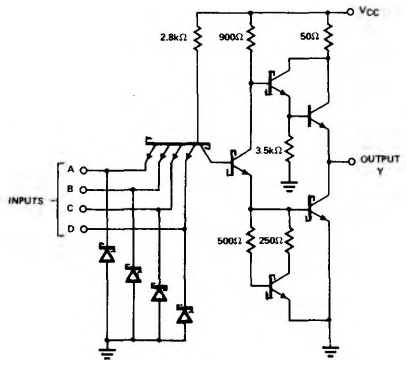
POSITIVE-NAND GATE

S54S20
N74S20

S54S20–A,F,W • N74S20–A,F

DIGITAL 54/74 TTL SERIES

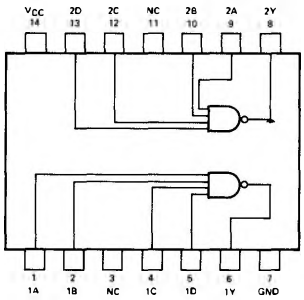
SCHEMATIC (each gate)



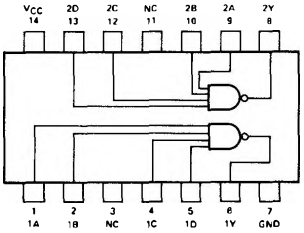
NOTE: Component values shown are nominal.

PIN CONFIGURATIONS

W PACKAGE



A,F PACKAGE



RECOMMENDED OPERATING CONDITIONS

	S54S20			N74S20			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			10			10	
Operating Free-Air Temperature, T_A	-55		125	0		70	°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_I	Input clamp voltage	V_{CC} = MIN,	I_I = -18mA				-1.2	V
V_{OH}	High-level output voltage	V_{CC} = MIN,	V_{IL} = 0.8V,	Series 54S	2.5	3.4		V
		I_{OH} = -1mA		Series 74S	2.7	3.4		V
V_{OL}	Low-level output voltage	V_{CC} = MIN,	V_{IH} = 2V,					
		I_{OL} = 20mA					0.5	V
I_I	Input current at maximum input voltage	V_{CC} = MAX,	V_I = 5.5V				1	mA
I_{IH}	High-level input current (each input)	V_{CC} = MAX,	V_I = 2.7V				50	μA
I_{IL}	Low-level input current (each input)	V_{CC} = MAX,	V_I = 0.5V				-2	mA
I_{OS}	Short-circuit output current †	V_{CC} = MAX			-40		-100	mA
ICCH	Supply current, high-level output (average per gate)	V_{CC} = MAX,	All inputs at 0V			2.5	4	mA
ICCL	Supply current, low-level output (average per gate)	V_{CC} = MAX,	All inputs at 5V			5	9	mA

SWITCHING CHARACTERISTICS, V_{CC} = 5V, T_A = 25°C, N = 10

PARAMETER		TEST CONDITIONS		MIN	TYP	MAX	UNIT
t_{PLH}	Propagation delay time, low-to-high-level output	C_L = 15pF,	R_L = 280Ω	2	3	4.5	ns
		C_L = 50pF,	R_L = 280Ω		4.5		
t_{PHL}	Propagation delay time, high-to-low-level output	C_L = 15pF,	R_L = 280Ω	2	3	5	ns
		C_L = 50pF,	R_L = 280Ω		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_{CC} = 5V, T_A = 25°C.

† Not more than one output should be shorted at a time, and duration of the short-circuit test should not exceed one second.

NOTES:

A. The pulse generator has the following characteristics: $V_{in(1)}$ = 3V, $V_{in(0)}$ = 0V, $t_1 = t_0$ = 2.5ns, PRR = 1MHz, duty cycle = 50%, and $Z_{out} \approx 50\Omega$.

B. Inputs not under test are at 2.7V.

C. C_L includes probe and jig capacitance.