

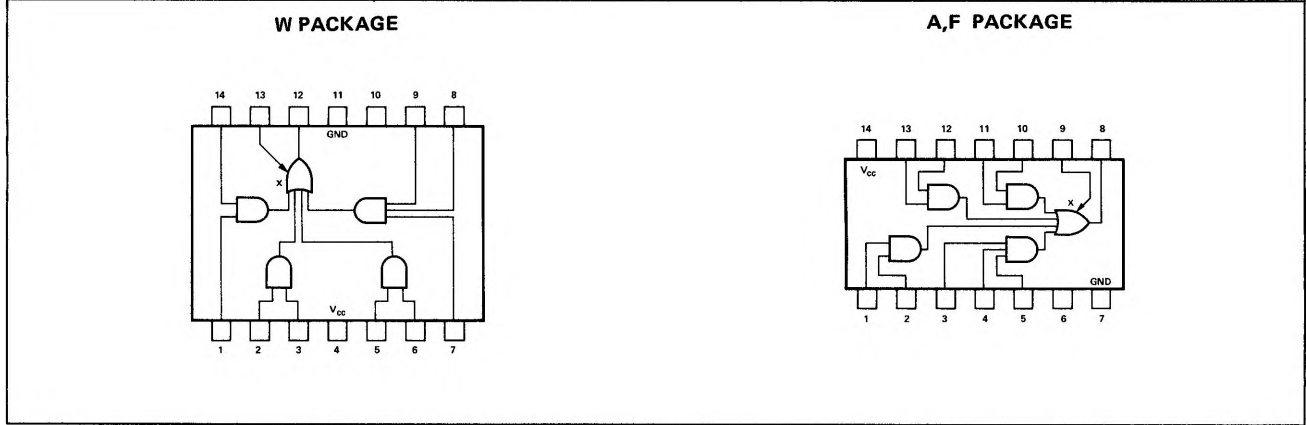
# 4-WIDE 2-2-2-3-INPUT AND-OR GATE

# S54H52 N74H52

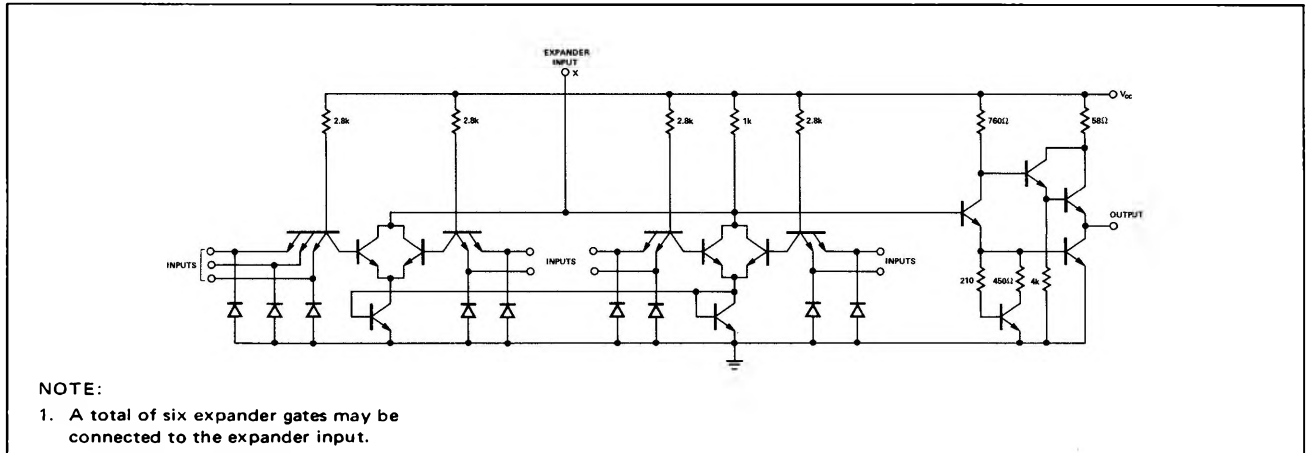
S54H52-A,F,W • N74H52-A,F

DIGITAL 54/74 TTL SERIES

## PIN CONFIGURATIONS



## SCHEMATIC DIAGRAM



## 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	$^{\circ}\text{C}$
N74H52 Circuits	0	25	70	$^{\circ}\text{C}$

## 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	$V_{CC} = \text{MIN}$			V
$V_{in(0)}$	Logical 0 input voltage required at one input terminal of each AND section to ensure logical 0 at output	$V_{CC} = \text{MIN}$			0.8 V
$V_{out(1)}$	Logical 1 output voltage	$V_{CC} = \text{MIN}, V_{in} = 2V, I_{load} = -500\mu\text{A}$			V

SIGNETICS DIGITAL 54/74 TTL SERIES – S54H52 • N74H52

ELECTRICAL CHARACTERISTICS (Cont'd)

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

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

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

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

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

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

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

SWITCHING CHARACTERISTICS,  $V_{CC} = 5\text{V}, T_A = 25^\circ\text{C}, N = 10, C_X = 15\text{pF}$

PARAMETER		TEST CONDITIONS		MIN	TYP	MAX	UNIT
$t_{pd0}$	Propagation delay time to logical 0 level	$C_L = 25\text{pF},$	$R_L = 280\Omega$		9.8		ns
$t_{pd1}$	Propagation delay time to logical 1 level	$C_L = 25\text{pF},$	$R_L = 280\Omega$		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  $V_{CC} = 5\text{V}, T_A = 25^\circ\text{C}.$