

# 74ACT16245

## 16-Bit Transceiver with 3-STATE Outputs

### General Description

The ACT16245 contains sixteen non-inverting bidirectional buffers with 3-STATE outputs and is intended for bus oriented applications. The device is byte controlled. Each has separate control inputs which can be shorted together for full 16-bit operation. The T/R inputs determine the direction of data flow through the device. The OE inputs disable both the A and B ports by placing them in a high impedance state.

### Features

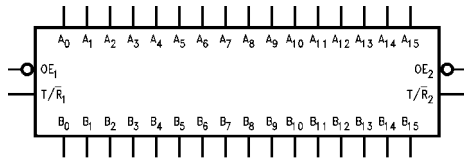
- Bidirectional non-inverting buffers
- Separate control logic for each byte
- 16-bit version of the ACT245
- Outputs source/sink 24 mA
- TTL-compatible inputs

### Ordering Code:

Order Number	Package Number	Package Description
74ACT16245SSC	MS48A	48-Lead Small Shrink Outline Package (SSOP), JEDEC MO-118, 0.300" Wide
74ACT16245MTD	MTD48	48-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 6.1mm Wide

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

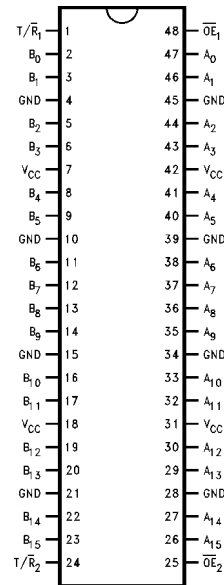
### Logic Symbol



### Pin Description

Pin Names	Description
$\overline{OE}_n$	Output Enable Input (Active LOW)
T/R	Transmit/Receive Input
A <sub>0</sub> -A <sub>15</sub>	Side A Inputs/Outputs
B <sub>0</sub> -B <sub>15</sub>	Side B Outputs/Inputs

### Connection Diagram



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## Functional Description

The ACT16245 contains sixteen non-inverting bidirectional buffers with 3-STATE 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 following description applies to each byte. When the  $\overline{T/R}$  input is HIGH, then Bus A data is transmitted to Bus B. When the  $\overline{T/R}$  input is LOW,

Bus B data is transmitted to Bus A. 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.

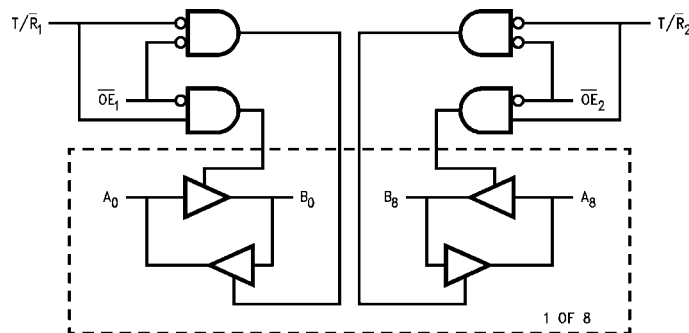
## Truth Tables

Inputs		Outputs
$\overline{OE}_1$	$\overline{T/R}_1$	
L	L	Bus B <sub>0</sub> -B <sub>7</sub> Data to Bus A <sub>0</sub> -A <sub>7</sub>
L	H	Bus A <sub>0</sub> -A <sub>7</sub> Data to Bus B <sub>0</sub> -B <sub>7</sub>
H	X	HIGH-Z State on A <sub>0</sub> -A <sub>7</sub> , B <sub>0</sub> -B <sub>7</sub>

Inputs		Outputs
$\overline{OE}_2$	$\overline{T/R}_2$	
L	L	Bus B <sub>8</sub> -B <sub>15</sub> Data to Bus A <sub>8</sub> -A <sub>15</sub>
L	H	Bus A <sub>8</sub> -A <sub>15</sub> Data to Bus B <sub>8</sub> -B <sub>15</sub>
H	X	HIGH-Z State on A <sub>8</sub> -A <sub>15</sub> , B <sub>8</sub> -B <sub>15</sub>

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	$I_{OUT} = -50 \mu A$
		5.5	5.49	5.4	5.4		
		4.5		3.86	3.76	V	$V_{IN} = V_{IL}$ or $V_{IH}$ $I_{OH} = -24$ mA $I_{OH} = -24$ mA (Note 2)
		5.5		4.86	4.76		
$V_{OL}$	Maximum LOW Output Voltage	4.5	0.001	0.1	0.1	V	$I_{OUT} = 50 \mu A$
		5.5	0.001	0.1	0.1		
		4.5		0.36	0.44	V	$V_{IN} = V_{IL}$ or $V_{IH}$ $I_{OL} = 24$ mA $I_{OL} = 24$ mA (Note 2)
		5.5		0.36	0.44		
$I_{OZT}$	Maximum I/O Leakage Current	5.5		$\pm 0.5$	$\pm 5.0$	$\mu A$	$V_I = V_{IL}, V_{IH}$ $V_O = V_{CC}, GND$
$I_{IN}$	Maximum Input Leakage Current	5.5		$\pm 0.1$	$\pm 1.0$	$\mu A$	$V_I = V_{CC}, GND$
$I_{CCT}$	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	$\mu A$	$V_{IN} = V_{CC}$ or GND
$I_{OLD}$	Minimum Dynamic	5.5			75	mA	$V_{OLD} = 1.65V$ Max
$I_{OHD}$	Output Current (Note 3)				-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

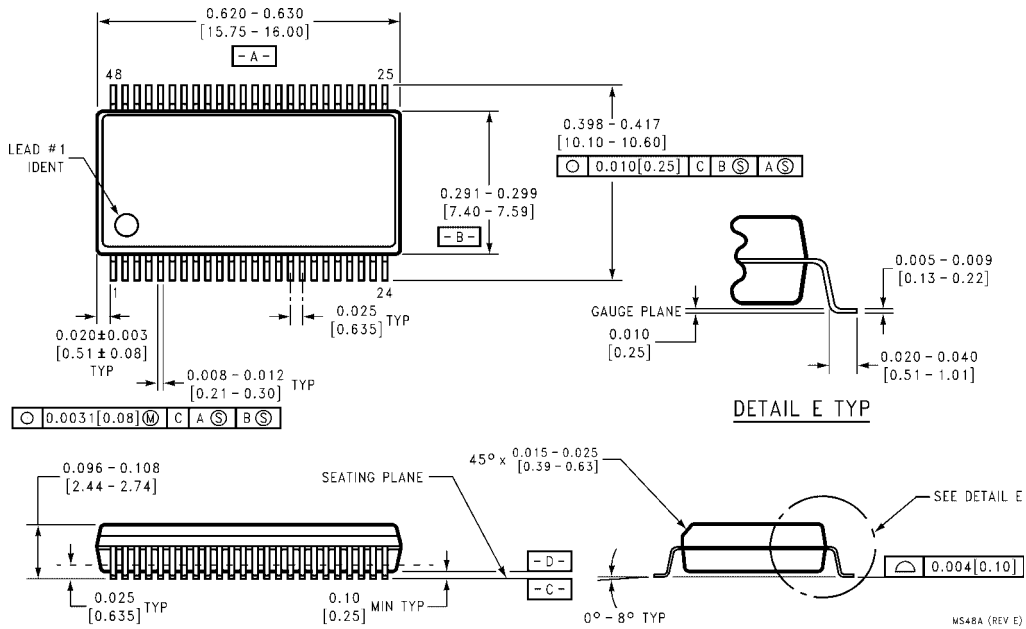
Symbol	Parameter	V <sub>CC</sub> (V) (Note 4)	T <sub>A</sub> = +25°C C <sub>L</sub> = 50 pF			T <sub>A</sub> = -40°C to +85°C C <sub>L</sub> = 50 pF		Units
			Min	Typ	Max	Min	Max	
t <sub>PLH</sub>	Propagation	5.0	3.2	5.7	8.4	3.2	9.0	ns
t <sub>PHL</sub>	Delay A <sub>n</sub> , B <sub>n</sub> to B <sub>n</sub> , A <sub>n</sub>		2.6	5.1	7.9	2.6	8.4	
t <sub>PZH</sub>	Output Enable	5.0	3.7	6.4	9.4	2.7	10.0	ns
t <sub>PZL</sub>	Time		4.1	7.4	10.5	3.4	11.6	
t <sub>PHZ</sub>	Output Disable	5.0	2.2	5.4	8.7	2.2	9.3	ns
t <sub>PLZ</sub>	Time		2.0	5.2	8.2	2.0	8.8	

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

## Capacitance

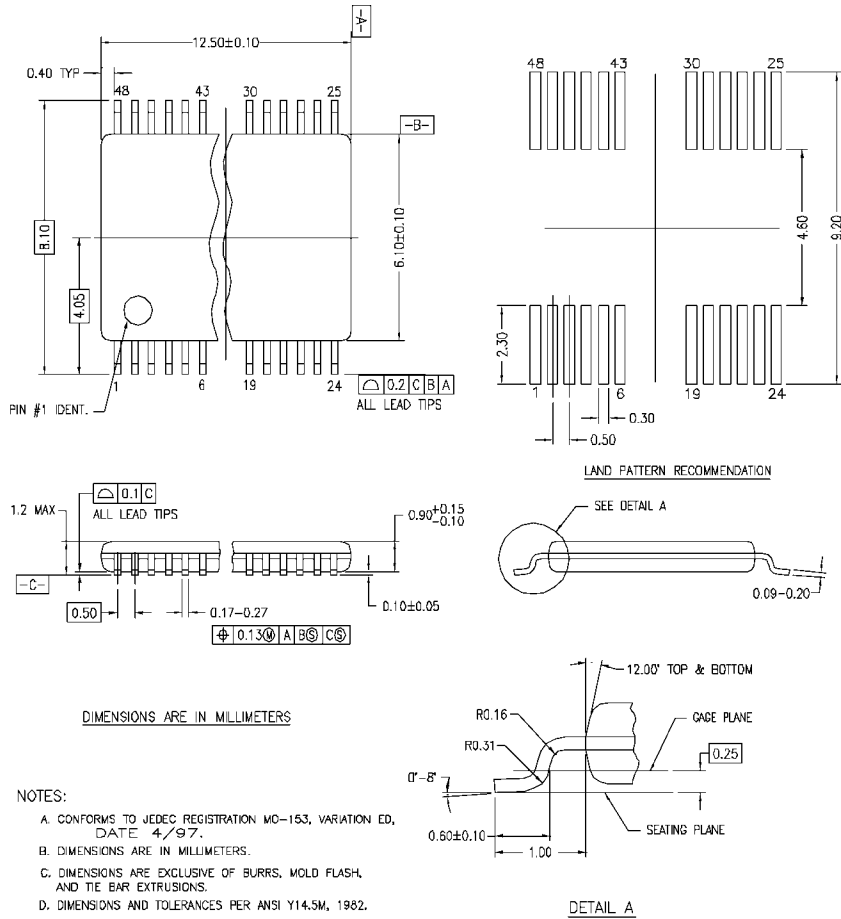
Symbol	Parameter	Typ	Units	Conditions
C <sub>IN</sub>	Input Pin Capacitance	4.5	pF	V <sub>CC</sub> = 5.0V
C <sub>PD</sub>	Power Dissipation Capacitance	25	pF	V <sub>CC</sub> = 5.0V

**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)



MTD48REV C

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

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