

54FCT540

Octal Buffer/Line Driver with TRI-STATE® Outputs

General Description

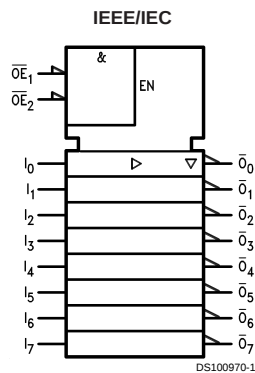
The 'FCT540 is an octal buffer/line drivers designed to be employed as memory and address drivers, clock drivers and bus oriented transmitter/receivers.

These devices are similar in function to the 'FCT240 while providing flow-through architecture (inputs on opposite side from outputs). This pinout arrangement makes these devices especially useful as output ports for microprocessors, allowing ease of layout and greater PC board density.

Features

- TRI-STATE inverting outputs
- Inputs and outputs opposite side of package, allowing easier interface to microprocessors
- TTL input and output level compatible
- CMOS power consumption
- Output sink capability of 48mA, source capability of 12 mA
- Standard Microcircuit Drawing (SMD) 5962-8976701

Logic Symbol

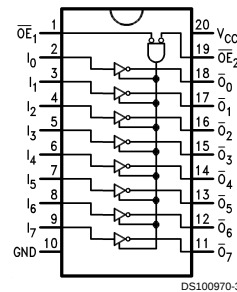


Inputs			Outputs
OE ₁	OE ₂	I	
L	L	H	L
H	X	X	Z
X	H	X	Z
L	L	L	H

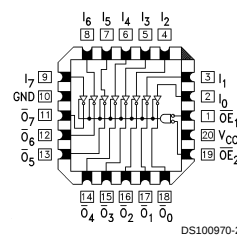
H = HIGH Voltage Level
L = LOW Voltage Level
X = Immaterial
Z = High Impedance

Connection Diagrams

Pin Assignment for DIP and Flatpak



Pin Assignment for LCC



Absolute Maximum Ratings (Note 1)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Supply Voltage (V_{CC})	-0.5V to +7.0V
DC Input Diode Current (I_{IK})	
$V_I = -0.5V$	-20 mA
$V_I = V_{CC} + 0.5V$	+20 mA
DC Input Voltage (V_I)	-0.5V to $V_{CC} + 0.5V$
DC Output Diode Current (I_{OK})	
$V_O = -0.5V$	-20 mA
$V_O = V_{CC} + 0.5V$	+20 mA
DC Output Voltage (V_O)	-0.5V to $V_{CC} + 0.5V$
DC Output Source	
or Sink Current (I_O)	±50 mA
DC V_{CC} or Ground Current	
per Output Pin (I_{CC} or I_{GND})	±50 mA

Storage Temperature (T_{STG}) -65°C to +150°C

Junction Temperature (T_J)
CDIP 175°C

Recommended Operating Conditions

Supply Voltage (V_{CC})	
'FCT	2.0V to 6.0V
Input Voltage (V_I)	0V to V_{CC}
Output Voltage (V_O)	0V to V_{CC}
Operating Temperature (T_A)	
54FCT	-55°C to +125°C

Note 1: Absolute maximum ratings are those values beyond which damage to the device may occur. The databook specifications should be met, without exception, to ensure that the system design is reliable over its power supply, temperature, and output/input loading variables. National does not recommend operation of FACT® circuits outside databook specifications.

DC Characteristics for 'FCT Family Devices

Symbol	Parameter	FCT540		Units	V_{CC}	Conditions
		Min	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	54FCT	4.3	V	Min	$I_{OH} = -300$ μ A
		54FCT	2.4	V	Min	$I_{OH} = -12$ mA
V_{OL}	Output LOW Voltage	54FCT	0.2	V	Min	$I_{OL} = 300$ μ A
		54FCT	0.55	V	Min	$I_{OL} = 48$ mA
I_{IH}	Input HIGH Current		5	μ A	Max	$V_{IN} = V_{CC}$
I_{IL}	Input LOW Current		-5	μ A	Max	$V_{IN} = 0.0V$
I_{OZH}	Output Leakage Current		10	μ A	Max	$V_{OUT} = 5.5V$; $\overline{OE}_n = 2.0V$
I_{OZL}	Output Leakage Current		-10	μ A	Max	$V_{OUT} = 0.0V$; $\overline{OE}_n = 2.0V$
I_{OS}	Output Short-Circuit Current		-60	mA	Max	$V_{OUT} = 0.0V$
I_{CCQ}	Quiescent Power Supply Current		1.5	mA	Max	$V_{IN} < 0.2V$ or $V_{IN} 5.3V$, $V_{CC} = 5.5V$
ΔI_{CC}	Quiescent Power Supply Current		2.0	mA	Max	$V_I = V_{CC} - 2.1V$
I_{CCD}	Dynamic I_{CC}		0.4	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		6.0	mA	Max	$V_{CC} = 5.5V$, Outputs Open, fl = 10MHz, $\overline{OE}_n = GND$, One Bit Toggling, 50% Duty Cycle

Note 2: All outputs loaded; thresholds on input associated with output under test.

Note 3: Maximum test duration 2.0 ms, one output loaded at a time.

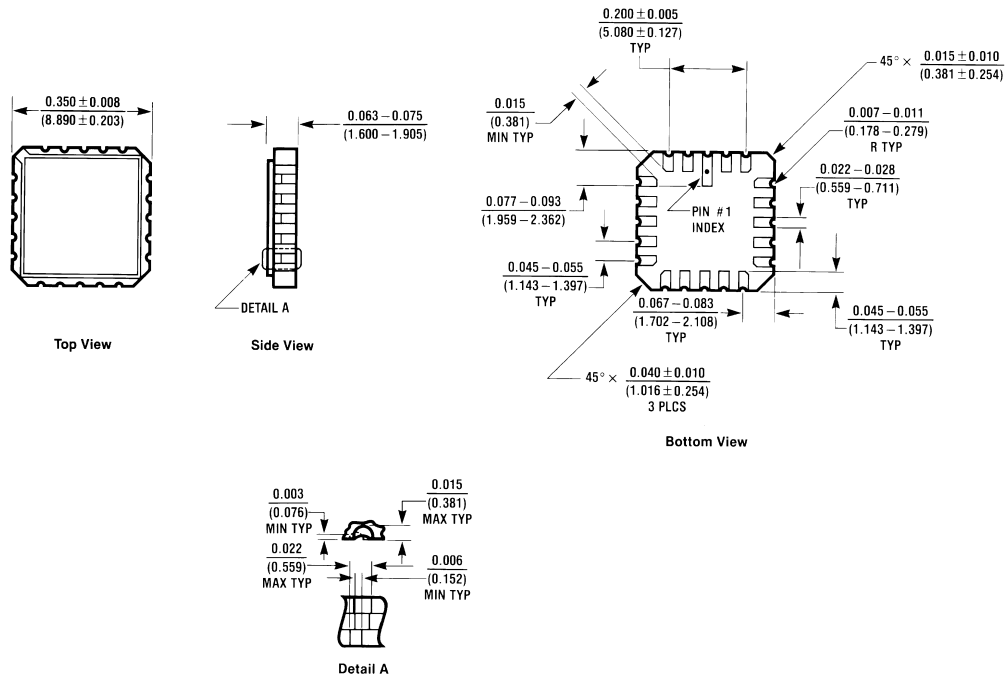
AC Electrical Characteristics

Symbol	Parameter	54FCT		Units
		T _A = -55°C to +125°C V _{CC} = 4.5V-5.5V C _L = 50 pF		
		Min	Max	
t _{PLH}	Propagation Delay	2.0	9.5	ns
t _{PHL}	Data to Outputs	2.0	9.5	
t _{PZH}	Output Enable Time	2.0	12.5	ns
t _{PZL}		2.0	12.5	
t _{PHZ}	Output Disable Time	2.0	12.5	ns
t _{PLZ}		2.0	12.5	

Capacitance

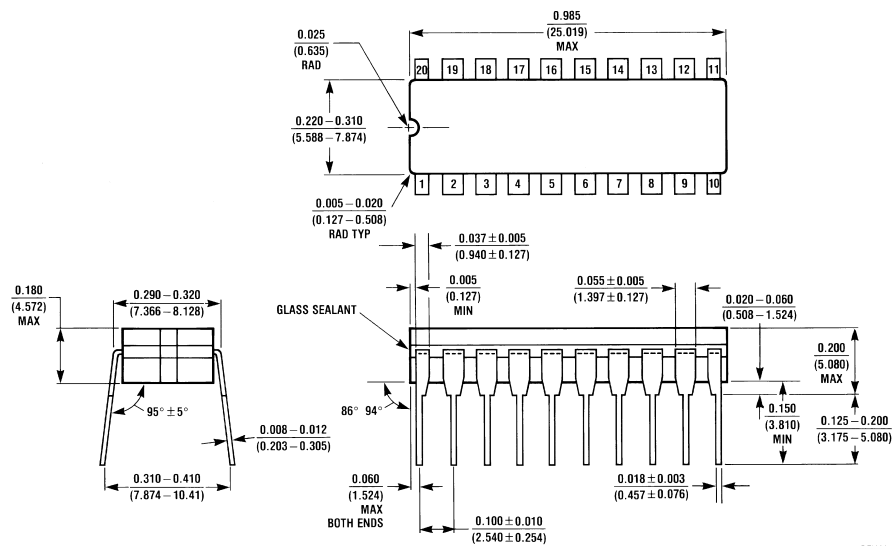
Symbol	Parameter	Typ	Units	Conditions
C_{IN}	Input Capacitance	4.5	pF	$V_{CC} = \text{OPEN}$
C_{PD}	Power Dissipation Capacitance	30.0	pF	$V_{CC} = 5.0\text{V}$

Physical Dimensions inches (millimeters) unless otherwise noted



E20A (REV D)

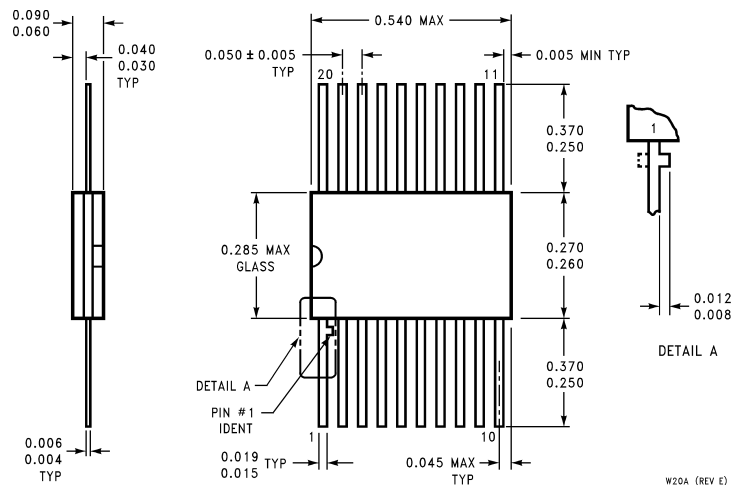
20-Terminal Ceramic Leadless Chip Carrier (L)
NS Package Number E20A



J20A (REV M)

20-Lead Ceramic Dual-In-Line Package (D)
NS Package Number J20A

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



20-Lead Ceramic Flatpak (F)
NS Package Number W20A

LIFE SUPPORT POLICY

NATIONAL'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT AND GENERAL COUNSEL OF NATIONAL SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component is 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.



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: 81-3-5639-7560
Fax: 81-3-5639-7507