

54FCT541

54FCT541 Octal Buffer/Line Driver with -TRISTATE Outputs



Literature Number: SNOS424

54FCT541

Octal Buffer/Line Driver with TRI-STATE® Outputs

General Description

The 'FCT541 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 'FCT541 is similar to the 'FCT244 with broad-side pinout.

Features

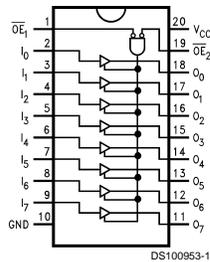
- Non-inverting buffers
- TTL input and output level compatible
- CMOS power consumption
- Output sink capability of 48 mA, source capability of 12 mA
- Flow-through pinout for ease of PC board layout
- Standard Microcircuit Drawing (SMD) 5962-8976601

Ordering Code

Military	Package Number	Package Description
54FCT541DMQB	J20A	20-Lead Ceramic Dual-In-Line
54FCT541FMQB	W20A	20-Lead Cerpack
54FCT541LMQB	E20A	20-Lead Ceramic Leadless Chip Carrier, Type C

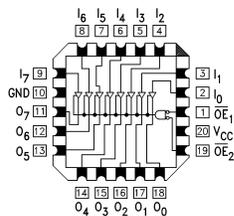
Connection Diagram

Pin Assignment
DIP and Cerpack



DS100953-1

Pin Assignment
LCC



DS100953-30

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

Inputs			Outputs
\overline{OE}_1	\overline{OE}_2	I	FCT541
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

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	-500 mA

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

DC Electrical Characteristics

Symbol	Parameter	FCT541			Units	V _{CC}	Conditions
		Min	Typ	Max			
V _{IH}	Input HIGH Voltage	2.0			V		Recognized HIGH Signal
V _{IL}	Input LOW Voltage				V		Recognized LOW Signal
V _{CD}	Input Clamp Diode Voltage				V	Min	I _{IN} = -18 mA
V _{OH}	Output HIGH Voltage	54FCT	4.3		V	Min	I _{OH} = -300 μA
		54FCT	2.4		V	Min	I _{OH} = -12 mA
V _{OL}	Output LOW Voltage	54FCT		0.2	V	Min	I _{OL} = 300 μA
		54FCT		0.55	V	Min	I _{OL} = 48 mA
I _{IH}	Input HIGH Current				μA	Max	V _{IN} = V _{CC}
I _{IL}	Input LOW Current				μA	Max	V _{IN} = 0.0V
I _{OZH}	Output Leakage Current				μA	Max	V _{OUT} = 5.5V; $\overline{OE}_n = 2.0V$
I _{OZL}	Output Leakage Current				μA	Max	V _{OUT} = 0.0V; $\overline{OE}_n = 2.0V$
I _{OS}	Output Short-Circuit Current				mA	Max	V _{OUT} = 0.0V
I _{CCQ}	Quiescent Power Supply Current				mA	Max	V _{IN} < 0.2V or V _{IN} 5.3V, V _{CC} = 5.5V
ΔI _{CC}	Quiescent Power Supply Current				mA	Max	V _I = V _{CC} - 2.1V
I _{CCD}	Dynamic I _{CC}				mA/ MHz	Max	V _{CC} = 5.5V, Outputs Open, One Bit Toggling, 50% Duty Cycle, $\overline{OE}_n = GND$
I _{CC}	Total Power Supply Current				mA	Max	V _{CC} = 5.5V, Outputs Open, f _I = 10MHz, $\overline{OE}_n = GND$, One Bit Toggling, 50% Duty Cycle, $\overline{OE}_n = GND$

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.

AC Electrical Characteristics

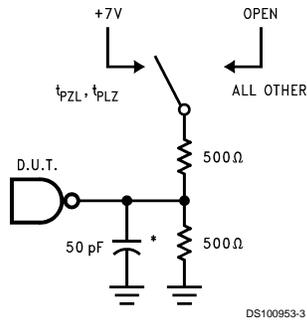
Symbol	Parameter	54FCT		Units	Fig. No.
		$T_A = -55^\circ\text{C to } +125^\circ\text{C}$			
		$V_{CC} = 4.5\text{V} - 5.5\text{V}$ $C_L = 50\text{ pF}$			
		Min	Max		
t_{PLH}	Propagation Delay	2.0	9.0	ns	Figure 4
t_{PHL}	Data to Outputs	2.0	9.0		
t_{PZH}	Output Enable Time	2.0	12.5	ns	Figure 5
t_{PZL}		2.0	12.5		
t_{PHZ}	Output Disable Time	2.0	12.5	ns	Figure 5
t_{PLZ}		2.0	12.5		

Capacitance

Symbol	Parameter	Max	Units	Conditions $T_A = 25^\circ\text{C}$
C_{IN}	Input Capacitance	10.0	pF	$V_{CC} = 0.0\text{V}$
C_{OUT} (Note 3)	Output Capacitance	12.0	pF	$V_{CC} = 5.0\text{V}$

Note 3: C_{OUT} is measured at frequency of $f = 1\text{ MHz}$, per MIL-STD-883B, Method 3012.

AC Loading



*Includes jig and probe capacitance

FIGURE 1. Standard AC Test Load

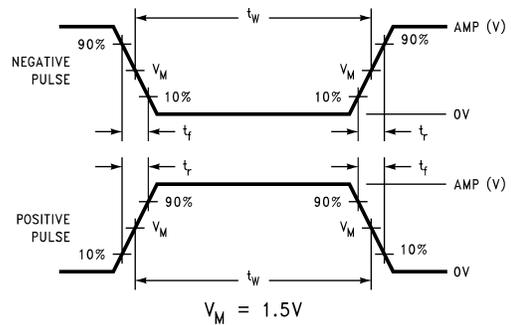


FIGURE 2. Test Input Signal Levels

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

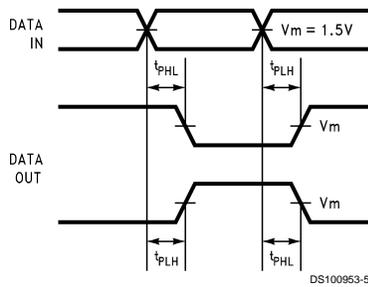


FIGURE 4. Propagation Delay Waveforms for Inverting and Non-Inverting Functions

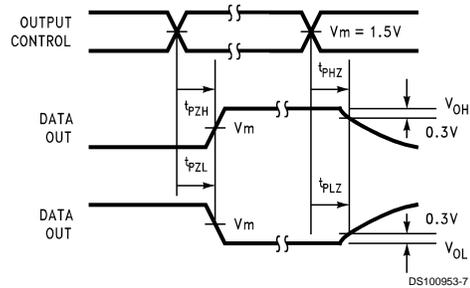
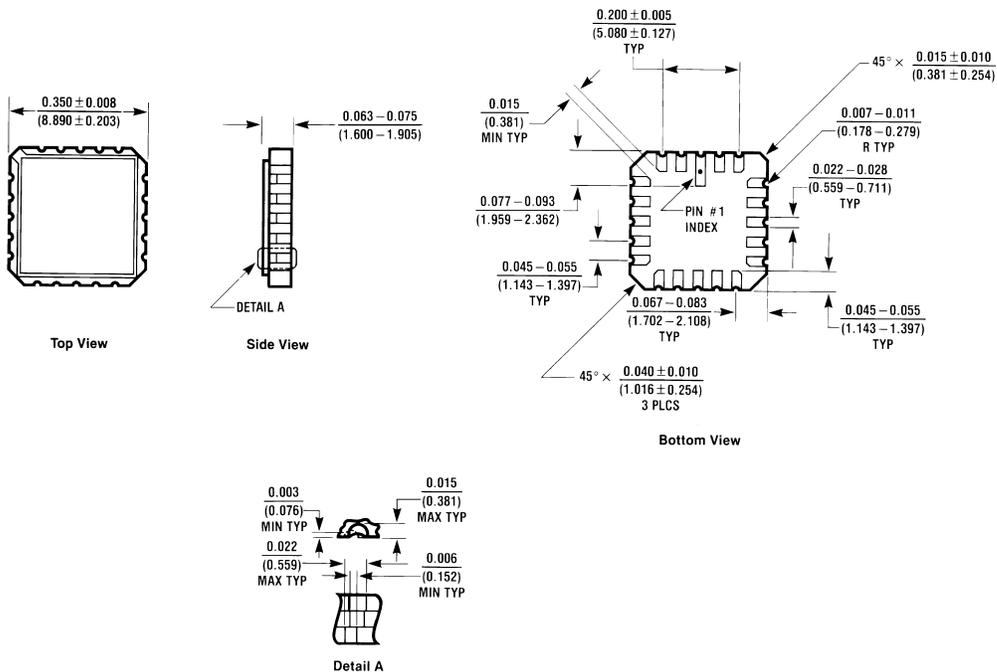


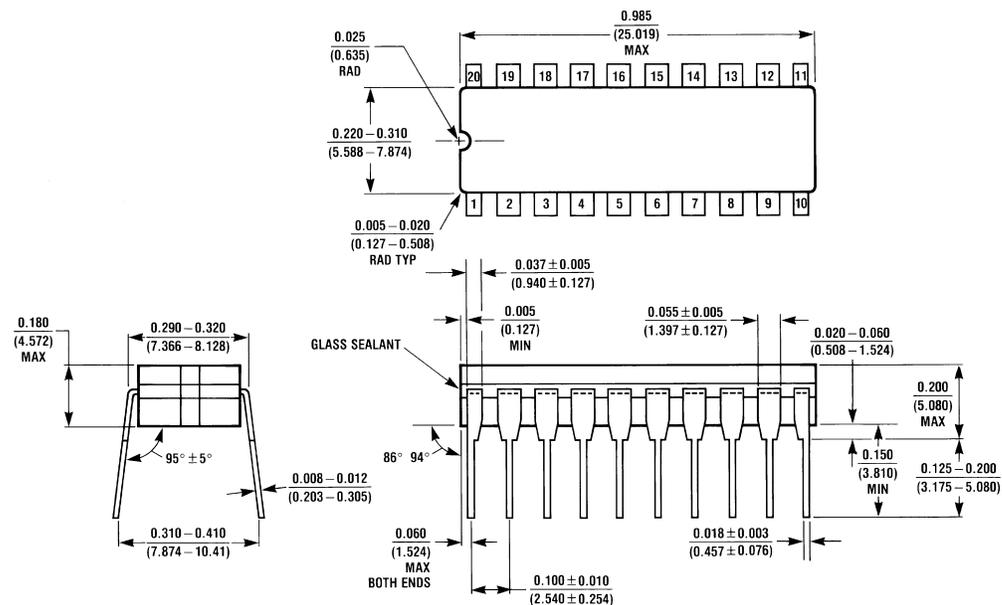
FIGURE 5. TRI-STATE Output HIGH and LOW Enable and Disable Time

Physical Dimensions inches (millimeters) unless otherwise noted



E20A (REV D)

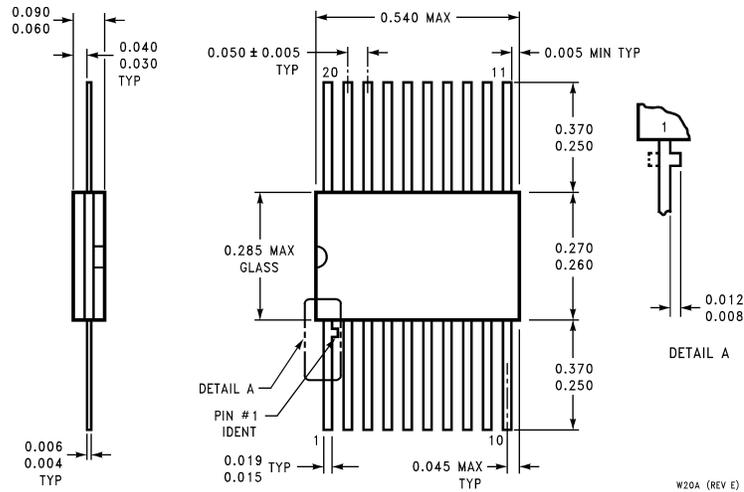
20-Terminal Ceramic Chip Carrier
NS Package Number E20A



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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