

# 54FCT241

## Octal Buffer/Line Driver with TRI-STATE® Outputs

### General Description

The FCT241 is an octal buffer and line driver with 3-STATE outputs designed to be employed as a memory and address driver, clock driver, or bus-oriented transmitter/receiver.

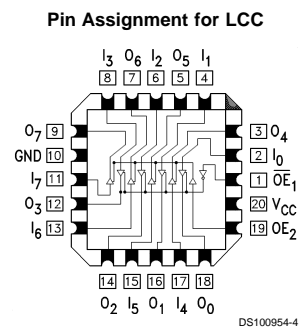
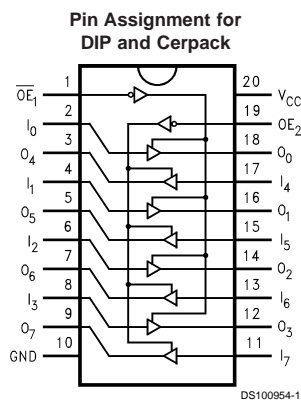
### Features

- TTL input and output level compatible
- CMOS power consumption
- Non-inverting buffers
- Output sink capability of 48 mA, source capability of 12 mA

### Ordering Code

Military	Package Number	Package Description
54FCT241DMQB	J20A	20-Lead Ceramic Dual-In-Line
54FCT241FMQB	W20A	20-Lead Cerpack
54FCT241LMQB	E20A	20-Lead Ceramic Leadless Chip Carrier, Type C

### Connection Diagram



Pin Names	Description
$\overline{OE}_1$	Output Enable Input (Active Low)
$OE_2$	Output Enable Input (Active High)
$I_0-I_7$	Inputs
$O_0-O_7$	Outputs

$\overline{OE}_1$	$I_{0-3}$	$O_{0-3}$	$\overline{OE}_2$	$I_{4-7}$	$O_{4-7}$
H	X	Z	L	X	Z
L	H	H	H	H	H
L	L	L	H	L	L

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

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**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 <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  
 (Over Comm Operating Range) -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

**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	54FCT	4.3		V	Min	I <sub>OH</sub> = -3 mA
		54FCT	2.4		V	Min	I <sub>OH</sub> = -12 mA
V <sub>OL</sub>	Output LOW Voltage	54FCT		0.2	V	Min	I <sub>OL</sub> = 300 uA
		54FCT		0.5	V	Min	I <sub>OL</sub> = 48 mA
I <sub>IH</sub>	Input HIGH Current			5	μA	Max	V <sub>IN</sub> = 2.7V (Note 3) V <sub>IN</sub> = V <sub>CC</sub>
I <sub>IL</sub>	Input LOW Current			-5	μA	Max	V <sub>IN</sub> = 0.5V (Note 3) V <sub>IN</sub> = 0.0V
				-5	μA	Max	V <sub>IN</sub> = 0.5V (Note 3) V <sub>IN</sub> = 0.0V
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	-60			mA	Max	V <sub>OUT</sub> = 0.0V
I <sub>CCH</sub>	Power Supply Current			160	μA	Max	All Outputs HIGH
I <sub>CCL</sub>	Power Supply Current			160	μA	Max	All Outputs LOW
I <sub>CCZ</sub>	Power Supply Current			160	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			2.0	mA	Max	V <sub>I</sub> = V <sub>CC</sub> - 2.1V
I <sub>CCD</sub>	Dynamic I <sub>CC</sub>			0.4	mA/ MHz	Max	Outputs Open, $\overline{OE}_n = GND$ , One Bit Toggling, 50% Duty Cycle

**Note 3:** Guaranteed, but not tested.

**AC Electrical Characteristics**

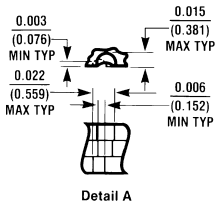
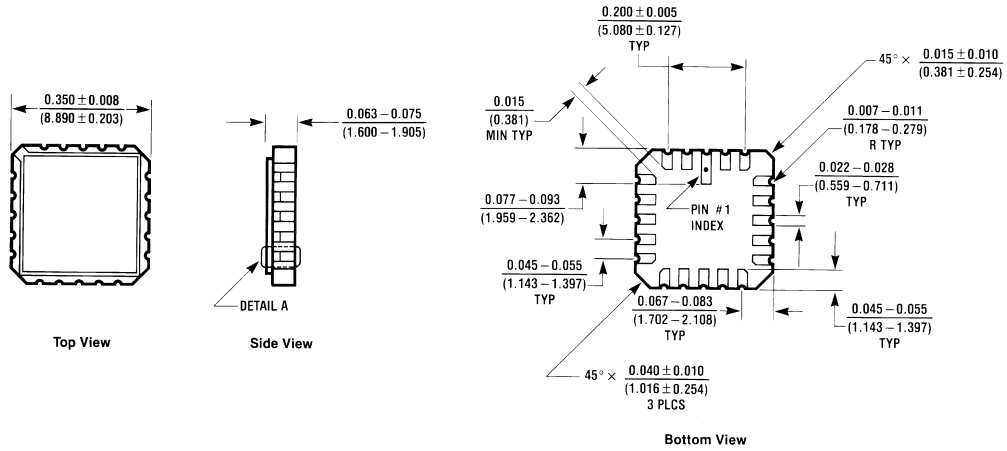
Symbol	Parameter	$T_A = -55^\circ\text{C to } +125^\circ\text{C}$ $V_{CC} = 4.5\text{V} - 5.5\text{V}$ $C_L = 50\text{ pF}$		Units	Fig. No.
		Min	Max		
$t_{PLH}$	Propagation Delay	1.5	9.0	ns	
$t_{PHL}$	Data to Outputs	1.5	9.0		
$t_{PZH}$	Output Enable	1.5	9.5	ns	
$t_{PZL}$	Time	1.5	12.5		
$t_{PHZ}$	Output Disable	1.5	11.5	ns	
$t_{PLZ}$	Time	1.5	11.5		

**Capacitance**

Symbol	Parameter	Max	Units	Conditions $T_A = 25^\circ\text{C}$
$C_{IN}$	Input Capacitance	10.0	pF	$V_{CC} = 0\text{V}$
$C_{OUT}$ (Note 4)	Output Capacitance	12.0	pF	$V_{CC} = 5.0\text{V}$

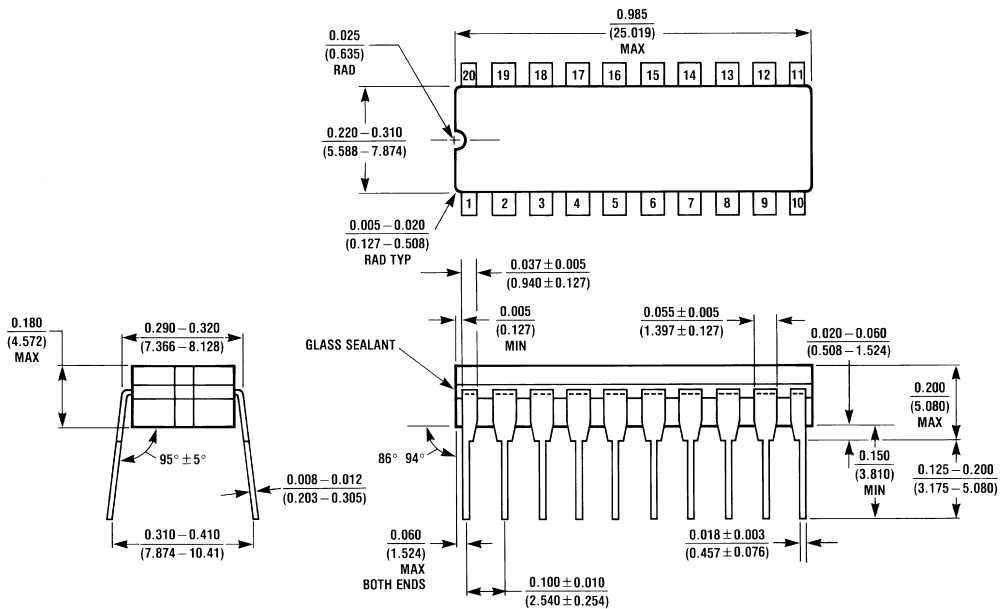
**Note 4:**  $C_{OUT}$  is measured at frequency  $f = 1\text{ MHz}$ , per MIL-STD-883B, Method 3012.

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



**20-Lead Ceramic Leadless Chip Carrier**  
Package Number E20A

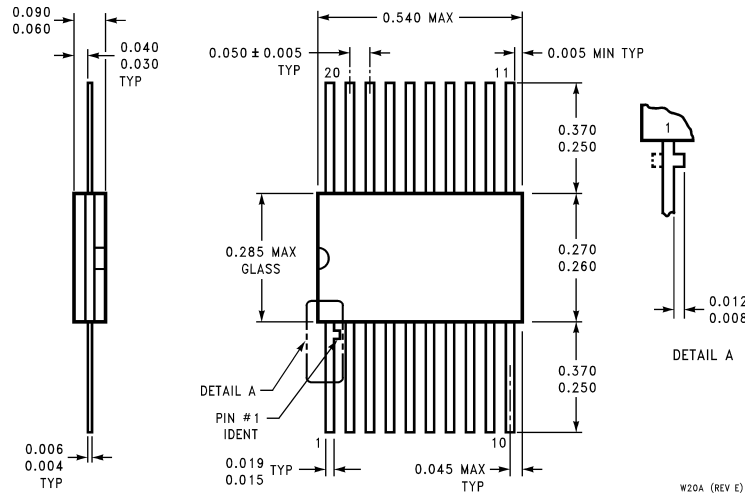
E20A (REV 01)



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

J20A (REV M)

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



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

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