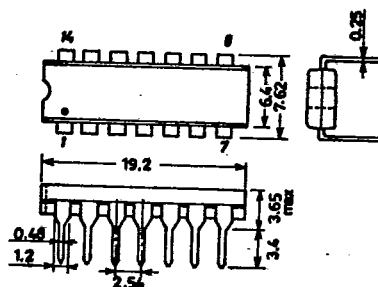


Pin assignment (top view)



Case Outline 3003A-D14IC

(unit: mm)



SANYO: DIP14

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Electrical Characteristics/ $T_a = +25^\circ\text{C}$ $V_{SS} = 0\text{ V}$

			min	typ	max	unit
"H" level output voltage	V_{OH}	$V_{DD} = 5\text{ V}, V_{IN} = V_{DD},$ $ I_{OUT} < 1\text{ }\mu\text{A}$	4.95	5.00		V
		$V_{DD} = 10\text{ V}, V_{IN} = V_{DD},$ $ I_{OUT} < 1\text{ }\mu\text{A}$	9.95	10.00		V
		$V_{DD} = 15\text{ V}, V_{IN} = V_{DD},$ $ I_{OUT} < 1\text{ }\mu\text{A}$	14.95	15.00		V
"L" level output voltage	V_{OL}	$V_{DD} = 5\text{ V}, V_{IN} = V_{DD}, V_{SS},$ $ I_{OUT} < 1\text{ }\mu\text{A}$		0.00	0.05	V
		$V_{DD} = 10\text{ V}, V_{IN} = V_{DD}, V_{SS},$ $ I_{OUT} < 1\text{ }\mu\text{A}$		0.00	0.05	V
		$V_{DD} = 15\text{ V}, V_{IN} = V_{DD}, V_{SS},$ $ I_{OUT} < 1\text{ }\mu\text{A}$		0.00	0.05	V
"H" level output current	I_{OH}	$V_{DD} = 5\text{ V}, V_O = 4.6\text{ V},$ $V_{IN} = V_{DD}$	-0.16	-0.5		mA
		$V_{DD} = 10\text{ V}, V_O = 9.5\text{ V},$ $V_{IN} = V_{DD}$	-0.4	-1.2		mA
		$V_{DD} = 15\text{ V}, V_O = 13.5\text{ V},$ $V_{IN} = V_{DD}$	-1.2	-6.0		mA
"L" level output current	I_{OL}	$V_{DD} = 5\text{ V}, V_O = 0.4\text{ V},$ $V_{IN} = V_{DD}, V_{SS}$	0.44	1.5		mA
		$V_{DD} = 10\text{ V}, V_O = 0.5\text{ V},$ $V_{IN} = V_{DD}, V_{SS}$	1.1	3.5		mA
		$V_{DD} = 15\text{ V}, V_O = 1.5\text{ V},$ $V_{IN} = V_{DD}, V_{SS}$	3.0	15		mA
"H" level input voltage	V_{IH}	$V_{DD} = 5\text{ V}, V_O = 0.5\text{ V}, 4.5\text{ V},$ $ I_{OUT} < 1\text{ }\mu\text{A}$	3.5	2.75		V
		$V_{DD} = 10\text{ V}, V_O = 1.0\text{ V}, 9.0\text{ V},$ $ I_{OUT} < 1\text{ }\mu\text{A}$	7.0	5.5		V
		$V_{DD} = 15\text{ V}, V_O = 1.5\text{ V},$ $13.5\text{ V}, I_{OUT} < 1\text{ }\mu\text{A}$	11.0	8.25		V
"L" level input voltage	V_{IL}	$V_{DD} = 5\text{ V}, V_O = 0.5\text{ V},$ $ I_{OUT} < 1\text{ }\mu\text{A}$		2.25	1.5	V
		$V_{DD} = 10\text{ V}, V_O = 1.0\text{ V},$ $ I_{OUT} < 1\text{ }\mu\text{A}$		4.5	3.0	V
		$V_{DD} = 15\text{ V}, V_O = 1.5\text{ V},$ $I_{OUT} < 1\text{ }\mu\text{A}$		6.75	4.0	V
"H" level input current	I_{IH}	$V_{DD} = 18\text{ V}, V_{IH} = 18\text{ V}$		10^{-5}	0.3	μA
"L" level input current	I_{IL}	$V_{DD} = 18\text{ V}, V_{IH} = 0\text{ V}$		-10^{-5}	-0.3	μA
Quiescent device current	I_{DD}	$V_{DD} = 5\text{ V}, V_{IN} = V_{DD}, V_{SS}$		0.001	1.0	μA
		$V_{DD} = 10\text{ V}, V_{IN} = V_{DD}, V_{SS}$		0.001	2.0	μA
		$V_{DD} = 15\text{ V}, V_{IN} = V_{DD}, V_{SS}$		0.002	4.0	μA
Input stray capacitance	C_{IN}			5	7.5	pF

Electrical Characteristics at $T_a = -40^\circ\text{C}$, $V_{SS} = 0\text{ V}$

			min	typ	max	unit
"H" level output voltage	V_{OH}	$V_{DD} = 5\text{ V}, V_{IN} = V_{DD},$ $ I_{OUT} < 1\text{ }\mu\text{A}$	4.95			V
		$V_{DD} = 10\text{ V}, V_{IN} = V_{DD},$ $ I_{OUT} < 1\text{ }\mu\text{A}$	9.95			V
		$V_{DD} = 15\text{ V}, V_{IN} = V_{DD},$ $ I_{OUT} < 1\text{ }\mu\text{A}$	14.95			V
"L" level output voltage	V_{OL}	$V_{DD} = 5\text{ V}, V_{IN} = V_{DD}, V_{SS},$ $ I_{OUT} < 1\text{ }\mu\text{A}$			0.05	V
		$V_{DD} = 10\text{ V}, V_{IN} = V_{DD}, V_{SS},$ $ I_{OUT} < 1\text{ }\mu\text{A}$			0.05	V
		$V_{DD} = 15\text{ V}, V_{IN} = V_{DD}, V_{SS},$ $ I_{OUT} < 1\text{ }\mu\text{A}$			0.05	V
"H" level output current	I_{OH}	$V_{DD} = 5\text{ V}, V_O = 4.6\text{ V},$ $V_{IN} = V_{DD}$	-0.2			mA
		$V_{DD} = 10\text{ V}, V_O = 9.5\text{ V},$ $V_{IN} = V_{DD}$	-0.5			mA
		$V_{DD} = 15\text{ V}, V_O = 13.5\text{ V},$ $V_{IN} = V_{DD}$	-1.4			mA

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			min	typ	max	unit
"L" level output current	IOL	VDD = 5 V, VO = 0.4 V, VIN = VDD, VSS	0.52			mA
		VDD = 10 V, VO = 0.5 V, VIN = VDD, VSS	1.3			mA
		VDD = 15 V, VO = 1.5 V, VIN = VDD, VSS	3.6			mA
"H" level input voltage	VIH	VDD = 5 V, VO = 0.5 V, 4.5 V, IOUT < 1 μ A	3.5			V
		VDD = 10 V, VO = 1.0 V, 9.0 V, IOUT < 1 μ A	7.0			V
		VDD = 15 V, VO = 1.5 V, 13.5 V, IOUT < 1 μ A	11.0			V
"L" level input voltage	VIL	VDD = 5 V, VO = 0.5 V, IOUT < 1 μ A			1.5	V
		VDD = 10 V, VO = 1.0 V, IOUT < 1 μ A			3.0	V
		VDD = 15 V, VO = 1.5 V, IOUT < 1 μ A			4.0	V
"H" level input current	IIH	VDD = 18 V, VIH = 18 V			0.3	μ A
"L" level input current	IIIL	VDD = 18 V, VIH = 0 V			-0.3	μ A
Quiescent device current	IDD	VDD = 5 V, VIN = VDD, VSS			1.0	μ A
		VDD = 10 V, VIN = VDD, VSS			2.0	μ A
		VDD = 15 V, VIN = VDD, VSS			4.0	μ A
Electrical Characteristics/Ta = +85°C VSS = 0 V						
"H" level output voltage	VOH	VDD = 5 V, VIN = VDD, IOUT < 1 μ A	4.95			V
		VDD = 10 V, VIN = VDD, IOUT < 1 μ A	9.95			V
		VDD = 15 V, VIN = VDD, IOUT < 1 μ A	14.95			V
"L" level output voltage	VOL	VDD = 5 V, VIN = VDD, VSS, IOUT < 1 μ A			0.05	V
		VDD = 10 V, VIN = VDD, VSS, IOUT < 1 μ A			0.05	V
		VDD = 15 V, VIN = VDD, VSS, IOUT < 1 μ A			0.05	V
"H" level output current	IOH	VDD = 5 V, VO = 4.6 V, VIN = VDD	-0.12			mA
		VDD = 10 V, VO = 9.5 V, VIN = VDD	-0.3			mA
		VDD = 15 V, VO = 13.5 V, VIN = VDD	-1.0			mA
"L" level output current	IOL	VDD = 5 V, VO = 0.4 V, VIN = VDD, VSS	0.36			mA
		VDD = 10 V, VO = 0.5 V, VIN = VDD, VSS	0.9			mA
		VDD = 15 V, VO = 1.5 V, VIN = VDD, VSS	2.4			mA
"H" level input voltage	VIH	VDD = 5 V, VO = 0.5 V, 4.5 V, IOUT < 1 μ A	3.5			V
		VDD = 10 V, VO = 1.0 V, 9.0 V, IOUT < 1 μ A	7.0			V
		VDD = 15 V, VO = 1.5 V, 13.5 V, IOUT < 1 μ A	11.0			V

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			min	typ	max	unit
"L" level input voltage	V_{IL}	$V_{DD} = 5\text{ V}, V_O = 0.5\text{ V},$ $ I_{OUT} < 1\text{ }\mu\text{A}$			1.5	V
		$V_{DD} = 10\text{ V}, V_O = 1.0\text{ V},$ $ I_{OUT} < 1\text{ }\mu\text{A}$			3.0	V
		$V_{DD} = 15\text{ V}, V_O = 1.5\text{ V},$ $ I_{OUT} < 1\text{ }\mu\text{A}$			4.0	V
"H" level input current	I_{IH}	$V_{DD} = 18\text{ V}, V_{IH} = 18\text{ V}$			1.0	μA
"L" level input current	I_{IL}	$V_{DD} = 18\text{ V}, V_{IH} = 0\text{ V}$			-1.0	μA
Quiescent device current	I_{DD}	$V_{DD} = 5\text{ V}, V_{IN} = V_{DD}, V_{SS}$			7.5	μA
		$V_{DD} = 10\text{ V}, V_{IN} = V_{DD}, V_{SS}$			15	μA
		$V_{DD} = 15\text{ V}, V_{IN} = V_{DD}, V_{SS}$			30	μA

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

Switching Characteristics at $T_a = 25 \pm 2^\circ\text{C}$, $C_L = 50\text{ pF}$, $V_{SS} = 0\text{ V}$			min	typ	max	unit
"H" level propagation delay time	t_{PLH}	$V_{DD} = 5\text{ V}$		180	350	ns
		$V_{DD} = 10\text{ V}$		90	175	ns
		$V_{DD} = 15\text{ V}$		80	150	ns
"L" level propagation delay time	t_{PHL}	$V_{DD} = 5\text{ V}$		160	350	ns
		$V_{DD} = 10\text{ V}$		80	175	ns
		$V_{DD} = 15\text{ V}$		70	150	ns
Output rise time	t_{TLH} (t_r)	$V_{DD} = 5\text{ V}$		130	400	ns
		$V_{DD} = 10\text{ V}$		65	200	ns
		$V_{DD} = 15\text{ V}$		50	160	ns
Output fall time	t_{THL} (t_f)	$V_{DD} = 5\text{ V}$		100	200	ns
		$V_{DD} = 10\text{ V}$		50	100	ns
		$V_{DD} = 15\text{ V}$		40	80	ns

Switching Time Test Circuit and Waveforms

