SERTECH LABS
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TSC321/322/323/324
NAND Gates
- Quad 2-Input (Active Pullup)
- Dual 5-Input (Active Pullup)
- Quad 2-Input (Open Collector)
- Quad 2-Input (Passive Pullup)

Features

321/322

- IDEAL FOR DRIVING LINES UP TO 10 FEET
- 5mA DRIVE CURRENT IN "1" STATE
- EXPANDER INPUTS
- ACTIVE PULLUP

323/324

- COLLECTOR OR'ABLE
- EXPANDER INPUTS
- 323 SINKS UP TO 11.5 mA (C TYPE) OR 14.0 mA (A TYPE)
- 323 OUTPUT LEVELS ADJUSTABLE TO DTL, TTL OR MOS LEVELS
- 324 HAS PULLUP RESISTORS ON CHIP
- 324 SINKS UP TO 16.8 mA (C TYPE) OR 20.8 mA (A TYPE)

General Descriptions

321/322

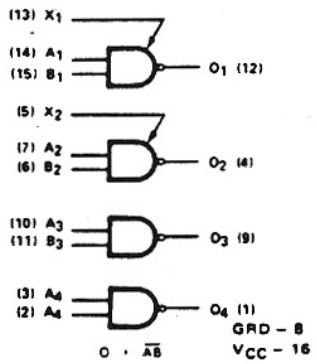
The 321 and 322 are expandable gates with active pullup outputs. Their 5 mA drive currents allow them to drive moderately long lines with no loss of noise immunity.

323/324

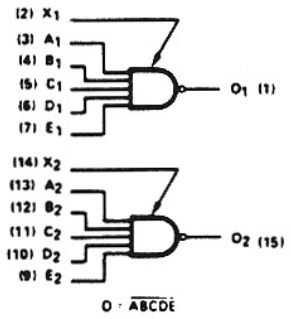
The 323 and 324 are expandable NAND gates for applications such as "wire-OR" logic systems and interfaces with other logic families. Two gates in each package have expander inputs. The 323 is used with an external pullup resistor while the 324 has pullup resistors on the chip.

Logic Diagrams

321, 323, 324

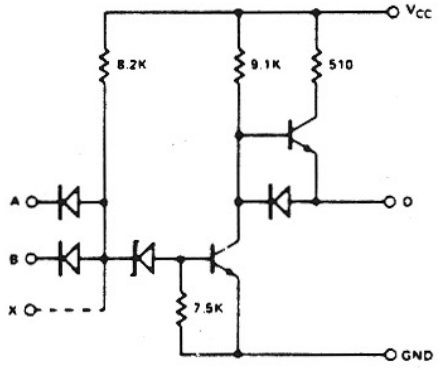


322

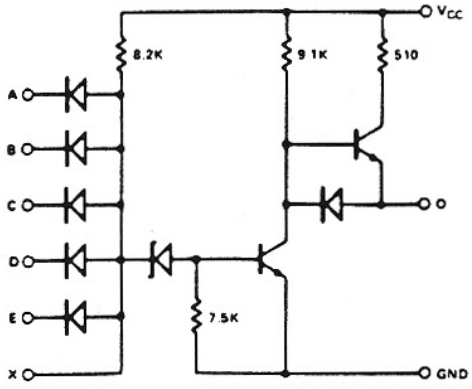


Equivalent Circuits

321

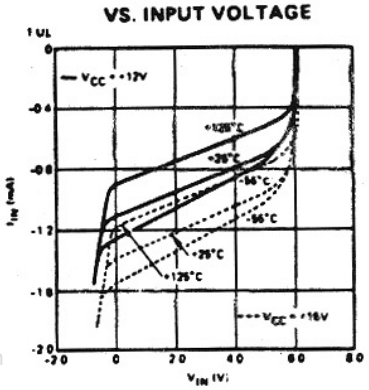


322



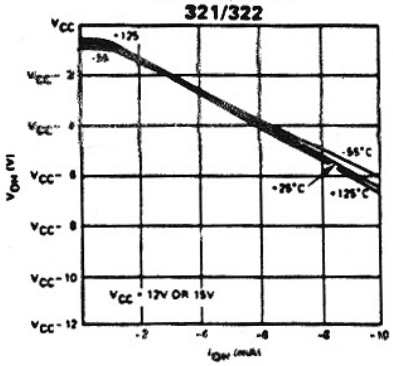
Typical Performance Characteristics

INPUT CURRENT VS. INPUT VOLTAGE

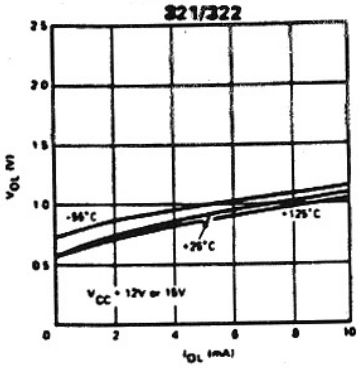


OUTPUT CURRENT VS OUTPUT VOLTAGE

OUTPUT HIGH 321/322

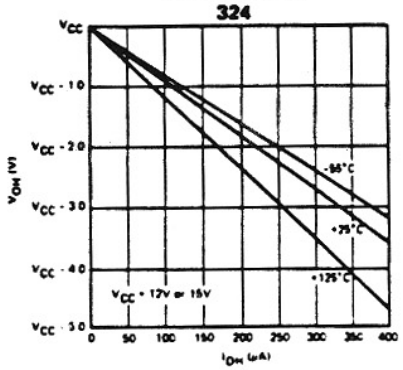


OUTPUT LOW 321/322

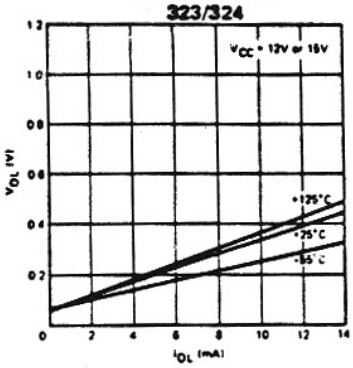


OUTPUT CURRENT VS OUTPUT VOLTAGE

OUTPUT HIGH 324



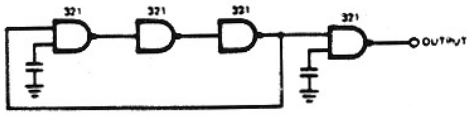
OUTPUT LOW 323/324



Typical Applications

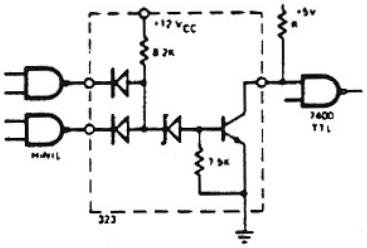
Rules for selecting external resistors and calculating fanout with collectors OR'd are given in the applications notes. The external resistor of the 323 may be connected to a voltage other than V_{CC} to adjust the output voltage level. The expandable gates may be provided any number of inputs by adding 331 gate expanders or 1N914 diodes (or any 20-volt silicon diodes) to the expander inputs.

FREE-RUNNING MULTIVIBRATOR



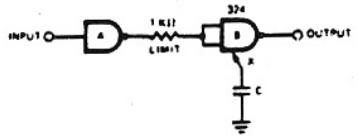
This self-starting circuit even works without capacitors. PW ≅ 1.5 μsec. f ≅ 3MHz.

TTL INTERFACE



Choose the value of pullup resistor R by the rules given in the applications notes, with V_{CC} = 5V.

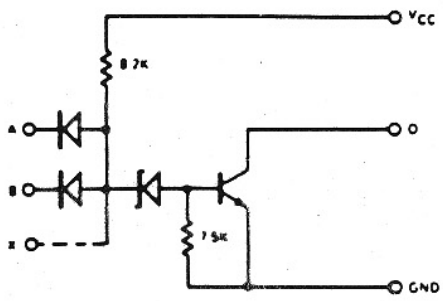
SYSTEM MONITOR



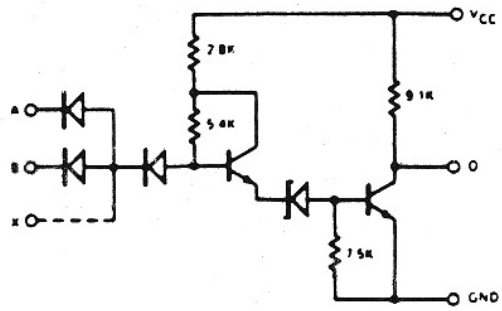
This circuit is used in applications such as detecting presence of data on a normally quiet line, or detecting malfunctions represented by an absence of pulses on a normally active line. A steady succession of pulses at the input holds the output high, but the output goes low if the input remains low for longer than a minimum time established by the value of C. A high input allows C to discharge, switching gate B to a high output. However, a low input causes C to charge at a rate t = C (8.2K) where 8.2K is B's input resistor (internal). For B's output to switch to low, the input to gate A must go low long enough for C to charge above the threshold of gate B. Any new input pulse retriggers the circuit and switches the output to high.

Equivalent Circuits (contd.)

323



324



Specifications

321

I_{CC} (WORST-CASE)	15 mA @ 13V, 20 mA @ 16V	
t_{PD} I/O FUNCTION FOR t_{PD}	200 ns A+O−	300 ns A−O+

322

I_{CC} (WORST-CASE)	8 mA @ 13V, 11 mA @ 16V	
t_{PD} I/O FUNCTION FOR t_{PD}	190 ns A+O−	550 ns A−O+

323

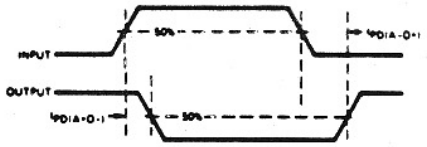
I_{CC} (WORST-CASE)	5.5 mA @ 13V, 8 mA @ 16V	
t_{PD} I/O FUNCTION FOR t_{PD}	160 ns A+O−	400 ns A−O+

324

I_{CC} (WORST-CASE)	28 mA @ 13V, 40 mA @ 16V	
t_{PD} I/O FUNCTION FOR t_{PD}	200 ns A+O−	600 ns A−O+

NOTE:
I_{CC} is tested at V_{CC} +1 Volt (+13V for C type and +16V for A type) and is guaranteed across the applicable temp range. t_{PD} is guaranteed at V_{CC} ±1V and across the applicable temp range with the output loaded with 5 unit loads.
See page 12 for electrical summary data.

Switching Time Waveform



Loading Table

PINS	FUNCTION	LOADING
A, B, A·E	Input	1 UL
X	Expanders	Each diode tied to X_1 or X_2 is 1 unit load
0	Outputs	5 UL (321, 322, 324) 7 UL (324 with supplemental 10 kΩ pullup resistor)

323 also handles 4 TTL loads at 400 mV.