National Semiconductor

PRELIMINARY

54ABT/74ABT125C
Quad Buffer with TRI-STATE® Outputs

General Description

The 'ABT125C contains four independent non-inverting buffers with TRI-STATE outputs.

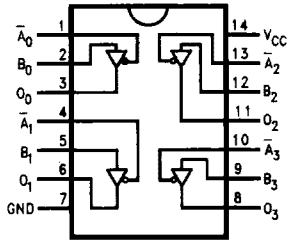
Features

- 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

Ordering Code: See Section 10

Connection Diagrams

Pin Assignment for DIP, SOIC and Flatpak



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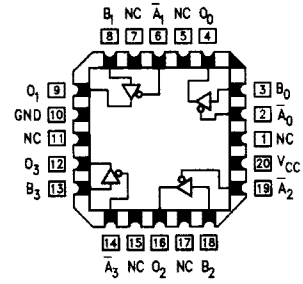
Pin Assignment for LCC



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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

Absolute Maximum Ratings (Note 1)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Storage Temperature	−65°C to +150°C
Ambient Temperature under Bias	−55°C to +125°C
Junction Temperature under Bias	
Ceramic	−55°C to +175°C
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
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	
Military	−55°C to +125°C
Commercial	−40°C to +85°C
Supply Voltage	
Military	+4.5V to +5.5V
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		ABT125C Min	ABT125C Typ	ABT125C 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	54ABT/74ABT	2.5			V	Min	I_{OH} = −3 mA
		54ABT	2.0			V	Min	I_{OH} = −24 mA
		74ABT	2.0			V	Min	I_{OH} = −32 mA
V_{OL}	Output LOW Voltage	54ABT			0.55	V	Min	I_{OL} = 48 mA
		74ABT			0.55			I_{OL} = 64 mA
I_{IH}	Input HIGH Current				5	μA	Max	V_{IN} = 2.7V (Note 2)
					5			V_{IN} = V_{CC}
I_{BVI}	Input HIGH Current Breakdown Test				7	μA	Max	V_{IN} = 7.0V
I_{IL}	Input LOW Current				−5	μA	Max	V_{IN} = 0.5V (Note 2)
					−5			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			2.5	mA	Max	V_I = V_{CC} − 2.1V
		Outputs TRI-STATE			2.5	mA		Enable Input V_I = V_{CC} − 2.1V
		Outputs TRI-STATE			50	μA		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): See Section 2

Symbol	Parameter	74ABT $T_A = +25°C$, $V_{CC} = +5V$, $C_L = 50$ pF			54ABT $T_A = -55°C$ to $+125°C$, $V_{CC} = 4.5V-5.5V$, $C_L = 50$ pF		74ABT $T_A = -40°C$ to $+85°C$, $V_{CC} = 4.5V-5.5V$, $C_L = 50$ pF		Units	Fig. No.
		Min	Typ	Max	Min	Max	Min	Max		
t_{PLH}	Propagation Delay	1.0		4.6			1.0	4.6	ns	2-3, 5
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	2-4
t_{PZL}	Time	1.0		6.8			1.0	6.8		
t_{PHZ}	Output Disable	1.0		6.2			1.0	6.2	ns	2-4
t_{PLZ}	Time	1.5		5.5			1.5	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.