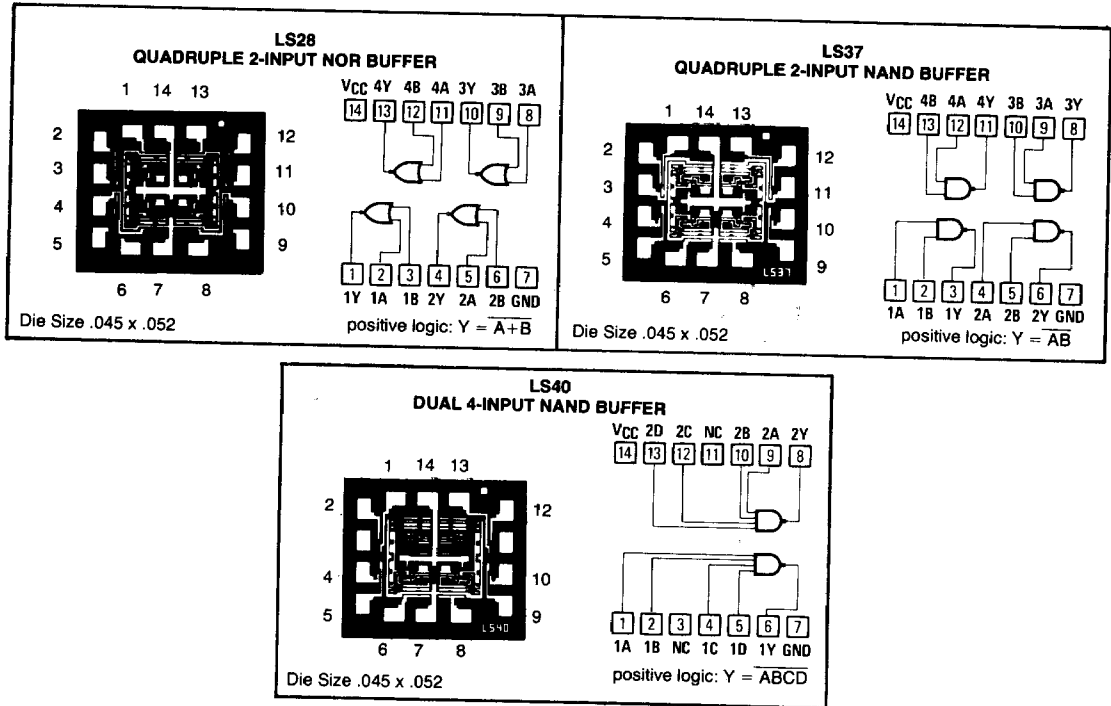


### PIN-OUT AND LOGIC DIAGRAMS



### Recommended Operating Conditions

	9LS/54LS			9LS/74LS			Unit
	Min	Nom	Max	Min	Nom	Max	
Supply voltage, $V_{CC}$	4.5	5	5.5	4.75	5	5.25	V
Normalized fan-out from each output, N	High logic level		60			60	
	Low logic level		30			60	
Operating free-air temperature, $T_A$	-55		125	0		70	$^{\circ}C$

**Electrical Characteristics Over Recommended Free-Air Temperature Range (Unless Otherwise Noted)**

Parameter	Test Conditions*	9LS/54LS			9LS/74LS			Unit
		Min	Typ**	Max	Min	Typ**	Max	
V <sub>IH</sub>		2			2			V
V <sub>IL</sub>				0.7			0.8	V
V <sub>I</sub>	V <sub>CC</sub> =MIN, I <sub>I</sub> =-18mA			-1.5			-1.5	V
V <sub>OH</sub>	V <sub>CC</sub> =MIN, I <sub>OH</sub> =-1.2mA	2.5	3.4		2.7	3.4		V
V <sub>OL</sub>	V <sub>CC</sub> =MIN, V <sub>IH</sub> =2V	V <sub>IL</sub> =0.7V						V
		I <sub>OL</sub> =12mA	0.25	0.4		0.25	0.4	
		I <sub>OL</sub> =22mA				0.35	0.5	
I <sub>I</sub>	V <sub>CC</sub> =MAX, V <sub>I</sub> =7V			0.1			0.1	mA
I <sub>IH</sub>	V <sub>CC</sub> =MAX, V <sub>I</sub> =2.7V			20			20	μA
I <sub>IL</sub>	V <sub>CC</sub> =MAX, V <sub>I</sub> =0.4V			-0.4			-0.4	mA
I <sub>OS</sub>	V <sub>CC</sub> =MAX	-30		-100	-30		-100	mA
I <sub>CCH</sub>	V <sub>CC</sub> =MAX, All inputs at 0V (Per Gate)	LS28	0.45	0.9		0.45	0.9	mA
		LS37,40		0.23	0.5		0.23	
I <sub>CCL</sub>	V <sub>CC</sub> MAX, All inputs at 5V (Per Gate)	LS28	1.7	3.45		1.7	3.45	mA
		LS37,40		1.5	3.0		1.5	

\*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<sub>CC</sub> = 5V, T<sub>A</sub> = 25°C.

†Not more than one output should be shorted at a time.

**Switching Characteristics, V<sub>CC</sub> = 5V Over Recommended Free-Air Temperature Range**

Parameter	-55°C			+25°C			+125°C			Unit
	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
<b>Test Conditions: C<sub>L</sub> = 45pF, R<sub>L</sub> = 667Ω (See Fig. A, page 2-174)</b>										
t <sub>PLH</sub>		6	10		5	11		6	14	ns
t <sub>PHL</sub>		9	14		7	15		7	15	ns
<b>Test Conditions: C<sub>L</sub> = 125pF, R<sub>L</sub> = 667Ω (See Fig. A, page 2-174)</b>										
t <sub>PLH</sub>		8	16		7	15		8	16	ns
t <sub>PHL</sub>		14	20		10	18		10	20	ns

Note: AC specification shown under -55°C and +125°C are for 9LS devices only. All 50pF specifications are for 9LS devices only.