

# MC74ACT241

## Octal Buffer/Line Driver with 3-State Outputs

The MC74ACT241 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.

### Features

- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- Outputs Source/Sink 24 mA
- TTL Compatible Inputs
- Pb-Free Packages are Available

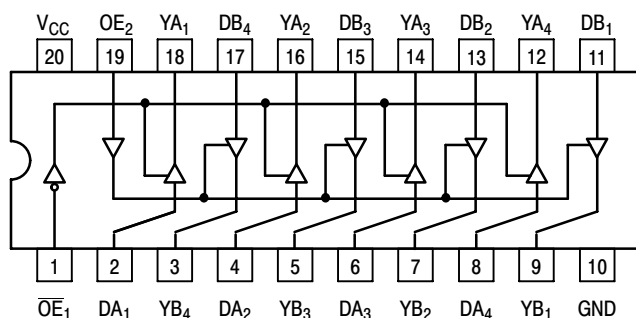


Figure 1. Pinout: 20-Lead Packages Conductors  
(Top View)

### TRUTH TABLE

| Inputs            |   | Outputs<br>(Pins 12, 14, 16, 18) |
|-------------------|---|----------------------------------|
| $\overline{OE}_1$ | D |                                  |
| L                 | L | L                                |
| L                 | H | H                                |
| H                 | X | Z                                |

H = HIGH Voltage Level

L = LOW Voltage Level

X = Immaterial

Z = High Impedance

### TRUTH TABLE

| Inputs |   | Outputs<br>(Pins 3, 5, 7, 9) |
|--------|---|------------------------------|
| $OE_2$ | D |                              |
| H      | L | L                            |
| H      | H | H                            |
| L      | X | Z                            |

H = HIGH Voltage Level

L = LOW Voltage Level

X = Immaterial

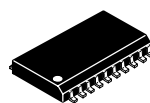
Z = High Impedance



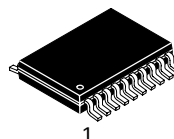
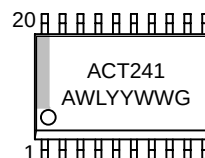
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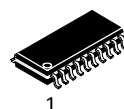
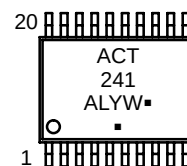
### MARKING DIAGRAMS



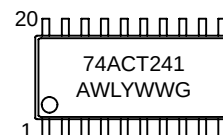
SOIC-20W  
DW SUFFIX  
CASE 751D



TSSOP-20  
DT SUFFIX  
CASE 948E



SOEIAJ-20  
M SUFFIX  
CASE 967



A = Assembly Location

WL, L = Wafer Lot

YY, Y = Year

WW, W = Work Week

G or ■ = Pb-Free Package

(Note: Microdot may be in either location)

### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

# MC74ACT241

## MAXIMUM RATINGS

| Symbol               | Parameter                                       | Value                                                                                                             | Unit        |
|----------------------|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|-------------|
| V <sub>CC</sub>      | DC Supply Voltage                               | − 0.5 to + 7.0                                                                                                    | V           |
| V <sub>I</sub>       | DC Input Voltage                                | − 0.5 ≤ V <sub>I</sub> ≤ V <sub>CC</sub> + 0.5                                                                    | V           |
| V <sub>O</sub>       | DC Output Voltage (Note 1)                      | − 0.5 ≤ V <sub>O</sub> ≤ V <sub>CC</sub> + 0.5                                                                    | V           |
| I <sub>IK</sub>      | DC Input Diode Current                          | ± 20                                                                                                              | mA          |
| I <sub>OK</sub>      | DC Output Diode Current                         | ± 50                                                                                                              | mA          |
| I <sub>O</sub>       | DC Output Sink/Source Current                   | ± 50                                                                                                              | mA          |
| I <sub>CC</sub>      | DC Supply Current per Output Pin                | ± 50                                                                                                              | mA          |
| I <sub>GND</sub>     | DC Ground Current per Output Pin                | ± 100                                                                                                             | mA          |
| T <sub>STG</sub>     | Storage Temperature Range                       | − 65 to + 150                                                                                                     | °C          |
| T <sub>L</sub>       | Lead temperature, 1 mm from Case for 10 Seconds | 260                                                                                                               | °C          |
| T <sub>J</sub>       | Junction temperature under Bias                 | + 150                                                                                                             | °C          |
| θ <sub>JA</sub>      | Thermal Resistance                              | SOIC<br>TSSOP<br>96<br>128                                                                                        | °C/W        |
| P <sub>D</sub>       | Power Dissipation in Still Air at 85°C          | SOIC<br>TSSOP<br>500<br>450                                                                                       | mW          |
| MSL                  | Moisture Sensitivity                            | Level 1                                                                                                           |             |
| F <sub>R</sub>       | Flammability Rating                             | Oxygen Index: 30% – 35%<br>UL 94 V-0 @ 0.125 in                                                                   |             |
| V <sub>ESD</sub>     | ESD Withstand Voltage                           | Human Body Model (Note 2)<br>Machine Model (Note 3)<br>Charged Device Model (Note 4)<br>> 2000<br>> 200<br>> 1000 | V           |
| I <sub>Latchup</sub> | Latchup Performance                             | Above V <sub>CC</sub> and Below GND at 85°C (Note 5)                                                              | ± 100<br>mA |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. I<sub>O</sub> absolute maximum rating must be observed.
2. Tested to EIA/JESD22-A114-A.
3. Tested to EIA/JESD22-A115-A.
4. Tested to JESD22-C101-A.
5. Tested to EIA/JESD78.

## RECOMMENDED OPERATING CONDITIONS

| Symbol                             | Parameter                                            | Min                                                          | Typ       | Max             | Unit |
|------------------------------------|------------------------------------------------------|--------------------------------------------------------------|-----------|-----------------|------|
| V <sub>CC</sub>                    | DC Input Voltage (Referenced to GND)                 | 4.5                                                          |           | 5.5             | V    |
| V <sub>in</sub> , V <sub>out</sub> | DC Input Voltage, Output Voltage (Referenced to GND) | 0                                                            |           | V <sub>CC</sub> | V    |
| T <sub>A</sub>                     | Operating Temperature, All Package Types             | −40                                                          | 25        | +85             | °C   |
| t <sub>r</sub> , t <sub>f</sub>    | Input Rise and Fall Time (Note 7)                    | V <sub>CC</sub> = 4.5 V<br>0<br>V <sub>CC</sub> = 5.5 V<br>0 | 10<br>8.0 | 10<br>8.0       | ns/V |
| I <sub>OH</sub>                    | Output Current – High                                | –                                                            | –         | −24             | mA   |
| I <sub>OL</sub>                    | Output Current – Low                                 | –                                                            | –         | 24              | mA   |

6. Unused Inputs may not be left open. All inputs must be tied to a high voltage level or low logic voltage level.
7. V<sub>in</sub> from 0.8 V to 2.0 V; refer to individual Data Sheets for devices that differ from the typical input rise and fall times.

# MC74ACT241

## DC CHARACTERISTICS

| Symbol                               | Parameter                                 | V <sub>CC</sub><br>(V) | T <sub>A</sub> = +25°C |                   | T <sub>A</sub> = -40°C to +85°C | Unit     | Conditions                                                                                                                                  |
|--------------------------------------|-------------------------------------------|------------------------|------------------------|-------------------|---------------------------------|----------|---------------------------------------------------------------------------------------------------------------------------------------------|
|                                      |                                           |                        | Typ                    | Guaranteed Limits |                                 |          |                                                                                                                                             |
| V <sub>IH</sub>                      | Minimum High Level Input Voltage          | 4.5<br>5.5             | 1.5<br>1.5             | 2.0<br>2.0        | 2.0<br>2.0                      | V<br>V   | V <sub>OUT</sub> = 0.1 V or<br>V <sub>CC</sub> - 0.1 V                                                                                      |
| V <sub>IL</sub>                      | Maximum Low Level Input Voltage           | 4.5<br>5.5             | 1.5<br>1.5             | 0.8<br>0.8        | 0.8<br>0.8                      | V<br>V   | V <sub>OUT</sub> = 0.1 V or<br>V <sub>CC</sub> - 0.1 V                                                                                      |
| V <sub>OH</sub>                      | Minimum High Level Output Voltage         | 4.5<br>5.5             | 4.49<br>5.49           | 4.4<br>5.4        | 4.4<br>5.4                      | V<br>V   | I <sub>OUT</sub> = -50 μA                                                                                                                   |
|                                      |                                           | 4.5<br>5.5             | —                      | 3.86<br>4.86      | 3.76<br>4.76                    | V<br>V   | *V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> -24 mA<br>I <sub>OH</sub> -24 mA                                                      |
| V <sub>OL</sub>                      | Maximum Low Level Output Voltage          | 4.5<br>5.5             | 0.001<br>0.001         | 0.1<br>0.1        | 0.1<br>0.1                      | V<br>V   | I <sub>OUT</sub> = 50 μA                                                                                                                    |
|                                      |                                           | 4.5<br>5.5             | —                      | 0.36<br>0.36      | 0.44<br>0.44                    | V<br>V   | *V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> 24 mA<br>I <sub>OL</sub> 24 mA                                                        |
| I <sub>IN</sub>                      | Maximum Input Leakage Current             | 5.5                    | —                      | ±0.1              | ±1.0                            | μA       | V <sub>I</sub> = V <sub>CC</sub> , GND                                                                                                      |
| ΔI <sub>CCT</sub>                    | Additional Maximum I <sub>CC</sub> /Input | 5.5                    | 0.6                    | —                 | 1.5                             | mA       | V <sub>I</sub> = V <sub>CC</sub> - 2.1 V                                                                                                    |
| I <sub>OZ</sub>                      | Maximum 3-State Current                   | 5.5                    | —                      | ±0.5              | ±5.0                            | μA       | V <sub>I</sub> (OE) = V <sub>IL</sub> , V <sub>IH</sub><br>V <sub>I</sub> = V <sub>CC</sub> , GND<br>V <sub>O</sub> = V <sub>CC</sub> , GND |
| I <sub>OLD</sub><br>I <sub>OHD</sub> | †Minimum Dynamic Output Current           | 5.5<br>5.5             | —                      | —                 | 75<br>-75                       | mA<br>mA | V <sub>OLD</sub> = 1.65 V Max<br>V <sub>OHD</sub> = 3.85 V Min                                                                              |
| I <sub>CC</sub>                      | Maximum Quiescent Supply Current          | 5.5                    | —                      | 8.0               | 80                              | μA       | V <sub>IN</sub> = V <sub>CC</sub> or GND                                                                                                    |

\*All outputs loaded; thresholds on input associated with output under test.

†Maximum test duration 2.0 ms, one output loaded at a time.

## AC CHARACTERISTICS t<sub>r</sub> = t<sub>f</sub> = 3.0 ns (For Figures and Waveforms, See Figures 2, 3, and 4.)

| Symbol           | Parameter                        | V <sub>CC</sub> *<br>(V) | T <sub>A</sub> = +25°C<br>C <sub>L</sub> = 50 pF |     |      | T <sub>A</sub> = -40°C to +85°C<br>C <sub>L</sub> = 50 pF |      | Unit |
|------------------|----------------------------------|--------------------------|--------------------------------------------------|-----|------|-----------------------------------------------------------|------|------|
|                  |                                  |                          | Min                                              | Typ | Max  | Min                                                       | Max  |      |
| t <sub>PLH</sub> | Propagation Delay Data to Output | 5.0                      | 1.5                                              | 6.5 | 9.0  | 1.5                                                       | 10.0 | ns   |
| t <sub>PHL</sub> | Propagation Delay Data to Output | 5.0                      | 1.5                                              | 7.0 | 9.0  | 1.5                                                       | 10.0 | ns   |
| t <sub>PZH</sub> | Output Enable Time               | 5.0                      | 1.5                                              | 6.0 | 9.0  | 1.0                                                       | 10.0 | ns   |
| t <sub>PZL</sub> | Output Enable Time               | 5.0                      | 1.5                                              | 7.0 | 10.0 | 1.5                                                       | 11.0 | ns   |
| t <sub>PHZ</sub> | Output Disable Time              | 5.0                      | 1.5                                              | 8.0 | 10.5 | 1.5                                                       | 11.5 | ns   |
| t <sub>PLZ</sub> | Output Disable Time              | 5.0                      | 2.0                                              | 7.0 | 10.5 | 1.5                                                       | 11.5 | ns   |

\*Voltage Range 5.0 V is 5.0 V ±0.5 V

## CAPACITANCE

| Symbol          | Parameter                     | Value Typ | Unit | Test Conditions         |
|-----------------|-------------------------------|-----------|------|-------------------------|
| C <sub>IN</sub> | Input Capacitance             | 4.5       | pF   | V <sub>CC</sub> = 5.0 V |
| C <sub>PD</sub> | Power Dissipation Capacitance | 45        | pF   | V <sub>CC</sub> = 5.0 V |

# MC74ACT241

## SWITCHING WAVEFORMS

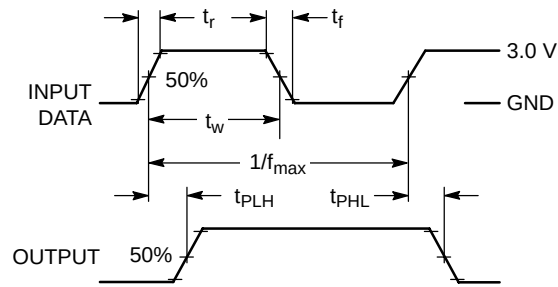


Figure 2.

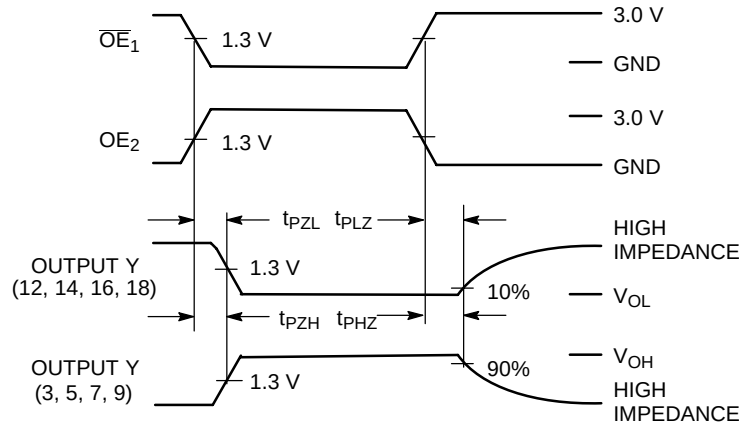
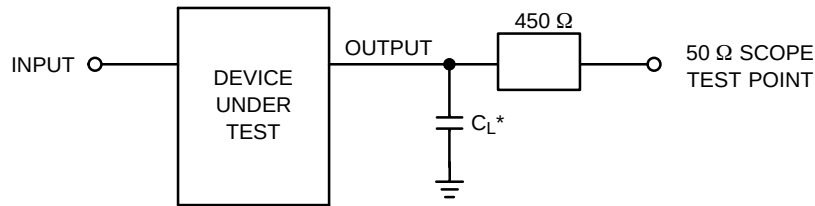


Figure 3.



\*Includes all probe and jig capacitance

Figure 4. Test Circuit

## MC74ACT241

### ORDERING INFORMATION

| Device          | Package                | Shipping <sup>†</sup> |
|-----------------|------------------------|-----------------------|
| MC74ACT241DW    | SOIC-20                | 38 Units / Rail       |
| MC74ACT241DWG   | SOIC-20<br>(Pb-Free)   |                       |
| MC74ACT241DWR2  | SOIC-20                | 1000 / Tape & Reel    |
| MC74ACT241DWR2G | SOIC-20<br>(Pb-Free)   |                       |
| MC74ACT241DTR2  | TSSOP-20*              | 2500 / Tape & Reel    |
| MC74ACT241DTR2G | TSSOP-20*              |                       |
| MC74ACT241MEL   | SOEIAJ-20              | 2000 / Tape & Reel    |
| MC74ACT241MELG  | SOEIAJ-20<br>(Pb-Free) |                       |

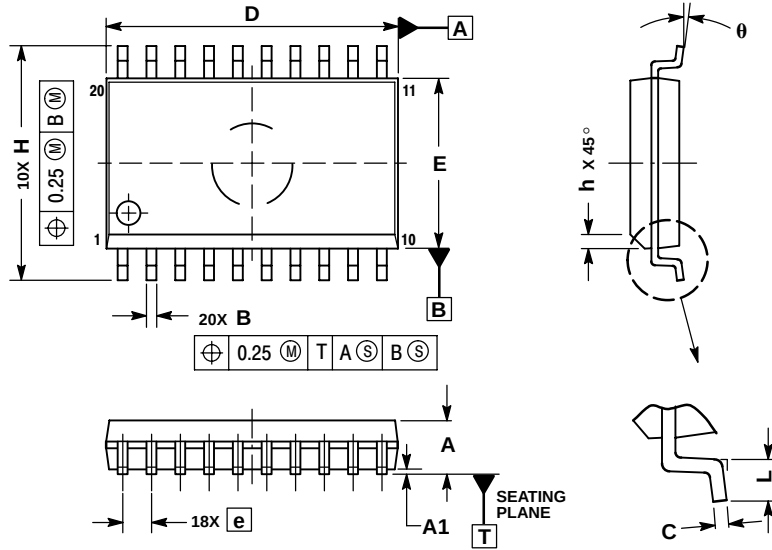
<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

\*These packages are inherently Pb-Free.

# MC74ACT241

## PACKAGE DIMENSIONS

SOIC-20W  
DW SUFFIX  
CASE 751D-05  
ISSUE G



### NOTES:

1. DIMENSIONS ARE IN MILLIMETERS.
2. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994.
3. DIMENSIONS D AND E DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
5. DIMENSION B DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE PROTRUSION SHALL BE 0.13 TOTAL IN EXCESS OF B DIMENSION AT MAXIMUM MATERIAL CONDITION.

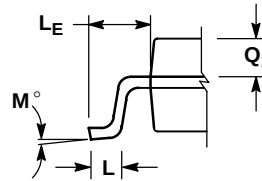
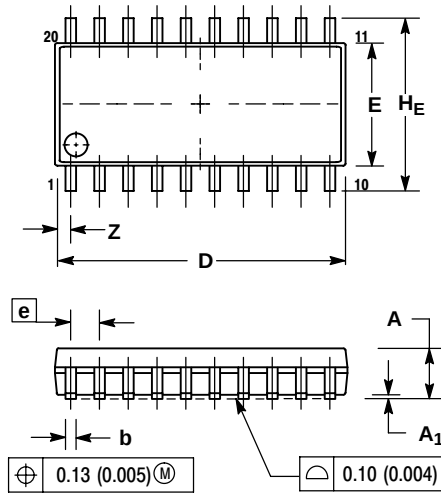
| MILLIMETERS |          |       |
|-------------|----------|-------|
| DIM         | MIN      | MAX   |
| A           | 2.35     | 2.65  |
| A1          | 0.10     | 0.25  |
| B           | 0.35     | 0.49  |
| C           | 0.23     | 0.32  |
| D           | 12.65    | 12.95 |
| E           | 7.40     | 7.60  |
| e           | 1.27 BSC |       |
| H           | 10.05    | 10.55 |
| h           | 0.25     | 0.75  |
| L           | 0.50     | 0.90  |
| θ           | 0°       | 7°    |



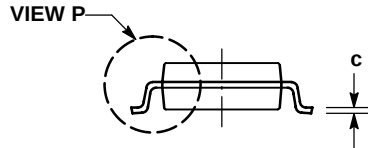
# MC74ACT241

## PACKAGE DIMENSIONS

SOEIAJ-20  
M SUFFIX  
CASE 967-01  
ISSUE A



DETAIL P



### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS AND ARE MEASURED AT THE PARTING LINE. MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
5. THE LEAD WIDTH DIMENSION (b) DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 (0.003) TOTAL IN EXCESS OF THE LEAD WIDTH DIMENSION AT MAXIMUM MATERIAL CONDITION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OR THE FOOT. MINIMUM SPACE BETWEEN PROTRUSIONS AND ADJACENT LEAD TO BE 0.46 (0.018).

| DIM | MILLIMETERS |       | INCHES    |       |
|-----|-------------|-------|-----------|-------|
|     | MIN         | MAX   | MIN       | MAX   |
| A   | ---         | 2.05  | ---       | 0.081 |
| A1  | 0.05        | 0.20  | 0.002     | 0.008 |
| b   | 0.35        | 0.50  | 0.014     | 0.020 |
| c   | 0.15        | 0.25  | 0.006     | 0.010 |
| D   | 12.35       | 12.80 | 0.486     | 0.504 |
| E   | 5.10        | 5.45  | 0.201     | 0.215 |
| e   | 1.27 BSC    |       | 0.050 BSC |       |
| HE  | 7.40        | 8.20  | 0.291     | 0.323 |
| L   | 0.50        | 0.85  | 0.020     | 0.033 |
| LE  | 1.10        | 1.50  | 0.043     | 0.059 |
| M   | 0°          | 10°   | 0°        | 10°   |
| Q1  | 0.70        | 0.90  | 0.028     | 0.035 |
| Z   | ---         | 0.81  | ---       | 0.032 |

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Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

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