

54ABT240

Octal Buffer/Line Driver with TRI-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.

- Guaranteed latchup protection
- High impedance glitch free bus loading during entire power up and power down cycle
- Nondestructive hot insertion capability
- Standard Microcircuit Drawing (SMD)—5962-9318801

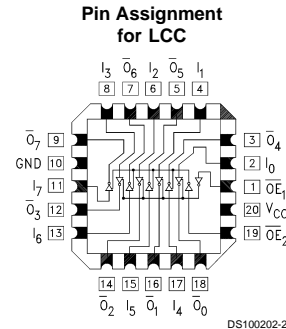
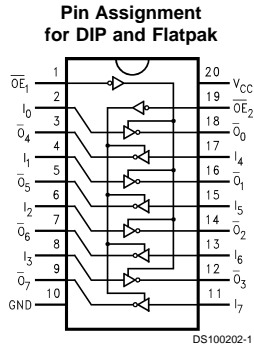
Features

- Output sink capability of 48 mA, source capability of 24 mA

Ordering Code

Military	Package Number	Package Description
54ABT240J-QML	J20A	20-Lead Ceramic Dual-In-Line
54ABT240W-QML	W20A	20-Lead Cerpack
54ABT240E-QML	E20A	20-Lead Ceramic Leadless Chip Carrier, Type C

Connection Diagrams



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

TRI-STATE® is a registered trademark of National Semiconductor Corporation.

Truth Tables

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

Inputs		Outputs (Pins 3, 5, 7, 9)
\overline{OE}_2	I_n	
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)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Storage Temperature	–65°C to +150°C
Ambient Temperature under Bias	–55°C to +125°C
Junction Temperature under Bias	
Ceramic	–55°C to +175°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)	–150 mA
Over Voltage Latchup (I/O)	10V

Recommended Operating Conditions

Free Air Ambient Temperature	
Military	–55°C to +125°C
Supply Voltage	
Military	+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	ABT240			Units	V _{CC}	Conditions
		Min	Typ	Max			
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	54ABT	2.5		V	Min	I _{OH} = –3 mA
		54ABT	2.0		V	Min	I _{OH} = –24 mA
V _{OL}	Output LOW Voltage	54ABT		0.55	V	Min	I _{OL} = 48 mA
I _{IH}	Input HIGH Current		5		μA	Max	V _{IN} = 2.7V (Note 4)
			5				V _{IN} = V _{CC}
I _{BVI}	Input HIGH Current Breakdown Test			7	μA	Max	V _{IN} = 7.0V
I _{IL}	Input LOW Current			–5	μA	Max	V _{IN} = 0.5V (Note 4)
				–5			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		50		μA	0 – 5.5V	V _{OUT} = 2.7V; \overline{OE}_n = 2.0V
I _{OZL}	Output Leakage Current		–50		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		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 Ground
I _{CCT}	Additional I _{CC} /Input	Outputs Enabled Outputs TRI-STATE Outputs TRI-STATE	1.5		mA	Max	V _I = V _{CC} – 2.1V
			1.5		mA		Enable Input V _I = V _{CC} – 2.1V
			50		μA		Data Input V _I = V _{CC} – 2.1V All Others at V _{CC} or Ground
I _{CCD}	Dynamic I _{CC} (Note 4)	No Load		0.1	mA/ MHz	Max	Outputs Open \overline{OE}_n = GND, (Note 3) One Bit Toggling, 50% Duty Cycle

Note 3: For 8 bits toggling, I_{CCD} < 0.8 mA/MHz.

Note 4: Guaranteed, but not tested.

AC Electrical Characteristics

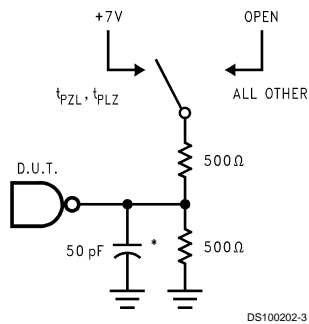
Symbol	Parameter	54ABT		Units	Fig. No.
		T _A = −55°C to +125°C V _{CC} = 4.5V–5.5V C _L = 50 pF			
		Min	Max		
t _{PLH}	Propagation Delay	0.8	5.5	ns	Figure 5
t _{PHL}	Data to Outputs	1.0	5.5		
t _{PZH}	Output Enable	0.8	7.5	ns	Figure 4
t _{PZL}	Time	0.8	7.7		
t _{PHZ}	Output Disable	1.0	7.5	ns	Figure 4
t _{PLZ}	Time	1.0	7.2		

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-883B, Method 3012.

AC Loading



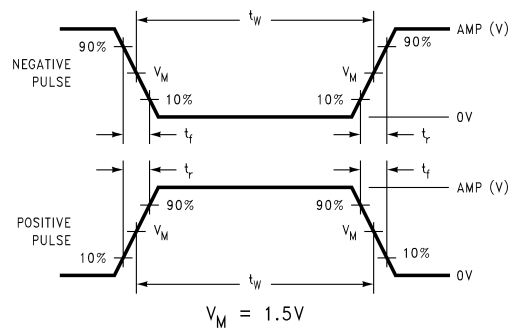
DS100202-3

*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



DS100202-4

FIGURE 2. Test Input Signal Levels

AC Waveforms

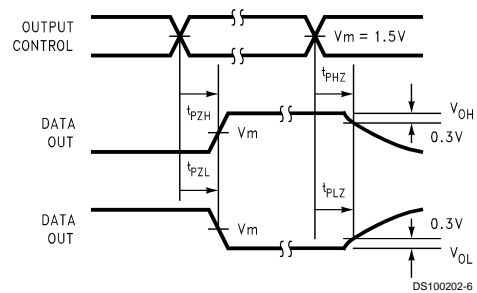


FIGURE 4. TRI-STATE Output HIGH and LOW Enable and Disable Times

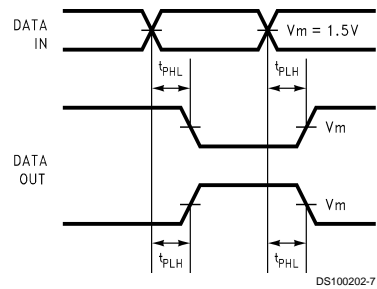
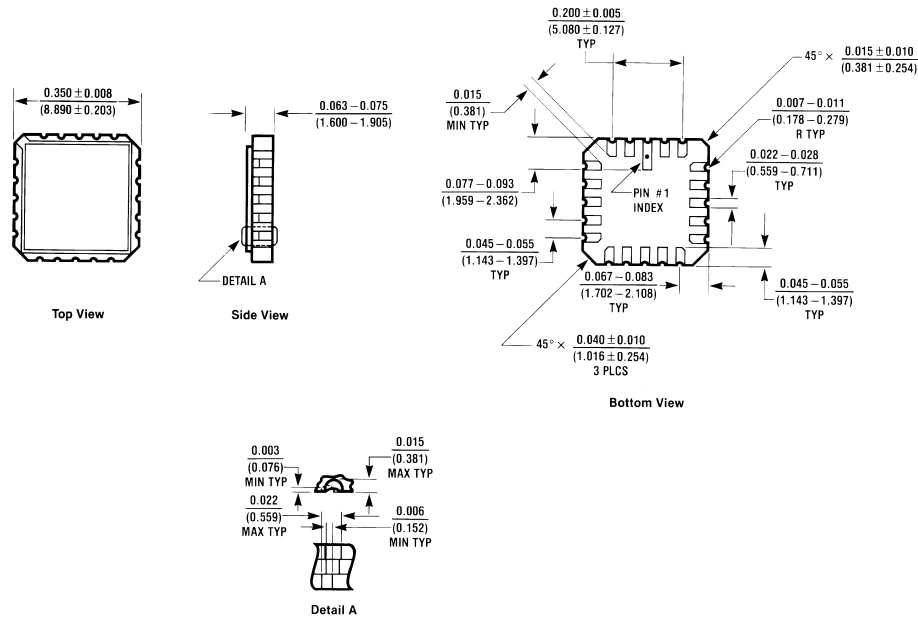


FIGURE 5. Propagation Delay Waveforms for Inverting and Non-Inverting Functions

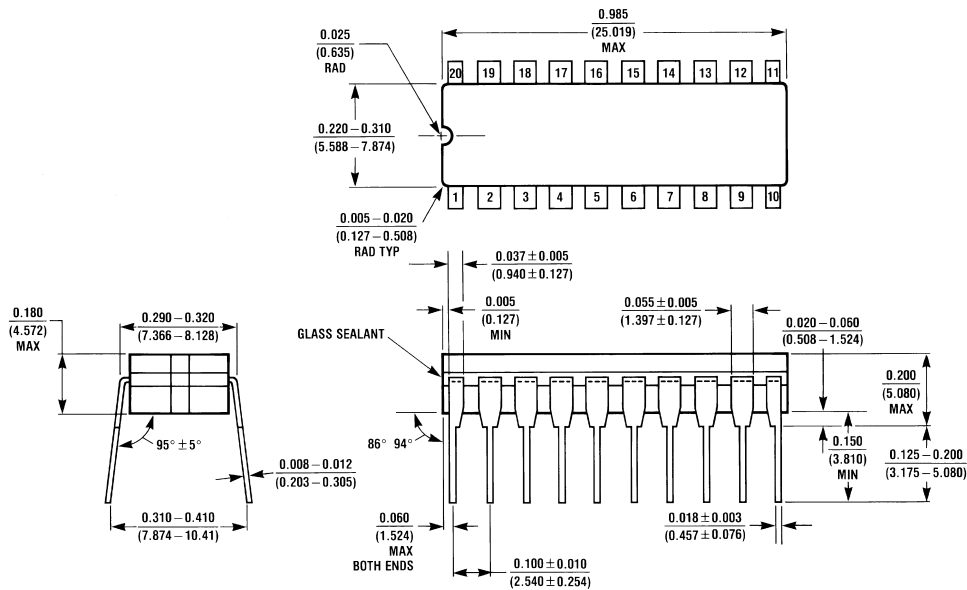


Physical Dimensions inches (millimeters) unless otherwise noted



E20A (REV D)

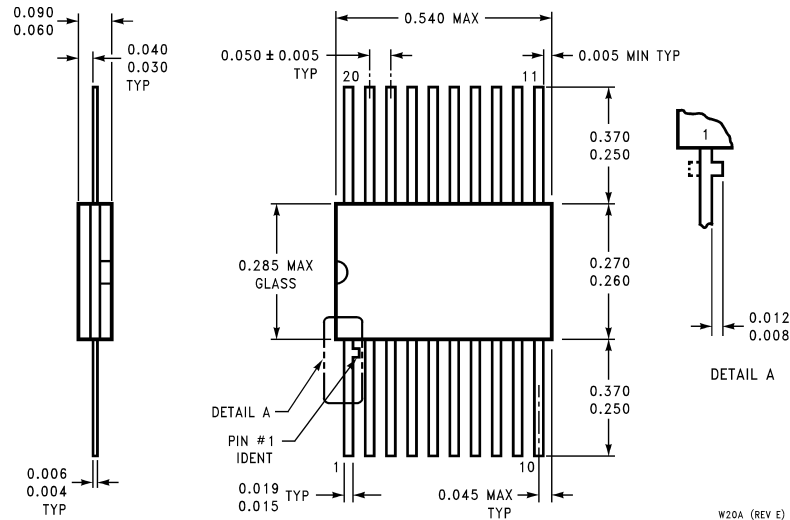
20-Terminal Ceramic Chip Carrier (L) NS Package Number E20A



J20A (REV M)

20-Lead Ceramic Dual-In-Line Package (D) NS Package Number J20A

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



20-Lead Ceramic Flatpak (F)
NS Package Number W20A

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