

High-speed dual-differential comparator/sense amp

NE522

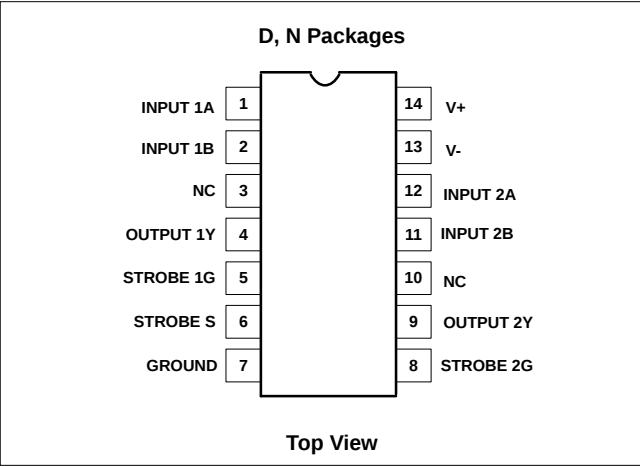
FEATURES

- 15ns maximum guaranteed propagation delay
- 20μA maximum input bias current
- TTL-compatible strobes and outputs
- Large common-mode input voltage range
- Operates from standard supply voltages

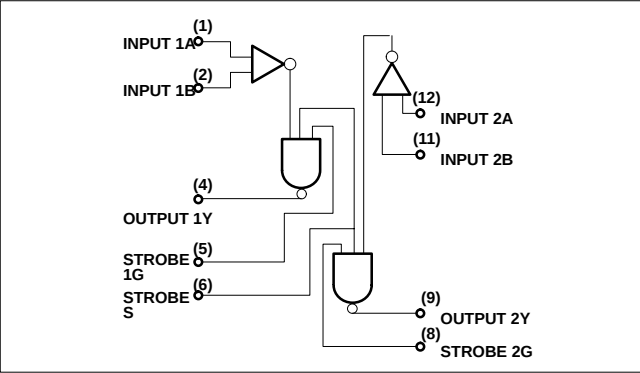
APPLICATIONS

- MOS memory sense amp
- A-to-D conversion
- High-speed line receiver

PIN CONFIGURATION



BLOCK DIAGRAM



ORDERING INFORMATION

| DESCRIPTION        | TEMPERATURE RANGE | ORDER CODE | DWG # |
|--------------------|-------------------|------------|-------|
| 14-Pin Plastic DIP | 0 to +70°C        | NE522N     | 0405B |
| 14-Pin Plastic SO  | 0 to +70°C        | NE522D     | 0175D |

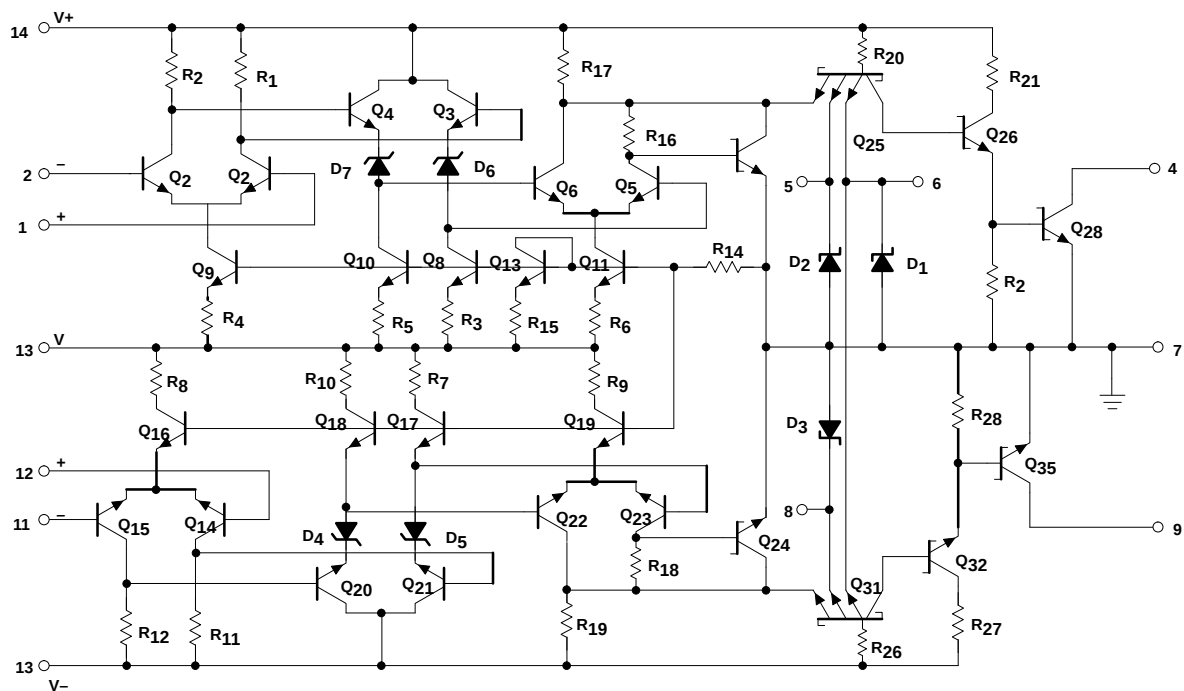
ABSOLUTE MAXIMUM RATINGS

| SYMBOL            | PARAMETER                              | RATING      | UNITS |
|-------------------|----------------------------------------|-------------|-------|
| V+                | Single supply voltage                  | +7          | V     |
| V-                |                                        | -7          | V     |
| V <sub>IDR</sub>  | Differential input voltage             | ±6          | V     |
| V <sub>IN</sub>   | Input voltage                          | ± 5         | V     |
|                   |                                        | +5.25       | V     |
| P <sub>D</sub>    | Power dissipation                      | 600         | mW    |
| T <sub>A</sub>    | Operating temperature range NE522      | 0 to 70     | °C    |
| T <sub>STG</sub>  | Storage temperature range              | -65 to +150 | °C    |
| T <sub>SOLD</sub> | Lead soldering temperature (10sec max) | +300        | °C    |

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## EQUIVALENT SCHEMATIC



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**DC ELECTRICAL CHARACTERISTICS** $V_{\pm} = \pm 5V \pm 5\%$ ,  $T_A = 0$  to  $+70^{\circ}C$ , unless otherwise stated.

| SYMBOL                 | PARAMETER                                                          | TEST CONDITIONS                                                                        | LIMITS        |             |               | UNITS              |
|------------------------|--------------------------------------------------------------------|----------------------------------------------------------------------------------------|---------------|-------------|---------------|--------------------|
|                        |                                                                    |                                                                                        | MIN           | TYP         | MAX           |                    |
| $V_{OS}$               | Input offset voltage<br>At $25^{\circ}C$<br>Over temperature range | $V+ = +4.75V$ , $V- = -4.75V$                                                          |               | 6           | 7.5<br>10     | mV                 |
| $I_{BIAS}$             | Input bias current<br>At $25^{\circ}C$<br>Over temperature range   | $V+ = +5.25V$ , $V- = -5.25V$                                                          |               | 7.5         | 20<br>40      | $\mu A$            |
| $I_{OS}$               | Input offset current<br>At $25^{\circ}C$<br>Over temperature range | $V+ = +5.25V$ , $V- = -5.25V$                                                          |               | 1.0         | 5<br>12       | $\mu A$            |
| $V_{CM}$               | Common-mode voltage range                                          | $V+ = +4.75V$ , $V- = -4.75V$                                                          | -3            |             | +3            | V                  |
| $V_{IL}$               | Low level input<br>At $25^{\circ}C$<br>Over temperature range      |                                                                                        |               |             | 0.8<br>0.7    | V                  |
| $V_{IH}$               | High level input                                                   |                                                                                        | 2.0           |             |               | V                  |
| $I_{IH}$               | Input current<br>High                                              | $V+ = +5.25V$ , $V- = -5.25V$<br>$V_{IH} = 2.7V$<br>1G or 2G strobe<br>Common strobe S |               |             | 50<br>100     | $\mu A$<br>$\mu A$ |
| $I_{IL}$               | Low input current                                                  | $V_{IL} = 0.5V$<br>1G or 2G strobe<br>Common strobe S                                  |               |             | -2.0<br>-4.0  | mA<br>mA           |
| $V_{OL}$               | Output voltage Low                                                 | $V+ = +5.25V$ , $V- = -5.25V$ , $V_{I(S)} = 2.0V$ , $I_{LOAD} = 20mA$                  |               |             | 0.5           | V                  |
| $I_{OH}$               | Output current High                                                | $V+ = +4.75V$ , $V- = -4.75V$ , $V_{OH} = 5.25V$                                       |               |             | 250           | $\mu A$            |
| $V+$<br>$V-$           | Supply voltage<br>Positive<br>Negative                             |                                                                                        | 4.75<br>-4.75 | 5.0<br>-5.0 | 5.25<br>-5.25 | V                  |
| $I_{CC+}$<br>$I_{CC-}$ | Supply current<br>Positive<br>Negative                             | $V+ = +5.25V$ , $V- = -5.25V$ , $T_A = 25^{\circ}C$                                    |               | 27<br>-15   | 35<br>-28     | mA                 |

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**AC ELECTRICAL CHARACTERISTICS** $T_A = 25^\circ\text{C}$ ,  $R_L = 280\Omega$ ,  $C_L = 15\text{pF}$ , unless otherwise stated.

| SYMBOL                              | PARAMETER                                     | FROM INPUT | TO OUTPUT | LIMITS |     |     | UNITS     |
|-------------------------------------|-----------------------------------------------|------------|-----------|--------|-----|-----|-----------|
|                                     |                                               |            |           | MIN    | TYP | MAX |           |
| $I_R$                               | Input resistance                              |            |           |        | 4   |     | $k\Omega$ |
| $I_C$                               | Input capacitance                             |            |           |        | 3   |     | pF        |
| <b>Large-signal switching speed</b> |                                               |            |           |        |     |     |           |
| $t_{PLH(D)}$                        | Propagation delay<br>Low to high <sup>1</sup> | Amp        | Output    |        | 10  | 15  | ns        |
| $t_{PHL(D)}$                        | High to low <sup>1</sup>                      | Amp        | Output    |        | 8   | 12  |           |
| $t_{PLH(S)}$                        | Low to high <sup>2</sup>                      | Strobe     | Output    |        | 6   | 13  |           |
| $t_{PHL(S)}$                        | High to low <sup>2</sup>                      | Strobe     | Output    |        | 5   | 9   |           |
| $I_{MAX}$                           | Maximum operating frequency                   |            |           | 25     | 35  |     | MHz       |

**NOTES:**

- Response time measured from 0V point of +100mV<sub>P-P</sub> 10MHz square wave to the 1.5V point of the output.
- Response time measured from 1.5V point of the input to 1.5V point of the output.

**LOGIC FUNCTION TABLE**

| $V_{ID} (A^+, B^-)$         | STRS | STRG | OUTPUT TRANSISTOR |
|-----------------------------|------|------|-------------------|
| $< -V_{OS}$                 | H    | H    | ON                |
| $-V_{OS} < V_{ID} < V_{OS}$ | H    | H    | Undefined         |
| $> V_{OS}$                  | H    | H    | OFF               |
| X                           | L    | X    | OFF               |
| X                           | X    | L    | OFF               |

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