DN74LS283 N74LS283

4-bit Binary Full Adders (with Fast Carry)

■ Description

DN74LS283 is a 4-bit full adder with a "look-ahead" carry.

■ Features

- "Look-ahead" carry for high speed
- System capability with partial "look-ahead" carry.
- Wide operating temperature range (Ta = −20 to +75°C)

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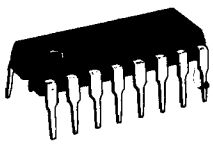

16-pin plastic DIL package

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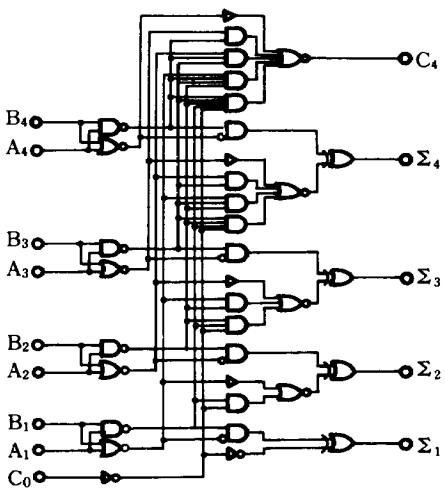
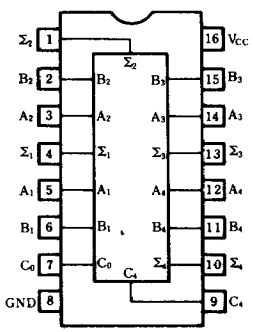
16-pin Panaflat package (SO-16D)

■ Logic diagram



Pin configuration (top view)



■ Recommended operating conditions

Parameter	Sym	Min	Typ	Max	Unit
Supply voltage	V_{CC}	4.75	5.00	5.25	V
Output current	I_{OH}			−400	μA
	I_{OL}			8	mA
Operating temperature range	Topr	−20	25	75	℃

■ DC characteristics ($Ta = -20 \sim +75℃$)

Parameter		Sym	Test conditions		Min	Typ*	Max	Unit
Input voltage		V_{IH}			2.0			V
		V_{IL}					0.8	V
Output voltage		V_{OH}	$V_{CC}=4.75V$, $V_{IH}=2V$, $V_{IL}=0.8V$,	$I_{OH}=-2.6mA$	2.7	3.4		V
		V_{OL1}	$V_{CC}=4.75V$, $V_{IH}=2V$, $V_{IL}=0.8V$	$I_{OL}=4mA$		0.25	0.4	V
		V_{OL2}		$I_{OL}=8mA$		0.35	0.5	V
Input current	Inputs other than C_O	I_{IH}	$V_{CC}=5.25V$, $V_I=2.7V$				40	μA
	C_O						20	μA
	Inputs other than C_O	I_{IL}	$V_{CC}=5.25V$, $V_I=0.4V$				−0.8	mA
	C_O						−0.4	mA
	Inputs other than C_O	I_I	$V_{CC}=5.25V$, $V_I=7V$				0.2	mA
	C_O						0.1	mA
Output short circuit current**		I_{OS}	$V_{CC}=5.25V$, $V_O=0V$		−15		−100	mA
Input clamp voltage		V_{IK}	$V_{CC}=4.75V$, $I_I=-18mA$				−1.5	V
Supply current	All outputs HIGH	I_{CC}	$V_{CC}=5.25V$			22	39	mA
	All outputs LOW					19	34	mA
	All outputs OFF					19	34	mA

* When constant at V_{CC} = 5V, Ta = 25°C.

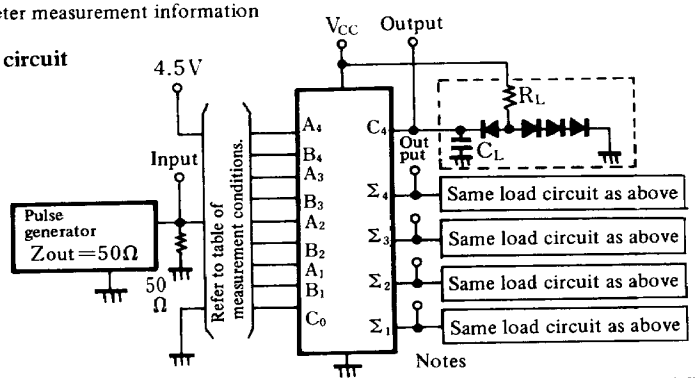
** Only one output at a time short circuited to GND. Also, short circuit time to GND within 7 seconds.

■ Switching characteristics ($V_{CC}=5V$, $Ta=25℃$)

Parameter	Sym	Inputs	Outputs	Test conditions	Min	Typ	Max	Unit
Propagation delay time	t_{PLH}	C_O	Σ	$C_L=15pF$, $R_L=2k\Omega$		16	24	ns
	t_{PHL}					15	24	ns
	t_{PLH}	Ai, Bi	Σi			15	24	ns
	t_{PHL}					15	24	ns
	t_{PLH}	C_O	C_4			11	17	ns
	t_{PHL}					11	22	ns
	t_{PLH}	Ai, Bi	C_4			11	17	ns
	t_{PHL}					12	17	ns

※ Switching parameter measurement information

1. Measurement circuit



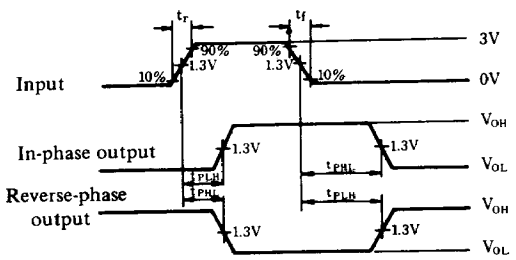
Notes

1. C_L includes probe and tool floating capacitance.
2. Diodes are all MA161 or equivalent.

2. Table of measurement conditions

Parameter	Input / Output	Inputs									Outputs				
		B_4	A_4	B_3	A_3	B_2	A_2	B_1	A_1	C_0	C_4	Σ_4	Σ_3	Σ_2	Σ_1
t_{PLH} t_{PHL}	C_0 → Σi or C_4	GND	GND	GND	GND	GND	GND	GND	GND	IN					OUT
		GND	4.5V	GND	4.5V	GND	4.5V	GND	4.5V	IN	OUT	OUT	OUT	OUT	OUT
	Ai or Bi → Σi or C_4	GND	GND	GND	GND	GND	GND	GND / IN	IN / GND	GND					OUT
		GND	GND	GND	GND	GND / IN	GND / IN	GND	GND	GND				OUT	
		GND	GND	GND / IN	IN / GND	GND	GND	GND	GND	GND			OUT		
		GND / IN	IN / GND	GND	GND	GND	GND	GND	GND	GND		OUT			
		GND	GND	GND	GND	GND	GND	4.5V / IN	IN / 4.5V	GND				OUT	OUT
		GND	GND	GND	GND	4.5V / IN	IN / 4.5V	GND	GND	GND			OUT	OUT	
		GND	GND	4.5V / IN	IN / 4.5V	GND	GND	GND	GND	GND		OUT	OUT		
		4.5V / IN	IN / 4.5V	GND	GND	GND	GND	GND	GND	GND	OUT	OUT			

3.Waveforms



Notes
1. Input waveform: $t_r \leqq 15$ns, $t_f \leqq 6$ns, PRR = 1MHz, duty cycle = 50%.

■ Truth tables

Inputs				Outputs					
				When C_0 = L			When C_0 = H		
				When C_2 = L			When C_2 = H		
A_1 / A_3	B_1 / B_3	A_2 / A_4	B_2 / B_4	Σ_1 / Σ_3	Σ_2 / Σ_4	C_2 / C_4	Σ_1 / Σ_3	Σ_2 / Σ_4	C_2 / C_4
L	L	L	L	L	L	L	H	L	L
H	L	L	L	H	L	L	L	H	L
L	H	L	L	H	L	L	L	H	L
H	H	L	L	L	H	L	H	H	L
L	L	H	L	L	H	L	H	H	L
H	L	H	L	H	H	L	L	L	H
L	H	H	L	H	H	L	L	L	H
H	H	H	L	L	L	H	H	L	H
L	L	L	H	L	H	L	H	H	L
H	L	L	H	H	H	L	L	L	H
L	H	L	H	H	H	L	L	L	H
H	H	L	H	L	L	H	H	L	H
L	L	H	H	L	L	H	H	L	H
H	L	H	H	H	L	H	L	H	H
L	H	H	H	H	L	H	L	H	H
H	H	H	H	L	H	H	H	H	H

Notes
1. A_1, B_1, A_2, B_2, and C_0 input requirements are used to determine values for. Σ_1, Σ_2, and the internal carry C_2. C_2, A_3, B_3, A_4, and B_4 values are used to determine the outputs Σ_3, Σ_4, C_4. (C_2 is not output as an external signal.)
2. H: HIGH voltage level.
3. L: LOW voltage level.