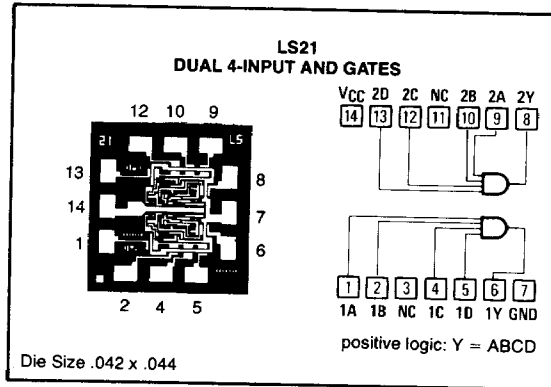
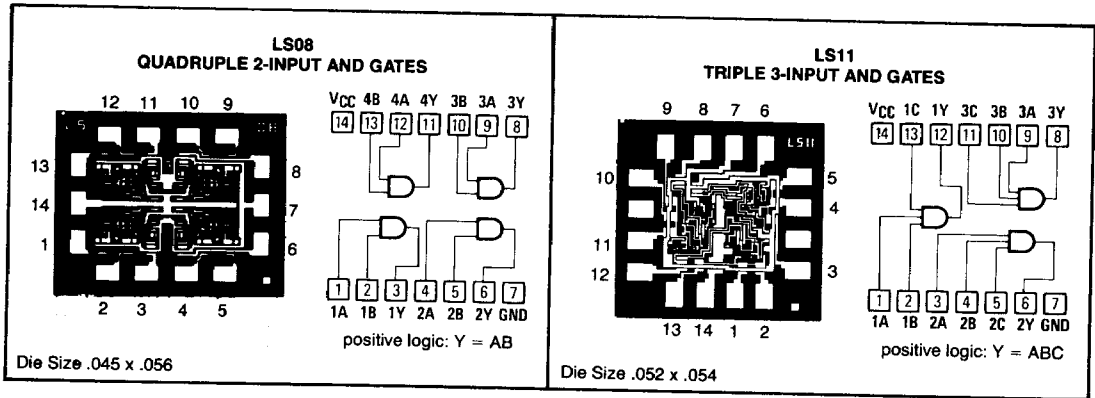


Positive-AND Gates

LS08 LS11 LS21

PIN-OUT AND LOGIC DIAGRAMS



NC—No internal connection

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			20			20	
	Low logic level			11			20	
Operating free-air temperature, T_A		-55		125	0		70	°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 _{IH}		2			2			V
V _{IL}				0.7			0.8	V
V _I	V _{CC} =MIN, I _I =-18mA			-1.5			-1.5	V
V _{OH}	V _{CC} =MIN, I _{OH} =-400μA, V _{IH} =2.0V	2.5	3.4		2.7	3.4		V
V _{OL}				I _{OL} =4mA		0.25	0.4	V
				I _{OL} =8mA			0.35	
I _I	V _{CC} =MAX, V _I =7.0V			0.1			0.1	mA
I _{IH}	V _{CC} =MAX, V _I =2.7V			20			20	μA
I _{IL}	V _{CC} =MAX, V _I =0.4V			-0.4			-0.4	mA
I _{OS}	V _{CC} =MAX	-15		-100	-15		-100	mA
I _{CCH}	V _{CC} =MAX, All inputs at 4.5V (Per Gate)		0.6	1.2		0.6	1.2	mA
I _{CCL}	V _{CC} =MAX, All inputs at 0V (Per Gate)		1.1	2.2		1.1	2.2	mA

*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} = 5V, T_A = 25°C.

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

Switching Characteristics, V_{CC} = 5V Over Recommended Free-Air Temperature Range

Parameter		-55°C			+25°C			+125°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
Test Conditions: C_L = 15pF, R_L = 2kΩ (See Fig. A, page 2-174)											
t _{PLH}	LS08,11		9	4		8.5	13		9	14	ns
	LS21		10	15		9	14		10	15	
t _{PHL}	LS08,11		6	11		6	10		8	12	ns
	LS21		6	11		6	10		8	12	
Test Conditions: C_L = 50pF, R_L = 2kΩ (See Fig. A, page 2-174)											
t _{PLH}	LS08,11		11	17		10	15		11	16	ns
	LS21		12	22		12	20		12	23	
t _{PHL}	LS08,11		10	15		8	12		11	16	ns
	LS21		14	22		12	20		12	23	

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