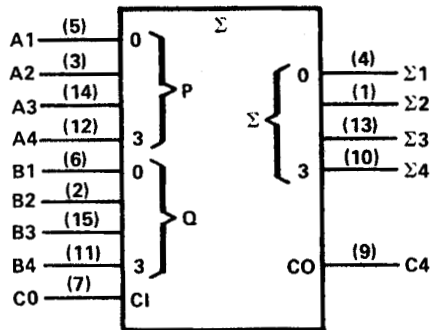


SN54283, SN54LS283, SN54S283, SN74283, SN74LS283, SN74S283 4-BIT BINARY FULL ADDERS WITH FAST CARRY

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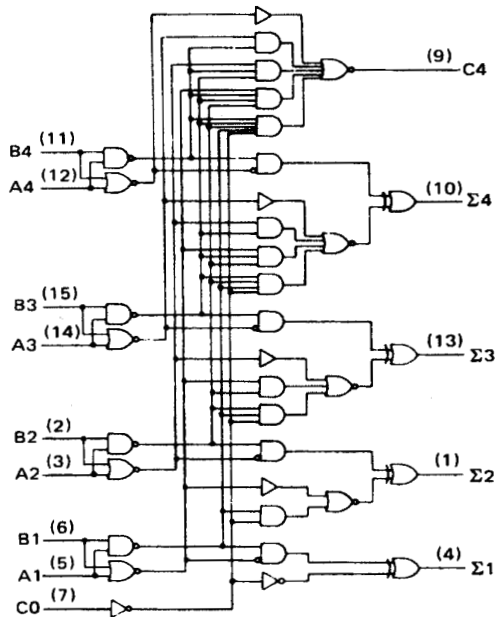
logic symbol†



†This symbol is in accordance with ANSI/IEEE Std. 91-1984 and IEC Publication 617-12.

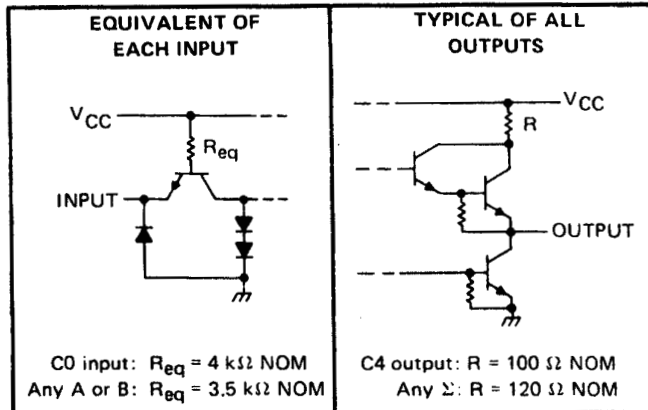
Pin numbers shown are for D, J, N, and W packages.

logic diagram (positive logic)

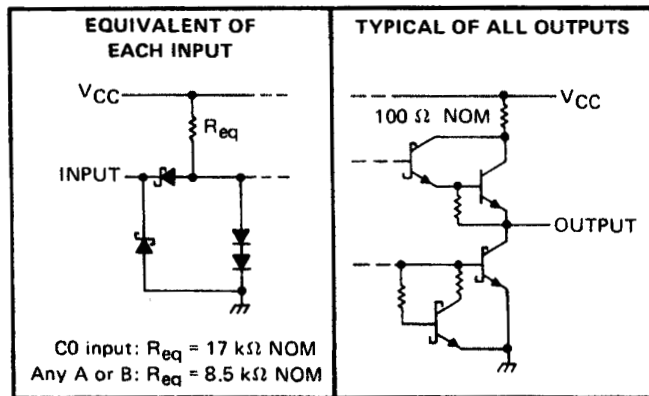


Pin numbers shown are for D, J, N, and W packages.

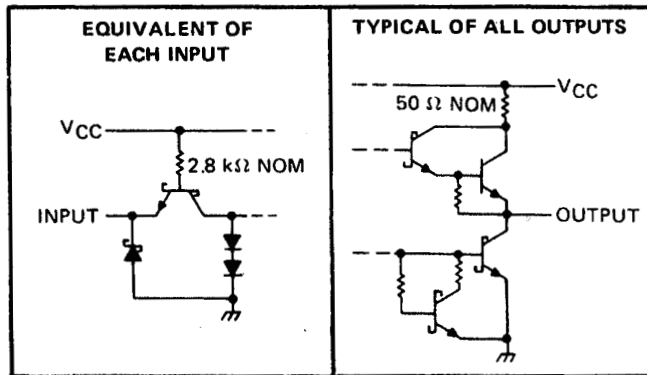
schematics of inputs and outputs '283



'LS283



'S283



absolute maximum ratings over operating free-air temperature (unless otherwise noted)

Supply voltage, V_{CC} (see Note 1)	7V
Input voltage: '283, 'S283	5.5V
'LS283	7V
Interemitter voltage (see Note 2)	5.5V
Operating free-air temperature range: SN54283, SN54LS283, SN54S283	-55°C to 125°C
SN74283, SN74LS283, SN74S283	0°C to 70°C
Storage temperature range	-65°C to 150°C

NOTES: 1. Voltage values, except interemitter voltage, are with respect to network ground terminal.

2. This is the voltage between two emitters of a multiple-emitter transistor. This rating applies for the '283 and 'S283 only between the following pairs: A1 and B1, A2 and B2, A3 and B3, A4 and B4.

SN54283, SN74283

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recommended operating conditions

		SN54283			SN74283			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
Supply Voltage, V_{CC}		4.5	5	5.5	4.75	5	5.25	V
High-level output current, I_{OH}	Any output except C4	-800			-800			μ A
	Output C4	-400			-400			
Low-level output current, I_{OL}	Any output except C4	16			16			mA
	Output C4	8			8			
Operating free-air temperature, T_A		-55	125		0	70		$^{\circ}$ C

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

PARAMETER		TEST CONDITIONS [†]	SN54283			SN74283			UNIT
			MIN	TYP [‡]	MAX	MIN	TYP [‡]	MAX	
V_{IH}	High-level input voltage		2			2			V
V_{IL}	Low-level input voltage		0.8			0.8			V
V_{IK}	Input clamp voltage	$V_{CC} = \text{MIN}, I_I = -12 \text{ mA}$	-1.5			-1.5			V
V_{OH}	High-level output voltage	$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, V_{IL} = 0.8 \text{ V}, I_{OH} = \text{MAX}$	2.4	3.6		2.4	3.6		V
V_{OL}	Low-level output voltage	$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, V_{IL} = 0.8 \text{ V}, I_{OL} = \text{MAX}$		0.2	0.4		0.2	0.4	V
I_I	Input current at maximum input voltage	$V_{CC} = \text{MAX}, V_I = 5.5 \text{ V}$	1			1			mA
I_{IH}	High-level input current	$V_{CC} = \text{MAX}, V_I = 2.4 \text{ V}$	40			40			μ A
I_{IL}	Low-level input current	$V_{CC} = \text{MAX}, V_I = 0.4 \text{ V}$	-1.6			-1.6			mA
I_{OS}	Short-circuit output current [§]	Any output except C4	-20			-18			mA
		Output C4	-55			-55			
I_{CC}	Supply current	$V_{CC} = \text{MAX},$ Outputs open	All B low, other inputs at 4.5 V		56		56		mA
			All inputs at 4.5 V		66	99	66	110	

[†] For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

[‡] All typical values are at $V_{CC} = 5 \text{ V}, T_A = 25^{\circ}\text{C}$.

[§] Only one output should be shorted at a time.

switching characteristics, $V_{CC} = 5 \text{ V}, T_A = 25^{\circ}\text{C}$

PARAMETER [¶]	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH}	C0	Any Σ	$C_L = 15 \text{ pF}, R_L = 400 \Omega,$ See Note 3	14	21	ns	
t_{PHL}				12	21		
t_{PLH}	A_i or B_i	Σ_i		16	24	ns	
t_{PHL}				16	24		
t_{PLH}	C0	C4	$C_L = 15 \text{ pF}, R_L = 780 \Omega,$ See Note 3	9	14	ns	
t_{PHL}				11	16		
t_{PLH}	A_i or B_i	C4		9	14	ns	
t_{PHL}				11	16		

[¶] t_{PLH} = propagation delay time, low-to-high-level output

t_{PHL} = propagation delay time, high-to-low-level output

NOTE 3: Load circuits and voltage waveforms are shown in Section 1.



SN54LS283, SN74LS283

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recommended operating conditions

	SN54LS283			SN74LS283			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
Supply voltage, V_{CC}	4.5	5	5.5	4.75	5	5.25	V
High-level output current, I_{OH}			-400			-400	μ A
Low-level output current, I_{OL}			4			8	mA
Operating free-air temperature, T_A	-55		125	0		70	$^{\circ}$ C

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

PARAMETER		TEST CONDITIONS [†]	SN54LS283			SN74LS283			UNIT
			MIN	TYP [‡]	MAX	MIN	TYP [‡]	MAX	
V_{IH}	High-level input voltage		2			2			V
V_{IL}	Low-level input voltage				0.7			0.8	V
V_{IK}	Input clamp voltage	$V_{CC} = \text{MIN}, I_I = -18 \text{ mA}$			-1.5			-1.5	V
V_{OH}	High-level output voltage	$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, V_{IL} = V_{IL \text{ max}}, I_{OH} = -400 \mu\text{A}$	2.5	3.4		2.7	3.4		V
V_{OL}	Low-level output voltage	$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, V_{IL} = V_{IL \text{ max}}$	$I_{OL} = 4 \text{ mA}$		0.25	0.4	$I_{OL} = 4 \text{ mA}$		V
			$I_{OL} = 8 \text{ mA}$				$I_{OL} = 8 \text{ mA}$		
I_I	Input current at maximum input voltage	Any A or B	$V_{CC} = \text{MAX}, V_I = 7 \text{ V}$		0.2		0.2		mA
		C0							
I_{IH}	High-level input current	Any A or B	$V_{CC} = \text{MAX}, V_I = 2.7 \text{ V}$		40		40		μ A
		C0							
I_{IL}	Low-level input current	Any A or B	$V_{CC} = \text{MAX}, V_I = 0.4 \text{ V}$		-0.8		-0.8		mA
		C0							
I_{OS}	Short-circuit output current [§]	$V_{CC} = \text{MAX}$	-20	-100	-20	-100			mA
I_{CC}	Supply current	$V_{CC} = \text{MAX},$ Outputs open	All inputs grounded		22	39	22	39	mA
			All B low, other inputs at 4.5 V		19	34	19	34	
			All inputs at 4.5 V		19	34	19	34	

[†]For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

[‡]All typical values are at $V_{CC} = 5 \text{ V}, T_A = 25^{\circ}\text{C}$.

[§]Only one output should be shorted at a time and duration of the short-circuit should not exceed one second.

switching characteristics, $V_{CC} = 5 \text{ V}, T_A = 25^{\circ}\text{C}$

PARAMETER [¶]	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS		MIN	TYP	MAX	UNIT
t_{PLH}	C0	Any Σ	$C_L = 15 \text{ pF},$ See Note 3	$R_L = 2 \text{ k}\Omega,$	16	24	ns	
t_{PHL}					15	24		
t_{PLH}	A_i or B_i	Σ_j			15	24	ns	
t_{PHL}					15	24		
t_{PLH}	C0	C4			11	17	ns	
t_{PHL}					11	22		
t_{PLH}	A_i or B_i	C4			11	17	ns	
t_{PHL}					12	17		

[¶] t_{PLH} = propagation delay time, low-to-high-level output

t_{PHL} = propagation delay time, high-to-low-level output

NOTE 3: Load circuits and voltage waveforms are shown in Section 1.



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SN54S283, SN74S283 4-BIT BINARY FULL ADDERS WITH FAST CARRY

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recommended operating conditions

		SN54S283			SN74S283			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
Supply voltage, V_{CC}		4.5	5	5.5	4.75	5	5.25	V
High-level output current, I_{OH}	Any output except C4	-1			-1			mA
	Output C4	-500			-500			μ A
Low-level output current, I_{OL}	Any output except C4	20			20			mA
	Output C4	10			10			
Operating free-air temperature, T_A		-55		125	0		70	$^{\circ}$ C

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

PARAMETER		TEST CONDITIONS [†]		MIN	TYP [‡]	MAX	UNIT
V_{IH}	High-level input voltage			2			V
V_{IL}	Low-level input voltage					0.8	V
V_{IK}	Input clamp voltage	$V_{CC} = \text{MIN}, I_I = -18 \text{ mA}$				-1.2	V
V_{OH}	High-level output voltage	SN54S283	$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V},$	2.5	3.4		V
		SN74S283	$V_{IL} = 0.8 \text{ V}, I_{OH} = \text{MAX}$	2.7	3.4		
V_{OL}	Low-level output voltage	$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V},$ $V_{IL} = 0.8 \text{ V}, I_{OL} = \text{MAX}$				0.5	V
I_I	Input current at maximum input voltage	$V_{CC} = \text{MAX}, V_I = 5.5 \text{ V}$				1	mA
I_{IH}	High-level input current	$V_{CC} = \text{MAX}, V_I = 2.7 \text{ V}$				50	μ A
I_{IL}	Low-level input current	$V_{CC} = \text{MAX}, V_I = 0.5 \text{ V}$				-2	mA
I_{OS}	Short-circuit output current [§]	Any output except C4	$V_{CC} = \text{MAX}$	-40		-100	mA
		Output C4		-20		-100	
I_{CC}	Supply current	$V_{CC} = \text{MAX},$ Outputs open	All B low, other inputs at 4.5 V		80		mA
			All inputs at 4.5 V		95	160	

[†]For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable device type.

[‡]All typical values are at $V_{CC} = 5 \text{ V}, T_A = 25^{\circ}\text{C}$.

[§]Only one output should be shorted at a time, and duration of the short-circuit should not exceed one second.

switching characteristics, $V_{CC} = 5 \text{ V}, T_A = 25^{\circ}\text{C}$

PARAMETER [†]	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH}	C0	Any Σ	$C_L = 15 \text{ pF}, R_L = 280 \Omega,$ See Note 3		11	18	ns
t_{PHL}					12	18	
t_{PLH}	A_i or B_i	Σ_i			12	18	ns
t_{PHL}					11.5	18	
t_{PLH}	C0	C4	$C_L = 15 \text{ pF}, R_L = 560 \Omega,$ See Note 3		6	11	ns
t_{PHL}					7.5	11	
t_{PLH}	A_i or B_i	C4			7.5	12	ns
t_{PHL}					8.5	12	

[†] t_{PLH} = propagation delay time, low-to-high-level output

t_{PHL} = propagation delay time, high-to-low-level output

NOTE 3: Load circuits and voltage waveforms are shown in Section 1.



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