August 1998

National Semiconductor

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

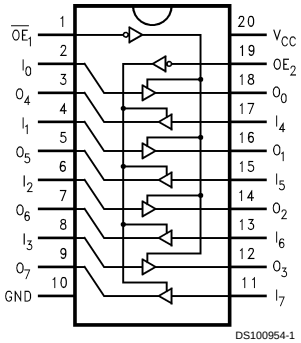
- TTL input and output level compatible
- CMOS power consumption
- Non-inverting buffers
- Output sink capability of 48 mA, source capability of 12 mA

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 Assignment for DIP and Cerpack



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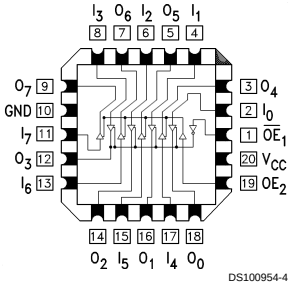
Pin Assignment for LCC



DS100954-4

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

Truth Table

$\overline{OE}_1$	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_{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	
(Over Comm Operating Range)	−500 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		Min	Typ	Max	Units	V_{CC}	Conditions
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	54FCT	4.3			V	Min	I_{OH} = −3 mA
		54FCT	2.4			V	Min	I_{OH} = −12 mA
V_{OL}	Output LOW Voltage	54FCT			0.2	V	Min	I_{OL} = 300 uA
		54FCT			0.5	V	Min	I_{OL} = 48 mA
I_{IH}	Input HIGH Current				5	µA	Max	V_{IN} = 2.7V (Note 3)
					5			V_{IN} = V_{CC}
I_{IL}	Input LOW Current				−5	µA	Max	V_{IN} = 0.5V (Note 3)
					−5			V_{IN} = 0.0V
I_{OZH}	Output Leakage Current				10	µA	0 − 5.5V	V_{OUT} = 2.7V; $\overline{OE}_n$ = 2.0V
I_{OZL}	Output Leakage Current				−10	µA	0 − 5.5V	V_{OUT} = 0.5V; $\overline{OE}_n$ = 2.0V
I_{OS}	Output Short-Circuit Current		−60			mA	Max	V_{OUT} = 0.0V
I_{CCH}	Power Supply Current				160	µA	Max	All Outputs HIGH
I_{CCL}	Power Supply Current				160	µA	Max	All Outputs LOW
I_{CCZ}	Power Supply Current				160	µA	Max	$\overline{OE}_n$ = V_{CC}, All Others at V_{CC} or Ground
I_{CCT}	Additional I_{CC}/Input	Outputs Enabled			2.0	mA	Max	V_I = V_{CC} − 2.1V
I_{CCD}	Dynamic I_{CC}	No Load			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˚C to +125˚C, V_{CC} = 4.5V–5.5V, C_L = 50 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	

AC Electrical Characteristics (Continued)

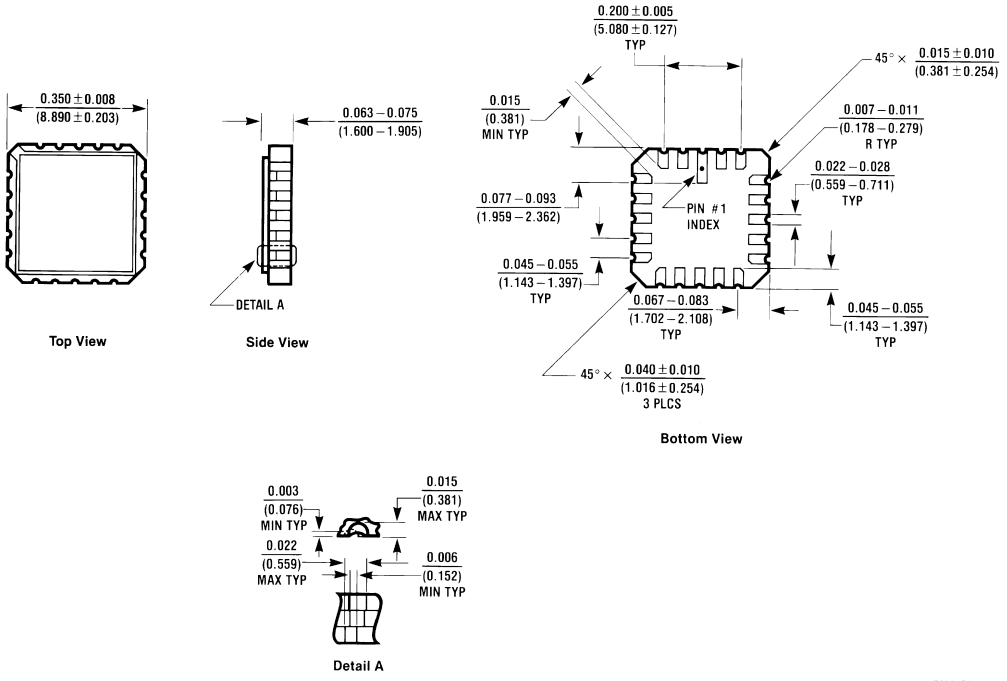
Symbol	Parameter	$T_A = -55^\circ C$ to $+125^\circ C$, $V_{CC} = 4.5V-5.5V$, $C_L = 50$ pF		Units	Fig. No.
		Min	Max		
t_{PZL}	Time	1.5	12.5		
t_{PHZ}	Output Disable	1.5	11.5	ns	
t_{PLZ}	Time	1.5	11.5		

Capacitance

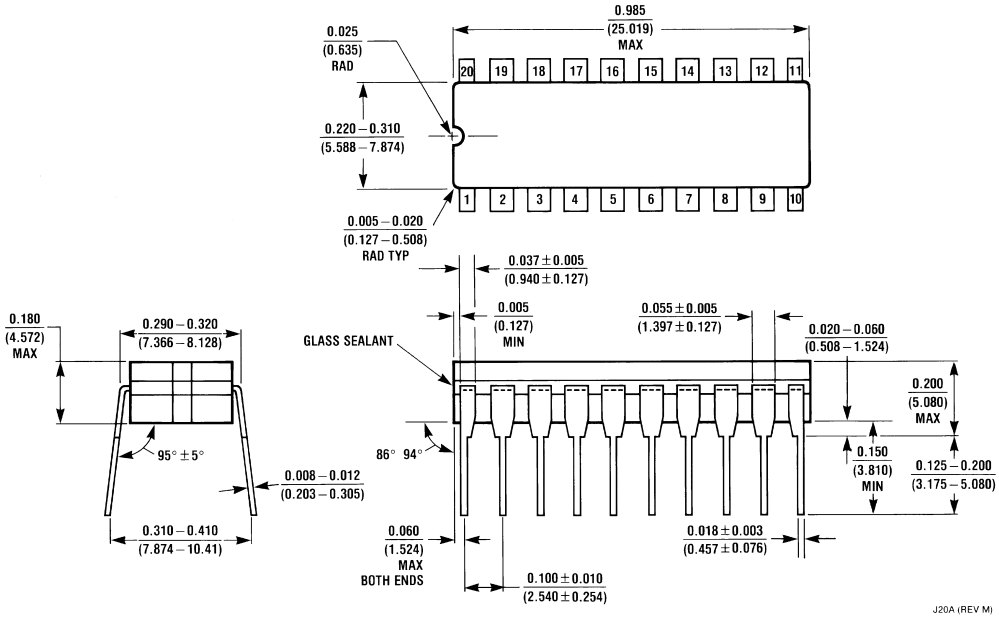
Symbol	Parameter	Max	Units	Conditions $T_A = 25^\circ C$
C_{IN}	Input Capacitance	10.0	pF	V_{CC} = 0V
C_{OUT} (Note 4)	Output Capacitance	12.0	pF	V_{CC} = 5.0V

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

Physical Dimensions inches (millimeters) unless otherwise noted

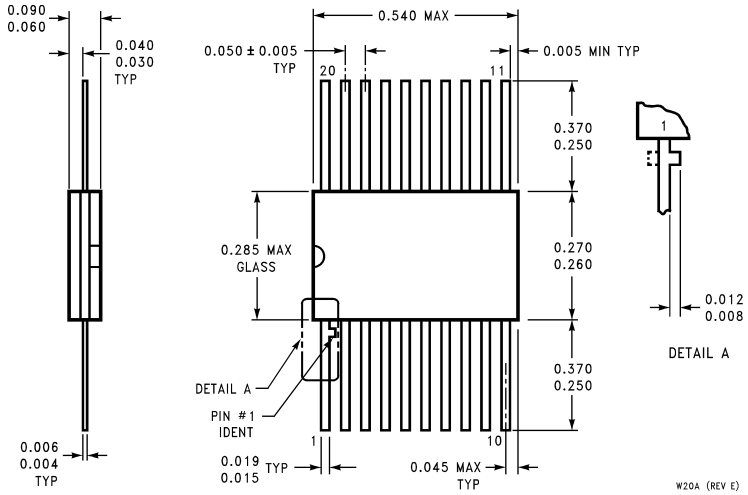


20-Lead Ceramic Leadless Chip Carrier
Package Number E20A



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

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



20-Lead Ceramic Flatpack
Package Number W20A

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2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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