

54ABT541

Octal Buffer/Line Driver with TRI-STATE® Outputs

General Description

The 'ABT541 is an octal buffer and line driver with TRI-STATE outputs designed to be employed as a memory and address driver, clock driver, or bus-oriented transmitter/receiver. The 'ABT541 is similar to the 'ABT244 with broad-side pinout.

Features

- Non-inverting buffers
- Output sink capability of 48 mA, source capability of 24 mA

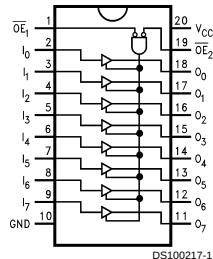
- Guaranteed latchup protection
- High impedance glitch free bus loading during entire power up and power down cycle
- Nondestructive hot insertion capability
- Flow-through pinout for ease of PC board layout
- Disable time less than enable time to avoid bus contention
- Standard Microcircuit Drawing (SMD) 5962-9471801

Ordering Code

Military	Package Number	Package Description
54ABT541J-QML	J20A	20-Lead Ceramic Dual-In-Line
54ABT541W-QML	W20A	20-Lead Cerpac
54ABT541E-QML	E20A	20-Lead Ceramic Leadless Chip Carrier, Type C

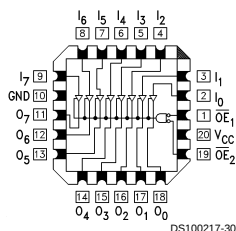
Connection Diagram

Pin Assignment
DIP and Cerpac



DS100217-1

Pin Assignment
LCC



DS100217-30

Pin Names	Description
$\overline{OE}_1, \overline{OE}_2$	Output Enable Input (Active Low)
I_0-I_7	Inputs
O_0-O_7	Outputs

Truth Table

Inputs			Outputs
$\overline{OE}_1$	$\overline{OE}_2$	I	ABT541
L	L	H	H
H	X	X	Z
X	H	X	Z
L	L	L	L

H = HIGH Voltage Level

L = LOW Voltage Level

X = Immaterial

Z = High Impedance

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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	
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	–500 mA
Over Voltage Latchup (I/O)	10V

Recommended Operating Conditions

Free Air Ambient Temperature	–55°C to +125°C
Military	
Supply Voltage	
Military	+4.5V to +5.5V
Minimum Input Edge Rate	(ΔV/Δt)
Data Input	50 mV/ns
Enable Input	20 mV/ns

DC Electrical Characteristics

Symbol	Parameter	ABT541			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	2.5		mA		V _I = V _{CC} – 2.1V
		Outputs TRI-STATE	2.5		mA	Max	Enable Input V _I = V _{CC} – 2.1V
		Outputs TRI-STATE	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, One Bit Toggling (Note 3), 50% Duty Cycle

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.

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

Note 4: Guaranteed, but not tested.

DC Electrical Characteristics

Symbol	Parameter	Min	Max	Units	V _{CC}	Conditions C _L = 50 pF, R _L = 500Ω
V _{OLP}	Quiet Output Maximum Dynamic V _{OL}		1.0	V	5.0	T _A = 25°C (Note 5)
V _{OLV}	Quiet Output Minimum Dynamic V _{OL}		-1.45	V	5.0	T _A = 25°C (Note 5)

Note 5: Max number of outputs defined as (n). n – 1 data inputs are driven 0V to 3V. One output at LOW. Guaranteed, but not tested.

AC Electrical Characteristics

Symbol	Parameter	54ABT		Units
		T _A = –55°C to +125°C V _{CC} = 4.5V–5.5V C _L = 50 pF		
		Min	Max	
t _{PLH}	Propagation Delay	1.0	5.0	ns
t _{PHL}	Data to Outputs	1.0	5.3	
t _{PZH}	Output Enable Time	1.1	7.2	ns
t _{PZL}		1.5	7.9	
t _{PHZ}	Output Disable Time	1.5	7.5	ns
t _{PLZ}		1.5	7.9	

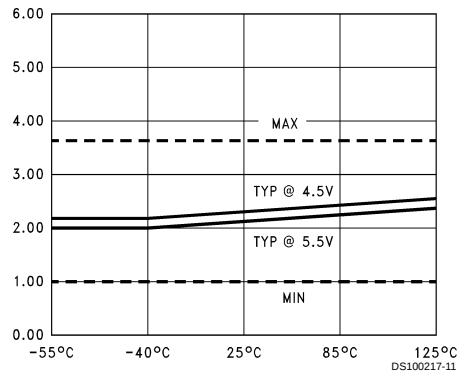
Capacitance

Symbol	Parameter	Typ	Units	Conditions T _A = 25°C
C _{IN}	Input Capacitance	5.0	pF	V _{CC} = 0.0V
C _{OUT} (Note 6)	Output Capacitance	9.0	pF	V _{CC} = 5.0V

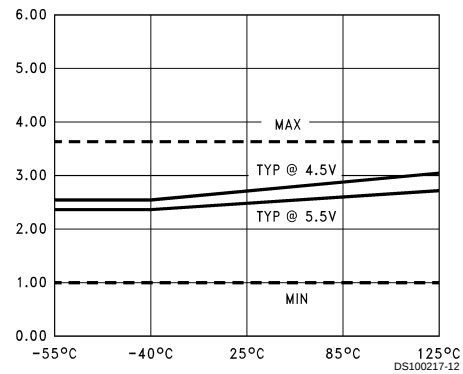
Note 6: C_{OUT} is measured at frequency of f = 1 MHz, per MIL-STD-883B, Method 3012.

Capacitance (Continued)

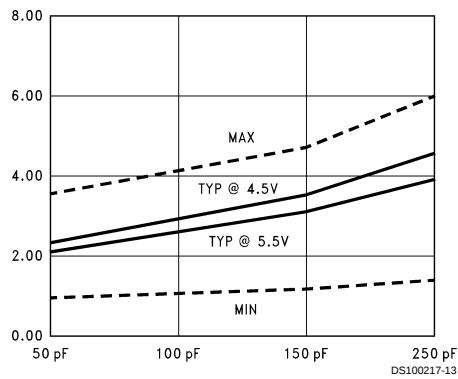
t_{PLH} vs Temperature (T_A)
 $C_L = 50$ pF, 1 Output Switching



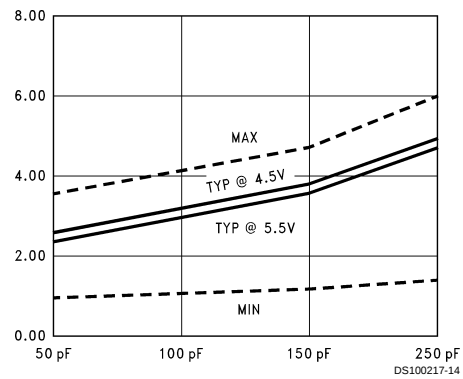
t_{PHL} vs Temperature (T_A)
 $C_L = 50$ pF, 1 Output Switching



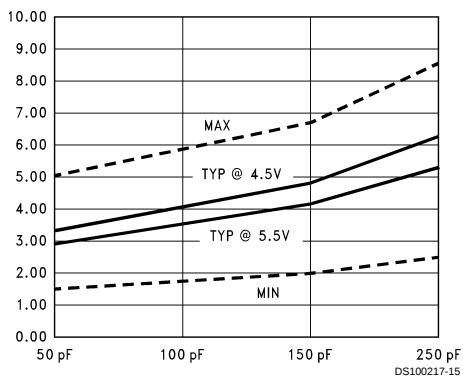
t_{PLH} vs Load Capacitance
 1 Output Switching, $T_A = 25^\circ\text{C}$



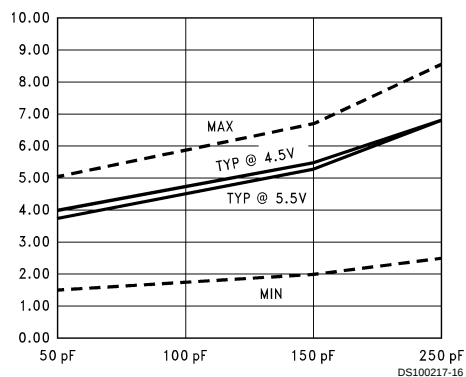
t_{PHL} vs Load Capacitance
 1 Output Switching, $T_A = 25^\circ\text{C}$



t_{PLH} vs Load Capacitance
 8 Outputs Switching, $T_A = 25^\circ\text{C}$



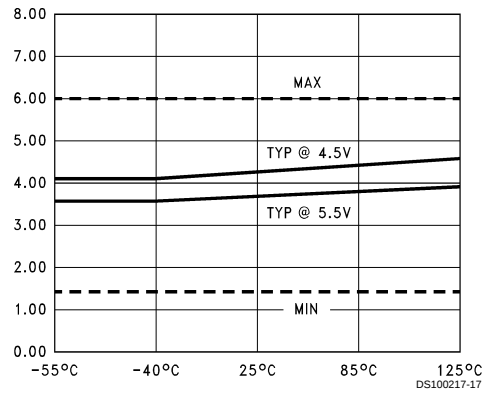
t_{PHL} vs Load Capacitance
 8 Outputs Switching, $T_A = 25^\circ\text{C}$



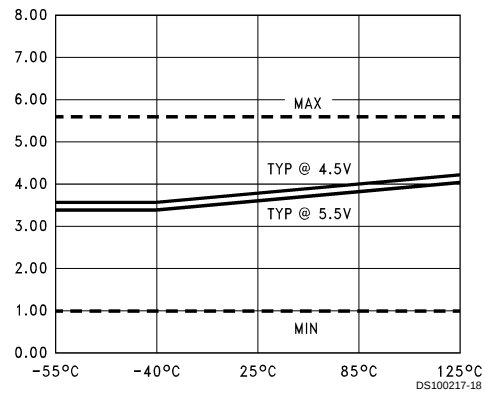
Dashed lines represent design characteristics; for specified guarantees refer to AC Characteristics Table.

Capacitance (Continued)

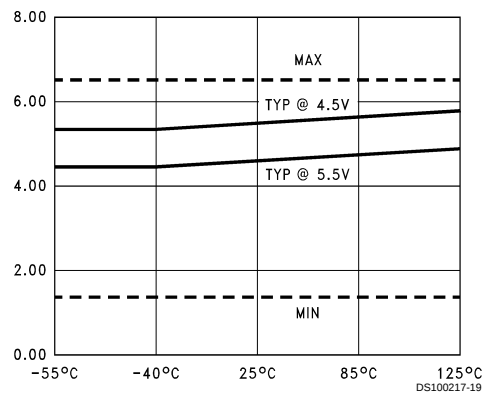
t_{PZL} vs Temperature (T_A)
 $C_L = 50$ pF, 1 Output Switching



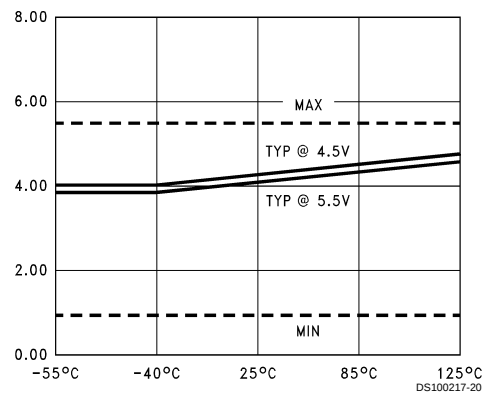
t_{PLZ} vs Temperature (T_A)
 $C_L = 50$ pF, 1 Output Switching



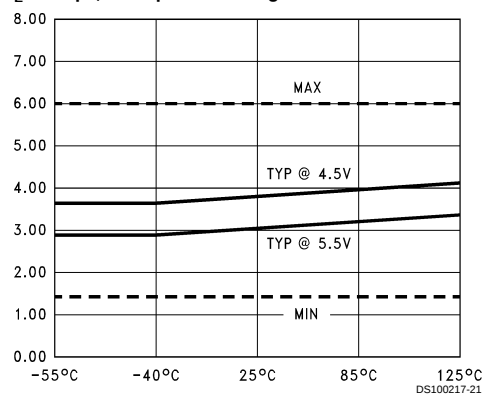
t_{PZL} vs Temperature (T_A)
 $C_L = 50$ pF, 8 Outputs Switching



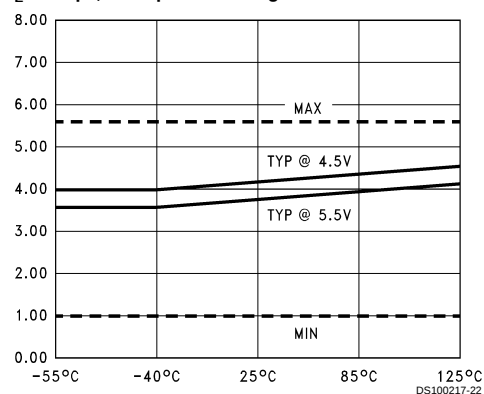
t_{PLZ} vs Temperature (T_A)
 $C_L = 50$ pF, 8 Outputs Switching



t_{PZH} vs Temperature (T_A)
 $C_L = 50$ pF, 1 Output Switching



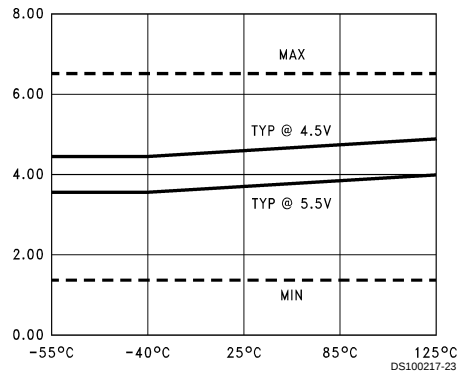
t_{PHZ} vs Temperature (T_A)
 $C_L = 50$ pF, 1 Output Switching



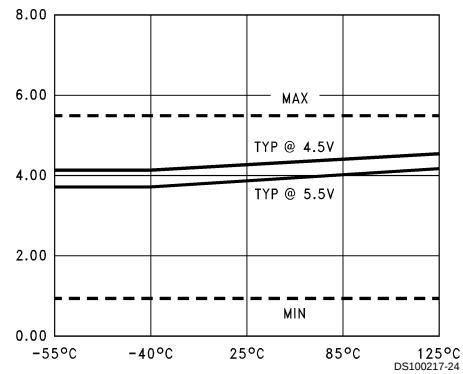
Dashed lines represent design characteristics; for specified guarantees refer to AC Characteristics Table.

Capacitance (Continued)

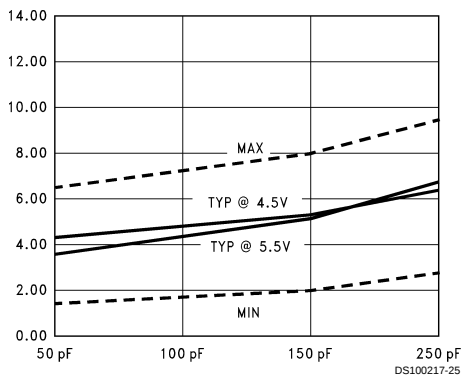
t_{PZH} vs Temperature (T_A)
 $C_L = 50$ pF, 8 Outputs Switching



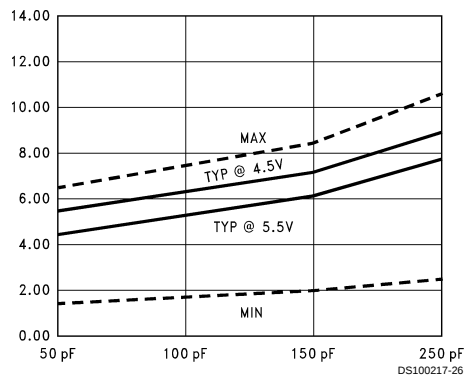
t_{PHZ} vs Temperature (T_A)
 $C_L = 50$ pF, 8 Outputs Switching



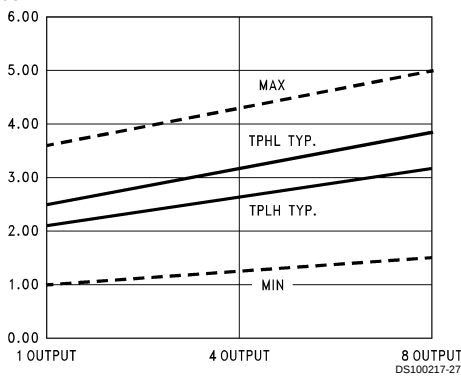
t_{PZH} vs Load Capacitance
 8 Outputs Switching, $T_A = 25^\circ\text{C}$



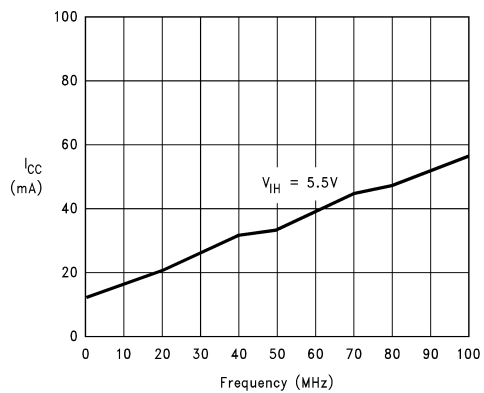
t_{PZL} vs Load Capacitance
 8 Outputs Switching, $T_A = 25^\circ\text{C}$



t_{PLH} and t_{PHL} vs Number Outputs Switching
 $V_{CC} = 5.0\text{V}$, $T_A = 25^\circ\text{C}$, $C_L = 50$ pF

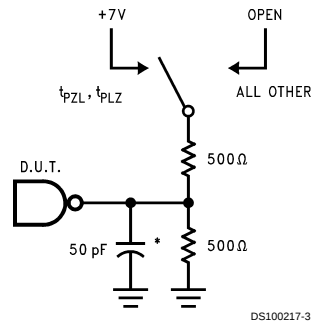


I_{CC} vs Frequency, Average, $T_A = 25^\circ\text{C}$, All Outputs Unloaded/Unterminated



Dashed lines represent design characteristics; for specified guarantees refer to AC Characteristics Table.

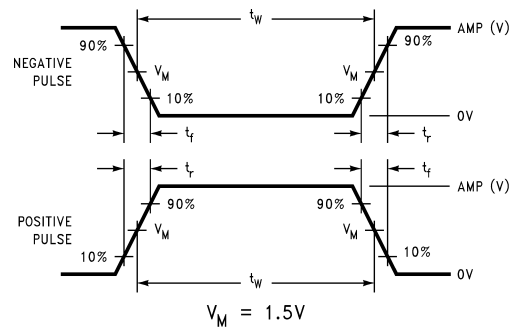
AC Loading



DS100217-3

*Includes jig and probe capacitance

FIGURE 1. Standard AC Test Load



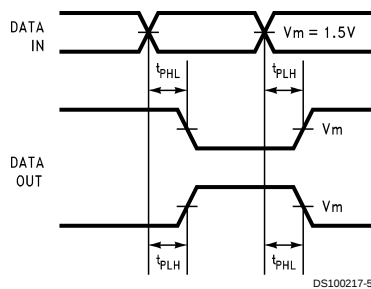
DS100217-4

FIGURE 2. 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

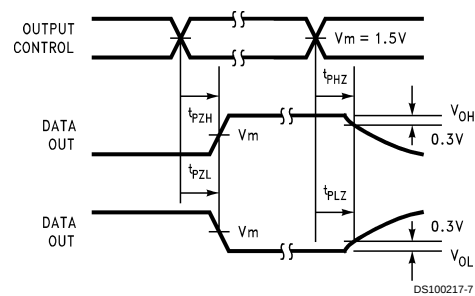
FIGURE 3. Test Input Signal Requirements

AC Waveforms



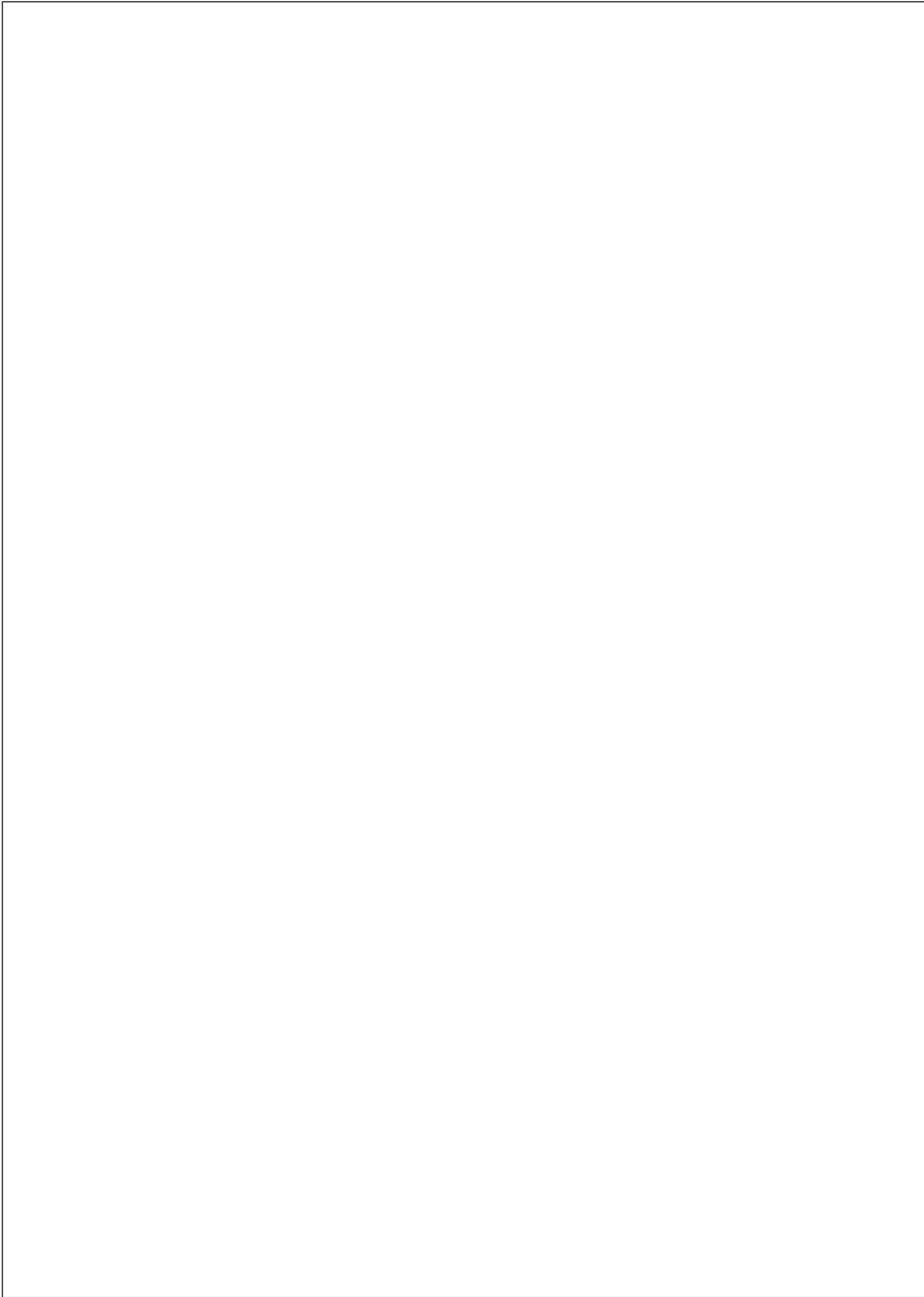
DS100217-5

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

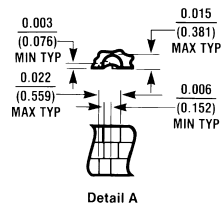
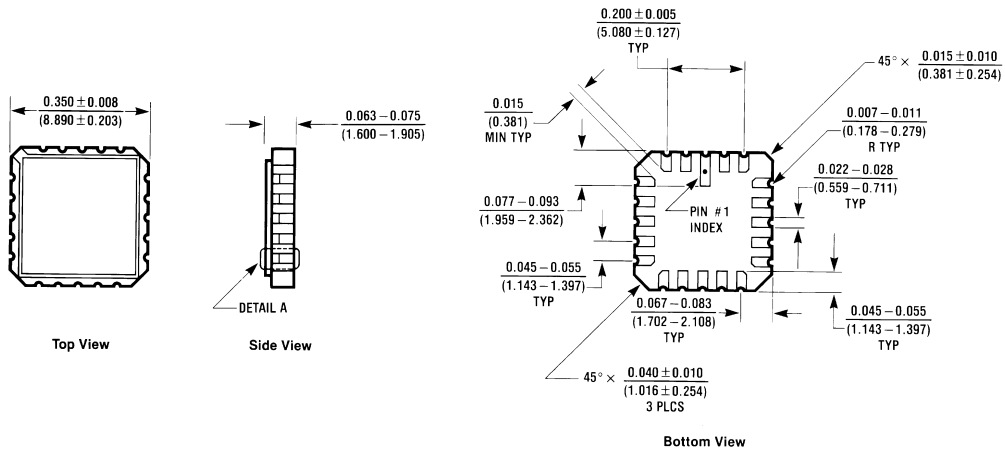


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FIGURE 5. TRI-STATE Output HIGH and LOW Enable and Disable Time

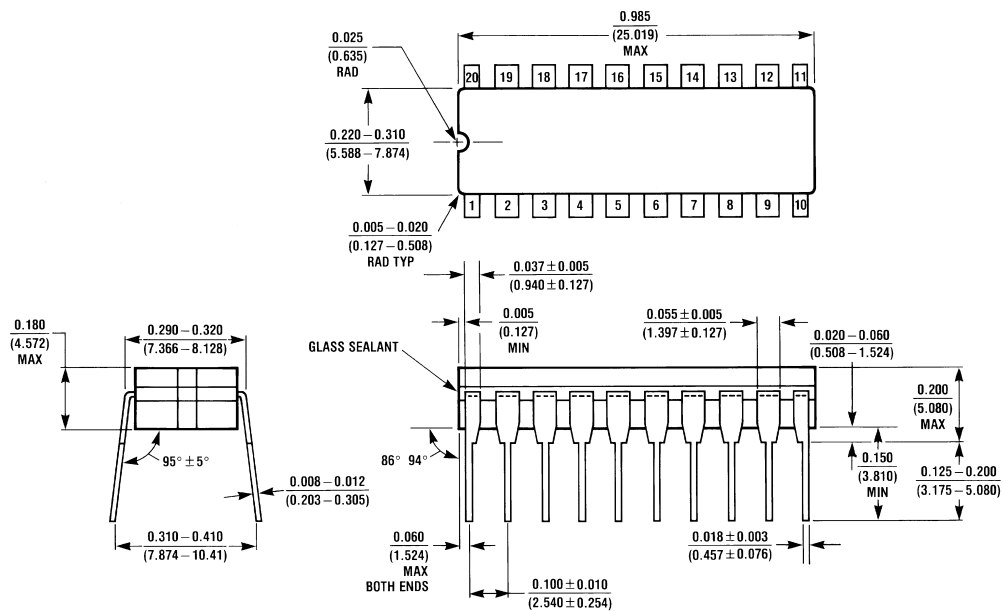


Physical Dimensions inches (millimeters) unless otherwise noted



E20A (REV D)

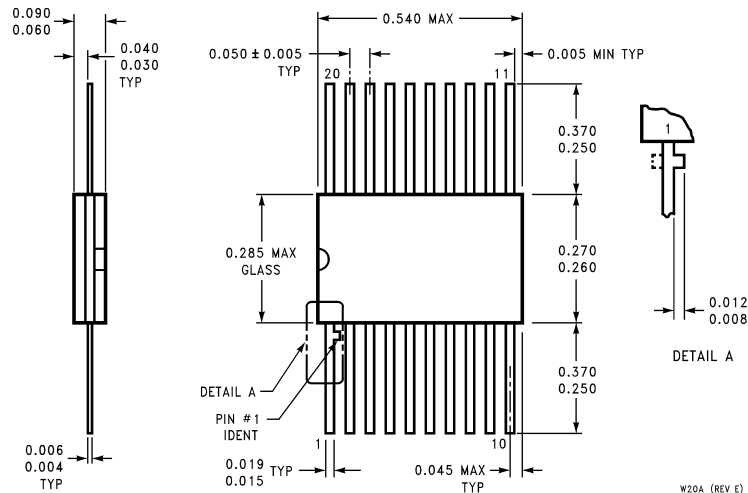
20-Terminal Ceramic Chip Carrier NS Package Number E20A



J20A (REV M)

20-Lead Ceramic Dual-In-Line Package NS Package Number J20A

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



20-Lead Ceramic Flatpack
NS Package Number W20A

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National Semiconductor Corporation
Americas
Tel: 1-800-272-9959
Fax: 1-800-737-7018
Email: support@nsc.com

www.national.com

National Semiconductor Europe

Fax: +49 (0) 1 80-530 85 86
Email: europe.support@nsc.com
Deutsch Tel: +49 (0) 1 80-530 85 85
English Tel: +49 (0) 1 80-532 78 32
Français Tel: +49 (0) 1 80-532 93 58
Italiano Tel: +49 (0) 1 80-534 16 80

National Semiconductor Asia Pacific Customer Response Group

Tel: 65-2544466
Fax: 65-2504466
Email: sea.support@nsc.com

National Semiconductor Japan Ltd.

Tel: 81-3-5620-6175
Fax: 81-3-5620-6179