

MARCH 1974 — REVISED MARCH 1988

- (TOP VIEW)**



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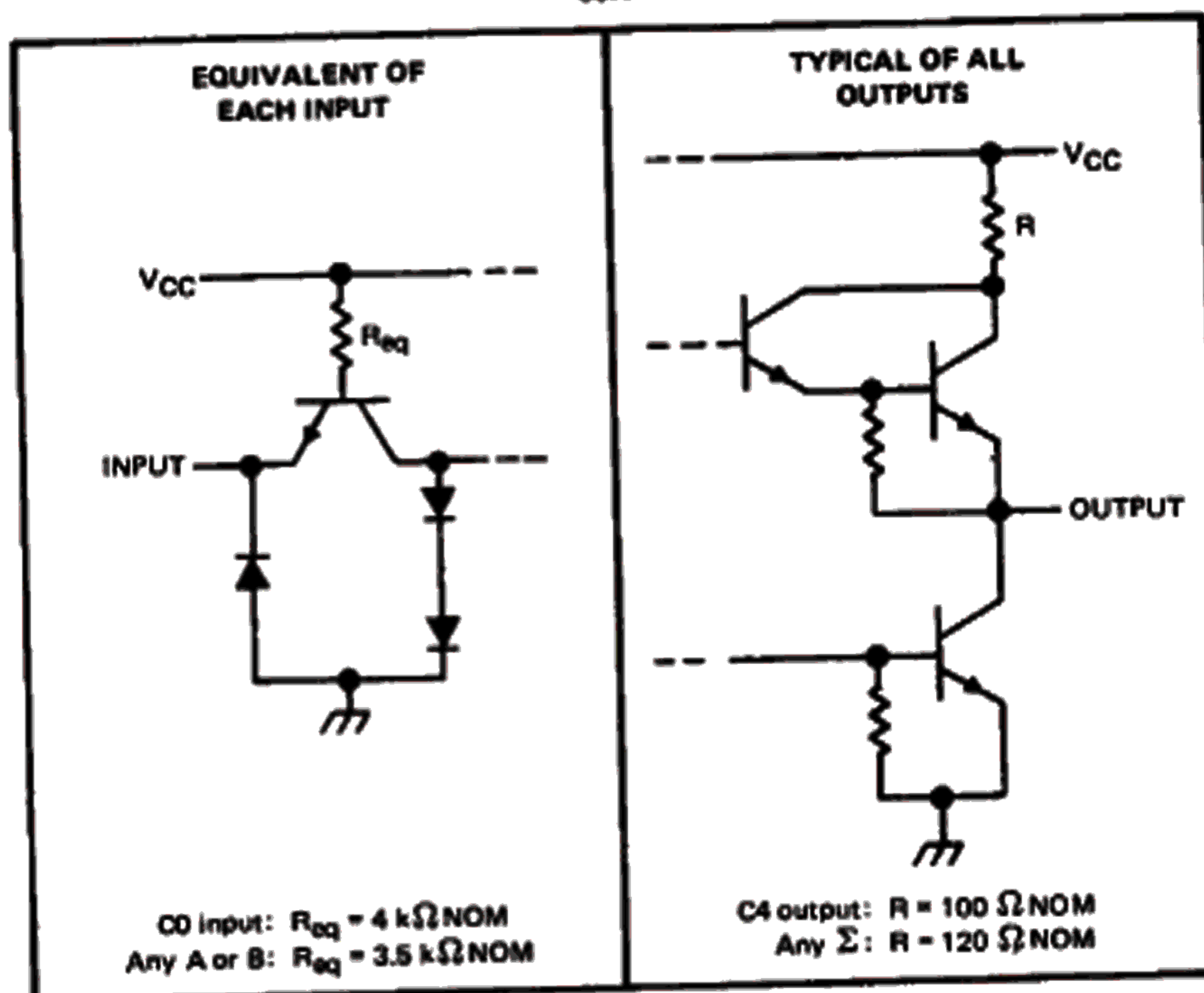
SN5483A, SN54LS83A, SN7483A, SN74LS83A
4-BIT BINARY FULL ADDERS WITH FAST CARRY

schematics of inputs and outputs

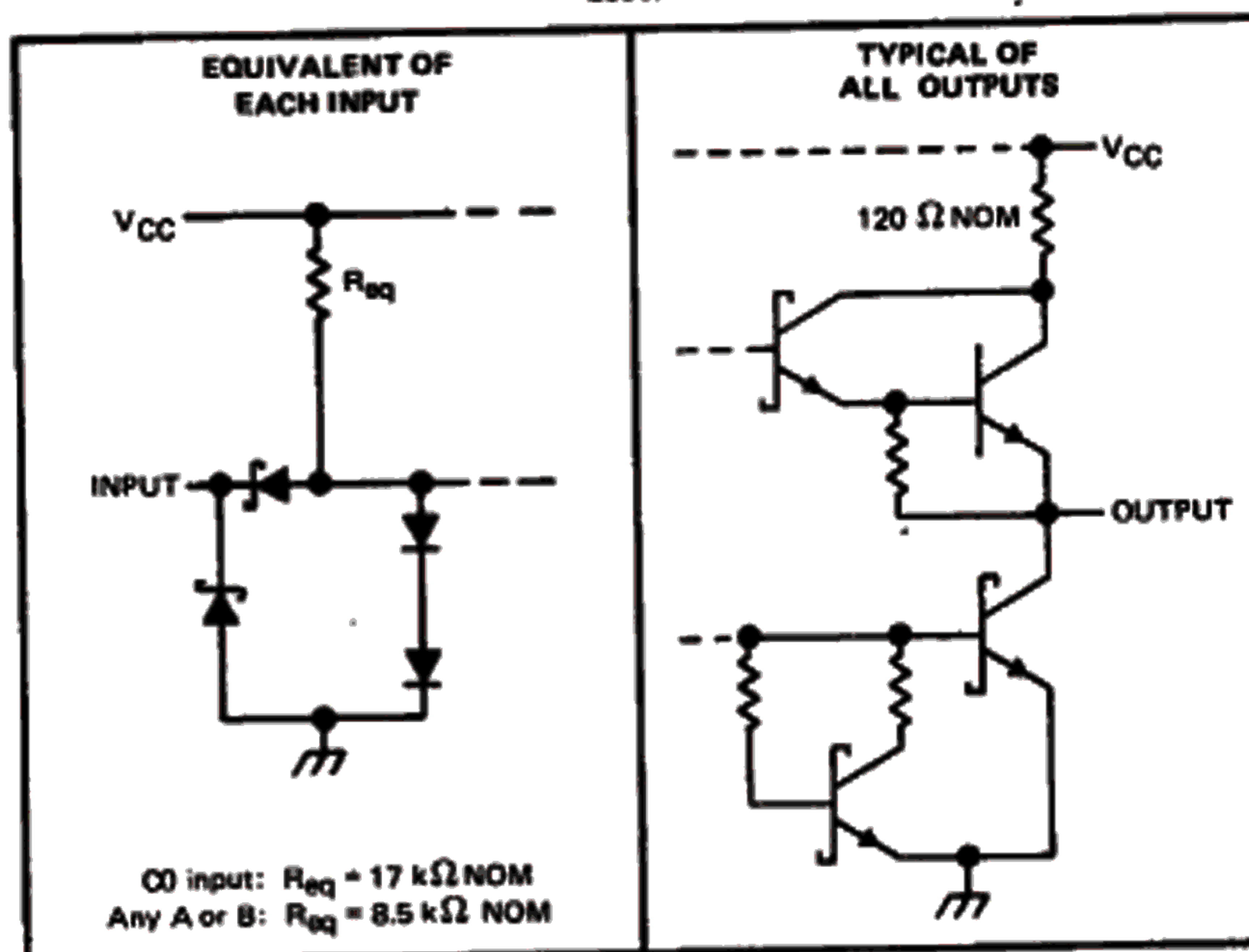
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'83A

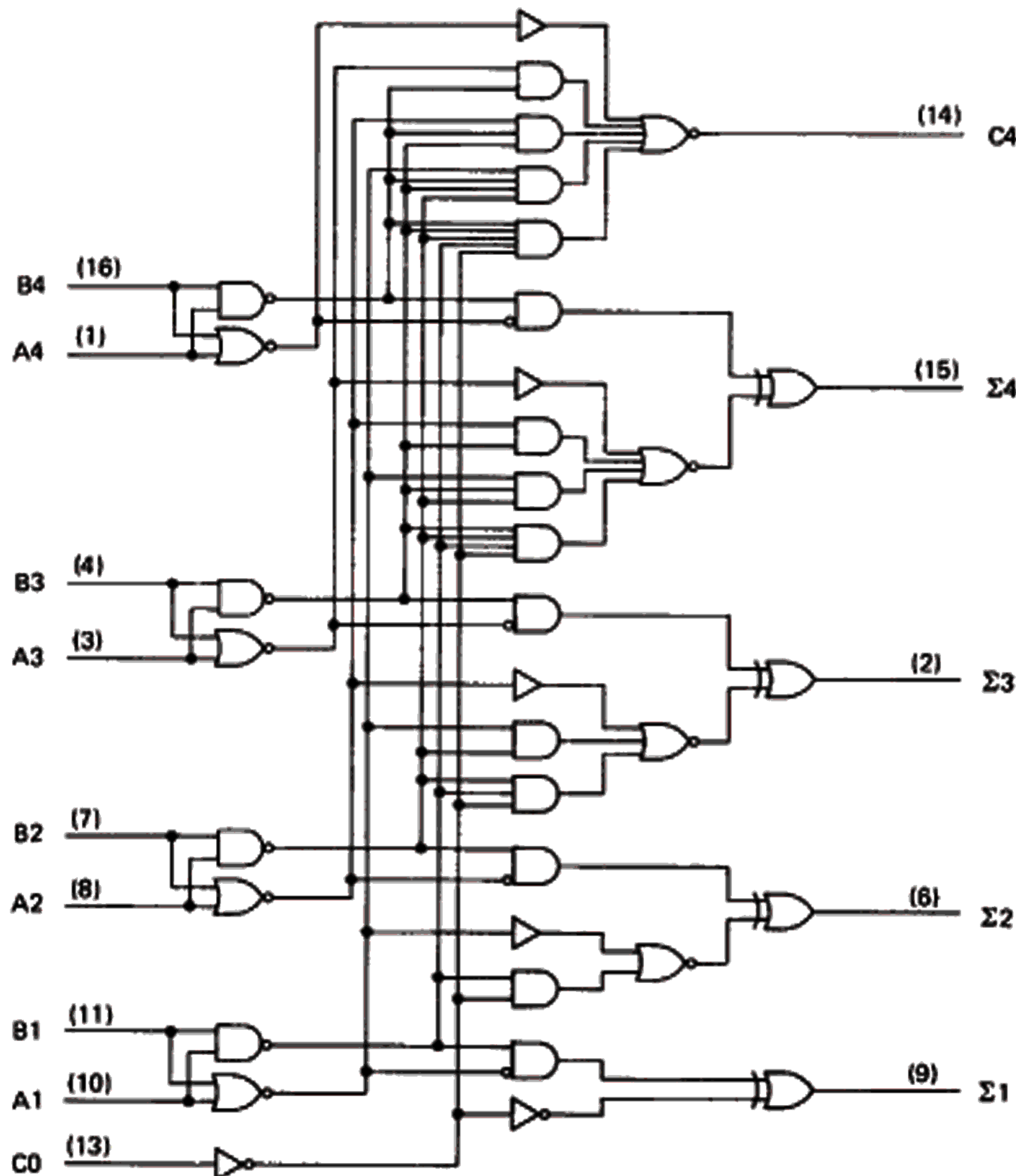


'LS83A



SN5483A, SN54LS83A, SN7483A, SN74LS83A
4-BIT BINARY FULL ADDERS WITH FAST CARRY

logic diagram (positive logic)



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

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

Supply voltage, V _{CC} (see Note 1)	7 V
Input voltage: '83A	5.5 V
'LS83A	7 V
Interemitter voltage (see Note 2)	5.5 V
Operating free-air temperature range: SN5483A, SN54LS83A	-55°C to 125°C
SN7483A, SN74LS83A	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 '83A only between the following pairs: A1 and B1, A2 and B2, A3 and B3, A4 and B4.

SN5483A, SN7483A 4-BIT BINARY FULL ADDERS WITH FAST CARRY

recommended operating conditions

		SN5483A			SN7483A			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			μA
	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			0			$^{\circ}C$

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

PARAMETER		SN5483A			SN7483A			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			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	3.4		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	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	$V_{CC} = \text{MAX.}, V_I = 2.4 \text{ V}$					40	μA
I_{IL}	Low-level input current	$V_{CC} = \text{MAX.}, V_I = 0.4 \text{ V}$					-1.6	mA
I_{OS}	Short-circuit output current §	Any output except C4	$V_{CC} = \text{MAX}$		-20		-55	mA
		Output C4			-20		-70	
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 $V_{CC} = 5 \text{ V}, T_A = 25^{\circ}C$.

§ Only one output should be shorted at a time.

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

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_j	$C_L = 15 \text{ pF}, R_L = 400 \Omega,$ See Note 3	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	$C_L = 15 \text{ pF}, R_L = 780 \Omega,$ See Note 3	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.

SN54LS83A, SN74LS83A 4-BIT BINARY FULL ADDERS WITH FAST CARRY

recommended operating conditions

	SN54LS83A			SN74LS83A			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	μA
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†	SN54LS83A			SN74LS83A			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	$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, V_{IL} = V_{IL \text{ max}}, I_{OH} = -400 \mu A$	2.5	3.4		2.7	3.4		V
V_{OL}	Low-level output voltage	$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, I_{OL} = 4 \text{ mA}$	0.25	0.4		0.25	0.4		V
		$V_{IL} = V_{IL \text{ max}}, I_{OL} = 8 \text{ mA}$				0.35	0.5		
I_I	Input current at maximum input voltage	Any A or B			0.2			0.2	mA
		C0			0.1			0.1	
I_{IH}	High-level input current	Any A or B			40			40	μA
		C0			20			20	
I_{IL}	Low-level input current	Any A or B			-0.8			-0.8	mA
		C0			-0.4			-0.4	
I_{OS}	Short-circuit output current‡	$V_{CC} = \text{MAX}$	-20		-100	-20		-100	mA
I_{CC}	Supply current	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 $V_{CC} = 5 \text{ V}, T_A = 25^{\circ}C$.

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

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

PARAMETER ¹	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_i			15	24	ns	
t_{PHL}					15	24		
t_{PLH}	C0	C4			11	17	ns	
t_{PHL}					15	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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