

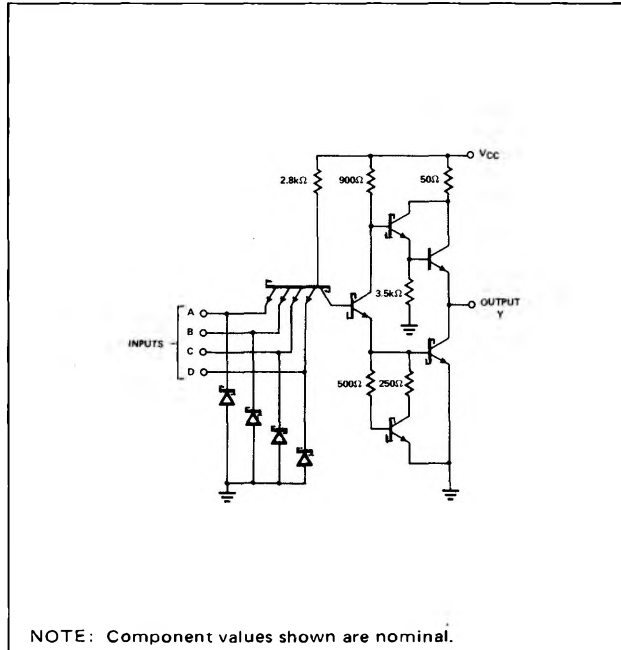
# POSITIVE-NAND GATE

# S54S20 N74S20

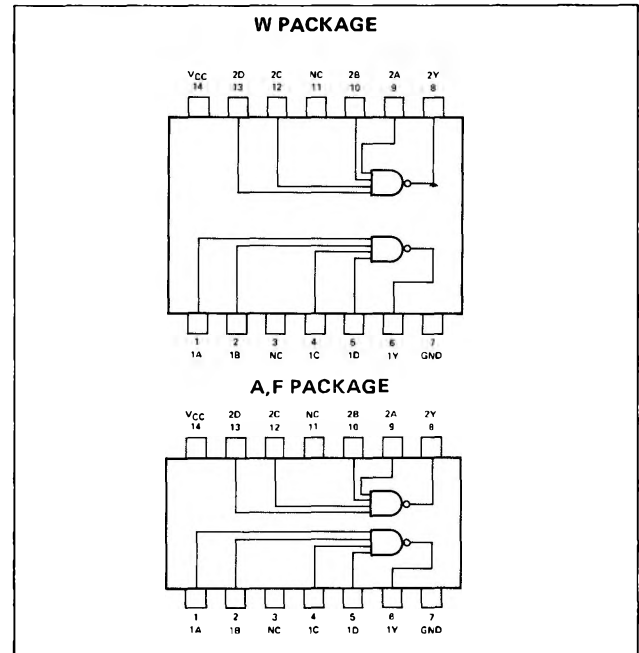
S54S20-A,F,W • N74S20-A,F

DIGITAL 54/74 TTL SERIES

### SCHEMATIC (each gate)



### PIN CONFIGURATIONS



### 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	$V_{CC} = \text{MIN}, I_I = -18\text{mA}$			-1.2	V
$V_{OH}$ High-level output voltage	$V_{CC} = \text{MIN}, I_{OH} = -1\text{mA}$	2.5	3.4		V
	Series 54S	2.7	3.4		V
	Series 74S				
$V_{OL}$ Low-level output voltage	$V_{CC} = \text{MIN}, I_{OL} = 20\text{mA}$			0.5	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 (each input)	$V_{CC} = \text{MAX}, V_I = 2.7\text{V}$			50	μA
$I_{IL}$ Low-level input current (each input)	$V_{CC} = \text{MAX}, V_I = 0.5\text{V}$			-2	mA
$I_{OS}$ Short-circuit output current †	$V_{CC} = \text{MAX}$	-40		-100	mA
$IC_{CH}$ Supply current, high-level output (average per gate)	$V_{CC} = \text{MAX},$ All inputs at 0V		2.5	4	mA
$IC_{CL}$ Supply current, low-level output (average per gate)	$V_{CC} = \text{MAX},$ All inputs at 5V		5	9	mA

SIGNETICS DIGITAL 54/74 TTL SERIES — S54S20 • N74S20

SWITCHING CHARACTERISTICS,  $V_{CC} = 5V$ ,  $T_A = 25^\circ C$ ,  $N = 10$

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

† 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.