# **Quad 2-Input AND Gate**

# High–Performance Silicon–Gate CMOS

### Features

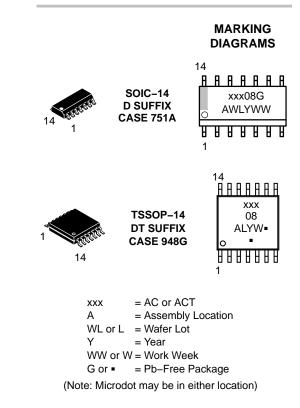
- Outputs Source/Sink 24 mA
- 'ACT08 Has TTL Compatible Inputs
- These are Pb–Free Devices

V<sub>CC</sub>



# **ON Semiconductor®**

www.onsemi.com



#### **ORDERING INFORMATION**

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

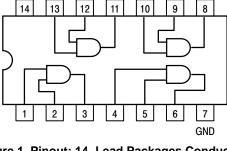


Figure 1. Pinout: 14–Lead Packages Conductors (Top View)

#### MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V <sub>CC</sub>	DC Supply Voltage		-0.5 to +7.0	V
VI	DC Input Voltage		$-0.5 \leq V_I \leq V_{CC} + 0.5$	V
Vo	DC Output Voltage	(Note 1)	$-0.5 \leq V_O \leq V_{CC} + 0.5$	V
I <sub>IK</sub>	DC Input Diode Current		±20	mA
I <sub>OK</sub>	DC Output Diode Current		±50	mA
I <sub>O</sub>	DC Output Sink/Source Current		±50	mA
I <sub>CC</sub>	DC Supply Current per Output Pin		±50	mA
I <sub>GND</sub>	DC Ground Current per Output Pin		±50	mA
T <sub>STG</sub>	Storage Temperature Range		-65 to +150	°C
TL	Lead temperature, 1 mm from Case for 10 Seco	nds	260	°C
TJ	Junction temperature under Bias		+ 150	°C
$\theta_{JA}$	Thermal Resistance (Note 2)	SOIC TSSOP	125 170	°C/W
P <sub>D</sub>	Power Dissipation in Still Air at 85°C	SOIC TSSOP	125 170	mW
MSL	Moisture Sensitivity		Level 1	
F <sub>R</sub>	Flammability Rating Oxy	gen Index: 30% – 35%	UL 94 V-0 @ 0.125 in	
V <sub>ESD</sub>	Ň	n Body Model (Note 3) Iachine Model (Note 4) Device Model (Note 5)	> 2000 > 200 > 1000	V
I <sub>Latch-Up</sub>	Latch–Up Performance Above V <sub>CC</sub> and Below	GND at 85°C (Note 6)	±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.

1. I<sub>O</sub> absolute maximum rating must be observed.

The package thermal impedance is calculated in accordance with JESD51–7.
 Tested to EIA/JESD22–A114–A.

4. Tested to EIA/JESD22-A115-A.

5. Tested to JESD22-C101-A.

6. Tested to EIA/JESD78.

#### **RECOMMENDED OPERATING CONDITIONS**

Symbol	Parameter		Min	Тур	Max	Unit
		′AC	2.0	5.0	6.0	
V <sub>CC</sub>	Supply Voltage	'ACT	4.5	5.0	5.5	V
V <sub>in</sub> , V <sub>out</sub>	DC Input Voltage, Output Voltage (Ref. to GND)		0	-	V <sub>CC</sub>	V
		V <sub>CC</sub> @ 3.0 V	-	150	-	ns/V
t <sub>r</sub> , t <sub>f</sub>	t <sub>r</sub> , t <sub>f</sub> Input Rise and Fall Time (Note 1) 'AC Devices except Schmitt Inputs	V <sub>CC</sub> @ 4.5 V	-	40	-	
		V <sub>CC</sub> @ 5.5 V	-	25	_	
	Input Rise and Fall Time (Note 2)	V <sub>CC</sub> @ 4.5 V	-	10	-	
t <sub>r</sub> , t <sub>f</sub>	'ACT Devices except Schmitt Inputs	V <sub>CC</sub> @ 5.5 V	-	8.0	-	ns/V
TJ	Junction Temperature (PDIP)		_	_	140	°C
T <sub>A</sub>	Operating Ambient Temperature Range		-40	25	85	°C
I <sub>OH</sub>	Output Current – High		-	_	-24	mA
I <sub>OL</sub>	Output Current – Low		-	_	24	mA

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.

1.  $V_{in}$  from 30% to 70%  $V_{CC}$ ; see individual Data Sheets for devices that differ from the typical input rise and fall times. 2.  $V_{in}$  from 0.8 V to 2.0 V; see individual Data Sheets for devices that differ from the typical input rise and fall times.

#### **DC CHARACTERISTICS**

					74	AC	74AC	
				v <sub>cc</sub>	T <sub>A</sub> = -	+25°C	T <sub>A</sub> = -40°C to +85°C	
Symbol	Parameter	Con	ditions	(V)	Тур	Guar	anteed Limits	Unit
V <sub>IH</sub>	Minimum High Level Input Voltage	V <sub>OUT</sub> = 0.1 V or V <sub>CC</sub> – 0.1 V	/	3.0 4.5 5.5	1.5 2.25 2.75	2.1 3.15 3.85	2.1 3.15 3.85	V
V <sub>IL</sub>	Maximum Low Level Input Voltage	V <sub>OUT</sub> = 0.1 V or V <sub>CC</sub> – 0.1 V	/	3.0 4.5 5.5	1.5 2.25 2.75	0.9 1.35 1.65	0.9 1.35 1.65	V
V <sub>OH</sub>	Minimum High Level Output Voltage	I <sub>OUT</sub> = -50 μA		3.0 4.5 5.5	2.99 4.49 5.49	2.9 4.4 5.4	2.9 4.4 5.4	V
		V <sub>IN</sub> = V <sub>IL</sub> or V I <sub>OH</sub>	<sub>IH</sub> (Note 3) –12 mA –24 mA –24 mA	3.0 4.5 5.5		2.56 3.86 4.86	2.46 3.76 4.76	v
V <sub>OL</sub>	Maximum Low Level Output Voltage	V <sub>IN</sub> = V <sub>IL</sub> or V I <sub>OL</sub>	<sub>IH</sub> (Note 3) 12 mA 24 mA 24 mA	3.0 4.5 5.5	_ _ _	0.36 0.36 0.36	0.44 0.44 0.44	V
I <sub>IN</sub>	Maximum Input Leakage Current	V <sub>I</sub> = V <sub>CC</sub> , GNI	C	5.5	-	±0.1	±1.0	μΑ
I <sub>OLD</sub>	Minimum Dynamic (Note 4)	V <sub>OLD</sub> = 1.65 V Max		5.5	_	-	75	mA
I <sub>OHD</sub>	Output Current	V <sub>OHD</sub> = 3.85 \	/ Min	5.5	-	-	-75	mA
I <sub>CC</sub>	Maximum Quiescent Supply Current	$V_{IN} = V_{CC}$ or 0	GND	5.5	-	4.0	40	μΑ

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.

NOTE:  $I_{IN}$  and  $I_{CC}$  @ 3.0 V are guaranteed to be less than or equal to the respective limit @ 5.5 V V<sub>CC</sub>.

3. All outputs loaded; thresholds on input associated with output under test.

4. Maximum test duration 2.0 ms, one output loaded at a time.

### AC CHARACTERISTICS

		74AC			74	AC			
		V <sub>CC</sub> (V)	-	₄ = +25° <sub>L</sub> = 50 p		T <sub>A</sub> = - to +8 C <sub>L</sub> = 5	35°C		Fig.
Symbol	Parameter	(Note5)	Min	Тур	Max	Min	Max	Unit	No.
t <sub>PLH</sub>	Propagation Delay	3.3 5.0	1.5 1.5	7.5 5.5	9.5 7.5	1.0 1.0	10.0 8.5	ns	3–5
t <sub>PHL</sub>	Propagation Delay	3.3 5.0	1.5 1.5	7.0 5.5	8.5 7.0	1.0 1.0	9.0 7.5	ns	3–5

5. Voltage Range 3.3 V is 3.3 V ±0.3 V. Voltage Range 5.0 V is 5.0 V ±0.5 V.

#### **DC CHARACTERISTICS**

					74A	СТ	74ACT		
				v <sub>cc</sub>	T <sub>A</sub> = +25°C		T <sub>A</sub> = −40°C to +85°C		
Symbol	Parameter	Conditio	ons	(V)	Тур	Guar	anteed Limits	Unit	
V <sub>IH</sub>	Minimum High Level	V <sub>OUT</sub> = 0.1 V		4.5	1.5	2.0	2.0	V	
	Input Voltage	or V <sub>CC</sub> – 0.1 V		5.5	1.5	2.0	2.0	v	
V <sub>IL</sub>	Maximum Low Level	V <sub>OUT</sub> = 0.1 V		4.5	1.5	0.8	0.8	V	
	Input Voltage	or V <sub>CC</sub> – 0.1 V		5.5	1.5	0.8	0.8	v	
V <sub>OH</sub>	Minimum High Level	I <sub>OUT</sub> = -50 μA		4.5	4.49	4.4	4.4	V	
	Output Voltage			5.5	5.49	5.4	5.4	v	
		$V_{IN} = V_{IL} \text{ or } V_{IH}$ (N						V	
			–24 mA	4.5	-	3.86	3.76		
			–24 mA	5.5	-	4.86	4.76		
V <sub>OL</sub>	Maximum Low Level	I <sub>OUT</sub> = 50 μA		4.5	0.001	0.1	0.1	V	
	Output Voltage			5.5	0.001	0.1	0.1	v	
		$V_{IN} = V_{IL} \text{ or } V_{IH}$ (N	lote 6)					V	
			24 mA	4.5	-	0.36	0.44		
			24 mA	5.5	-	0.36	0.44		
I <sub>IN</sub>	Maximum Input Leakage Current	$V_{I} = V_{CC}, \text{ GND}$		5.5	-	±0.1	±1.0	μΑ	
$\Delta I_{CCT}$	Additional Max. I <sub>CC</sub> /Input	$V_{I} = V_{CC} - 2.1 V$		5.5	0.6	-	1.5	mA	
I <sub>OLD</sub>	Minimum Dynamic (Note 7)	V <sub>OLD</sub> = 1.65 V Ma	х	5.5	-	-	75	mA	
I <sub>OHD</sub>	Output Current	V <sub>OHD</sub> = 3.85 V Min	า	5.5	-	-	-75	mA	
I <sub>CC</sub>	Maximum Quiescent Supply Current	V <sub>IN</sub> = V <sub>CC</sub> or GND		5.5	-	4.0	40	μΑ	

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.
6. All outputs loaded; thresholds on input associated with output under test.
7. Maximum test duration 2.0 ms, one output loaded at a time.

#### **AC CHARACTERISTICS**

				74ACT		74A	СТ		
		V <sub>CC</sub> (V)		₄ = +25° ∟ = 50 p		T <sub>A</sub> = - to +8 C <sub>L</sub> = \$	35°C		Fig.
Symbol	Parameter	(Note 8)	Min	Тур	Max	Min	Max	Unit	No.
t <sub>PLH</sub>	Propagation Delay	5.0	1.0	-	9.0	1.0	10.0	ns	3–5
t <sub>PHL</sub>	Propagation Delay	5.0	1.0	-	9.0	1.0	10.0	ns	3–5

8. Voltage Range 5.0 V is 5.0 V  $\pm 0.5$  V.

#### CAPACITANCE

Symbol	Parameter	Test Conditions	Value Typ	Unit
C <sub>IN</sub>	Input Capacitance	V <sub>CC</sub> = 5.0 V	4.5	pF
C <sub>PD</sub>	Power Dissipation Capacitance	V <sub>CC</sub> = 5.0 V	20	pF

#### **ORDERING INFORMATION**

Device	Package	Shipping <sup>†</sup>
MC74AC08DG	SOIC-14 (Pb-Free)	55 Units / Rail
MC74AC08DR2G	SOIC-14 (Pb-Free)	2500 / Tape & Reel
MC74AC08DTR2G	TSSOP-14 (Pb-Free)	2500 / Tape & Reel
MC74ACT08DG	SOIC-14 (Pb-Free)	55 Units / Rail
MC74ACT08DR2G	SOIC-14 (Pb-Free)	2500 / Tape & Reel
MC74ACT08DTR2G	TSSOP-14 (Pb-Free)	2500 / 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.





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

#### **STYLES ON PAGE 2**

DOCUMENT NUMBER:	98ASB42565B	Electronic versions are uncontrolled except when accessed directly from the Document Repositor Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.					
DESCRIPTION:	SOIC-14 NB		PAGE 1 OF 2				
ON Semiconductor reserves the right the suitability of its products for any pa	to make changes without further notice to an articular purpose, nor does ON Semiconducto	stries, LLC dba ON Semiconductor or its subsidiaries in the United States y products herein. ON Semiconductor makes no warranty, representation r assume any liability arising out of the application or use of any product o ncidental damages. ON Semiconductor does not convey any license under	or guarantee regarding or circuit, and specifically				

#### SOIC-14 CASE 751A-03 ISSUE L

#### DATE 03 FEB 2016

STYLE 1: PIN 1. COMMON CATHODE 2. ANODE/CATHODE 3. ANODE/CATHODE 4. NO CONNECTION 5. ANODE/CATHODE 6. NO CONNECTION 7. ANODE/CATHODE 8. ANODE/CATHODE 9. ANODE/CATHODE 10. NO CONNECTION 11. ANODE/CATHODE 12. ANODE/CATHODE 13. NO CONNECTION 14. COMMON ANODE	STYLE 2: CANCELLED	STYLE 3: PIN 1. NO CONNECTION 2. ANODE 3. ANODE 4. NO CONNECTION 5. ANODE 6. NO CONNECTION 7. ANODE 8. ANODE 9. ANODE 10. NO CONNECTION 11. ANODE 12. ANODE 13. NO CONNECTION 14. COMMON CATHODE	STYLE 4: PIN 1. NO CONNECTION 2. CATHODE 3. CATHODE 4. NO CONNECTION 5. CATHODE 6. NO CONNECTION 7. CATHODE 8. CATHODE 10. NO CONNECTION 11. CATHODE 12. CATHODE 13. NO CONNECTION 14. COMMON ANODE
STYLE 5: PIN 1. COMMON CATHODE 2. ANODE/CATHODE 3. ANODE/CATHODE 4. ANODE/CATHODE 5. ANODE/CATHODE 6. NO CONNECTION 7. COMMON ANODE 8. COMMON CATHODE 10. ANODE/CATHODE 11. ANODE/CATHODE 12. ANODE/CATHODE 13. NO CONNECTION 14. COMMON ANODE	STYLE 6: PIN 1. CATHODE 2. CATHODE 3. CATHODE 4. CATHODE 5. CATHODE 6. CATHODE 7. CATHODE 8. ANODE 9. ANODE 10. ANODE 11. ANODE 12. ANODE 13. ANODE 14. ANODE	STYLE 7: PIN 1. ANODE/CATHODE 2. COMMON ANODE 3. COMMON CATHODE 4. ANODE/CATHODE 5. ANODE/CATHODE 6. ANODE/CATHODE 8. ANODE/CATHODE 9. ANODE/CATHODE 10. ANODE/CATHODE 11. COMMON CATHODE 12. COMMON ANODE 13. ANODE/CATHODE 14. ANODE/CATHODE	STYLE 8: PIN 1. COMMON CATHODE 2. ANODE/CATHODE 3. ANODE/CATHODE 4. NO CONNECTION 5. ANODE/CATHODE 6. ANODE/CATHODE 7. COMMON ANODE 9. ANODE/CATHODE 10. ANODE/CATHODE 11. NO CONNECTION 12. ANODE/CATHODE 13. ANODE/CATHODE 14. COMMON CATHODE

DOCUMENT NUMBER:	98ASB42565B	ASB42565B Electronic versions are uncontrolled except when accessed directly from the Document Repose Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.						
DESCRIPTION:	SOIC-14 NB		PAGE 2 OF 2					
ON Semiconductor and image trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries								

ON Semiconductor and united states and/or other countries. LC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. ON Semiconductor does not convey any license under its patent rights nor the rights of others.





may or may not be present.

DOCUMENT NUMBER:	98ASH70246A	Electronic versions are uncontrolled except when accessed directly from the Document Repositor Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.					
DESCRIPTION:	TSSOP-14 WB		PAGE 1 OF 1				
ON Semiconductor reserves the right the suitability of its products for any pa	to make changes without further notice to an articular purpose, nor does ON Semiconducto	stries, LLC dba ON Semiconductor or its subsidiaries in the United States y products herein. ON Semiconductor makes no warranty, representation r assume any liability arising out of the application or use of any product or icidental damages. ON Semiconductor does not convey any license under	or guarantee regarding r circuit, and specifically				

DIMENSIONS: MILLIMETERS

© Semiconductor Components Industries, LLC, 2019

onsemi, ONSEMI, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "onsemi" or its affiliates and/or subsidiaries in the United States and/or other countries. onsemi owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of onsemi's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. onsemi reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and onsemi makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and calcular performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

#### PUBLICATION ORDERING INFORMATION

#### LITERATURE FULFILLMENT:

#### TECHNICAL SUPPORT

onsemi Website: www.onsemi.com

Email Requests to: orderlit@onsemi.com

North American Technical Support: Voice Mail: 1 800-282-9855 Toll Free USA/Canada Phone: 011 421 33 790 2910

Europe, Middle East and Africa Technical Support: Phone: 00421 33 790 2910 For additional information, please contact your local Sales Representative

# **X-ON Electronics**

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Logic Gates category:

Click to view products by ON Semiconductor manufacturer:

Other Similar products are found below :

74HC85N NLU1G32AMUTCG CD4068BE NL17SG32P5T5G NL17SG86DFT2G NLV14001UBDR2G NLX1G11AMUTCG NLX1G97MUTCG 74LS38 74LVC32ADTR2G MC74HCT20ADTR2G NLV17SZ00DFT2G NLV17SZ02DFT2G NLV74HC02ADR2G 74HC32S14-13 74LS133 74LVC1G32Z-7 M38510/30402BDA 74LVC1G86Z-7 74LVC2G08RA3-7 NLV74HC08ADTR2G NLV74HC14ADR2G NLV74HC20ADR2G NLX2G86MUTCG 5962-8973601DA 74LVC2G02HD4-7 NLU1G00AMUTCG 74LVC2G32RA3-7 74LVC2G00HD4-7 NL17SG02P5T5G 74LVC2G00HK3-7 74LVC2G86HK3-7 NLX1G99DMUTWG NLVVHC1G00DFT2G NLVHC1G08DFT2G NLV7SZ57DFT2G NLV74VHC04DTR2G NLV27WZ86USG NLV27WZ00USG NLU1G86CMUTCG NLU1G08CMUTCG NL17SZ32P5T5G NL17SZ00P5T5G NL17SH02P5T5G 74AUP2G00RA3-7 NLV74HC02ADTR2G NLX1G332CMUTCG NL17SG86P5T5G NL17SZ05P5T5G NLV74VHC00DTR2G