FAIRCHILD SEMICONDUCTOR®

April 1992
Revised May 2005

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

General Description

The ABT162244 contains sixteen non-inverting buffers with 3-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 3-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.

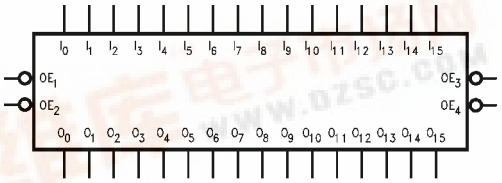
Features

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

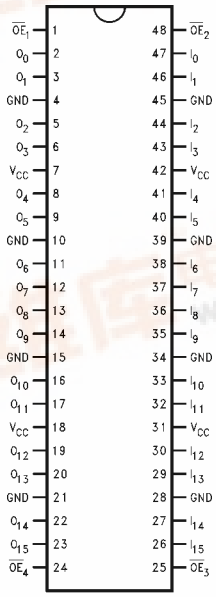
Ordering Code:

Order Number	Package Number	Package Description
74ABT162244CSSC	MS48A	48-Lead Small Shrink Outline Package (SSOP), JEDEC MO-118, 0.300" Wide [RAIL]
74ABT162244CSSX	MS48A	48-Lead Small Shrink Outline Package (SSOP), JEDEC MO-118, 0.300" Wide [TAPE and REEL]
74ABT162244CMTD	MTD48	48-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 6.1mm Wide [RAIL]
74ABT162244MTDX	MTD48	48-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 6.1mm Wide [TAPE and REEL]

Logic Symbol



Connection Diagram



Pin Descriptions

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

Truth Tables

Inputs		Outputs
$\overline{OE}_1$	I_0–I_3	O_0–O_3
L	L	L
L	H	H
H	X	Z

Inputs		Outputs
$\overline{OE}_3$	I_8–I_{11}	O_8–O_{11}
L	L	L
L	H	H
H	X	Z

Inputs		Outputs
$\overline{OE}_2$	I_4–I_7	O_4–O_7
L	L	L
L	H	H
H	X	Z

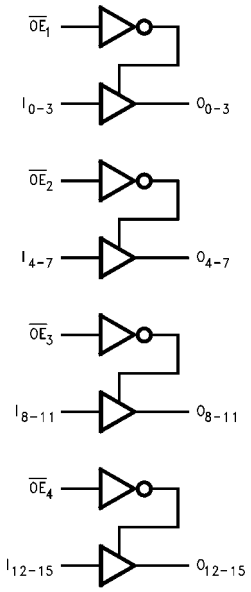
Inputs		Outputs
$\overline{OE}_4$	I_{12}–I_{15}	O_{12}–O_{15}
L	L	L
L	H	H
H	X	Z

H = HIGH Voltage Level
L = LOW Voltage Level
X = Immaterial
Z = High Impedance

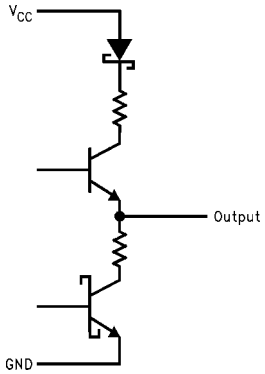
Functional Description

The ABT162244 contains sixteen non-inverting buffers with 3-STATE outputs. The device is nibble (4 bits) controlled with each nibble functioning identically, but independent of the other. The control pins can be shorted together to obtain full 16-bit operation.

Logic Diagram



Schematic of each Output



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	−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

Recommended Operating Conditions

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

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.

DC Electrical Characteristics

Symbol	Parameter		Min	Typ	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		2.5			V	Min	I_{OH} = −3 mA
			2.0			V	Min	I_{OH} = −32 mA
V_{OL}	Output LOW Voltage				0.8	V	Min	I_{OL} = 12 mA
I_{IH}	Input HIGH Current				1	μA	Max	V_{IN} = 2.7V (Note 3)
					1			V_{IN} = V_{CC}
I_{BVI}	Input HIGH Current Breakdown Test				7	μA	Max	V_{IN} = 7.0V
I_{IL}	Input LOW Current				−1	μA	Max	V_{IN} = 0.5V (Note 3)
					−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				10	μA	0 – 5.5V	V_{OUT} = 2.7V; $\overline{OE}_n$ = 2.0V
I_{OZL}	Output Leakage Current				−10	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
		Outputs 3-STATE			3.0	mA		Enable Input V_I = V_{CC} − 2.1V
		Outputs 3-STATE			50	μA		Data Input V_I = V_{CC} − 2.1V
								All Others at V_{CC} or GND
I_{CCD}	Dynamic I_{CC}	No Load				mA/	Max	Outputs OPEN
	(Note 3)				0.1	MHz		$\overline{OE}_n$ = GND
								One Bit Toggling, 50% Duty Cycle

Note 3: Guaranteed, but not tested.

AC Electrical Characteristics

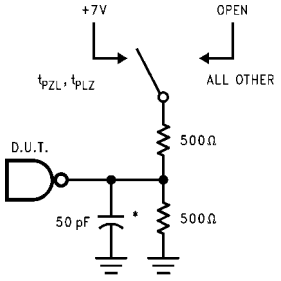
Symbol	Parameter	$T_A = +25°C$, $V_{CC} = +5V$, $C_L = 50$ pF			$T_A = -40°C$ to $+85°C$, $V_{CC} = 4.5V–5.5V$, $C_L = 50$ pF		Units
		Min	Typ	Max	Min	Max	
t_{PLH}	Propagation	1.0	2.4	3.9	1.0	3.9	ns
t_{PHL}	Delay Data to Outputs	1.0	3.2	4.7	1.0	4.7	
t_{PZH}	Output	1.5	3.5	6.3	1.5	6.3	ns
t_{PZL}	Enable Time	1.5	4.2	6.9	1.5	6.9	
t_{PHZ}	Output	1.0	4.2	6.7	1.0	6.7	ns
t_{PLZ}	Disable Time	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 4)	Output Capacitance	9.0	pF	$V_{CC} = 5.0V$

Note 4: C_{OUT} is measured at frequency f = 1 MHz per MIL-STD-883, Method 3012.

AC Loading



*Includes jig and probe capacitance

FIGURE 1. Standard AC Test Load

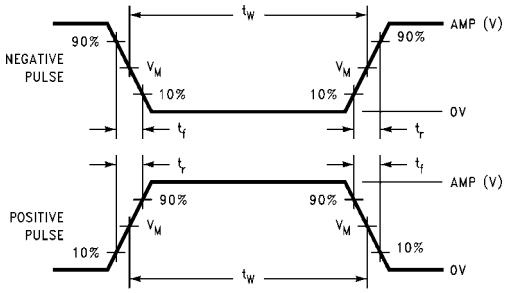


FIGURE 2. Input Pulse Requirements

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

FIGURE 3. Test Input Signal Requirements

AC Waveforms

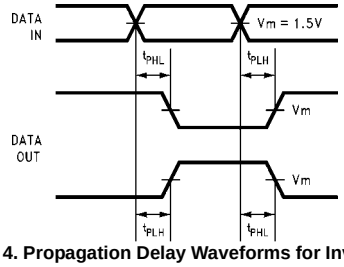


FIGURE 4. Propagation Delay Waveforms for Inverting and Non-Inverting Functions

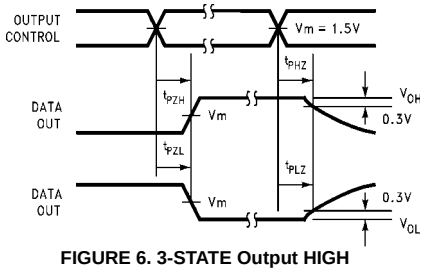


FIGURE 6. 3-STATE Output HIGH and LOW Enable and Disable Times

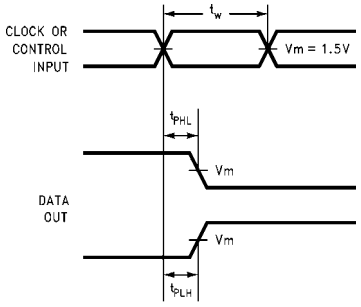


FIGURE 5. Propagation Delay, Pulse Width Waveforms

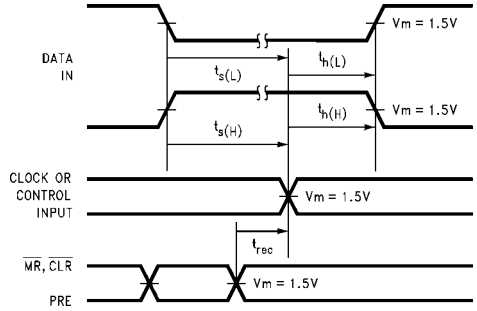
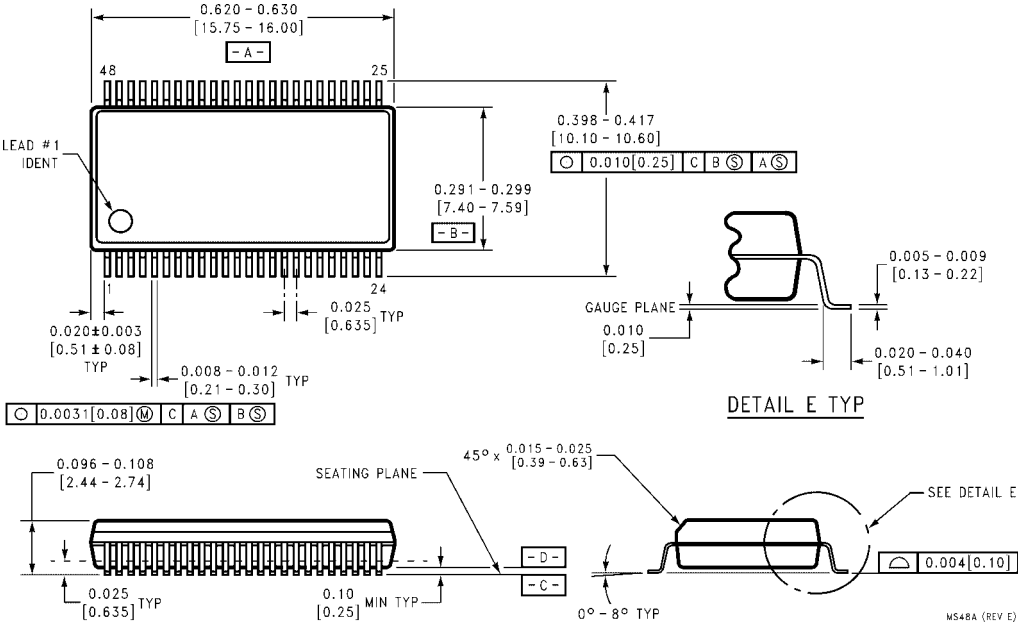


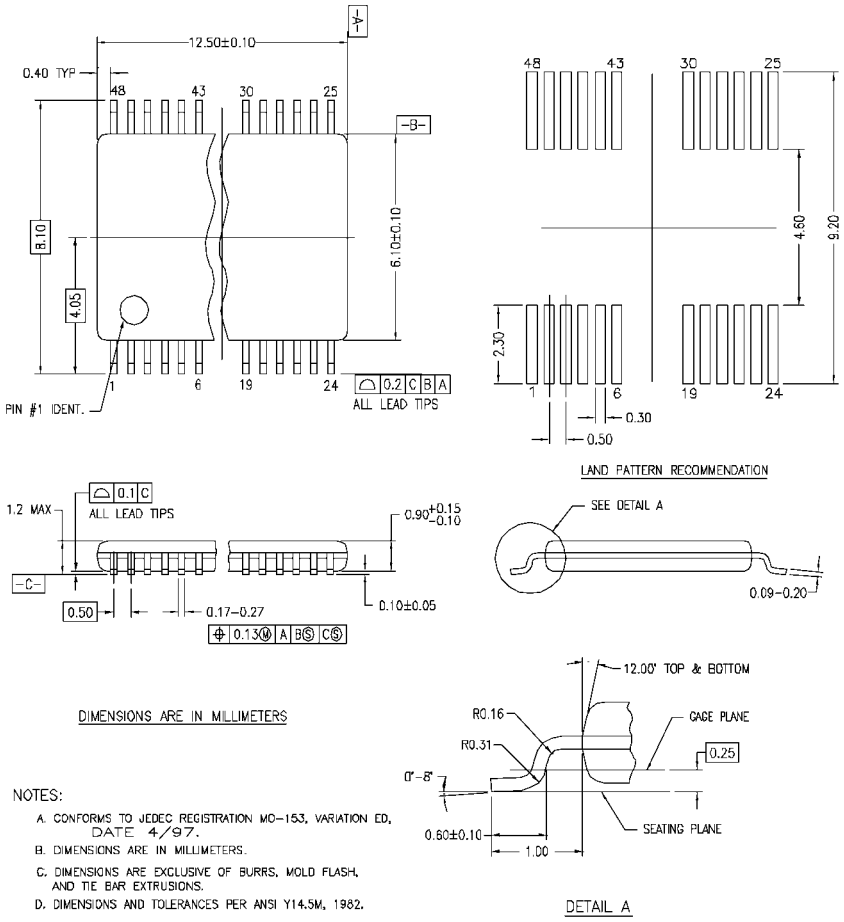
FIGURE 7. Setup Time, Hold Time and Recovery Time Waveforms

Physical Dimensions inches (millimeters) unless otherwise noted



48-Lead Small Shrink Outline Package (SSOP), JEDEC MO-118, 0.300" Wide
Package Number MS48A

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



48-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 6.1mm Wide
Package Number MTD48

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2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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