Signetics

4-WIDE 2-2-2-3-INPUT AND-OR GATE

S54H52—A,F,W ● N74H52—A,F
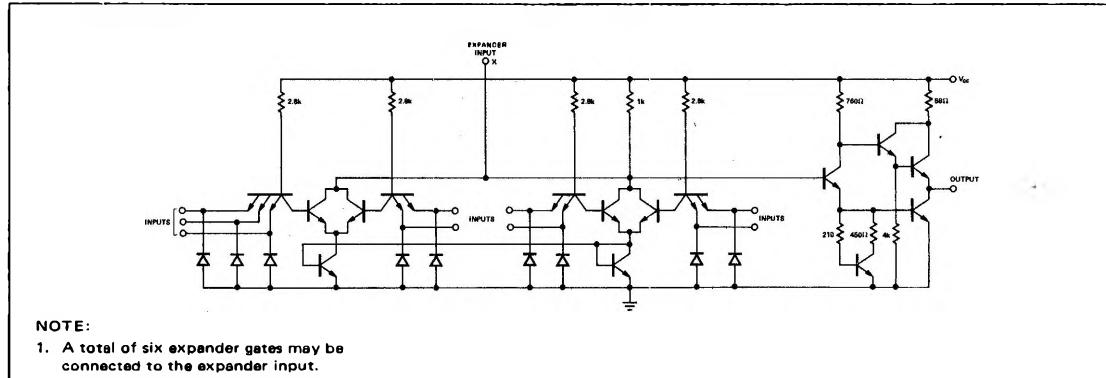
DIGITAL 54/74 TTL SERIES

S54H52
N74H52

PIN CONFIGURATIONS

W PACKAGE

A,F PACKAGE

SCHEMATIC DIAGRAM

NOTE:
1. A total of six expander gates may be connected to the expander input.
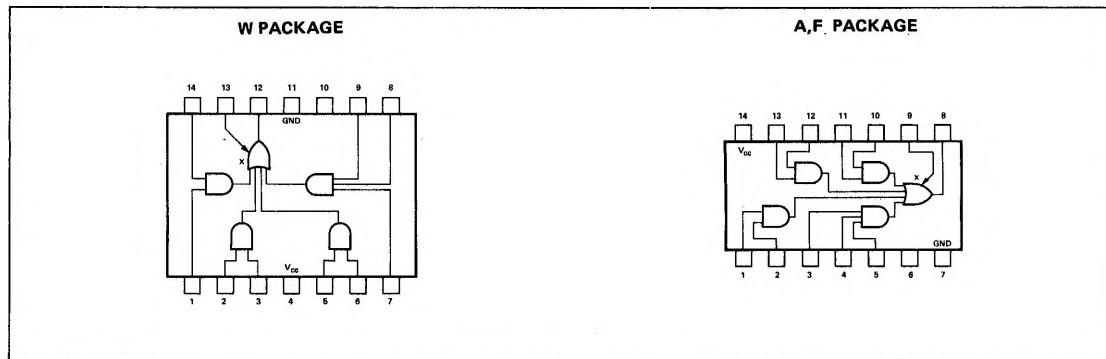
RECOMMENDED OPERATING CONDITIONS

		MIN	NOM	MAX	UNIT
Supply Voltage V_{CC}:	S54H52 Circuits	4.5	5	5.5	V
	N74H52 Circuits	4.75	5	5.25	V
Normalized Fan-Out from each Output, N				10	
Operating Free-Air Temperature Range, T_A:	S54H52 Circuits	-55	25	125	°C
	N74H52 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 all input terminals of one AND section to ensure logical 1 at output	V_{CC} = MIN	2			V
$V_{in(0)}$	Logical 0 input voltage required at one input terminal of each AND section to ensure logical 0 at output	V_{CC} = MIN			0.8	V
$V_{out(1)}$	Logical 1 output voltage	V_{CC} = MIN, V_{in} = 2V, I_{load} = –500μA	2.4			V

ELECTRICAL CHARACTERISTICS (Cont'd)

	PARAMETER	TEST CONDITIONS		MIN	TYP	MAX	UNIT
$V_{out(0)}$	Logical 0 output voltage	$V_{CC} = MIN$, $I_{sink} = 20mA$	$V_{in} = 0.8V$,			0.4	V
$I_{in(0)}$	Logical 0 level input current (each input)	$V_{CC} = MAX$,	$V_{in} = 0.4V$			-2	mA
$I_{in(1)}$	Logical 1 level input current (each input)	$V_{CC} = MAX$, $V_{CC} = MAX$,	$V_{in} = 2.4V$ $V_{in} = 5.5V$			50 1	µA mA
I_{OS}	Short circuit output current**	$V_{CC} = MAX$,	$V_{in} = 4.5V$	-40		-100	mA
$I_{CC(0)}$	Logical 0 level supply current	$V_{CC} = MAX$,	$V_{in} = 0$		15.2	24	mA
$I_{CC(1)}$	Logical 1 level supply current	$V_{CC} = MAX$,	$V_{in} = 4.5V$		20	31	mA

ELECTRICAL CHARACTERISTICS (S54H52 circuits only) using expander input, $V_{CC} = 4.5V$

	PARAMETER	TEST CONDITIONS		MIN	TYP	MAX	UNIT
I_{inX}	Expander-node input current	$V_X = 1V$, $T_A = -55°C$	$I_{load} = -500µA$,	-2.7		-4.5	mA
$V_{out(1)}$	Logical 1 output voltage	$V_X = 1V$, $T_A = -55°C$	$I_{load} = -500µA$,	2.4			V
$V_{out(0)}$	Logical 0 output voltage	$I_{inX} = -300µA$, $T_A = 125°C$	$I_{sink} = 20mA$,			0.4	V

ELECTRICAL CHARACTERISTICS (N74H52 circuits only) using expander input, $V_{CC} = 4.75V$

	PARAMETER	TEST CONDITIONS			MIN	TYP	MAX	UNIT
I_{inX}	Expander-node input current	$V_X = 1V$,	$I_{load} = -500µA$,	$T_A = 0°C$	-2.9		-5.35	mA
$V_{out(1)}$	Logical 1 output voltage	$V_X = 1V$,	$I_{load} = -500µA$,	$T_A = 0°C$	2.4			V
$V_{out(0)}$	Logical 0 output voltage	$I_{inX} = -300µA$,	$I_{sink} = 20mA$,	$T_A = 70°C$			0.4	V

SWITCHING CHARACTERISTICS, $V_{CC} = 5V$, $T_A = 25°C$, N = 10, expander pin is open

	PARAMETER	TEST CONDITIONS		MIN	TYP	MAX	UNIT
t_{pd0}	Propagation delay time to logical 0 level	$C_L = 25pF$,	$R_L = 280Ω$		9.2	15	ns
t_{pd1}	Propagation delay time to logical 1 level	$C_L = 25pF$,	$R_L = 280Ω$		10.6	15	ns

SWITCHING CHARACTERISTICS, $V_{CC} = 5V$, $T_A = 25°C$, N = 10, $C_X = 15pF$

	PARAMETER	TEST CONDITIONS		MIN	TYP	MAX	UNIT
t_{pd0}	Propagation delay time to logical 0 level	$C_L = 25pF$,	$R_L = 280Ω$		9.8		ns
t_{pd1}	Propagation delay time to logical 1 level	$C_L = 25pF$,	$R_L = 280Ω$		14.8		ns

* For conditions shown as MIN or MAX, use the appropriate values specified under recommended operating conditions for the applicable device type. Expander pin is open.
** Duration of short circuit test should not exceed 1 second.
† All typical values are at $V_{CC} = 5V$, $T_A = 25°C$.