Single 2-Input AND Gate

NL17SV08

The NL17SV08 is a single 2-input AND gate in tiny footprint packages. The device is designed to operate for V_{CC} = 0.9 V to 3.6 V.

Features

- Designed for 0.9 V to 3.6 V V_{CC} Operation
- 1.6 ns t_{PD} at 3.3 V (Typ)
- Inputs/Outputs Over-Voltage Tolerant up to 3.6 V
- I_{OFF} Supports Partial Power Down Protection
- Source/Sink 24 mA at 3.3 V
- Available in SOT-553 Package
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

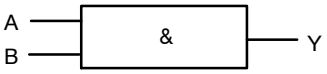
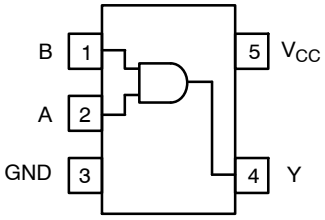


Figure 1. Logic Symbol



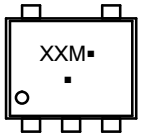
SOT-553

Figure 2. Pinout (Top View)

MARKING DIAGRAMS



SOT−553, 5 LEAD
CASE 463B



XX = Specific Device Code
M = Date Code*
▪ = Pb−Free Package
(Note: Microdot may be in either location)

ORDERING INFORMATION

See detailed ordering, marking and shipping information in the package dimensions section on page 6 of this data sheet.

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PIN ASSIGNMENT

Pin	SOT−553
1	B
2	A
3	GND
4	Y
5	V_{CC}
6	−

FUNCTION TABLE

Input		Output Y = AB
A	B	Y
L	L	L
L	H	L
H	L	L
H	H	H

MAXIMUM RATINGS

Symbol	Characteristics		Value	Unit
V_{CC}	DC Supply Voltage		−0.5 to +4.3	V
V_{IN}	DC Input Voltage		−0.5 to +4.3	V
V_{OUT}	DC Output Voltage	Active-Mode (High or Low State) Tri-State Mode (Note 1) Power-Down Mode (V_{CC} = 0 V)	−0.5 to V_{CC} + 0.5 −0.5 to +4.3 −0.5 to +4.3	V
I_{IK}	DC Input Diode Current	V_{IN} < GND	−50	mA
I_{OK}	DC Output Diode Current	V_{OUT} < GND	−50	mA
I_{OUT}	DC Output Source/Sink Current		±50	mA
I_{CC} or I_{GND}	DC Supply Current per Supply Pin or Ground Pin		±50	mA
T_{STG}	Storage Temperature Range		−65 to +150	°C
T_L	Lead Temperature, 1 mm from Case for 10 Seconds		260	°C
T_J	Junction Temperature Under Bias		+150	°C
θ_{JA}	Thermal Resistance (Note 2)	SOT-553	324	°C/W
P_D	Power Dissipation in Still Air	SOT-553	386	mW
MSL	Moisture Sensitivity		Level 1	−
F_R	Flammability Rating	Oxygen Index: 28 to 34	UL 94 V−0 @ 0.125 in	−
V_{ESD}	ESD Withstand Voltage (Note 3)	Human Body Model Charged Device Model	2000 1000	V
$I_{Latchup}$	Latchup Performance (Note 4)		±100	mA

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected. Operating the device outside its recommended conditions, but still within its maximum rated limits may not cause immediate damage. However, doing so can lead to reduced performance, unpredictable behavior, and potentially shorten the device's lifespan or reliability.

1. Applicable to devices with outputs that may be tri-stated.
2. Measured with minimum pad spacing on an FR4 board, using 10 mm-by-1 inch, 2 ounce copper trace no air flow per JESD51-7.
3. HBM tested to EIA / JESD22-A114-A. CDM tested to JESD22-C101-A. JEDEC recommends that ESD qualification to EIA/JESD22-A115A (Machine Model) be discontinued.
4. Tested to EIA/JESD78 Class II.

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RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter		Min	Max	Unit
V_{CC}	Positive DC Supply Voltage		0.9	3.6	V
V_{IN}	DC Input Voltage		0	3.6	V
V_{OUT}	DC Output Voltage	Active-Mode (High or Low State) Tri-State Mode (Note 1) Power-Down Mode (V_{CC} = 0 V)	0 0 0	V_{CC} 3.6 3.6	
T_A	Operating Temperature Range		−55	+125	°C
t_r , t_f	Input Transition Rise and Fall Time		0	20	ns/V

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Condition	V_{CC} (V)	T_A = 25 °C			T_A = −55 °C to +125 °C		Unit
				Min	Typ	Max	Min	Max	
V_{IH}	High-Level Input Voltage		0.9	–	0.5	–	–	–	V
			1.1 to 1.3	0.65 x V_{CC}	–	–	0.65 x V_{CC}	–	
			1.4 to 1.6	0.65 x V_{CC}	–	–	0.65 x V_{CC}	–	
			1.65 – 1.95	0.65 x V_{CC}	–	–	0.65 x V_{CC}	–	
			2.3 to < 2.7	1.6	–	–	1.6	–	
			2.7 to 3.6	2.0	–	–	2.0	–	
V_{IL}	Low-Level Input Voltage		0.9	–	0.5	–	–	–	V
			1.1 to 1.3	–	–	0.35 x V_{CC}	–	0.35 x V_{CC}	
			1.4 to 1.6	–	–	0.35 x V_{CC}	–	0.35 x V_{CC}	
			1.65 – 1.95	–	–	0.35 x V_{CC}	–	0.35 x V_{CC}	
			2.3 to < 2.7	–	–	0.7	–	0.7	
			2.7 to 3.6	–	–	0.8	–	0.8	
V_{OH}	High-Level Output Voltage	V_{IN} = V_{IH} or V_{IL}							V
		I_{OH} = −100 μA	0.9	–	V_{CC} – 0.1	–	–	–	
			1.1 to 1.3	V_{CC} – 0.1	–	–	V_{CC} – 0.1	–	
			1.4 to 1.6	V_{CC} – 0.1	–	–	V_{CC} – 0.1	–	
			1.65 to 1.95	V_{CC} – 0.2	–	–	V_{CC} – 0.2	–	
			2.3 to <2.7	V_{CC} – 0.2	–	–	V_{CC} – 0.2	–	
			2.7 to 3.6	V_{CC} – 0.2	–	–	V_{CC} – 0.2	–	
		I_{OH} = −2 mA	1.1 o 1.3	0.75 x V_{CC}	–	–	0.75 x V_{CC}	–	
		I_{OH} = −4 mA	1.4 to 1.6	0.75 x V_{CC}	–	–	0.75 x V_{CC}	–	
		I_{OH} = −6 mA	1.65 to 1.95	1.25	–	–	1.25	–	
			2.3 to 2.7	2.0	–	–	2.0	–	
		I_{OH} = −12 mA	2.3 to 2.7	1.8	–	–	1.8	–	
			2.7 to 3.6	2.2	–	–	2.2	–	
		I_{OH} = −18 mA	2.3 to 2.7	1.7	–	–	1.7	–	
			2.7 to 3.6	2.4	–	–	2.4	–	
		I_{OH} = −24 mA	2.7 to 3.6	2.2	–	–	2.2	–	

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DC ELECTRICAL CHARACTERISTICS (continued)

Symbol	Parameter	Condition	V_{CC} (V)	T_A = 25 °C			T_A = −55 °C to +125 °C		Unit
				Min	Typ	Max	Min	Max	
V_{OL}	Low-Level Output Voltage	V_{IN} = V_{IH} or V_{IL}							V
		I_{OL} = 100 μA	0.9	–	0.1	–	–	–	
			1.1 to 1.3	–	–	0.1	–	0.1	
			1.4 to 1.6	–	–	0.1	–	0.1	
			1.65 to 1.95	–	–	0.2	–	0.2	
			2.3 to < 2.7	–	–	0.2	–	0.2	
			2.7 to 3.6	–	–	0.2	–	0.2	
		I_{OL} = 2 mA	1.1 o 1.3	–	–	0.25 x V_{CC}	–	0.25 x V_{CC}	
		I_{OL} = 4 mA	1.4 to 1.6	–	–	0.25 x V_{CC}	–	0.25 x V_{CC}	
		I_{OL} = 6 mA	1.65 to 1.95	–	–	0.3	–	0.3	
			2.3 to 2.7	–	–	0.3	–	0.3	
		I_{OL} = 12 mA	2.3 to 2.7	–	–	0.4	–	0.4	
			2.7 to 3.6	–	–	0.4	–	0.4	
		I_{OL} = 18 mA	2.3 to 2.7	–	–	0.6	–	0.6	
			2.7 to 3.6	–	–	0.4	–	0.4	
		I_{OL} = 24 mA	2.7 to 3.6	–	–	0.55	–	0.55	
I_{IN}	Input Leakage Current	V_{IN} = 3.6 V or GND	0.9 to 3.6	–	–	±0.1	–	±0.9	μA
I_{OZ}	3-State Output Leakage Current	V_{OUT} = 0 V to 3.6 V	0.9 to 3.6	–	–	±0.5	–	±5.0	μA
I_{OFF}	Power Off Leakage Current	V_{IN} = 3.6 V or V_{OUT} = 3.6 V	0	–	–	1.0	–	5.0	μA
I_{CC}	Quiescent Supply Current	V_{IN} = V_{CC} or GND	0.9 to 3.6	–	–	0.9	–	5.0	μA

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

AC ELECTRICAL CHARACTERISTICS

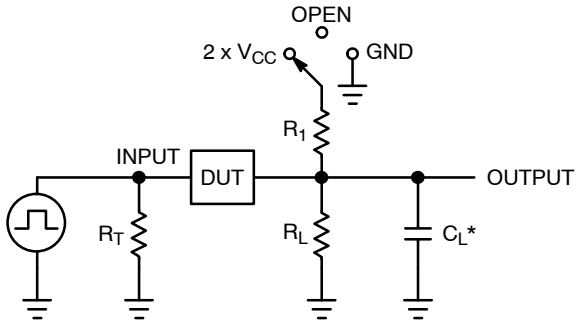
Symbol	Parameter	Condition	V_{CC} (V)	T_A = 25 °C			T_A = −55 °C to +125 °C		Unit
				Min	Typ	Max	Min	Max	
t_{PLH}, t_{PHL}	Propagation Delay, (A or B) to Y (Figures 3 and 4)	R_L = 1 MΩ, C_L = 15 pF	0.9	–	15.9	–	–	–	ns
		R_L = 2 kΩ, C_L = 15 pF	1.10 to 1.30	–	6.8	11.6	–	14.6	
			1.40 to 1.60	–	3.6	6.0	–	7.2	
		R_L = 500 Ω, C_L = 30 pF	1.65 to 1.95	–	2.6	4.5	–	5.3	
			2.3 to 2.7	–	1.9	2.6	–	3.7	
			2.7 to 3.6	–	1.6	2.3	–	3.0	

CAPACITIVE CHARACTERISTICS

Symbol	Parameter	Test Condition	Typical (T_A = 25 °C)	Unit
C_{IN}	Input Capacitance	V_{CC} = 0 V	2.0	pF
C_{OUT}	Output Capacitance	V_{CC} = 0 V	4.5	pF
C_{PD}	Power Dissipation Capacitance (Note 5)	10 MHz, V_{CC} = 0.9 to 3.6 V, V_{IN} = 0 V or V_{CC}	20	pF

5. C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load. Average operating current can be obtained by the equation $I_{CC(OPR)} = C_{PD} \bullet V_{CC} \bullet f_{in} + I_{CC}$. C_{PD} is used to determine the no-load dynamic power consumption: $P_D = C_{PD} \bullet V_{CC}^2 \bullet f_{in} + I_{CC} \bullet V_{CC}$.

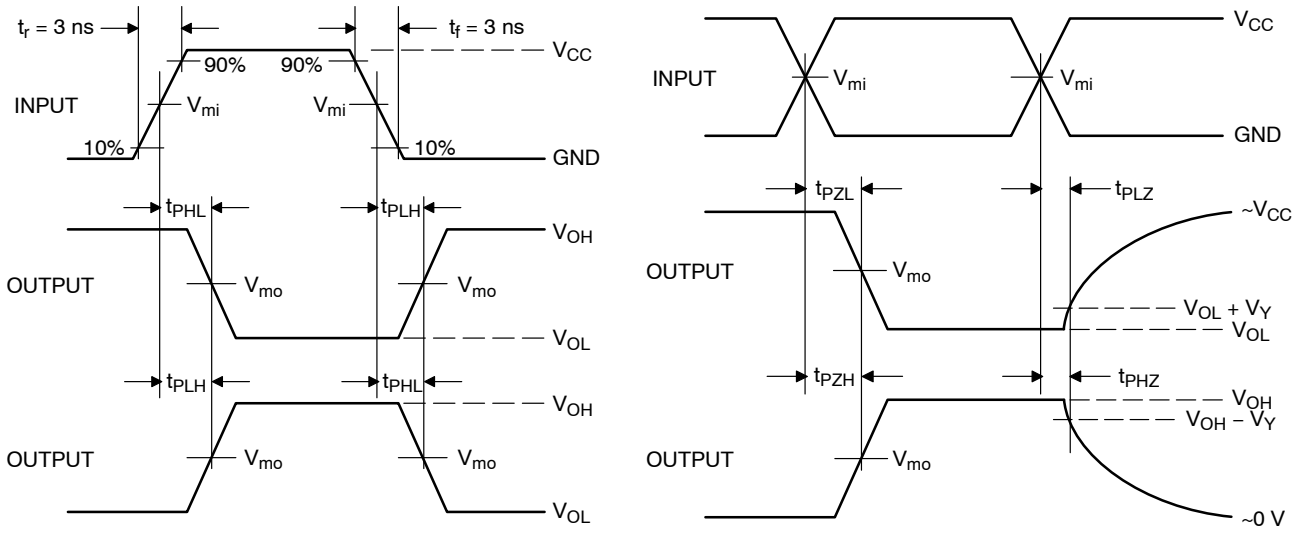
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Test	Switch Position
t_{PLH} / t_{PHL}	Open
t_{PLZ} / t_{PZL}	2 x V_{CC}
t_{PHZ} / t_{PZH}	GND

C_L includes probe and jig capacitance
R_T is Z_{OUT} of pulse generator (typically 50 Ω)
f = 1 MHz

Figure 3. Test Circuit



V_{CC}, V	V_{mi}, V	V_{mo}, V		V_Y, V
		t_{PLH}, t_{PHL}	t_{PZL}, t_{PLZ}, t_{PZH}, t_{PHZ}	
0.9	V_{CC} / 2	V_{CC} / 2	V_{CC} / 2	0.1
1.1 to 1.3	V_{CC} / 2	V_{CC} / 2	V_{CC} / 2	0.1
1.4 to 1.6	V_{CC} / 2	V_{CC} / 2	V_{CC} / 2	0.1
1.65 to 1.95	V_{CC} / 2	V_{CC} / 2	V_{CC} / 2	0.15
2.3 to 2.7	V_{CC} / 2	V_{CC} / 2	V_{CC} / 2	0.15
3.0 to 3.6	1.5	1.5	1.5	0.3

Figure 4. Switching Waveforms

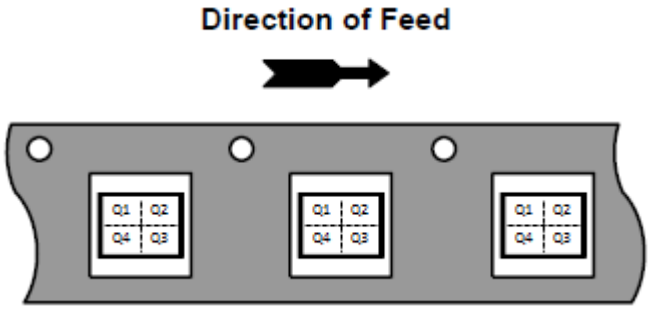
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ORDERING INFORMATION

Device	Package	Marking	Pin 1 Orientation (See below)	Shipping†
NL17SV08XV5T2G	SOT-553	UG	Q4	4000 / Tape & Reel

† 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.

PIN 1 ORIENTATION IN TAPE AND REEL

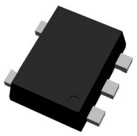


REVISION HISTORY

Revision	Description of Changes	Date
10	Rebranded the document to **onsemi** format.	10/3/2025
11	Removed four package ordering options and OPNs	1/15/2026

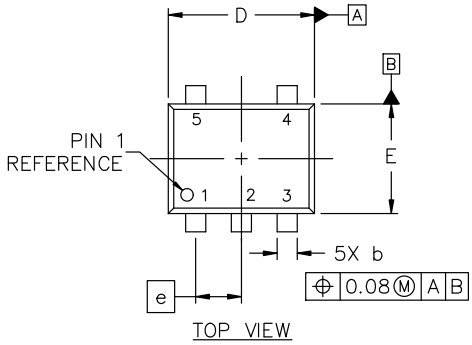
* Please note that this document has been previously updated prior to the inclusion of this revision history table and that the changes tracked only reflect what has occurred on the noted approval dates.

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SOT−553−5 1.60x1.20x0.55, 0.50P
CASE 463B
ISSUE D

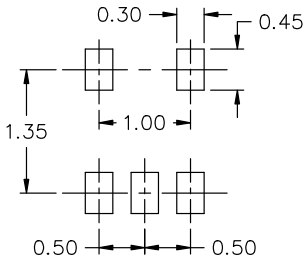
DATE 21 FEB 2024



NOTES:

1. DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5−2018.
2. ALL DIMENSION ARE IN MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.50	0.55	0.60
b	0.17	0.22	0.27
c	0.08	0.13	0.18
D	1.55	1.60	1.65
E	1.15	1.20	1.25
e	0.50 BSC		
H	1.55	1.60	1.65
L	0.10	0.20	0.30



RECOMMENDED MOUNTING 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.

GENERIC MARKING DIAGRAM*



XX = Specific Device Code
M = Date Code
▪ = Pb−Free Package

(Note: Microdot may be in either location)

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “▪”, may or may not be present. Some products may not follow the Generic Marking.

STYLE 1:
PIN 1. BASE
2. EMITTER
3. BASE
4. COLLECTOR
5. COLLECTOR

STYLE 2:
PIN 1. CATHODE
2. COMMON ANODE
3. CATHODE 2
4. CATHODE 3
5. CATHODE 4

STYLE 3:
PIN 1. ANODE 1
2. N/C
3. ANODE 2
4. CATHODE 2
5. CATHODE 1

STYLE 4:
PIN 1. SOURCE 1
2. DRAIN 1/2
3. SOURCE 1
4. GATE 1
5. GATE 2

STYLE 5:
PIN 1. ANODE
2. EMITTER
3. BASE
4. COLLECTOR
5. CATHODE

STYLE 6:
PIN 1. EMITTER 2
2. BASE 2
3. EMITTER 1
4. COLLECTOR 1
5. COLLECTOR 2/BASE 1

STYLE 7:
PIN 1. BASE
2. EMITTER
3. BASE
4. COLLECTOR
5. COLLECTOR

STYLE 8:
PIN 1. CATHODE
2. COLLECTOR
3. N/C
4. BASE
5. EMITTER

STYLE 9:
PIN 1. ANODE
2. CATHODE
3. ANODE
4. ANODE
5. ANODE

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DESCRIPTION:	**SOT−553−5 1.60x1.20x0.55, 0.50P**	**PAGE 1 OF 1**

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