

74AC241, 74ACT241 Octal Buffer/Line Driver with 3-STATE Outputs

Features

- I_{CC} and I_{OZ} reduced by 50%
- Non-inverting 3-STATE outputs drive bus lines or buffer memory address registers
- Outputs source/sink 24mA
- ACT241 has TTL-compatible inputs

General Description

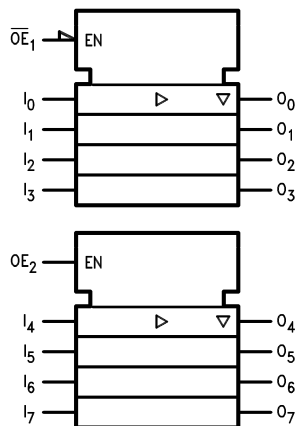
The AC/ACT241 is an octal buffer and line driver designed to be employed as a memory address driver, clock driver and bus-oriented transmitter or receiver which provides improved PC board density.

Ordering Information

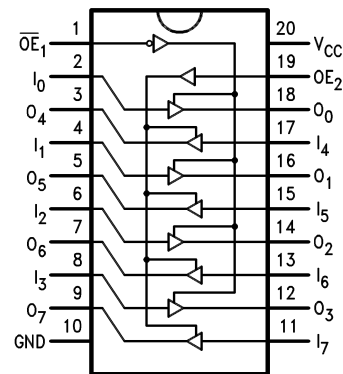
Order Number	Package Number	Package Description
74AC241SC	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide
74AC241SJ	M20D	20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
74AC241MTC	MTC20	20-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide
74ACT241SC	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide
74ACT241SJ	M20D	20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
74ACT241MTC	MTC20	20-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide

Device also available in Tape and Reel. Specify by appending suffix letter "X" to the ordering number.
Pb-Free package per JEDEC J-STD-020B.

Logic Symbol



Connection Diagram



Pin Descriptions

Pin Names	Description
\overline{OE}_1	3-STATE Output Enable Input
OE_2	3-STATE Output Enable Input (Active HIGH)
I_0 - I_7	Inputs
O_0 - O_7	Outputs

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Truth Table

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

Inputs		Outputs
OE_2	I_n	Pins 3, 5, 7, 9
H	L	L
H	H	H
L	X	Z

H = HIGH Voltage Level

X = Immaterial

L = LOW Voltage Level

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 $V_I = -0.5V$ $V_I = V_{CC} + 0.5V$	-20mA +20mA
V_I	DC Input Voltage	-0.5V to $V_{CC} + 0.5V$
I_{OK}	DC Output Diode Current $V_O = -0.5V$ $V_O = V_{CC} + 0.5V$	-20mA +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 ACT	2.0V to 6.0V 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 _{CC} (V)	Conditions	T _A = +25°C		T _A = -40°C to +85°C		Units		
				Typ.	Guaranteed Limits					
V _{IH}	Minimum HIGH Level Input Voltage	3.0	V _{OUT} = 0.1V or V _{CC} - 0.1V	1.5	2.1	2.1		V		
		4.5		2.25	3.15	3.15				
		5.5		2.75	3.85	3.85				
V _{IL}	Maximum LOW Level Input Voltage	3.0	V _{OUT} = 0.1V or V _{CC} - 0.1V	1.5	0.9	0.9		V		
		4.5		2.25	1.35	1.35				
		5.5		2.75	1.65	1.65				
V _{OH}	Minimum HIGH Level Output Voltage	3.0	I _{OUT} = -50μA	2.99	2.9	2.9		V		
		4.5		4.49	4.4	4.4				
		5.5		5.49	5.4	5.4				
		3.0	V _{IN} = V _{IL} or V _{IH} ; I _{OH} = -12mA			2.56	2.46			
		4.5		I _{OH} = -24mA			3.86		3.76	
		5.5		I _{OH} = -24mA ⁽¹⁾			4.86		4.76	
V _{OL}	Maximum LOW Level Output Voltage	3.0	I _{OUT} = 50μA	0.002	0.1	0.1		V		
		4.5		0.001	0.1	0.1				
		5.5		0.001	0.1	0.1				
		3.0	V _{IN} = V _{IL} or V _{IH} ; I _{OL} = 12mA			0.36	0.44			
		4.5		I _{OL} = 24mA			0.36		0.44	
		5.5		I _{OL} = 24mA ⁽¹⁾			0.36		0.44	
I _{IN} ⁽³⁾	Maximum Input Leakage Current	5.5	V _I = V _{CC} , GND		±0.1	±0.1		μA		
I _{OZ}	Maximum 3-STATE Leakage Current	5.5	V _I (OE) = V _{IL} , V _{IH} ; V _I = V _{CC} , GND; V _O = V _{CC} , GND		±0.25	±2.5		μA		
I _{OLD}	Minimum Dynamic Output Current ⁽²⁾	5.5	V _{OLD} = 1.65V Max.			75		mA		
I _{OHD}			V _{OHD} = 3.85V Min.			-75		mA		
I _{CC} ⁽³⁾	Maximum Quiescent Supply Current	5.5	V _{IN} = V _{CC} or GND		4.0	40.0		μA		

Notes:

1. All outputs loaded; thresholds on input associated with output under test.
2. Maximum test duration 2.0ms, one output loaded at a time.
3. I_{IN} and I_{CC} @ 3.0V are guaranteed to be less than or equal to the respective limit @ 5.5V V_{CC}.

DC Electrical Characteristics for ACT

Symbol	Parameter	V _{CC} (V)	Conditions	T _A = +25°C		T _A = -40°C to +85°C		Units	
				Typ.	Guaranteed Limits				
V _{IH}	Minimum HIGH Level Input Voltage	4.5	V _{OUT} = 0.1V or V _{CC} - 0.1V	1.5	2.0	2.0		V	
		5.5		1.5	2.0	2.0			
V _{IL}	Maximum LOW Level Input Voltage	4.5	V _{OUT} = 0.1V or V _{CC} - 0.1V	1.5	0.8	0.8		V	
		5.5		1.5	0.8	0.8			
V _{OH}	Minimum HIGH Level Output Voltage	4.5	I _{OUT} = -50μA	4.49	4.4	4.4		V	
		5.5		5.49	5.4	5.4			
		4.5	V _{IN} = V _{IL} or V _{IH} ; I _{OH} = -24mA			3.86	3.76		
		5.5	I _{OH} = -24mA ⁽⁴⁾			4.86	4.76		
V _{OL}	Maximum LOW Level Output Voltage	4.5	I _{OUT} = 50μA	0.001	0.1	0.1		V	
		5.5		0.001	0.1	0.1			
		4.5	V _{IN} = V _{IL} or V _{IH} ; I _{OL} = 24mA			0.36	0.44		
		5.5	I _{OL} = 24mA ⁽⁴⁾			0.36	0.44		
I _{IN}	Maximum Input Leakage Current	5.5	V _I = V _{CC} , GND		±0.1	± 1.0		μA	
I _{OZ}	Maximum 3-STATE Leakage Current	5.5	V _I = V _{IL} , V _{IH} ; V _O = V _{CC} , GND		±0.25	±2.5		μA	
I _{CC}	Maximum I _{CC} /Input	5.5	V _I = V _{CC} - 2.1V	0.6		1.5		mA	
I _{OLD}	Minimum Dynamic Output Current ⁽⁵⁾	5.5	V _{OLD} = 1.65V Max.			75		mA	
I _{OHD}			V _{OHD} = 3.85V Min.			-75		mA	
I _{CC}	Maximum Quiescent Supply Current	5.5	V _{IN} = V _{CC} or GND		4.0	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 _{CC} (V) ⁽⁶⁾	T _A = +25°C, C _L = 50pF			T _A = -40°C to +85°C, C _L = 50pF		Units
			Min.	Typ.	Max.	Min.	Max.	
t _{PLH}	Propagation Delay, Data to Output	3.3	1.5	6.0	9.0	1.5	10.0	ns
		5.0	1.5	5.0	7.0	1.0	7.5	
t _{PHL}	Propagation Delay, Data to Output	3.3	1.5	6.0	9.0	1.0	10.5	ns
		5.0	1.5	4.5	7.0	1.0	7.5	
t _{PZH}	Output Enable Time	3.3	1.5	6.5	12.5	1.0	13.0	ns
		5.0	1.5	5.5	9.0	1.0	9.5	
t _{PZL}	Output Enable Time	3.3	1.5	7.0	12.0	1.5	13.0	ns
		5.0	1.5	5.5	9.0	1.0	9.5	
t _{PHZ}	Output Disable Time	3.3	2.0	8.0	12.0	2.0	12.5	ns
		5.0	1.5	6.5	10.0	1.0	10.5	
t _{PLZ}	Output Disable Time	3.3	1.5	7.0	12.5	1.0	13.0	ns
		5.0	1.5	6.0	10.0	1.0	10.5	

Note:

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

AC Electrical Characteristics for ACT

Symbol	Parameter	V _{CC} (V) ⁽⁷⁾	T _A = +25°C, C _L = 50pF			T _A = -40°C to +85°C, C _L = 50pF		Units
			Min.	Typ.	Max.	Min.	Max.	
t _{PLH}	Propagation Delay, Data to Output	5.0	1.5	6.5	9.0	1.5	10.0	ns
t _{PHL}	Propagation Delay, Data to Output	5.0	1.5	7.0	9.0	1.5	10.0	ns
t _{PZH}	Output Enable Time	5.0	1.5	6.0	9.0	1.0	10.0	ns
t _{PZL}	Output Enable Time	5.0	1.5	7.0	10.0	1.5	11.0	ns
t _{PHZ}	Output Disable Time	5.0	1.5	8.0	10.5	1.5	11.5	ns
t _{PLZ}	Output Disable Time	5.0	2.0	7.0	10.5	1.5	11.5	ns

Note:

7. Voltage range 5.0 is 5.0V ± 0.5V.

Capacitance

Symbol	Parameter	Conditions	Typ.	Units
C _{IN}	Input Capacitance	V _{CC} = OPEN	4.5	pF
C _{PD}	Power Dissipation Capacitance	V _{CC} = 5.0V	45.0	pF

Physical Dimensions

Dimensions are in inches (millimeters) unless otherwise noted.

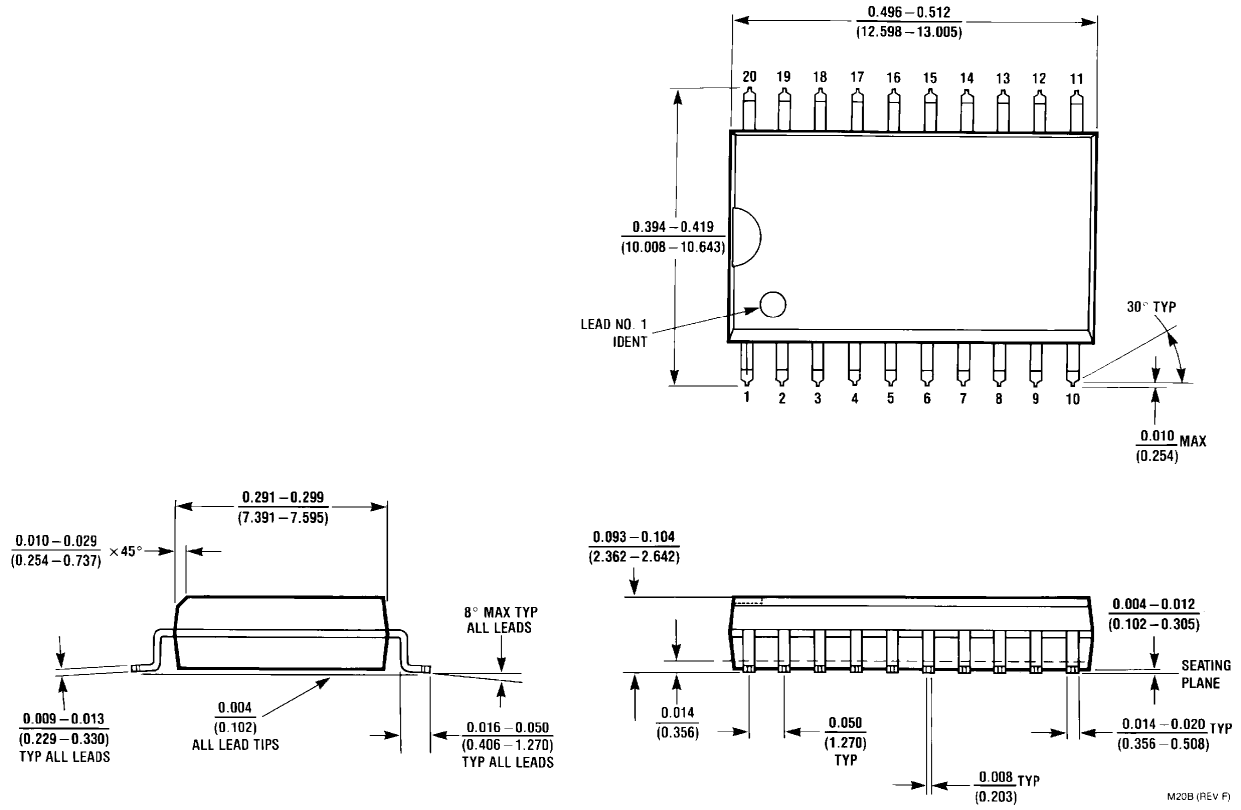
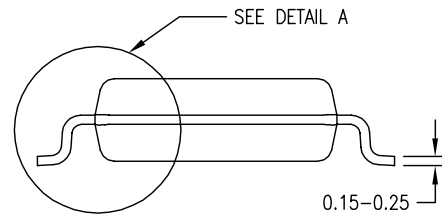
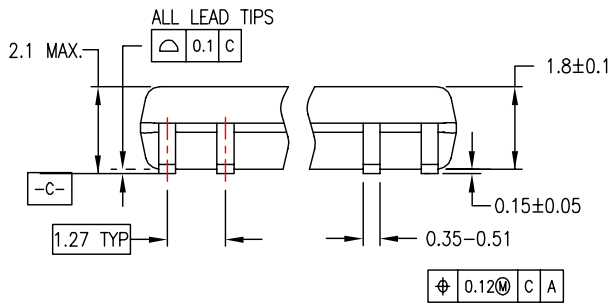
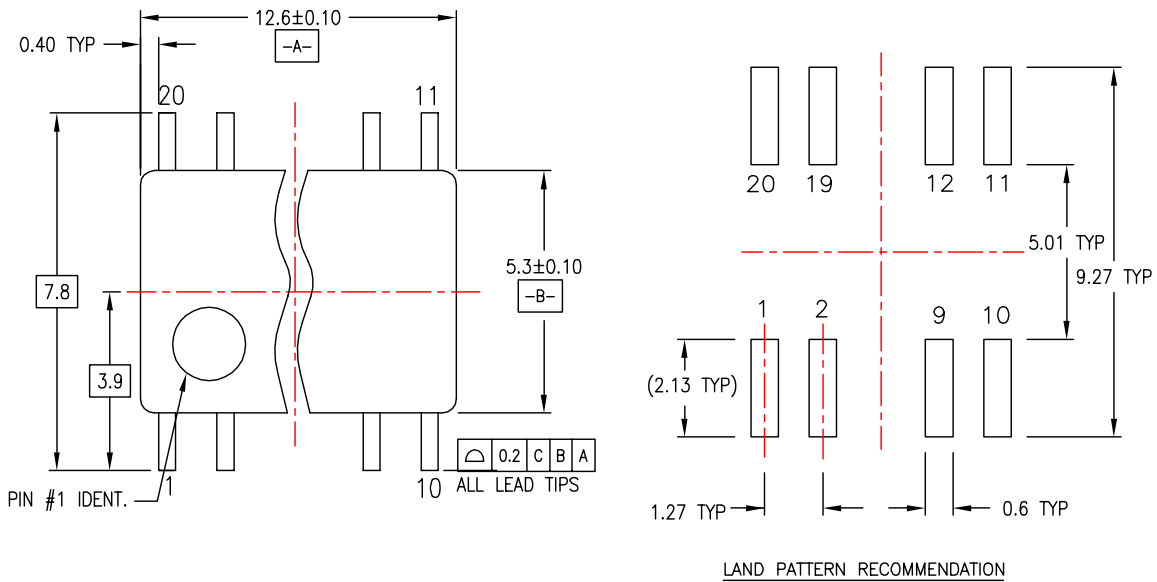


Figure 1. 20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide Package Number M20B

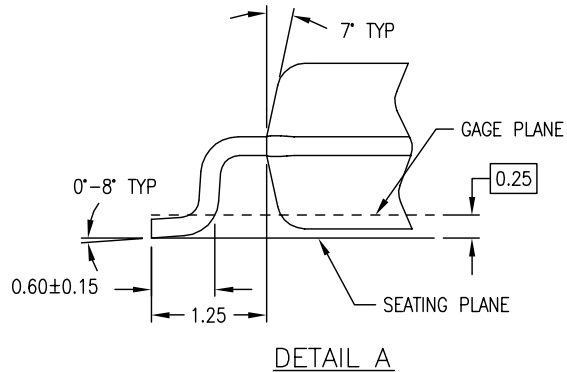
Physical Dimensions (Continued)

Dimensions are in millimeters unless otherwise noted.



DIMENSIONS ARE IN MILLIMETERS

- NOTES:
- A. CONFORMS TO EIAJ EDR-7320 REGISTRATION, ESTABLISHED IN DECEMBER, 1998.
 - B. DIMENSIONS ARE IN MILLIMETERS.
 - C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND THE BAR EXTRUSIONS.

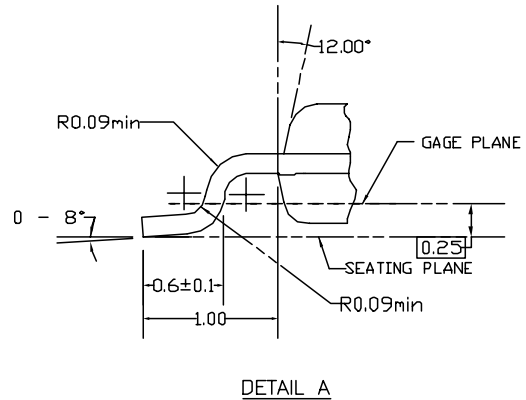
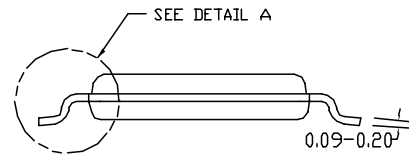
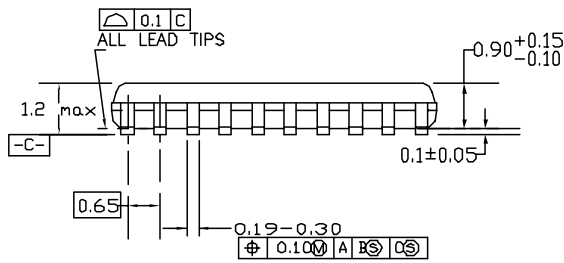
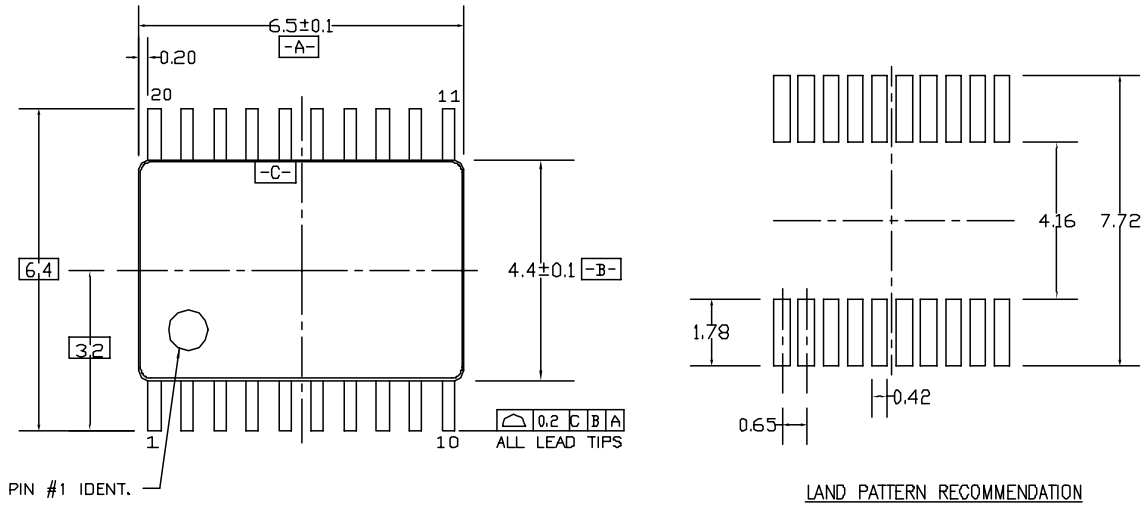


M20DREVC

Figure 2. 20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide Package Number M20D

Physical Dimensions (Continued)

Dimensions are in millimeters unless otherwise noted.



NOTES:


- A. CONFORMS TO JEDEC REGISTRATION MO-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 Package Number MTC20

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