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

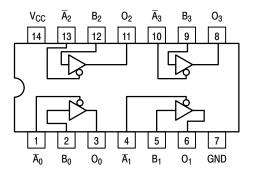


Figure 1. Pinout: 14–Lead Packages Conductors (Top View)

PIN ASSIGNMENT

PIN	FUNCTION
Ā _n , B _n	Inputs
On	Outputs

FUNCTION TABLE

Inp	uts	Output
Ān	B _n	O _n
L	L	L
L	Н	Н
Н	Х	Z

NOTE: H = High Voltage Level;

L = Low Voltage Level;

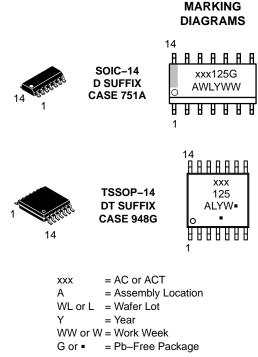
Z = High Impedance;

X = Immaterial



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(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 _{CC}	DC Supply Voltage		-0.5 to +7.0	V
VI	DC Input Voltage		$-0.5 \leq V_{I} \leq V_{CC} + 0.5$	V
V _O	DC Output Voltage	(Note 1)	$-0.5 \leq V_O \leq V_{CC} + 0.5$	V
I _{IK}	DC Input Diode Current		±20	mA
I _{OK}	DC Output Diode Current		±50	mA
I _O	DC Output Sink/Source Current		±50	mA
I _{CC}	DC Supply Current per Output Pin		±50	mA
I _{GND}	DC Ground Current per Output Pin		±50	mA
T _{STG}	Storage Temperature Range		-65 to +150	°C
TL	Lead temperature, 1 mm from Case for 10 Secon	nds	260	°C
TJ	Junction temperature under Bias		+ 150	°C
θ_{JA}	Thermal Resistance (Note 2)	SOIC TSSOP	125 170	°C/W
P _D	Power Dissipation in Still Air at 85°C	SOIC TSSOP	125 170	mW
MSL	Moisture Sensitivity		Level 1	
F _R	Flammability Rating Oxyg	gen Index: 30% – 35%	UL 94 V-0 @ 0.125 in	
V _{ESD}	M	n Body Model (Note 3) achine Model (Note 4) Device Model (Note 5)	> 2000 > 200 > 1000	V
I _{Latch-Up}	Latch–Up Performance Above V_{CC} 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_O absolute maximum rating must be observed.

2. The package thermal impedance is calculated in accordance with JESD51–7.

3. 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
		′AC	2.0	5.0	6.0	
V _{CC}	Supply Voltage	′ACT	4.5	5.0	5.5	V
V _{in} , V _{out}	DC Input Voltage, Output Voltage (Ref. to GND)		0	-	V _{CC}	V
	r, t _f Input Rise and Fall Time (Note 1) 'AC Devices except Schmitt Inputs	V _{CC} @ 3.0 V	-	150	-	
t _r , t _f		V _{CC} @ 4.5 V	-	40	-	ns/V
		V _{CC} @ 5.5 V	-	25	-	
ТJ	Junction Temperature (PDIP)		-	-	140	°C
T _A	Operating Ambient Temperature Range		-40	25	85	°C
I _{OH}	Output Current – HIGH		_	-	-24	mA
I _{OL}	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

			74AC		74AC			
Symbol	Parameter	V _{CC} (V)		⊦25°C	T _A = –40°C to +85°C	Unit	Conditions	
			Тур	Guara	anteed Limits			
V _{IH}	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 _{OUT} = 0.1 V or V _{CC} – 0.1 V	
VIL	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 _{OUT} = 0.1 V or V _{CC} – 0.1 V	
V _{OH}	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 _{OUT} = – 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 _{OL}	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 _{OUT} = 50 μA	
		3.0 4.5 5.5	- - -	0.36 0.36 0.36	0.44 0.44 0.44	v	*V _{IN} = V _{IL} or V _{IH} 12 mA I _{OL} 24 mA 24 mA	
I _{IN}	Maximum Input Leakage Current	5.5	-	±0.1	±1.0	μΑ	$V_{I} = V_{CC}, GND$	
I _{OZ}		5.5	-	±0.5	±5.0	μΑ		
I _{OLD}	†Minimum Dynamic	5.5	-	-	75	mA	V _{OLD} = 1.65 V Max	
I _{OHD}	Output Current	5.5	-	-	-75	mA	V _{OHD} = 3.85 V Min	
I _{CC}	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

		74AC 74AC	AC				
Symbol	Parameter	V _{CC} * T _A = (V) C _L =		T _A = +25°C C _L = 50 pF		T _A = −40°C to +85°C C _L = 50 pF	
			Min	Max	Min	Max	
t _{PLH}	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 _{PHL}	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 _{PZH}	Output Enable Time	3.3 5.0	1.0 1.0	10.5 7.0	1.0 1.0	11 8.0	ns
t _{PZL}	Output Enable Time	3.3 5.0	1.0 1.0	10 8.0	1.0 1.0	11 8.5	ns
t _{PHZ}	Output Disable Time	3.3 5.0	1.0 1.0	10 9.0	1.0 1.0	10.5 9.5	ns
t _{PLZ}	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 ± 0.3 V. Voltage Range 5.0 V is 5.0 V ± 0.5 V.

DC CHARACTERISTICS

			74ACT T _A = +25°C		74ACT		
Symbol	Parameter	V _{CC} (V)			T _A = –40°C to +85°C	Unit	Conditions
l			Тур	Guara	anteed Limits		
V _{IH}	Minimum High Level Input Voltage	4.5 5.5	1.5 1.5	2.2 2.0	2.0 2.0	V	$V_{OUT} = 0.1 V$ or $V_{CC} - 0.1 V$
V _{IL}	Maximum Low Level Input Voltage	4.5 5.5	1.5 1.5	0.8 0.8	0.8	V	$V_{OUT} = 0.1 V$ or $V_{CC} - 0.1 V$
V _{OH}	Minimum High Level Output Voltage	4.5 5.5	4.49 5.49	4.4 5.4	4.4 5.4	V	I _{OUT} = – 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 _{OL}	Minimum Low Level Output Voltage	4.5 5.5	0.001 0.001	0.1 0.1	0.1 0.1	V	I _{OUT} = – 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 _{IN}	Maximum Input Leakage Current	5.5	-	±0.1	±1.0	μΑ	V _I = V _{CC} , GND
I _{OZ}		5.5	-	±0.5	±5.0	μΑ	$V_{I} (OE) = V_{IL}, V_{IH}$ $V_{I} = V_{CC}, GND$ $V_{O} = V_{CC}, GND$
ΔI_{CCT}	Additional Max. I _{CC} /Input	5.5	0.6	-	1.5	mA	$V_{I} = V_{CC} - 2.1 V$
I _{OLD}	†Minimum Dynamic	5.5	-	-	75	mA	V_{OLD} = 1.65 V Max
I _{OHD}	Output Current	5.5	-	-	-75	mA	V _{OHD} = 3.85 V Min
I _{CC}	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 _{CC} * (V)	T _A = +25°C C _L = 50 pF	$ \begin{array}{c} +25^{\circ}C \\ = 50 \text{ pF} \end{array} \begin{array}{c} T_{A} = -40^{\circ}C \\ to +85^{\circ}C \\ C_{L} = 50 \text{ pF} \end{array} $		Unit	
			Min	Max	Min	Max	
t _{PLH}	Propagation Delay Data to Output	5.0	1.0	9.0	1.0	10	ns
t _{PHL}	Propagation Delay Data to Output	5.0	1.0	9.0	1.0	10	ns
t _{PZH}	Output Enable Time	5.0	1.0	8.5	1.0	9.5	ns
t _{PZL}	Output Enable Time	5.0	1.0	9.5	1.0	10.5	ns
t _{PHZ}	Output Disable Time	5.0	1.0	9.5	1.0	10.5	ns
t _{PLZ}	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

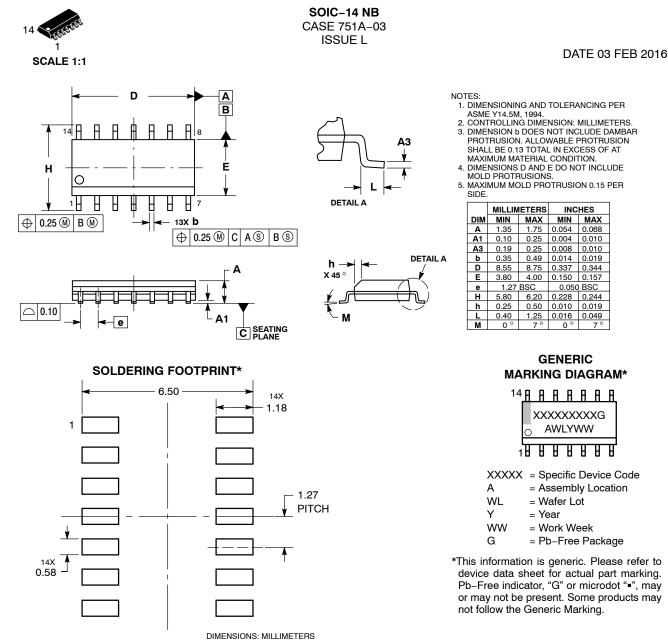
Symbol	Parameter	Value Typ	Unit	Test Conditions
C _{IN}	Input Capacitance	4.5	pF	$V_{CC} = 5.0 V$
C _{PD}	Power Dissipation Capacitance	45	pF	$V_{CC} = 5.0 V$

ORDERING INFORMATION

Device	Package	Shipping [†]
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.

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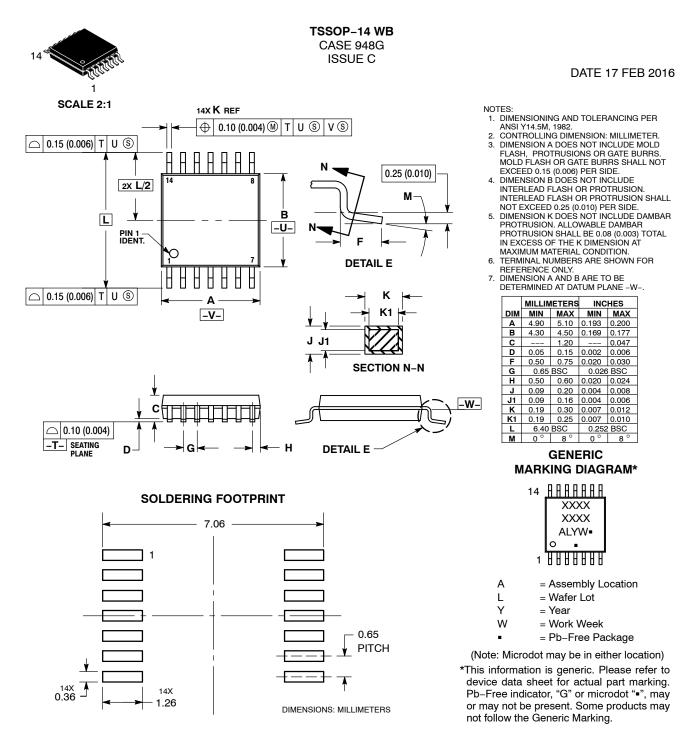
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STYLE 5: PIN 1. COMMON CATHODE 2. ANODE/CATHODE 3. ANODE/CATHODE 4. ANODE/CATHODE 5. ANODE/CATHODE 6. NO CONNECTION 7. COMMON ANODE 8. COMMON CATHODE 9. ANODE/CATHODE 10. ANODE/CATHODE 11. ANODE/CATHODE 12. ANODE/CATHODE 13. NO CONNECTION 14. COMMON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

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