



U74ACT240

CMOS IC

OCTAL BUFFERS/DRIVERS WITH 3-STATE OUTPUTS

DESCRIPTION

The **U74ACT240** is a octal buffers/drivers with 3-state outputs. It is organized as two 4-bit buffers/drivers with separate output-enable (\overline{OE}) inputs. When \overline{OE} is high, the Y outputs are in a high-impedance state, and the outputs neither load nor drive the bus lines. When \overline{OE} is low, the device passes inverted data from the a inputs to the Y outputs.

The **U74ACT240** is designed to improve the performance and density of 3-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters.

To ensure the high-impedance state during power up or power down, \overline{OE} should be tied to V_{CC} through a pull-up resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

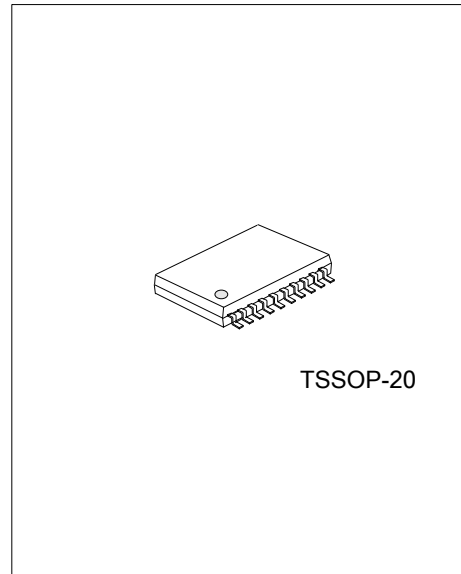
FEATURES

- * 4.5V to 5.5V V_{CC} operation
- * Inputs accept voltages to 5.5V
- * Max t_{pd} of 8.5 ns from A to Y at 5V
- * Low power consumption, $I_{CC} = 4 \mu A$ (Max.) at 5.5V
- * TTL compatible
- * ± 24 mA output driver at 5.5V

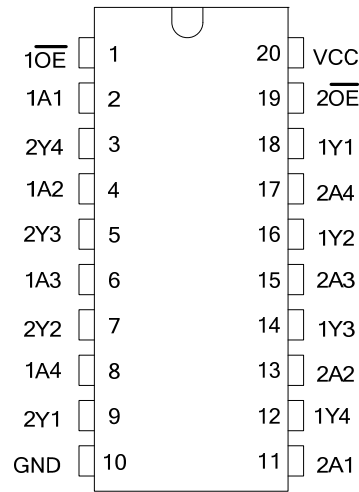
ORDERING INFORMATION

| Ordering Number | | Package | Packing |
|-------------------|-------------------|----------|-----------|
| Lead Free | Halogen Free | | |
| U74ACT240L-P20-R | U74ACT240G- P20-R | TSSOP-20 | Tape Reel |
| U74ACT240L- P20-T | U74ACT240G- P20-T | TSSOP-20 | Tube |

| | |
|--|---|
| <p>U74ACT240L-P20-T</p> <p>(1) Packing Type (2) Package Type (3) Lead Free</p> | <p>(1) R: Tape Reel, T: Tube (2) P20:TSSOP-20 (3) G: Halogen Free, L: Lead Free</p> |
|--|---|



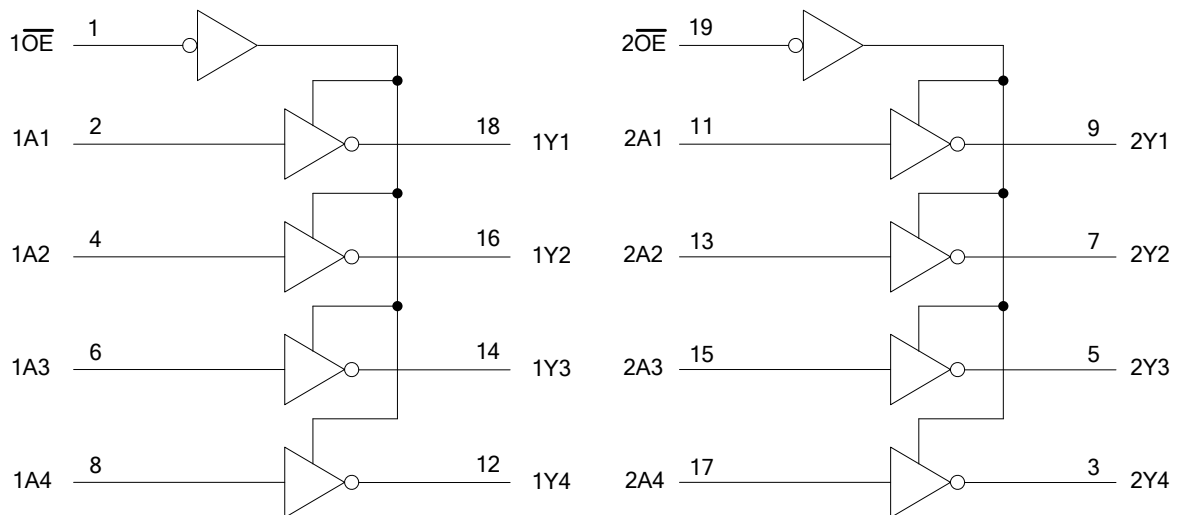
■ PIN CONFIGURATION



■ FUNCTION TABLE (each buffer)

| INPUTS | | OUTPUT |
|-----------------|---|--------|
| \overline{OE} | A | Y |
| L | H | L |
| L | L | L |
| H | X | H |

■ LOGIC SYMBOL (positive logic)



■ ABSOLUTE MAXIMUM RATING (T_A =25°C , unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | |
|---|------------------|----------------------------|----|
| Supply Voltage | V _{CC} | -0.5~7 | V |
| Input Voltage | V _{IN} | -0.5~ V _{CC} +0.5 | V |
| Output Voltage | V _{OUT} | -0.5~ V _{CC} +0.5 | V |
| Input Clamp Current (V _{IN} <0, or V _{IN} >V _{CC}) | I _{IK} | ±20 | mA |
| Output Clamp Current (V _{OUT} <0, or V _{OUT} >V _{CC}) | I _{OK} | ±20 | mA |
| Output Current | I _{OUT} | ±50 | mA |
| V _{CC} or GND Current | I _{CC} | ±200 | mA |
| Storage Temperature | T _{STG} | -65 ~ +150 | °C |

Notes: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.
 2. Absolute maximum ratings are those values beyond which the device could be permanently damaged.
 Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ THERMAL DATA

| PARAMETER | SYMBOL | RATING | UNIT |
|---------------------|-----------------|--------|------|
| Junction to Ambient | θ _{JA} | 85 | °C/W |

■ RECOMMENDED OPERATING CONDITIONS

| PARAMETER | SYMBOL | MIN | MAX | UNIT |
|------------------------------------|------------------|-----|-----------------|------|
| Supply Voltage | V _{CC} | 4.5 | 5.5 | V |
| High-Level Input Voltage | V _{IH} | 2 | | V |
| Low-Level Input Voltage | V _{IL} | | 0.8 | V |
| Input Voltage | V _{IN} | 0 | V _{CC} | V |
| Output Voltage | V _{OUT} | 0 | V _{CC} | V |
| High-level Output Current | I _{OH} | | -24 | mA |
| Low-level Output Current | I _{OL} | | 24 | mA |
| Input Transition Rise or Fall Rate | Δt/Δv | 0 | 8 | ns/V |
| Operating Temperature | T _A | -40 | 85 | °C |

■ ELECTRICAL CHARACTERISTICS (T_A =25°C , unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|----------------------|--|------|-------|-------|------|
| High-Level Output Voltage | V _{OH} | I _{OH} = -50 μA, V _{CC} = 4.5V | 4.4 | 4.49 | | V |
| | | I _{OH} = -50 μA, V _{CC} = 5.5V | 5.4 | 5.49 | | |
| | | I _{OH} = -24 mA, V _{CC} = 4.5V | 3.86 | | | |
| | | I _{OH} = -24 mA, V _{CC} = 5.5V | 4.86 | | | |
| Low-Level Output Voltage | V _{OL} | I _{OL} = 50 μA, V _{CC} = 4.5V | | 0.001 | 0.1 | V |
| | | I _{OL} = 50 μA, V _{CC} = 5.5V | | 0.001 | 0.1 | |
| | | I _{OL} = 24 mA, V _{CC} = 4.5V | | | 0.36 | |
| | | I _{OL} = 24 mA, V _{CC} = 5.5V | | | 0.36 | |
| Input Leakage Current (A or \overline{OE} inputs) | I _{I(LEAK)} | V _{IN} = V _{CC} or GND, V _{CC} = 5.5V | | | ±0.1 | μA |
| High-impedance state Current | I _{OZ} | V _O = V _{CC} or GND, V _{CC} = 5.5V V _{I(OE)} = V _{IL} or V _{IH} | | | ±0.25 | μA |
| Quiescent Supply Current | I _{CC} | V _{IN} = V _{CC} or GND, I _{OUT} = 0, V _{CC} = 5.5V | | | 4 | μA |
| Additional quiescent Supply Current | Δ I _{CC} | One input at 3.4V; other inputs at V _{CC} or GND; V _{CC} =5.5V | | 0.6 | | mA |
| Input Capacitance | C _{IN} | V _{IN} = V _{CC} or GND, V _{CC} =5V | | 2.5 | | pF |
| Output Capacitance | C _{OUT} | V _{IN} = V _{CC} or GND, V _{CC} =5V | | 8 | | pF |

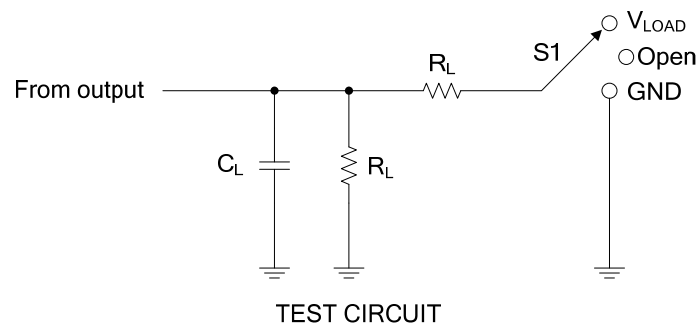
■ SWITCHING CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|-----------|---|-----|-----|-----|------|
| Propagation delay from input A to output Y, t_{pd} | t_{PLH} | $V_{CC}=5\pm 0.5\text{V}$, $C_L=50\text{pF}$, $R_L=500\Omega$ | 1.5 | 6 | 8.5 | ns |
| | t_{PHL} | $V_{CC}=5\pm 0.5\text{V}$, $C_L=50\text{pF}$, $R_L=500\Omega$ | 1.5 | 5.5 | 7.5 | |
| Propagation delay from input \overline{OE} to output Y, t_{en} | t_{PZH} | $V_{CC}=5\pm 0.5\text{V}$, $C_L=50\text{pF}$, $R_L=500\Omega$ | 1.5 | 7 | 8.5 | ns |
| | t_{PZL} | $V_{CC}=5\pm 0.5\text{V}$, $C_L=50\text{pF}$, $R_L=500\Omega$ | 2 | 7 | 9.5 | |
| Propagation delay from input \overline{OE} to output Y, t_{dis} | t_{PHZ} | $V_{CC}=5\pm 0.5\text{V}$, $C_L=50\text{pF}$, $R_L=500\Omega$ | 2 | 8 | 9.5 | ns |
| | t_{PLZ} | $V_{CC}=5\pm 0.5\text{V}$, $C_L=50\text{pF}$, $R_L=500\Omega$ | 2.5 | 6.5 | 10 | |

■ OPERATING CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

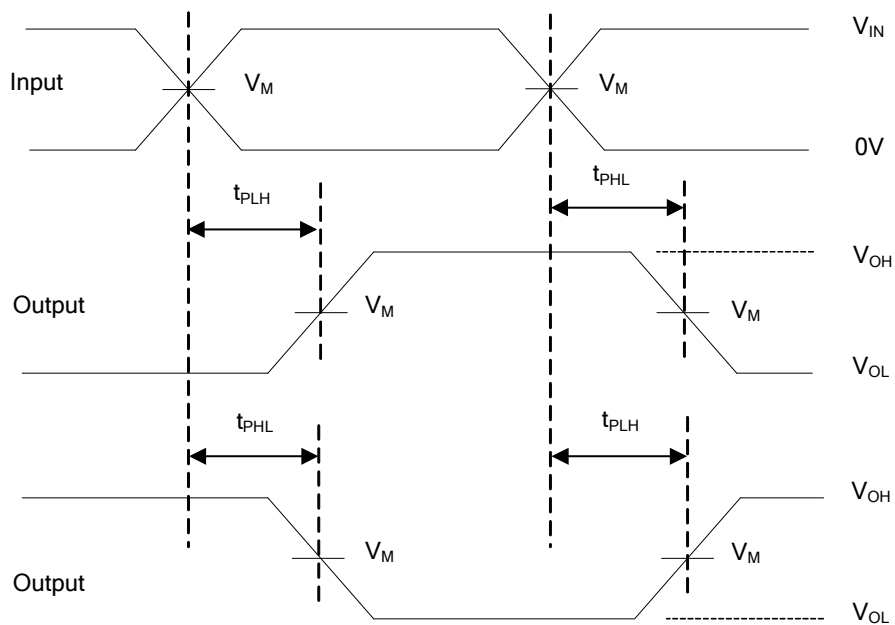
| PARAMETER | SYMBOL | TEST CONDITIONS | TYP | UNIT |
|---|----------|--|-----|------|
| Power dissipation capacitance per buffer/driver | C_{pd} | $V_{CC} = 5\text{V}$, $f=1\text{MHz}$, $C_L=50\text{pF}$ | 45 | pF |

■ TEST CIRCUIT AND WAVEFORMS



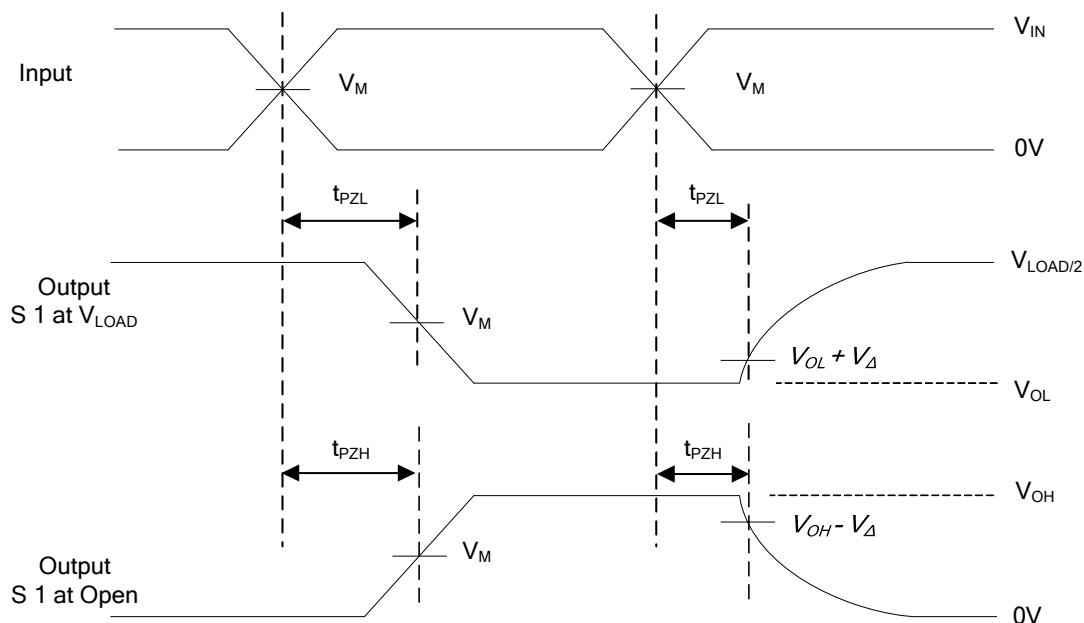
| TEST | S1 |
|-------------------|------------|
| t_{PLH}/t_{PHL} | Open |
| t_{PLZ}/t_{PZL} | V_{LOAD} |
| t_{PHZ}/t_{PZH} | Open |

| V_{CC} | Inputs | | V_M | V_{LOAD} | C_L | R_L | V_{Δ} |
|---------------|----------|--------------|------------|--------------|-------|--------------|---------------|
| | V_{IN} | t_r, t_f | | | | | |
| $5V \pm 0.5V$ | V_{CC} | $\leq 2.5ns$ | $V_{CC}/2$ | $2 * V_{CC}$ | 50pF | 500Ω | $5V \pm 0.5V$ |
| V_{CC} | Inputs | V_M | V_{LOAD} | C_L | R_L | V_{Δ} | V_{CC} |



VOLTAGE WAVEFORMS PROPAGATION DELAY TIMES

■ TEST CIRCUIT AND WAVEFORMS (Cont.)



VOLTAGE WAVEFORMS ENABLE AND DISABLE TIMES

Notes: 1. C_L includes probe and jig capacitance.

2. All input pulses are supplied by generators having the following characteristics: $PRR \leq 1\text{MHz}$, $Z_O = 50\Omega$.

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