



MOTOROLA

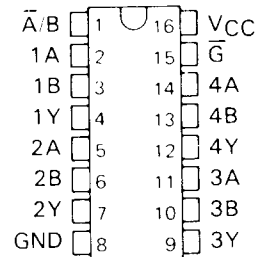
**TYPES SN54ALS157, SN54ALS158,
SN74ALS157, SN74ALS158
QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS**

000221

USS 1702/1250

9/30

(TOP VIEW)



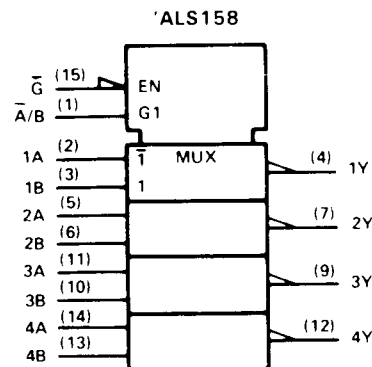
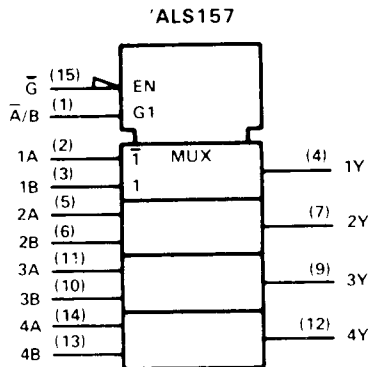
description

These monolithic data selectors/multiplexers contain inverters and drivers to supply full data selection to the four output gates. A separate strobe input (\bar{G}) is provided. A 4-bit word is selected from one of two sources and is routed to the four outputs. The 'ALS157 presents true data whereas the 'ALS158 presents inverted data to minimize propagation delay time.

The SN54ALS157 and SN54ALS158 are characterized for operation over the full military temperature range of -55°C to 125°C . The SN74ALS157 and SN74ALS158 are characterized for operation from 0°C to 70°C .

J Suffix—Case 620-08 (Ceramic)
N Suffix—Case 648-05 (Plastic)

logic symbols



FUNCTION TABLE

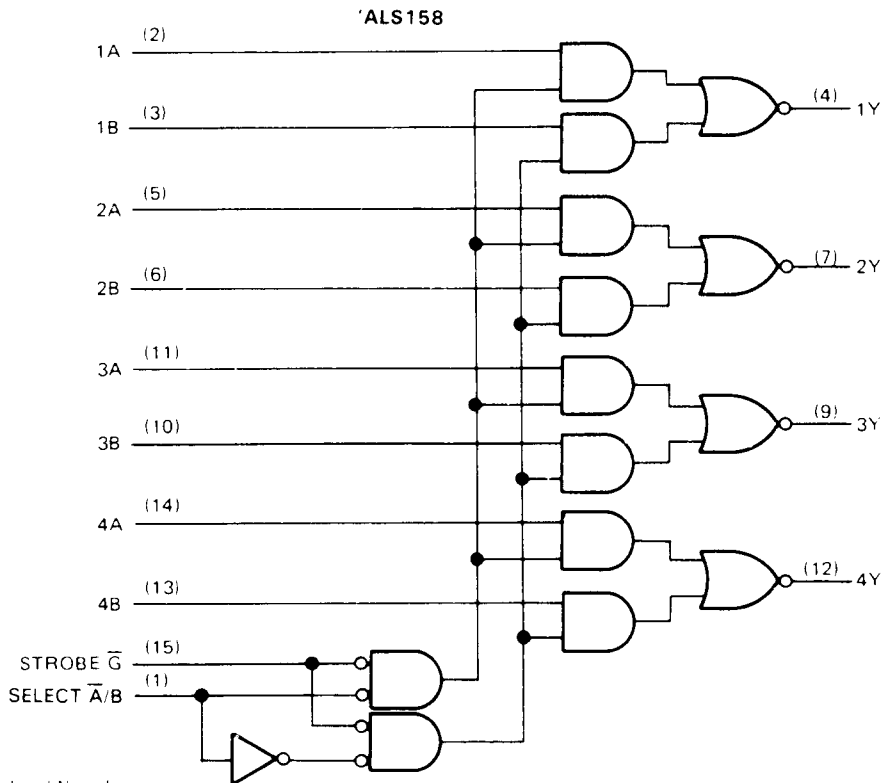
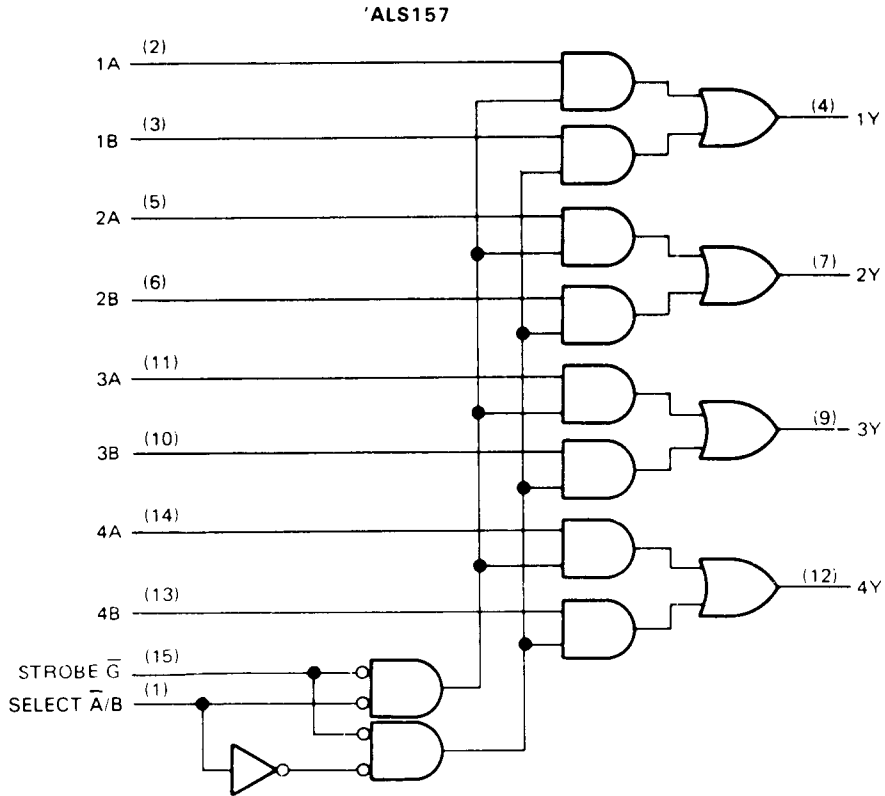
| STROBE \bar{G} | SELECT \bar{A}/\bar{B} | DATA | | OUTPUT Y | |
|---------------------|-----------------------------|------|---|----------|---------|
| | | A | B | 'ALS157 | 'ALS158 |
| | | | | H | X |
| L | L | L | X | L | H |
| L | L | L | X | H | L |
| L | H | X | L | L | H |
| L | H | X | H | H | L |

Pin numbers shown are for J and N packages

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TYPES SN54ALS157, SN54ALS158, SN74ALS157, SN74ALS158
QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS

logic diagrams (positive logic)



Pin numbers shown are for J and N packages.

TYPES SN54ALS157, SN54ALS158, SN74ALS157, SN74ALS158 QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS

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

| | |
|--|------------------|
| Supply voltage, V_{CC} | 7 V |
| Input voltage | 7 V |
| Operating free-air temperature range: SN54ALS157, SN54ALS158 | -55 °C to 125 °C |
| SN74ALS157, SN74ALS158 | 0 °C to 70 °C |
| Storage temperature range | -65 °C to 150 °C |

recommended operating conditions

| | | SN54ALS157 SN54ALS158 | | | SN74ALS157 SN74ALS158 | | | UNIT | | |
|----------|--------------------------------|--------------------------|-----|-----|--------------------------|-----|-----|------|----|----|
| | | MIN | NOM | MAX | MIN | NOM | MAX | | | |
| V_{CC} | Supply voltage | 4.5 | 5 | 5.5 | 4.5 | 5 | 5.5 | V | | |
| V_{IH} | High-level input voltage | 2 | | | 2 | | | V | | |
| V_{IL} | Low-level input voltage | 0.8 | | | 0.8 | | | V | | |
| I_{OH} | High-level output current | -0.4 | | | -0.4 | | | mA | | |
| I_{OL} | Low-level output current | 4 | | | 8 | | | mA | | |
| T_A | Operating free-air temperature | -55 | | | 125 | | | 0 | 70 | °C |

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

| PARAMETER | | TEST CONDITIONS | SN54ALS157 SN54ALS158 | | | SN74ALS157 SN74ALS158 | | | UNIT |
|------------|------------------------------------|---|--------------------------|------|------|--------------------------|------|------|---------------|
| | | | MIN | TYP‡ | MAX | MIN | TYP‡ | MAX | |
| V_{IK} | | $V_{CC} = 4.5\text{ V}, I_I = -18\text{ mA}$ | -1.5 | | | -1.5 | | | V |
| V_{OH} | | $V_{CC} = 4.5\text{ V}, I_{OH} = -0.4\text{ mA}$ | 2.5 | 3.4 | | 2.5 | | | V |
| | | $V_{CC} = 4.75\text{ V}, I_{OH} = -0.4\text{ mA}$ | | | | 2.7 | 3.4 | | |
| V_{OL} | | $V_{CC} = 4.5\text{ V}, I_{OL} = 4\text{ mA}$ | 0.25 | | 0.4 | 0.25 | | 0.4 | V |
| | | $V_{CC} = 4.75\text{ V}, I_{OL} = 8\text{ mA}$ | | | | 0.35 | 0.5 | | |
| I_I | A or B | $V_{CC} = 5.5\text{ V}, V_I = 7\text{ V}$ | 0.1 | | | 0.1 | | | mA |
| | \overline{A} B or \overline{C} | | 0.2 | | | 0.2 | | | |
| I_{IH} | A or B | $V_{CC} = 5.5\text{ V}, V_I = 2.7\text{ V}$ | 20 | | | 20 | | | μA |
| | \overline{A} B or \overline{C} | | 40 | | | 40 | | | |
| I_{IL} | A or B | $V_{CC} = 5.5\text{ V}, V_I = 0.4\text{ V}$ | -0.1 | | | -0.1 | | | mA |
| | \overline{A} B or \overline{C} | | -0.2 | | | -0.2 | | | |
| I_{OS}^* | | $V_{CC} = 5.5\text{ V}, V_O = \text{GND}$ | -25 | | -150 | -25 | | -150 | mA |
| I_{CC} | 'ALS157 | $V_{CC} = 5.5\text{ V}$ | 8.0 | | | 8.0 | | | mA |
| | 'ALS158 | | 4.0 | | | 4.0 | | | |

‡ All typical values are at $V_{CC} = 5\text{ V}, T_A = 25^\circ\text{C}$.

*The current produced by grounding the outputs is approximately twice that produced with 2.25 V on the outputs.

TYPES SN54ALS157, SN54ALS158, SN74ALS157, SN74ALS158 QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS

'ALS157 switching characteristics

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | $V_{CC} = 4.5 \text{ V to } 5.5 \text{ V},$ $C_L = 50 \text{ pF},$ $R_L = 500 \Omega,$ $T_A = \text{MIN to MAX}$ | | | | | | UNIT |
|-----------|-------------------|----------------|---|------|-----|------------|------|-----|------|
| | | | SN54ALS157 | | | SN74ALS157 | | | |
| | | | MIN | TYP† | MAX | MIN | TYP† | MAX | |
| t_{PLH} | A or B | Y | 3 | 7 | 14 | 3 | 7 | 13 | ns |
| t_{PHL} | | | 3 | 6 | 14 | 3 | 6 | 13 | |
| t_{PLH} | $\bar{A} \cdot B$ | Y | 6 | 18 | 32 | 6 | 18 | 30 | ns |
| t_{PHL} | | | 5 | 11 | 22 | 5 | 11 | 20 | |
| t_{PLH} | \bar{C} | Y | 6 | 14 | 27 | 6 | 14 | 25 | ns |
| t_{PHL} | | | 4 | 9 | 17 | 4 | 9 | 15 | |

'ALS158 switching characteristics

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | $V_{CC} = 4.5 \text{ V to } 5.5 \text{ V},$ $C_L = 50 \text{ pF},$ $R_L = 500 \Omega,$ $T_A = \text{MIN to MAX}$ | | | | | | UNIT |
|-----------|---------------------------|----------------|---|------|-----|------------|------|-----|------|
| | | | SN54ALS158 | | | SN74ALS158 | | | |
| | | | MIN | TYP† | MAX | MIN | TYP† | MAX | |
| t_{PLH} | A or B | Y | 3 | 7 | 17 | 3 | 7 | 14 | ns |
| t_{PHL} | | | 3 | 6 | 12 | 3 | 6 | 11 | |
| t_{PLH} | $\bar{A} \cdot B \cdot 1$ | Y | 5 | 12 | 25 | 5 | 12 | 23 | ns |
| t_{PHL} | | | 5 | 18 | 35 | 5 | 18 | 30 | |
| t_{PLH} | $\bar{C} \cdot 15$ | Y | 4 | 8 | 17 | 4 | 8 | 16 | ns |
| t_{PHL} | | | 4 | 13 | 25 | 4 | 13 | 23 | |

†All typical values are at $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}.$

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