National Semiconductor

October 1995

74ABT125
Quad Buffer with TRI-STATE® Outputs

General Description

The 'ABT125 contains four independent non-inverting buffers with TRI-STATE outputs.

Features

- Non-inverting buffers
- Output sink capability of 64 mA, source capability of 32 mA
- Guaranteed latchup protection
- High impedance glitch free bus loading during entire power up and power down cycle
- Nondestructive hot insertion capability
- Disable time less than enable time to avoid bus contention

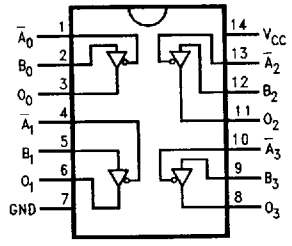
Commercial	Package Number	Package Description
74ABT125CSC (Note 1)	M14A	14-Lead (0.150" Wide) Molded Small Outline, JEDEC
74ABT125CSJ (Note 1)	M14D	14-Lead (0.300" Wide) Molded Small Outline, EIAJ
74ABT125CMTC (Notes 1, 2)	MTC14	14-Lead Molded Thin Shrink Small Outline, JEDEC

Note 1: Devices also available in 13" reel Use suffix = SCX, SJX, and MTCX.

Note 2: Contact factory for package availability

Connection Diagram

Pin Assignment for SOIC and TSSOP



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

Function Table

Inputs		Output
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

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RRD-B30M125/Printed in U S A.

Absolute Maximum Ratings (Note 1)

Storage Temperature	−65°C to +150°C
Ambient Temperature under Bias	−55°C to +125°C
Junction Temperature under Bias	
Plastic	−55°C to +150°C
V_{CC} Pin Potential to Ground Pin	−0.5V to +7.0V
Input Voltage (Note 2)	−0.5V to +7.0V
Input Current (Note 2)	−30 mA to +5.0 mA
Voltage Applied to Any Output	
in the Disabled or Power-Off State	−0.5V to 5.5V
in the HIGH State	−0.5V to V_{CC}
Current Applied to Output in LOW State (Max)	twice the rated I_{OL} (mA)
DC Latchup Source Current	−500 mA
(Across Comm Operating Range)	$\overline{A}$ −300 mA
Over Voltage Latchup (I/O)	10V

Note 1: Absolute maximum ratings are values beyond which the device may be damaged or have its useful life impaired. Functional operation under these conditions is not implied

Note 2: Either voltage limit or current limit is sufficient to protect inputs.

Recommended Operating Conditions

Free Air Ambient Temperature	
Commercial	−40°C to +85°C
Supply Voltage	
Commercial	+4.5V to +5.5V
Minimum Input Edge Rate	(ΔV/Δt)
Data Input	50 mV/ns
Enable Input	20 mV/ns

DC Electrical Characteristics

Symbol	Parameter		ABT125 Min	ABT125 Typ	ABT125 Max	Units	V_{CC}	Conditions
V_{IH}	Input HIGH Voltage		2.0			V		Recognized HIGH Signal
V_{IL}	Input LOW Voltage				0.8	V		Recognized LOW Signal
V_{CD}	Input Clamp Diode Voltage				−1.2	V	Min	I_{IN} = −18 mA
V_{OH}	Output HIGH Voltage	74ABT	2.5			V	Min	I_{OH} = −3 mA
		74ABT	2.0			V	Min	I_{OH} = −32 mA
V_{OL}	Output LOW Voltage	74ABT			0.55	V	Min	I_{OL} = 64 mA
I_{IH}	Input HIGH Current				5 5	μA	Max	V_{IN} = 2.7V (Note 2) V_{IN} = V_{CC}
I_{BVI}	Input HIGH Current Breakdown Test				7	μA	Max	V_{IN} = 7.0V
I_{IL}	Input LOW Current				−5 −5	μA	Max	V_{IN} = 0.5V (Note 2) V_{IN} = 0.0V
V_{ID}	Input Leakage Test		4.75			V	0.0	I_{ID} = 1.9 μA, All Other Pins Grounded
I_{OZH}	Output Leakage Current				50	μA	0 − 5.5V	V_{OUT} = 2.7V; $\overline{OE}_n$ = 2.0V
I_{OZL}	Output Leakage Current				−50	μA	0 − 5.5V	V_{OUT} = 0.5V; $\overline{OE}_n$ = 2.0V
I_{OS}	Output Short-Circuit Current		−100		−275	mA	Max	V_{OUT} = 0.0V
I_{CEX}	Output High Leakage Current				50	μA	Max	V_{OUT} = V_{CC}
I_{ZZ}	Bus Drainage Test				100	μA	0.0	V_{OUT} = 5.5V; All Others GND
I_{CCH}	Power Supply Current				50	μA	Max	All Outputs HIGH
I_{CCL}	Power Supply Current				15	mA	Max	All Outputs LOW
I_{CCZ}	Power Supply Current				50	μA	Max	$\overline{OE}_n$ = V_{CC}; All Others at V_{CC} or Ground
I_{CCT}	Additional I_{CC}/Input	Outputs Enabled Outputs TRI-STATE Outputs TRI-STATE			1.5 1.5 50	mA mA μA	Max	V_I = V_{CC} − 2.1V Enable Input V_I = V_{CC} − 2.1V Data Input V_I = V_{CC} − 2.1V All Others at V_{CC} or Ground
I_{CCD}	Dynamic I_{CC} (Note 2)	No Load			0.1	mA/MHz	Max	Outputs Open $\overline{OE}_n$ = GND, (Note 1) One Bit Toggling, 50% Duty Cycle

Note 1: For 8 bits toggling, I_{CCD} < 0.8 mA/MHz
Note 2: Guaranteed, but not tested

AC Electrical Characteristics (SOIC and SSOP package)

Symbol	Parameter	74ABT $T_A = +25°C$, $V_{CC} = +5V$, $C_L = 50\,pF$			74ABT $T_A = -40°C$ to $+85°C$, $V_{CC} = 4.5V-5.5V$, $C_L = 50\,pF$		Units
		Min	Typ	Max	Min	Max	
t_{PLH}	Propagation Delay	1.0		4.6	1.0	4.6	ns
t_{PHL}	Data to Outputs	1.0		4.9	1.0	4.9	
t_{PZH}	Output Enable	1.0		5.1	1.0	5.1	ns
t_{PZL}	Time	1.0		6.8	1.0	6.8	
t_{PHZ}	Output Disable	1.0		6.2	1.0	6.2	ns
t_{PLZ}	Time	1.0		5.5	1.0	5.5	

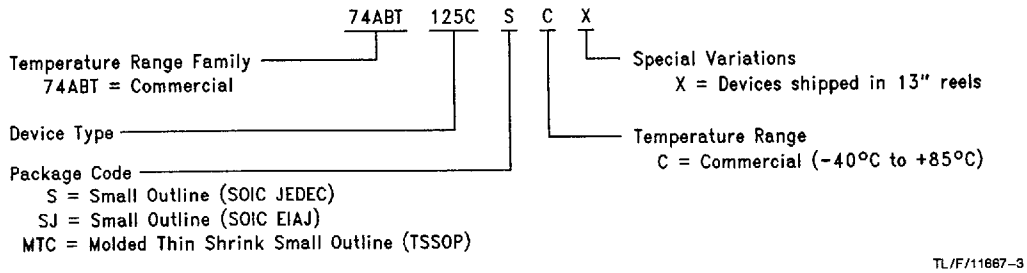
Capacitance

Symbol	Parameter	Typ	Units	Conditions $T_A = 25°C$
C_{IN}	Input Capacitance	5.0	pF	$V_{CC} = 0V$
C_{OUT} (Note 1)	Output Capacitance	9.0	pF	$V_{CC} = 5.0V$

Note 1: C_{OUT} is measured at frequency f = 1 MHz, per MIL-STD-883B, Method 3012.

Ordering Information

The device number is used to form part of a simplified purchasing code where the package type and temperature range are defined as follows:



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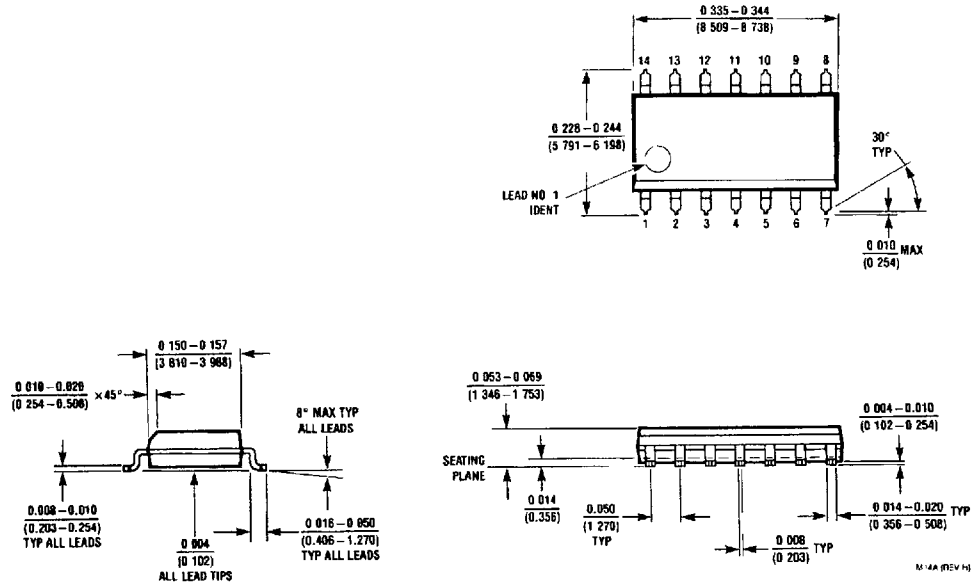
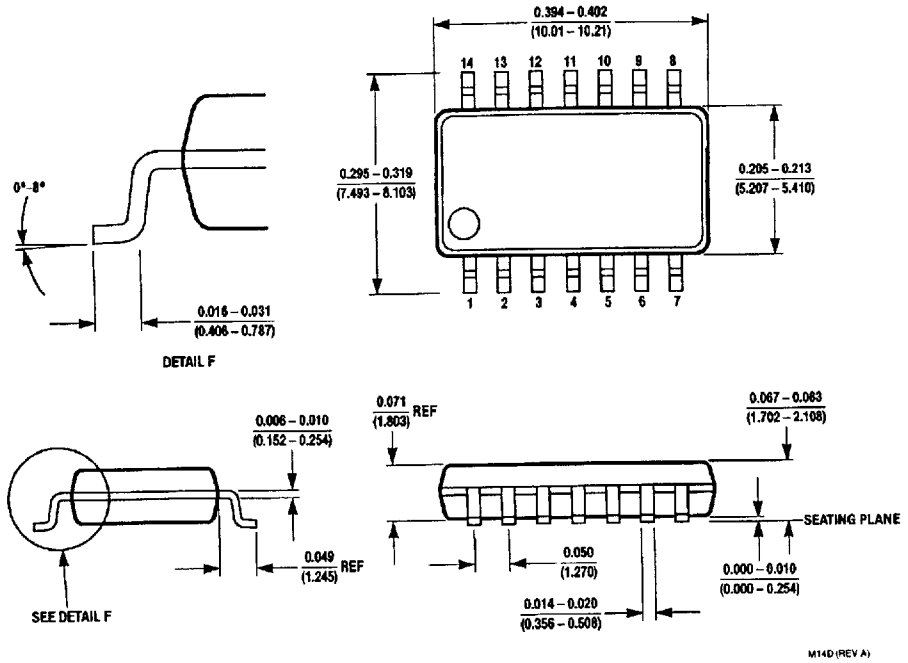
Physical Dimensions inches (millimeters) (Continued)

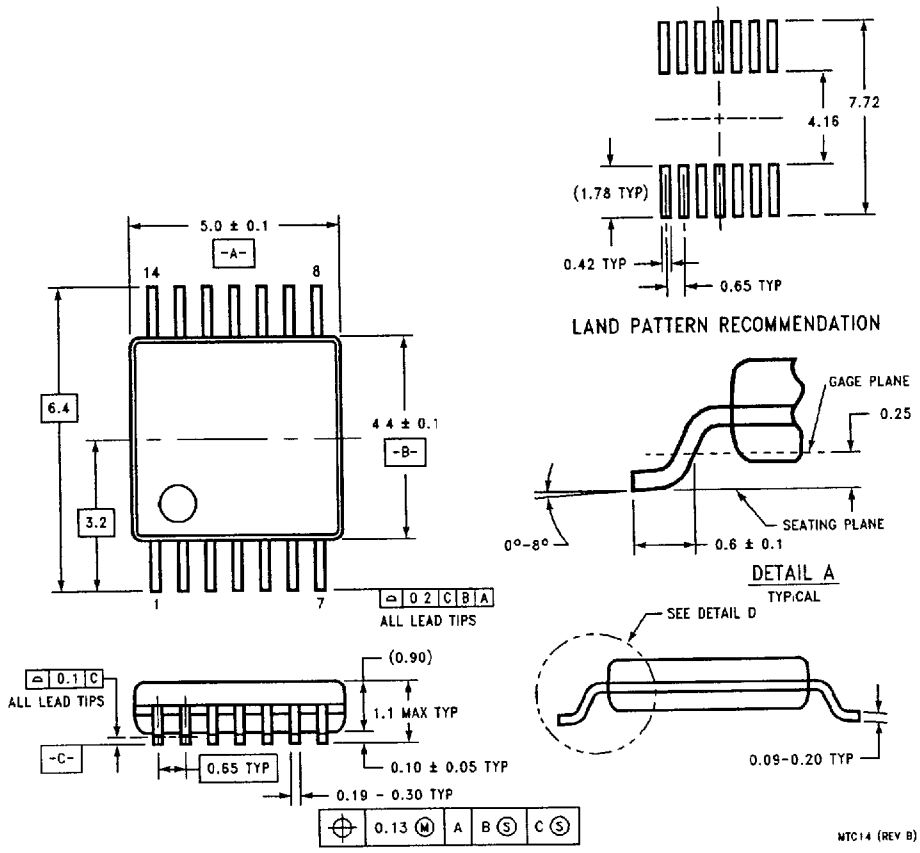


14-Lead Small Outline Integrated Circuit (S)
NS Package Number M14A



14-Lead Small Outline Package—EIAJ (SJ)
NS Package Number M14D

Physical Dimensions millimeters (Continued)



14-Lead Molded Thin Shrink Small Outline Package, JEDEC
NS Package Number MTC14

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