

4-WIDE 2-INPUT AND-OR-INVERT GATE

S5453

S5454

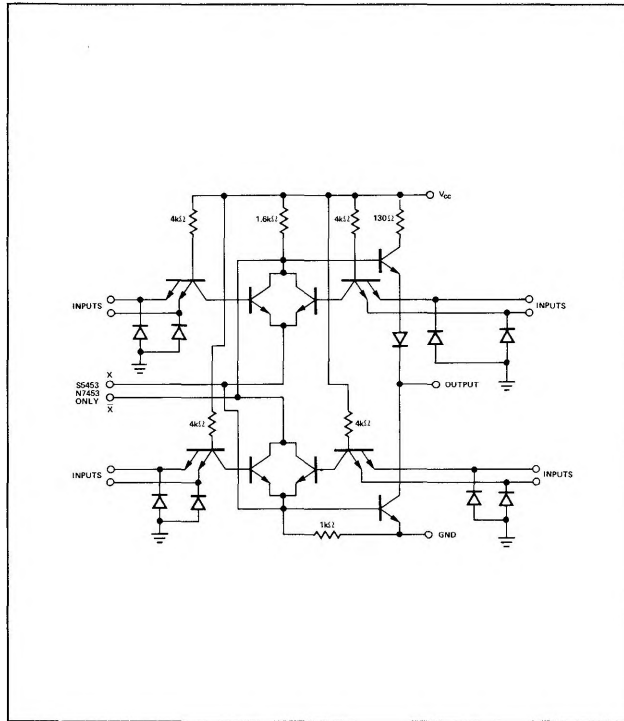
N7453

N7454

S5453—A,F,W • S5454—A,F,W • N7453—A,F • N7454—A,F

DIGITAL 54/74 TTL SERIES

SCHEMATIC DIAGRAM



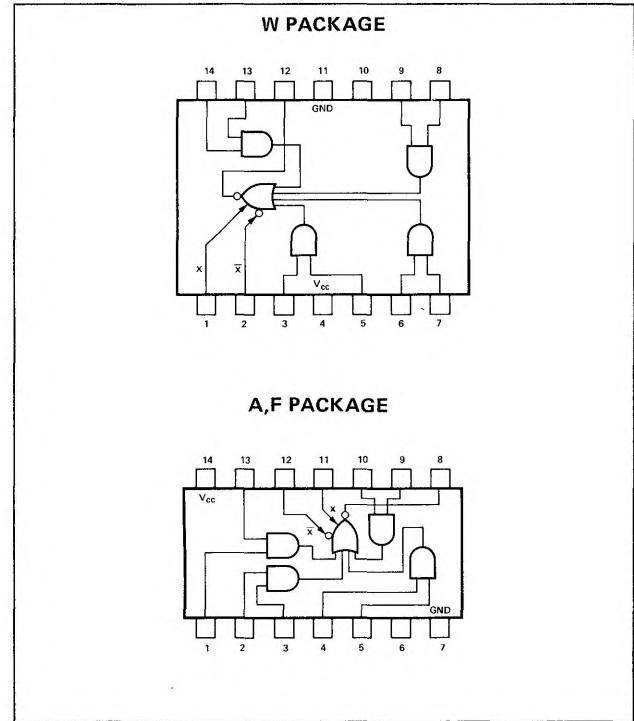
NOTES:

1. Component values shown are nominal.
2. Both expander inputs are used simultaneously for expanding.
3. If expander is not used leave X and X pins open.

RECOMMENDED OPERATING CONDITIONS

	MIN	NOM	MAX	UNIT
Supply Voltage V_{CC} : S5453, S5454 Circuits	4.5	5	5.5	V
N7453, N7454 Circuits	4.75	5	5.25	V
Normalized Fan-Out from Output, N			10	
Operating Free-Air Temperature Range, T_A : S5453, S5454 Circuits	-55	25	125	°C
N7453, N7454 Circuits	0	25	70	°C

PIN CONFIGURATIONS



4. Make no external connection to X and X pins of the S5454 and N7454.
5. A total of four expander gates can be connected to the expander inputs.

ELECTRICAL CHARACTERISTICS (over recommended operating free-air temperature range unless otherwise noted)

PARAMETER	TEST CONDITIONS*	MIN	TYP**	MAX	UNIT
$V_{in(1)}$ Logical 1 input voltage required at both input terminals of one AND section to ensure logical 0 level at output	$V_{CC} = \text{MIN}$	2			V
$V_{in(0)}$ Logical 0 input voltage required at one input terminal of each AND section to ensure logical 1 level at output	$V_{CC} = \text{MIN}$			0.8	V
$V_{out(1)}$ Logical 1 output voltage	$V_{CC} = \text{MIN}$, $I_{load} = -400\mu A$ $V_{in} = 0.8V$,	2.4	3.3		V
$V_{out(0)}$ Logical 0 output voltage	$V_{CC} = \text{MIN}$, $I_{sink} = 16mA$ $V_{in} = 2V$,		0.22	0.4	V

SIGNETICS DIGITAL 54/74 TTL SERIES – S5453 • S5454 • N7453 • N7454

ELECTRICAL CHARACTERISTICS (Cont'd)

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
$I_{in(0)}$	Logical 0 level input current (each input)	$V_{CC} = \text{MAX}, V_{in} = 0.4V$			-1.6	mA
$I_{in(1)}$	Logical 1 level input current (each input)	$V_{CC} = \text{MAX}, V_{in} = 2.4V$ $V_{CC} = \text{MAX}, V_{in} = 5.5V$			40 1	μA mA
I_{OS}	Short circuit output current†	$V_{CC} = 5.5V$ S5453, S5454 N7453, N7454	-20 -18		-55 -55	mA
$I_{CC(0)}$	Logical 0 level supply current	$V_{CC} = \text{MAX}, V_{in} = 5V$		5.1	9.5	mA
$I_{CC(1)}$	Logical 1 level supply current	$V_{CC} = \text{MAX}, V_{in} = 0$		4	8	mA

ELECTRICAL CHARACTERISTICS (S5453 circuits) using expander inputs, $V_{CC} = 4.5V, T_A = -55^\circ C$

PARAMETER		TEST CONDITIONS*	MIN	TYP**	MAX	UNIT
I_X	Expander current	$V_1 = 0.4V, I_{sink} = 16mA$			2.9	mA
$V_{BE(Q)}$	Base-emitter voltage of output transistor (Q)	$I_{sink} = 16mA, I_1 = 0.41mA, R_1 = 0$			1	V
$V_{out(1)}$	Logical 1 output voltage	$I_{load} = -400\mu A, I_1 = 0.15mA,$ $I_2 = -0.15mA$	2.4	3.3		V
$V_{out(0)}$	Logical 0 output voltage	$I_{sink} = 16mA, I_1 = 0.3mA, R_1 = 138\Omega$		0.22	0.4	V

ELECTRICAL CHARACTERISTICS (N7453 circuits) using expander inputs, $V_{CC} = 4.75V, T_A = 0^\circ C$

PARAMETER		TEST CONDITIONS*	MIN	TYP**	MAX	UNIT
I_X	Expander current	$V_1 = 0.4V, I_{sink} = 16mA$			3.1	mA
$V_{BE(Q)}$	Base-emitter voltage of output transistor (Q)	$I_{sink} = 16mA, I_1 = 0.62mA, R_1 = 0$			1	V
$V_{out(1)}$	Logical 1 output voltage	$I_{load} = -400\mu A, I_1 = 270\mu A,$ $I_2 = -270\mu A$	2.4	3.3		V
$V_{out(0)}$	Logical 0 output voltage	$I_{sink} = 16mA, I_1 = 0.43mA, R_1 = 130\Omega$		0.22	0.4	V

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

PARAMETER		TEST CONDITIONS*	MIN	TYP	MAX	UNIT
t_{pd0}	Propagation delay time to logical 0 level	$C_L = 15pF, R_L = 400\Omega$		8	15	ns
t_{pd1}	Propagation delay time to logical 1 level	$C_L = 15pF, R_L = 400\Omega$		13	22	ns

* For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable device type. Expander inputs X and $\bar{X}$ are open.

** All typical values are at $V_{CC} = 5V, T_A = 25^\circ C$.

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