

# Octal Buffer/Line Driver with 3-State Outputs

## 74AC540

### 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%
- 3-State Inverting Outputs
- Inputs and Outputs Opposite Side of Package, Allowing Easier Interface to Microprocessors
- Outputs Source/Sink 24 mA
- These are Pb-Free Devices

### TRUTH TABLE

Inputs			Outputs
$\overline{OE}_1$	$\overline{OE}_2$	D	
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

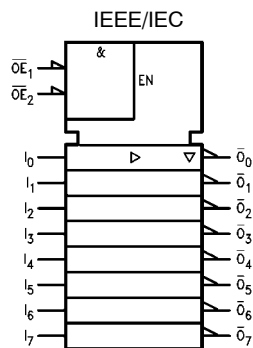


Figure 1. Logic Symbol

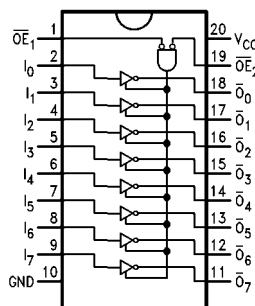
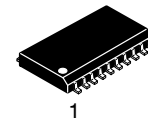
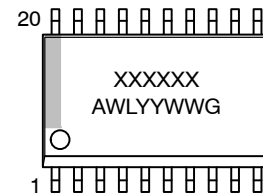


Figure 2. Connection Diagram



SOIC-20W  
CASE 751BJ

### MARKING DIAGRAM



- XXX = Specific Device Code  
A = Assembly Location  
WL = Wafer Lot  
YY = Year  
WW = Work Week  
G = Pb-Free Package

### ORDERING INFORMATION

See detailed ordering and shipping information on page 4 of this data sheet.

**ABSOLUTE MAXIMUM RATINGS**

Parameter	Symbol	Value	Unit
Supply Voltage	$V_{CC}$	-0.5 to 6.5	V
DC Input Diode Current $V_I = -0.5\text{ V}$ $V_I = V_{CC} + 0.5\text{ V}$	$I_{IK}$	-20 +20	mA
DC Input Voltage	$V_I$	-0.5 to $V_{CC} + 0.5$	V
DC Output Diode Current $V_O = -0.5\text{ V}$ $V_O = V_{CC} + 0.5\text{ V}$	$I_{OK}$	-20 +20	mA
DC Output Voltage	$V_O$	-0.5 to $V_{CC} + 0.5$	V
DC Output Source or Sink Current	$I_O$	$\pm 50$	mA
DC $V_{CC}$ or Ground Current per Output Pin	$I_{CC}$ or $I_{GND}$	$\pm 50$	mA
Storage Temperature	$T_{STG}$	-65 to +150	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

**RECOMMENDED OPERATING CONDITIONS**

Symbol	Parameter	Min	Max	Unit
$V_{CC}$	Supply Voltage	2.0	6.0	V
$V_I$	Input Voltage	0	$V_{CC}$	V
$V_O$	Output Voltage	0	$V_{CC}$	V
$T_A$	Operating Temperature	-40	85	°C
$\Delta V/\Delta t$	Minimum Input Edge Rate $V_{IN}$ from 30% to 70% $V_{CC}$ $V_{CC}$ @ 3.3 V, 4.5 V, 5.5 V	125		mV/ns

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

## DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	V <sub>CC</sub> (V)	T <sub>A</sub> = +25°C		T <sub>A</sub> = −40°C to +85°C	Unit	Conditions
			Typ	Guaranteed Limits			
V <sub>IH</sub>	Minimum High Level Input Voltage	3.0	1.5	2.1	2.1	V	V <sub>OUT</sub> = 0.1 V or V <sub>CC</sub> − 0.1 V
		4.5	2.25	3.15	3.15		
		5.5	2.75	3.85	3.85		
V <sub>IL</sub>	Maximum Low Level Input Voltage	3.0	1.5	0.9	0.9	V	V <sub>OUT</sub> = 0.1 V or V <sub>CC</sub> − 0.1 V
		4.5	2.25	1.35	1.35		
		5.5	2.75	1.65	1.65		
V <sub>OH</sub>	Minimum High Level Output Voltage	3.0	2.99	2.9	2.9	V	I <sub>OUT</sub> = −50 μA
		4.5	4.49	4.4	4.4		
		5.5	5.49	5.4	5.4		
		3.0	–	2.56	2.46	V	V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> I <sub>OH</sub> = −12 mA I <sub>OH</sub> = −24 mA I <sub>OH</sub> = −24 mA (Note 1)
		4.5	–	3.86	3.76		
		5.5	–	4.86	4.76		
		3.0	–	0.36	0.44		
V <sub>OL</sub>	Maximum Low Level Output Voltage	3.0	0.002	0.1	0.1	V	I <sub>OUT</sub> = 50 μA
		4.5	0.001	0.1	0.1		
		5.5	0.001	0.1	0.1		
		3.0	–	0.36	0.44	V	V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> I <sub>OL</sub> = 12 mA I <sub>OL</sub> = 24 mA I <sub>OL</sub> = 24 mA (Note 1)
		4.5	–	0.36	0.44		
		5.5	–	0.36	0.44		
		3.0	–	0.36	0.44		
I <sub>IN</sub> (Note 3)	Maximum Input Leakage Current	5.5	–	±0.1	±1.0	μA	V <sub>I</sub> = V <sub>CC</sub> , GND
I <sub>OZ</sub>	Maximum 3-State Current	5.5	–	±0.25	±2.5	μA	V <sub>I</sub> (OE) = V <sub>IL</sub> , V <sub>IH</sub> V <sub>I</sub> = V <sub>CC</sub> , GND V <sub>O</sub> = V <sub>CC</sub> , GND
I <sub>OLD</sub>	Minimum Dynamic Output Current (Note 2)	5.5	–	–	75	mA	V <sub>OLD</sub> = 1.65 V Max
I <sub>OHD</sub>		5.5	–	–	−75	mA	V <sub>OHD</sub> = 3.85 V Min
I <sub>CC</sub> (Note 3)	Maximum Quiescent Supply Current	5.5	–	8.0	80	μA	V <sub>IN</sub> = V <sub>CC</sub> or GND

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

1. All outputs loaded; thresholds on input associated with output under test.
2. Maximum test duration 2.0 ms, one output loaded at a time.
3. I<sub>IN</sub> and I<sub>CC</sub> @ 3.0 V are guaranteed to be less than or equal to the respective limit @ 5.5 V V<sub>CC</sub>.

# 74AC540

## AC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	V <sub>CC</sub> * (V)	T <sub>A</sub> = +25°C C <sub>L</sub> = 50 pF			T <sub>A</sub> = -40°C to +85°C C <sub>L</sub> = 50 pF		Unit
			Min	Typ	Max	Min	Max	
t <sub>PLH</sub>	Propagation Delay Data to Output	3.3	1.5	5.5	7.5	1.0	8.0	ns
		5.0	1.5	4.0	6.0	1.0	6.5	
t <sub>PHL</sub>	Propagation Delay Data to Output	3.3	1.5	5.0	7.0	1.0	7.5	ns
		5.0	1.5	4.0	5.5	1.0	6.0	
t <sub>PZH</sub>	Output Enable Time	3.3	3.0	8.5	11.0	2.5	12.0	ns
		5.0	2.0	6.5	8.5	2.0	9.5	
t <sub>PZL</sub>	Output Enable Time	3.3	2.5	7.5	10.0	2.0	11.0	ns
		5.0	2.0	6.0	7.5	1.5	8.5	
t <sub>PHZ</sub>	Output Disable Time	3.3	2.5	8.5	13.0	1.5	14.0	ns
		5.0	1.5	7.5	10.5	1.0	11.0	
t <sub>PLZ</sub>	Output Disable Time	3.3	2.5	7.0	10.0	2.0	11.0	ns
		5.0	1.5	6.0	8.0	1.5	9.0	

\*Voltage Range 3.3 V is 3.3 V ±0.3 V.  
Voltage Range 5.0 V is 5.0 V ±0.5 V.

## CAPACITANCE

Symbol	Parameter	Typ	Unit	Conditions
C <sub>IN</sub>	Input Capacitance	4.5	pF	V <sub>CC</sub> = OPEN
C <sub>PD</sub>	Power Dissipation Capacitance	30	pF	V <sub>CC</sub> = 5.0 V

## ORDERING INFORMATION

Device	Device Marking	Package	Shipping†
74AC540SCX	AC540	SOIC-20W, case 751BJ (Pb-Free)	1000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

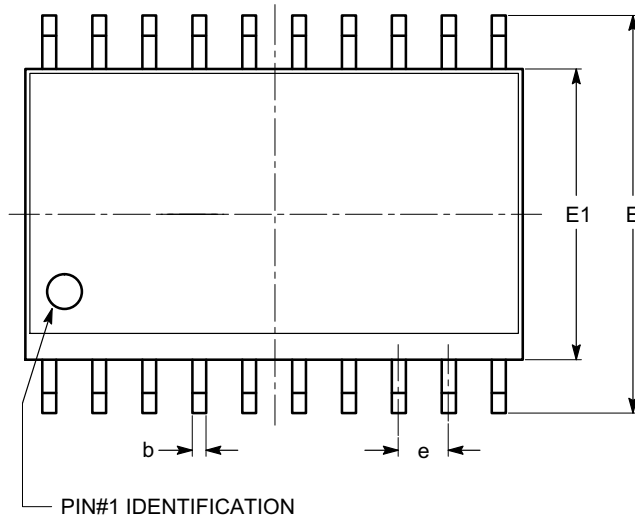
# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS



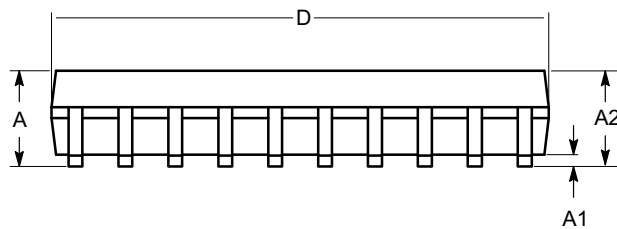
SOIC-20, 300 mils  
CASE 751BJ  
ISSUE O

DATE 19 DEC 2008

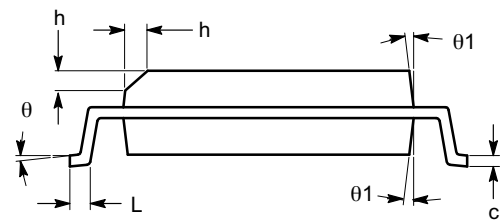


TOP VIEW

SYMBOL	MIN	NOM	MAX
A	2.36	2.49	2.64
A1	0.10		0.30
A2	2.05		2.55
b	0.31	0.41	0.51
c	0.20	0.27	0.33
D	12.60	12.80	13.00
E	10.01	10.30	10.64
E1	7.40	7.50	7.60
e	1.27 BSC		
h	0.25		0.75
L	0.40	0.81	1.27
$\theta$	0°		8°
$\theta 1$	5°		15°



SIDE VIEW



END VIEW

### Notes:

- (1) All dimensions are in millimeters. Angles in degrees.
- (2) Complies with JEDEC MS-013.

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