



**MC74AC540  
MC74ACT540  
MC74AC541  
MC74ACT541**

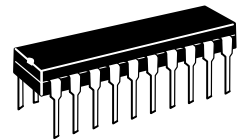
**Octal Buffer/Line Driver  
with 3-State Outputs**

The MC74AC540/74ACT540 and MC74AC541/74ACT541 are octal buffer/line drivers designed to be employed as memory and address drivers, clock drivers and bus oriented transmitter/receivers. The MC74AC541/74ACT541 is a noninverting option of the MC74AC540/74ACT540.

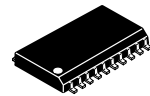
These devices are similar in function to the MC74AC240/74ACT240 and MC74AC244/74ACT244 while providing flow-through architecture (inputs on opposite side from outputs). This pinout arrangement makes these devices especially useful as output ports for microprocessors, allowing ease of layout and greater PC board density.

- 3-State Outputs
- Inputs and Outputs Opposite Side of Package, Allowing Easier Interface to Microprocessors
- Outputs Source/Sink 24 mA
- MC74AC540/74ACT540 Provides Inverted Outputs
- MC74AC541/74ACT541 Provides Noninverted Outputs
- 'ACT540 and 'ACT541 Have TTL Compatible Inputs

OCTAL  
BUFFER/LINE DRIVER  
WITH 3-STATE  
OUTPUTS



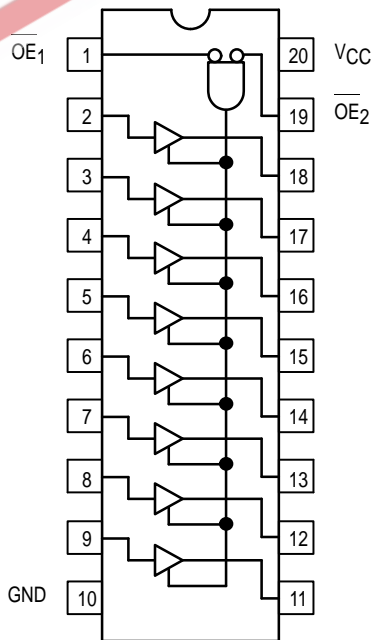
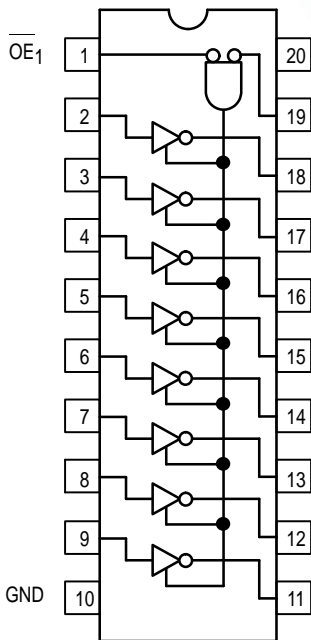
N SUFFIX  
CASE 738-03  
PLASTIC



DW SUFFIX  
CASE 751D-04  
PLASTIC

MC74AC540/74ACT540

MC74AC541/74ACT541



TRUTH TABLE

Inputs			Outputs	
OE <sub>1</sub>	OE <sub>2</sub>	D	'540	'541
L	L	H	L	H
H	X	X	Z	Z
X	H	X	Z	Z
L	L	L	H	L

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

## MC74AC540 MC74ACT540 MC74AC541 MC74ACT541

### MAXIMUM RATINGS\*

Symbol	Parameter	Value	Unit
V <sub>CC</sub>	DC Supply Voltage (Referenced to GND)	-0.5 to +7.0	V
V <sub>in</sub>	DC Input Voltage (Referenced to GND)	-0.5 to V <sub>CC</sub> +0.5	V
V <sub>out</sub>	DC Output Voltage (Referenced to GND)	-0.5 to V <sub>CC</sub> +0.5	V
I <sub>in</sub>	DC Input Current, per Pin	±20	mA
I <sub>out</sub>	DC Output Sink/Source Current, per Pin	±50	mA
I <sub>CC</sub>	DC V <sub>CC</sub> or GND Current per Output Pin	±50	mA
T <sub>stg</sub>	Storage Temperature	-65 to +150	°C

\* Maximum Ratings are those values beyond which damage to the device may occur. Functional operation should be restricted to the Recommended Operating Conditions.

### RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Typ	Max	Unit	
V <sub>CC</sub>	Supply Voltage	'AC	2.0	5.0	6.0	V
		'ACT	4.5	5.0	5.5	
V <sub>in</sub> , V <sub>out</sub>	DC Input Voltage, Output Voltage (Ref. to GND)	0		V <sub>CC</sub>	V	
t <sub>r</sub> , t <sub>f</sub>	Input Rise and Fall Time (Note 1) 'AC Devices except Schmitt Inputs	V <sub>CC</sub> @ 3.0 V		150		ns/V
		V <sub>CC</sub> @ 4.5 V		40		
		V <sub>CC</sub> @ 5.5 V		25		
t <sub>r</sub> , t <sub>f</sub>	Input Rise and Fall Time (Note 2) 'ACT Devices except Schmitt Inputs	V <sub>CC</sub> @ 4.5 V		10		ns/V
		V <sub>CC</sub> @ 5.5 V		8.0		
T <sub>J</sub>	Junction Temperature (PDIP)			140	°C	
T <sub>A</sub>	Operating Ambient Temperature Range	-40	25	85	°C	
I <sub>OH</sub>	Output Current — High			-24	mA	
I <sub>OL</sub>	Output Current — Low			24	mA	

1. V<sub>in</sub> from 30% to 70% V<sub>CC</sub>; see individual Data Sheets for devices that differ from the typical input rise and fall times.

2. V<sub>in</sub> from 0.8 V to 2.0 V; see individual Data Sheets for devices that differ from the typical input rise and fall times.

## MC74AC540 MC74ACT540 MC74AC541 MC74ACT541

### DC CHARACTERISTICS

Symbol	Parameter	V <sub>CC</sub> (V)	74AC		74AC		Unit	Conditions
			T <sub>A</sub> = +25°C		T <sub>A</sub> = -40°C to +85°C			
			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> -12 mA I <sub>OH</sub> -24 mA -24 mA
		4.5		3.86	3.76			
		5.5		4.86	4.76			
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> 12 mA I <sub>OL</sub> 24 mA 24 mA
		4.5		0.36	0.44			
		5.5		0.36	0.44			
I <sub>IN</sub>	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		±0.5	±5.0		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	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>	Maximum Quiescent Supply Current	5.5		8.0	80		μA	V <sub>IN</sub> = V <sub>CC</sub> or GND

\* All outputs loaded; thresholds on input associated with output under test.

† Maximum test duration 2.0 ms, one output loaded at a time.

Note: 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>.

## MC74AC540 MC74ACT540 MC74AC541 MC74ACT541

### AC CHARACTERISTICS (For Figures and Waveforms — See Section 3)

Symbol	Parameter	V <sub>CC</sub> * (V)	74AC			74AC		Unit	Fig. No.
			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			
			Min	Typ	Max	Min	Max		
t <sub>PLH</sub>	Propagation Delay Data to Output ('AC540)	3.3	1.5	5.5	7.5	1.0	8.0	ns	3-5
		5.0	1.5	4.0	6.0	1.0	6.5		
t <sub>PHL</sub>	Propagation Delay Data to Output ('AC540)	3.3	1.5	5.0	7.0	1.0	7.5	ns	3-5
		5.0	1.5	4.0	5.5	1.0	6.0		
t <sub>PZH</sub>	Output Enable Time ( 'AC540)	3.3	3.0	8.5	11	2.5	12	ns	3-7
		5.0	2.0	6.5	8.5	2.0	9.5		
t <sub>PZL</sub>	Output Enable Time ( 'AC540)	3.3	2.5	7.5	10	2.0	11	ns	3-8
		5.0	2.0	6.0	7.5	1.5	8.5		
t <sub>PHZ</sub>	Output Disable Time ( 'AC540)	3.3	2.5	8.5	13	1.5	14	ns	3-7
		5.0	1.5	7.5	10.5	1.0	11		
t <sub>PLZ</sub>	Output Disable Time ( 'AC540)	3.3	2.0	7.0	10	2.0	11	ns	3-8
		5.0	1.5	6.0	8.0	1.5	9.0		
t <sub>PLH</sub>	Propagation Delay Data to Output ('AC541)	3.3	2.0	5.5	8.0	1.5	9.0	ns	3-5
		5.0	1.5	4.0	6.0	1.0	6.5		
t <sub>PHL</sub>	Propagation Delay Data to Output ('AC541)	3.3	2.0	5.5	8.0	1.5	8.5	ns	3-5
		5.0	1.5	4.0	6.0	1.0	6.5		
t <sub>PZH</sub>	Output Enable Time ( 'AC541)	3.3	3.0	8.0	11.5	3.0	12.5	ns	3-7
		5.0	2.0	6.0	8.5	1.5	9.5		
t <sub>PZL</sub>	Output Enable Time ( 'AC541)	3.3	2.5	7.0	10	2.5	11.5	ns	3-8
		5.0	1.5	5.5	7.5	1.0	8.5		
t <sub>PHZ</sub>	Output Disable Time ( 'AC541)	3.3	3.5	9.0	12.5	2.5	14	ns	3-7
		5.0	2.0	7.0	9.5	1.0	10.5		
t <sub>PLZ</sub>	Output Disable Time ( 'AC541)	3.3	2.5	6.5	9.5	2.0	10.5	ns	3-8
		5.0	2.0	5.5	7.5	1.0	8.5		

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

## MC74AC540 MC74ACT540 MC74AC541 MC74ACT541

### DC CHARACTERISTICS

Symbol	Parameter	V <sub>CC</sub> (V)	74ACT		74ACT		Unit	Conditions
			T <sub>A</sub> = +25°C		T <sub>A</sub> = -40°C to +85°C			
			Typ	Guaranteed Limits				
V <sub>IH</sub>	Minimum High Level Input Voltage	4.5	1.5	2.0	2.0	V	V <sub>OUT</sub> = 0.1 V or V <sub>CC</sub> - 0.1 V	
		5.5	1.5	2.0	2.0			
V <sub>IL</sub>	Maximum Low Level Input Voltage	4.5	1.5	0.8	0.8	V	V <sub>OUT</sub> = 0.1 V or V <sub>CC</sub> - 0.1 V	
		5.5	1.5	0.8	0.8			
V <sub>OH</sub>	Minimum High Level Output Voltage	4.5	4.49	4.4	4.4	V	I <sub>OUT</sub> = -50 μA	
		5.5	5.49	5.4	5.4			
		4.5		3.86	3.76	V	*V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> -24 mA I <sub>OH</sub> = -24 mA	
		5.5		4.86	4.76			
V <sub>OL</sub>	Maximum Low Level Output Voltage	4.5	0.001	0.1	0.1	V	I <sub>OUT</sub> = 50 μA	
		5.5	0.001	0.1	0.1			
		4.5		0.36	0.44	V	*V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> 24 mA I <sub>OL</sub> = 24 mA	
		5.5		0.36	0.44			
I <sub>IN</sub>	Maximum Input Leakage Current	5.5		±0.1	±1.0	μA	V <sub>I</sub> = V <sub>CC</sub> , GND	
ΔI <sub>CCT</sub>	Additional Max. I <sub>CC</sub> /Input	5.5	0.6		1.5	mA	V <sub>I</sub> = V <sub>CC</sub> - 2.1 V	
I <sub>OZ</sub>	Maximum 3-State Current	5.5		±0.5	±5.0	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	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>	Maximum Quiescent Supply Current	5.5		8.0	80	μA	V <sub>IN</sub> = V <sub>CC</sub> or GND	

\* All outputs loaded; thresholds on input associated with output under test.

† Maximum test duration 2.0 ms, one output loaded at a time.

## MC74AC540 MC74ACT540 MC74AC541 MC74ACT541

### AC CHARACTERISTICS (For Figures and Waveforms — See Section 3)

Symbol	Parameter	V <sub>CC</sub> * (V)	74ACT			74ACT		Unit	Fig. No.
			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			
			Min	Typ	Max	Min	Max		
t <sub>PLH</sub>	Propagation Delay Data to Output ('ACT540)	5.0	1.0		7.0	1.0	7.5	ns	3-5
t <sub>PHL</sub>	Propagation Delay Data to Output ('ACT540)	5.0	1.0		8.0	1.0	8.5	ns	3-5
t <sub>PZH</sub>	Output Enable Time ( 'ACT540)	5.0	1.0		10.5	1.0	11.5	ns	3-7
t <sub>PZL</sub>	Output Enable Time ( 'ACT540)	5.0	1.0		9.5	1.0	10.5	ns	3-8
t <sub>PHZ</sub>	Output Disable Time ( 'ACT540)	5.0	1.0		12.0	1.0	12.5	ns	3-7
t <sub>PLZ</sub>	Output Disable Time ( 'ACT540)	5.0	1.5		9.0	1.0	10	ns	3-8
t <sub>PLH</sub>	Propagation Delay Data to Output ('ACT541)	5.0	1.5		7.5	1.0	8.0	ns	3-5
t <sub>PHL</sub>	Propagation Delay Data to Output ('ACT541)	5.0	1.5		7.5	1.0	8.0	ns	3-5
t <sub>PZH</sub>	Output Enable Time ( 'ACT541)	5.0	2.0		10.0	1.0	11.0	ns	3-7
t <sub>PZL</sub>	Output Enable Time ( 'ACT541)	5.0	1.5		9.5	1.0	10.5	ns	3-8
t <sub>PHZ</sub>	Output Disable Time ( 'ACT541)	5.0	2.0		11.0	1.0	12.0	ns	3-7
t <sub>PLZ</sub>	Output Disable Time ( 'ACT541)	5.0	2.0		9.0	1.0	10	ns	3-8

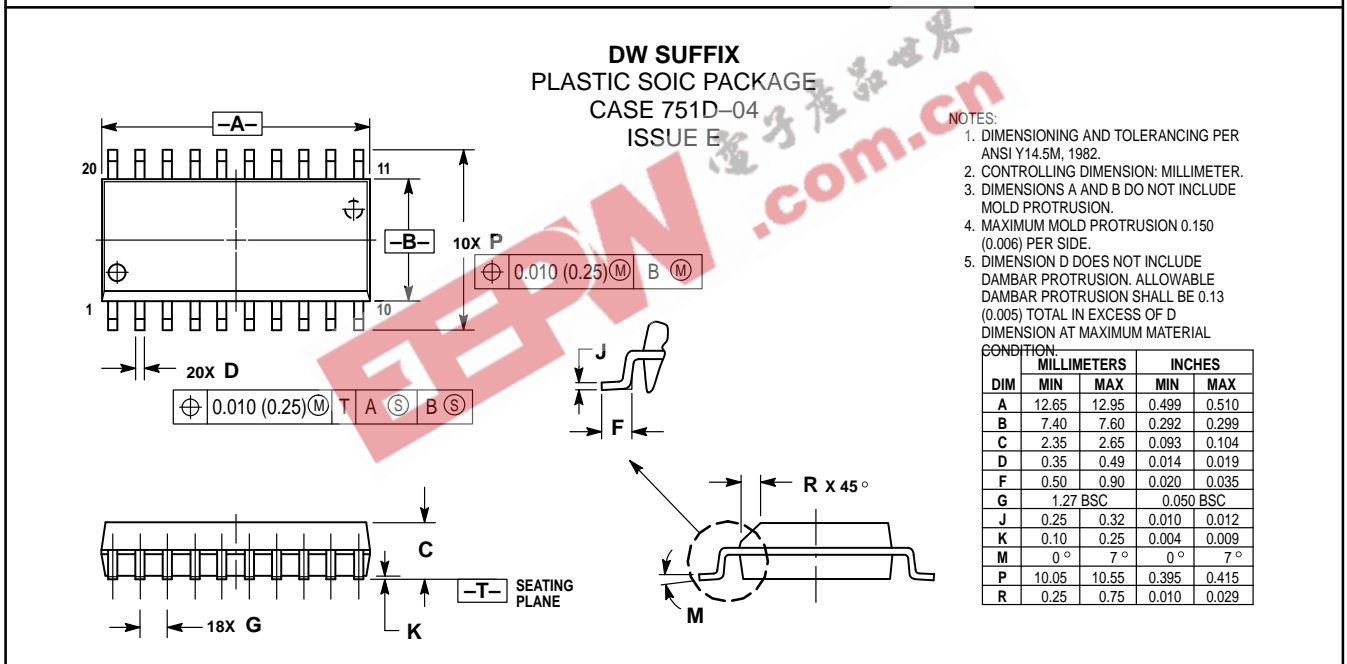
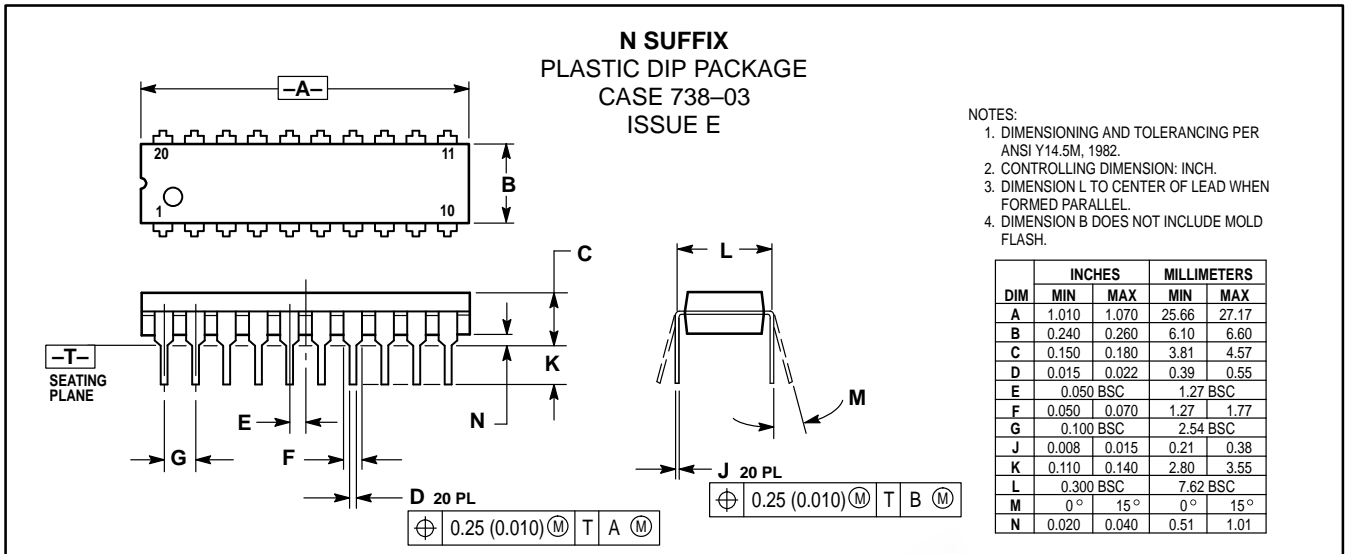
\* Voltage Range 5.0 V is 5.0 V ±0.5 V.

### CAPACITANCE

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

# MC74AC540 MC74ACT540 MC74AC541 MC74ACT541

## OUTLINE DIMENSIONS



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