

# 74ACT16541

## 16-Bit Buffer/Line Driver with 3-STATE Outputs

### General Description

The ACT16541 contains sixteen non-inverting buffers with 3-STATE outputs designed to be employed as a memory and address driver, clock driver, or bus oriented transmitter/receiver. The device is byte controlled. Each byte has separate 3-STATE control inputs which can be shorted together for full 16-bit operation.

### Features

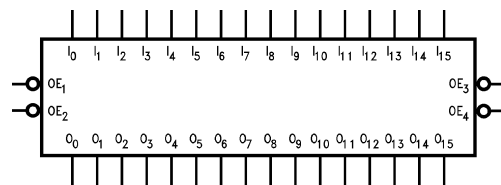
- Separate control logic for each byte
- Outputs source/sink 24 mA
- TTL-compatible inputs

### Ordering Code:

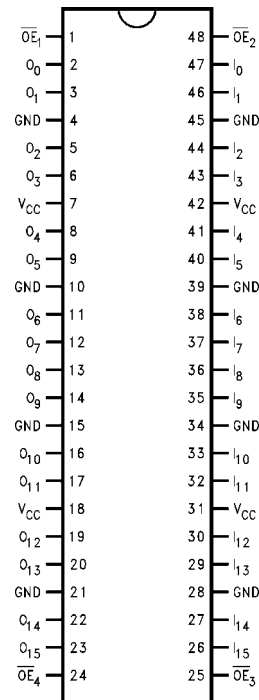
Order Number	Package Number	Package Description
74ACT16541SSC	MS48A	48-Lead Small Shrink Outline Package (SSOP), JEDEC MO-118, 0.300" Wide
74ACT16541MTD	MTD48	48-Lead Thin Shrink Small Outline Package (TSSOP), MO-153, 6.1mm Wide

Device also available in Tape and Reel. Specify by appending suffix letter "X" to the ordering code.

### Logic Symbol



### Connection Diagram



### Pin Descriptions

Pin Names	Description
$\overline{OE}_n$	Output Enable Input (Active LOW)
$I_0-I_{15}$	Inputs
$O_0-O_{15}$	Outputs

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## Functional Description

The ACT16541 contains sixteen non-inverting buffers with 3-STATE standard outputs. The device is byte controlled with each byte functioning identically, but independent of the other. The control pins can be shorted together to obtain full 16-bit operation. The 3-STATE outputs are controlled by an Output Enable ( $\overline{OE}_n$ ) input for each byte. When  $\overline{OE}_n$  is LOW, the outputs are in 2-state mode. When  $\overline{OE}_n$  is HIGH, the outputs are in the high impedance mode, but this does not interfere with entering new data into the inputs.

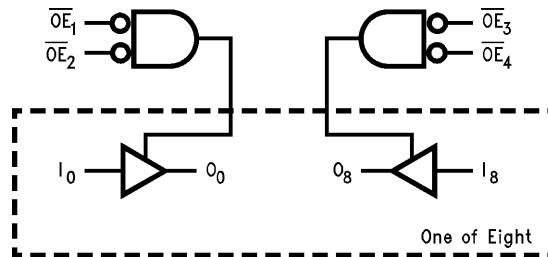
## Truth Tables

Inputs			Outputs
$\overline{OE}_1$	$\overline{OE}_2$	$I_0-I_7$	$O_0-O_7$
L	L	H	H
H	X	X	Z
X	H	X	Z
L	L	L	L

Inputs			Outputs
$\overline{OE}_3$	$\overline{OE}_4$	$I_8-I_{15}$	$O_8-O_{15}$
L	L	H	H
H	X	X	Z
X	H	X	Z
L	L	L	L

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

## Logic Diagram



**Absolute Maximum Ratings**(Note 1)

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 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/Sink Current ( $I_O$ )	$\pm 50$ mA
DC $V_{CC}$ or Ground Current per Output Pin	$\pm 50$ mA
Storage Temperature	-65°C to +150°C

**Recommended Operating Conditions**

Supply Voltage ( $V_{CC}$ )	4.5V to 5.5V
Input Voltage ( $V_I$ )	0V to $V_{CC}$
Output Voltage ( $V_O$ )	0V to $V_{CC}$
Operating Temperature ( $T_A$ )	-40°C to +85°C
Minimum Input Edge Rate ( $\Delta V/\Delta t$ )	125 mV/ns
$V_{IN}$ from 0.8V to 2.0V	
$V_{CC}$ @ 4.5V, 5.5V	

**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. Fairchild does not recommend operation of FACT™ circuits outside databook specifications.

**DC Electrical Characteristics**

Symbol	Parameter	$V_{CC}$ (V)	$T_A = +25^\circ\text{C}$		$T_A = -40^\circ\text{C to } +85^\circ\text{C}$		Units	Conditions
			Typ	Guaranteed Limits				
$V_{IH}$	Minimum HIGH Input Voltage	4.5	1.5	2.0	2.0	V	$V_{OUT} = 0.1V$ or $V_{CC} - 0.1V$	
	5.5	1.5	2.0	2.0				
$V_{IL}$	Maximum LOW Input Voltage	4.5	1.5	0.8	0.8	V	$V_{OUT} = 0.1V$ or $V_{CC} - 0.1V$	
	5.5	1.5	0.8	0.8				
$V_{OH}$	Minimum HIGH Output Voltage	4.5	4.49	4.4	4.4	V	$I_{OUT} = -50 \mu\text{A}$	
		5.5	5.49	5.4	5.4			
		4.5		3.86	3.76	V	$V_{IN} = V_{IL}$ or $V_{IH}$ $I_{OH} = -24 \text{ mA}$	
5.5		4.86	4.76	V	$I_{OH} = -24 \text{ mA}$ (Note 2)			
$V_{OL}$	Maximum LOW Output Voltage	4.5	0.001	0.1	0.1	V	$I_{OUT} = 50 \mu\text{A}$	
		5.5	0.001	0.1	0.1			
		4.5		0.36	0.44	V	$V_{IN} = V_{IL}$ or $V_{IH}$ $I_{OL} = 24 \text{ mA}$ $I_{OL} = 24 \text{ mA}$ (Note 2)	
5.5		0.36	0.44	V				
$I_{OZ}$	Maximum 3-STATE Leakage Current	5.5		$\pm 0.5$	$\pm 5.0$	$\mu\text{A}$	$V_I = V_{IL}, V_{IH}$ $V_O = V_{CC}, \text{GND}$	
$I_{IN}$	Maximum Input Leakage Current	5.5		$\pm 0.1$	$\pm 1.0$	$\mu\text{A}$	$V_I = V_{CC}, \text{GND}$	
$I_{CCT}$	Maximum $I_{CC}$ /Input	5.5	0.6		1.5	mA	$V_I = V_{CC} - 2.1V$	
$I_{CC}$	Max Quiescent Supply Current	5.5		8.0	80.0	$\mu\text{A}$	$V_{IN} = V_{CC}$ or GND	
$I_{OLD}$	Minimum Dynamic Output Current (Note 3)	5.5			75	mA	$V_{OLD} = 1.65V$ Max	
$I_{OHD}$					-75	mA	$V_{OHD} = 3.85V$ Min	

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

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

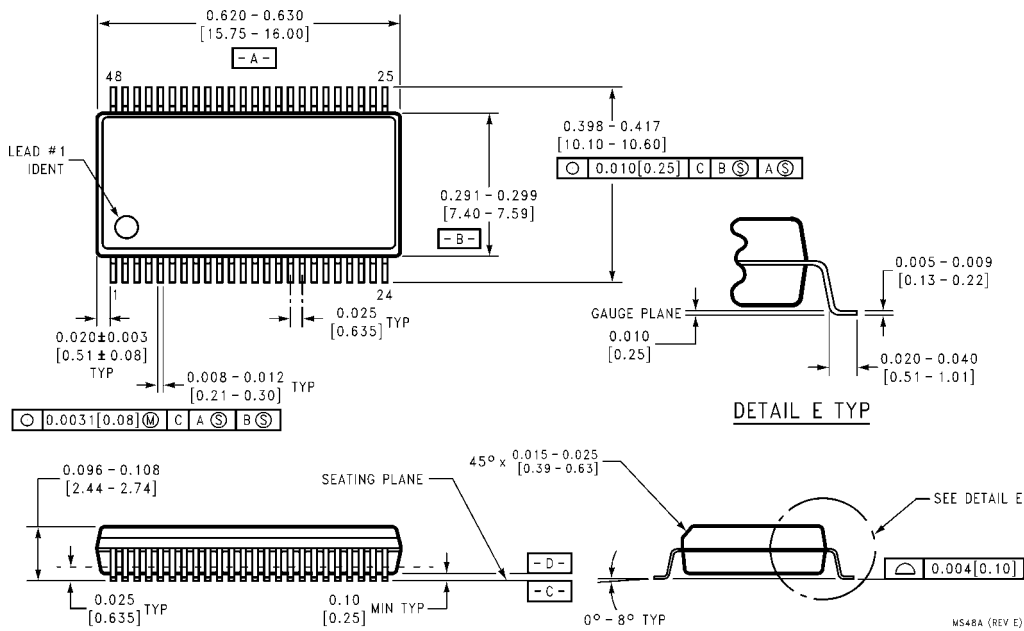
AC Electrical Characteristics								
Symbol	Parameter	V <sub>CC</sub> (V) (Note 4)	T <sub>A</sub> = +25°C C <sub>L</sub> = 50 pF			T <sub>A</sub> = -40°C to +85°C C <sub>L</sub> = 50 pF		Units
			Min	Typ	Max	Min	Max	
t <sub>PLH</sub>	Propagation Delay	5.0	3.0	5.2	7.3	3.0	7.8	ns
t <sub>PHL</sub>	Data to Output		2.5	4.8	7.3	2.5	7.8	
t <sub>PZH</sub>	Output Enable Time	5.0	2.6	5.0	7.4	2.6	7.9	ns
t <sub>PZL</sub>			2.7	5.4	8.0	2.7	8.5	
t <sub>PHZ</sub>	Output Disable Time	5.0	2.7	5.6	8.3	2.7	8.7	ns
t <sub>PLZ</sub>			2.4	5.2	7.9	2.4	8.4	

Note 4: Voltage Range 5.0 is 5.0V ± 0.5V.

### Capacitance

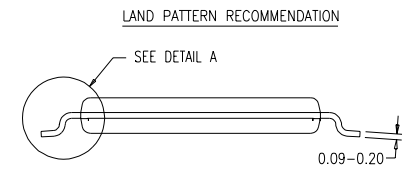
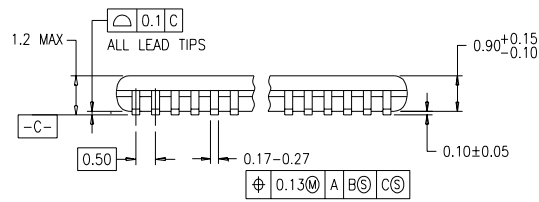
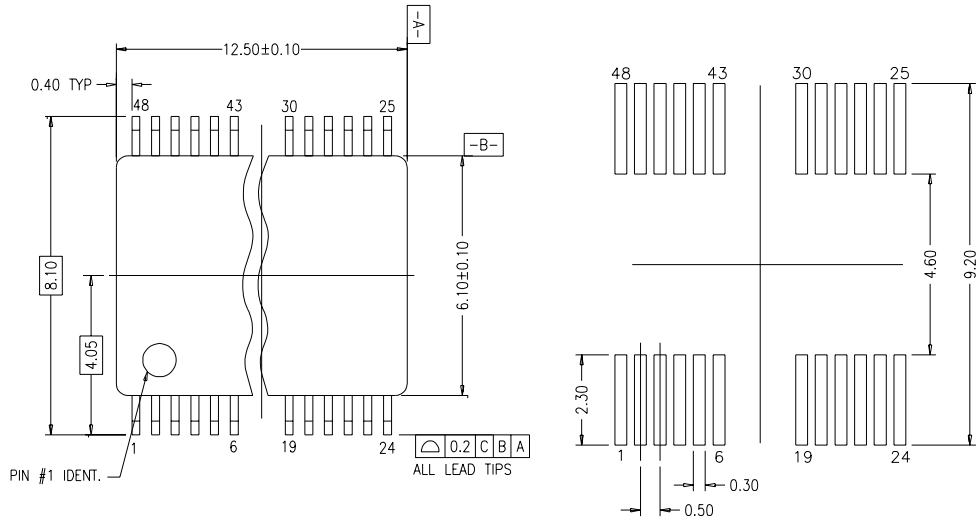
Symbol	Parameter	Typ	Units	Conditions
C <sub>IN</sub>	Input Capacitance	4.5	pF	V <sub>CC</sub> = 5.0V
C <sub>PD</sub>	Power Dissipation Capacitance	30	pF	V <sub>CC</sub> = 5.0V

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



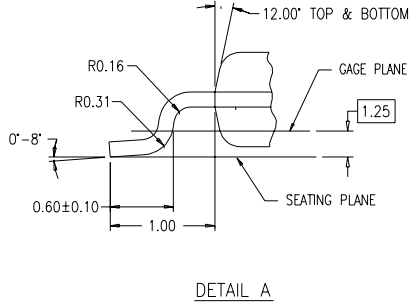
**48-Lead Small Shrink Outline Package (SSOP), JEDEC MO-118, 0.300" Wide  
Package Number MS48A**

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



DIMENSIONS ARE IN MILLIMETERS

- NOTES:
- A. CONFORMS TO JEDEC REGISTRATION MO-153, VARIATION AB, REF NOTE 6, DATE 7/93.
  - B. DIMENSIONS ARE IN MILLIMETERS.
  - C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.
  - D. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M, 1982.



MTD48REVB1  
**48-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 6.1mm Wide  
 Package Number MTD48**

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