FAIRCHILD SEMICONDUCTOR™

August 1999
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74ACT16240
16-Bit Inverting Buffer/Line Driver with 3-STATE Outputs

General Description

The ACT16240 contains sixteen 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 nibble controlled. Each nibble has separate 3-STATE control inputs which can be shorted together for full 16-bit operation.

Features

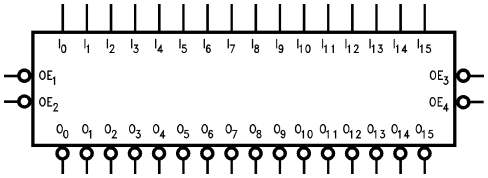
- Separate control logic for each byte
- 16-bit version of the ACT240
- Outputs source/sink 24 mA
- TTL-compatible inputs

Ordering Code:

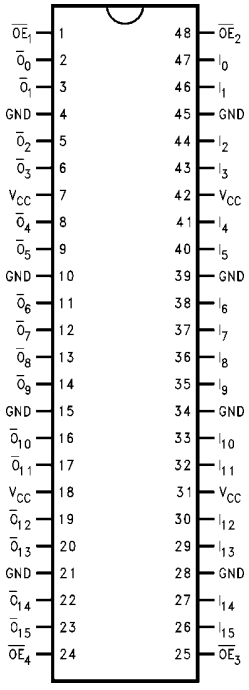
Order Number	Package Number	Package Description
74ACT16240SSC	MS48A	48-Lead Small Shrink Outline Package (SSOP), JEDEC MO-118, 0.300" Wide
74ACT16240MTD	MTD48	48-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 6.1mm Wide

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

Logic Symbol



Connection Diagram



Pin Descriptions

Pin Names	Description
$\overline{OE}_n$	Output Enable Inputs (Active LOW)
I_0–I_{15}	Inputs
$\overline{O}_0$–$\overline{O}_{15}$	Outputs

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Truth Tables

Inputs		Outputs
$\overline{OE}_1$	I_0–I_3	$\overline{O}_0$–$\overline{O}_3$
L	L	H
L	H	L
H	X	Z

Inputs		Outputs
$\overline{OE}_2$	I_4–I_7	$\overline{O}_4$–$\overline{O}_7$
L	L	H
L	H	L
H	X	Z

Inputs		Outputs
$\overline{OE}_3$	I_8–I_{11}	$\overline{O}_8$–$\overline{O}_{11}$
L	L	H
L	H	L
H	X	Z

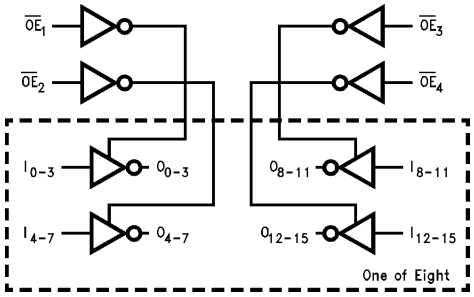
Inputs		Outputs
$\overline{OE}_4$	I_{12}–I_{15}	$\overline{O}_{12}$–$\overline{O}_{15}$
L	L	H
L	H	L
H	X	Z

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

Functional Description

The ACT16240 contains sixteen inverting buffers with 3-STATE standard outputs. The device is nibble (4 bits) controlled with each nibble functioning identically, but independently of the other. The control pins may 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 nibble. 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.

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)	± 50 mA
DC V_{CC} or Ground Current per Output Pin	± 50 mA
Junction Temperature	+140°C
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)	$T_A = +25°C$ Typ	$T_A = -40°C$ to $+85°C$ Guaranteed Limits		Units	Conditions
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		
						V	$V_{IN} = V_{IL}$ or V_{IH}
		4.5		3.86	3.76		$I_{OH} = -24$ mA
		5.5		4.86	4.76		$I_{OH} = -24$ mA (Note 2)
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		
						V	$V_{IN} = V_{IL}$ or V_{IH}
		4.5		0.36	0.44		$I_{OL} = 24$ mA
		5.5		0.36	0.44		$I_{OL} = 24$ mA (Note 2)
I_{OZ}	Maximum 3-STATE Leakage Current	5.5		±0.5	±5.0	µA	$V_I = V_{IL}, V_{IH}$ $V_O = V_{CC}$, GND
I_{IN}	Maximum Input Leakage Current	5.5		± 0.1	± 1.0	µA	$V_I = V_{CC}$, 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	µA	$V_{IN} = V_{CC}$ 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

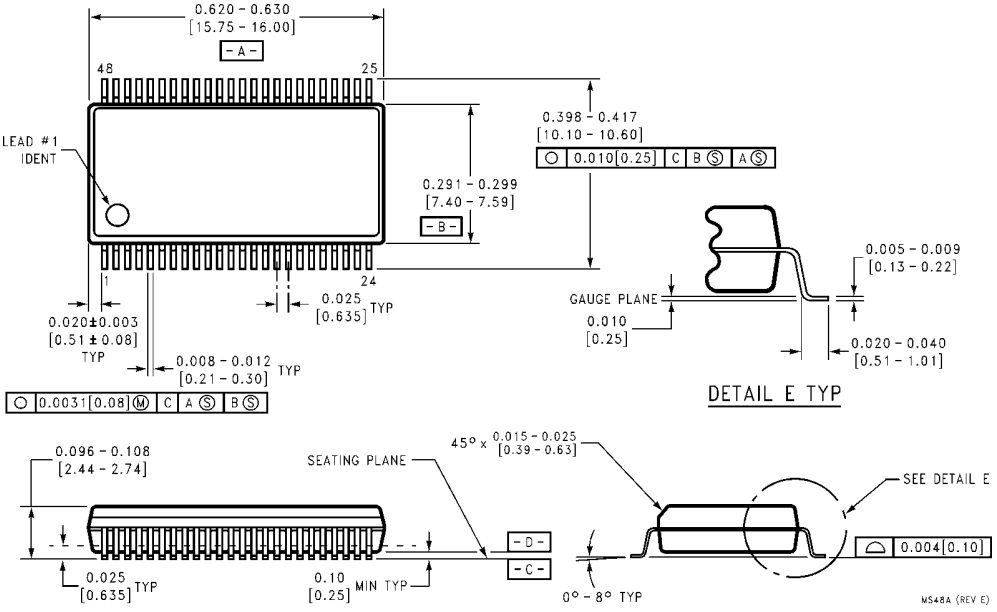
Symbol	Parameter	V_{CC} (V) (Note 4)	$T_A = +25°C$, $C_L = 50$ pF			$T_A = -40°C$ to $+85°C$, $C_L = 50$ pF		Units
			Min	Typ	Max	Min	Max	
t_{PLH}	Propagation Delay	5.0	2.7	4.8	7.3	2.7	7.8	ns
t_{PHL}	Data to Output		3.0	5.1	7.3	3.0	7.8	
t_{PZH}	Output Enable Time	5.0	2.5	4.5	7.4	2.5	7.9	ns
t_{PZL}			2.7	4.7	7.5	2.7	8.0	
t_{PHZ}	Output Disable Time	5.0	2.3	5.0	7.9	2.3	8.2	ns
t_{PLZ}			2.0	4.6	7.4	2.0	7.9	

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

Capacitance

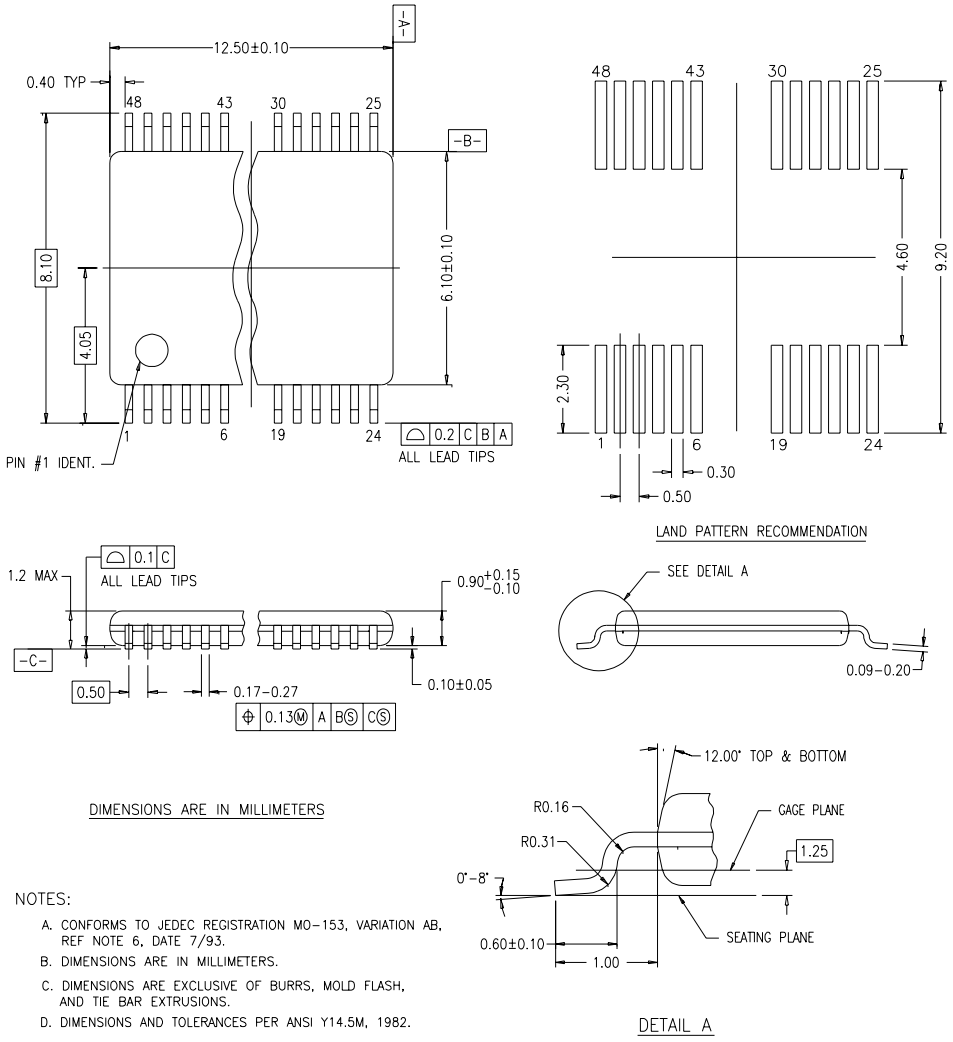
Symbol	Parameter	Typ	Units	Conditions
C_{IN}	Input Pin Capacitance	4.5	pF	$V_{CC} = 5.0V$
C_{PD}	Power Dissipation Capacitance	30	pF	$V_{CC} = 5.0V$

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)



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 Think Shrink Small Outline Package (TSSOP), JEDEC MO-153, 6.1mm Wide
Package Number MTD48