

# 74ABT240

## Octal Buffer/Line Driver with 3-STATE Outputs

### General Description

The ABT240 is an inverting octal buffer and line driver designed to be employed as a memory address driver, clock driver and bus oriented transmitter or receiver which provides improved PC board density.

### Features

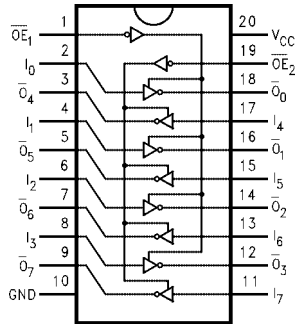
- Output sink capability of 64 mA, source capability of 32 mA
- Guaranteed latchup protection
- High impedance glitch free bus loading during entire power up and power down cycle
- Nondestructive hot insertion capability

### Ordering Code:

Order Number	Package Number	Package Description
74ABT240CSC	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide
74ABT240CSJ	M20D	Pb-Free 20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
74ABT240CMSA	MSA20	20-Lead Shrink Small Outline Package (SSOP), JEDEC MO-150, 5.3mm Wide
74ABT240CMTC	MTC20	20-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide

Device also available in Tape and Reel. Specify by appending suffix letter "X" to the ordering code.  
Pb-Free package per JEDEC J-STD-020B.

### Connection Diagram



### Pin Descriptions

Pin Names	Description
$\overline{OE}_1, \overline{OE}_2$	3-STATE Output Enable Inputs
$I_0-I_7$	Inputs
$\overline{O}_0-\overline{O}_7$	Outputs

### Truth Tables

Inputs		Outputs
$\overline{OE}_1$	$I_n$	(Pins 12, 14, 16, 18)
L	L	H
L	H	L
H	X	Z

Inputs		Outputs
$\overline{OE}_2$	$I_n$	(Pins 3, 5, 7, 9)
L	L	H
L	H	L
H	X	Z

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

**Absolute Maximum Ratings** (Note 1)

Storage Temperature	-65°C to +150°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)	-150 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		0.55		V	Min	I <sub>OL</sub> = 64 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	4.75			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; $\overline{OE}_n = 2.0V$
I <sub>OZL</sub>	Output Leakage Current			-10	μA	0 - 5.5V	V <sub>OUT</sub> = 0.5V; $\overline{OE}_n = 2.0V$
I <sub>OS</sub>	Output Short-Circuit Current	-100		-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	$\overline{OE}_n = V_{CC}$ ; All Others at V <sub>CC</sub> or Ground
I <sub>CCT</sub>	Additional I <sub>CC</sub> /Input	Outputs Enabled		1.5	mA	Max	V <sub>I</sub> = V <sub>CC</sub> - 2.1V
		Outputs 3-STATE		1.5	mA		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 Ground
I <sub>CCD</sub>	Dynamic I <sub>CC</sub> (Note 3)	No Load		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<sub>CCD</sub> < 0.8 mA/MHz.

## AC Electrical Characteristics

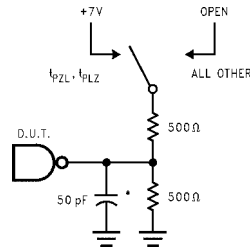
Symbol	Parameter	$T_A = +25^\circ\text{C}$ $V_{CC} = +5\text{V}$ $C_L = 50\text{ pF}$			$T_A = -55^\circ\text{C to } +125^\circ\text{C}$ $V_{CC} = 4.5\text{V} - 5.5\text{V}$ $C_L = 50\text{ pF}$		$T_A = -40^\circ\text{C to } +85^\circ\text{C}$ $V_{CC} = 4.5\text{V} - 5.5\text{V}$ $C_L = 50\text{ pF}$		Units
		Min	Typ	Max	Min	Max	Min	Max	
$t_{PLH}$	Propagation Delay	1.0		4.8	0.8	5.5	1.0	4.8	ns
$t_{PHL}$	Data to Outputs	1.6		4.8	1.0	5.5	1.6	4.8	
$t_{PZH}$	Output Enable	1.1		6.2	0.8	7.5	1.1	6.2	ns
$t_{PZL}$	Time	1.1		6.2	0.8	7.7	1.1	6.2	
$t_{PHZ}$	Output Disable	1.8		6.4	1.0	7.5	1.8	6.4	ns
$t_{PLZ}$	Time	1.6		5.8	1.0	7.2	1.6	5.8	

## 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	$V_{CC} = 5.0\text{V}$

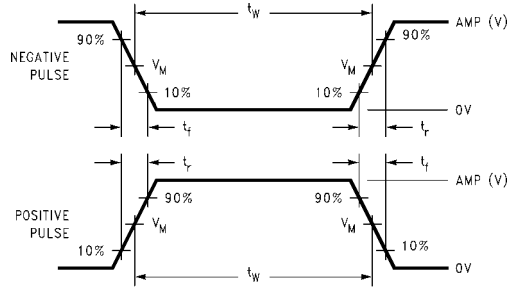
**Note 5:**  $C_{OUT}$  is measured at frequency  $f = 1\text{ MHz}$ , per MIL-STD-883, Method 3012.

### AC Loading



\*Includes jig and probe capacitance

Standard AC Test Load

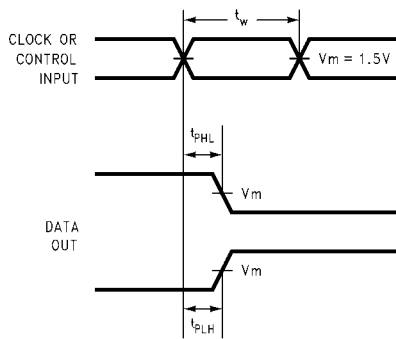


Test Input Signal Levels

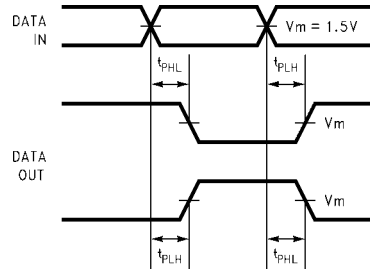
Amplitude	Rep. Rate	$t_w$	$t_r$	$t_f$
3.0V	1 MHz	500 ns	2.5 ns	2.5 ns

Test Input Signal Requirements

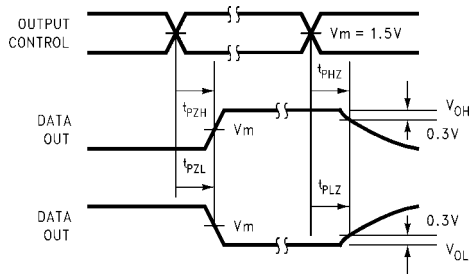
### AC Waveforms



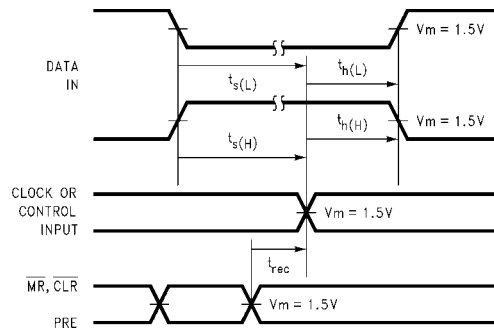
Propagation Delay, Pulse Width Waveforms



Propagation Delay Waveforms for Inverting and Non-Inverting Functions

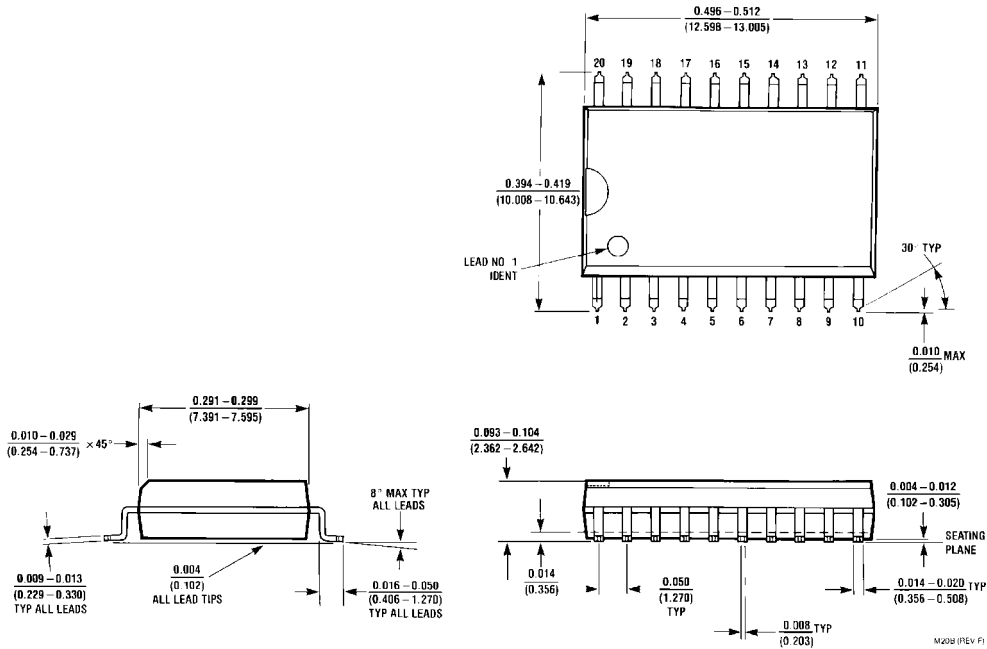


3-STATE Output HIGH and LOW Enable and Disable Times



Setup Time, Hold Time and Recovery Time Waveforms

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

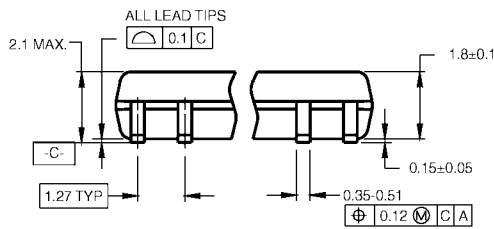


**20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide  
Package Number M20B**

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



LAND PATTERN RECOMMENDATION



DIMENSIONS ARE IN MILLIMETERS



DETAIL A

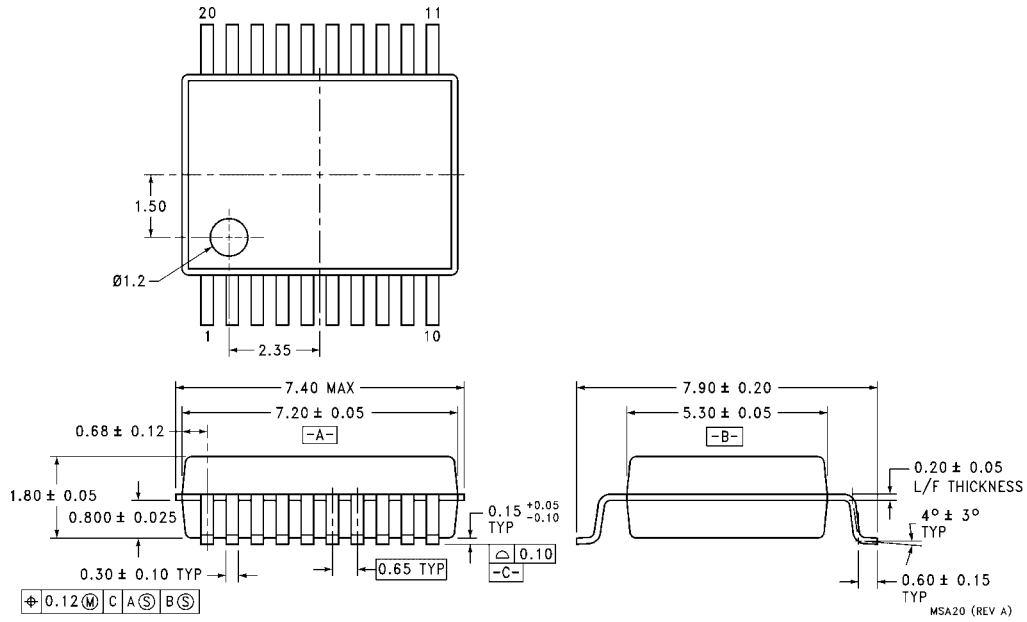
NOTES:

- 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

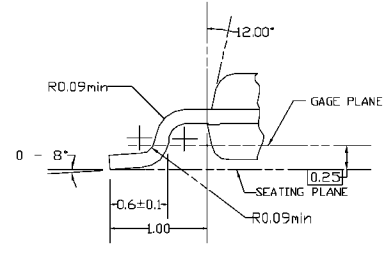
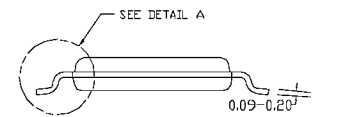
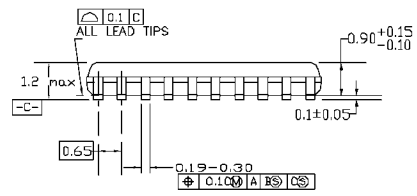
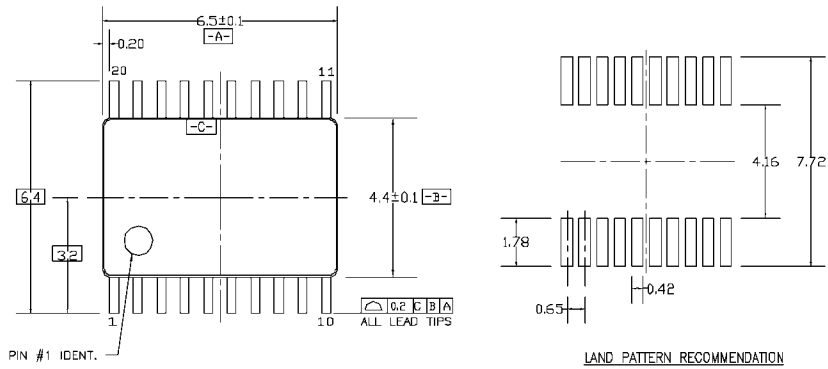
**Pb-Free 20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide Package Number M20D**

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



**20-Lead Shrink Small Outline Package (SSOP), JEDEC MO-150, 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, MOLDS FLASH, AND TIE BAR EXTRUSIONS.
  - D. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M, 1982.

MTC20REV D1

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

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