

Voltage comparator

NE527

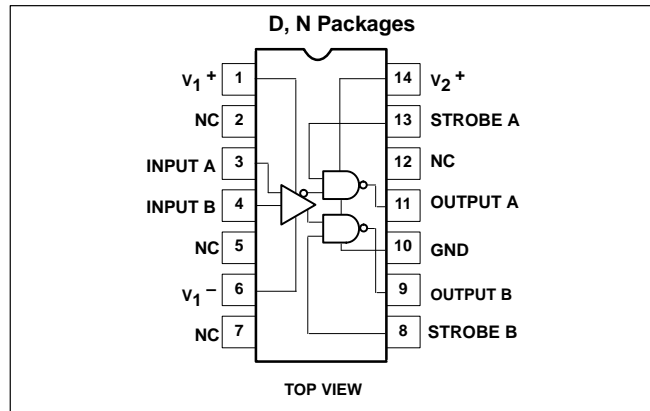
DESCRIPTION

The NE527 is a high-speed analog voltage comparator which, for the first time, mates state-of-the-art Schottky diode technology with the conventional linear process. This allows simultaneous fabrication of high speed TTL gates with a precision linear amplifier on a single monolithic chip. The NE527 is similar in design to the Philips Semiconductors NE529 voltage comparator except that it incorporates an "Emitter-Follower" input stage for extremely low input currents. This opens the door to a whole new range of applications for analog voltage comparators.

FEATURES

- 15ns propagation delay
- Complementary output gates
- TTL or ECL compatible outputs
- Wide common-mode and differential voltage range
- Typical gain of 5000

PIN CONFIGURATIONS



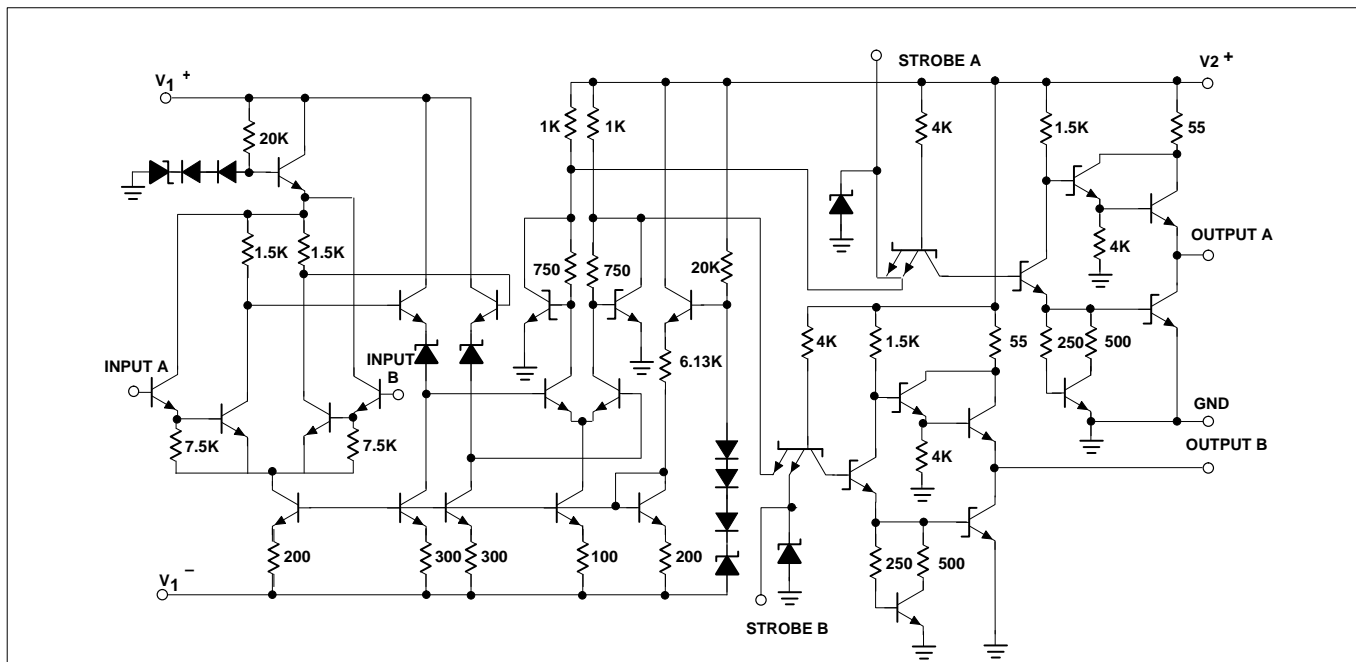
APPLICATIONS

- A/D conversion
- ECL-to-TTL interface
- TTL-to-ECL interface
- Memory sensing
- Optical data coupling

ORDERING INFORMATION

| DESCRIPTION | TEMPERATURE RANGE | ORDER CODE | DWG # |
|---|-------------------|------------|-------|
| 14-Pin Plastic Dual In-Line Package (DIP) | 0 to +70°C | NE527N | 0405B |
| 14-Pin Small Outline (SO) Package | 0 to +70°C | NE527D | 0175D |

EQUIVALENT SCHEMATIC



Voltage comparator

NE527

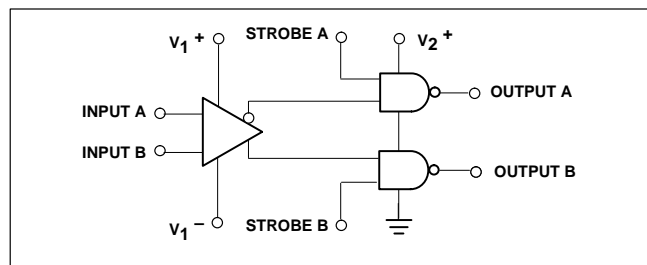
ABSOLUTE MAXIMUM RATINGS

| SYMBOL | PARAMETER | RATING | UNIT |
|------------|--|-------------|------|
| V_{1+} | Positive supply voltage | +15 | V |
| V_{1-} | Negative supply voltage | -15 | V |
| V_{2+} | Gate supply voltage | +7 | V |
| V_{OUT} | Output voltage | +7 | V |
| V_{IN} | Differential input voltage | ± 5 | V |
| V_{CM} | Input common mode voltage | ± 6 | V |
| P_D | Max power dissipation ¹ 25°C ambient (still air) | | |
| | N package | 1420 | mW |
| | D package | 1040 | mW |
| T_A | Operating temperature range | 0 to +70 | °C |
| T_{STG} | Storage temperature range | -65 to +150 | °C |
| T_{SOLD} | Lead soldering temperature (10sec max) | +300 | °C |

NOTES:

- Derate above 25°C, at the following rates:
 N package 11.4mW/°C
 D package 8.3mW/°C

BLOCK DIAGRAM



Voltage comparator

NE527

DC ELECTRICAL CHARACTERISTICSV₁₊=10V, V₁₋=-10V, V₂₊=+5.0V, unless otherwise specified.

| SYMBOL | PARAMETER | TEST CONDITIONS | NE527 | | | UNIT |
|---|--|---|-----------------|-----|-------------------------|--------------------------|
| | | | Min | Typ | Max | |
| Input characteristics | | | | | | |
| V _{OS} | Input offset voltage @ 25°C over temperature range | | | | 6 10 | mV |
| I _{BIAS} | Input bias current @ 25°C over temperature range | | | | 2 4 | μA |
| I _{OS} | Input offset current @ 25°C over temperature range | V _{IN} =0V | | | 0.75 1 | μA |
| V _{CM} | Common-mode voltage range | | -5 | | +5 | V |
| Gate characteristics | | | | | | |
| V _{OUT} | Output Voltage "1" State "0" State | V ₂₊ =4.75V, I _{SOURCE} =-1mA V ₂₊ =4.75V, I _{SINK} =10mA | 2.7 | 3.3 | | V V |
| | Strobe inputs "0" Input current ¹ "1" Input current @ 25°C ¹ Over temperature range "0" Input voltage "1" Input voltage | V ₂₊ =5.25V, V _{STROBE} =0.5V V ₂₊ =5.25V, V _{STROBE} =2.7V V ₂₊ =5.25V, V _{STROBE} =2.7V V ₂₊ =4.75V V ₂₊ =4.75V | | | -2 100 200 0.8 | mA μA μA V V |
| I _{SC} | Short-circuit output current | V ₂₊ =5.25V, V _{OUT} =0V | -18 | | -70 | mA |
| Power supply requirements | | | | | | |
| V ₁₊ V ₁₋ V ₂₊ | Supply voltage | | 5 -6 4.75 | | 10 -10 5.25 | V V V |
| I ₁₊ I ₁₋ I ₂₊ | Supply current | V ₁₊ =10V, V ₁₋ =-10V V ₂₊ =5.25V Over temp. Over temp. Over temp. | | | 5 10 20 | mA mA mA |

NOTES:

1. See Logic Function Table.

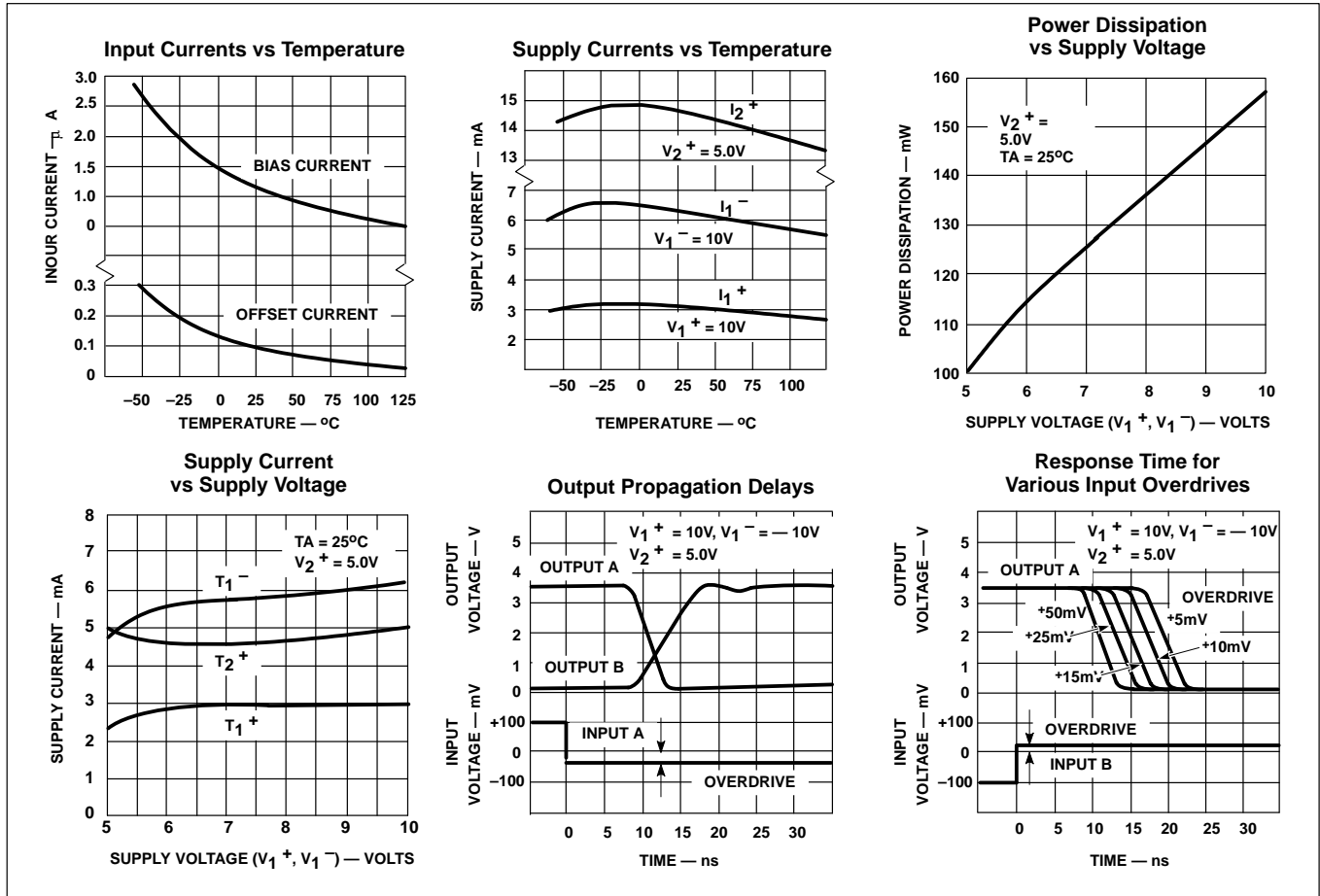
AC ELECTRICAL CHARACTERISTICST_A=25°C, unless otherwise specified. (See AC test circuit)

| SYMBOL | PARAMETER | TEST CONDITIONS | LIMITS | | | UNIT |
|--------------------------------------|---|------------------------------|--------|----------|----------|----------|
| | | | Min | Typ | Max | |
| t _{PLH} t _{PHL} | Transient response propagation delay time Low-to-High High-to-Low | V _{IN} =±100mV step | | 16 14 | 26 24 | ns ns |
| | Delay between output A and B | | | 2 | 5 | ns |
| t _{ON} t _{OFF} | Strobe delay time Turn-on time Turn-off time | | | 6 6 | | ns ns |

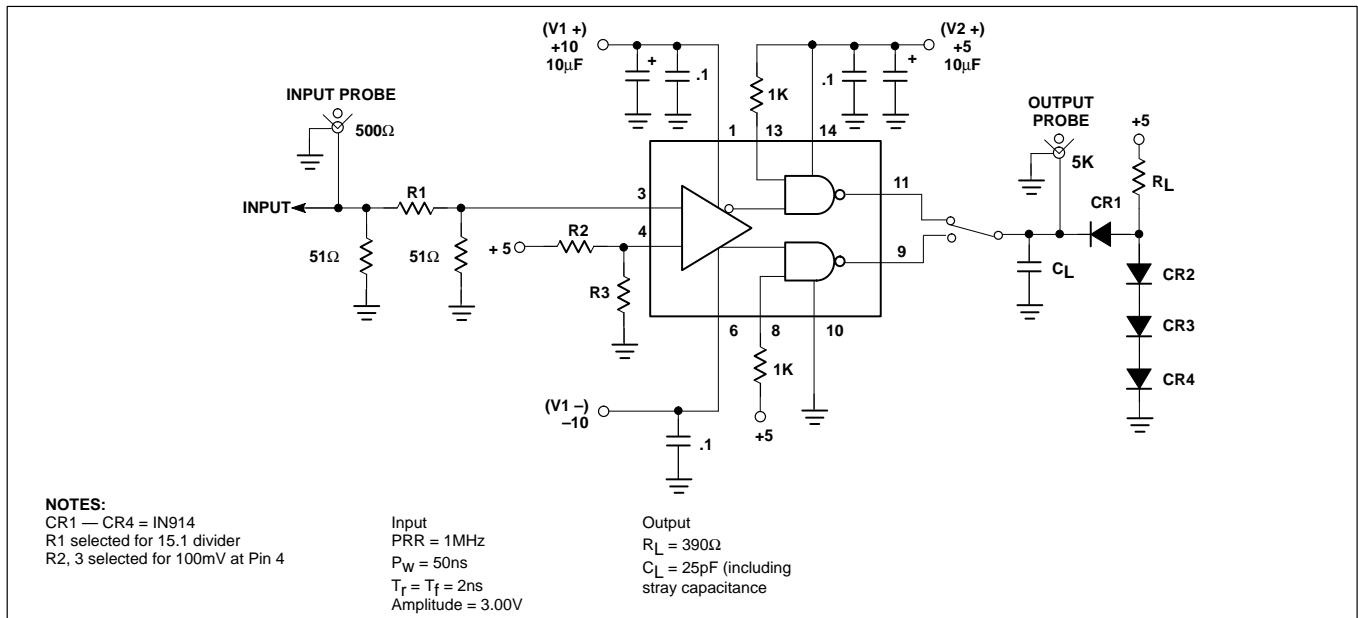
Voltage comparator

NE527

TYPICAL PERFORMANCE CHARACTERISTICS



RESPONSE TIME TEST CIRCUIT



Voltage comparator

NE527

APPLICATIONS

One of the main features of the device is that supply voltages (V_{1+} , V_{1-}) need not be balanced, as in the following diagrams. For proper operation, however, negative supply (V_{1-}) should always be at least 6V more than the ground terminal (Pin 6). Input common-mode

range should be limited to values of 2V less than the supply voltages (V_{1+} and V_{1-}) up to a maximum of $\pm 5V$ as supply voltages are increased. It is also important to note that Output A is in phase with Input A and Output B is in phase with Input B.

LOGIC FUNCTION

| V_{ID} (A+, B-) | STROBE A | STROBE B | OUTPUT A | OUTPUT B | COMMENT |
|-----------------------------|----------|----------|-----------|-----------|----------------------------|
| $V_{ID} \leq -V_{OS}$ | H | X | L | H | Read I_{IHA} , I_{ILB} |
| $-V_{OS} < V_{ID} < V_{OS}$ | H | H | Undefined | Undefined | |
| $V_{ID} \geq V_{OS}$ | X | H | H | L | Read I_{ILA} , I_{IHB} |
| X | L | L | H | H | |

TYPICAL APPLICATIONS

