

# NL17SV08XV5T2

## Single 2-Input AND Gate

The NL17SV08 is an ultra-high performance 2-Input AND gate manufactured in 0.35μ CMOS technology with excellent performance down to 0.9 volts. This device is ideal for extremely high-speed and high-drive applications. Additionally, limitations of board space are no longer a constraint. The very small SOT-553 makes this device fit most tight designs and spaces.

### Features

- Extremely High Speed:  $t_{PD} = 1.0 \text{ ns (Typ) @ } V_{CC} = 3.3 \text{ V}$
- Designed for 0.9 to 3.3 V Operation
- Overvoltage Tolerance (OVT)\* Input Pins Permit Logic Translation
- Balanced  $\pm 24 \text{ mA}$  Output Drive @ 3.3 Volts
- Near Zero Static Supply Current
- Ultra-Tiny SOT-553 5 Pin Package Only 1.6 x 1.6 x 0.6 mm
- All Devices in Package SOT-553 are Inherently Pb-Free\*\*

### Typical Applications

- Cellular
- Digital Camera
- PDA
- Digital Video

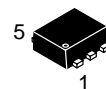
### Industry Standard

- Functionally Similar to NC7SV08 and SN74AUC1G08



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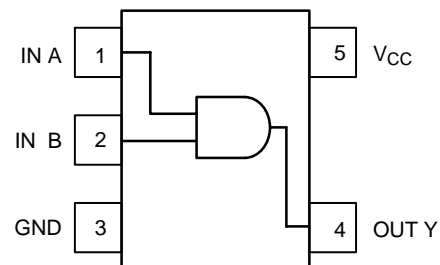
SOT-553  
CASE 463B

### MARKING DIAGRAM



UG = Specific Device Code  
D = Date Code

### PIN DIAGRAM



### PIN ASSIGNMENT

| PIN # | FUNCTION        |
|-------|-----------------|
| 1     | IN A            |
| 2     | IN B            |
| 3     | GND             |
| 4     | OUT Y           |
| 5     | V <sub>CC</sub> |

### FUNCTION TABLE

| Input A | Input B | Output Y |
|---------|---------|----------|
| L       | L       | L        |
| L       | H       | L        |
| H       | L       | L        |
| H       | H       | H        |

\*Overvoltage Tolerance (OVT) enables input pins to function outside (higher) of their operating voltages, with no damage to the devices or to signal integrity.

\*\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 4 of this data sheet.

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## MAXIMUM RATINGS

| Symbol           | Rating  | Value                        | Unit |
|------------------|---|------------------------------|------|
| V <sub>CC</sub>  | DC Supply Voltage   | −0.5 to + 4.6                | V    |
| V <sub>I</sub>   | DC Input Voltage  | −0.5 to + 4.6                | V    |
| V <sub>O</sub>   | DC Output Voltage   | −0.5 to V <sub>CC</sub> +0.5 | V    |
| I <sub>IK</sub>  | DC Input Diode Current<br>V <sub>I</sub> < GND                                      | ±50                          | mA   |
| I <sub>OK</sub>  | DC Output Diode Current<br>V <sub>O</sub> = GND<br>V <sub>O</sub> = V <sub>CC</sub> | −50<br>+50                   | mA   |
| I <sub>O</sub>   | DC Output Sink Current  | ±50                          | mA   |
| I <sub>CC</sub>  | DC Supply Current per Supply Pin  | ±50                          | mA   |
| I <sub>GND</sub> | DC Ground Current per Ground Pin  | ±50                          | mA   |
| T <sub>STG</sub> | Storage Temperature Range   | − 65 to +150                 | °C   |
| T <sub>L</sub>   | Lead Temperature, 1.0 mm from Case for 10 seconds                                   | 260                          | °C   |
| T <sub>J</sub>   | Junction Temperature Under Bias   | +150                         | °C   |
| θ <sub>JA</sub>  | Thermal Resistance (Note 1)   | 250                          | °C/W |
| P <sub>D</sub>   | Power Dissipation in Still Air at 85°C  | 250                          | mW   |
| MSL              | Moisture Sensitivity  | Level 1                      |      |
| F <sub>R</sub>   | Flammability Rating<br>Oxygen Index: 28 to 34                                       | UL 94 V−0 @ 0.125 in         |      |

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

1. Measured with minimum pad spacing on an FR4 board, using 10 mm-by-1 inch, 2 ounce copper trace no air flow.

## RECOMMENDED OPERATING CONDITIONS

| Symbol                           | Parameter   | Min | Max                                  | Unit |
|----------------------------------|---|-----|--------------------------------------|------|
| V <sub>CC</sub>                  | Positive DC Supply Voltage  | 0.9 | 3.6                                  | V    |
| V <sub>IN</sub>                  | Digital Input Voltage   | 0   | 3.6                                  | V    |
| V <sub>out</sub>                 | Output Voltage  | 0   | V <sub>CC</sub>                      | V    |
| I <sub>OH</sub> /I <sub>OL</sub> | Output Current<br>V <sub>CC</sub> = 3.0 V to 3.6 V<br>V <sub>CC</sub> = 2.3 V to 2.7 V<br>V <sub>CC</sub> = 1.65 V to 1.95 V<br>V <sub>CC</sub> = 1.4 V to 1.6 V<br>V <sub>CC</sub> = 1.1 V to 1.3 V<br>V <sub>CC</sub> = 0.9 V |     | ±24<br>±18<br>±6<br>±4<br>±2<br>±0.1 | mA   |
| t <sub>A</sub>                   | Operating Temperature Range. All Package Types  | −40 | +85                                  | °C   |
| t <sub>r</sub> , t <sub>f</sub>  | Input Rise or Fall Time<br>V <sub>CC</sub> = 3.3V ± 0.3 V   | 0   | 10                                   | nS/V |

## DEVICE JUNCTION TEMPERATURE VERSUS TIME TO 0.1% BOND FAILURES

| Junction Temperature °C | Time, Hours | Time, Years |
|-------------------------|-------------|-------------|
| 80                      | 1,032,200   | 117.8       |
| 90                      | 419,300     | 47.9        |
| 100                     | 178,700     | 20.4        |
| 110                     | 79,600      | 9.4         |
| 120                     | 37,000      | 4.2         |
| 130                     | 17,800      | 2.0         |
| 140                     | 8,900       | 1.0         |

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## DC CHARACTERISTICS– Digital Section (Voltages Referenced to GND)

| Symbol           | Parameter                 | Condition                               | V <sub>CC</sub>   | T <sub>A</sub> = 25°C  |  | T <sub>A</sub> = –40 to 85°C   |  | Unit |
|------------------|---------------------------|---|---|--|--|--|--|------|
|                  |                           |   |   | Min  | Max  | Min  | Max  |      |
| V <sub>IH</sub>  | High Level Input Voltage  |   | 0.90<br>1.10 ≤ V <sub>CC</sub> ≤ 1.30<br>1.40 ≤ V <sub>CC</sub> ≤ 1.60<br>1.65 ≤ V <sub>CC</sub> ≤ 1.95<br>2.30 ≤ V <sub>CC</sub> ≤ 2.70<br>2.70 ≤ V <sub>CC</sub> ≤ 3.60 | 0.65 x V <sub>CC</sub><br>0.65 x V <sub>CC</sub><br>0.65 x V <sub>CC</sub><br>0.65 x V <sub>CC</sub><br>1.6<br>2.0                                 |  | 0.65 x V <sub>CC</sub><br>0.65 x V <sub>CC</sub><br>0.65 x V <sub>CC</sub><br>0.65 x V <sub>CC</sub><br>1.6<br>2.0                                 |  | V    |
| V <sub>IL</sub>  | Low Level Input Voltage   |   | 0.90<br>1.10 ≤ V <sub>CC</sub> ≤ 1.30<br>1.40 ≤ V <sub>CC</sub> ≤ 1.60<br>1.65 ≤ V <sub>CC</sub> ≤ 1.95<br>2.30 ≤ V <sub>CC</sub> ≤ 2.70<br>2.70 ≤ V <sub>CC</sub> ≤ 3.60 |  | 0.35 x V <sub>CC</sub><br>0.35 x V <sub>CC</sub><br>0.35 x V <sub>CC</sub><br>0.35 x V <sub>CC</sub><br>0.7<br>0.8 |  | 0.35 x V <sub>CC</sub><br>0.35 x V <sub>CC</sub><br>0.35 x V <sub>CC</sub><br>0.35 x V <sub>CC</sub><br>0.7<br>0.8 | V    |
| V <sub>OH</sub>  | High Level Output Voltage | I <sub>OH</sub> = –100 μA               | 0.90<br>1.10 ≤ V <sub>CC</sub> ≤ 1.30<br>1.40 ≤ V <sub>CC</sub> ≤ 1.60<br>1.65 ≤ V <sub>CC</sub> ≤ 1.95<br>2.30 ≤ V <sub>CC</sub> ≤ 2.70<br>2.70 ≤ V <sub>CC</sub> ≤ 3.60 | V <sub>CC</sub> – 0.1<br>V <sub>CC</sub> – 0.1<br>V <sub>CC</sub> – 0.2<br>V <sub>CC</sub> – 0.2<br>V <sub>CC</sub> – 0.2<br>V <sub>CC</sub> – 0.2 |  | V <sub>CC</sub> – 0.1<br>V <sub>CC</sub> – 0.1<br>V <sub>CC</sub> – 0.2<br>V <sub>CC</sub> – 0.2<br>V <sub>CC</sub> – 0.2<br>V <sub>CC</sub> – 0.2 |  | V    |
|                  |                           | I <sub>OH</sub> = –2.0 mA               | 1.10 ≤ V <sub>CC</sub> ≤ 1.30   | 0.75 x V <sub>CC</sub>   |  | 0.75 x V <sub>CC</sub>   |  |      |
|                  |                           | I <sub>OH</sub> = –4.0 mA               | 1.40 ≤ V <sub>CC</sub> ≤ 1.60   | 0.75 x V <sub>CC</sub>   |  | 0.75 x V <sub>CC</sub>   |  |      |
|                  |                           | I <sub>OH</sub> = –6.0 mA               | 1.65 ≤ V <sub>CC</sub> ≤ 1.95<br>2.30 ≤ V <sub>CC</sub> ≤ 2.70  | 1.25<br>2.0  |  | 1.25<br>2.0  |  |      |
|                  |                           | I <sub>OH</sub> = –12 mA                | 2.30 ≤ V <sub>CC</sub> ≤ 2.70<br>2.70 ≤ V <sub>CC</sub> ≤ 3.60  | 1.8<br>2.2   |  | 1.8<br>2.2   |  |      |
|                  |                           | I <sub>OH</sub> = –18 mA                | 2.30 ≤ V <sub>CC</sub> ≤ 2.70<br>2.70 ≤ V <sub>CC</sub> ≤ 3.60  | 1.7<br>2.4   |  | 1.7<br>2.4   |  |      |
|                  |                           | I <sub>OH</sub> = –24 mA                | 2.70 ≤ V <sub>CC</sub> ≤ 3.60   | 2.2  |  | 2.2  |  |      |
| V <sub>OL</sub>  | Low Level Output Voltage  | I <sub>OL</sub> = 100 μA                | 0.90<br>1.10 ≤ V <sub>CC</sub> ≤ 1.30<br>1.40 ≤ V <sub>CC</sub> ≤ 1.60<br>1.65 ≤ V <sub>CC</sub> ≤ 1.95<br>2.30 ≤ V <sub>CC</sub> ≤ 2.70<br>2.70 ≤ V <sub>CC</sub> ≤ 3.60 |  | 0.1<br>0.1<br>0.2<br>0.2<br>0.2<br>0.2   |  | 0.1<br>0.1<br>0.2<br>0.2<br>0.2<br>0.2   | V    |
|                  |                           | I <sub>OL</sub> = 2.0 mA                | 1.10 ≤ V <sub>CC</sub> ≤ 1.30   |  | 0.25 x V <sub>CC</sub>   |  | 0.25 x V <sub>CC</sub>   |      |
|                  |                           | I <sub>OL</sub> = 4.0 mA                | 1.40 ≤ V <sub>CC</sub> ≤ 1.60   |  | 0.25 x V <sub>CC</sub>   |  | 0.25 x V <sub>CC</sub>   |      |
|                  |                           | I <sub>OL</sub> = 6.0 mA                | 1.65 ≤ V <sub>CC</sub> ≤ 1.95   |  | 0.3  |  | 0.3  |      |
|                  |                           | I <sub>OL</sub> = 12 mA                 | 2.30 ≤ V <sub>CC</sub> ≤ 2.70<br>2.70 ≤ V <sub>CC</sub> ≤ 3.60  |  | 0.4<br>0.4   |  | 0.4<br>0.4   |      |
|                  |                           | I <sub>OL</sub> = 18 mA                 | 2.30 ≤ V <sub>CC</sub> ≤ 2.70<br>2.70 ≤ V <sub>CC</sub> ≤ 3.60  |  | 0.6<br>0.4   |  | 0.6<br>0.4   |      |
|                  |                           | I <sub>OL</sub> = 24 mA                 | 2.70 ≤ V <sub>CC</sub> ≤ 3.60   |  | 0.55   |  | 0.55   |      |
|                  |                           |   |   |  |  |  |  |      |
| I <sub>IN</sub>  | Input Leakage Current     | 0 = V <sub>I</sub> = 3.6 V              | 0.90 to 3.60  |  | ±0.1   |  | ±0.9   | μA   |
| I <sub>OFF</sub> | Power Off Leakage Current |   | 0   |  | 10   |  | 10   | μA   |
| I <sub>CC</sub>  | Quiescent Supply Current  | V <sub>I</sub> = V <sub>CC</sub> or GND | 0.90 to 3.60  |  | 0.9  |  | 5  | μA   |

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## AC CHARACTERISTICS (Input $t_r = t_f = 3.0$ nS)

| Symbol                   | Parameter                     | -40°C                                   |  | 25°C              |                   |                   | 85°C              |                   | Unit |
|--------------------------|-------------------------------|---|--|-------------------|-------------------|-------------------|-------------------|-------------------|------|
|                          |                               | Condition                               | $V_{CC}$   | Min               | Typ               | Max               | Min               | Max               |      |
| $T_{PHL}$ ,<br>$T_{PLH}$ | Propagation Delay             | $C_L = 15$ pF, $R_L = 1.0$ M $\Omega$   | 0.90   |                   | 13                |                   |                   |                   | nS   |
|                          |                               | $C_L = 15$ pF, $R_L = 2.0$ k $\Omega$   | $1.10 \leq V_{CC} \leq 1.30$<br>$1.40 \leq V_{CC} \leq 1.60$                                 | 3.0<br>1.0        | 6.0<br>3.2        | 10.0<br>6.0       | 1.0<br>1.0        | 14.6<br>7.2       | nS   |
|                          |                               | $C_L = 30$ pF, $R_L = 500$ k $\Omega$   | $1.65 \leq V_{CC} \leq 1.95$<br>$2.30 \leq V_{CC} \leq 2.70$<br>$2.70 \leq V_{CC} \leq 3.60$ | 1.0<br>0.8<br>0.7 | 2.0<br>1.2<br>1.0 | 4.5<br>2.6<br>2.3 | 1.0<br>0.7<br>0.6 | 5.3<br>3.7<br>3.0 | nS   |
| $C_{IN}$                 | Input Capacitance             |   | 0  |                   | 2.0               |                   |                   |                   | pF   |
| $C_{OUT}$                | Output Capacitance            |   | 0  |                   | 4.5               |                   |                   |                   | pF   |
| $C_{PD}$                 | Power Dissipation Capacitance | $V_I = 0$ V or $V_{CC}$<br>$F = 10$ MHz | 0.90 to 3.60   |                   | 20                |                   |                   |                   | pF   |

## DEVICE ORDERING INFORMATION

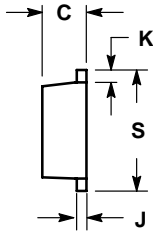
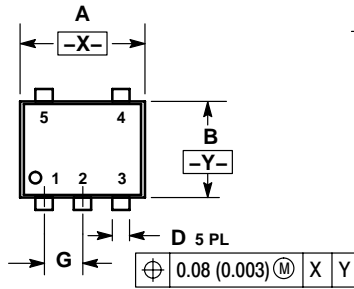
| Device Order Number | Device Nomenclature     |                          |                       |            |                 |                |                      | Package Type      | Tape and Reel Size† |
|---------------------|-------------------------|--------------------------|-----------------------|------------|-----------------|----------------|----------------------|-------------------|---------------------|
|                     | Logic Circuit Indicator | No. of Gates per Package | Temp Range Identifier | Technology | Device Function | Package Suffix | Tape and Reel Suffix |                   |                     |
| NL17SV08XV5T2       | NL                      | 1                        | 7                     | SV         | 08              | XV5            | T2                   | SOT-553 (Pb-Free) | 178 mm 4000 Units   |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

# NL17SV08XV5T2

## PACKAGE DIMENSIONS

**SOT-553**  
5-LEAD PACKAGE  
CASE 463B-01  
ISSUE A

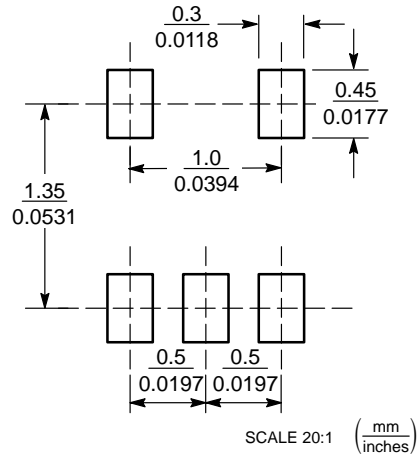


### NOTES:


1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETERS
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.

| DIM | MILLIMETERS |      | INCHES    |       |
|-----|-------------|------|-----------|-------|
|     | MIN         | MAX  | MIN       | MAX   |
| A   | 1.50        | 1.70 | 0.059     | 0.067 |
| B   | 1.10        | 1.30 | 0.043     | 0.051 |
| C   | 0.50        | 0.60 | 0.020     | 0.024 |
| D   | 0.17        | 0.27 | 0.007     | 0.011 |
| G   | 0.50 BSC    |      | 0.020 BSC |       |
| J   | 0.08        | 0.18 | 0.003     | 0.007 |
| K   | 0.10        | 0.30 | 0.004     | 0.012 |
| S   | 1.50        | 1.70 | 0.059     | 0.067 |

## SOLDERING FOOTPRINT\*



\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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