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March 1994
Revised November 1999

74ABT2240 Octal Buffer/Line Driver with 25Ω Series Resistors in the Outputs

General Description

The ABT2240 is an inverting octal buffer and line driver designed to drive the capacitive inputs of MOS memory drivers, address drivers, clock drivers, and bus-oriented transmitters/receivers.

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

Features

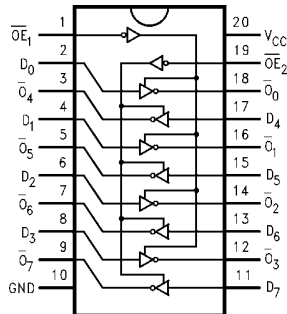
- Guaranteed latchup protection
- High impedance glitch-free bus loading during entire power up and power down cycle
- Nondestructive hot insertion capability

Ordering Code:

Order Number	Package Number	Package Description
74ABT2240CSC	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide Body
74ABT2240CSJ	M20D	20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
74ABT2240CMSA	MSA20	20-Lead Shrink Small Outline Package (SSOP), EIAJ TYPE II, 5.3mm Wide
74ABT2240CMTC	MTC20	20-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide

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

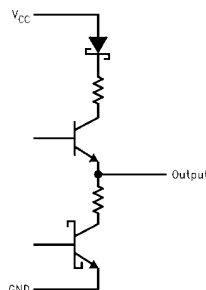
Connection Diagram



Pin Descriptions

Pin Names	Descriptions
$\overline{OE}_1, \overline{OE}_2$	Output Enable Input (Active LOW)
D_0-D_7	Data Inputs
$\overline{O}_0-\overline{O}_7$	Outputs

Schematic of Each Output



Truth Table

\overline{OE}_1	I_{0-3}	\overline{O}_{0-3}	\overline{OE}_2	I_{4-7}	\overline{O}_{4-7}
H	X	Z	H	X	Z
L	H	L	L	H	L
L	L	H	L	L	H

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

74ABT2240

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 (Across Comm Operating Range)	-300 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 (ΔV/Δt)	
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} = 15 mA
I _{IH}	Input HIGH Current			1	μA	Max	V _{IN} = 2.7V (Note 3) V _{IN} = V _{CC}
				1	μA		
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) V _{IN} = 0.0V
				-1	μA		
V _{ID}	Input Leakage Test				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			-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			30	mA	Max	All Outputs LOW
I _{CCZ}	Power Supply Current			50	μA	Max	$\overline{OE}n = V_{CC}$ All Others at V _{CC} or GND
I _{CCT}	Additional I _{CC} /Input			1.5	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
				1.5	mA		
				50	μA		
I _{CCD}	Dynamic I _{CC} (Note 3)			0.1	mA/ MHz	Max	Outputs OPEN $\overline{OE}n = GND$ (Note 4) One Bit Toggling, 50% Duty Cycle

Note 3: Guaranteed, but not tested.

Note 4: For 8 bits toggling, I_{CCD} < 0.8 mA/MHz.

74ABT2240

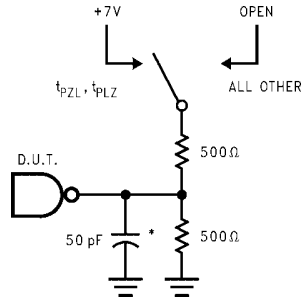
AC Electrical Characteristics							
Symbol	Parameter	T _A = +25°C V _{CC} = +5V C _L = 50 pF			T _A = -40°C to +85°C V _{CC} = 4.5V-5.5V C _L = 50 pF		Units
		Min	Typ	Max	Min	Max	
t _{PLH}	Propagation	1.0		4.9	1.0	4.9	ns
t _{PHL}	Delay Data to Outputs	1.5		5.3	1.5	5.3	
t _{PZH}	Output Enable	1.5		6.6	1.5	6.6	ns
t _{PZL}	Time	2.7		6.9	2.7	6.9	
t _{PHZ}	Output Disable	1.9		6.4	1.9	6.4	ns
t _{PLZ}	Time	1.9		6.4	1.9	6.4	

Capacitance				
Symbol	Parameter	Typ	Units	Conditions T _A = 25°C
C _{IN}	Input Capacitance	5.0	pF	V _{CC} = 0V
C _{OUT} (Note 5)	Output Capacitance	9.0	pF	V _{CC} = 5.0V

Note 5: C_{OUT} is measured at frequency f = 1 MHz, per MIL-STD-883, Method 3012.

74ABT2240

AC Loading



*Includes jig and probe capacitance

FIGURE 1. Standard AC Test Load

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

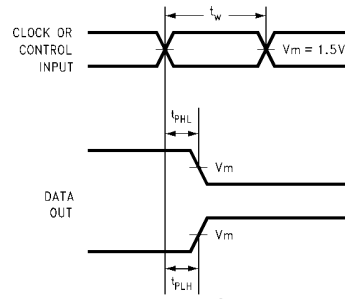


FIGURE 2. Propagation Delay, Pulse Width Waveforms

AC Waveforms

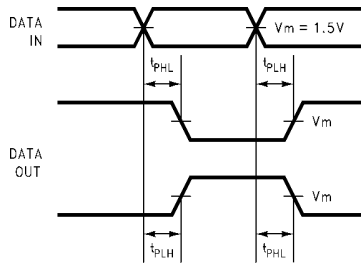


FIGURE 4. Propagation Delay Waveforms for Inverting and Non-Inverting Functions

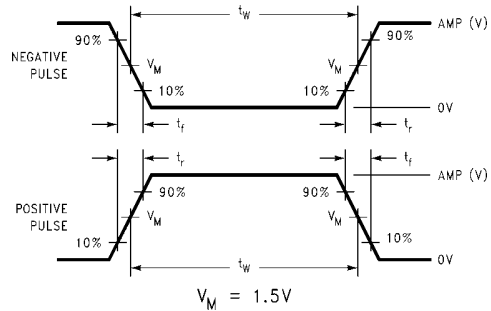


FIGURE 6. Test Input Signal Levels

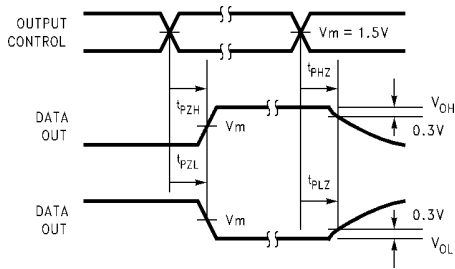


FIGURE 5. 3-STATE Output HIGH and LOW Enable and Disable Times

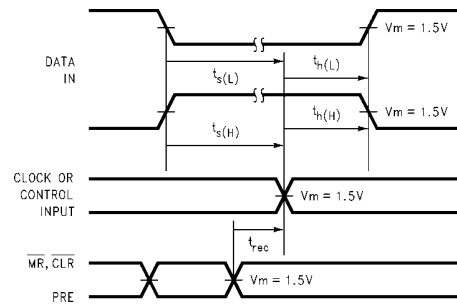
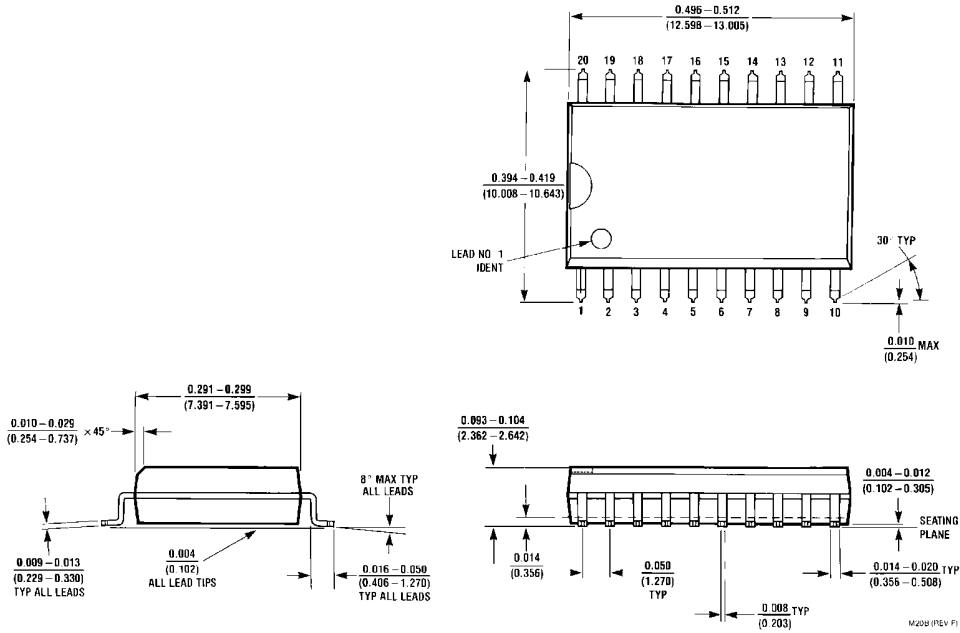


FIGURE 7. Setup Time, Hold Time and Recovery Time Waveforms

74ABT2240

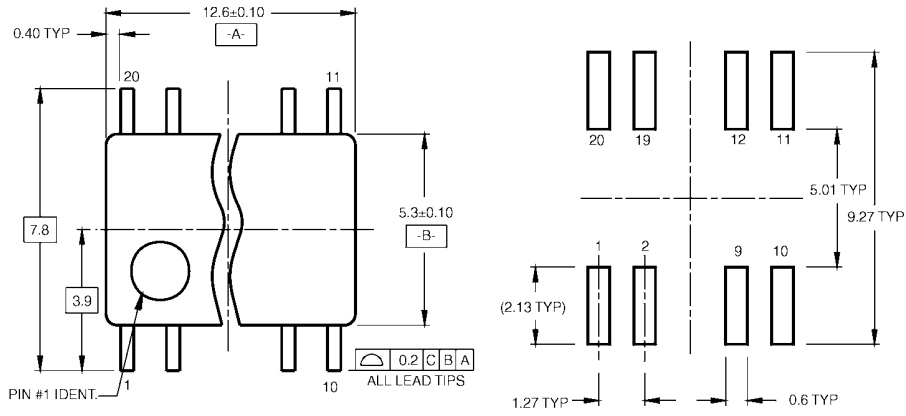
Physical Dimensions inches (millimeters) unless otherwise noted



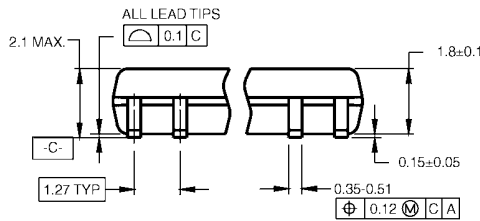
**20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide Body
 Package Number M20B**

74ABT2240

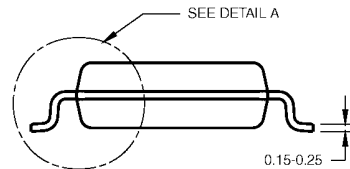
Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



LAND PATTERN RECOMMENDATION



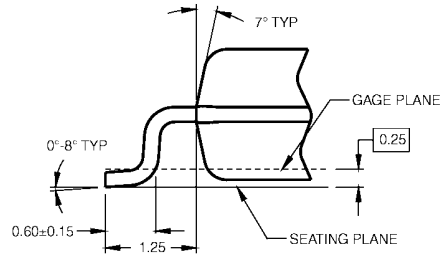
DIMENSIONS ARE IN MILLIMETERS



NOTES:

- A. CONFORMS TO EIAJ EDR-7320 REGISTRATION, ESTABLISHED IN DECEMBER, 1998.
- B. DIMENSIONS ARE IN MILLIMETERS.
- C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.

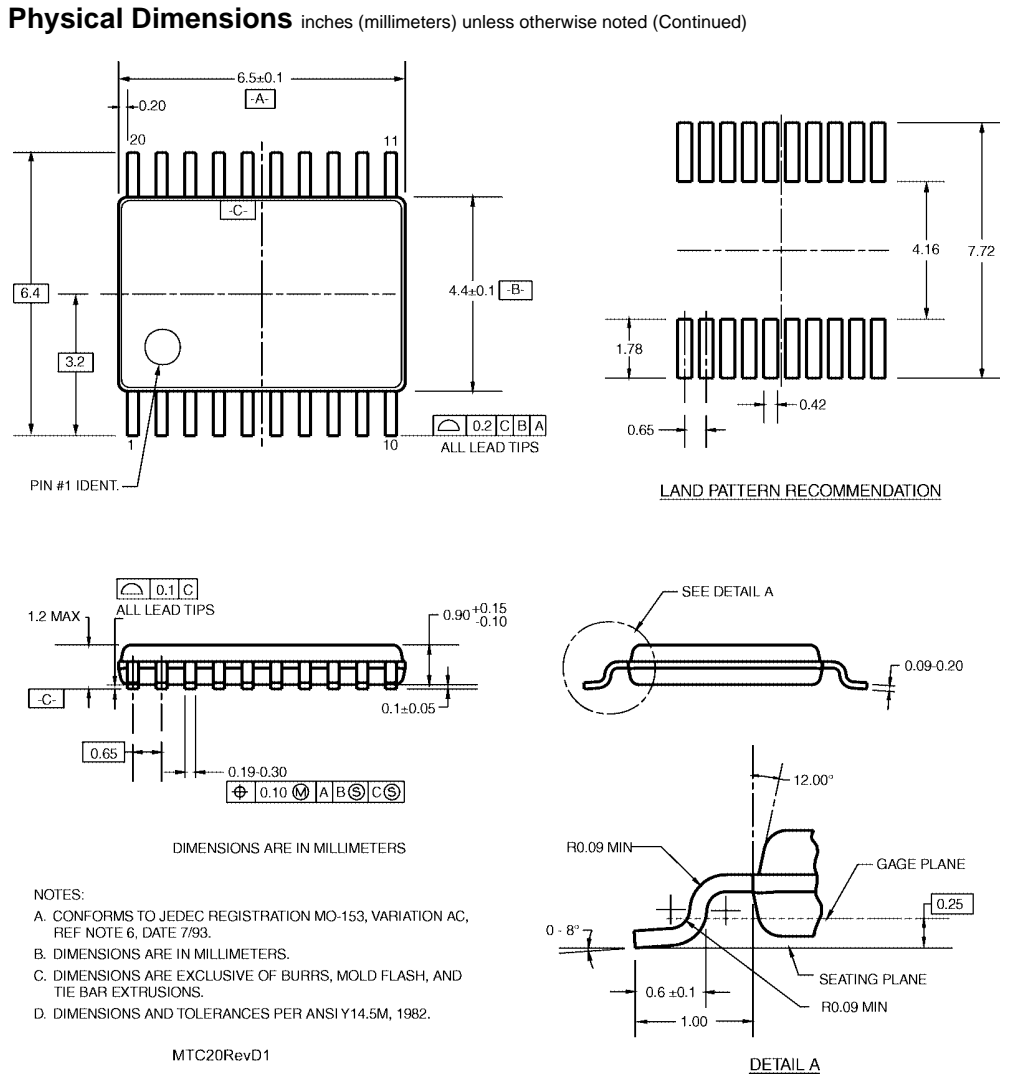
M20DRRevB1



DETAIL A

**20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
Package Number M20D**

74ABT2240 Octal Buffer/Line Driver with 25Ω Series Resistors in the Outputs



**20-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide
Package Number MTC20**

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