

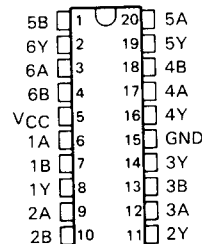
# SN54ALS1808A, SN54AS1808, SN74ALS1808A, SN74AS1808 HEX 2-INPUT AND DRIVERS

AUGUST 1984 – REVISED MAY 1986

- High Capacitive Drive Capability
- 'ALS1808A Has Typical Delay Time of 4.8 ns ( $C_L = 50$  pF) and Typical Power Dissipation of 4.5 mW per Gate
- 'AS1808 Has Typical Delay Time of 3.2 ns ( $C_L = 50$  pF) and Typical Power Dissipation of Less than 13 mW per Gate
- Center VCC and GND Configuration Provides Minimum Lead Inductance in High Current Switching Applications
- Package Options Include Plastic "Small Outline" Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs
- Dependable Texas Instruments Quality and Reliability

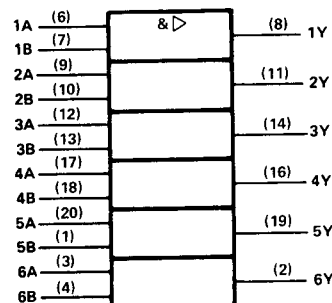
SN54ALS1808A, SN54AS1808 . . . J PACKAGE  
SN74ALS1808A, SN74AS1808 . . . N PACKAGE

(TOP VIEW)



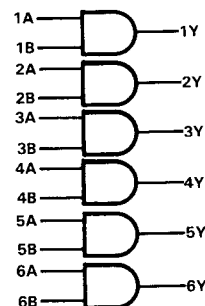
Use 'ALS808A or 'AS808B for chip carrier option.

logic symbol†



† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram (positive logic)



## description

These devices contain six independent 2-input AND drivers. They perform the Boolean functions  $Y = A \cdot B$  or  $Y = \bar{A} + \bar{B}$  in positive logic.

The center pin configuration used in the 'ALS1808A and 'AS1808 provides a reduction of lead inductance when compared to the 'ALS808A and 'AS808B. This reduction of lead inductance will minimize noise generated onto either the VCC or GND bus. This reduction is significant in high current switching applications.

The SN54ALS1808A and SN54AS1808 are characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The SN74ALS1808A and SN74AS1808 are characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

FUNCTION TABLE (each driver)

| INPUTS |   | OUTPUT |
|--------|---|--------|
| A      | B | Y      |
| H      | H | H      |
| L      | X | L      |
| X      | L | L      |

PRODUCTION DATA documents contain information current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

TEXAS  
INSTRUMENTS

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2-901

# SN54ALS1808A, SN75ALS1808A HEX 2-INPUT AND DRIVERS

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: SN54ALS1808A | -55°C to 125°C |
| SN74ALS1808A                                       | 0°C to 70°C    |
| Storage temperature range                          | -65°C to 150°C |

recommended operating conditions

|          |                                | SN54ALS1808A |     |     | SN74ALS1808A |     |     | 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        |              |     | 0.7 |              |     | 0.8 | V    |
| $I_{OH}$ | High-level output current      |              |     | -12 |              |     | -15 | mA   |
| $I_{OL}$ | Low-level output current       |              |     | 12  |              |     | 24  | 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                               | SN54ALS1808A |                  |      | SN74ALS1808A |                  |      | UNIT |
|------------------|-----------------------------------------------|--------------|------------------|------|--------------|------------------|------|------|
|                  |                                               | MIN          | TYP <sup>†</sup> | MAX  | MIN          | TYP <sup>†</sup> | MAX  |      |
| $V_{IK}$         | $V_{CC} = 4.5$ V, $I_I = -18$ mA              |              |                  | -1.2 |              |                  | -1.2 | V    |
| $V_{OH}$         | $V_{CC} = 4.5$ V to 5.5 V, $I_{OH} = -0.4$ mA | $V_{CC}-2$   |                  |      | $V_{CC}-2$   |                  |      | V    |
|                  | $V_{CC} = 4.5$ V, $I_{OH} = -3$ mA            | 2.4          | 3.2              |      | 2.4          | 3.2              |      |      |
|                  | $V_{CC} = 4.5$ V, $I_{OH} = -12$ mA           | 2            |                  |      |              |                  |      |      |
|                  | $V_{CC} = 4.5$ V, $I_{OH} = -15$ mA           |              |                  |      | 2            |                  |      |      |
| $V_{OL}$         | $V_{CC} = 4.5$ V, $I_{OL} = 12$ mA            |              | 0.25             | 0.4  |              | 0.25             | 0.4  | V    |
|                  | $V_{CC} = 4.5$ V, $I_{OL} = 24$ mA            |              |                  |      |              | 0.35             | 0.5  |      |
| $I_I$            | $V_{CC} = 5.5$ V, $V_I = 7$ V                 |              |                  | 0.1  |              |                  | 0.1  | mA   |
| $I_{IH}$         | $V_{CC} = 5.5$ V, $V_I = 2.7$ V               |              |                  | 20   |              |                  | 20   | μA   |
| $I_{IL}$         | $V_{CC} = 5.5$ V, $V_I = 0.4$ V               |              |                  | -0.1 |              |                  | -0.1 | mA   |
| $I_O^{\ddagger}$ | $V_{CC} = 5.5$ V, $V_O = 2.25$ V              | -30          |                  | -112 | -30          |                  | -112 | mA   |
| $I_{CCH}$        | $V_{CC} = 5.5$ V, $V_I = 4.5$ V               |              | 4.5              | 7    |              | 4.5              | 7    | mA   |
| $I_{CCL}$        | $V_{CC} = 5.5$ V, $V_I = 0$ V                 |              | 8                | 16   |              | 8                | 16   | mA   |

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

<sup>‡</sup> The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current,  $I_{OS}$ .

switching characteristics (see Note 1)

| PARAMETER | FROM<br>(INPUT) | TO<br>(OUTPUT) | $V_{CC} = 5\text{ V},$<br>$C_L = 50\text{ pF},$<br>$R_L = 500\ \Omega,$<br>$T_A = 25^\circ\text{C}$ | $V_{CC} = 4.5\text{ V to }5.5\text{ V},$<br>$C_L = 50\text{ pF},$<br>$R_L = 500\ \Omega$<br>$T_A = \text{MIN to MAX}$ |              | UNIT |     |     |
|-----------|-----------------|----------------|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|--------------|------|-----|-----|
|           |                 |                | ALS1808A                                                                                            | SN54ALS1808A                                                                                                          | SN74ALS1808A |      |     |     |
|           |                 |                | TYP                                                                                                 | MIN                                                                                                                   | MAX          |      | MIN | MAX |
| $t_{PLH}$ | A or B          | Y              | 6                                                                                                   | 2                                                                                                                     | 11           | 2    | 9   | ns  |
| $t_{PHL}$ |                 |                | 4                                                                                                   | 1                                                                                                                     | 10           | 1    | 8   |     |

NOTE 1: Load circuit and voltage waveforms are shown in Section 1.

2

ALS and AS Circuits

**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: SN54AS1808 | -55°C to 125°C |
| SN74AS1808                                       | 0°C to 70°C    |
| Storage temperature range                        | -65°C to 150°C |

**recommended operating conditions**

|          |                                | SN54AS1808 |     |     | SN74AS1808 |     |     | 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      |            |     | -40 |            |     | -48 | mA   |
| $I_{OL}$ | Low-level output current       |            |     | 40  |            |     | 48  | 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                                                       | SN54AS1808 |      |      | SN74AS1808 |      |      | UNIT |
|-----------|-----------------------------------------------------------------------|------------|------|------|------------|------|------|------|
|           |                                                                       | MIN        | TYP† | MAX  | MIN        | TYP† | MAX  |      |
| $V_{IK}$  | $V_{CC} = 4.5 \text{ V}$ , $I_I = -18 \text{ mA}$                     |            |      | -1.2 |            |      | -1.2 | V    |
| $V_{OH}$  | $V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$ , $I_{OH} = -2 \text{ mA}$ | $V_{CC}-2$ |      |      | $V_{CC}-2$ |      |      | V    |
|           | $V_{CC} = 4.5 \text{ V}$ , $I_{OH} = -3 \text{ mA}$                   | 2.4        | 3.2  |      | 2.4        | 3.2  |      |      |
|           | $V_{CC} = 4.5 \text{ V}$ , $I_{OH} = -40 \text{ mA}$                  | 2          |      |      |            |      |      |      |
|           | $V_{CC} = 4.5 \text{ V}$ , $I_{OH} = -48 \text{ mA}$                  |            |      |      | 2          |      |      |      |
| $V_{OL}$  | $V_{CC} = 4.5 \text{ V}$ , $I_{OL} = 40 \text{ mA}$                   |            | 0.25 | 0.5  |            |      |      | V    |
|           | $V_{CC} = 4.5 \text{ V}$ , $I_{OL} = 48 \text{ mA}$                   |            |      |      | 0.35       | 0.5  |      |      |
| $I_I$     | $V_{CC} = 5.5 \text{ V}$ , $V_I = 7 \text{ V}$                        |            |      | 0.1  |            |      | 0.1  | mA   |
| $I_{IH}$  | $V_{CC} = 5.5 \text{ V}$ , $V_I = 2.7 \text{ V}$                      |            |      | 20   |            |      | 20   | μA   |
| $I_{IL}$  | $V_{CC} = 5.5 \text{ V}$ , $V_I = 0.4 \text{ V}$                      |            |      | -0.5 |            |      | -0.5 | mA   |
| $I_{O†}$  | $V_{CC} = 5.5 \text{ V}$ , $V_O = 2.25 \text{ V}$                     | -50        |      | -200 | -50        |      | -200 | mA   |
| $I_{CCH}$ | $V_{CC} = 5.5 \text{ V}$ , $V_I = 4.5 \text{ V}$                      |            | 8    | 13   |            | 8    | 13   | mA   |
| $I_{CCL}$ | $V_{CC} = 5.5 \text{ V}$ , $V_I = 0 \text{ V}$                        |            | 20   | 33   |            | 20   | 33   | mA   |

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

‡The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current,  $I_{OS}$ .

**switching characteristics (see Note 1)**

| PARAMETER | FROM<br>(INPUT) | TO<br>(OUTPUT) | $V_{CC} = 4.5 \text{ V to } 5.5 \text{ V},$<br>$C_L = 50 \text{ pF},$<br>$R_L = 500 \Omega,$<br>$T_A = \text{MIN to MAX}$ |     |            |     | UNIT |
|-----------|-----------------|----------------|---------------------------------------------------------------------------------------------------------------------------|-----|------------|-----|------|
|           |                 |                | SN54AS1808                                                                                                                |     | SN74AS1808 |     |      |
|           |                 |                | MIN                                                                                                                       | MAX | MIN        | MAX |      |
| $t_{PLH}$ | A or B          | Y              | 1                                                                                                                         | 6.5 | 1          | 6   | ns   |
| $t_{PHL}$ |                 |                | 1                                                                                                                         | 6.5 | 1          | 6   |      |

NOTE 1: Load circuit and voltage waveforms are shown in Section 1.