

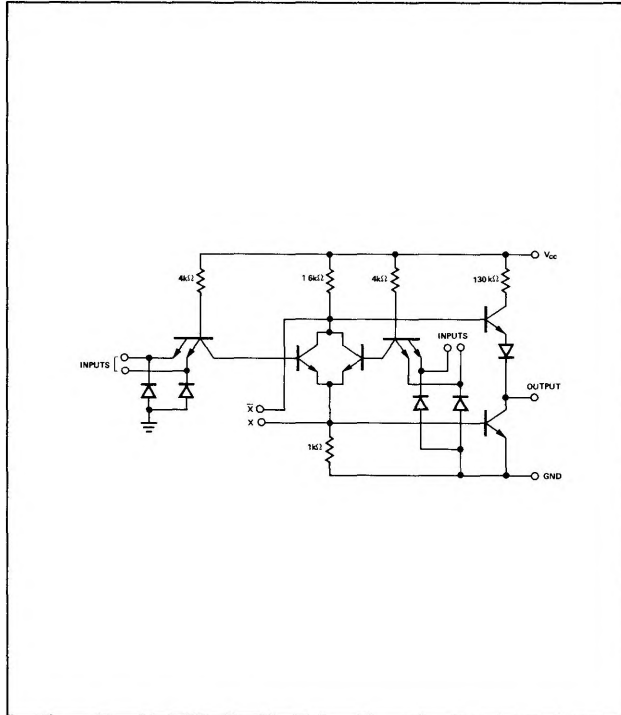
EXPANDABLE DUAL 2-WIDE 2-INPUT AND-OR-INVERT GATES

S5450A,F,W • S5451—A,F,W • N7450—A,F • N7451—A,F

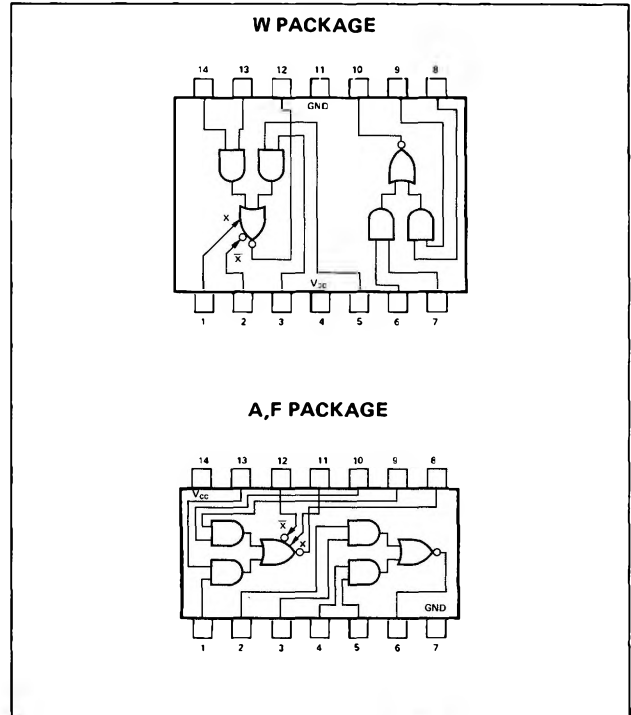
DIGITAL 54/74 TTL SERIES

S5450
S5451
N7450
N7451

SCHEMATIC (each gate)



PIN CONFIGURATIONS



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 $\bar{X}$ pins open.

4. Make no external connection to X and $\bar{X}$ pins of the S5451 and N7451.
5. A total of four expander gates can be connected to the expander inputs.

RECOMMENDED OPERATING CONDITIONS

	MIN	NOM	MAX	UNIT
Supply Voltage V_{CC} : S5450, S5451 Circuits	4.5	5	5.5	V
N7450, N7451 Circuits	4.75	5	5.25	V
Normalized Fan-Out from Output, N			10	
Operating Free-Air Temperature Range, T_A : S5450, S5451 Circuits	-55	25	125	°C
N7450, N7451 Circuits	0	25	70	°C

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 either AND section to ensure logical 0 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 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 - S5450 • S5451 • N7450 • N7451
ELECTRICAL CHARACTERISTICS (Cont'd)

PARAMETER		TEST CONDITIONS*		MIN	TYP**	MAX	UNIT
$I_{in(0)}$	Logical 0 level input current (each input)	$V_{CC} = \text{MAX}$,	$V_{in} = 0.4\text{V}$			-1.6	mA
$I_{in(1)}$	Logical 1 level input current (each input)	$V_{CC} = \text{MAX}$,	$V_{in} = 2.4\text{V}$			40	μA
		$V_{CC} = \text{MAX}$,	$V_{in} = 5.5\text{V}$			1	mA
I_{OS}	Short circuit output current†	$V_{CC} = \text{MAX}$	S5450, S5451 N7450, N7451	-20 -18		-55 -55	mA
$I_{CC(0)}$	Logical 0 level supply current	$V_{CC} = \text{MAX}$,	$V_{in} = 5\text{V}$		7.4	14	mA
$I_{CC(1)}$	Logical 1 level supply current	$V_{CC} = \text{MAX}$,	$V_{in} = 0$		4	8	mA

ELECTRICAL CHARACTERISTICS (S5450 circuits) using expander inputs, $V_{CC} = 4.5\text{V}$, $T_A = -55^\circ\text{C}$

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

ELECTRICAL CHARACTERISTICS (N7450 circuits) using expander inputs, $V_{CC} = 4.75\text{V}$, $T_A = 0^\circ\text{C}$

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

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

PARAMETER		TEST CONDITIONS*		MIN	TYP	MAX	UNIT
t_{pd0}	Propagation delay time to logical 0 level	$C_L = 15\text{pF}$,	$R_L = 400\Omega$		8	15	ns
t_{pd1}	Propagation delay time to logical 1 level	$C_L = 15\text{pF}$,	$R_L = 400\Omega$		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 $V_{CC} = 5\text{V}$, $T_A = 25^\circ\text{C}$.

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