



DM54S283/DM74S283 4-Bit Binary Adders with Fast Carry

General Description

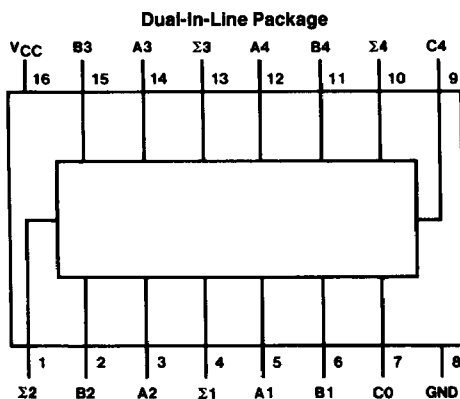
These full adders perform the addition of two 4-bit binary numbers. The sum (Σ) outputs are provided for each bit and the resultant carry (C4) is obtained from the fourth bit. These adders feature full internal look ahead across all four bits. This provides the system designer with partial look-ahead 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 15 ns
 - Two 16-bit words 30 ns
- Typical power dissipation 510 mW

Connection Diagram



TL/F/6484-1

Order Number DM54S283J or DM74S283N
See NS Package Number J16A or N16E

Absolute Maximum Ratings (Note)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Supply Voltage	7V
Input Voltage	5.5V
Operating Free Air Temperature Range	
DM54S	-55°C to +125°C
DM74S	0°C to +70°C
Storage Temperature Range	-65°C to +150°C

Note: 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" table 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	DM54S283			DM74S283			Units
		Min	Nom	Max	Min	Nom	Max	
V _{CC}	Supply Voltage	4.5	5	5.5	4.75	5	5.25	V
V _{IH}	High Level Input Voltage	2			2			V
V _{IL}	Low Level Input Voltage			0.8			0.8	V
I _{OH}	High Level Output Current (Output C4)			-0.5			-0.5	mA
	High Level Output Current (Other Outputs)			-1			-1	
I _{OL}	Low Level Output Current (Output C4)			10			10	mA
	Low Level Output Current (Other Outputs)			20			20	
T _A	Free Air Operating Temperature	-55		125	0		70	°C

Electrical Characteristics over recommended operating free air temperature (unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ (Note 1)	Max	Units
V _I	Input Clamp Voltage	V _{CC} = Min, I _I = -18 mA			-1.2	V
V _{OH}	High Level Output Voltage	V _{CC} = Min I _{OH} = Max V _{IL} = Max V _{IH} = Min	DM54	2.5	3.4	V
			DM74	2.7	3.4	
V _{OL}	Low Level Output Voltage	V _{CC} = Min, I _{OL} = Max V _{IH} = Min, V _{IL} = Max			0.5	V
I _I	Input Current @ Max Input Voltage	V _{CC} = Max, V _I = 5.5V			1	mA
I _{IH}	High Level Input Current	V _{CC} = Max, V _I = 2.7V			50	μA
I _{IL}	Low Level Input Current	V _{CC} = Max, V _I = 0.5V			-2	mA
I _{OS}	Short Circuit Output Current	V _{CC} = Max (Note 2)	C4 Output	-20	-100	mA
			Other Outputs	-40	-100	
I _{CC1}	Supply Current	V _{CC} = Max (Note 3)		80	120	mA
I _{CC2}	Supply Current	V _{CC} = Max (Note 4)		95	160	mA

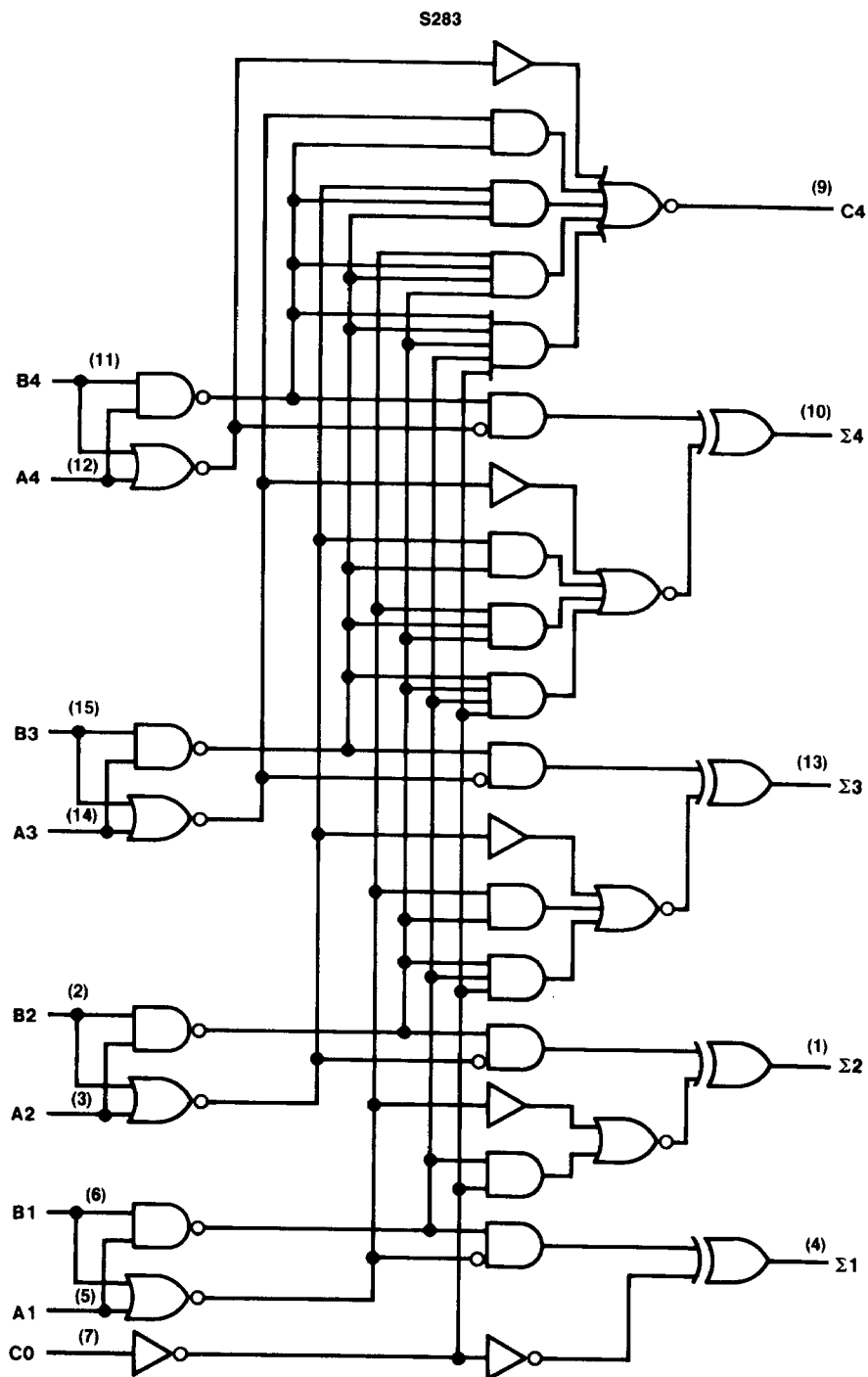
Note 1: All typicals are at V_{CC} = 5V, T_A = 25°C.

Note 2: Not more than one output should be shorted at a time, and the duration should not exceed one second.

Note 3: I_{CC1} is measured with all outputs open, all B inputs low and all other inputs at 4.5V.

Note 4: I_{CC2} is measured with all outputs open and all inputs at 4.5V.

Logic Diagram



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