

74ABT162244

16-Bit Buffer/Line Driver

with 25Ω Series Resistors in the Outputs

General Description

The 'ABT162244 contains sixteen non-inverting buffers with TRI-STATE® outputs designed to be employed as a memory and address driver, clock driver, or bus oriented transmitter/receiver. The device is nibble controlled. Individual TRI-STATE control inputs can be shorted together for 8-bit or 16-bit operation.

The 25Ω series resistors in the outputs reduce ringing and eliminate the need for external resistors.

Features

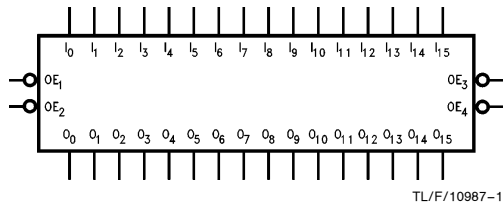
- Separate control logic for each nibble
- 16-bit version of the 'ABT2244
- Guaranteed latch protection
- High impedance glitch free bus loading during entire power up and power down cycle
- Non-destructive hot insertion capability

Commercial	Package Number	Package Description
74ABT162244CSSC (Note 1)	MS48A	48-Lead (0.300" Wide) Molded Shrink Small Outline, JEDEC (SSOP)
74ABT162244CMD (Notes 1, 2)	MTD48	48-Lead Molded Thin Shrink Small Outline, JEDEC (TSSOP)

Note 1: Devices also available in 13" reel. Use suffix = SSCX and MTDX.

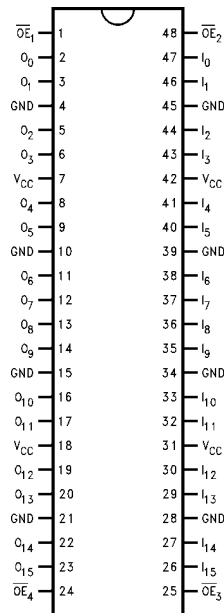
Note 2: Contact factory for package availability.

Logic Symbol



Connection Diagram

Pin Assignment for SSOP



Pin Description

Pin Names	Description
\overline{OE}_n	Output Enable Input (Active Low)
I_0 - I_{15}	Inputs
O_0 - O_{15}	Outputs

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Functional Description

The 'ABT162244 contains sixteen non-inverting buffers with TRI-STATE outputs. The device is nibble (4 bits) controlled with each nibble functioning identically, but indepen-

dent of the other. The control pins can be shorted together to obtain full 16-bit operation.

Truth Tables

Inputs		Outputs
\overline{OE}_1	I ₀₋₁₃	O ₀₋₀₃
L	L	L
L	H	H
H	X	Z

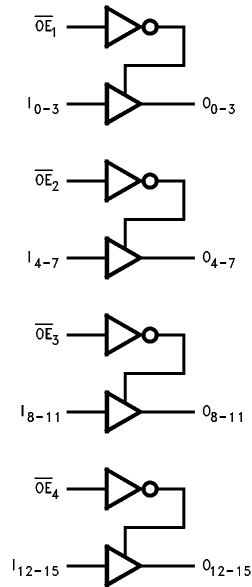
Inputs		Outputs
\overline{OE}_2	I ₄₋₁₇	O ₄₋₀₇
L	L	L
L	H	H
H	X	Z

Inputs		Outputs
\overline{OE}_3	I ₈₋₁₁₁	O ₈₋₀₁₁
L	L	L
L	H	H
H	X	Z

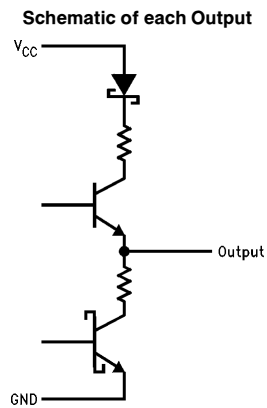
Inputs		Outputs
\overline{OE}_4	I ₁₂₋₁₁₅	O ₁₂₋₀₁₅
L	L	L
L	H	H
H	X	Z

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

Logic Diagrams



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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 in the HIGH State	-0.5V to 5.5V -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	
Commercial	-40°C to +85°C
Supply Voltage	
Commercial	+4.5V to +5.5V
Minimum Input Edge Rate	($\Delta V/\Delta t$)
Data Input	50 mV/ns
Enable Input	20 mV/ns

DC Electrical Characteristics

Symbol	Parameter	ABT162244			Units	V _{CC}	Conditions
		Min	Typ	Max			
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		0.8	V	Min	I _{OL} = 12 mA
I _{IH}	Input HIGH Current			5 5	μA	Max	V _{IN} = 2.7V (Note 1) 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 1) 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			2.0	mA	Max	All Outputs HIGH
I _{CCL}	Power Supply Current			60	mA	Max	All Outputs LOW
I _{CCZ}	Power Supply Current			2.0	mA	Max	$\overline{OE}_n = V_{CC}$ All Others at V _{CC} or GND
I _{CCT}	Additional I _{CC} /Input	Outputs Enabled		3.0	mA	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 GND
		Outputs TRI-STATE		3.0	mA		
		Outputs TRI-STATE		50	μA		
I _{CCD}	Dynamic I _{CC} (Note 1)	No Load		0.1	mA/ MHz	Max	Outputs Open $\overline{OE}_n = GND$ One Bit Toggling, 50% Duty Cycle

Note 1: Guaranteed, but not tested.

AC Electrical Characteristics

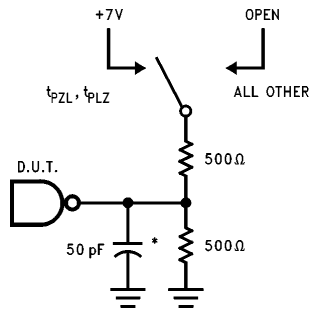
Symbol	Parameter	74ABT			74ABT		Units
		T _A = +25°C V _{CC} = +5V C _L = 50 pF			T _A = -40°C to +85°C V _{CC} = 4.5V-5.5V C _L = 50 pF		
		Min	Typ	Max	Min	Max	
t _{PLH} t _{PHL}	Propagation Delay Data to Outputs	1.0	2.4	3.9	1.0	3.9	ns
		1.0	3.2	4.7	1.0	4.7	
t _{PZH} t _{PZL}	Output Enable Time	1.5	3.5	6.3	1.5	6.3	ns
		1.5	4.2	6.9	1.5	6.9	
t _{PHZ} t _{PLZ}	Output Disable Time	1.0	4.2	6.7	1.0	6.7	ns
		1.0	3.8	6.7	1.0	6.7	

Capacitance

Symbol	Parameter	Typ	Units	Conditions, T _A = 25°C
C _{IN}	Input Capacitance	5.0	pF	V _{CC} = 0.0V
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.

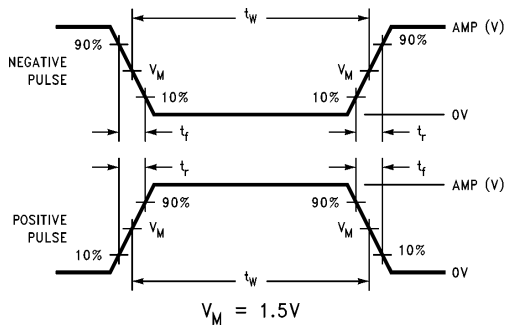
AC Loading



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*Includes jig and probe capacitance

FIGURE 1. Standard AC Test Load

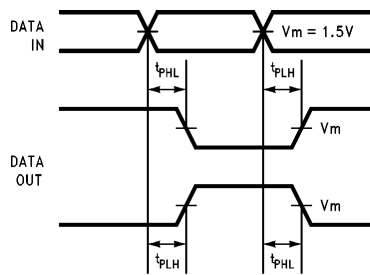


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FIGURE 2a. Input Pulse Requirements

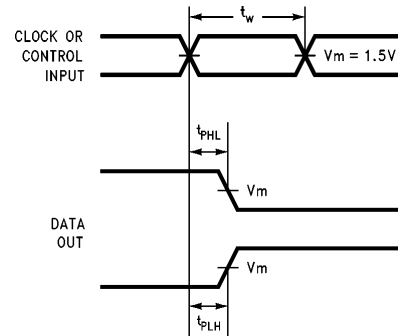
Amplitude	Rep. Rate	t_w	t_r	t_f
3.0V	1 MHz	500 ns	2.5 ns	2.5 ns

FIGURE 2b. Test Input Signal Requirements



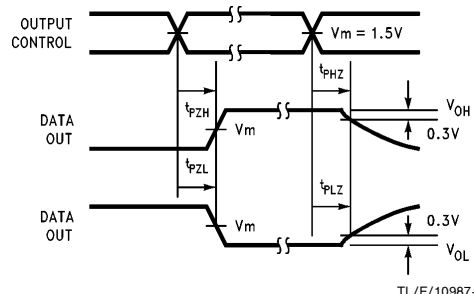
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FIGURE 3. Propagation Delay Waveforms for Inverting and Non-Inverting Functions



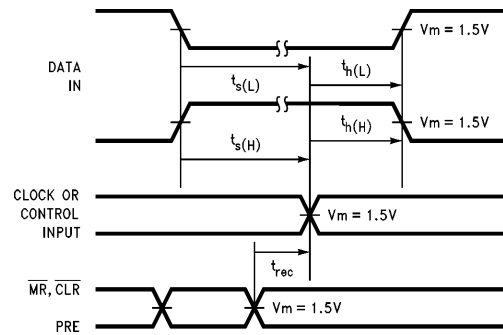
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FIGURE 4. Propagation Delay, Pulse Width Waveforms



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FIGURE 5. TRI-STATE Output HIGH and LOW Enable and Disable Times

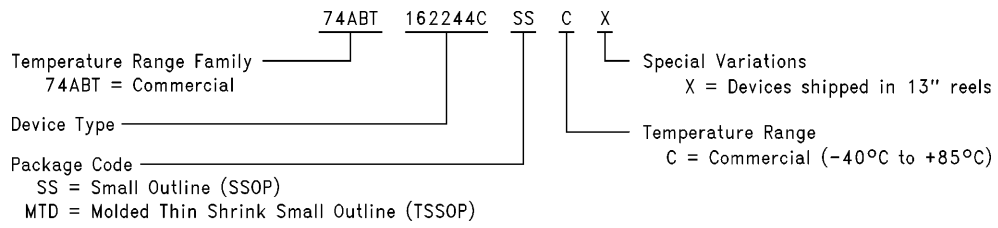


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FIGURE 6. Setup Time, Hold Time and Recovery Time Waveforms

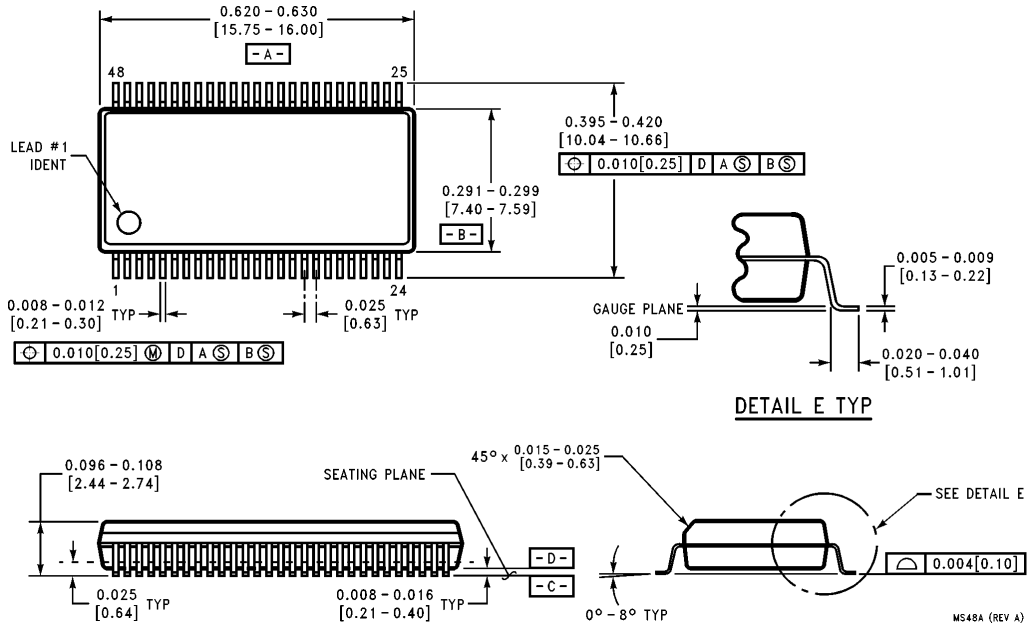
Ordering Information

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)

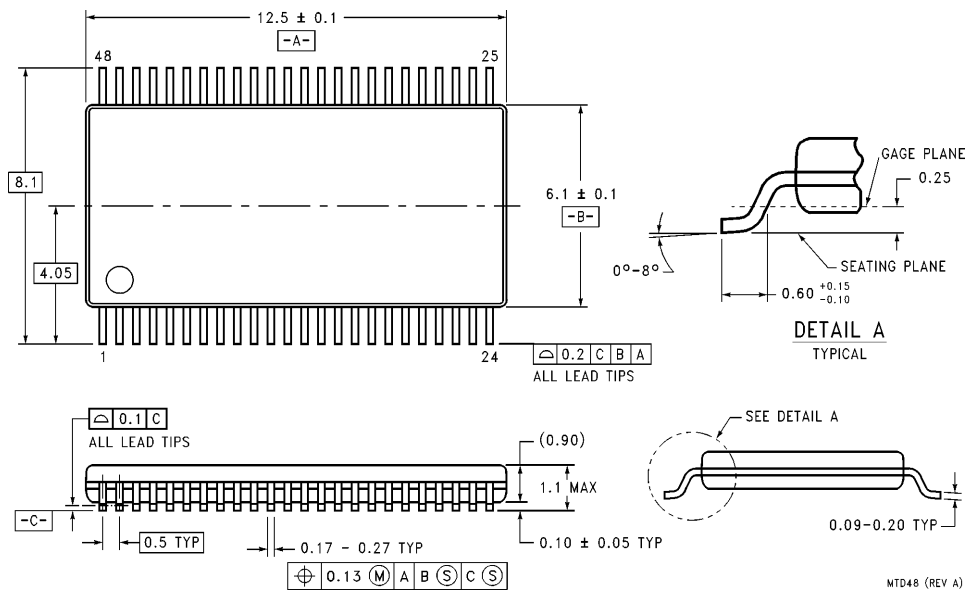


**48-Lead SSOP (0.300" Wide) (SS)
NS Package Number MS48A**

MS48A (REV A)

**74ABT162244 16-Bit Buffer/Line Driver
with 25Ω Series Resistors in the Outputs**

Physical Dimensions millimeters (Continued)



**48-Lead Molded Thin Shrink Small Outline Package, JEDEC
NS Package Number MTD48**

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