

## 1. DESCRIPTION

The **XD74LS283** adders are electrically and functionally; only the arrangement of the terminals has been changed.

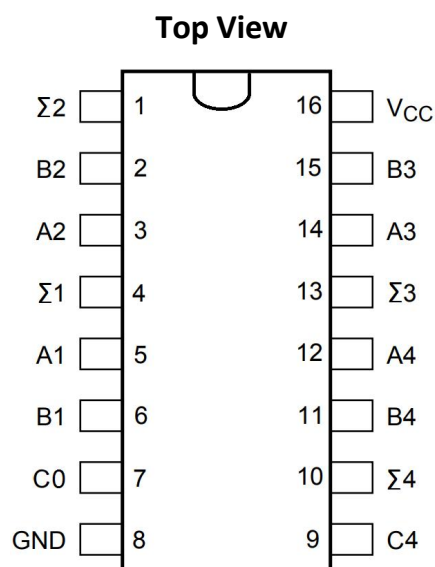
These improved full adders perform the addition of two 4-bit binary words. The sum outputs are provided for each bit and the resultant carry is obtained from the fourth bit. These adders feature full internal look-ahead across all four bits generating the carry term in ten nanoseconds, typically, for the **XD74LS283**. This capability provides the system designer with partial look-ahead performance at the economy and reduced package count of a ripple-carry implementation.

The adder logic, including the carry, is implemented in its true form. End around carry can be accomplished without the need for logic or level inversion.

## 2. FEATURES

- Full-Carry Look-Ahead Across the Four Bits
- Systems Achieve Partial Look-Ahead Performance with the Economy of Ripple Carry
- Supply Voltage and Ground on Corner Pins to Simplify P-C Board Layout

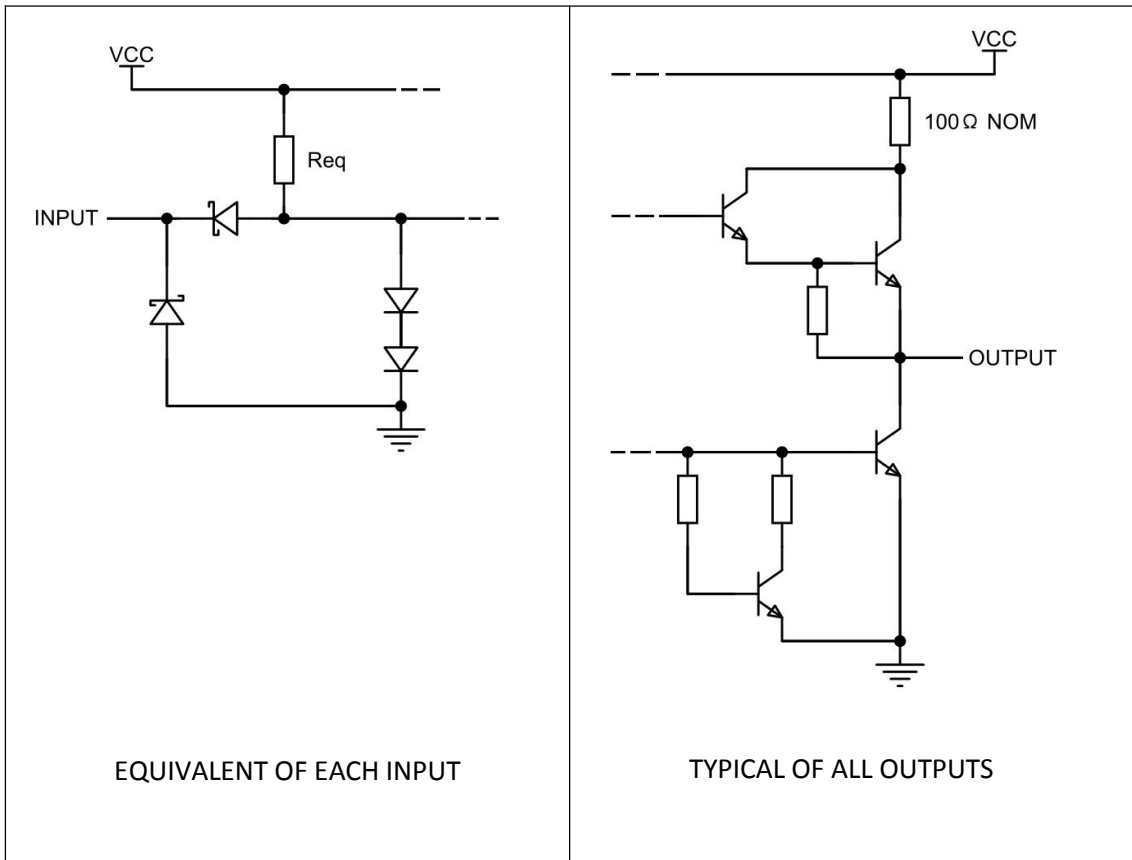
## 3. PIN CONFIGURATIONS





INPUT				OUTPUT					
				WHEN C0=L			WHEN C0=H		
A1	B1	A2	B2	$\Sigma 1$	$\Sigma 2$	C2	$\Sigma 1$	$\Sigma 2$	C2
A2	B3	A4	B4	$\Sigma 3$	$\Sigma 4$	C4	$\Sigma 3$	$\Sigma 4$	C4
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

**5. SCHEMATICS OF INPUTS AND OUTPUTS**



**6. ABSOLUTE MAXIMUM RATINGS OVER OPERATING FREE-AIR TEMPERATURE RANGE (UNLESS OTHERWISE NOTES)**

Supply voltage, $V_{CC}$ (see Note 1).....	7V
Input voltage, $V_I$ : 74LS283.....	7V
Operating free-air temperature range: SOP package.....	0°C to 70°C
DIP package.....	0°C to 70°C
Storage temperature range, $T_{stg}$ .....	-65°C to 150°C

- NOTES: 1. Voltage values, except inter-emitter voltage, are with respect to the network ground terminal.  
2. This is the voltage between two emitters of a multiple-emitter transistor.

## 7. RECOMMENDED OPERATING CONDITIONS

		74LS283			UNIT
		MIN	NOM	MAX	
V <sub>CC</sub>	Supply voltage	4.75	5	5.25	V
I <sub>OH</sub>	High-level output current			-400	μA
I <sub>OL</sub>	Low-level output current			8	mA
T <sub>A</sub>	Operating free-air temperature	0		70	°C

## 8. ELECTRICAL CHARACTERISTICS OVER RECOMMENDED OPERATING FREE-AIR RANGE (UNLESS OTHERWISE NOTED)

PARAMETER		TEST CONDITIONS <sup>†</sup>	74LS283		UNIT	
			MIN	TYP <sup>‡</sup>		MAX
V <sub>IH</sub>	High-level input voltage		2		V	
V <sub>IL</sub>	Low-level input voltage			0.8	V	
V <sub>IK</sub>	Input clamp voltage	V <sub>CC</sub> = MIN, I <sub>I</sub> = -18 mA		-1.5	V	
V <sub>OH</sub>	High-level output voltage	V <sub>CC</sub> = MIN, V <sub>IL</sub> = 0.8 V, V <sub>IH</sub> = 2 V, I <sub>OH</sub> = -400 μA	2.7	3.4	V	
V <sub>OL</sub>	Low-level output voltage	V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = V <sub>IL</sub> MAX	I <sub>OL</sub> = 4 mA	0.25	0.4	V
			I <sub>OL</sub> = 8 mA	0.35	0.5	
I <sub>I</sub>	Input current at maximum input voltage	Any A or B	V <sub>CC</sub> = MAX, V <sub>I</sub> = 7 V	0.2		mA
		C0		0.1		
I <sub>IH</sub>	High-level input current	Any A or B	V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.7 V	40		μA
		C0		20		
I <sub>IL</sub>	Low-level input current	Any A or B	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.4 V	-0.8		mA
		C0		-0.4		
I <sub>OS</sub>	Short-circuit output current <sup>§</sup>	V <sub>CC</sub> = MAX	-20	-100	mA	
I <sub>CC</sub>	Supply current	V <sub>CC</sub> = MAX Outputs open	All inputs grounded	22	39	mA
			All B low, other inputs at 4.5V	19	34	
			All inputs at 4.5V	19	34	

<sup>†</sup> For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

<sup>‡</sup> All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.

<sup>§</sup> Not more than one output should be shorted at a time.

**9. SWITCHING CHARACTERISTICS, VCC = 5 V, TA = 25°C**

PARAMETER†	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t <sub>PLH</sub>	C0	Any Σ	C <sub>L</sub> = 15 pF, R <sub>L</sub> = 2 kΩ See Note 3		16	24	ns
t <sub>PHL</sub>					15	24	
t <sub>PLH</sub>	Ai or Bi	Σi			15	24	ns
t <sub>PHL</sub>					15	24	
t <sub>PLH</sub>	C0	C4			11	17	ns
t <sub>PHL</sub>					11	22	
t <sub>PLH</sub>	Ai or Bi	C4			11	17	ns
t <sub>PHL</sub>					12	17	

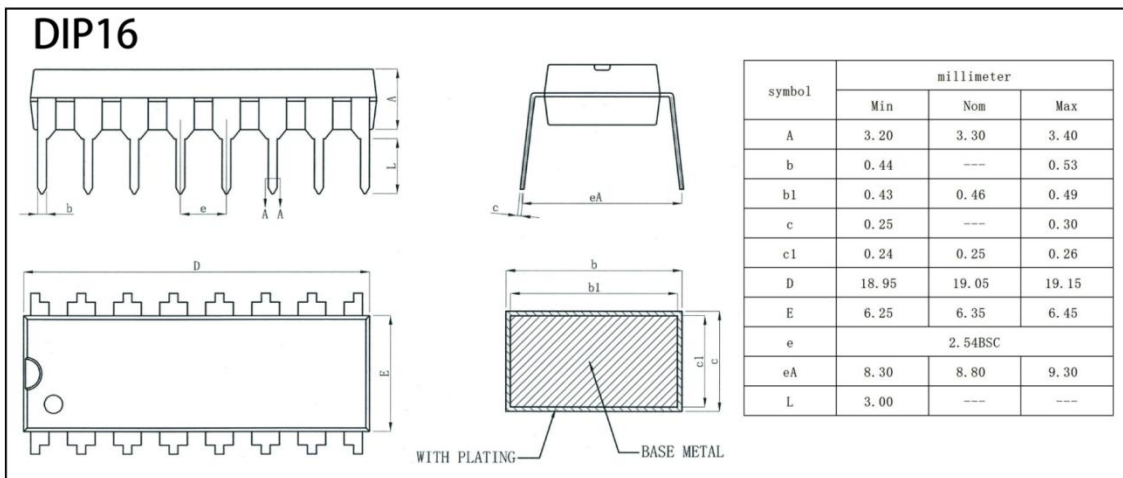
† t<sub>PLH</sub> = propagation delay time, low-to-high-level output  
t<sub>PHL</sub> = propagation delay time, high-to-low-level output

## 10. ORDERING INFORMATION

### Ordering Information

Part Number	Device Marking	Package Type	Body size (mm)	Temperature (°C)	MSL	Transport Media	Package Quantity
XD74LS283	XD74LS283	DIP16	19.05 * 6.35	-0 to 70	MSL3	Tube 25	1000

## 11. DIMENSIONAL DRAWINGS



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