5420/7420 Dual 4-Input Positive-NAND Gate

	Schottky TTL					High-Speed TTL					Low-Power Schottky TTL					Standard TTL					Low-Power TTL				
	Device Type	Package				Device Type	Package				Device Type	Package				Device Type	Package				Device Type	Package			
		C	P	M	CF		C	P	M	CF		C	P	M	CF		C	P	M	CF		C	P	M	CF
T.I.	SN54S20	J①			W①	SN54H20	J①			W②	SN54LS20	J①			W①	SN5420	J①			W②	SN54L20	J①	N①	T②	W②
	SN74S20	J①	N①			SN74H20	J①	N①			SN74LS20	J①	N①			SN7420	J①	N①			SN74L20	J①	N①	T②	
FAIRCHILD	FM54S20/FM9S20	D①				FM54H20/FM9H20	D①			F②	FM54LS20/FM9LS20	D①			F①	FM5420/FM9N20	D①			F②					
	FC74S20/FC9S20	D①	P①			FC74H20/FC9H20	D①	P①			FC74LS20/FC9LS20	D①	P①		F①	FC7420/FC9N20	D①	P①							
MOTOROLA						MC3110	L①			F②						MC5420	L①			F②					
						MC3010	L①	P①		F②	SN74LS20		P①			MC7420	L①	P①		F②					
N. S. C.						DM54H20	J①	N①			DM54LS20					DM5420	J①	N①		W②	DM54L20	J①	N①		F②
	DM74S20		N①			DM74H20	J①	N①			DM74LS20					DM7420	J①	N①			DM74L20	J①	N①		F②
PHILIPS																									
	N74S20		①			GJH111/74H20		①			N74LS20		①			FJH111/7420		①							
SIGNETICS	S54S20	F①	A①		W①	S54H20	F①	A①		W②						S5420	F①	A①		W②					
	N74S20	F①	A①			N74H20	F①	A①			N74LS20		A①			N7420	F①	A①							
SIEMENS																									
																FLH121		①							
FUJITSU						MB603	①	M①			74LS20		M①			MB402	①	M①							
						MB603																			
HITACHI	HD74S20	①	P①								HD74LS20		P①			HD7420/HD2504	①	P①							
MITSUBISHI	M5S020	①	P①								M74LS20		P①			M53220		P①							
NEC	μPB2S20	D①									74LS20		C①			μPB203	D①	C①							
TOSHIBA																TD3420A		P①							

Electrical Characteristics SN54LS20/SN74LS20

absolute maximum ratings over operating free-air temperature range

Supply voltage, V_{CC}	7V	Operating free-air temperature range	SN54LS	−55°C to 125°C
Input voltage	7V		SN74LS	0°C to 70°C
Interemitter voltage	5.5V	Storage temperature range		−65°C to 150°C

recommended operating conditions

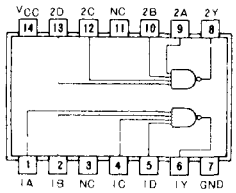
	SN54LS20			SN74LS20			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
Supply voltage, V_{CC}	4.5	5	5.5	4.75	5	5.25	V
High-level output current, I_{OH}			−400			−400	μA
Low-level output current, I_{OL}			4			8	mA
Operating free-air temperature, T_A	−55		125	0		70	°C

electrical characteristics over recommended operating free-air temperature range

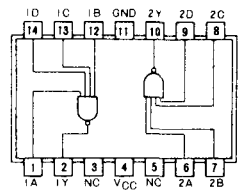
	PARAMETER	TEST CONDITIONS†		MIN	TYP‡	MAX	UNIT
V_{IH}	High-level input voltage			2			V
V_{IL}	Low-level input voltage					0.8	V
V_I	Input clamp voltage	V_{CC} = MIN, I_I = −18mA				−1.5	V
V_{OH}	High-level output voltage	V_{CC} = MIN, I_{OH} = MAX	V_{IL} = V_{IL} max,	2.7	3.4		V
V_{OL}	Low-level output voltage	V_{CC} = MIN, I_{OL} = 4mA	V_{IH} = 2V,			0.4	V
I_I	Input current at maximum input voltage	V_{CC} = MAX, V_I = 7V				0.1	mA
I_{IH}	High-level input current	V_{CC} = MAX, V_{IH} = 2.7V				20	μA
I_{IL}	Low-level input current	V_{CC} = MAX, V_{IL} = 0.4V				−0.4	mA
I_{OS}	Short-circuit output current◆	V_{CC} = MAX	54LS Family	−20		−100	mA
			74LS Family	20		−100	
I_{CCH}	Supply current	V_{CC} = MAX	Total, outputs high		0.4	0.8	mA
I_{CCL}	Supply current		Total, outputs low		1.2	2.2	mA
I_{CC}	Supply current	V_{CC} = 5V	Average per gate (50% duty cycle)		0.4		mA
t_{PLH}	Propagation delay time, low-to-high-level output	V_{CC} = 5V, C_L = 15pF,	T_A = 25°C, R_L = 2kΩ		9	15	ns
t_{PHL}	Propagation delay time, high-to-low-level output				10	15	ns

Pin Assignments (Top View)

①



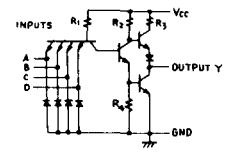
②



positive logic : $Y = \overline{ABCD}$

NC No internal connection

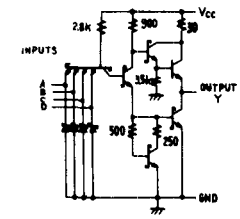
Schematics(each gate)



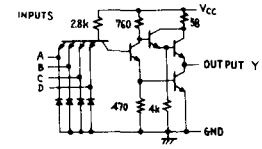
CIRCUIT	R_1	R_2	R_3	R_4
'20	4k	1.6k	130	1k
'L20	40k	20k	500	12k

Input clamp diodes not on SN54L'/SN74L' circuits.

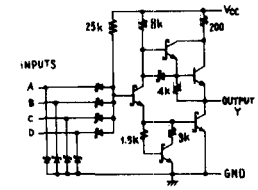
'20, 'L20 CIRCUITS



'S20 CIRCUIT



H20 CIRCUIT



'LS20 CIRCUIT

Resistor values shown are nominal and in ohms.

† For conditions shown as MIN or MAX, use appropriate value specified under recommended operating conditions.
‡ All typical values are at V_{CC} = 5V, T_A = 25°C.
◆ Not more than one output should be shorted at a time, and for SN54H'/SN74H' and SN54S'/SN74S', duration of short-circuit should not exceed 1 second.