

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

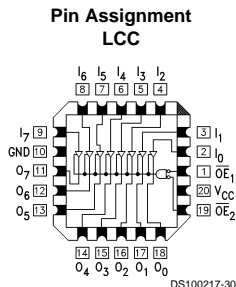
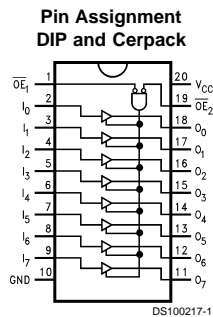
- Non-inverting buffers
- Output sink capability of 48 mA, source capability of 24 mA

- Guaranteed latching 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 Cerpack
54ABT541E-QML	E20A	20-Lead Ceramic Leadless Chip Carrier, Type C

Connection Diagram



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 in the HIGH State	-0.5V to 5.5V
Current Applied to Output	-0.5V to V _{CC}

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
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
					5	μA	V _{IN} = 2.7V (Note 4) V _{IN} = V _{CC}
I _{BVI}	Input HIGH Current Breakdown Test				7	μA	Max
I _{IL}	Input LOW Current				-5	μA	Max
					-5	μA	V _{IN} = 0.5V (Note 4) 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
I _{OZL}	Output Leakage Current				-50	μA	0 - 5.5V
I _{OS}	Output Short-Circuit Current	-100			-275	mA	Max
I _{CEX}	Output High Leakage Current				50	μA	Max
I _{ZZ}	Bus Drainage Test				100	μA	0.0
I _{CCH}	Power Supply Current				50	μA	Max
I _{CCL}	Power Supply Current				30	mA	Max
I _{CCZ}	Power Supply Current				50	μA	Max
I _{CC1}	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, 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	

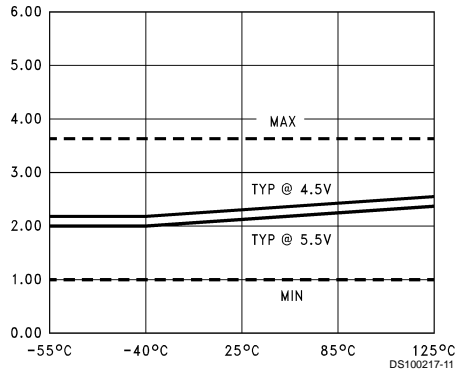
Capacitance

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

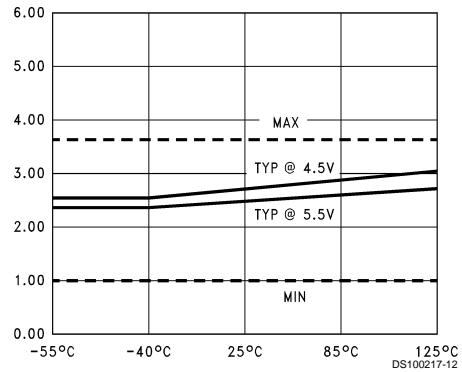
Note 6: C_{OUT} is measured at frequency of f = 1 MHz, per MIL-STD-883B, Method 3012.

Capacitance (Continued)

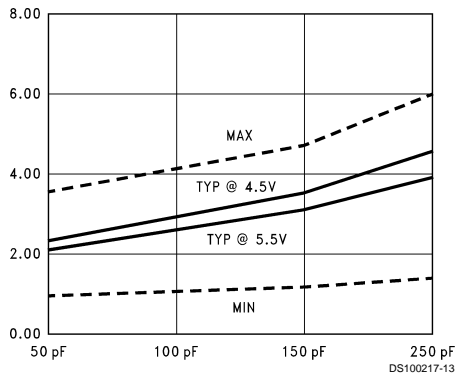
t_{PLH} vs Temperature (T_A)
 $C_L = 50$ pF, 1 Output Switching



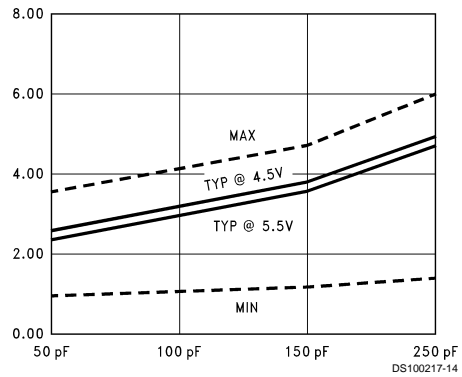
t_{PHL} vs Temperature (T_A)
 $C_L = 50$ pF, 1 Output Switching



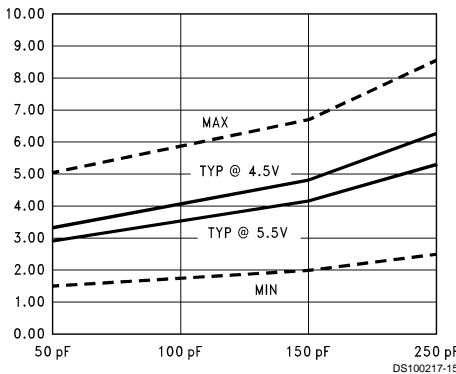
t_{PLH} vs Load Capacitance
 1 Output Switching, $T_A = 25^\circ\text{C}$



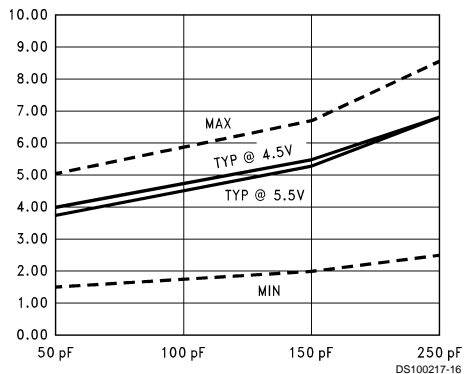
t_{PHL} vs Load Capacitance
 1 Output Switching, $T_A = 25^\circ\text{C}$



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



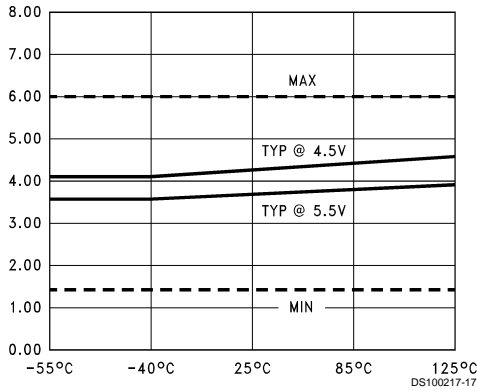
t_{PHL} vs Load Capacitance
 8 Outputs Switching, $T_A = 25^\circ\text{C}$



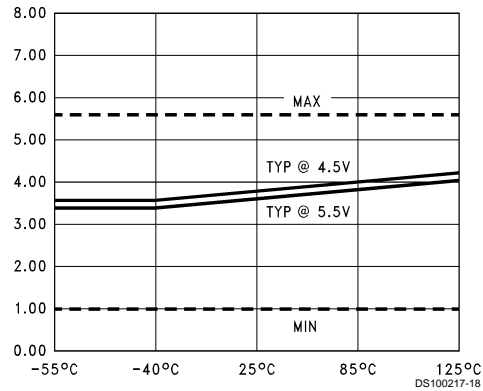
Dashed lines represent design characteristics; for specified guarantees refer to AC Characteristics Table.

Capacitance (Continued)

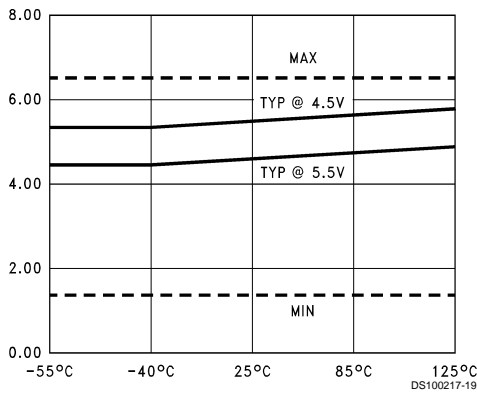
t_{PZL} vs Temperature (T_A)
 $C_L = 50$ pF, 1 Output Switching



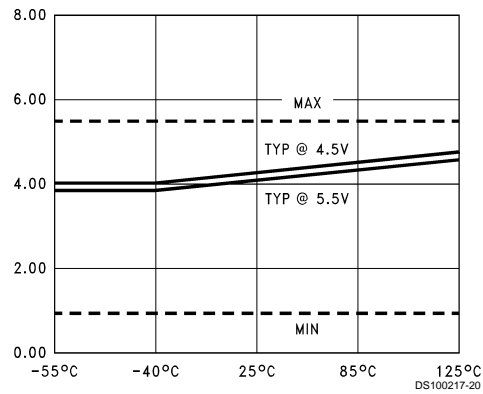
t_{PLZ} vs Temperature (T_A)
 $C_L = 50$ pF, 1 Output Switching



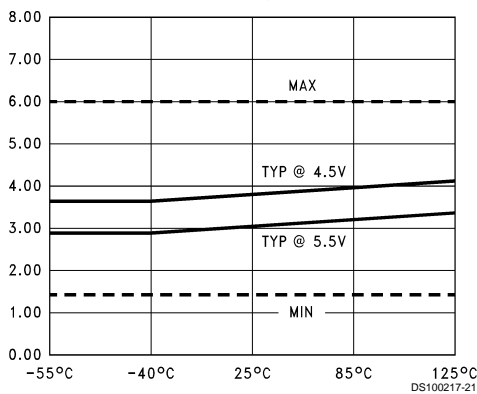
t_{PZL} vs Temperature (T_A)
 $C_L = 50$ pF, 8 Outputs Switching



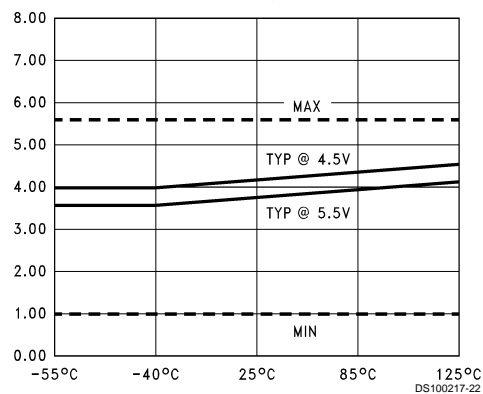
t_{PLZ} vs Temperature (T_A)
 $C_L = 50$ pF, 8 Outputs Switching



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



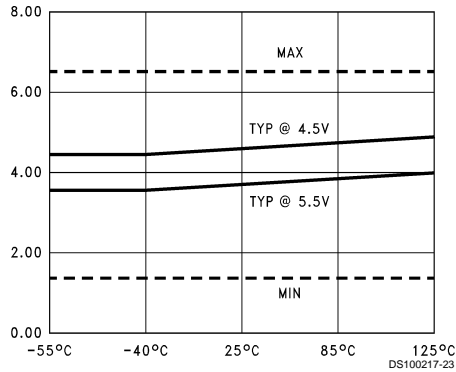
t_{PHZ} vs Temperature (T_A)
 $C_L = 50$ pF, 1 Output Switching



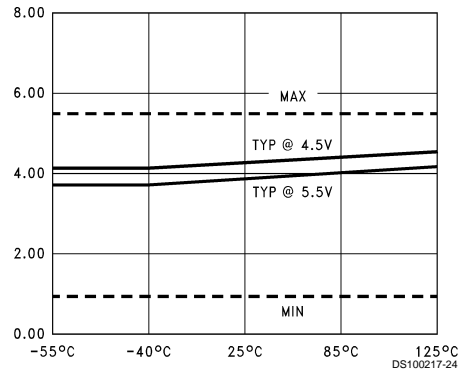
Dashed lines represent design characteristics; for specified guarantees refer to AC Characteristics Table.

Capacitance (Continued)

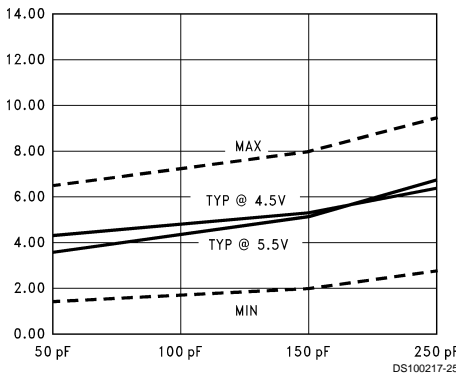
t_{PZH} vs Temperature (T_A)
 $C_L = 50$ pF, 8 Outputs Switching



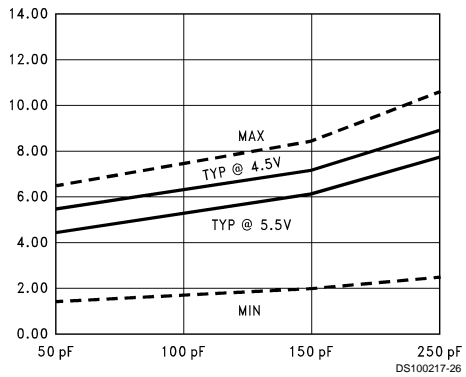
t_{PHZ} vs Temperature (T_A)
 $C_L = 50$ pF, 8 Outputs Switching



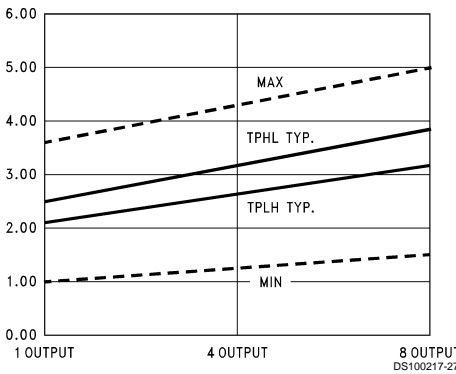
t_{PZH} vs Load Capacitance
 8 Outputs Switching, $T_A = 25^\circ\text{C}$



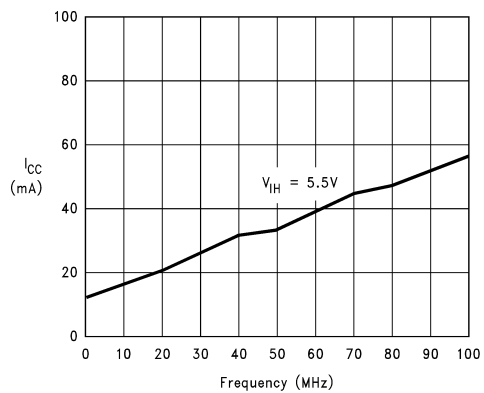
t_{PZL} vs Load Capacitance
 8 Outputs Switching, $T_A = 25^\circ\text{C}$



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

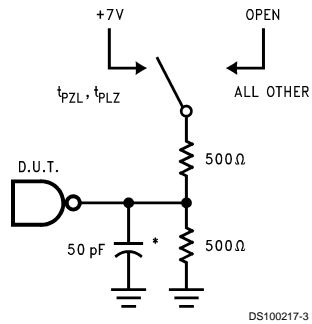


I_{CC} vs Frequency, Average, $T_A = 25^\circ\text{C}$, All Outputs Unloaded/Unterminated



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

AC Loading



*Includes jig and probe capacitance

FIGURE 1. Standard AC Test Load

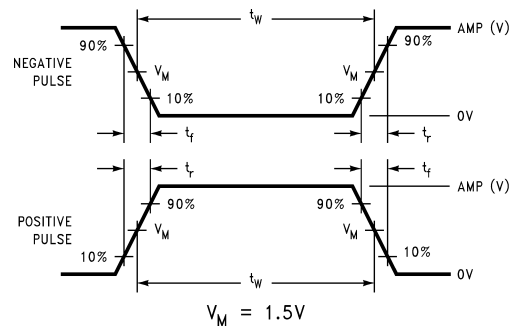


FIGURE 2. Test Input Signal Levels

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

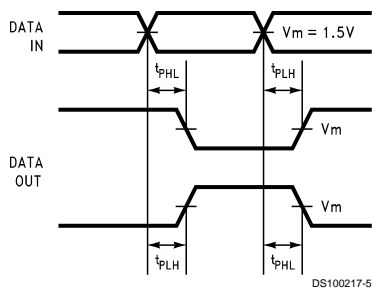


FIGURE 4. Propagation Delay Waveforms for Inverting and Non-Inverting Functions

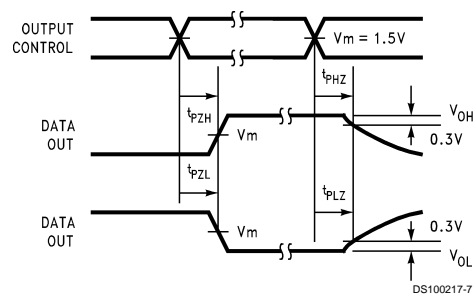
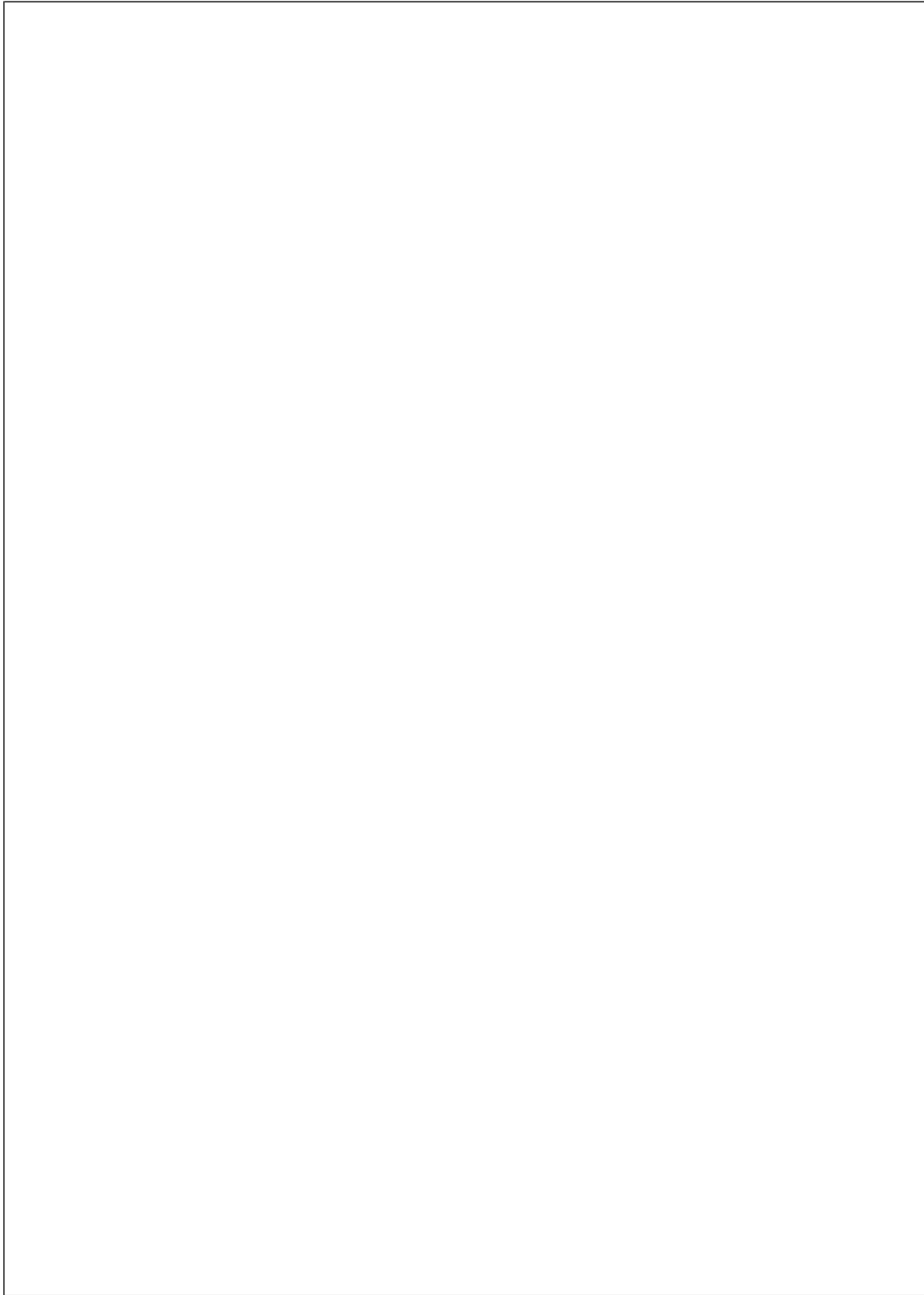
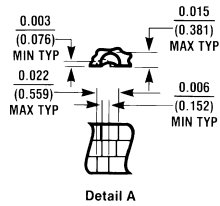
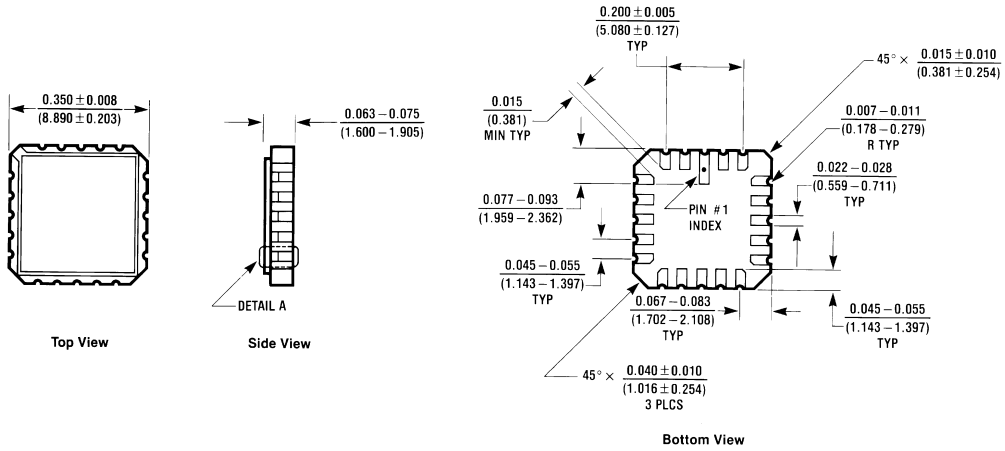


FIGURE 5. TRI-STATE Output HIGH and LOW Enable and Disable Time

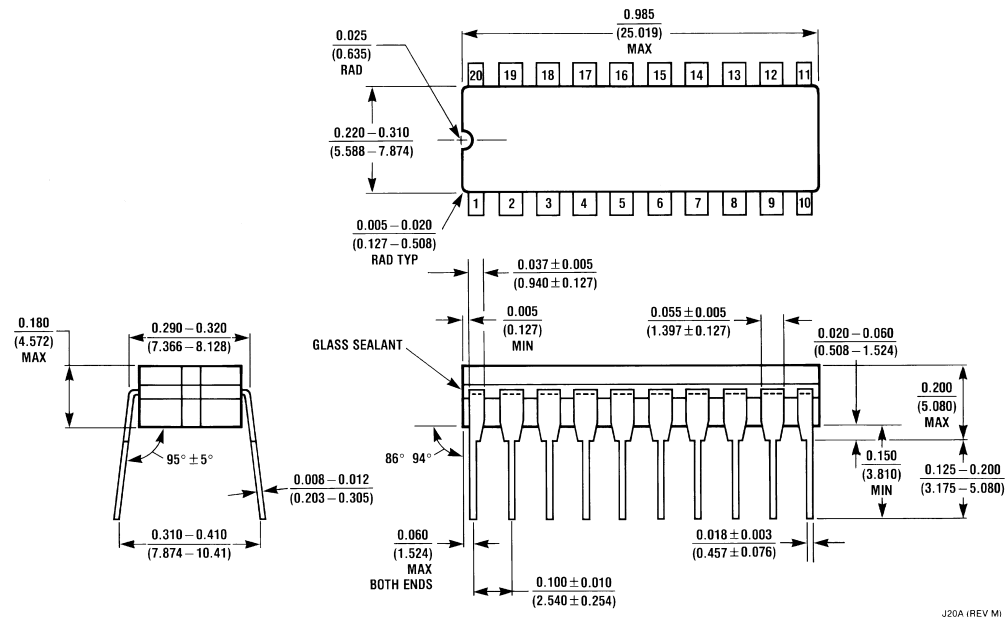


Physical Dimensions inches (millimeters) unless otherwise noted



**20-Terminal Ceramic Chip Carrier
 NS Package Number E20A**

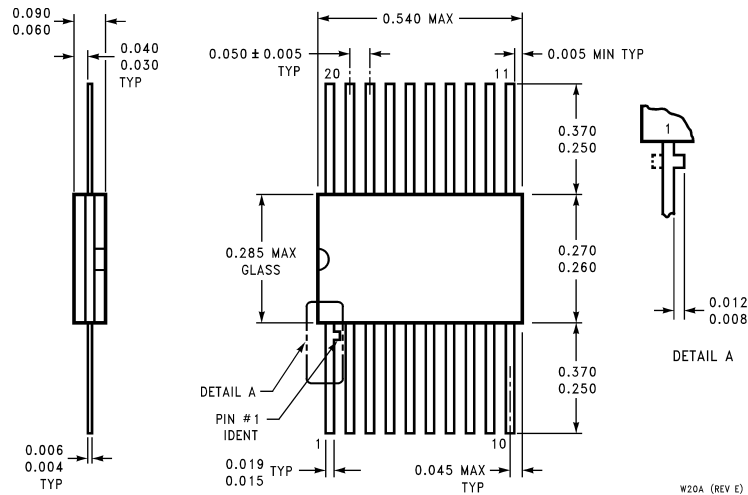
E20A (REV D)



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

J20A (REV M)

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



**20-Lead Ceramic Flatpack
NS Package Number W20A**

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