

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

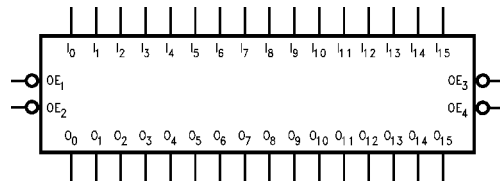
- Separate control logic for each nibble
- 16-bit version of the ABT2244
- Guaranteed latchup protection
- High impedance glitch free bus loading during entire power up and power down cycle
- Non-destructive hot insertion capability

Ordering Code:

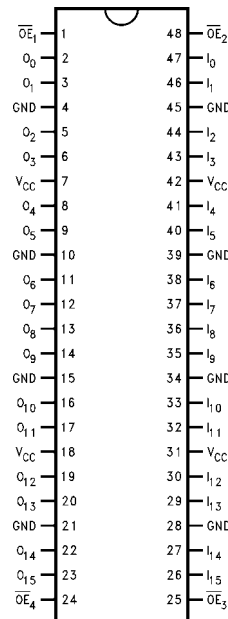
Order Number	Package Number	Package Description
74ABT162244CSSC	MS48A	48-Lead Small Shrink Outline Package (SSOP), JEDEC MO-118, 0.300" Wide
74ABT162244CMTD	MTD48	48-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 6.1mm Wide

Device also available in Tape and Reel. Specify by appending suffix letter "X" to the ordering code.

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 ₀₋₁₃	O ₀₋₃
L	L	L
L	H	H
H	X	Z

Inputs		Outputs
\overline{OE}_3	I ₈₋₁₁	O ₈₋₁₁
L	L	L
L	H	H
H	X	Z

Inputs		Outputs
\overline{OE}_2	I ₄₋₇	O ₄₋₇
L	L	L
L	H	H
H	X	Z

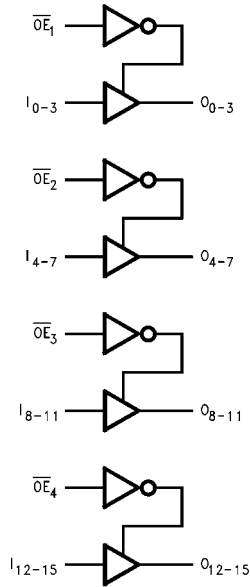
Inputs		Outputs
\overline{OE}_4	I ₁₂₋₁₅	O ₁₂₋₁₅
L	L	L
L	H	H
H	X	Z

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

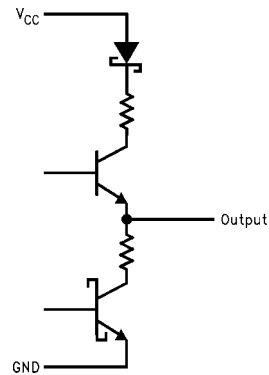
Functional Description

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	μA	Max	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	μA	Max	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 Enable Input V _I = V _{CC} - 2.1V Data Input V _I = V _{CC} - 2.1V All Others at V _{CC} or GND
		Outputs 3-STATE		3.0	mA		
		Outputs 3-STATE		50	μA		
I _{CCD}	Dynamic I _{CC} (Note 3)	No Load		0.1	mA/ MHz	Max	Outputs OPEN $\overline{OE}_n = GND$ One Bit Toggling, 50% Duty Cycle

Note 3: Guaranteed, but not tested.

AC Electrical Characteristics

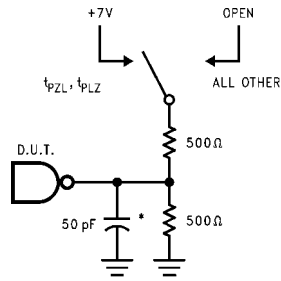
Symbol	Parameter	$T_A = +25^\circ\text{C}$ $V_{CC} = +5\text{V}$ $C_L = 50\text{ pF}$			$T_A = -40^\circ\text{C to } +85^\circ\text{C}$ $V_{CC} = 4.5\text{V} - 5.5\text{V}$ $C_L = 50\text{ pF}$		Units
		Min	Typ	Max	Min	Max	
t_{PLH}	Propagation	1.0	2.4	3.9	1.0	3.9	ns
t_{PHL}	Delay Data to Outputs	1.0	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 $T_A = 25^\circ\text{C}$
C_{IN}	Input Capacitance	5.0	pF	$V_{CC} = 0.0\text{V}$
C_{OUT} (Note 4)	Output Capacitance	9.0	pF	$V_{CC} = 5.0\text{V}$

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

AC Loading



*Includes jig and probe capacitance

FIGURE 1. Standard AC Test Load

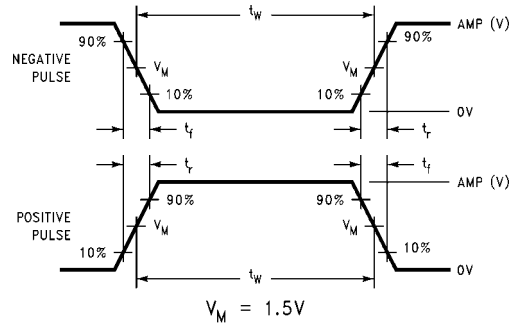


FIGURE 2. Input Pulse Requirements

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

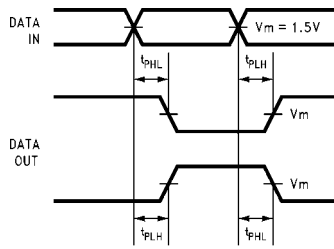


FIGURE 4. Propagation Delay Waveforms for Inverting and Non-Inverting Functions

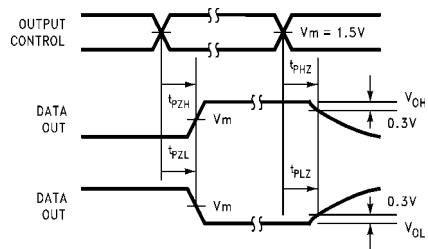


FIGURE 6. 3-STATE Output HIGH and LOW Enable and Disable Times

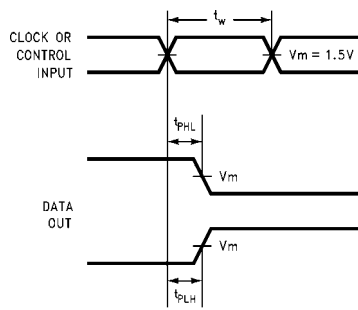


FIGURE 5. Propagation Delay, Pulse Width Waveforms

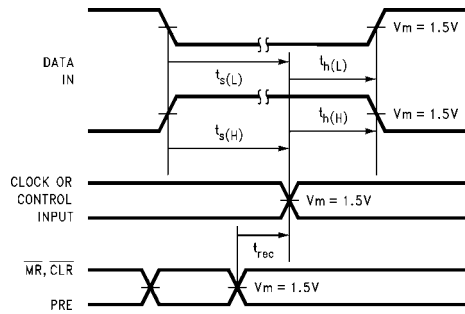
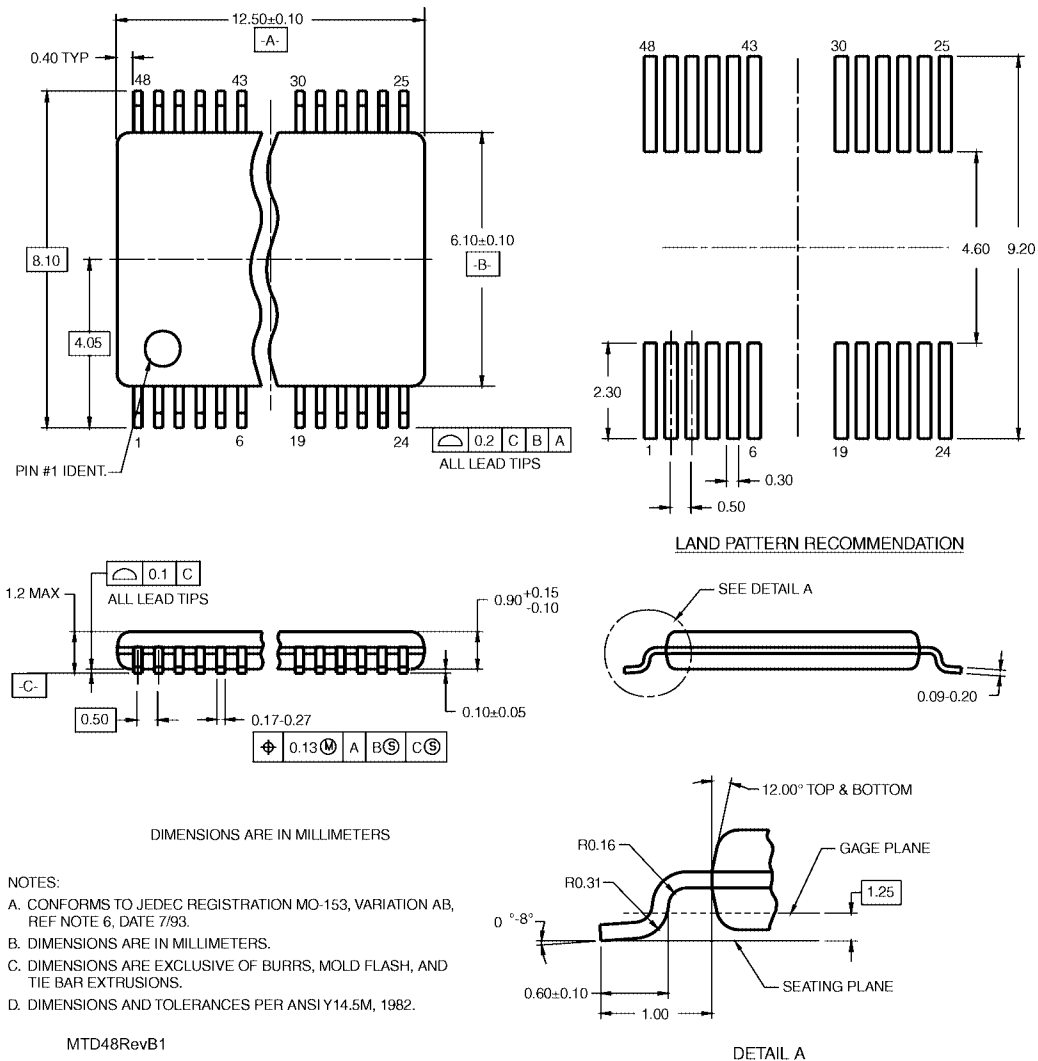


FIGURE 7. Setup Time, Hold Time and Recovery Time Waveforms

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



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