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## 74AC244, 74ACT244 Octal Buffer/Line Driver with 3-STATE Outputs

### Features

- $I_{CC}$  and  $I_{OZ}$  reduced by 50%
- 3-STATE outputs drive bus lines or buffer memory address registers
- Outputs source/sink 24mA
- ACT244 has TTL-compatible inputs

### General Description

The AC/ACT244 is an octal buffer and line driver designed to be employed as a memory address driver, clock driver and bus-oriented transmitter/receiver which provides improved PC board density.

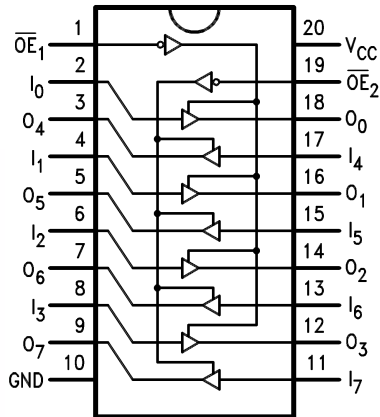
### Ordering Information

Order Number	Package Number	Package Description
74AC244SC	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide
74AC244SJ	M20D	20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
74AC244MTC	MTC20	20-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide
74AC244PC	N20A	20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide
74ACT244SC	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide
74ACT244SJ	M20D	20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
74ACT244MSA	MSA20	20-Lead Shrink Small Outline Package (SSOP), JEDEC MO-150, 5.3mm Wide
74ACT244MTC	MTC20	20-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide
74ACT244PC	N20A	20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide

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

 All packages are lead free per JEDEC: J-STD-020B standard.

### Connection Diagram



### Logic Symbol



### Pin Description

Pin Names	Description
$\overline{OE}_1, \overline{OE}_2$	3-STATE Output Enable Inputs
$I_0-I_7$	Inputs
$O_0-O_7$	Outputs

### Truth Tables

Inputs		Outputs
$\overline{OE}_1$	$I_n$	(Pins 12, 14, 16, 18)
L	L	L
L	H	H
H	X	Z

Inputs		Outputs
$\overline{OE}_2$	$I_n$	(Pins 3, 5, 7, 9)
L	L	L
L	H	H
H	X	Z

X = Immaterial

Z = High Impedance

## Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameter	Rating
$V_{CC}$	Supply Voltage	-0.5V to +7.0V
$I_{IK}$	DC Input Diode Current $V_I = -0.5V$	-20mA
	$V_I = V_{CC} + 0.5$	+20mA
$V_I$	DC Input Voltage	-0.5V to $V_{CC} + 0.5V$
$I_{OK}$	DC Output Diode Current $V_O = -0.5V$	-20mA
	$V_O = V_{CC} + 0.5V$	+20mA
$V_O$	DC Output Voltage	-0.5V to $V_{CC} + 0.5V$
$I_O$	DC Output Source or Sink Current	$\pm 50mA$
$I_{CC}$ or $I_{GND}$	DC $V_{CC}$ or Ground Current per Output Pin	$\pm 50mA$
$T_{STG}$	Storage Temperature	-65°C to +150°C
$T_J$	Junction Temperature	140°C

## Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications. Fairchild does not recommend exceeding them or designing to absolute maximum ratings.

Symbol	Parameter	Rating
$V_{CC}$	Supply Voltage AC	2.0V to 6.0V
	ACT	4.5V to 5.5V
$V_I$	Input Voltage	0V to $V_{CC}$
$V_O$	Output Voltage	0V to $V_{CC}$
$T_A$	Operating Temperature	-40°C to +85°C
$\Delta V / \Delta t$	Minimum Input Edge Rate, AC Devices: $V_{IN}$ from 30% to 70% of $V_{CC}$ , $V_{CC}$ @ 3.3V, 4.5V, 5.5V	125mV/ns
$\Delta V / \Delta t$	Minimum Input Edge Rate, ACT Devices: $V_{IN}$ from 0.8V to 2.0V, $V_{CC}$ @ 4.5V, 5.5V	125mV/ns

## DC Electrical Characteristics for AC

Symbol	Parameter	V <sub>CC</sub> (V)	Conditions	T <sub>A</sub> = +25°C		T <sub>A</sub> = -55°C to +125°C	T <sub>A</sub> = -40°C to +85°C	Units	
				Typ.	Guaranteed Limits				
V <sub>IH</sub>	Minimum HIGH Level Input Voltage	3.0	V <sub>OUT</sub> = 0.1V or V <sub>CC</sub> - 0.1V	1.5	2.1	2.1	2.1	V	
		4.5		2.25	3.15	3.15	3.15		
		5.5		2.75	3.85	3.85	3.85		
V <sub>IL</sub>	Maximum LOW Level Input Voltage	3.0	V <sub>OUT</sub> = 0.1V or V <sub>CC</sub> - 0.1V	1.5	0.9	0.9	0.9	V	
		4.5		2.25	1.35	1.35	1.35		
		5.5		2.75	1.65	1.65	1.65		
V <sub>OH</sub>	Minimum HIGH Level Output Voltage	3.0	I <sub>OUT</sub> = -50μA	2.99	2.9	2.9	2.9	V	
		4.5		4.49	4.4	4.4	4.4		
		5.5		5.49	5.4	5.4	5.4		
		3.0	V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> , I <sub>OH</sub> = 12mA		2.56	2.4	2.46		
		4.5		V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> , I <sub>OH</sub> = 24mA		3.86	3.7		3.76
		5.5			V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> , I <sub>OH</sub> = 24mA <sup>(1)</sup>		4.86		4.7
V <sub>OL</sub>	Maximum LOW Level Output Voltage	3.0	I <sub>OUT</sub> = 50μA	0.002	0.1	0.1	0.1	V	
		4.5		0.001	0.1	0.1	0.1		
		5.5		0.001	0.1	0.1	0.1		
		3.0	V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> , I <sub>OL</sub> = 12mA		0.36	0.50	0.44		
		4.5		V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> , I <sub>OL</sub> = 24mA		0.36	0.50		0.44
		5.5			V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> , I <sub>OL</sub> = 24mA <sup>(1)</sup>		0.36		0.50
I <sub>IN</sub> <sup>(2)</sup>	Maximum Input Leakage Current	5.5	V <sub>I</sub> = V <sub>CC</sub> , GND		±0.1	±1.0	±1.0	μA	
I <sub>OZ</sub>	Maximum 3-STATE Leakage Current	5.5	V <sub>I</sub> (OE) = V <sub>IL</sub> , V <sub>IH</sub> ; V <sub>I</sub> = V <sub>CC</sub> , V <sub>GND</sub> ; V <sub>O</sub> = V <sub>CC</sub> , GND		±0.25	±5.0	±2.5	μA	
I <sub>OLD</sub>	Minimum Dynamic Output Current <sup>(3)</sup>	5.5	V <sub>OLD</sub> = 1.65V Max.			50	75	mA	
I <sub>OHD</sub>		5.5	V <sub>OHD</sub> = 3.85V Min.			-50	-75	mA	
I <sub>CC</sub> <sup>(2)</sup>	Maximum Quiescent Supply Current	5.5	V <sub>IN</sub> = V <sub>CC</sub> or GND		4.0	80.0	40.0	μA	

**Notes:**

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

## DC Electrical Characteristics for ACT

Symbol	Parameter	V <sub>CC</sub> (V)	Conditions	T <sub>A</sub> = +25°C		T <sub>A</sub> = -55°C to +125°C	T <sub>A</sub> = -40°C to +85°C	Units
				Typ.	Guaranteed Limits			
V <sub>IH</sub>	Minimum HIGH Level Input Voltage	4.5	V <sub>OUT</sub> = 0.1V or V <sub>CC</sub> - 0.1V	1.5	2.0	2.0	2.0	V
		5.5		1.5	2.0	2.0	2.0	
V <sub>IL</sub>	Maximum LOW Level Input Voltage	4.5	V <sub>OUT</sub> = 0.1V or V <sub>CC</sub> - 0.1V	1.5	0.8	0.8	0.8	V
		5.5		1.5	0.8	0.8	0.8	
V <sub>OH</sub>	Minimum HIGH Level Output Voltage	4.5	I <sub>OUT</sub> = -50μA	4.49	4.4	4.4	4.4	V
		5.5		5.49	5.4	5.4	5.4	
		4.5	V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> , I <sub>OH</sub> = 24mA		3.86	3.70	3.76	
		5.5		V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> , I <sub>OH</sub> = 24mA <sup>(4)</sup>		4.86	4.70	
V <sub>OL</sub>	Maximum LOW Level Output Voltage	4.5	I <sub>OUT</sub> = 50μA	0.001	0.1	0.1	0.1	V
		5.5		0.001	0.1	0.1	0.1	
		4.5	V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> , I <sub>OL</sub> = 24mA		0.36	0.50	0.44	
		5.5		V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> , I <sub>OL</sub> = 24mA <sup>(4)</sup>		0.36	0.50	
I <sub>IN</sub>	Maximum Input Leakage Current	5.5	V <sub>I</sub> = V <sub>CC</sub> , GND		±0.1	±1.0	±1.0	μA
I <sub>OZ</sub>	Maximum 3-STATE Leakage Current	5.5	V <sub>I</sub> = V <sub>IL</sub> , V <sub>IH</sub> ; V <sub>O</sub> = V <sub>CC</sub> , GND		±0.25	±5.0	±2.5	μA
I <sub>CC</sub>	Maximum I <sub>CC</sub> /Input	5.5	V <sub>I</sub> = V <sub>CC</sub> - 2.1V	0.6		1.6	1.5	mA
I <sub>OLD</sub>	Minimum Dynamic Output Current <sup>(5)</sup>	5.5	V <sub>OLD</sub> = 1.65V Max.			50	75	mA
I <sub>OHD</sub>		5.5	V <sub>OHD</sub> = 3.85V Min.			-50	-75	mA
I <sub>CC</sub>	Maximum Quiescent Supply Current	5.5	V <sub>IN</sub> = V <sub>CC</sub> or GND		4.0	80.0	40.0	μA

**Notes:**

- All outputs loaded; thresholds on input associated with output under test.
- Maximum test duration 2.0ms, one output loaded at a time.

## AC Electrical Characteristics for AC

Symbol	Parameter	V <sub>CC</sub> (V) <sup>(6)</sup>	T <sub>A</sub> = +25°C, C <sub>L</sub> = 50pF			T <sub>A</sub> = -55°C to +125°C, C <sub>L</sub> = 50pF		T <sub>A</sub> = -40°C to +85°C, C <sub>L</sub> = 50pF		Units
			Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
t <sub>PLH</sub>	Propagation Delay, Data to Output	3.3	2.0	6.5	9.0	1.0	12.5	1.5	10.0	ns
		5.0	1.5	5.0	7.0	1.0	9.5	1.0	7.5	
t <sub>PHL</sub>	Propagation Delay, Data to Output	3.3	2.0	6.5	9.0	1.0	12.0	2.0	10.0	ns
		5.0	1.5	5.0	7.0	1.0	9.0	1.0	7.5	
t <sub>PZH</sub>	Output Enable Time	3.3	2.0	6.0	10.5	1.0	11.5	1.5	11.0	ns
		5.0	1.5	5.0	7.0	1.0	9.0	1.5	8.0	
t <sub>PZL</sub>	Output Enable Time	3.3	2.5	7.5	10.0	1.0	13.0	2.0	11.0	ns
		5.0	1.5	5.5	8.0	1.0	10.5	1.5	8.5	
t <sub>PHZ</sub>	Output Disable Time	3.3	3.0	7.0	10.0	1.0	12.5	1.5	10.5	ns
		5.0	2.5	6.5	9.0	1.0	10.5	1.0	9.5	
t <sub>PLZ</sub>	Output Disable Time	3.3	2.5	7.5	10.5	1.0	13.0	2.5	11.5	ns
		5.0	2.0	6.5	9.0	1.0	11.0	2.0	9.5	

## Note:

6. Voltage range 3.3 is 3.3V ± 0.3V. Voltage range 5.0 is 5.0V ± 0.5V.

## AC Electrical Characteristics for ACT

Symbol	Parameter	V <sub>CC</sub> (V) <sup>(7)</sup>	T <sub>A</sub> = +25°C, C <sub>L</sub> = 50pF			T <sub>A</sub> = -55°C to +125°C, C <sub>L</sub> = 50pF		T <sub>A</sub> = -40°C to +85°C, C <sub>L</sub> = 50pF		Units
			Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
t <sub>PLH</sub>	Propagation Delay, Data to Output	5.0	2.0	6.5	9.0	1.0	10.0	1.5	10.0	ns
t <sub>PHL</sub>	Propagation Delay, Data to Output	5.0	2.0	7.0	9.0	1.0	10.0	1.5	10.0	ns
t <sub>PZH</sub>	Output Enable Time	5.0	1.5	6.0	8.5	1.0	9.5	1.0	9.5	ns
t <sub>PZL</sub>	Output Enable Time	5.0	2.0	7.0	9.5	1.0	11.0	1.5	10.5	ns
t <sub>PHZ</sub>	Output Disable Time	5.0	2.0	7.0	9.5	1.0	11.0	1.5	10.5	ns
t <sub>PLZ</sub>	Output Disable Time	5.0	2.5	7.5	10.0	1.0	11.5	2.0	10.5	ns

## Note:

7. Voltage range 5.0 is 5.0V ± 0.5V.

## Capacitance

Symbol	Parameter	Conditions	Typ	Units
C <sub>IN</sub>	Input Capacitance	V <sub>CC</sub> = OPEN	4.5	pF
C <sub>PD</sub>	Power Dissipation Capacitance	V <sub>CC</sub> = 5.0V	45.0	pF

### Physical Dimensions



**Figure 1. 20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide**

Package drawings are provided as a service to customers considering Fairchild components. Drawings may change in any manner without notice. Please note the revision and/or date on the drawing and contact a Fairchild Semiconductor representative to verify or obtain the most recent revision. Package specifications do not expand the terms of Fairchild's worldwide terms and conditions, specifically the warranty therein, which covers Fairchild products.

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Physical Dimensions (Continued)



M20DREVC

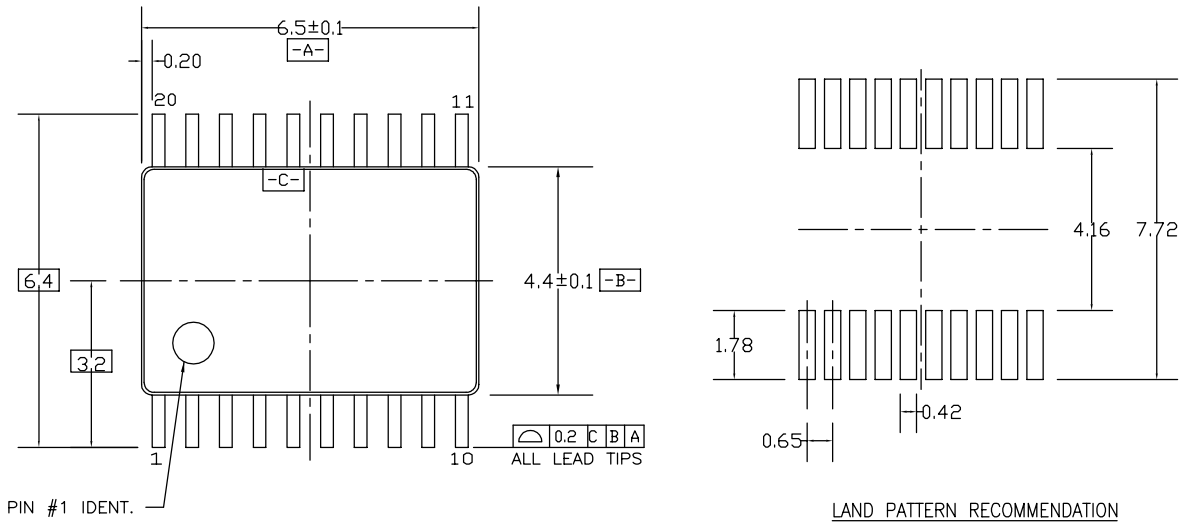
Figure 2. 20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide

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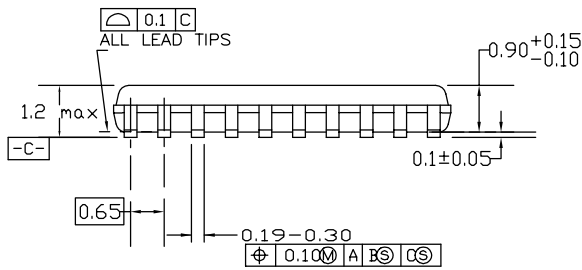
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**Physical Dimensions** (Continued)

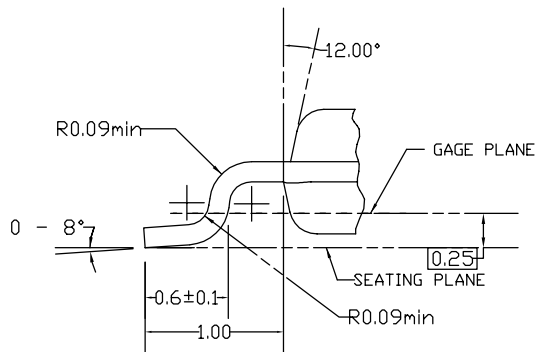
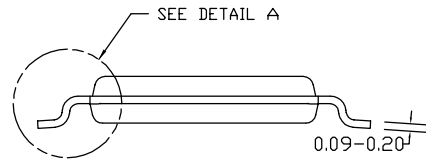


PIN #1 IDENT.

LAND PATTERN RECOMMENDATION



DIMENSIONS ARE IN MILLIMETERS



DETAIL A

NOTES:

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

MTC20REV D1

**Figure 3. 20-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide**

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**Physical Dimensions** (Continued)



**NOTES:**

- A. CONFORMS TO JEDEC REGISTRATION MS-001, VARIATIONS AD.
- B. ALL DIMENSIONS ARE IN MILLIMETERS
- C. DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS. MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED 0.25MM.
- D. DOES NOT INCLUDE DAMBAR PROTRUSIONS. DAMBAR PROTRUSIONS SHALL NOT EXCEED 0.25MM.
- E. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
- F. DRAWING FILE NAME: N20AREV8

**Figure 4. 20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide**

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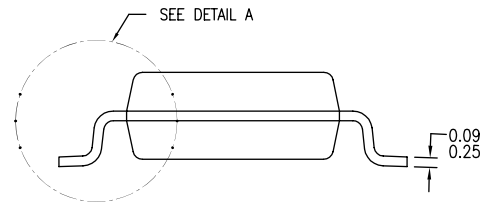
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Physical Dimensions (Continued)



LAND PATTERN RECOMMENDATIONS



DIMENSIONS ARE IN MILLIMETERS

NOTES:

- A. CONFORMS TO JEDEC REGISTRATION MO-150, VARIATION AE, DATE 1/94.
- B. DIMENSIONS ARE IN MILLIMETERS.
- C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.
- D. DIMENSIONS AND TOLERANCES PER ASME Y14.5M - 1994.



MSA20REV B

Figure 5. 20-Lead Shrink Small Outline Package (SSOP), JEDEC MO-150, 5.3mm Wide

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

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| Build it Now <sup>™</sup>   | FRFET <sup>®</sup>                           | Power220 <sup>®</sup>                  | SYSTEM <sup>®</sup>              |
| CorePLUS <sup>™</sup>   | Global Power Resource <sup>SM</sup>          | Power247 <sup>®</sup>                  | GENERAL <sup>®</sup>             |
| CROSSVOLT <sup>™</sup>  | Green FPS <sup>™</sup>                       | POWEREDGE <sup>®</sup>                 | The Power Franchise <sup>®</sup> |
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