# Quad 3-state Buffer with Low Enable High-Performance Silicon-Gate CMOS

### Features

- Outputs Source/Sink
- 'ACT125 Has TTL Compatible Inputs
- These are Pb–Free Devices

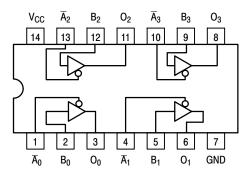


Figure 1. Pinout: 14–Lead Packages Conductors (Top View)

#### **PIN ASSIGNMENT**

PIN	FUNCTION
Ā <sub>n</sub> , B <sub>n</sub>	Inputs
On	Outputs

#### FUNCTION TABLE

Inp	outs	Output
$\overline{A}_n$	B <sub>n</sub>	O <sub>n</sub>
L	L	L
L	Н	н
Н	Х	Z

NOTE: H = High Voltage Level;

L = Low Voltage Level;

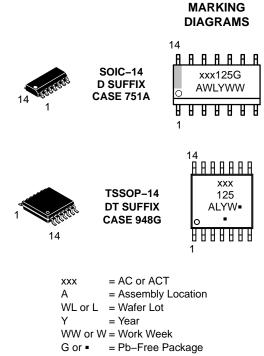
Z = High Impedance;

X = Immaterial



## **ON Semiconductor®**

www.onsemi.com



(Note: Microdot may be in either location)

#### **ORDERING INFORMATION**

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

#### 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.

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.

Tested to EIA/JESD22–A115–A.
Tested to JESD22–C101–A.

6. Tested to EIA/JESD78.

#### **RECOMMENDED OPERATING CONDITIONS**

Symbol	Parameter		Min	Тур	Max	Unit
	V <sub>CC</sub> Supply Voltage	ΆC	2.0	5.0	6.0	Ň
VCC		'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
	Input Rise and Fall Time (Note 1) f AC Devices except Schmitt Inputs	V <sub>CC</sub> @ 3.0 V	-	150	-	
t <sub>r</sub> , t <sub>f</sub>		V <sub>CC</sub> @ 4.5 V	-	40	-	ns/V
		V <sub>CC</sub> @ 5.5 V	-	25	-	
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**

	Parameter		74AC T <sub>A</sub> = +25°C		74AC	Unit		
Symbol		V <sub>CC</sub> (V)			T <sub>A</sub> = –40°C to +85°C		Conditions	
			Тур	Guara	anteed Limits			
V <sub>IH</sub>	Minimum High Level Input Voltage	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>OUT</sub> = 0.1 V or V <sub>CC</sub> – 0.1 V	
V <sub>IL</sub>	Maximum Low Level Input Voltage	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>OUT</sub> = 0.1 V or V <sub>CC</sub> – 0.1 V	
V <sub>OH</sub>	Minimum High Level Output Voltage	3.0 4.5 5.5	2.99 4.46 5.49	2.9 4.4 5.4	2.9 4.4 5.4	v	l <sub>OUT</sub> = – 50 μA	
		3.0 4.5 5.5	_ _ _	2.56 3.86 4.86	2.46 3.76 4.76	v	$V_{IN} = V_{IL} \text{ or } V_{IH}$ -12 mA $I_{OH}$ - 24 mA - 24 mA	
V <sub>OL</sub>	Minimum Low Level Output Voltage	3.0 4.5 5.5	0.002 0.001 0.001	0.1 0.1 0.1	0.1 0.1 0.1	V	I <sub>OUT</sub> = 50 μA	
		3.0 4.5 5.5	_ _ _	0.36 0.36 0.36	0.44 0.44 0.44	v	*V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> 12 mA I <sub>OL</sub> 24 mA 24 mA	
I <sub>IN</sub>	Maximum Input Leakage Current	5.5	-	±0.1	±1.0	μΑ	$V_{I} = V_{CC}, GND$	
I <sub>OZ</sub>		5.5	_	±0.5	±5.0	μΑ		
I <sub>OLD</sub>	†Minimum Dynamic	5.5	-	-	75	mA	V <sub>OLD</sub> = 1.65 V Max	
I <sub>OHD</sub>	Output Current	5.5	-	-	-75	mA	V <sub>OHD</sub> = 3.85 V Min	
I <sub>CC</sub>	Maximum Quiescent Supply Current	5.5	_	8.0	80	μΑ	$V_{IN} = V_{CC}$ or GND	

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

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

#### **AC CHARACTERISTICS**

			74	AC	74AC		
Symbol	Parameter	V <sub>CC</sub> * (V)	T <sub>A</sub> = +25°C C <sub>L</sub> = 50 pF		$\begin{array}{c} C \\ T_A = -40^{\circ}C \\ to +85^{\circ}C \\ C_L = 50 \text{ pF} \end{array}$		Unit
			Min	Max	Min	Max	
t <sub>PLH</sub>	Propagation Delay Data to Output	3.3 5.0	1.0 1.0	9.0 7.0	1.0 1.0	10 7.5	ns
t <sub>PHL</sub>	Propagation Delay Data to Output	3.3 5.0	1.0 1.0	9.0 7.0	1.0 1.0	10 7.5	ns
t <sub>PZH</sub>	Output Enable Time	3.3 5.0	1.0 1.0	10.5 7.0	1.0 1.0	11 8.0	ns
t <sub>PZL</sub>	Output Enable Time	3.3 5.0	1.0 1.0	10 8.0	1.0 1.0	11 8.5	ns
t <sub>PHZ</sub>	Output Disable Time	3.3 5.0	1.0 1.0	10 9.0	1.0 1.0	10.5 9.5	ns
t <sub>PLZ</sub>	Output Disable Time	3.3 5.0	1.0 1.0	10.5 9.0	1.0 1.0	11.5 9.5	ns

\*Voltage Range 3.3 V is 3.3 V  $\pm 0.3$  V. Voltage Range 5.0 V is 5.0 V  $\pm 0.5$  V.

#### **DC CHARACTERISTICS**

	Parameter		74ACT T <sub>A</sub> = +25°C		74ACT		
Symbol		V <sub>CC</sub> (V)			T <sub>A</sub> = –40°C to +85°C	Unit	Conditions
l			Тур	Guara	anteed Limits		
V <sub>IH</sub>	Minimum High Level Input Voltage	4.5 5.5	1.5 1.5	2.2 2.0	2.0 2.0	V	V <sub>OUT</sub> = 0.1 V or V <sub>CC</sub> – 0.1 V
V <sub>IL</sub>	Maximum Low Level Input Voltage	4.5 5.5	1.5 1.5	0.8 0.8	0.8 0.8	V	V <sub>OUT</sub> = 0.1 V or V <sub>CC</sub> – 0.1 V
V <sub>OH</sub>	Minimum High Level Output Voltage	4.5 5.5	4.49 5.49	4.4 5.4	4.4 5.4	V	I <sub>OUT</sub> =  – 50 μA
		4.5 5.5		3.86 4.86	3.76 4.76	V	$V_{IN} = V_{IL} \text{ or } V_{IH}$ - 24 mA $V_{OH}$ - 24 mA
V <sub>OL</sub>	Minimum Low Level Output Voltage	4.5 5.5	0.001 0.001	0.1 0.1	0.1 0.1	V	I <sub>OUT</sub> =  – 50 μA
		4.5 5.5		0.36 0.36	0.44 0.44	V	$V_{IN} = V_{IL} \text{ or } V_{IH}$ $I_{OH} - 24 \text{ mA}$ - 24  mA
I <sub>IN</sub>	Maximum Input Leakage Current	5.5	-	±0.1	±1.0	μΑ	$V_I = V_{CC}, GND$
I <sub>OZ</sub>		5.5	-	±0.5	±5.0	μΑ	$V_{I} (OE) = V_{IL}, V_{IH}$ $V_{I} = V_{CC}, GND$ $V_{O} = V_{CC}, GND$
$\Delta I_{CCT}$	Additional Max. I <sub>CC</sub> /Input	5.5	0.6	-	1.5	mA	$V_{I} = V_{CC} - 2.1 V$
I <sub>OLD</sub>	†Minimum Dynamic	5.5	-	-	75	mA	V <sub>OLD</sub> = 1.65 V Max
I <sub>OHD</sub>	Output Current	5.5	-	-	-75	mA	V <sub>OHD</sub> = 3.85 V Min
I <sub>CC</sub>	Maximum Quiescent Supply Current	5.5	-	8.0	80	μΑ	$V_{IN} = V_{CC}$ or GND

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

#### **AC CHARACTERISTICS**

			74ACT 74ACT					
Symbol	Parameter	V <sub>CC</sub> * (V)	T <sub>A</sub> = - C <sub>L</sub> = -	T <sub>A</sub> = +25°C C <sub>L</sub> = 50 pF		-40°C 85°C 50 pF	Unit	
			Min	Max	Min	Max		
t <sub>PLH</sub>	Propagation Delay Data to Output	5.0	1.0	9.0	1.0	10	ns	
t <sub>PHL</sub>	Propagation Delay Data to Output	5.0	1.0	9.0	1.0	10	ns	
t <sub>PZH</sub>	Output Enable Time	5.0	1.0	8.5	1.0	9.5	ns	
t <sub>PZL</sub>	Output Enable Time	5.0	1.0	9.5	1.0	10.5	ns	
t <sub>PHZ</sub>	Output Disable Time	5.0	1.0	9.5	1.0	10.5	ns	
t <sub>PLZ</sub>	Output Disable Time	5.0	1.0	10	1.0	10.5	ns	

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

### CAPACITANCE

Symbol	Parameter	Value Typ	Unit	Test Conditions
C <sub>IN</sub>	Input Capacitance	4.5	pF	$V_{CC} = 5.0 V$
C <sub>PD</sub>	Power Dissipation Capacitance	45	pF	$V_{CC} = 5.0 V$

#### **ORDERING INFORMATION**

Device	Package	Shipping <sup>†</sup>
MC74AC125DG	SOIC-14	55 Units / Rail
MC74AC125DR2G	(Pb-Free)	2500 / Tape & Reel
MC74AC125DTR2G	TSSOP-14 (Pb-Free)	2500 / Tape & Reel
MC74ACT125DR2G	SOIC-14 (Pb-Free)	2500 / Tape & Reel
MC74ACT125DTR2G	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 Printed versions are uncontrolled except when stamped "CONTROLLED 0			
DESCRIPTION:	SOIC-14 NB		PAGE 1 OF 2		
ON Semiconductor and (III) are trademarks of Semiconductor Components Industries, LLC 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.					

#### 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	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.			
DESCRIPTION:	SOIC-14 NB		PAGE 2 OF 2		
ON Semiconductor and M are trademarks of Semiconductor Components Industries 11 C 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 Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.		
DESCRIPTION:	TSSOP-14 WB		PAGE 1 OF 1	
ON Semiconductor and ()) are trademarks of Semiconductor Components Industries, LLC 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				

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

# **Mouser Electronics**

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

onsemi:

MC74ACT125DG MC74AC125D MC74AC125DG MC74AC125DR2 MC74AC125DR2G MC74AC125DTR2 MC74AC125DTR2G MC74AC125M MC74AC125MEL MC74AC125MELG MC74AC125MG MC74AC125N MC74AC125NG MC74ACT125D MC74ACT125DR2 MC74ACT125DR2G MC74ACT125DTR2 MC74ACT125DTR2G MC74ACT125MEL MC74ACT125MELG MC74ACT125N MC74ACT125NG NLV74ACT125DR2G