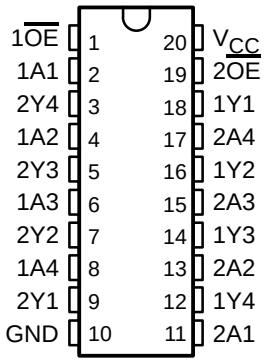
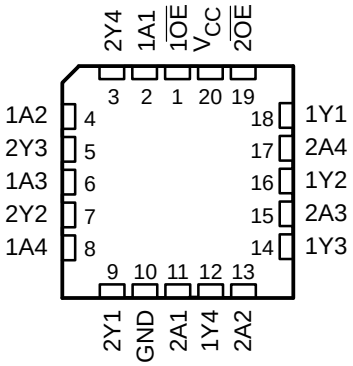
- **Inputs Are TTL-Voltage Compatible**
- ***EPIC***™ **(Enhanced-Performance Implanted CMOS) Process**
- **High Latch-Up Immunity Exceeds 250 mA Per JESD 17**
- **Package Options Include Plastic Small-Outline (DW), Shrink Small-Outline (DB), Thin Very Small-Outline (DGV), Thin Shrink Small-Outline (PW), and Ceramic Flat (W) Packages, Ceramic Chip Carriers (FK), and Standard Plastic (N) and Ceramic (J) DIPs**

**SN54AHCT240 . . . J OR W PACKAGE**
**SN74AHCT240 . . . DB, DGV, DW, N, OR PW PACKAGE**
**(TOP VIEW)**




**SN54AHCT240 . . . FK PACKAGE**
**(TOP VIEW)**




## description

These octal buffers/drivers are designed specifically to improve the performance and density of 3-state memory-address drivers, clock drivers, and bus-oriented receivers and transmitters.

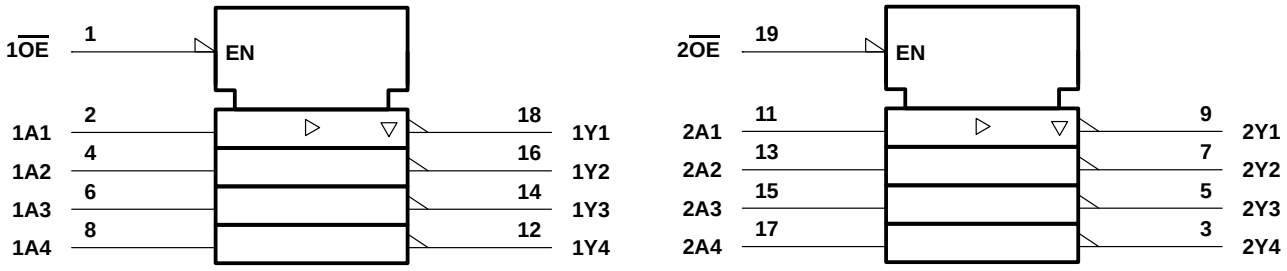
The ’AHCT240 are organized as two 4-bit buffers/line drivers with separate output-enable ($\overline{OE}$) inputs. When $\overline{OE}$ is low, the device passes data from the A inputs to the Y outputs. When $\overline{OE}$ is high, the outputs are in the high-impedance state.

The SN54AHCT240 is characterized for operation over the full military temperature range of –55°C to 125°C. The SN74AHCT240 is characterized for operation from –40°C to 85°C.

**FUNCTION TABLE**
**(each buffer/driver)**

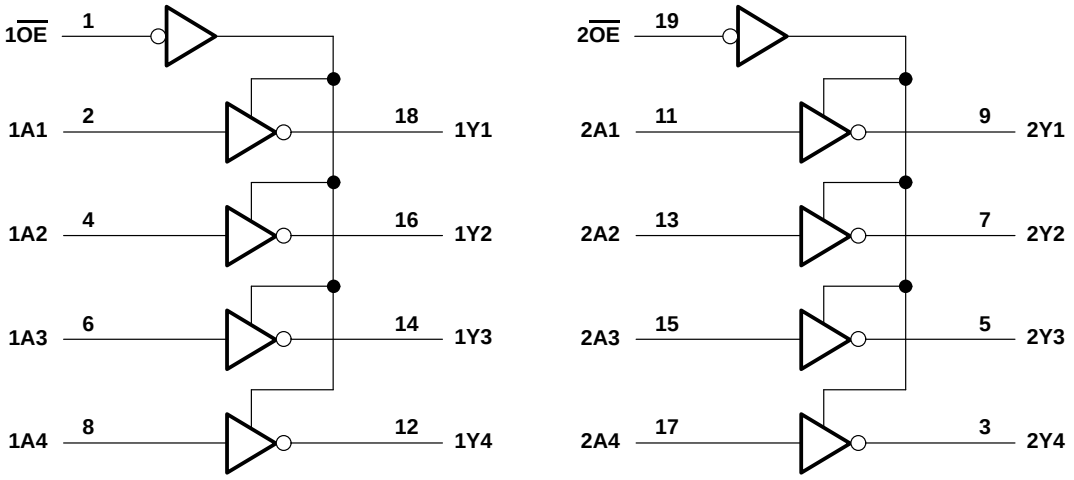
| INPUTS | | OUTPUT |
|---|---|---|
| $\overline{OE}$ | A | Y |
| L | H | L |
| L | L | H |
| H | X | Z |

## logic symbol†




† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

## logic diagram (positive logic)




## absolute maximum ratings over operating free-air temperature range (unless otherwise noted)‡

Supply voltage range, $V_{CC}$ . . . . . –0.5 V to 7 V
Input voltage range, $V_I$ (see Note 1) . . . . . –0.5 V to 7 V
Output voltage range, $V_O$ (see Note 1) . . . . . –0.5 V to $V_{CC}$ + 0.5 V
Input clamp current, $I_{IK}$ ($V_I$ < 0) . . . . . –20 mA
Output clamp current, $I_{OK}$ ($V_O$ < 0 or $V_O$ > $V_{CC}$) . . . . . ±20 mA
Continuous output current, $I_O$ ($V_O$ = 0 to $V_{CC}$) . . . . . ±25 mA
Continuous current through $V_{CC}$ or GND . . . . . ±75 mA
Package thermal impedance, $\theta_{JA}$ (see Note 2): DB package . . . . . 115°C/W
DGV package . . . . . 146°C/W
DW package . . . . . 97°C/W
N package . . . . . 67°C/W
PW package . . . . . 128°C/W
Storage temperature range, $T_{stg}$ . . . . . –65°C to 150°C

‡ Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTES: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.
2. The package thermal impedance is calculated in accordance with JESD 51, except for through-hole packages, which use a trace length of zero.

## recommended operating conditions (see Note 3)

| | | SN54AHCT240 | | SN74AHCT240 | | UNIT |
|---|---|---|---|---|---|---|
| | | MIN | MAX | MIN | MAX | |
| $V_{CC}$ | Supply voltage | 4.5 | 5.5 | 4.5 | 5.5 | V |
| $V_{IH}$ | High-level input voltage | 2 | | 2 | | V |
| $V_{IL}$ | Low-level input voltage | | 0.8 | | 0.8 | V |
| $V_I$ | Input voltage | 0 | 5.5 | 0 | 5.5 | V |
| $V_O$ | Output voltage | 0 | $V_{CC}$ | 0 | $V_{CC}$ | V |
| $I_{OH}$ | High-level output current | | –8 | | –8 | mA |
| $I_{OL}$ | Low-level output current | | 8 | | 8 | mA |
| $T_A$ | Operating free-air temperature | –55 | 125 | –40 | 85 | °C |

NOTE 3: Unused inputs must be held high or low to prevent them from floating.

## electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

| PARAMETER | TEST CONDITIONS | $V_{CC}$ | $T_A$ = 25°C | | | SN54AHCT240 | | SN74AHCT240 | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | |
| $V_{OH}$ | $I_{OH}$ = –50 μA | 4.5 V | 4.4 | 4.5 | | 4.4 | | 4.4 | | V |
| | $I_{OH}$ = –8 mA | | 3.94 | | | 3.8 | | 3.8 | | |
| $V_{OL}$ | $I_{OL}$ = 50 μA | 4.5 V | | | 0.1 | | 0.1 | | 0.1 | V |
| | $I_{OL}$ = 8 mA | | | | 0.36 | | 0.44 | | 0.44 | |
| $I_{OZ}$ | $V_O = V_{CC}$ or GND | 5.5 V | | | ±0.25 | | ±2.5 | | ±2.5 | μA |
| $I_I$ | $V_I = V_{CC}$ or GND | 5.5 V | | | ±0.1 | | ±1 | | ±1 | μA |
| $I_{CC}$ | $V_I = V_{CC}$ or GND, $I_O$ = 0 | 5.5 V | | | 4 | | 40 | | 40 | μA |
| $\Delta I_{CC}$† | One input at 3.4 V, Other inputs at $V_{CC}$ or GND | 5.5 V | | | 1.35 | | 1.5 | | 1.5 | mA |
| $C_i$ | $V_I = V_{CC}$ or GND | 5 V | | 2.5 | 10 | | | | 10 | pF |
| $C_o$ | $V_O = V_{CC}$ or GND | 5 V | | 3 | | | | | | pF |

† This is the increase in supply current for each input at one of the specified TTL voltage levels rather than 0 V or $V_{CC}$.

### switching characteristics over recommended operating free-air temperature range, $V_{CC}$ = 5 V ± 0.5 V (unless otherwise noted) (see Figure 1)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | LOAD CAPACITANCE | SN54AHCT240 | | | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|
| | | | | $T_A$ = 25°C | | | MIN | MAX | |
| | | | | MIN | TYP | MAX | | | |
| $t_{PLH}$* | A | Y | $C_L$ = 15 pF | | 5.4 | 7.4 | 1 | 8.5 | ns |
| $t_{PHL}$* | | | | | 5.4 | 7.4 | 1 | 8.5 | |
| $t_{PZH}$* | $\overline{OE}$ | Y | $C_L$ = 15 pF | | 7.7 | 10.4 | 1 | 12 | ns |
| $t_{PZL}$* | | | | | 7.7 | 10.4 | 1 | 12 | |
| $t_{PHZ}$* | $\overline{OE}$ | Y | $C_L$ = 15 pF | | 8.3 | 10.4 | 1 | 12 | ns |
| $t_{PLZ}$* | | | | | 8.3 | 10.4 | 1 | 12 | |
| $t_{PLH}$ | A | Y | $C_L$ = 50 pF | | 5.9 | 8.4 | 1 | 9.5 | ns |
| $t_{PHL}$ | | | | | 5.9 | 8.4 | 1 | 9.5 | |
| $t_{PZH}$ | $\overline{OE}$ | Y | $C_L$ = 50 pF | | 8.2 | 11.4 | 1 | 13 | ns |
| $t_{PZL}$ | | | | | 8.2 | 11.4 | 1 | 13 | |
| $t_{PHZ}$ | $\overline{OE}$ | Y | $C_L$ = 50 pF | | 8.8 | 11.4 | 1 | 13 | ns |
| $t_{PLZ}$ | | | | | 8.8 | 11.4 | 1 | 13 | |

* On products compliant to MIL-PRF-38535, this parameter is warranted but not production tested.

### switching characteristics over recommended operating free-air temperature range, $V_{CC}$ = 5 V ± 0.5 V (unless otherwise noted) (see Figure 1)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | LOAD CAPACITANCE | SN74AHCT240 | | | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|
| | | | | $T_A$ = 25°C | | | MIN | MAX | |
| | | | | MIN | TYP | MAX | | | |
| $t_{PLH}$ | A | Y | $C_L$ = 15 pF | | 5.4 | 7.4 | 1 | 8.5 | ns |
| $t_{PHL}$ | | | | | 5.4 | 7.4 | 1 | 8.5 | |
| $t_{PZH}$ | $\overline{OE}$ | Y | $C_L$ = 15 pF | | 7.7 | 10.4 | 1 | 12 | ns |
| $t_{PZL}$ | | | | | 7.7 | 10.4 | 1 | 12 | |
| $t_{PHZ}$ | $\overline{OE}$ | Y | $C_L$ = 15 pF | | 8.3 | 10.4 | 1 | 12 | ns |
| $t_{PLZ}$ | | | | | 8.3 | 10.4 | 1 | 12 | |
| $t_{PLH}$ | A | Y | $C_L$ = 50 pF | | 5.9 | 8.4 | 1 | 9.5 | ns |
| $t_{PHL}$ | | | | | 5.9 | 8.4 | 1 | 9.5 | |
| $t_{PZH}$ | $\overline{OE}$ | Y | $C_L$ = 50 pF | | 8.2 | 11.4 | 1 | 13 | ns |
| $t_{PZL}$ | | | | | 8.2 | 11.4 | 1 | 13 | |
| $t_{PHZ}$ | $\overline{OE}$ | Y | $C_L$ = 50 pF | | 8.8 | 11.4 | 1 | 13 | ns |
| $t_{PLZ}$ | | | | | 8.8 | 11.4 | 1 | 13 | |

### output-skew characteristics, $C_L$ = 50 pF (see Note 4)

| PARAMETER | | $V_{CC}$ | SN74AHCT240 | | | | UNIT |
|---|---|---|---|---|---|---|---|
| | | | $T_A$ = 25°C | | MIN | MAX | |
| | | | MIN | MAX | | | |
| $t_{sk(o)}$ | Output skew | 5 V ± 0.5 V | | 1 | | 1 | ns |

NOTE 4: Skew between any two outputs of the same package switching in the same direction. This parameter is warranted but not production tested.

## noise characteristics, $V_{CC}$ = 5 V, $C_L$ = 50 pF, $T_A$ = 25°C (see Note 5)

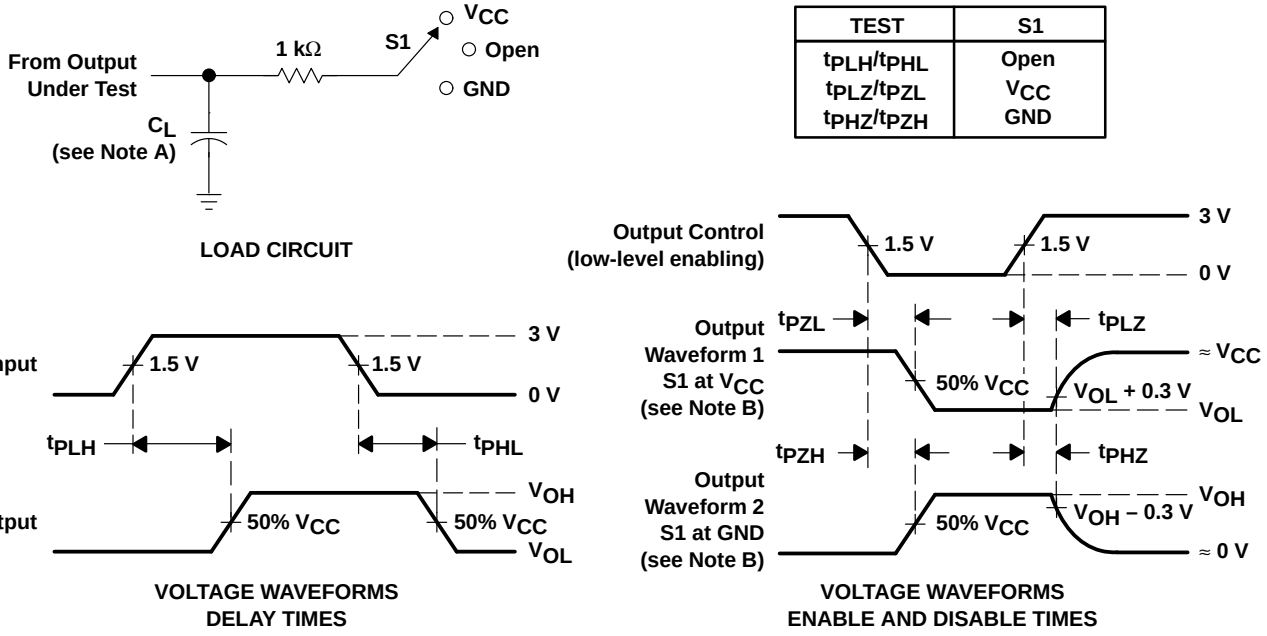
| PARAMETER | | SN74AHCT240 | | | UNIT |
|---|---|---|---|---|---|
| | | MIN | TYP | MAX | |
| $V_{OH(V)}$ | Quiet output, minimum dynamic $V_{OH}$ | | 4.1 | | V |
| $V_{IH(D)}$ | High-level dynamic input voltage | 2 | | | V |
| $V_{IL(D)}$ | Low-level dynamic input voltage | | | 0.8 | V |

NOTE 5: Characteristics are for surface-mount packages only. These parameters are warranted but not production tested.

## operating characteristics, $V_{CC}$ = 5 V, $T_A$ = 25°C

| PARAMETER | | TEST CONDITIONS | | TYP | UNIT |
|---|---|---|---|---|---|
| $C_{pd}$ | Power dissipation capacitance | No load, | f = 1 MHz | 10 | pF |

## PARAMETER MEASUREMENT INFORMATION




NOTES: A. $C_L$ includes probe and jig capacitance.
B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
C. All input pulses are supplied by generators having the following characteristics: PRR ≤ 1 MHz, $Z_O$ = 50 Ω, $t_r$ = 3 ns, $t_f$ = 3 ns.
D. The outputs are measured one at a time with one input transition per measurement.

**Figure 1. Load Circuit and Voltage Waveforms**

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