

DM74LS283

4-Bit Binary Adder with Fast Carry

These full adders perform the addition of two 4-bit binary numbers. The sum (Σ) outputs are provided for each bit and the resultant carry (C4) is obtained from the fourth bit. These adders feature full internal look ahead across all four bits. This 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 meaning that the end-around carry can be accomplished without the need for logic or level inversion.

Rochester Electronics Manufactured Components

Rochester branded components are manufactured using either die/wafers purchased from the original suppliers or Rochester wafers recreated from the original IP. All re-creations are done with the approval of the Original Component Manufacturer (OCM).

Parts are tested using original factory test programs or Rochester developed test solutions to guarantee product meets or exceeds the OCM data sheet.

Quality Overview

- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-35835
 - Class Q Military
 - Class V Space Level
- Qualified Suppliers List of Distributors (QSLD)
 - Rochester is a critical supplier to DLA and meets all industry and DLA standards.

Rochester Electronics, LLC is committed to supplying products that satisfy customer expectations for quality and are equal to those originally supplied by industry manufacturers.

The original manufacturer's datasheet accompanying this document reflects the performance and specifications of the Rochester manufactured version of this device. Rochester Electronics guarantees the performance of its semiconductor products to the original OCM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.

FOR REFERENCE ONLY

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4-Bit Binary Adder with Fast Carry

General Description

These full adders perform the addition of two 4-bit binary numbers. The sum (Σ) outputs are provided for each bit and the resultant carry (C4) is obtained from the fourth bit. These adders feature full internal look ahead across all four bits. This 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 meaning that the end-around carry can be accomplished without the need for logic or level inversion.

Features

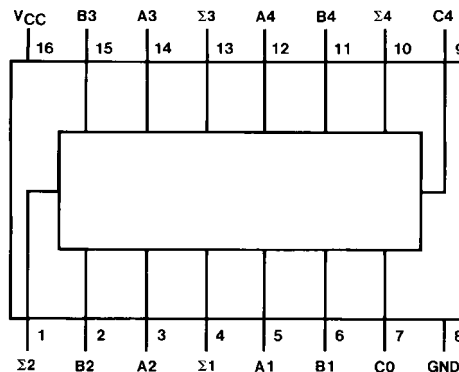
- Full-carry look-ahead across the four bits
- Systems achieve partial look-ahead performance with the economy of ripple carry
- Typical add times
 - Two 8-bit words 25 ns
 - Two 16-bit words 45 ns
- Typical power dissipation per 4-bit adder 95 mW

Ordering Code:

Order Number	Package Number	Package Description
DM74LS283M	M16A	16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow
DM74LS283N	N16E	16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide

Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

Connection Diagram



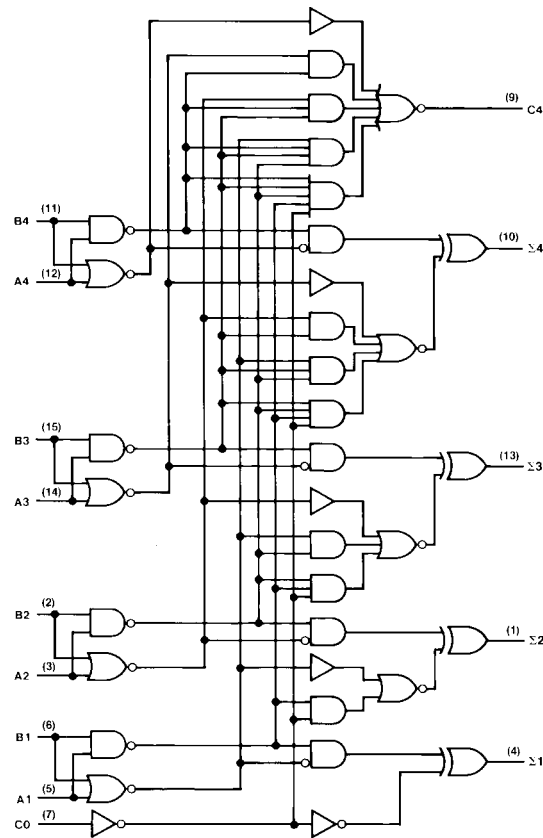
Function Table

Input				Outputs						
				When C0 = L			When C0 = H			
				When C2 = L		C2	When C2 = H		C2	
A1 A3	B1 B3	A2 A4	B2 B4	$\Sigma 1$ $\Sigma 3$	$\Sigma 2$ $\Sigma 4$	C2 C4	$\Sigma 1$ $\Sigma 3$	$\Sigma 2$ $\Sigma 4$	C2 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	L	H	L	H	H	L	
H	H	L	L	L	H	L	H	H	L	
L	L	H	L	L	L	H	L	L	H	
H	L	H	L	L	L	H	L	L	H	
L	H	H	L	L	H	L	H	L	H	
H	H	H	L	L	H	L	H	L	H	
L	L	L	H	L	L	H	L	H	L	
H	L	L	H	L	L	H	L	H	L	
L	H	L	H	L	H	L	H	L	H	
H	H	L	H	L	H	L	H	L	H	
L	L	H	H	L	L	H	L	H	L	
H	L	H	H	L	L	H	L	H	L	
L	H	H	H	L	H	L	H	L	H	
H	H	H	H	L	H	L	H	L	H	

H = HIGH Level, L = LOW Level

Input conditions at A1, B1, A2, B2, and C0 are used to determine outputs $\Sigma 1$ and $\Sigma 2$ and the value of the internal carry C2. The values at C2, A3, B3, A4, and B4 are then used to determine outputs $\Sigma 3$, $\Sigma 4$, and C4.

Logic Diagram



Absolute Maximum Ratings(Note 1)

Supply Voltage	7V
Input Voltage	7V
Operating Free Air Temperature Range	0°C to +70°C
Storage Temperature Range	-65°C to +150°C

Note 1: The "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the Electrical Characteristics tables are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

Recommended Operating Conditions

Symbol	Parameter	Min	Nom	Max	Units
V _{CC}	Supply Voltage	4.75	5	5.25	V
V _{IH}	HIGH Level Input Voltage	2			V
V _{IL}	LOW Level Input Voltage			0.8	V
I _{OH}	HIGH Level Output Current			-0.4	mA
I _{OL}	LOW Level Output Current			8	mA
T _A	Free Air Operating Temperature	0		70	°C

Electrical Characteristics

over recommended operating free air temperature range (unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ (Note 2)	Max	Units
V _I	Input Clamp Voltage	V _{CC} = Min, I _I = -18 mA			-1.5	V
V _{OH}	HIGH Level Output Voltage	V _{CC} = Min, I _{OH} = Max V _{IL} = Max, V _{IH} = Min	2.7	3.4		V
V _{OL}	LOW Level Output Voltage	V _{CC} = Min, I _{OL} = Max V _{IL} = Max, V _{IH} = Min I _{OL} = 4 mA, V _{CC} = Min		0.35 0.25	0.5 0.4	V
I _I	Input Current @ Max Input Voltage	V _{CC} = Max V _I = 7V	A, B C0		0.2 0.1	mA
I _{IH}	HIGH Level Input Current	V _{CC} = Max V _I = 2.7V	A, B C0		40 20	μA
I _{IL}	LOW Level Input Current	V _{CC} = Max V _I = 0.4V	A, B C0		-0.8 -0.4	mA
I _{OS}	Short Circuit Output Current	V _{CC} = Max		-20	-100	mA
I _{CC1}	Supply Current	V _{CC} = Max (Note 4)		19	34	mA
I _{CC2}	Supply Current	V _{CC} = Max (Note 5)		22	39	mA

Note 2: All typicals are at V_{CC} = 5V, T_A = 25°C.

Note 3: Not more than one output should be shorted at a time, and the duration should not exceed one second.

Note 4: I_{CC1} is measured with all outputs OPEN, all B inputs LOW and all other inputs at 4.5V, or all inputs at 4.5V.

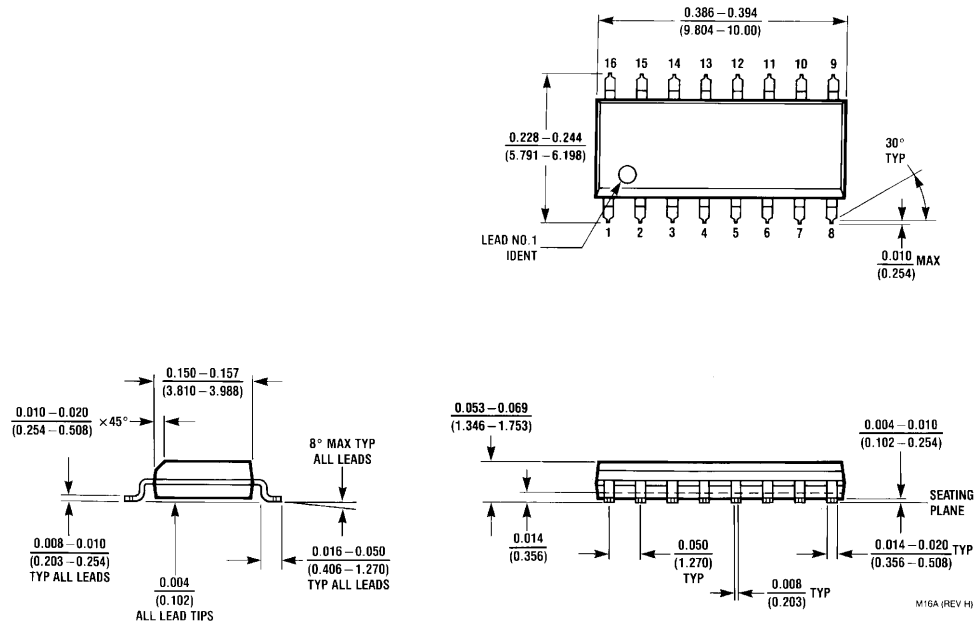
Note 5: I_{CC2} is measured with all outputs OPEN and all inputs GROUNDED.

Switching Characteristics

at $V_{CC} = 5V$ and $T_A = 25^\circ C$

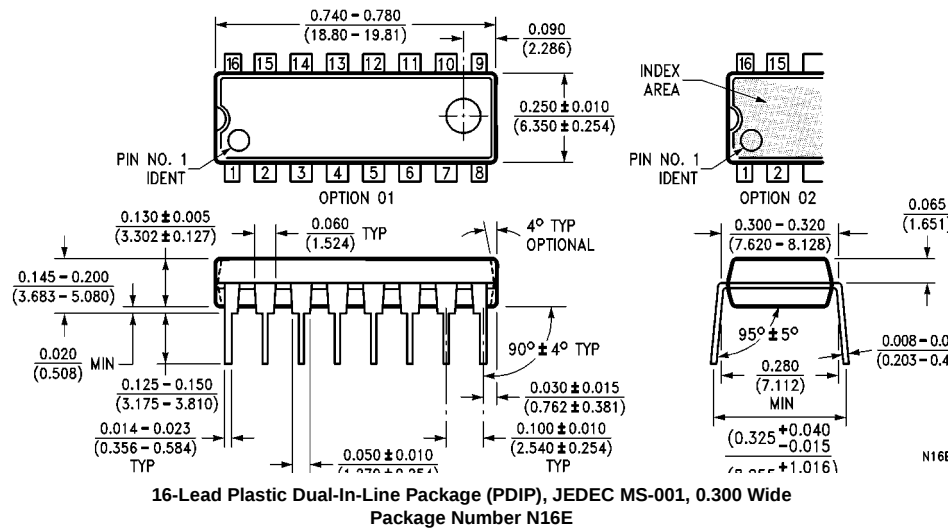
Symbol	Parameter	From (Input) To (Output)	R _L = 2 kΩ				Units
			C _L = 15 pF		C _L = 50 pF		
			Min	Max	Min	Max	
t _{PLH}	Propagation Delay Time LOW-to-HIGH Level Output	C0 to Σ1, Σ2		24		28	ns
t _{PHL}	Propagation Delay Time HIGH-to-LOW Level Output	C0 to Σ1, Σ2		24		30	ns
t _{PLH}	Propagation Delay Time LOW-to-HIGH Level Output	C0 to Σ3		24		28	ns
t _{PHL}	Propagation Delay Time HIGH-to-LOW Level Output	C0 to Σ3		24		30	ns
t _{PLH}	Propagation Delay Time LOW-to-HIGH Level Output	C0 to Σ4		24		28	ns
t _{PHL}	Propagation Delay Time HIGH-to-LOW Level Output	C0 to Σ4		24		30	ns
t _{PLH}	Propagation Delay Time LOW-to-HIGH Level Output	A _i or B _i to Σ _i		24		28	ns
t _{PHL}	Propagation Delay Time HIGH-to-LOW Level Output	A _i or B _i to Σ _i		24		30	ns
t _{PLH}	Propagation Delay Time LOW-to-HIGH Level Output	C0 to C4		17		24	ns
t _{PHL}	Propagation Delay Time HIGH-to-LOW Level Output	C0 to C4		17		25	ns
t _{PLH}	Propagation Delay Time LOW-to-HIGH Level Output	A _i or B _i to C4		17		24	ns
t _{PHL}	Propagation Delay Time HIGH-to-LOW Level Output	A _i or B _i to C4		17		26	ns

Physical Dimensions inches (millimeters) unless otherwise noted



**16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow
Package Number M16A**

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



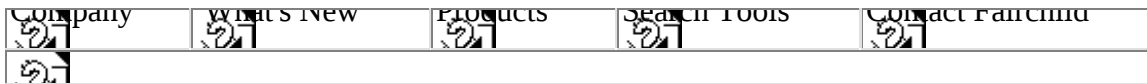
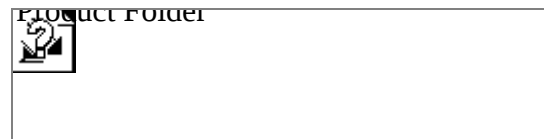
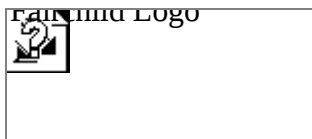
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[Information as of 1-Aug-2000]

DM74LS283

4-Bit Binary Adder with Fast Carry

Generic P/N 74LS283

Contents

[General Description](#)

[Features](#)

[Datasheet](#)

[Availability, Models, Samples & Pricing](#)

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Datasheet

Receive datasheet via E-mail  or download now  ; use [Adobe Acrobat](#) to view...

  [DM74LS283 4-Bit Binary Adder with Fast Carry](#) (63 Kbytes; 29-JUL-00)

Availability, Models, Samples & Pricing

Part Number	Grade	Package		Status	Models		Budgetary Pricing		Std Pack Size	Package Marking
		Type	# pins		SPICE	IBIS	Quantity	\$US ea		
DM74LS283MX	Comm	SOIC	16	Full Production	N/A	N/A	1-24	\$0.7780	N/A	\$Y&Z DM74
							25-99	\$0.5830		
							100-1000	\$0.4670		
DM74LS283M	Comm	SOIC	16	Full Production	N/A	N/A	1-24	\$0.7330	N/A	\$Y&Z DM74
							25-99	\$0.55		
							100-1000	\$0.44		
DM74LS283N	Comm	MDIP	16	Full Production	N/A	N/A	1-24	\$0.7780	N/A	\$Y&Z DM74
							25-99	\$0.5830		
							100-1000	\$0.4670		
DM74LS283CW	Comm	wafer		Preliminary	N/A	N/A		N/A	N/A	

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