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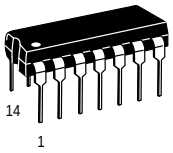
MOTOROLA

MC74AC125
MC74ACT125

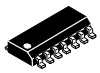
Quad Buffer With 3-State Outputs

- Outputs Source/Sink
- ′ACT125 Has TTL Compatible Inputs

QUAD BUFFER
WITH 3-STATE OUTPUTS

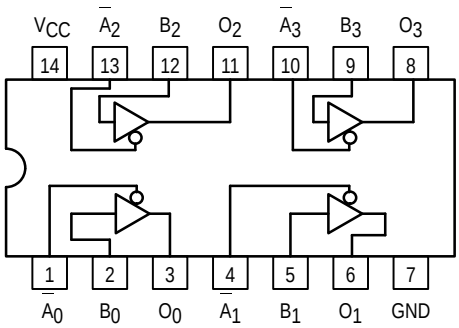


N SUFFIX
CASE 646-06
PLASTIC



D SUFFIX
CASE 751A-03
SOIC

PIN ASSIGNMENTS



PIN NAMES

$\overline{A}_n$, B_n	Inputs
O_n	Outputs

FUNCTION TABLE

Inputs		Output
$\overline{A}_n$	B_n	O_n
L	L	L
L	H	H
H	X	Z

H = High Voltage Level
L = Low Voltage Level
Z = High Impedance
X = Immaterial

MAXIMUM RATINGS*

Symbol	Parameter	Value	Unit
V_{CC}	DC Supply Voltage (Referenced to GND)	–0.5 to +7.0	V
V_{in}	DC Input Voltage (Referenced to GND)	–0.5 to V_{CC} + 0.5	V
V_{out}	DC Output Voltage (Referenced to GND)	–0.5 to V_{CC} + 0.5	V
I_{in}	DC Input Current, per Pin	± 20	mA
I_{out}	DC Output Sink/Source Current, per Pin	± 50	mA
I_{CC}	DC V_{CC} or GND Current per Output Pin	± 50	mA
T_{stg}	Storage Temperature	–65 to +150	°C

* Maximum Ratings are those values beyond which damage to the device may occur. Functional operation should be restricted to the Recommended Operating Conditions.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter		Min	Typ	Max	Unit
V_{CC}	Supply Voltage	′AC	2.0	5.0	6.0	V
		′ACT	4.5	5.0	5.5	
V_{in}, V_{out}	DC Input Voltage, Output Voltage (Ref. to GND)		0		V_{CC}	V
t_r, t_f	Input Rise and Fall Time (Note 1) ′AC Devices except Schmitt Inputs	V_{CC} @ 3.0 V		150		ns/V
		V_{CC} @ 4.5 V		40		
		V_{CC} @ 5.5 V		25		
T_J	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

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

Symbol	Parameter	V_{CC} (V)	74AC T_A = +25°C	74AC T_A = –40°C to +85°C		Unit	Conditions
			Typ	Guaranteed Limits			
V_{IH}	Minimum High Level Input Voltage	3.0	1.5	2.1	2.1	V	V_{OUT} = 0.1 V or V_{CC} – 0.1 V
		4.5	2.25	3.15	3.15		
		5.5	2.75	3.85	3.85		
V_{IL}	Maximum Low Level Input Voltage	3.0	1.5	0.9	0.9	V	V_{OUT} = 0.1 V or V_{CC} – 0.1 V
		4.5	2.25	1.35	1.35		
		5.5	2.75	1.65	1.65		
V_{OH}	Minimum High Level Output Voltage	3.0	2.99	2.9	2.9	V	I_{OUT} = – 50 μA
		4.5	4.46	4.4	4.4		
		5.5	5.49	5.4	5.4		
		3.0		2.56	2.46	V	*V_{IN} = V_{IL} or V_{IH} –12 mA
		4.5		3.86	3.76		I_{OH} – 24 mA
		5.5		4.86	4.76		– 24 mA
V_{OL}	Minimum Low Level Output Voltage	3.0	0.002	0.1	0.1	V	I_{OUT} = 50 μA
		4.5	0.001	0.1	0.1		
		5.5	0.001	0.1	0.1		
		3.0		0.36	0.44	V	*V_{IN} = V_{IL} or V_{IH} 12 mA
		4.5		0.36	0.44		I_{OL} 24 mA
		5.5		0.36	0.44		24 mA
I_{IN}	Maximum Input Leakage Current	5.5		±0.1	±1.0	μA	V_I = V_{CC}, GND
I_{OZ}	V_I (OE) = V_{IL}, V_{IH} V_I = V_{CC}, GND V_O = V_{CC} , GND	5.5		±0.5	±5.0	μA	V_I (OE) = V_{IL}, V_{IH} V_I = V_{CC}, GND V_O = V_{CC}, GND
I_{OLD}	†Minimum Dynamic Output Current	5.5			75	mA	V_{OLD} = 1.65 V Max
I_{OHD}		5.5			–75	mA	V_{OHD} = 3.85 V Min
I_{CC}	Maximum Quiescent Supply Current	5.5		8.0	80	μA	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

Symbol	Parameter	V_{CC}* (V)	74AC T_A = +25°C C_L = 50 pF		74AC T_A = –40°C to +85°C C_L = 50 pF		Unit
			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

Symbol	Parameter	V_{CC} (V)	74ACT T_A = +25°C		74ACT T_A = –40°C to +85°C	Unit	Conditions
			Typ	Guaranteed 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 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} or V_{IH} I_{OH} – 24 mA – 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} or V_{IH} I_{OH} – 24 mA – 24 mA
I_{IN}	Maximum Input Leakage Current	5.5		±0.1	±1.0	μA	V_I = V_{CC}, GND
I_{OZ}	V_I (OE) = V_{IL}, V_{IH} V_I = V_{CC}, GND V_O = V_{CC} , GND	5.5		±0.5	±5.0	μA	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 Output Current	5.5			75	mA	V_{OLD} = 1.65 V Max
I_{OHD}		5.5			–75	mA	V_{OHD} = 3.85 V Min
I_{CC}	Maximum Quiescent Supply Current	5.5		8.0	80	μA	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

Symbol	Parameter	V_{CC}* (V)	74ACT T_A = +25°C C_L = 50 pF		74ACT T_A = –40°C to +85°C C_L = 50 pF		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

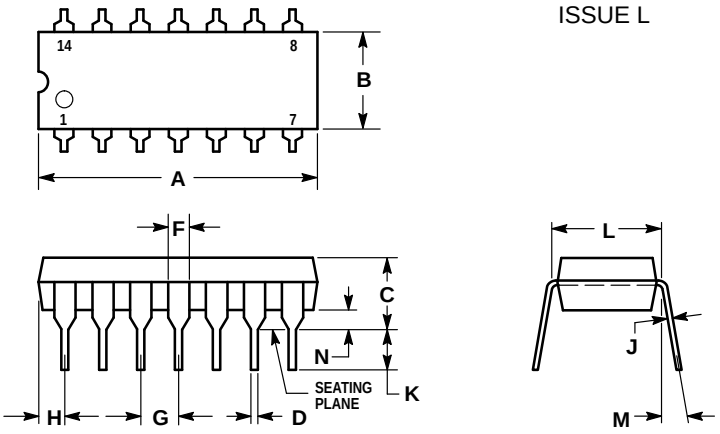
* Voltage Range 5.0 V is 5.0 V ±0.5 V.

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

OUTLINE DIMENSIONS

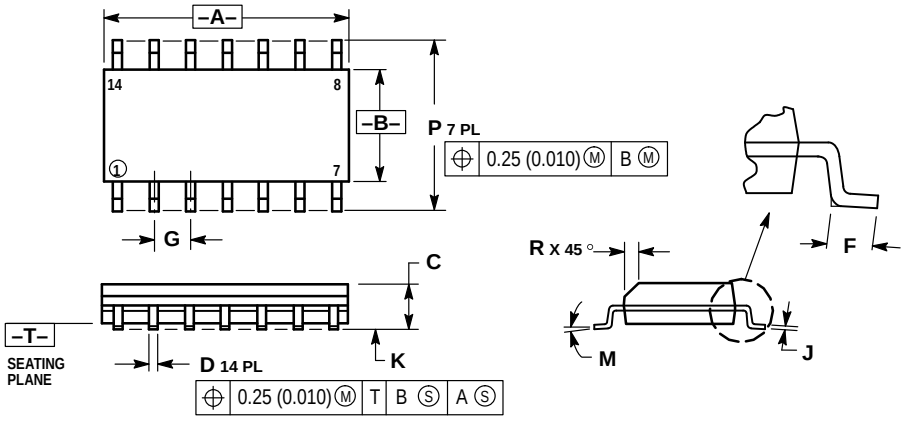
N SUFFIX
PLASTIC DIP PACKAGE
CASE 646–06
ISSUE L



NOTES:
1. LEADS WITHIN 0.13 (0.005) RADIUS OF TRUE POSITION AT SEATING PLANE AT MAXIMUM MATERIAL CONDITION.
2. DIMENSION L TO CENTER OF LEADS WHEN FORMED PARALLEL.
3. DIMENSION B DOES NOT INCLUDE MOLD FLASH.
4. ROUNDED CORNERS OPTIONAL.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.715	0.770	18.16	19.56
B	0.240	0.260	6.10	6.60
C	0.145	0.185	3.69	4.69
D	0.015	0.021	0.38	0.53
F	0.040	0.070	1.02	1.78
G	0.100 BSC		2.54 BSC	
H	0.052	0.095	1.32	2.41
J	0.008	0.015	0.20	0.38
K	0.115	0.135	2.92	3.43
L	0.300 BSC		7.62 BSC	
M	0°	10°	0°	10°
N	0.015	0.039	0.39	1.01

D SUFFIX
PLASTIC SOIC PACKAGE
CASE 751A–03
ISSUE F



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	8.55	8.75	0.337	0.344
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
G	1.27 BSC		0.050 BSC	
J	0.19	0.25	0.008	0.009
K	0.10	0.25	0.004	0.009
M	0 °	7 °	0 °	7 °
P	5.80	6.20	0.228	0.244
R	0.25	0.50	0.010	0.019

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