

54AC540

Octal Buffer/Line Driver with TRI-STATE® Outputs

General Description

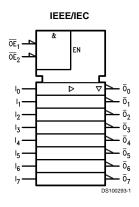
The 'AC540 is an octal buffer/line drivers designed to be employed as memory and address drivers, clock drivers and bus oriented transmitter/receivers.

These devices are similar in function to the 'AC240 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

- I_{CC} and I_{OZ} reduced by 50%
- TRI-STATE inverting outputs
- Inputs and outputs opposite side of package, allowing easier interface to microprocessors
- Output source/sink 24 mA
- Standard Military Drawing 54AC540: 5962-8769501

Logic Symbol



Truth Table

Inputs			Outputs
ŌĒ₁	OE ₂	ı	
L	L	Н	L
Н	X	Χ	Z
X	Н	Χ	Z
L	L	L	Н

H = HIGH Voltage Level L = LOW Voltage Level

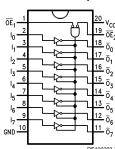
X = Immaterial

Z = High Impedance

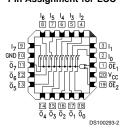
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Connection Diagrams

Pin Assignment for DIP and Flatpak



Pin Assignment for LCC



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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.

Supply Voltage (V_{CC}) -0.5V to +7.0VDC Input Diode Current (IIK)

 $V_1 = -0.5V$ -20 mA $V_I = V_{CC} + 0.5V$ +20 mA

DC Input Voltage (V_I) -0.5V to $V_{\rm CC}$ + 0.5V

DC Output Diode Current (I_{OK})

 $V_{O} = -0.5V$ -20 mA $V_{\rm O} = V_{\rm CC} + 0.5V$ +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

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

CDIP 175°C

Recommended Operating Conditions

Supply Voltage (V_{CC})

2.0V to 6.0V 'AC 0V to $V_{\rm CC}$ Input Voltage (V_I) Output Voltage (V_O) 0V to V_{CC}

Operating Temperature (T_A)

54AC -55°C to +125°C

Minimum Input Edge Rate (ΔV/Δt)

'AC Devices

 $\rm V_{IN}$ from 30% to 70% of $\rm V_{CC}$

 V_{CC} @ 3.3V, 4.5V, 5.5V 125 mV/ns

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 $^{\scriptscriptstyle\mathsf{TM}}$ circuits outside databook specifications.

DC Characteristics for 'AC Family Devices

	Parameter		54AC	Units	Conditions
Symbol		V _{cc}	T _A =		
		(V)	-55°C to +125°C		
			Guaranteed Limits		
V _{IH}	Minimum High Level	3.0	2.1		V _{OUT} = 0.1V
	Input Voltage	4.5	3.15	V	or V _{CC} – 0.1V
		5.5	3.85		
V _{IL}	Maximum Low Level	3.0	0.9		V _{OUT} = 0.1V
	Input Voltage	4.5	1.35	V	or V _{CC} – 0.1V
		5.5	1.65		
V _{OH}	Minimum High Level	3.0	2.9		I _{OUT} = -50 μA
	Output Voltage	4.5	4.4	V	
		5.5	5.4		
					(Note 2)
					$V_{IN} = V_{IL} \text{ or } V_{IH}$
		3.0	2.4		$I_{OH} = -12 \text{ mA}$
		4.5	3.7	V	$I_{OH} = -24 \text{ mA}$
		5.5	4.7		I _{OH} = -24 mA
V_{OL}	Maximum Low Level	3.0	0.1		I _{OUT} = 50 μA
	Output Voltage	4.5	0.1	V	
		5.5	0.1		
					(Note 2)
					$V_{IN} = V_{IL} \text{ or } V_{IH}$
		3.0	0.50		I _{OL} = 12 mA
		4.5	0.50	V	I _{OL} = 24 mA
		5.5	0.50		I _{OL} = 24 mA
I _{IN}	Maximum Input	5.5	±1.0	μA	$V_I = V_{CC}$, GND
	Leakage Current				
I_{OZ}	Maximum TRI-STATE				V_{I} (OE) = V_{IL} , V_{IH}
	Current	5.5	±5.0	μA	$V_I = V_{CC}$, GND
					$V_O = V_{CC}$, GND

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DC Characteristics for 'AC Family Devices (Continued)

			54AC		
Symbol	Parameter	V _{cc} (V)	T _A = -55°C to +125°C	Units	Conditions
			Guaranteed Limits		
	(Note 3)				
I _{OLD}	Minimum Dynamic	5.5	50	mA	V _{OLD} = 1.65V Max
I _{OHD}	Output Current	5.5	-50	mA	V _{OHD} = 3.85V Min
I _{cc}	Maximum Quiescent	5.5	80.0	μΑ	V _{IN} = V _{CC}
	Supply Current				or GND

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.

Note 4: I_{IN} and I_{CC} @ 3.0V are guaranteed to be less than or equal to the respective limit @ 5.5V V_{CC} . I_{CC} for 54AC @ 25°C is identical to 74AC @ 25°C.

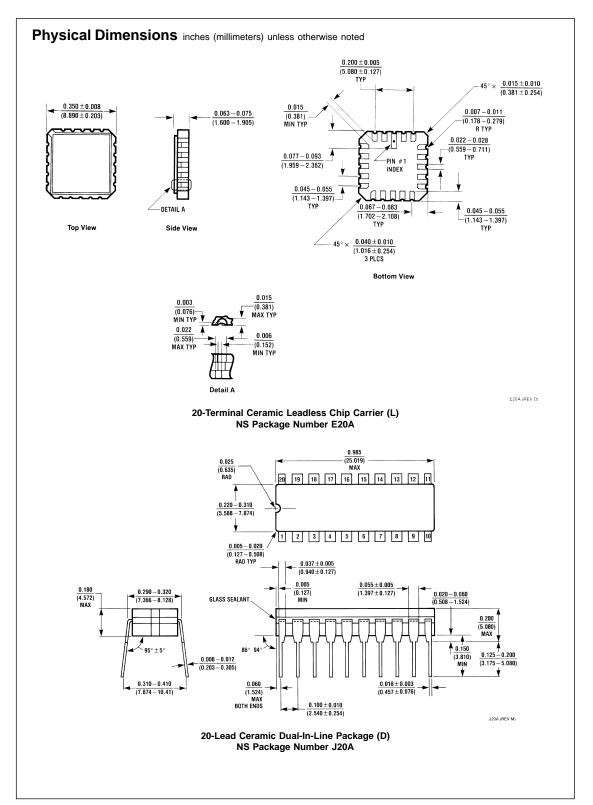
AC Electrical Characteristics

	Parameter	V _{cc} (V) (Note 5)	54AC T _A = -55°C to +125°C C _L = 50 pF		Units
Symbol					
			Min	Max	
t _{PLH}	Propagation Delay	3.3	1.0	9.0	ns
	Data to Output	5.0	1.5	7.0	
t _{PHL}	Propagation Delay	3.3	1.0	8.0	ns
	Data to Output	5.0	1.5	6.5	
t _{PZH}	Output Enable Time	3.3	1.0	13.0	ns
		5.0	1.5	10.0	
t _{PZL}	Output Enable Time	3.3	1.0	12.0	ns
		5.0	1.5	9.0	
t _{PHZ}	Output Disable Time	3.3	1.0	15.5	ns
		5.0	1.5	12.0	
t _{PLZ}	Output Disable Time	3.3	1.0	12.0	ns
		5.0	1.5	10.0	

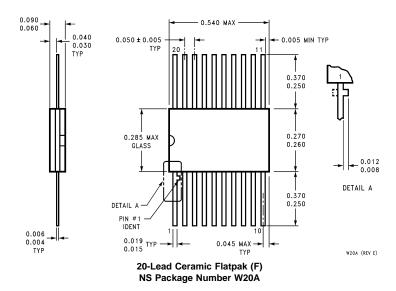
Note 5: Voltage Range 3.3 is 3.3V ±0.3V Voltage Range 5.0 is 5.0V ±0.5V

Capacitance

Symbol	Parameter	Тур	Units	Conditions
C _{IN}	Input Capacitance	4.5	pF	V _{CC} = OPEN
C _{PD}	Power Dissipation	30.0	pF	V _{CC} = 5.0V
	Capacitance			



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



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