

# 具有三态输出的 SNx4AHCT240 八通道反相缓冲器/驱动器

## 1 特性

- 输入兼容 TTL 电压
- 闩锁性能超过 250mA，符合 JESD 17 规范
- 对于符合 MIL-PRF-38535 标准的产品，所有参数均经过测试，除非另外注明。对于所有其他产品，生产流程不一定包含对所有参数的测试。

## 2 应用

- 网络交换机
- 健康与健身
- 电视
- 电力基础设施

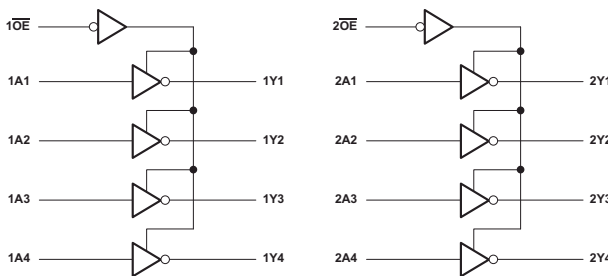
## 3 说明

SNx4AHCT240 八通道缓冲器/驱动器专门设计用于提高三态存储器地址驱动器、时钟驱动器以及总线导向接收器和发射器的性能和密度。

### 器件信息

| 器件型号        | 封装 <sup>(1)</sup> | 封装尺寸 <sup>(2)</sup> | 本体尺寸 <sup>(3)</sup> |
|-------------|-------------------|---------------------|---------------------|
| SN74AHCT240 | DB ( SSOP , 20 )  | 7.2mm × 7.8mm       | 7.50mm x 5.30mm     |
|             | NS ( SOP , 20 )   | 12.60mm × 7.8mm     | 12.6mm x 5.30mm     |
|             | PW ( TSSOP , 20 ) | 6.50mm × 6.4mm      | 6.50mm x 4.40mm     |
|             | DW ( SOIC , 20 )  | 12.80mm × 10.3mm    | 12.8mm x 7.5mm      |
|             | N ( PDIP , 20 )   | 24.33mm × 9.4mm     | 25.40mm x 6.35mm    |

- (1) 有关更多信息，请参阅节 10。
- (2) 封装尺寸 (长 × 宽) 为标称值，并包括引脚 (如适用)。
- (3) 本体尺寸 (长 × 宽) 为标称值，不包括引脚。



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简化版原理图



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## 4 Pin Configuration and Functions

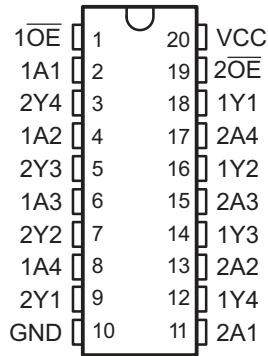


图 4-1. SN54AHCT240, J or W Package  
SN74AHCT240, DB, DGV, DW, N, NS, or PW  
Package (20) Pin Top View

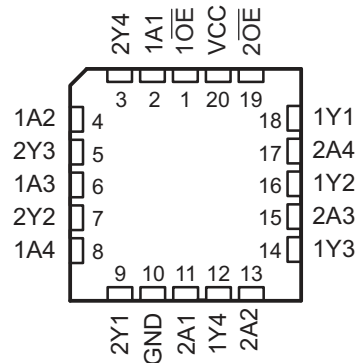


图 4-2. SN54AHCT240 FK Package (20) Pin Top  
View

| PIN             |     | I/O | DESCRIPTION     |
|-----------------|-----|-----|-----------------|
| NAME            | NO. |     |                 |
| 1 OE            | 1   | I   | Output Enable 1 |
| 1A1             | 2   | I   | 1A1 Input       |
| 2Y4             | 3   | O   | 2Y4 Output      |
| 1A2             | 4   | I   | 1A2 Input       |
| 2Y3             | 5   | O   | 2Y3 Output      |
| 1A3             | 6   | I   | 1A3 Input       |
| 2Y2             | 7   | O   | 2Y2 Output      |
| 1A4             | 8   | I   | 1A4 Input       |
| 2Y1             | 9   | O   | 2Y1 Output      |
| GND             | 10  | —   | Ground Pin      |
| 2A1             | 11  | I   | 2A1 Input       |
| 1Y4             | 12  | O   | 1Y4 Output      |
| 2A2             | 13  | I   | 2A2 Input       |
| 1Y3             | 14  | O   | 1Y3 Output      |
| 2A3             | 15  | I   | 2A3 Input       |
| 1Y2             | 16  | O   | 1Y2 Output      |
| 2A4             | 17  | I   | 2A4 Input       |
| 1Y1             | 18  | O   | 1Y1 Output      |
| 2 OE            | 19  | I   | Output Enable 2 |
| V <sub>CC</sub> | 20  | —   | Power Pin       |

## 5 Specifications

### 5.1 Absolute Maximum Ratings

over operating free-air temperature range (unless otherwise noted)<sup>(1)</sup>

|                      |  | MIN                         | MAX            | UNIT |
|----------------------|--|-----------------------------|----------------|------|
| $V_{CC}$             | Supply voltage                             | - 0.5                       | 7              | V    |
| $V_I$ <sup>(2)</sup> | Input voltage                              | - 0.5                       | 7              | V    |
| $V_O$ <sup>(2)</sup> | Output voltage                             | - 0.5                       | $V_{CC} + 0.5$ | V    |
| $I_{IK}$             | Input clamp current                        | $V_I < 0$                   | - 20           | mA   |
|                      | Output clamp current, $I_{OK}$             | $V_O < 0$ or $V_O > V_{CC}$ | $\pm 20$       | mA   |
|                      | Continuous output current, $I_O$           | $V_O = 0$ to $V_{CC}$       | $\pm 25$       | mA   |
|                      | Continuous current through $V_{CC}$ or GND |                             | $\pm 75$       | mA   |
| $T_J$                | Junction temperature                       |                             | 150            | °C   |
| $T_{stg}$            | Storage temperature                        | - 65                        | 150            | °C   |

- (1) Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the device. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions*. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
- (2) The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

### 5.2 ESD Ratings

|             |  | Value      | UNIT |
|-------------|--|------------|------|
| $V_{(ESD)}$ | Electrostatic discharge  |            |      |
|             | Human body model (HBM), per ANSI/ESDA/JEDEC JS-001, all pins <sup>(1)</sup>              | $\pm 1000$ | V    |
|             | Charged device model (CDM), per JEDEC specification JESD22-C101, all pins <sup>(2)</sup> | $\pm 2000$ |      |

- (1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.
- (2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

### 5.3 Recommended Operating Conditions

over operating free-air temperature range (unless otherwise noted)<sup>(1)</sup>

|                 |                                | SN54AHCT240 |                 | SN74AHCT240 |                 | UNIT |
|-----------------|--------------------------------|-------------|-----------------|-------------|-----------------|------|
|                 |                                | MIN         | MAX             | MIN         | MAX             |      |
| V <sub>CC</sub> | Supply voltage                 | 4.5         | 5.5             | 4.5         | 5.5             | V    |
| V <sub>IH</sub> | High-level input voltage       | 2           |                 | 2           |                 | V    |
| V <sub>IL</sub> | Low-level Input voltage        |             | 0.8             |             | 0.8             | V    |
| V <sub>I</sub>  | Input voltage                  | 0           | 5.5             | 0           | 5.5             | V    |
| V <sub>O</sub>  | Output voltage                 | 0           | V <sub>CC</sub> | 0           | V <sub>CC</sub> | V    |
| I <sub>OH</sub> | High-level output current      |             | -8              |             | -8              | mA   |
| I <sub>OL</sub> | Low-level output current       |             | 8               |             | 8               | mA   |
| T <sub>A</sub>  | Operating free-air temperature | -55         | 125             | -40         | 125             | °C   |

(1) All unused inputs of the device must be held at V<sub>CC</sub> or GND to ensure proper device operation. See the [Implications of Slow or Floating CMOS Inputs application report](#).

### 5.4 Thermal Information

| THERMAL METRIC <sup>(1)</sup> |  | SN74AHCT240 |           |          |          |            | UNIT |
|-------------------------------|--|-------------|-----------|----------|----------|------------|------|
|                               |  | DW (SOIC)   | DB (SSOP) | N (PDIP) | NS (SOP) | PW (TSSOP) |      |
|                               |  | 20 PINS     | 20 PINS   | 20 PINS  | 20 PINS  | 20 PINS    |      |
| R <sub>θJA</sub>              | Junction-to-ambient thermal resistance       | 81.1        | 99.9      | 54.9     | 80.4     | 116.8      | °C/W |
| R <sub>θJC(top)</sub>         | Junction-to-case (top) thermal resistance    | 48.9        | 61.7      | 41.7     | 46.9     | 58.5       |      |
| R <sub>θJB</sub>              | Junction-to-board thermal resistance         | 53.8        | 55.2      | 35.8     | 47.9     | 78.7       |      |
| ψ <sub>JT</sub>               | Junction-to-top characterization parameter   | 19.5        | 22.6      | 27.9     | 19.9     | 12.6       |      |
| ψ <sub>JB</sub>               | Junction-to-board characterization parameter | 53.1        | 54.8      | 35.7     | 47.5     | 77.9       |      |

(1) For more information about traditional and new thermal metrics, see the [IC Package Thermal Metrics application report](#).

### 5.5 Electrical Characteristics

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

| PARAMETER                       | TEST CONDITIONS                     | T <sub>A</sub> = 25°C                             |      |       | SN54AHCT240 |                   | -40°C to 85°C<br>SN74AHCT240 |      | -40°C to 125°C<br>SN74AHCT240 |      | UNIT |
|---------------------------------|-------------------------------------|---|------|-------|-------------|-------------------|------------------------------|------|-------------------------------|------|------|
|                                 |                                     | MIN   | TYP  | MAX   | MIN         | MAX               | MIN                          | MAX  | MIN                           | MAX  |      |
| V <sub>OH</sub>                 | High-level output voltage           | I <sub>OH</sub> = -50 μA, V <sub>CC</sub> = 4.5 V | 4.4  | 4.5   | 4.4         |                   | 4.4                          |      | 4.4                           |      | V    |
|                                 |                                     | I <sub>OH</sub> = -8 mA, V <sub>CC</sub> = 4.5 V  | 3.94 |       | 3.8         |                   | 3.8                          |      | 3.8                           |      |      |
| V <sub>OL</sub>                 | Low-level output voltage            | I <sub>OL</sub> = 50 μA, V <sub>CC</sub> = 4.5 V  |      |       | 0.1         |                   | 0.1                          |      | 0.1                           |      | V    |
|                                 |                                     | I <sub>OL</sub> = 8 mA, V <sub>CC</sub> = 4.5 V   |      |       | 0.36        |                   | 0.44                         |      | 0.44                          |      |      |
| I <sub>OZ</sub>                 | High-impedance-state output current |   |      | ±0.25 |             | ±2.5              |                              | ±2.5 |                               | ±2.5 | μA   |
| I <sub>I</sub>                  | Inflection-point current            |   |      | ±0.1  |             | ±1 <sup>(1)</sup> |                              | ±1   |                               | ±1   | μA   |
| I <sub>CC</sub>                 | Supply current                      |   |      | 4     |             | 40                |                              | 40   |                               | 40   | μA   |
| ΔI <sub>CC</sub> <sup>(2)</sup> | Supply current change               |   |      | 1.35  |             | 1.5               |                              | 1.5  |                               | 1.5  | mA   |

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

| PARAMETER      | TEST CONDITIONS  | T <sub>A</sub> = 25°C |     |     | SN54AHCT240 |     | - 40°C to 85°C<br>SN74AHCT240 |     | - 40°C to 125°C<br>SN74AHCT240 |     | UNIT |
|----------------|--|-----------------------|-----|-----|-------------|-----|-------------------------------|-----|--------------------------------|-----|------|
|                |  | MIN                   | TYP | MAX | MIN         | MAX | MIN                           | MAX | MIN                            | MAX |      |
| C <sub>i</sub> | Input capacitance<br>V <sub>I</sub> = V <sub>CC</sub> or GND<br>V <sub>CC</sub> = 5.5 V  |                       | 2.5 | 10  |             |     |                               | 10  |                                | 10  | pF   |
| C <sub>o</sub> | Output capacitance<br>V <sub>O</sub> = V <sub>CC</sub> or GND<br>V <sub>CC</sub> = 5.5 V |                       | 3   |     |             |     |                               |     |                                |     | pF   |

- (1) On products compliant to MIL-PRF-38535, this parameter is not production tested at V<sub>CC</sub> = 0 V.
- (2) This is the increase in supply current for each input at one of the specified TTL voltage levels, rather than 0 V or V<sub>CC</sub>.

## 5.6 Switching Characteristics

over recommended operating free-air temperature range,  $V_{CC} = 5\text{ V} \pm 0.5\text{ V}$  (unless otherwise noted) (see [Parameter Measurement Information](#) section)

| PARAMETER   | TEST CONDITIONS       |                      | $T_A = 25^\circ\text{C}$ |                     | SN54AHCT240      |                    | - 40°C to 85°C<br>SN74AHCT240 |     | - 40°C to 125°C<br>SN74AHCT240 |      | UNIT |
|---|-----------------------|----------------------|--------------------------|---------------------|------------------|--------------------|-------------------------------|-----|--------------------------------|------|------|
|   |                       |                      | TYP                      | MAX                 | MIN              | MAX                | MIN                           | MAX | MIN                            | MAX  |      |
| $t_{PLH}$ Propagation delay time (low-to-high output) | A-to-Y                | $C_L = 15\text{ pF}$ | 5.4 <sup>(1)</sup>       | 7.4 <sup>(1)</sup>  | 1 <sup>(1)</sup> | 8.5 <sup>(1)</sup> | 1                             | 8.5 | 1                              | 9.5  | ns   |
| $t_{PHL}$ Propagation delay time (high-to-low output) |                       |                      | 5.4 <sup>(1)</sup>       | 7.4 <sup>(1)</sup>  | 1 <sup>(1)</sup> | 8.5 <sup>(1)</sup> | 1                             | 8.5 | 1                              | 9.5  |      |
| $t_{PZH}$ Enable time (to the high level)             | $\overline{OE}$ -to-Y | $C_L = 15\text{ pF}$ | 7.7 <sup>(1)</sup>       | 10.4 <sup>(1)</sup> | 1 <sup>(1)</sup> | 12 <sup>(1)</sup>  | 1                             | 12  | 1                              | 13   | ns   |
| $t_{PZL}$ Enable time (to the low level)              |                       |                      | 7.7 <sup>(1)</sup>       | 10.4 <sup>(1)</sup> | 1 <sup>(1)</sup> | 12 <sup>(1)</sup>  | 1                             | 12  | 1                              | 13   |      |
| $t_{PHZ}$ Disable time (from high level)              | $\overline{OE}$ -to-Y | $C_L = 15\text{ pF}$ | 8.3 <sup>(1)</sup>       | 10.4 <sup>(1)</sup> | 1 <sup>(1)</sup> | 12 <sup>(1)</sup>  | 1                             | 12  | 1                              | 13   | ns   |
| $t_{PLZ}$ Disable time (from low level)               |                       |                      | 8.3 <sup>(1)</sup>       | 10.4 <sup>(1)</sup> | 1 <sup>(1)</sup> | 12 <sup>(1)</sup>  | 1                             | 12  | 1                              | 13   |      |
| $t_{PLH}$ Propagation delay time (low-to-high output) | A-to-Y                | $C_L = 50\text{ pF}$ | 5.9                      | 8.4                 | 1                | 9.5                | 1                             | 9.5 | 1                              | 10.5 | ns   |
| $t_{PHL}$ Propagation delay time (high-to-low output) |                       |                      | 5.9                      | 8.4                 | 1                | 9.5                | 1                             | 9.5 | 1                              | 10.5 |      |
| $t_{PZH}$ Enable time (to the high level)             | $\overline{OE}$ -to-Y | $C_L = 50\text{ pF}$ | 8.2                      | 11.4                | 1                | 13                 | 1                             | 13  | 1                              | 14   | ns   |
| $t_{PZL}$ Enable time (to the low level)              |                       |                      | 8.2                      | 11.4                | 1                | 13                 | 1                             | 13  | 1                              | 14   |      |
| $t_{PHZ}$ Disable time (from high level)              | $\overline{OE}$ -to-Y | $C_L = 50\text{ pF}$ | 8.8                      | 11.4                | 1                | 13                 | 1                             | 13  | 1                              | 14   | ns   |
| $t_{PLZ}$ Disable time (from low level)               |                       |                      | 8.8                      | 11.4                | 1                | 13                 | 1                             | 13  | 1                              | 14   |      |
| $t_{sk(o)}$ Skew (time), output                       |                       | $C_L = 50\text{ pF}$ |                          | 1 <sup>(2)</sup>    |                  | 1                  |                               | 1   |                                | 1    | ns   |

- (1) On products compliant to MIL-PRF-38535, this parameter is not production tested.  
 (2) On products compliant to MIL-PRF-38535, this parameter does not apply.

## 5.7 Noise Characteristics

$V_{CC} = 5\text{ V}$ ,  $C_L = 50\text{ pF}$ ,  $T_A = 25^\circ\text{C}$ <sup>(1)</sup>

| 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    |

- (1) Characteristics are for surface-mount packages only.

## 5.8 Operating Characteristics

$V_{CC} = 5\text{ V}$ ,  $T_A = 25^\circ\text{C}$

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

## 5.9 Typical Characteristics

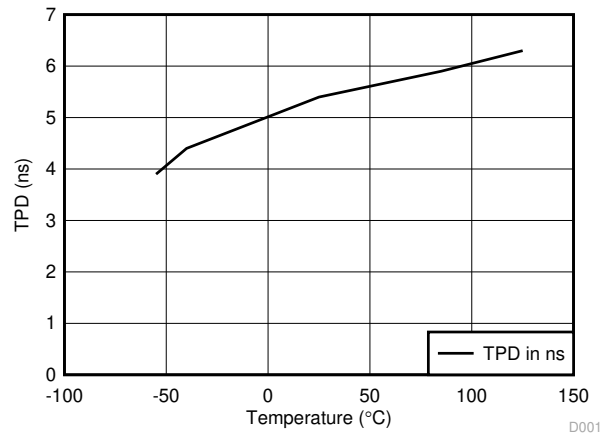


图 5-1. TPD vs Temperature



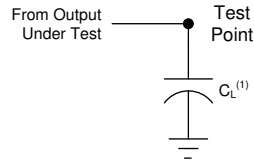
## Parameter Measurement Information

Unless otherwise noted, all input pulses are supplied by generators having the following characteristics:

- $PRR \leq 1 \text{ MHz}$
- $Z_O = 50 \ \Omega$
- $t_r \leq 3 \text{ ns}$
- $t_f \leq 3 \text{ ns}$

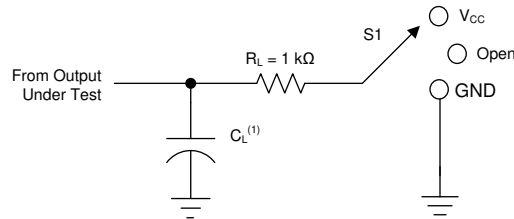
### 备注

All parameters and waveforms are not applicable to all devices.



- A.  $C_L$  includes probe and jig capacitance.
- B. The outputs are measured one at a time, with one transition per measurement.

图 6-1. Load Circuit For Totem-Pole Outputs



- A.  $C_L$  includes probe and jig capacitance.
- B. The outputs are measured one at a time, with one transition per measurement.

图 6-2. Load Circuit For Tri-State And Open-Drain Outputs

表 6-1. Loading Conditions For Parameter

| TEST                              | S1       |
|-----------------------------------|----------|
| $t_{PLH}^{(1)}$ , $t_{PHL}^{(1)}$ | Open     |
| $t_{PLZ}^{(3)}$ , $t_{PZL}^{(2)}$ | $V_{CC}$ |
| $t_{PHZ}^{(3)}$ , $t_{PZH}^{(2)}$ | GND      |
| Open drain                        | $V_{CC}$ |

- (1)  $t_{PLH}$  and  $t_{PHL}$  are the same as  $t_{pd}$ .
- (2)  $t_{PZL}$  and  $t_{PZH}$  are the same as  $t_{en}$ .
- (3)  $t_{PLZ}$  and  $t_{PHZ}$  are the same as  $t_{dis}$ .

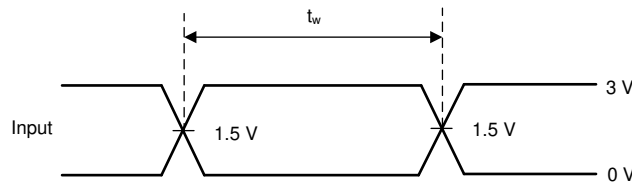
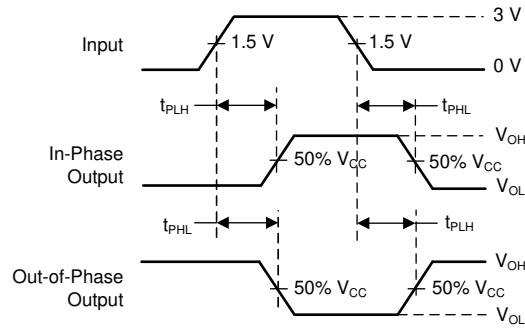
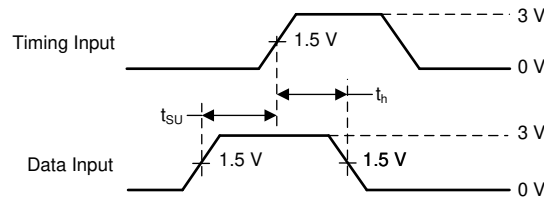


图 6-3. Voltage Waveforms Pulse Durations

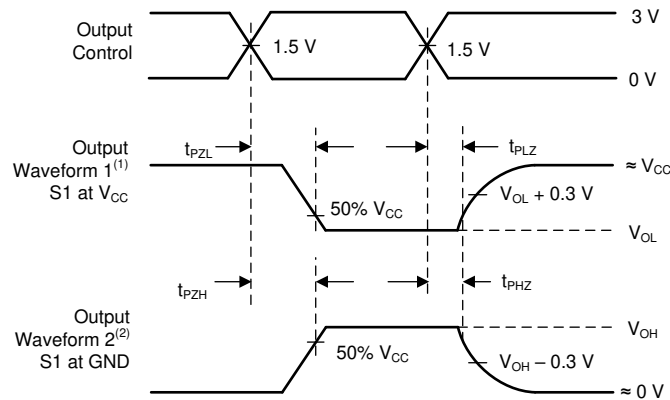


A. The outputs are measured one at a time, with one transition per measurement.

**图 6-4. Voltage Waveforms Propagation Delay Times Inverting and Noninverting Outputs**



**图 6-5. Voltage Waveforms Setup And Hold Times**



- A. Waveform 1 is for an output with internal conditions such that the output is low, except when disabled by the output control.
- B. Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control.
- C. The outputs are measured one at a time, with one transition per measurement.

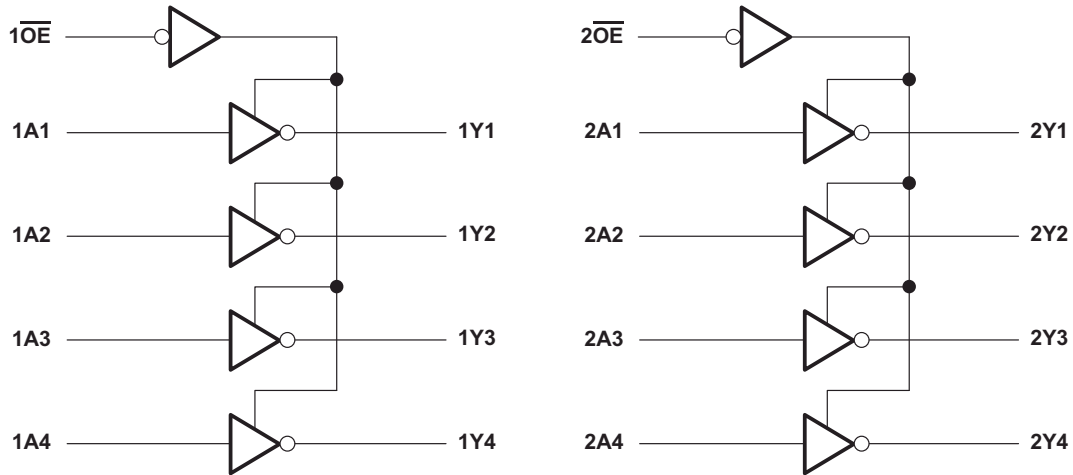
**图 6-6. Voltage Waveforms Enable And Disable Times Low- and High-Level Enabling**

## 6 Detailed Description

### 6.1 Overview

The SN74AHCT240 devices are organized as two 4-bit buffers/line drivers with separate output-enable ( $\overline{OE}$ ) inputs. When  $\overline{OE}$  is low, the device passes inverted data from the A inputs to the Y outputs. When  $\overline{OE}$  is high, the outputs are in the high-impedance state. 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.

### 6.2 Functional Block Diagram



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### 6.3 Feature Description

- $V_{CC}$  is optimized at 5 V
- Allows up-voltage translation from 3.3 V to 5 V
  - Inputs accept  $V_{IH}$  levels of 2 V
- Slow edge rates minimize output ringing
- Inputs are TTL-voltage compatible

### 6.4 Device Functional Modes

表 6-1. Function Table  
(Each 4-bit Inverting Buffer/Driver)

| INPUTS |   | OUTPUT<br>Y |
|--------|---|-------------|
| OE     | A |             |
| L      | H | L           |
| L      | L | H           |
| H      | X | Z           |

## 7 Application and Implementation

### 备注

以下应用部分中的信息不属于 TI 器件规格的范围，TI 不担保其准确性和完整性。TI 的客户应负责确定器件是否适用于其应用。客户应验证并测试其设计，以确保系统功能。

### 7.1 Application Information

The SNx4AHCT240 device is a low-drive CMOS device that may be used for a multitude of bus interface type applications where output ringing is a concern. The low drive and slow edge rates will minimize overshoot and undershoot on the outputs. The input switching levels have been lowered to accommodate TTL inputs of 0.8-V  $V_{IL}$  and 2-V  $V_{IH}$ . This feature makes the SNx4AHCT240 device ideal for translating up from 3.3 V to 5 V. 图 7-1 shows this type of translation.

### 7.2 Typical Application

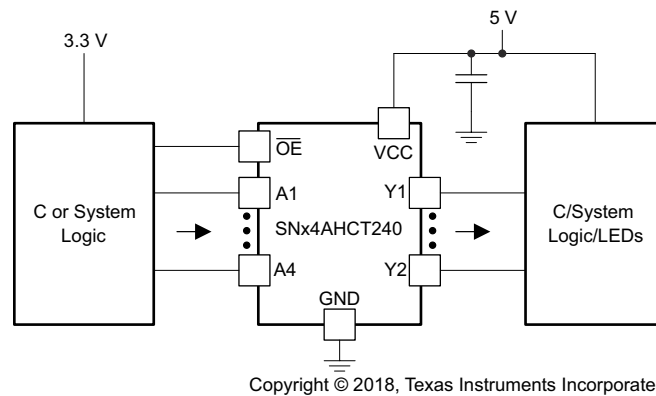


图 7-1. Application Diagram

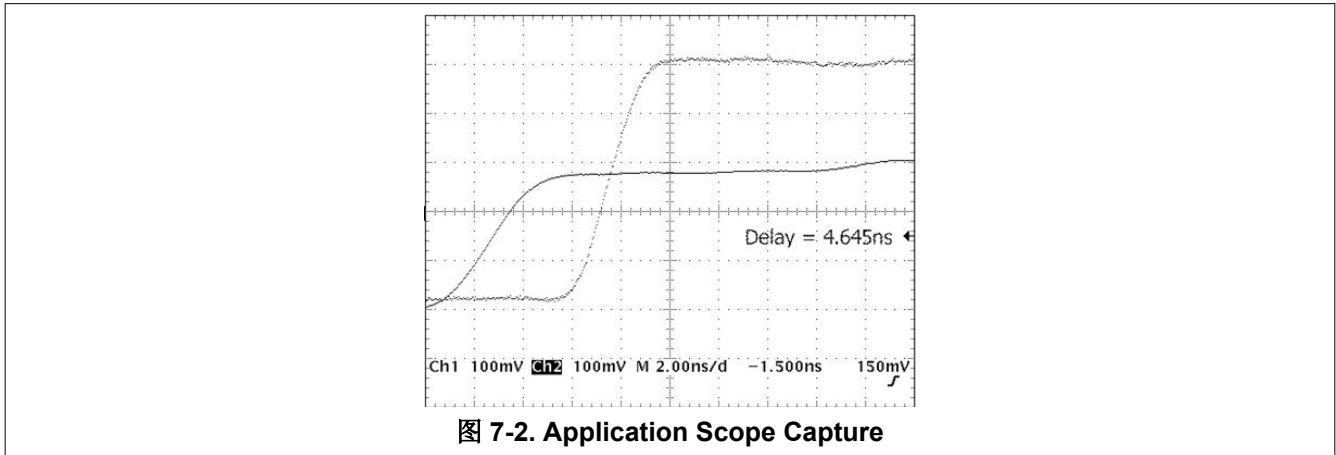
#### 7.2.1 Design Requirements

This device uses CMOS technology and has balanced output drive. Care should be taken to avoid bus contention because it can drive currents that would exceed maximum limits. The high drive will also create fast edges into light loads; therefore, routing and load conditions should be considered to prevent ringing.

#### 7.2.2 Detailed Design Procedure

- Recommended Input Conditions:
  - For rise time and fall time specifications, see  $\Delta t / \Delta V$  in the 节 5.3 table.
  - For specified high and low levels, see  $V_{IH}$  and  $V_{IL}$  in the 节 5.3 table.
  - Inputs are overvoltage tolerant, allowing them to go as high as 5.5 V at any valid  $V_{CC}$ .
- Recommend Output Conditions:
  - Load currents should not exceed 25 mA per output and 75 mA total for the part.
  - Outputs should not be pulled above  $V_{CC}$ .

### 7.2.3 Application Curves



### 7.3 Power Supply Recommendations

The power supply can be any voltage between the MIN and MAX supply voltage rating located in the [节 5.3](#).

Each  $V_{CC}$  terminal should have a good bypass capacitor to prevent power disturbance. For devices with a single supply, a  $0.1 \mu F$  capacitor is recommended. If there are multiple  $V_{CC}$  terminals then  $0.01 \mu F$  or  $0.022 \mu F$  capacitors are recommended for each power terminal. It is ok to parallel multiple bypass capacitors to reject different frequencies of noise.  $0.1 \mu F$  and  $1.0 \mu F$  capacitors are commonly used in parallel. The bypass capacitor should be installed as close to the power terminal as possible for the best results.

### 7.4 Layout

#### 7.4.1 Layout Guidelines

When using multiple bit logic devices, inputs should not float. In many cases, functions or parts of functions of digital logic devices are unused. Such examples are when only two inputs of a triple-input AND gate are used, or only 3 of the 4-buffer gates are used. Such input pins should not be left unconnected because the undefined voltages at the outside connections result in undefined operational states.

Specified in [图 7-3](#) are rules that must be observed under all circumstances. All unused inputs of digital logic devices must be connected to a high or low bias to prevent them from floating. The logic level that should be applied to any particular unused input depends on the function of the device. Generally they will be tied to GND or  $V_{CC}$ , whichever makes more sense or is more convenient. It is acceptable to float outputs unless the part is a transceiver. If the transceiver has an output enable pin, it will disable the outputs section of the part when asserted. This will not disable the input section of the I/Os so they also cannot float when disabled.

#### 7.4.2 Layout Example

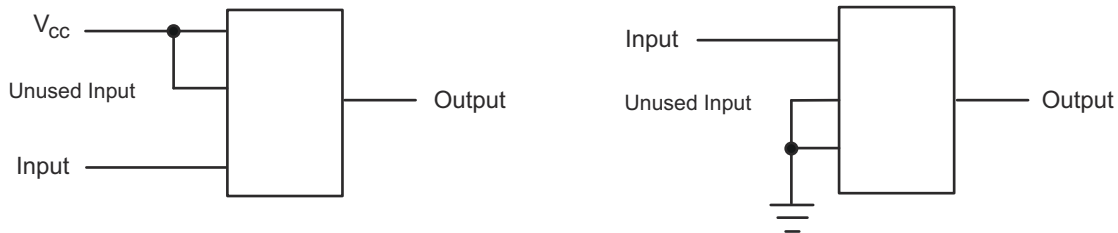


图 7-3. Layout Diagram

## 8 Device and Documentation Support

### 8.1 Documentation Support (Analog)

#### 8.1.1 Related Links

The table below lists quick access links. Categories include technical documents, support and community resources, tools and software, and quick access to sample or buy.

表 8-1. Related Links

| PARTS       | PRODUCT FOLDER             | SAMPLE & BUY               | TECHNICAL DOCUMENTS        | TOOLS & SOFTWARE           | SUPPORT & COMMUNITY        |
|-------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| SN54AHCT240 | <a href="#">Click here</a> | <a href="#">Click here</a> | <a href="#">Click here</a> | <a href="#">Click here</a> | <a href="#">Click here</a> |
| SN74AHCT240 | <a href="#">Click here</a> | <a href="#">Click here</a> | <a href="#">Click here</a> | <a href="#">Click here</a> | <a href="#">Click here</a> |

### 8.2 接收文档更新通知

要接收文档更新通知，请导航至 [ti.com](http://ti.com) 上的器件产品文件夹。点击 [通知](#) 进行注册，即可每周接收产品信息更改摘要。有关更改的详细信息，请查看任何已修订文档中包含的修订历史记录。

### 8.3 支持资源

TI E2E™ 中文支持论坛是工程师的重要参考资料，可直接从专家处获得快速、经过验证的解答和设计帮助。搜索现有解答或提出自己的问题，获得所需的快速设计帮助。

链接的内容由各个贡献者“按原样”提供。这些内容并不构成 TI 技术规范，并且不一定反映 TI 的观点；请参阅 TI 的 [使用条款](#)。

### 8.4 Trademarks

TI E2E™ is a trademark of Texas Instruments.

所有商标均为其各自所有者的财产。

### 8.5 静电放电警告



静电放电 (ESD) 会损坏这个集成电路。德州仪器 (TI) 建议通过适当的预防措施处理所有集成电路。如果不遵守正确的处理和安装程序，可能会损坏集成电路。

ESD 的损坏小至导致微小的性能降级，大至整个器件故障。精密的集成电路可能更容易受到损坏，这是因为非常细微的参数更改都可能会导致器件与其发布的规格不相符。

### 8.6 术语表

TI 术语表 本术语表列出并解释了术语、首字母缩略词和定义。

## 9 Revision History

### Changes from Revision N (January 2018) to Revision O (July 2024) Page

|  |   |
|--|---|
| • 向 <a href="#">器件信息</a> 表添加了封装尺寸.....   | 1 |
| • Updated R <sup>θ</sup> JA values: PW = 105.4 to 116.8, DW = 83.0 to 81.1; Updated PW and DW packages for R <sup>θ</sup> JC(top), R <sup>θ</sup> JB, ΨJT, ΨJB, and R <sup>θ</sup> JC(bot), all values in °C/W ..... | 5 |

### Changes from Revision M (April 2016) to Revision N (January 2018) Page

|   |    |
|---|----|
| • Added junction temperature to <i>Absolute Maximum Ratings</i> table.....                              | 4  |
| • Moved storage temperature from <i>ESD Ratings</i> table to <i>Absolute Maximum Ratings</i> table..... | 4  |
| • Changed the <i>Function</i> table layout.....   | 11 |

## 10 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

**PACKAGING INFORMATION**

| Orderable Device | Status<br>(1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan<br>(2)  | Lead finish/<br>Ball material<br>(6) | MSL Peak Temp<br>(3) | Op Temp (°C) | Device Marking<br>(4/5)               | Samples                 |
|------------------|---------------|--------------|-----------------|------|-------------|------------------|--------------------------------------|----------------------|--------------|---------------------------------------|-------------------------|
| 5962-9680601Q2A  | ACTIVE        | LCCC         | FK              | 20   | 55          | Non-RoHS & Green | SNPB                                 | N / A for Pkg Type   | -55 to 125   | 5962-9680601Q2A<br>SNJ54AHCT<br>240FK | <a href="#">Samples</a> |
| 5962-9680601QRA  | ACTIVE        | CDIP         | J               | 20   | 20          | Non-RoHS & Green | SNPB                                 | N / A for Pkg Type   | -55 to 125   | 5962-9680601QR<br>A<br>SNJ54AHCT240J  | <a href="#">Samples</a> |
| 5962-9680601QSA  | ACTIVE        | CFP          | W               | 20   | 25          | Non-RoHS & Green | SNPB                                 | N / A for Pkg Type   | -55 to 125   | 5962-9680601QS<br>A<br>SNJ54AHCT240W  | <a href="#">Samples</a> |
| SN74AHCT240DBR   | ACTIVE        | SSOP         | DB              | 20   | 2000        | RoHS & Green     | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | HB240                                 | <a href="#">Samples</a> |
| SN74AHCT240DW    | OBSOLETE      | SOIC         | DW              | 20   |             | TBD              | Call TI                              | Call TI              | -40 to 125   | AHCT240                               |                         |
| SN74AHCT240DWR   | ACTIVE        | SOIC         | DW              | 20   | 2000        | RoHS & Green     | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AHCT240                               | <a href="#">Samples</a> |
| SN74AHCT240N     | ACTIVE        | PDIP         | N               | 20   | 20          | RoHS & Green     | NIPDAU                               | N / A for Pkg Type   | -40 to 125   | SN74AHCT240N                          | <a href="#">Samples</a> |
| SN74AHCT240NSR   | ACTIVE        | SO           | NS              | 20   | 2000        | RoHS & Green     | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | AHCT240                               | <a href="#">Samples</a> |
| SN74AHCT240PW    | OBSOLETE      | TSSOP        | PW              | 20   |             | TBD              | Call TI                              | Call TI              | -40 to 125   | HB240                                 |                         |
| SN74AHCT240PWR   | ACTIVE        | TSSOP        | PW              | 20   | 2000        | RoHS & Green     | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | HB240                                 | <a href="#">Samples</a> |
| SN74AHCT240PWRG4 | ACTIVE        | TSSOP        | PW              | 20   | 2000        | RoHS & Green     | NIPDAU                               | Level-1-260C-UNLIM   | -40 to 125   | HB240                                 | <a href="#">Samples</a> |
| SNJ54AHCT240FK   | ACTIVE        | LCCC         | FK              | 20   | 55          | Non-RoHS & Green | SNPB                                 | N / A for Pkg Type   | -55 to 125   | 5962-9680601Q2A<br>SNJ54AHCT<br>240FK | <a href="#">Samples</a> |
| SNJ54AHCT240J    | ACTIVE        | CDIP         | J               | 20   | 20          | Non-RoHS & Green | SNPB                                 | N / A for Pkg Type   | -55 to 125   | 5962-9680601QR<br>A<br>SNJ54AHCT240J  | <a href="#">Samples</a> |
| SNJ54AHCT240W    | ACTIVE        | CFP          | W               | 20   | 25          | Non-RoHS & Green | SNPB                                 | N / A for Pkg Type   | -55 to 125   | 5962-9680601QS<br>A<br>SNJ54AHCT240W  | <a href="#">Samples</a> |

(1) The marketing status values are defined as follows:  
**ACTIVE:** Product device recommended for new designs.



**LIFEBUY:** TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

**NRND:** Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

**PREVIEW:** Device has been announced but is not in production. Samples may or may not be available.

**OBSOLETE:** TI has discontinued the production of the device.

<sup>(2)</sup> **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".

**RoHS Exempt:** TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.

**Green:** TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of  $\leq 1000$ ppm threshold. Antimony trioxide based flame retardants must also meet the  $\leq 1000$ ppm threshold requirement.

<sup>(3)</sup> MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

<sup>(4)</sup> There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

<sup>(5)</sup> Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

<sup>(6)</sup> Lead finish/Ball material - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

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**OTHER QUALIFIED VERSIONS OF SN54AHCT240, SN74AHCT240 :**

● Catalog : [SN74AHCT240](#)

● Automotive : [SN74AHCT240-Q1](#), [SN74AHCT240-Q1](#)

● Military : [SN54AHCT240](#)

NOTE: Qualified Version Definitions:

- Catalog - TI's standard catalog product
- Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects
- Military - QML certified for Military and Defense Applications

**TAPE AND REEL INFORMATION**

**QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE**


\*All dimensions are nominal

| Device         | Package Type | Package Drawing | Pins | SPQ  | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|----------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| SN74AHCT240DBR | SSOP         | DB              | 20   | 2000 | 330.0              | 16.4               | 8.2     | 7.5     | 2.5     | 12.0    | 16.0   | Q1            |
| SN74AHCT240DWR | SOIC         | DW              | 20   | 2000 | 330.0              | 24.4               | 10.8    | 13.3    | 2.7     | 12.0    | 24.0   | Q1            |
| SN74AHCT240NSR | SO           | NS              | 20   | 2000 | 330.0              | 24.4               | 8.4     | 13.0    | 2.5     | 12.0    | 24.0   | Q1            |
| SN74AHCT240PWR | TSSOP        | PW              | 20   | 2000 | 330.0              | 16.4               | 6.95    | 7.0     | 1.4     | 8.0     | 16.0   | Q1            |

**TAPE AND REEL BOX DIMENSIONS**


\*All dimensions are nominal

| Device         | Package Type | Package Drawing | Pins | SPQ  | Length (mm) | Width (mm) | Height (mm) |
|----------------|--------------|-----------------|------|------|-------------|------------|-------------|
| SN74AHCT240DBR | SSOP         | DB              | 20   | 2000 | 356.0       | 356.0      | 35.0        |
| SN74AHCT240DWR | SOIC         | DW              | 20   | 2000 | 367.0       | 367.0      | 45.0        |
| SN74AHCT240NSR | SO           | NS              | 20   | 2000 | 367.0       | 367.0      | 45.0        |
| SN74AHCT240PWR | TSSOP        | PW              | 20   | 2000 | 356.0       | 356.0      | 35.0        |

**TUBE**


\*All dimensions are nominal

| Device          | Package Name | Package Type | Pins | SPQ | L (mm) | W (mm) | T (μm) | B (mm) |
|-----------------|--------------|--------------|------|-----|--------|--------|--------|--------|
| 5962-9680601Q2A | FK           | LCCC         | 20   | 55  | 506.98 | 12.06  | 2030   | NA     |
| 5962-9680601QSA | W            | CFP          | 20   | 25  | 506.98 | 26.16  | 6220   | NA     |
| SN74AHCT240N    | N            | PDIP         | 20   | 20  | 506    | 13.97  | 11230  | 4.32   |
| SNJ54AHCT240FK  | FK           | LCCC         | 20   | 55  | 506.98 | 12.06  | 2030   | NA     |
| SNJ54AHCT240W   | W            | CFP          | 20   | 25  | 506.98 | 26.16  | 6220   | NA     |

W (R-GDFP-F20)

CERAMIC DUAL FLATPACK



- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - C. This package can be hermetically sealed with a ceramic lid using glass frit.
  - D. Index point is provided on cap for terminal identification only.
  - E. Falls within Mil-Std 1835 GDFP2-F20

PW0020A



# PACKAGE OUTLINE

## TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



4220206/A 02/2017

### NOTES:

- All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
- This drawing is subject to change without notice.
- This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.
- This dimension does not include interlead flash. Interlead flash shall not exceed 0.25 mm per side.
- Reference JEDEC registration MO-153.

# EXAMPLE BOARD LAYOUT

PW0020A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE: 10X



SOLDER MASK DETAILS

4220206/A 02/2017

NOTES: (continued)

- 6. Publication IPC-7351 may have alternate designs.
- 7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.



# EXAMPLE STENCIL DESIGN

PW0020A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



SOLDER PASTE EXAMPLE  
BASED ON 0.125 mm THICK STENCIL  
SCALE: 10X

4220206/A 02/2017

NOTES: (continued)

8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

# DB0020A



# PACKAGE OUTLINE

## SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



4214851/B 08/2019

### NOTES:

1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.25 mm per side.
5. Reference JEDEC registration MO-150.

# EXAMPLE BOARD LAYOUT

DB0020A

SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE: 10X



4214851/B 08/2019

NOTES: (continued)

- 6. Publication IPC-7351 may have alternate designs.
- 7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

# EXAMPLE STENCIL DESIGN

DB0020A

SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



SOLDER PASTE EXAMPLE  
BASED ON 0.125 mm THICK STENCIL  
SCALE: 10X

4214851/B 08/2019

NOTES: (continued)

8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

# MECHANICAL DATA

NS (R-PDSO-G\*\*)

PLASTIC SMALL-OUTLINE PACKAGE

14-PINS SHOWN



- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.

J (R-GDIP-T\*\*)

14 LEADS SHOWN

CERAMIC DUAL IN-LINE PACKAGE



| DIM \ PINS ** | 14                     | 16                     | 18                     | 20                     |
|---------------|------------------------|------------------------|------------------------|------------------------|
| A             | 0.300<br>(7,62)<br>BSC | 0.300<br>(7,62)<br>BSC | 0.300<br>(7,62)<br>BSC | 0.300<br>(7,62)<br>BSC |
| B MAX         | 0.785<br>(19,94)       | .840<br>(21,34)        | 0.960<br>(24,38)       | 1.060<br>(26,92)       |
| B MIN         | —                      | —                      | —                      | —                      |
| C MAX         | 0.300<br>(7,62)        | 0.300<br>(7,62)        | 0.310<br>(7,87)        | 0.300<br>(7,62)        |
| C MIN         | 0.245<br>(6,22)        | 0.245<br>(6,22)        | 0.220<br>(5,59)        | 0.245<br>(6,22)        |



4040083/F 03/03

- NOTES:
- All linear dimensions are in inches (millimeters).
  - This drawing is subject to change without notice.
  - This package is hermetically sealed with a ceramic lid using glass frit.
  - Index point is provided on cap for terminal identification only on press ceramic glass frit seal only.
  - Falls within MIL STD 1835 GDIP1-T14, GDIP1-T16, GDIP1-T18 and GDIP1-T20.

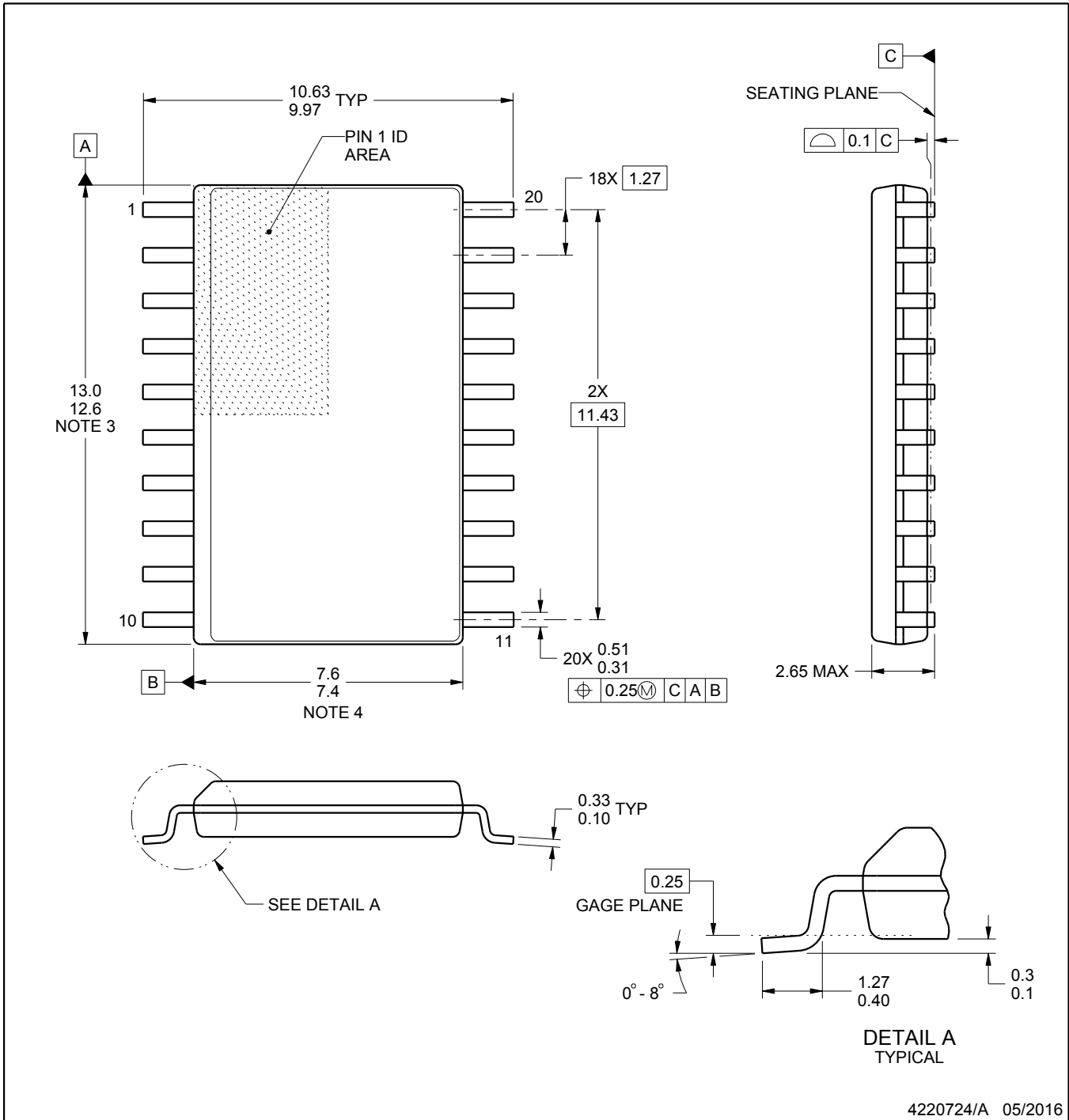
N (R-PDIP-T\*\*)

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - $\triangle C$  Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
  - $\triangle D$  The 20 pin end lead shoulder width is a vendor option, either half or full width.



4220724/A 05/2016

NOTES:

1. All linear dimensions are in millimeters. Dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.43 mm per side.
5. Reference JEDEC registration MS-013.



# EXAMPLE BOARD LAYOUT

DW0020A

SOIC - 2.65 mm max height

SOIC



LAND PATTERN EXAMPLE  
SCALE:6X



SOLDER MASK DETAILS

4220724/A 05/2016

NOTES: (continued)

- 6. Publication IPC-7351 may have alternate designs.
- 7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

# EXAMPLE STENCIL DESIGN

DW0020A

SOIC - 2.65 mm max height

SOIC



SOLDER PASTE EXAMPLE  
BASED ON 0.125 mm THICK STENCIL  
SCALE:6X

4220724/A 05/2016

NOTES: (continued)

8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

## GENERIC PACKAGE VIEW

**FK 20**

**LCCC - 2.03 mm max height**

8.89 x 8.89, 1.27 mm pitch

LEADLESS CERAMIC CHIP CARRIER

This image is a representation of the package family, actual package may vary.  
Refer to the product data sheet for package details.



4229370VA\

## 重要声明和免责声明

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