



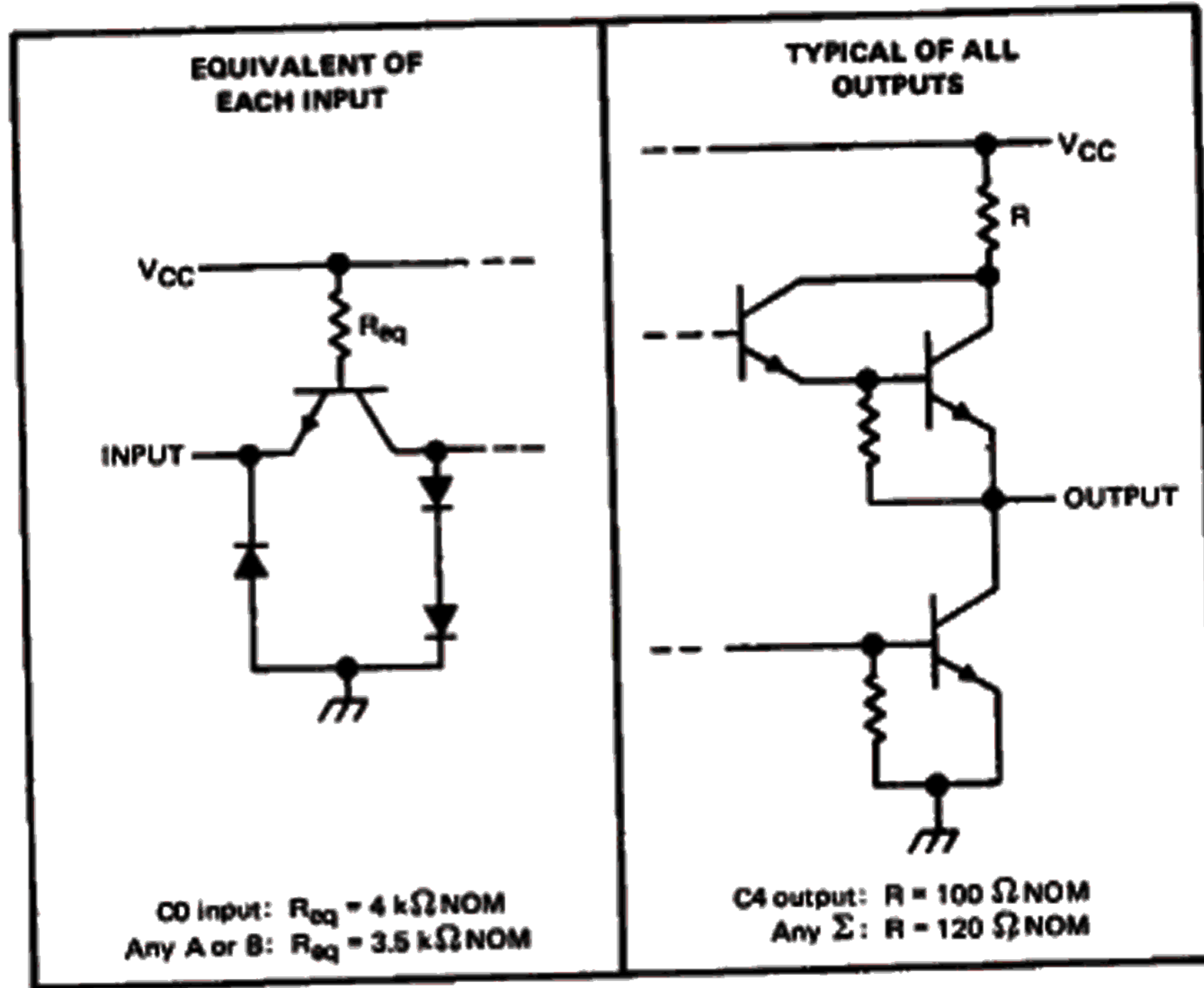


**SN5483A, SN54LS83A, SN7483A, SN74LS83A**  
**4-BIT BINARY FULL ADDERS WITH FAST CARRY**

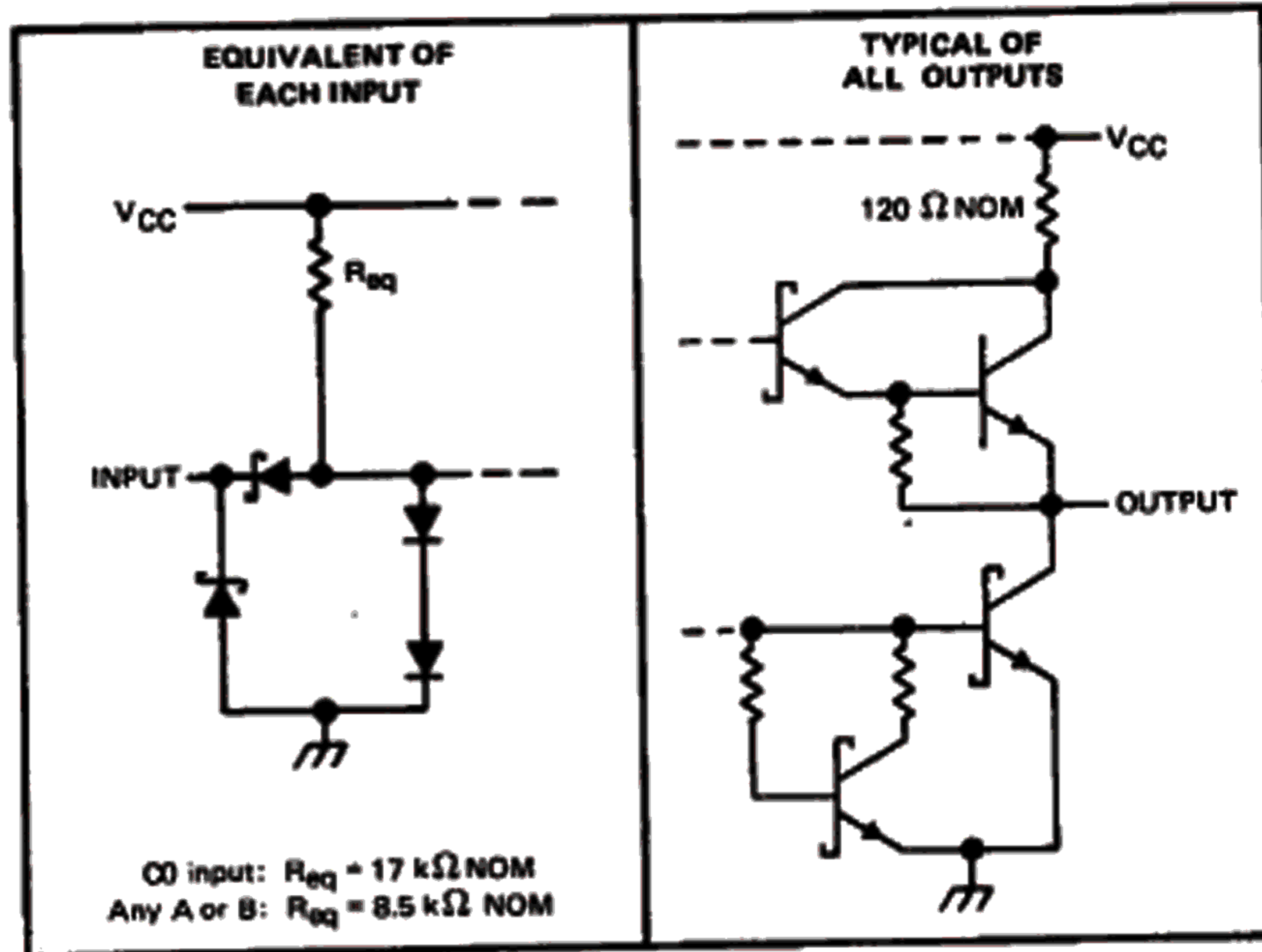
schematics of inputs and outputs

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**TTL Devices**

'83A



'LS83A









# 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			$\mu$ 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 <sup>†</sup>	SN5483A			SN7483A			UNIT
			MIN	TYP <sup>‡</sup>	MAX	MIN	TYP <sup>‡</sup>	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	3.4		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		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			$\mu$ 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 <sup>§</sup>	Any output except C4	-20			-18			mA
		Output C4	-20			-18			
$I_{CC}$	Supply current	$V_{CC} = \text{MAX.},$ Outputs open	All B low, other inputs at 4.5 V			56			mA
			All inputs at 4.5 V			66	99	66	

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

<sup>§</sup> Only one output should be shorted at a time.

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

PARAMETER <sup>¶</sup>	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
$t_{PLH}$	C0	Any $\Sigma$	$C_L = 15 \text{ pF}, R_L = 400 \Omega,$ See Note 3	14	21	ns	
$t_{PHL}$				12	21		
$t_{PLH}$	$A_i$ or $B_i$	$\Sigma_j$		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		

<sup>¶</sup>  $t_{PLH}$  = 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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# 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	$\mu$ A
Low-level output current, $I_{OL}$			4			8	mA
Operating free-air temperature, $T_A$	-65		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	$V_{CC} = \text{MIN.}$ , $V_{IH} = 2 \text{ V}$ , $V_{IL} = V_{IL \text{ max.}}$ , $I_{OH} = -400 \mu\text{A}$	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	$I_{OL} = 4 \text{ mA}$		0.25	0.4
			$I_{OL} = 8 \text{ mA}$				$I_{OL} = 8 \text{ mA}$		0.35	0.5
$I_I$	Input current at maximum input voltage	Any A or B C0	$V_{CC} = \text{MAX.}$ , $V_I = 7 \text{ V}$						0.2	0.2
									0.1	0.1
$I_{IH}$	High-level input current	Any A or B C0	$V_{CC} = \text{MAX.}$ , $V_I = 2.7 \text{ V}$						40	40
									20	20
$I_{IL}$	Low-level input current	Any A or B C0	$V_{CC} = \text{MAX.}$ , $V_I = 0.4 \text{ V}$						-0.8	-0.8
									-0.4	-0.4
$I_{OS}$	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
					All B low, other inputs at 4.5 V				19	34
					All inputs at 4.5 V				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 $\Sigma$	$C_L = 15 \text{ pF}$ , See Note 3	$R_L = 2 \text{ k}\Omega$	11	17	17	ns
$t_{PHL}$								
$t_{PLH}$	$A_i$ or $B_i$	$\Sigma_i$			15	24	24	ns
$t_{PHL}$								
$t_{PLH}$	C0	C4			11	17	17	ns
$t_{PHL}$								
$t_{PLH}$	$A_i$ or $B_i$	C4			11	17	17	ns
$t_{PHL}$								

‡  $t_{PLH}$  = 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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