

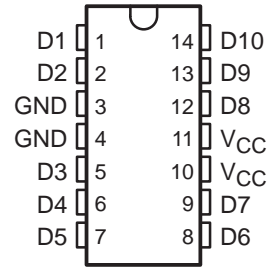
SN74ACT1071

10-BIT BUS-TERMINATION ARRAY WITH BUS-HOLD FUNCTION

SCAS192 – D3994, MARCH 1992 – REVISED APRIL 1993

- Designed to Ensure Defined Voltage Levels on Floating Bus Lines in CMOS Systems
- Reduces Undershoot and Overshoot Caused By Line Reflections
- Repetitive Peak Forward Current . . . $I_{FRM} = 100 \text{ mA}$
- Inputs Are TTL-Voltage Compatible
- Low Power Consumption (Like CMOS)
- ESD Protection Exceeds 2000 V Per MIL-STD-883C, Method 3015; Exceeds 200 V Using Machine Model ($C = 200 \text{ pF}$, $R = 0$)
- Center-Pin V_{CC} and GND Configuration Minimizes High-Speed Switching Noise

D PACKAGE
(TOP VIEW)



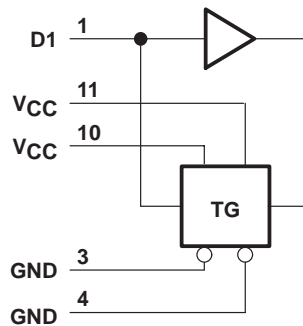
description

This device is designed to terminate bus lines in CMOS systems. The integrated low-impedance diodes clamp the voltage of undershoots and overshoots caused by line reflections and ensure signal integrity. The device also contains a bus-hold function that consists of a CMOS-buffer stage with a high-resistance feedback path between its output and its input. The SN74ACT1071 prevents bus lines from floating without using pullup or pulldown resistors.

The high-impedance inputs of these internal buffers are connected to the input terminals of the device. The feedback path on each internal buffer stage keeps a bus line tied to the bus holder at the last valid logic state generated by an active driver before the bus switches to the high-impedance state.

The SN74ACT1071 is characterized for operation from -40°C to 85°C .

logic diagram, one of ten channels (positive logic)



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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 $V_{CC} + 0.5$ V |
| Continuous input clamp current, I_{IK} ($V_I < 0$ or $V_I > V_{CC}$) | ±20 mA |
| Positive-peak input clamp current, I_{IK} ($V_I > V_{CC}$) ($t_w < 1 \mu s$, duty cycle < 20%) | 100 mA |
| Negative-peak input clamp current, I_{IK} ($V_I < 0$) ($t_w < 1 \mu s$, duty cycle < 20%) | –100 mA |
| Storage temperature range | –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.

NOTE 1: The input negative-voltage rating may be exceeded if the input clamp-current rating is observed.

recommended operating conditions

| | | MIN | MAX | UNIT |
|----------|--------------------------------|-----|----------|------|
| V_{CC} | Supply voltage | 4.5 | 5.5 | V |
| V_{IH} | High-level input voltage | 2.5 | | V |
| V_{IL} | Low-level input voltage | | 0.8 | V |
| V_I | Input voltage | 0 | V_{CC} | V |
| T_A | Operating free-air temperature | –40 | 85 | °C |

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

| PARAMETER | TEST CONDITIONS | $T_A = 25^\circ\text{C}$ | | | MIN | MAX | UNIT |
|--------------------|---|--------------------------|------|------------|-------|------------|------|
| | | MIN | TYP† | MAX | | | |
| I_{IL} | $V_{CC} = 4.5$ to 5.5 V, $V_I = 0.8$ V | 0.15 | 0.3 | 0.9 | 0.1 | 1 | mA |
| I_{IH} | $V_{CC} = 4.5$ to 5.5 V, $V_I = 2.5$ V | –0.2 | –0.5 | –1.4 | –0.15 | –1.5 | mA |
| V_{IKL} | $I_{IN} = -18$ mA | | | –1.5 | | –1.5 | V |
| V_{IKH} | $I_{IN} = 18$ mA | | | $V_{CC}+2$ | | $V_{CC}+2$ | V |
| I_{CC}^\ddagger | $V_{CC} = 5.5$ V, Inputs open | | | 4 | | 40 | μA |
| ΔI_{CC}^\S | One input at 3.4 V, Other inputs at V_{CC} or GND | | | 0.9 | | 1 | mA |
| C_i | $V_I = V_{CC}$ or GND | | 3 | | | | pF |

† All typical values are at $V_{CC} = 5$ V.

‡ Inputs may be set high or low prior to the I_{CC} measurement.

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

TYPICAL CHARACTERISTICS

FORWARD CURRENT
 vs
 INPUT VOLTAGE
 (UPPER CLAMPING DIODE)

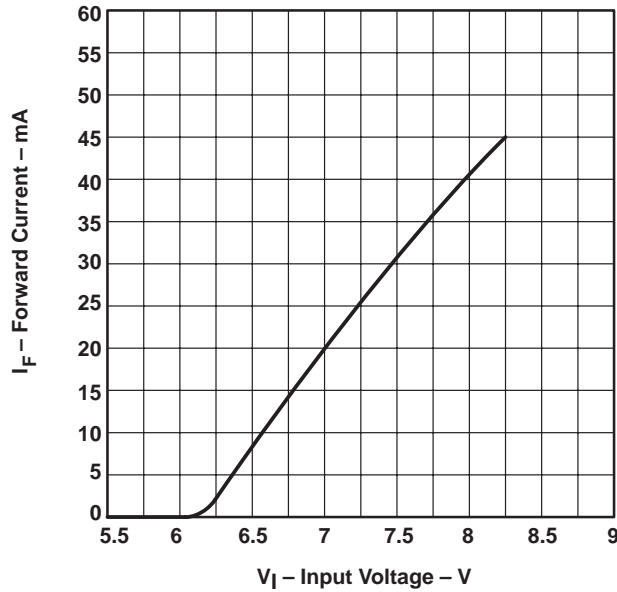


Figure 1

FORWARD CURRENT
 vs
 INPUT VOLTAGE
 (LOWER CLAMPING DIODE)

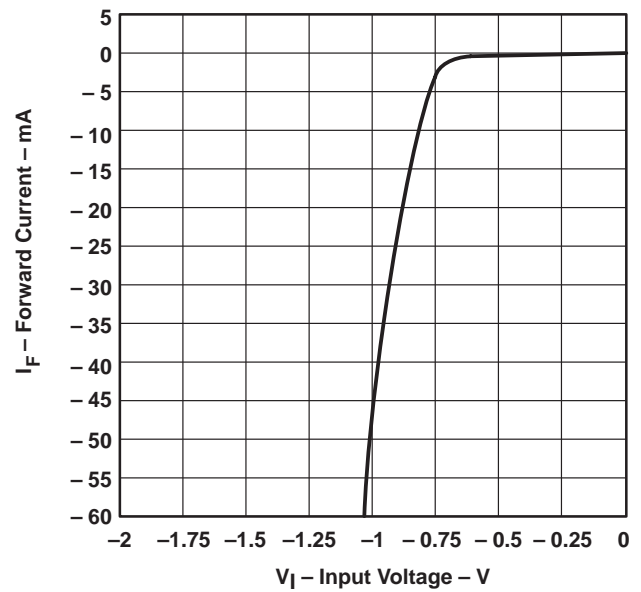


Figure 2

INPUT CURRENT
 vs
 INPUT VOLTAGE

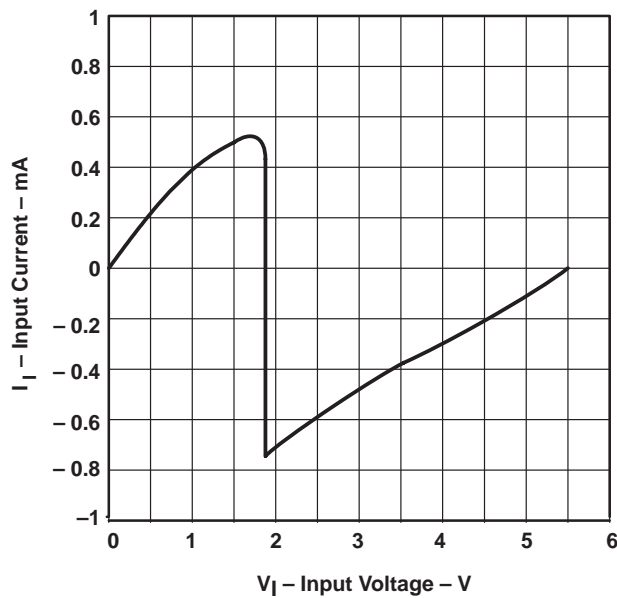


Figure 3

SUPPLY CURRENT
 vs
 INPUT VOLTAGE

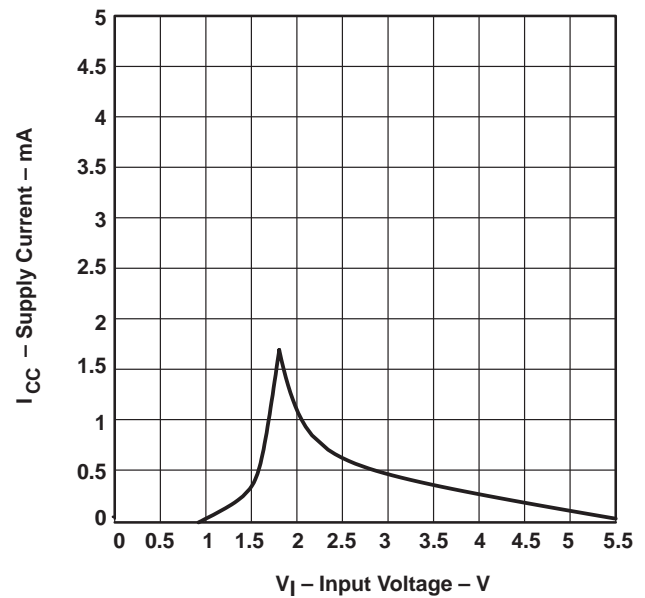


Figure 4

SN74ACT1071 10-BIT BUS-TERMINATION ARRAY WITH BUS-HOLD FUNCTION

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APPLICATION INFORMATION

The SN74ACT1071 terminates the output of a driving device and holds the input of the driven device at the logic level of the driver output prior to establishment of the high-impedance state on that output (see Figure 5).

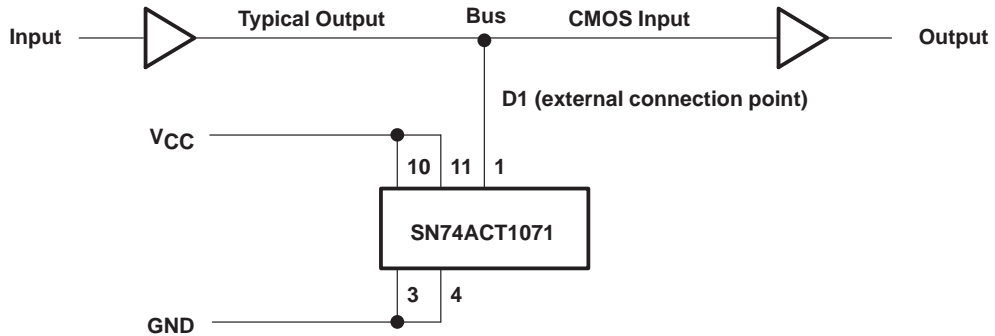


Figure 5. Bus-Hold Application

PACKAGING INFORMATION

| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead finish/ Ball material (6) | MSL Peak Temp (3) | Op Temp (°C) | Device Marking (4/5) | Samples |
|------------------|---------------|--------------|-----------------|------|-------------|-----------------|--------------------------------------|----------------------|--------------|-------------------------|----------------|
| SN74ACT1071D | ACTIVE | SOIC | D | 14 | 50 | RoHS & Green | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | ACT1071 | Samples |
| SN74ACT1071DR | ACTIVE | SOIC | D | 14 | 2500 | RoHS & Green | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | ACT1071 | Samples |

(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.

(2) **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 <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

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

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

(5) 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.

(6) 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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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 |
|---------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| SN74ACT1071DR | SOIC | D | 14 | 2500 | 330.0 | 16.4 | 6.5 | 9.0 | 2.1 | 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) |
|---------------|--------------|-----------------|------|------|-------------|------------|-------------|
| SN74ACT1071DR | SOIC | D | 14 | 2500 | 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) |
|--------------|--------------|--------------|------|-----|--------|--------|--------|--------|
| SN74ACT1071D | D | SOIC | 14 | 50 | 506.6 | 8 | 3940 | 4.32 |

D (R-PDSO-G14)

PLASTIC SMALL OUTLINE



- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - $\triangle C$ Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0,15) each side.
 - $\triangle D$ Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
 - E. Reference JEDEC MS-012 variation AB.

D (R-PDSO-G14)

PLASTIC SMALL OUTLINE



4211283-3/E 08/12

- NOTES:
- All linear dimensions are in millimeters.
 - This drawing is subject to change without notice.
 - Publication IPC-7351 is recommended for alternate designs.
 - Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525 for other stencil recommendations.
 - Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.

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