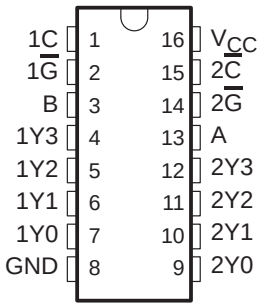
- **Applications:**
  - **Dual 2-Line to 4-Line Decoder**
  - **Dual 1-Line to 4-Line Demultiplexer**
  - **3-Line to 8-Line Decoder**
  - **1-Line to 8-Line Demultiplexer**
- **Individual Strobes Simplify Cascading For Decoding or Demultiplexing Larger Words**
- **Package Options Include Plastic "Small Outline" Packages and Standard Plastic 300-mil DIPs**

**D or N Package**
**(Top View)**



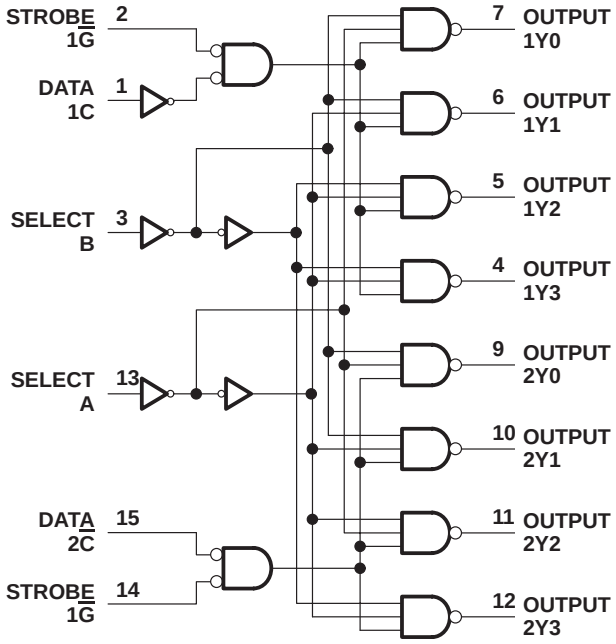

## description

The ′ALS155 circuits feature dual 1-line to 4-line demultiplexers with individual strobes and common binary-address inputs in a single 16-pin package. When both sections are enabled, the common binary-address inputs sequentially select and route associated input data to the appropriate output of each section. The individual strobes permit enabling or disabling each of the 4-bit sections as desired.

Data applied to input 1C is inverted at its outputs and data applied at input $2\overline{C}$ is not inverted through its outputs. The inverter following the 1C data input permits use of the ′ALS155 as a 3-line to 8-line demultiplexer without external gating. All inputs are clamped with high-performance Schottky diodes to suppress line ringing and simplify system design.

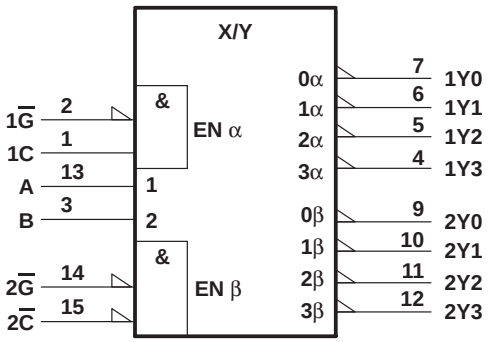
The SN74ALS155 is characterized for operation from 0°C to 70°C.

## logic diagram (positive logic)

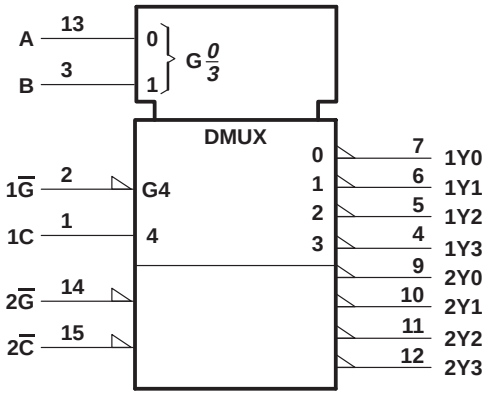


## logic symbols† (alternatives)

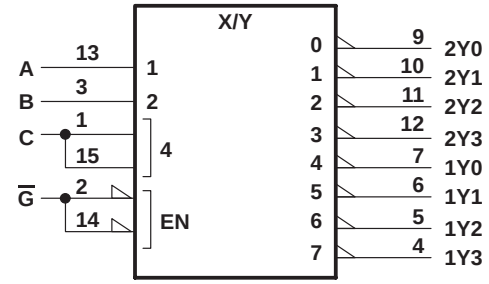
**2-LINE TO 4-LINE DECODER**



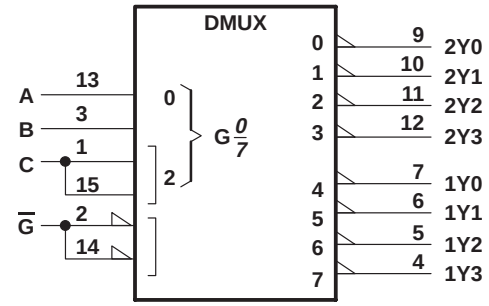

**1-LINE TO 4-LINE DEMULTIPLEXER**




**3-LINE TO 8-LINE DECODER**




**1-LINE TO 8-LINE DEMULTIPLEXER**




† These symbols are in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

**FUNCTION TABLE**
**2-LINE TO 4-LINE DECODER**
**OR**
**1-LINE TO 4-LINE DEMULTIPLEXER**

| INPUTS | | | | OUTPUTS | | | |
|---|---|---|---|---|---|---|---|
| SELECT | | STROBE $1\overline{G}$ | DATA 1C | | | | |
| B | A | | | 1Y0 | 1Y1 | 1Y2 | 1Y3 |
| X | X | H | X | H | H | H | H |
| L | L | L | H | L | H | H | H |
| L | H | L | H | H | L | H | H |
| H | L | L | H | H | H | L | H |
| H | H | L | H | H | H | H | L |
| X | X | X | L | H | H | H | H |

| INPUTS | | | | OUTPUTS | | | |
|---|---|---|---|---|---|---|---|
| SELECT | | STROBE $2\overline{G}$ | DATA $2\overline{C}$ | | | | |
| B | A | | | 2Y0 | 2Y1 | 2Y2 | 2Y3 |
| X | X | H | X | H | H | H | H |
| L | L | L | L | L | H | H | H |
| L | H | L | L | H | L | H | H |
| H | L | L | L | H | H | L | H |
| H | H | L | L | H | H | H | L |
| X | X | X | H | H | H | H | H |

**FUNCTION TABLE**
**3-LINE TO 8-LINE DECODER**
**OR**
**1-LINE TO 8-LINE DEMULTIPLEXER**

| INPUTS | | | | OUTPUTS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SELECT | | | STROBE OR DATA | (0) | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| C‡ | B | A | $\overline{G}$§ | 2Y0 | 2Y1 | 2Y2 | 2Y3 | 1Y0 | 1Y1 | 1Y2 | 1Y3 |
| X | X | X | H | H | H | H | H | H | H | H | H |
| L | L | L | L | L | H | H | H | H | H | H | H |
| L | L | H | L | H | L | H | H | H | H | H | H |
| L | H | L | L | H | H | L | H | H | H | H | H |
| L | H | H | L | H | H | H | L | H | H | H | H |
| H | L | L | L | H | H | H | H | L | H | H | H |
| H | L | H | L | H | H | H | H | H | L | H | H |
| H | H | L | L | H | H | H | H | H | H | L | H |
| H | H | H | L | H | H | H | H | H | H | H | L |

‡ C = inputs 1C and $2\overline{C}$ connected together
§ $\overline{G}$ = inputs $1\overline{G}$ and $2\overline{G}$ connected together

### absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†

Supply voltage, $V_{CC}$ (see Note 1) . . . . . 7 V
Input voltage . . . . . 7 V
Operating free-air temperature range . . . . . 0°C to 70°C
Storage temperature range . . . . . – 65°C to 150°C

† Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only, and functional operation of the device at these or any other conditions beyond those indicated in the "Recommended Operating Conditions" section of this specification is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTE 1: All voltage values are with respect to GND.

### recommended operating conditions

| | | MIN | NOM | MAX | UNIT |
|---|---|---|---|---|---|
| $V_{CC}$ | Supply voltage | 4.5 | 5 | 5.5 | V |
| $V_{IH}$ | High-level input voltage | 2 | | | V |
| $V_{IL}$ | Low-level input voltage | | | 0.8 | V |
| $I_{OH}$ | High-level output current | | | – 0.4 | mA |
| $I_{OL}$ | Low-level output current | | | 8 | mA |
| $T_A$ | Operating free-air temperature | 0 | | 70 | °C |

### electrical characteristics over recommended free-air temperature range (unless otherwise noted)

| PARAMETER | TEST CONDITIONS | | MIN | TYP† | MAX | UNIT |
|---|---|---|---|---|---|---|
| $V_{IK}$ | $V_{CC}$ = 4.5 V, | $I_I$ = – 18 mA | | | – 1.5 | V |
| $V_{OH}$ | $V_{CC}$ = 4.5 V to 5.5 V, | $I_{OH}$ = – 0.4 mA | $V_{CC}$ – 2 | | | V |
| $V_{OL}$ | $V_{CC}$ = 4.5 V, | $I_{OL}$ = 8 mA | | 0.35 | 0.5 | V |
| $I_I$ | $V_{CC}$ = 5.5 V, | $V_I$ = 7 V | | | 0.1 | mA |
| $I_{IH}$ | $V_{CC}$ = 5.5 V, | $V_I$ = 2.7 V | | | 20 | µA |
| $I_L$ | $V_{CC}$ = 5.5 V, | $V_I$ = 0.4 V | | | – 0.1 | µA |
| $I_{CCL}$ | $V_{CC}$ = 5.5 V, | | | 7 | 13 | mA |

† All typical value are at $V_{CC}$ = 5 V, $T_A$ = 25°C.

### switching characteristics over recommended ranges of supply voltage and operating free-air temperature (see Note 2)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | $V_{CC}$ = 4.5 V to 5.5 V, $C_L$ = 50 pF, $R_L$ = 500 Ω, $T_A$ = 0°C to 70°C | | UNIT |
|---|---|---|---|---|---|
| | | | MIN | MAX | |
| $t_{PLH}$ | A, B | 1Y, 2Y | 3 | 14 | ns |
| $t_{PHL}$ | | | 3 | 12 | |
| $t_{PLH}$ | 1C | 1Y | 3 | 12 | ns |
| $t_{PHL}$ | | | 3 | 14 | |
| $t_{PLH}$ | $1\overline{G}$ | 1Y | 3 | 12 | ns |
| $t_{PHL}$ | | | 3 | 13 | |
| $t_{PLH}$ | $2\overline{C}$, $2\overline{G}$ | 2Y | 3 | 12 | ns |
| $t_{PHL}$ | | | 3 | 14 | |

NOTE 2: Load circuits and voltage waveforms are shown in Section 1, *ALS/AS Logic Data Book*, 1986.

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