

S5437-A,F,W • S5438-A,F,W • S5439-A,F • N7437-A,F,W • N7438-A,F • N7439-A,F

DIGITAL 54/74 TTL SERIES

#### DESCRIPTION

The S5437/N7437 is a NAND Gate (output low only when all inputs are high) the same as N7400 except that it will drive 3 times as many loads. The S5438/N7438 and S5439/N7439 are also NAND Gates but have open-collectors similar to N7403.

The S5437/N7437, S5438/N7438 and S5439/N7439 contain four 2-input NAND gates in a package with a guaranteed fan-out of 30-series 54/74 loads in both the logical "1" (1.2mA), and logical "0" (48mA) states. The S5438/N7438 and S5439/N7439 have an open collector output for "WIRE-AND" applications but still retain the high sink current capability of the S5437/N7437.

**ABSOLUTE MAXIMUM RATINGS** (over operating temperature ranges unless otherwise noted)

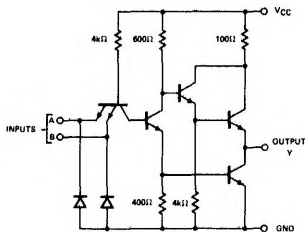
Supply Voltage $V_{CC}$ (See Note 1)	7V
Supply Voltage (See Note 1)	5.5V
Intermittent Voltage (See Note 2)	5.5V
Output Voltage (See Notes 1 and 3): S5438/N7438, S5439/N7439	5.5V
Operating Free-Air Temperature Range: S5437/S5438/S5439	-55°C to 125°C
N7437/N7438/N7439	0°C to 70°C
Storage Temperature Range	-65°C to 150°C

#### NOTES:

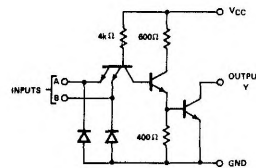
1. Voltage values, except intermittent voltage, are with respect to network ground terminal.
2. This is the voltage between two emitters of a multiple-emitter transistor.
3. This is the maximum voltage which should be applied to any output when it is in the off state.

#### SCHEMATICS (each buffer)

S5437, N7437 (Totem-Pole Output)



S5438, N5438, S5439, N7439 (Open-Collector Output)



#### RECOMMENDED OPERATING CONDITIONS

	S5437, S5438, S5439			N7437, N7438, N7439			UNIT
	MIN	TYP	MAX	MIN	TYP	MAX	
Supply Voltage $V_{CC}$	4.5	5	5.5	4.75	5	5.25	V
Normalized Fan-Out from each Output, N			30			30	
Operating Free-Air Temperature Range, $T_A$	-55	25	125	0	25	70	°C

**DIGITAL 54/74 TTL SERIES ■ S5437, S5438, S5439, N7437, N7438, N7439**

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

PARAMETER		TEST CONDITIONS *		MIN	TYP **	MAX	UNIT
V <sub>IH</sub>	High-level input voltage			2			V
V <sub>IL</sub>	Low-level input voltage					0.8	V
V <sub>I</sub>	Input clamp voltage	V <sub>CC</sub> = MAX, I <sub>I</sub> = -12mA				-1.5	V
V <sub>OH</sub>	High-level output voltage	V <sub>CC</sub> = MIN, V <sub>IL</sub> = 0.8V I <sub>OH</sub> = 1.2mA		2.4	3.3		V
V <sub>OL</sub>	Low-level output voltage	V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2V I <sub>OL</sub> = 48mA			0.22	0.4	V
I <sub>I</sub>	Input current at max. input voltage	V <sub>CC</sub> = MAX, V <sub>I</sub> = 5.5V				1	mA
I <sub>IH</sub>	High-level input current	V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.4V				40	μA
I <sub>IL</sub>	Low-level input current	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.4V				-1.6	mA
I <sub>OS</sub>	Short-circuit output current	V <sub>CC</sub> = MAX		-20 -18		-55 -55	mA
I <sub>CCH</sub>	Supply current, high-level output	V <sub>CC</sub> = MAX, See Note 2			9	15.5	mA
I <sub>CCL</sub>	Supply current, low-level output	V <sub>CC</sub> = MAX, See Note 3			34	54	mA

**SWITCHING CHARACTERISTICS, V<sub>CC</sub> = 5V, T<sub>A</sub> = 25°C, N = 10**

PARAMETER	54/7437	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t <sub>PHL</sub>	Propagation delay time, high-to-low-level output	C <sub>L</sub> = 45pF, R <sub>L</sub> = 133Ω		13	22	ns
t <sub>PLH</sub>	Propagation delay time, low-to-high-level output			8	15	ns

\* For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable device type.

\*\* All typical values are at V<sub>CC</sub> = 5V, T<sub>A</sub> = 25°C.

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

PARAMETER	54/7438/39	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t <sub>PHL</sub>	Propagation delay time, high-to-low-level output	C <sub>L</sub> = 45pF, R <sub>L</sub> = 133Ω		14	22	ns
t <sub>PLH</sub>	Propagation delay time, low-to-high-level output			11	18	ns