

# 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

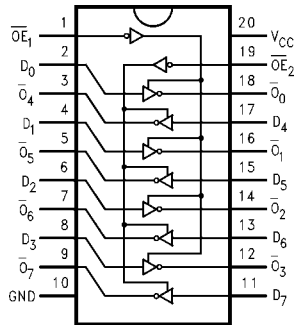
- Guaranteed latchup protection
- High impedance glitch-free bus loading during entire power up and power down cycle
- Nondestructive hot insertion capability

### 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
74ABT2240CMT	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.

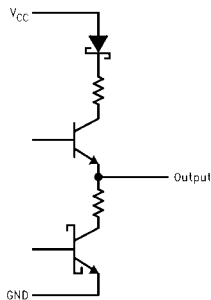
### Connection Diagram



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

**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 <sub>CC</sub> 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 <sub>CC</sub>
Current Applied to Output in LOW State (Max)	twice the rated I <sub>OL</sub> (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 ( $\Delta V/\Delta t$ )	
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**

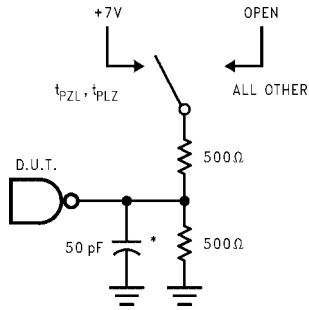
Symbol	Parameter	Min	Typ	Max	Units	V <sub>CC</sub>	Conditions
V <sub>IH</sub>	Input HIGH Voltage	2.0			V		Recognized HIGH Signal
V <sub>IL</sub>	Input LOW Voltage			0.8	V		Recognized LOW Signal
V <sub>CD</sub>	Input Clamp Diode Voltage			-1.2	V	Min	I <sub>IN</sub> = -18 mA
V <sub>OH</sub>	Output HIGH Voltage	2.5			V	Min	I <sub>OH</sub> = -3 mA
		2.0			V	Min	I <sub>OH</sub> = -32 mA
V <sub>OL</sub>	Output LOW Voltage			0.8	V	Min	I <sub>OL</sub> = 15 mA
I <sub>IH</sub>	Input HIGH Current			1	μA	Max	V <sub>IN</sub> = 2.7V (Note 3)
				1	μA	Max	V <sub>IN</sub> = V <sub>CC</sub>
I <sub>BVI</sub>	Input HIGH Current Breakdown Test			7	μA	Max	V <sub>IN</sub> = 7.0V
I <sub>IL</sub>	Input LOW Current			-1	μA	Max	V <sub>IN</sub> = 0.5V (Note 3)
				-1	μA	Max	V <sub>IN</sub> = 0.0V
V <sub>ID</sub>	Input Leakage Test				V	0.0	I <sub>ID</sub> = 1.9 μA All Other Pins Grounded
I <sub>OZH</sub>	Output Leakage Current			10	μA	0 - 5.5V	V <sub>OUT</sub> = 2.7V; $\overline{\text{OEn}}$ = 2.0V
I <sub>OZL</sub>	Output Leakage Current			-10	μA	0 - 5.5V	V <sub>OUT</sub> = 0.5V; $\overline{\text{OEn}}$ = 2.0V
I <sub>OS</sub>	Output Short-Circuit Current			-275	mA	Max	V <sub>OUT</sub> = 0.0V
I <sub>CEX</sub>	Output HIGH Leakage Current			50	μA	Max	V <sub>OUT</sub> = V <sub>CC</sub>
I <sub>ZZ</sub>	Bus Drainage Test			100	μA	0.0	V <sub>OUT</sub> = 5.5V; All Others GND
I <sub>CCH</sub>	Power Supply Current			50	μA	Max	All Outputs HIGH
I <sub>CCL</sub>	Power Supply Current			30	mA	Max	All Outputs LOW
I <sub>CCZ</sub>	Power Supply Current			50	μA	Max	$\overline{\text{OEn}}$ = V <sub>CC</sub> All Others at V <sub>CC</sub> or GND
I <sub>CCT</sub>	Additional Outputs Enabled			1.5	mA		V <sub>I</sub> = V <sub>CC</sub> - 2.1V
	I <sub>CC</sub> /Input Outputs 3-STATE			1.5	mA	Max	Enable Input V <sub>I</sub> = V <sub>CC</sub> - 2.1V
	Outputs 3-STATE			50	μA		Data Input V <sub>I</sub> = V <sub>CC</sub> - 2.1V All Others at V <sub>CC</sub> or GND
I <sub>CCD</sub>	Dynamic I <sub>CC</sub> (Note 3)	No Load		0.1	mA/ MHz	Max	Outputs OPEN $\overline{\text{OEn}}$ = GND (Note 4) One Bit Toggling, 50% Duty Cycle

**Note 3:** Guaranteed, but not tested.

**Note 4:** For 8 bits toggling, I<sub>CCD</sub> < 0.8 mA/MHz.

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		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 $T_A = 25^\circ\text{C}$			
$C_{IN}$	Input Capacitance	5.0	pF	$V_{CC} = 0\text{V}$			
$C_{OUT}$ (Note 5)	Output Capacitance	9.0	pF	$V_{CC} = 5.0\text{V}$			
<p><b>Note 5:</b> <math>C_{OUT}</math> is measured at frequency <math>f = 1\text{ MHz}</math>, per MIL-STD-883, Method 3012.</p>							

### AC Loading



\*Includes jig and probe capacitance

FIGURE 1. Standard AC Test Load

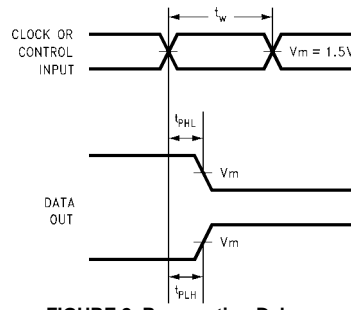


FIGURE 2. Propagation Delay, Pulse Width Waveforms

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

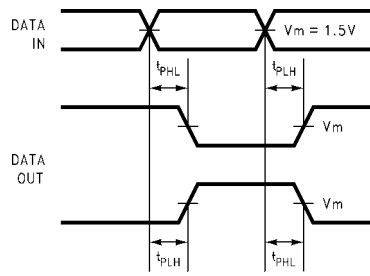


FIGURE 4. Propagation Delay Waveforms for Inverting and Non-Inverting Functions

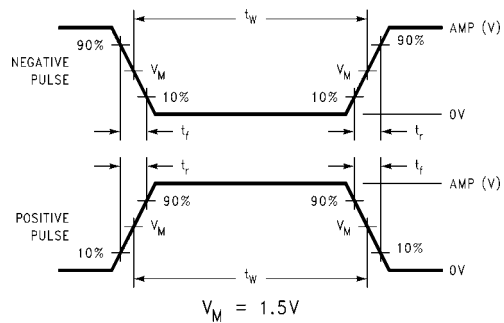


FIGURE 6. Test Input Signal Levels

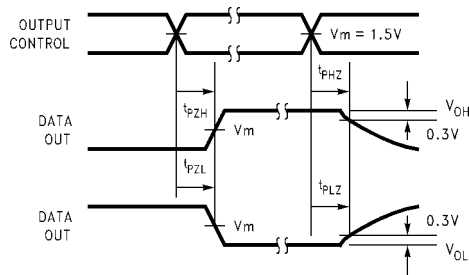


FIGURE 5. 3-STATE Output HIGH and LOW Enable and Disable Times

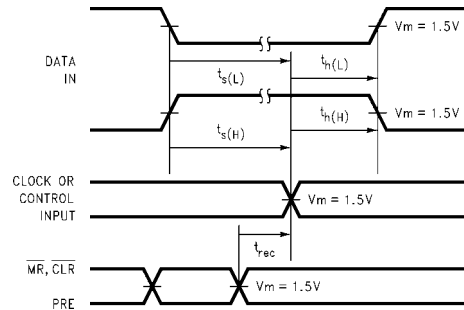


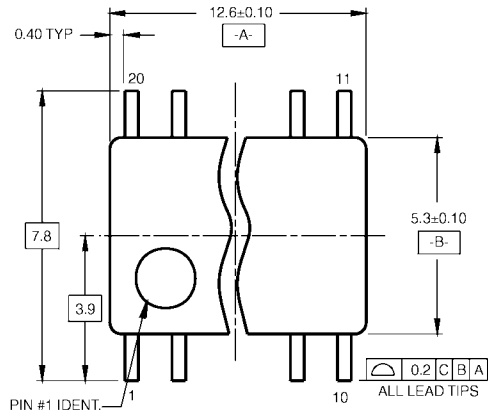
FIGURE 7. Setup Time, Hold Time and Recovery Time Waveforms

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



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

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



LAND PATTERN RECOMMENDATION



DIMENSIONS ARE IN MILLIMETERS



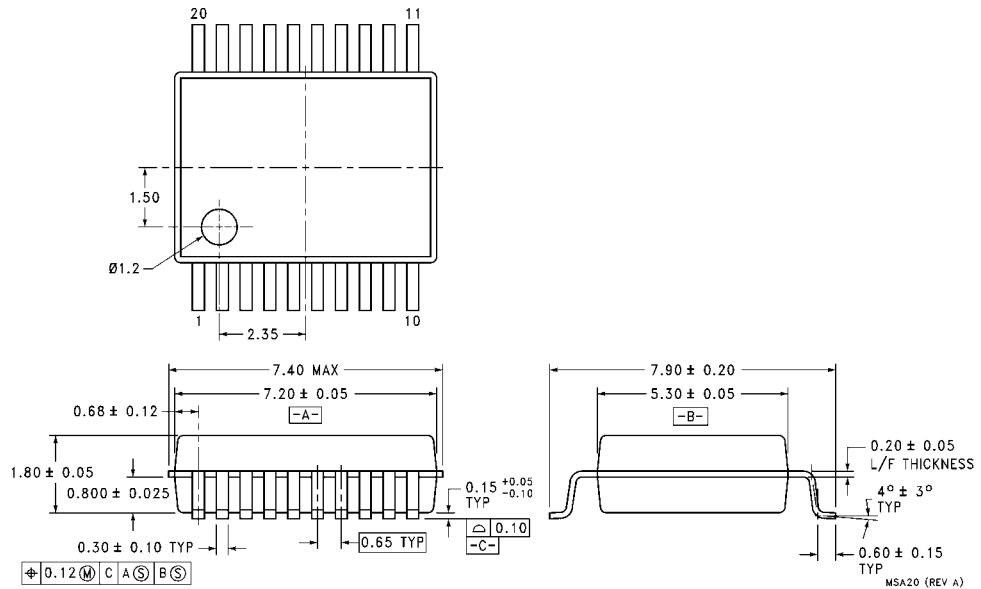
DETAIL A

- 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.

M20DRevB1

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

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



**20-Lead Shrink Small Outline Package (SSOP), EIAJ TYPE II, 5.3mm Wide  
Package Number MSA20**

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

DIMENSIONS ARE IN MILLIMETERS

NOTES:  
 A. CONFORMS TO JEDEC REGISTRATION MO-153, VARIATION AC, REF NOTE 6, DATE 7/93.  
 B. DIMENSIONS ARE IN MILLIMETERS.  
 C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.  
 D. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M, 1982.

MTC20RevD1

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

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