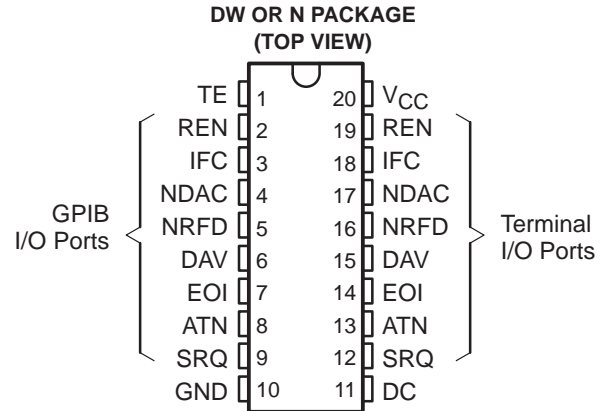


# SN75ALS161

## OCTAL GENERAL-PURPOSE INTERFACE BUS TRANSCEIVERS

SLLS019F – JUNE 1986 – REVISED JULY 2004

- Suitable for IEEE Standard 488-1978 (GPIB)
- 8-Channel Bidirectional Transceivers
- Designed to Implement Control Bus Interface
- Designed for Single Controller
- High-Speed Advanced Low-Power Schottky Circuitry
- Low Power Dissipation . . . 46 mW Max Per Channel
- Fast Propagation Times . . . 20 ns Max
- High-Impedance pnp Inputs
- Receiver Hysteresis . . . 650 mV Typ
- Bus-Terminating Resistors Provided on Driver Outputs
- No Loading of Bus When Device Is Powered Down ( $V_{CC} = 0$ )
- Power-Up/Power-Down Protection (Glitch Free)



**CHANNEL-IDENTIFICATION TABLE**

| NAME | IDENTITY           | CLASS          |
|------|--------------------|----------------|
| DC   | Direction Control  | Control        |
| TE   | Talk Enable        |                |
| ATN  | Attention          | Bus Management |
| SRQ  | Service Request    |                |
| REN  | Remote Enable      |                |
| IFC  | Interface Clear    |                |
| EOI  | End or Identify    | Data Transfer  |
| DAV  | Data Valid         |                |
| NDAC | Not Data Accepted  |                |
| NRFD | Not Ready for Data |                |

### description/ordering information

The SN75ALS161 eight-channel general-purpose interface bus transceivers are high-speed, advanced low-power Schottky-process devices designed to provide the bus-management and data-transfer signals between operating units of a single-controller instrumentation system. When combined with the SN75ALS160 octal bus transceivers, this device provides a complete 16-wire interface for the IEEE 488 bus.

The SN75ALS161 device features eight driver-receiver pairs connected in a front-to-back configuration to form input/output (I/O) ports at both the bus and terminal sides. The direction of data through these driver-receiver pairs is determined by the direction-control (DC) and talk-enable (TE) signals.

The driver outputs general-purpose interface bus (GPIB I/O ports) feature active bus-terminating resistor circuits designed to provide a high impedance to the bus when  $V_{CC} = 0$ . The drivers are designed to handle sink-current loads up to 48 mA. Each receiver features pnp transistor inputs for high input impedance and hysteresis of 400 mV on the commercial part, and 250 mV on the military part, minimum, for increased noise immunity. All receivers have 3-state outputs, to present a high impedance to the terminal when disabled.

The SN75ALS161 is characterized for operation from 0°C to 70°C.

### ORDERING INFORMATION

| TA          | PACKAGE†  |              | ORDERABLE PART NUMBER | TOP-SIDE MARKING |
|-------------|-----------|--------------|-----------------------|------------------|
| 0°C to 70°C | PDIP (N)  | Tube of 20   | SN75ALS161N           | SN75ALS161N      |
|             | SOIC (DW) | Tube of 25   | SN75ALS161DW          | 75ALS161         |
|             |           | Reel of 2000 | SN75ALS161DWR         |                  |

† Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at [www.ti.com/sc/package](http://www.ti.com/sc/package).



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.



POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

Copyright © 2004, Texas Instruments Incorporated

# SN75ALS161

## OCTAL GENERAL-PURPOSE INTERFACE BUS TRANSCEIVERS

SLLS019F – JUNE 1986 – REVISED JULY 2004

FUNCTION TABLE  
RECEIVE/TRANSMIT

| CONTROLS |    |                  | BUS-MANAGEMENT CHANNELS |     |     |     | DATA-TRANSFER CHANNELS |                    |      |      |
|----------|----|------------------|-------------------------|-----|-----|-----|------------------------|--------------------|------|------|
| DC       | TE | ATN <sup>†</sup> | ATN <sup>†</sup>        | SRQ | REN | IFC | EOI                    | DAV                | NDAC | NRFD |
|          |    |                  | (CONTROLLED BY DC)      |     |     |     |                        | (CONTROLLED BY TE) |      |      |
| H        | H  | H                | R                       | T   | R   | R   | T                      | T                  | R    | R    |
| H        | H  | L                |                         |     |     |     | R                      |                    |      |      |
| L        | L  | H                | T                       | R   | T   | T   | R                      | R                  | T    | T    |
| L        | L  | L                |                         |     |     |     | T                      |                    |      |      |
| H        | L  | X                | R                       | T   | R   | R   | R                      | R                  | T    | T    |
| L        | H  | X                | T                       | R   | T   | T   | T                      | T                  | R    | R    |

H = high level, L = low level, R = receive, T = transmit, X = irrelevant

Direction of data transmission is from the terminal side to the bus side, and the direction of data receiving is from the bus side to the terminal side.

Data transfer is noninverting in both directions.

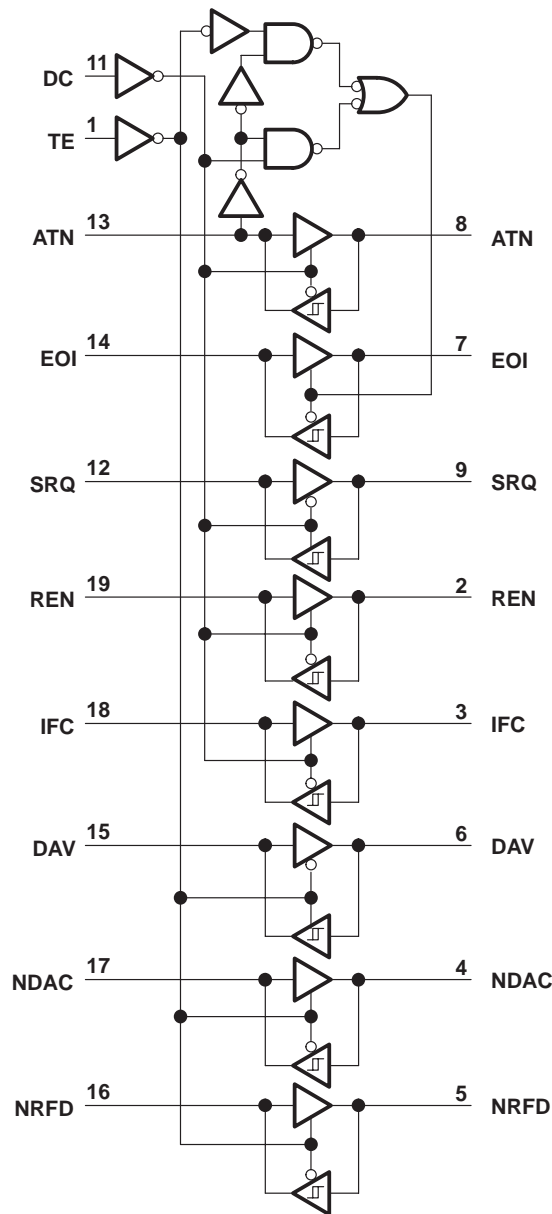
<sup>†</sup> ATN is a normal transceiver channel that functions additionally as an internal direction control or talk enable for EOI whenever the DC and TE inputs are in the same state. When DC and TE are in opposite states, the ATN channel functions as an independent transceiver only.



# SN75ALS161 OCTAL GENERAL-PURPOSE INTERFACE BUS TRANSCEIVERS

SLLS019F – JUNE 1986 – REVISED JULY 2004

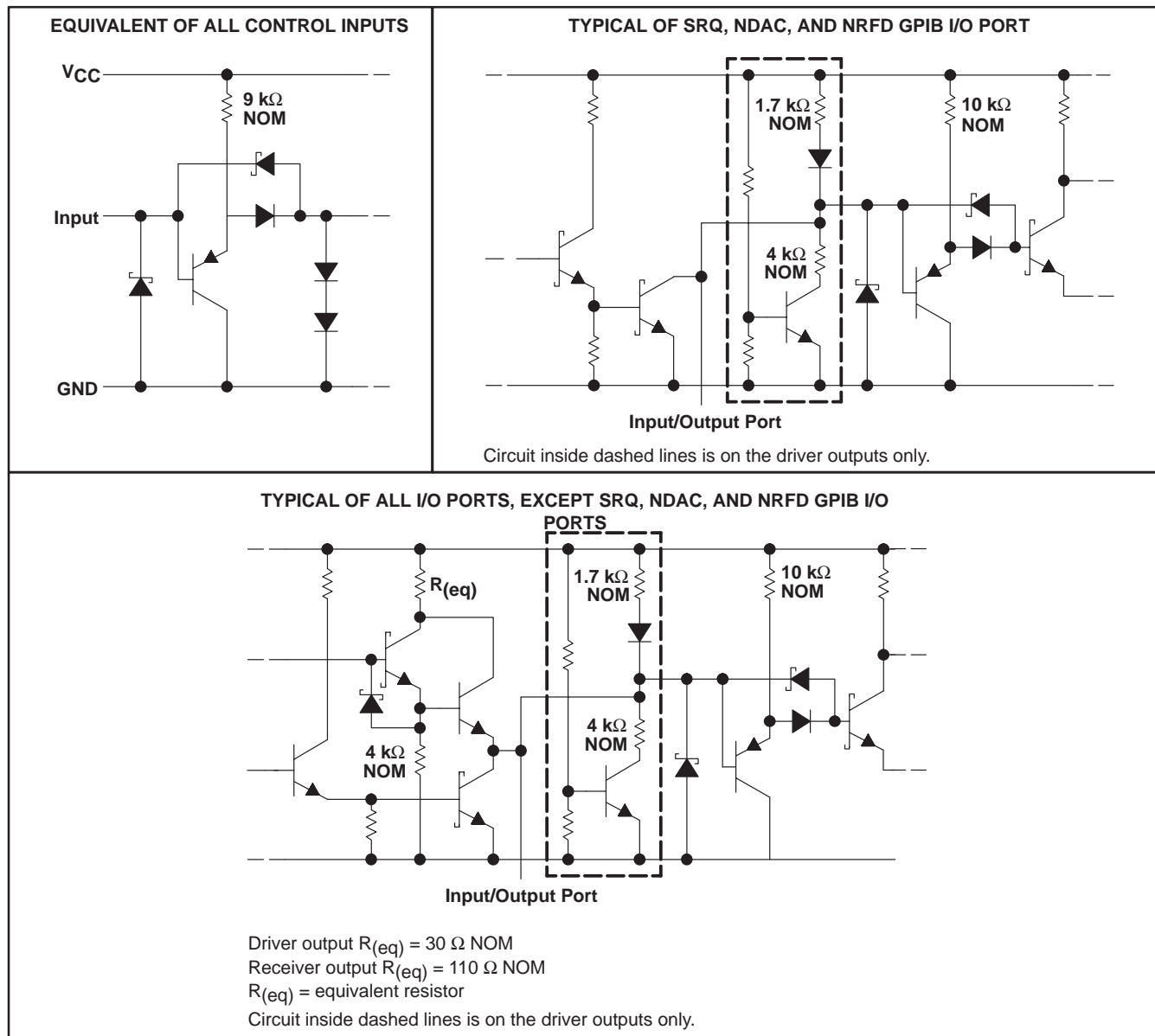
logic diagram (positive logic)



# SN75ALS161 OCTAL GENERAL-PURPOSE INTERFACE BUS TRANSCEIVERS

SLLS019F – JUNE 1986 – REVISED JULY 2004

## schematics of inputs and outputs



# SN75ALS161

## OCTAL GENERAL-PURPOSE INTERFACE BUS TRANSCEIVERS

SLLS019F – JUNE 1986 – REVISED JULY 2004

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

|                                                                                |                |
|--------------------------------------------------------------------------------|----------------|
| Supply voltage, $V_{CC}$ (see Note 1) .....                                    | 7 V            |
| Input voltage, $V_I$ .....                                                     | 5.5 V          |
| Low-level driver output current, $I_{OL}$ .....                                | 100 mA         |
| Package thermal impedance, $\theta_{JA}$ (see Notes 2 and 3): DW package ..... | 58°C/W         |
| N package .....                                                                | 69°C/W         |
| Operating virtual junction temperature, $T_J$ .....                            | 150°C          |
| 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. All voltage values are with respect to network ground terminal.  
 2. Maximum power dissipation is a function of  $T_{J(max)}$ ,  $\theta_{JA}$ , and  $T_A$ . The maximum allowable power dissipation at any allowable ambient temperature is  $P_D = (T_{J(max)} - T_A)/\theta_{JA}$ . Operating at the absolute maximum  $T_J$  of 150°C can affect reliability.  
 3. The package thermal impedance is calculated in accordance with JESD 51-7.

### recommended operating conditions

|          |                                | MIN                           | NOM | MAX   | UNIT |
|----------|--------------------------------|-------------------------------|-----|-------|------|
| $V_{CC}$ | Supply voltage                 | 4.75                          | 5   | 5.25  | V    |
| $V_{IH}$ | High-level input voltage       | 2                             |     |       | V    |
| $V_{IL}$ | Low-level input voltage        |                               |     | 0.8   | V    |
| $I_{OH}$ | High-level output current      | Bus ports with pullups active |     | – 5.2 | mA   |
|          |                                | Terminal ports                |     | – 800 | μA   |
| $I_{OL}$ | Low-level output current       | Bus ports                     |     | 48    | mA   |
|          |                                | Terminal ports                |     | 16    |      |
| $T_A$    | Operating free-air temperature | 0                             |     | 70    | °C   |



# SN75ALS161

## OCTAL GENERAL-PURPOSE INTERFACE BUS TRANSCEIVERS

SLLS019F – JUNE 1986 – REVISED JULY 2004

electrical characteristics over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted)

| PARAMETER |                                            | TEST CONDITIONS†                                                                                   |                                                      | MIN                                             | TYP‡ | MAX  | UNIT          |
|-----------|--------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------|-------------------------------------------------|------|------|---------------|
| $V_{IK}$  | Input clamp voltage                        | $I_I = -18 \text{ mA}$                                                                             |                                                      | -0.8                                            | -1.5 |      | V             |
| $V_{hys}$ | Hysteresis voltage ( $V_{IT+} - V_{IT-}$ ) | Bus                                                                                                |                                                      | 0.4                                             | 0.65 |      | V             |
| $V_{OH}§$ | High-level output voltage                  | Terminal                                                                                           | $I_{OH} = -800 \mu\text{A}$ , $V_{CC} = \text{MIN}$  | $T_A = 25^\circ\text{C}$<br>and MAX             | 2.7  | 3.5  | V             |
|           |                                            |                                                                                                    |                                                      | $T_A = \text{MIN}$                              | 2.7  | 3.5  |               |
|           |                                            | Bus                                                                                                | $I_{OH} = -5.2 \text{ mA}$ , $V_{CC} = \text{MIN}$   | $T_A = 25^\circ\text{C}$<br>and MAX             | 2.2  |      |               |
|           |                                            |                                                                                                    |                                                      | $T_A = \text{MIN}$                              | 2.2  |      |               |
| $V_{OL}$  | Low-level output voltage                   | Terminal                                                                                           | $I_{OL} = 16 \text{ mA}$ , $V_{CC} = \text{MIN}$     |                                                 | 0.3  | 0.5  | V             |
|           |                                            | Bus                                                                                                | $I_{OL} = 48 \text{ mA}$ , $V_{CC} = \text{MIN}$     |                                                 | 0.35 | 0.5  |               |
| $I_I$     | Input current at maximum input voltage     | Terminal                                                                                           | $V_I = 5.5 \text{ V}$ , $V_{CC} = \text{MAX}$        |                                                 | 0.2  | 100  | $\mu\text{A}$ |
| $I_{IH}$  | High-level input current                   | Terminal and control inputs                                                                        | $V_I = 2.7 \text{ V}$ , $V_{CC} = \text{MAX}$        |                                                 | 0.1  | 20   | $\mu\text{A}$ |
| $V_{I/O}$ | Voltage at GPIB I/O port                   | $I_I(\text{bus}) = 0$                                                                              |                                                      | 2.5                                             | 3    | 3.7  | V             |
|           |                                            | $I_I(\text{bus}) = 0$                                                                              |                                                      | 2.5                                             | 3    | 3.7  |               |
|           |                                            | $I_I(\text{bus}) = -12 \text{ mA}$                                                                 |                                                      |                                                 |      | -1.5 |               |
| $I_{IL}$  | Low-level input current                    | Terminal and control inputs                                                                        | $V_I = 0.5 \text{ V}$ , $V_{CC} = \text{MAX}$        |                                                 | -10  | -100 | $\mu\text{A}$ |
| $I_{I/O}$ | Current into GPIB I/O port                 | Power on                                                                                           | $V_I(\text{bus}) = -1.5 \text{ V to } 0.4 \text{ V}$ | -1.3                                            |      |      | mA            |
|           |                                            |                                                                                                    | $V_I(\text{bus}) = 0.4 \text{ V to } 2.5 \text{ V}$  | 0                                               |      | -3.2 |               |
|           |                                            |                                                                                                    | $V_I(\text{bus}) = 2.5 \text{ V to } 3.7 \text{ V}$  |                                                 |      | 2.5  |               |
|           |                                            |                                                                                                    | $V_I(\text{bus}) = 3.7 \text{ V to } 5 \text{ V}$    | 0                                               |      | 2.5  |               |
|           |                                            |                                                                                                    | $V_I(\text{bus}) = 5 \text{ V to } 5.5 \text{ V}$    | 0.7                                             |      | 2.5  |               |
|           |                                            | Power off                                                                                          | $V_{CC} = 0$                                         | $V_I(\text{bus}) = 0 \text{ to } 2.5 \text{ V}$ |      |      |               |
| $I_{OS}§$ | Short-circuit output current               | Terminal                                                                                           | $V_{CC} = \text{MAX}$                                | -15                                             | -35  | -75  | mA            |
|           |                                            | Bus                                                                                                |                                                      | -25                                             | -50  | -125 |               |
| $I_{CC}$  | Supply current                             | No load, TE and DC low, $V_{CC} = \text{MAX}$                                                      |                                                      |                                                 | 55   | 75   | mA            |
| $C_{I/O}$ | GPIB I/O port capacitance                  | $V_{CC} = 0 \text{ to } 5 \text{ V}$ , $V_{I/O} = 0 \text{ to } 2 \text{ V}$ , $f = 1 \text{ MHz}$ |                                                      |                                                 | 30   |      | pF            |

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

‡ All typical values are at  $V_{CC} = 5 \text{ V}$ ,  $T_A = 25^\circ\text{C}$ .

§  $V_{OH}$  and  $I_{OS}$  apply to 3-state outputs only.



# SN75ALS161

## OCTAL GENERAL-PURPOSE INTERFACE BUS TRANSCEIVERS

SLLS019F – JUNE 1986 – REVISED JULY 2004

switching characteristics over recommended operating free-air temperature range,  $V_{CC} = 5\text{ V}$

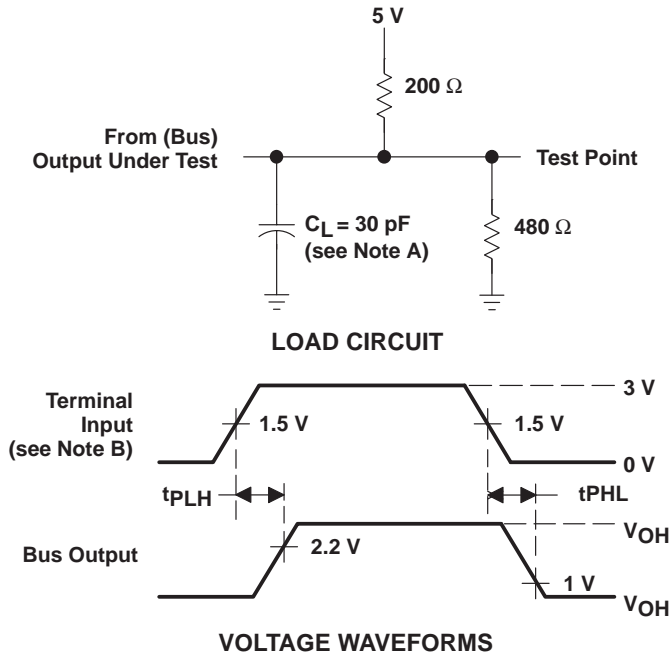
| PARAMETER |                                                   | FROM (INPUT) | TO (OUTPUT)                       | TEST CONDITIONS                        | MIN | TYP† | MAX | UNIT |
|-----------|---------------------------------------------------|--------------|-----------------------------------|----------------------------------------|-----|------|-----|------|
| $t_{PLH}$ | Propagation delay time, low- to high-level output | Terminal     | Bus                               | $C_L = 30\text{ pF}$ ,<br>See Figure 1 |     | 10   | 20  | ns   |
| $t_{PHL}$ | Propagation delay time, high- to low-level output |              |                                   |                                        |     | 12   | 20  |      |
| $t_{PLH}$ | Propagation delay time, low- to high-level output | Bus          | Terminal                          | $C_L = 30\text{ pF}$ ,<br>See Figure 2 |     | 5    | 10  | ns   |
| $t_{PHL}$ | Propagation delay time, high- to low-level output |              |                                   |                                        |     | 7    | 14  |      |
| $t_{PZH}$ | Output enable time to high level                  | TE or DC     | Bus (ATN, EOI, REN, IFC, and DAV) | $C_L = 15\text{ pF}$ ,<br>See Figure 3 |     |      | 30  | ns   |
| $t_{PHZ}$ | Output disable time from high level               |              |                                   |                                        |     |      | 20  |      |
| $t_{PZL}$ | Output enable time to low level                   |              |                                   |                                        |     |      | 45  |      |
| $t_{PLZ}$ | Output disable time from low level                |              |                                   |                                        |     |      | 20  |      |
| $t_{PZH}$ | Output enable time to high level                  | TE or DC     | Terminal                          | $C_L = 15\text{ pF}$ ,<br>See Figure 4 |     |      | 30  | ns   |
| $t_{PHZ}$ | Output disable time from high level               |              |                                   |                                        |     |      | 25  |      |
| $t_{PZL}$ | Output enable time to low level                   |              |                                   |                                        |     |      | 30  |      |
| $t_{PLZ}$ | Output disable time from low level                |              |                                   |                                        |     |      | 25  |      |

† All typical values are at  $T_A = 25^\circ\text{C}$ .

# SN75ALS161 OCTAL GENERAL-PURPOSE INTERFACE BUS TRANSCEIVERS

SLLS019F – JUNE 1986 – REVISED JULY 2004

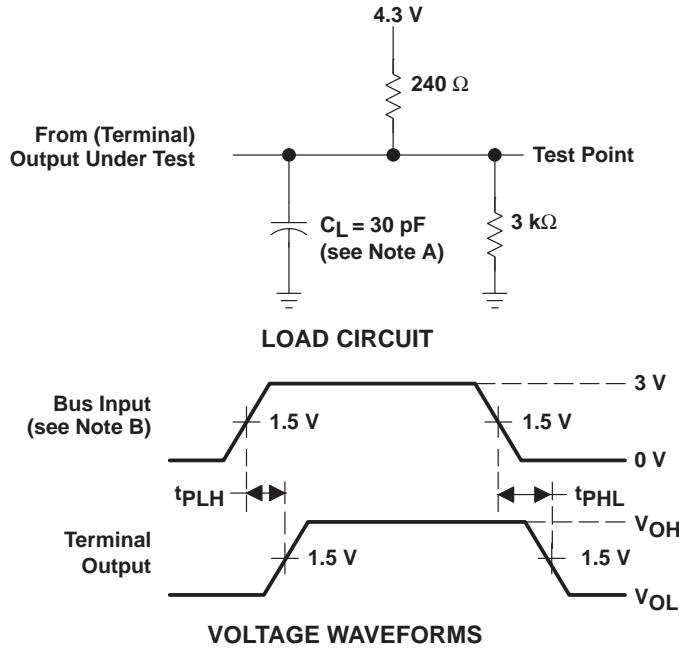
## PARAMETER MEASUREMENT INFORMATION



- NOTES: A.  $C_L$  includes probe and jig capacitance.  
 B. The input pulse is supplied by a generator having the following characteristics:  $PRR \leq 1 \text{ MHz}$ , 50% duty cycle,  $t_r \leq 6 \text{ ns}$ ,  $t_f \leq 6 \text{ ns}$ ,  $Z_O = 50 \Omega$ .

**Figure 1. Terminal-to-Bus Load Circuit and Voltage Waveforms**

**PARAMETER MEASUREMENT INFORMATION**



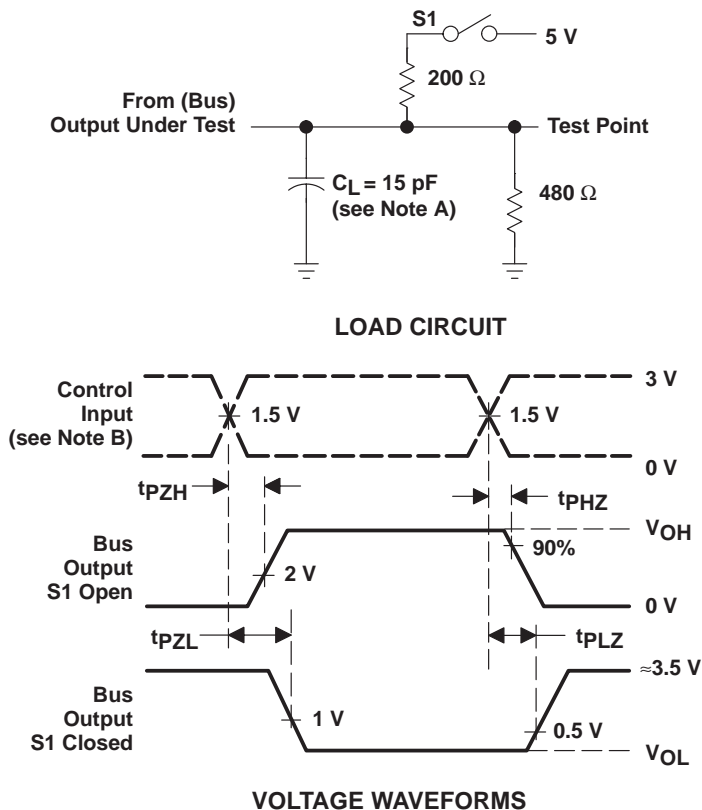
- NOTES: A.  $C_L$  includes probe and jig capacitance.  
 B. The input pulse is supplied by a generator having the following characteristics:  $PRR \leq 1 \text{ MHz}$ , 50% duty cycle,  $t_r \leq 6 \text{ ns}$ ,  $t_f \leq 6 \text{ ns}$ ,  $Z_O = 50 \Omega$ .

**Figure 2. Bus-to-Terminal Load Circuit and Voltage Waveforms**

# SN75ALS161 OCTAL GENERAL-PURPOSE INTERFACE BUS TRANSCEIVERS

SLLS019F – JUNE 1986 – REVISED JULY 2004

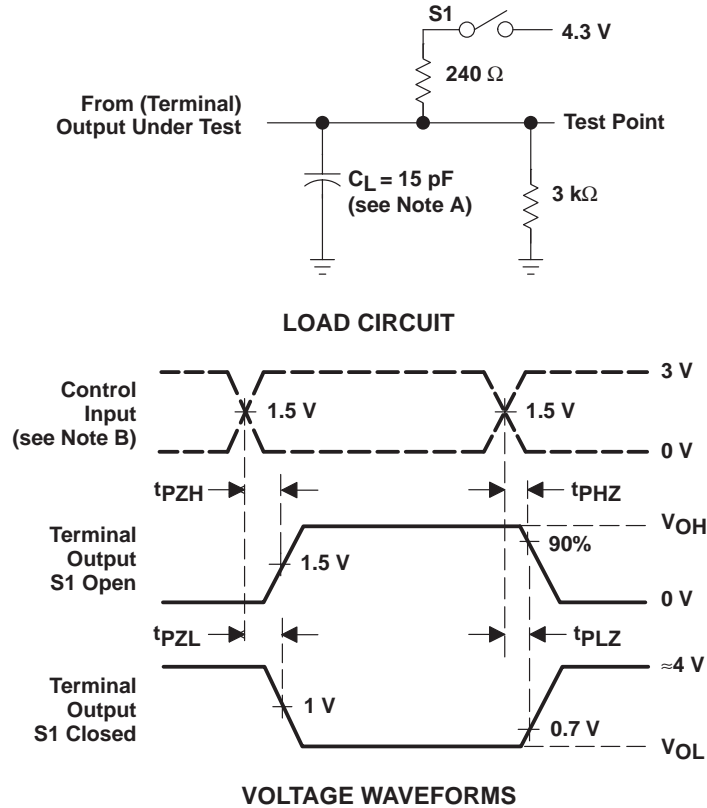
## PARAMETER MEASUREMENT INFORMATION



- NOTES: A.  $C_L$  includes probe and jig capacitance.  
 B. The input pulse is supplied by a generator having the following characteristics:  $PRR \leq 1 \text{ MHz}$ , 50% duty cycle,  $t_r \leq 6 \text{ ns}$ ,  $t_f \leq 6 \text{ ns}$ ,  $Z_O = 50 \Omega$ .

Figure 3. Bus Load Circuit and Voltage Waveforms

**PARAMETER MEASUREMENT INFORMATION**



- NOTES: A. C<sub>L</sub> includes probe and jig capacitance.  
 B. The input pulse is supplied by a generator having the following characteristics: PRR ≤ 1 MHz, 50% duty cycle, t<sub>r</sub> ≤ 6 ns, t<sub>f</sub> ≤ 6 ns, Z<sub>O</sub> = 50 Ω.

**Figure 4. Terminal Load Circuit and Voltage Waveforms**

# SN75ALS161 OCTAL GENERAL-PURPOSE INTERFACE BUS TRANSCEIVERS

SLLS019F – JUNE 1986 – REVISED JULY 2004

## TYPICAL CHARACTERISTICS†

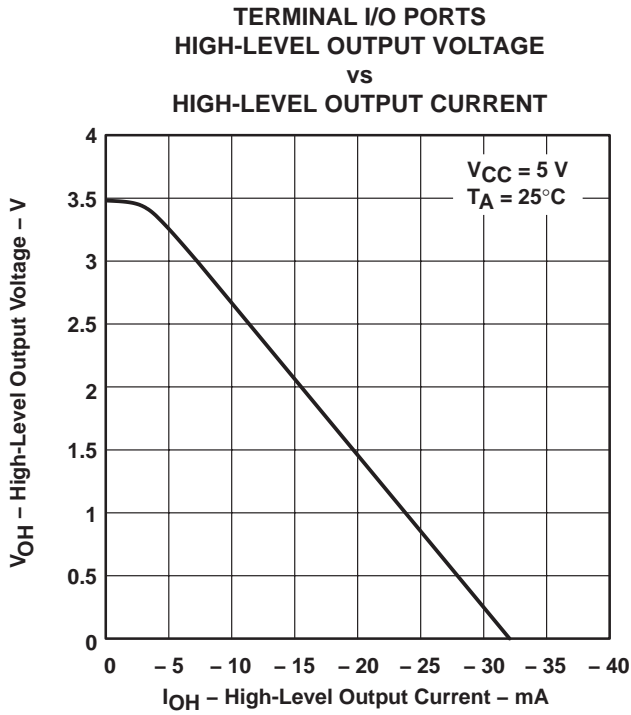


Figure 5

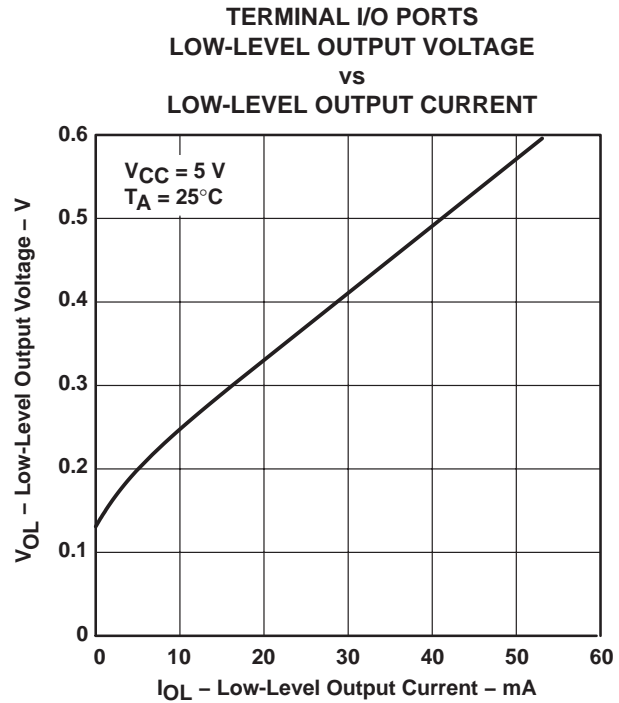


Figure 6

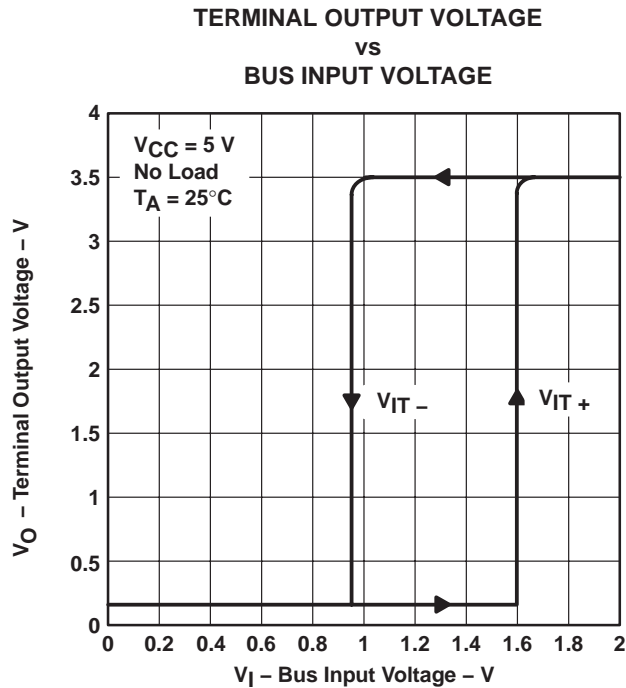


Figure 7

† Operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied.

## TYPICAL CHARACTERISTICS†

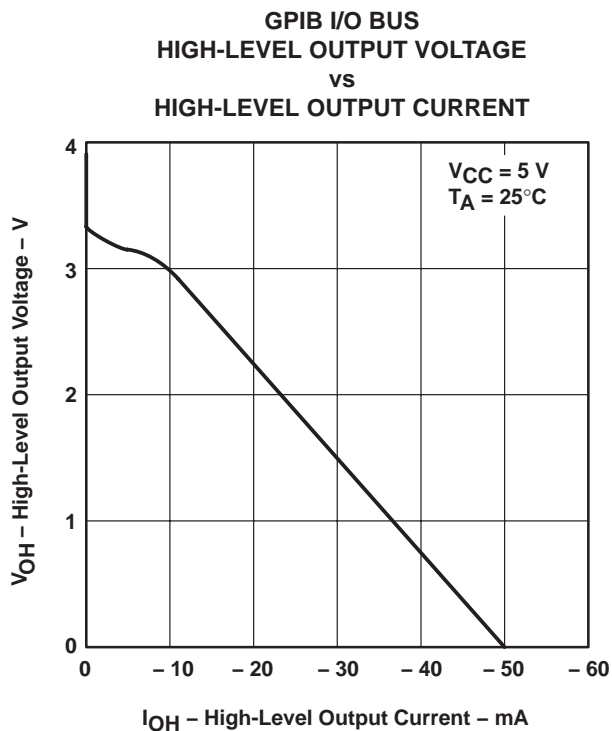


Figure 8

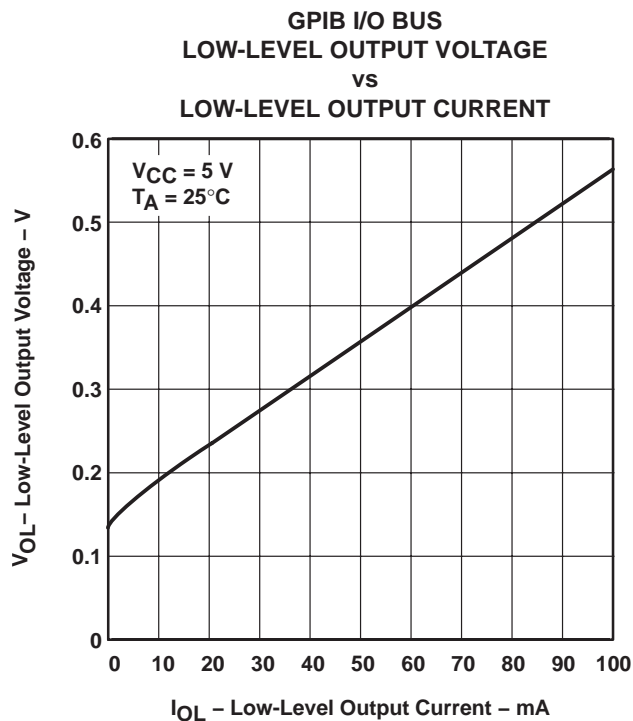


Figure 9

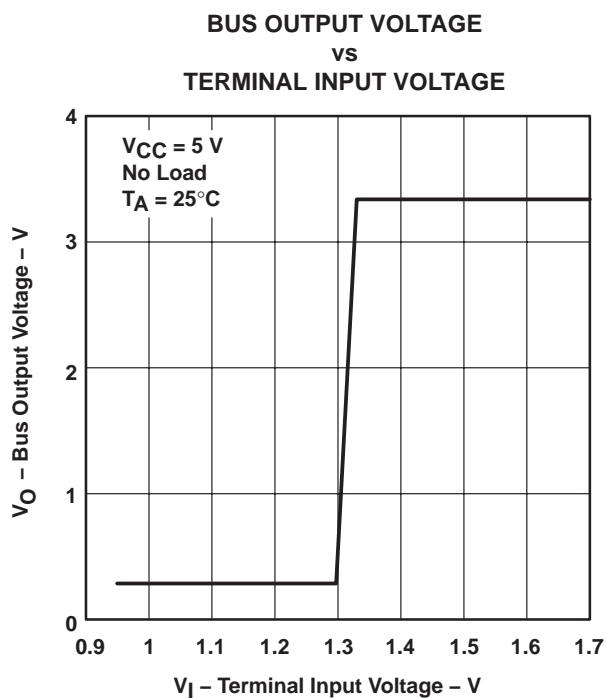


Figure 10

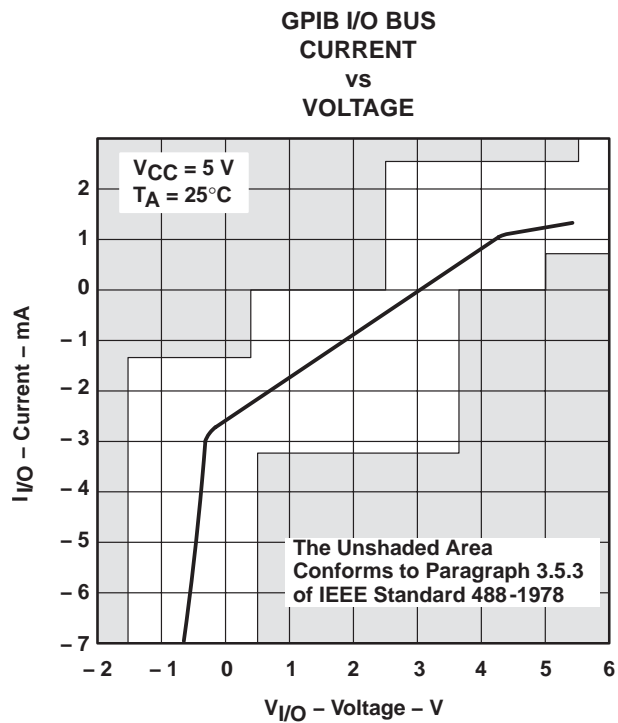


Figure 11

† Operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied.

**PACKAGING INFORMATION**

| Orderable Device | Status <sup>(1)</sup> | Package Type | Package Drawing | Pins | Package Qty | Eco Plan <sup>(2)</sup> | Lead/Ball Finish | MSL Peak Temp <sup>(3)</sup> |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| SN75ALS161DW     | ACTIVE                | SOIC         | DW              | 20   | 25          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN75ALS161DWE4   | ACTIVE                | SOIC         | DW              | 20   | 25          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN75ALS161DWG4   | ACTIVE                | SOIC         | DW              | 20   | 25          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN75ALS161DWR    | ACTIVE                | SOIC         | DW              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN75ALS161DWRE4  | ACTIVE                | SOIC         | DW              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN75ALS161DWRG4  | ACTIVE                | SOIC         | DW              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN75ALS161N      | ACTIVE                | PDIP         | N               | 20   | 20          | Pb-Free (RoHS)          | CU NIPDAU        | N / A for Pkg Type           |
| SN75ALS161NE4    | ACTIVE                | PDIP         | N               | 20   | 20          | Pb-Free (RoHS)          | CU NIPDAU        | N / A for Pkg Type           |

<sup>(1)</sup> 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.

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

<sup>(2)</sup> Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

**TBD:** The Pb-Free/Green conversion plan has not been defined.

**Pb-Free (RoHS):** TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

**Pb-Free (RoHS Exempt):** This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

**Green (RoHS & no Sb/Br):** TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

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

**Important Information and Disclaimer:**The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

**OTHER QUALIFIED VERSIONS OF SN75ALS161 :**

- Military: [SN55ALS161](#)

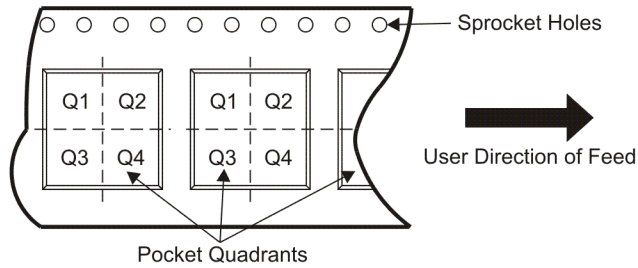
NOTE: Qualified Version Definitions:

- 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 |
|---------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| SN75ALS161DWR | SOIC         | DW              | 20   | 2000 | 330.0              | 24.4               | 10.8    | 13.1    | 2.65    | 12.0    | 24.0   | Q1            |

**TAPE AND REEL BOX DIMENSIONS**



\*All dimensions are nominal

| Device        | Package Type | Package Drawing | Pins | SPQ  | Length (mm) | Width (mm) | Height (mm) |
|---------------|--------------|-----------------|------|------|-------------|------------|-------------|
| SN75ALS161DWR | SOIC         | DW              | 20   | 2000 | 346.0       | 346.0      | 41.0        |

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

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN

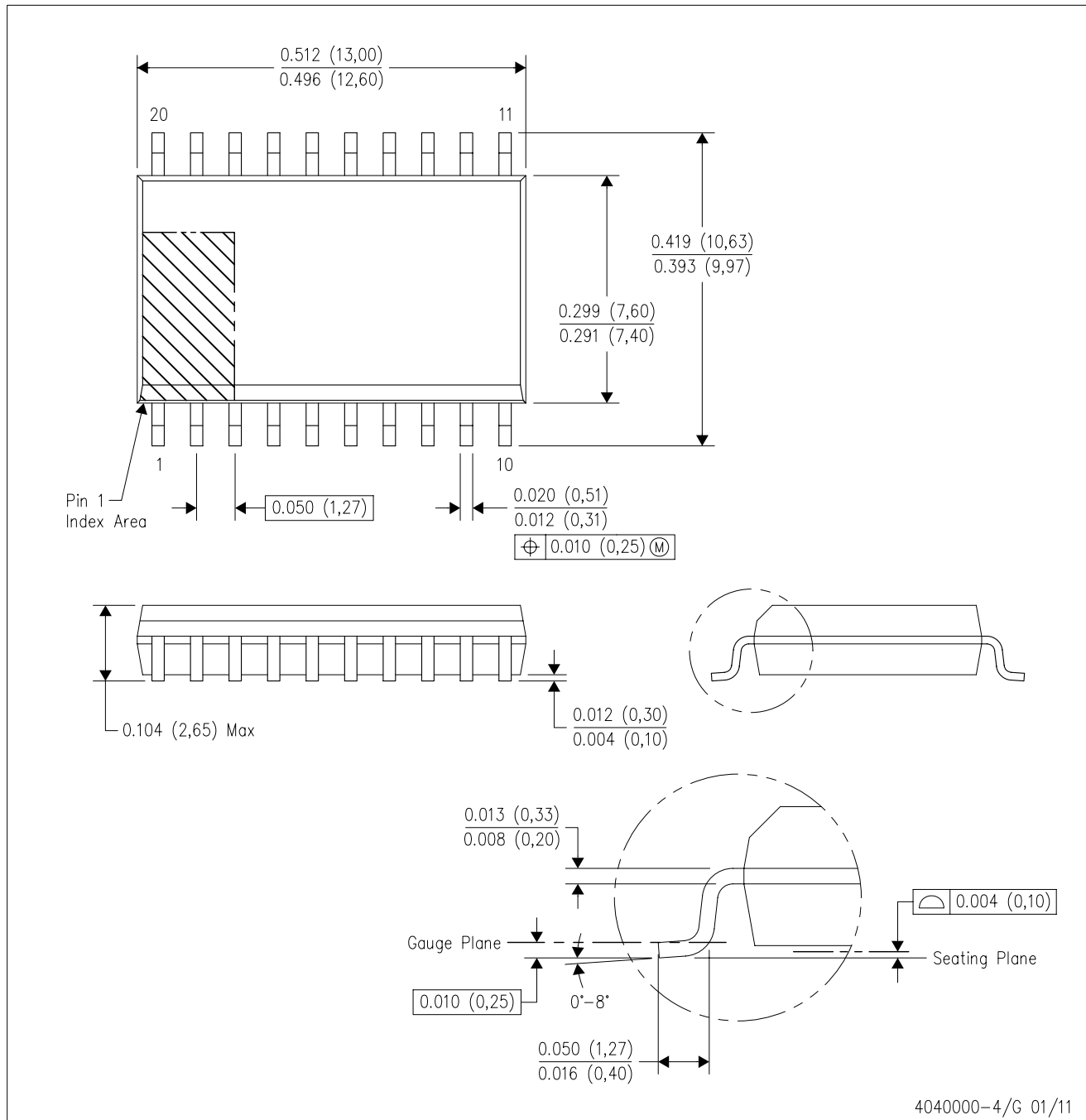


4040049/E 12/2002

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

DW (R-PDSO-G20)

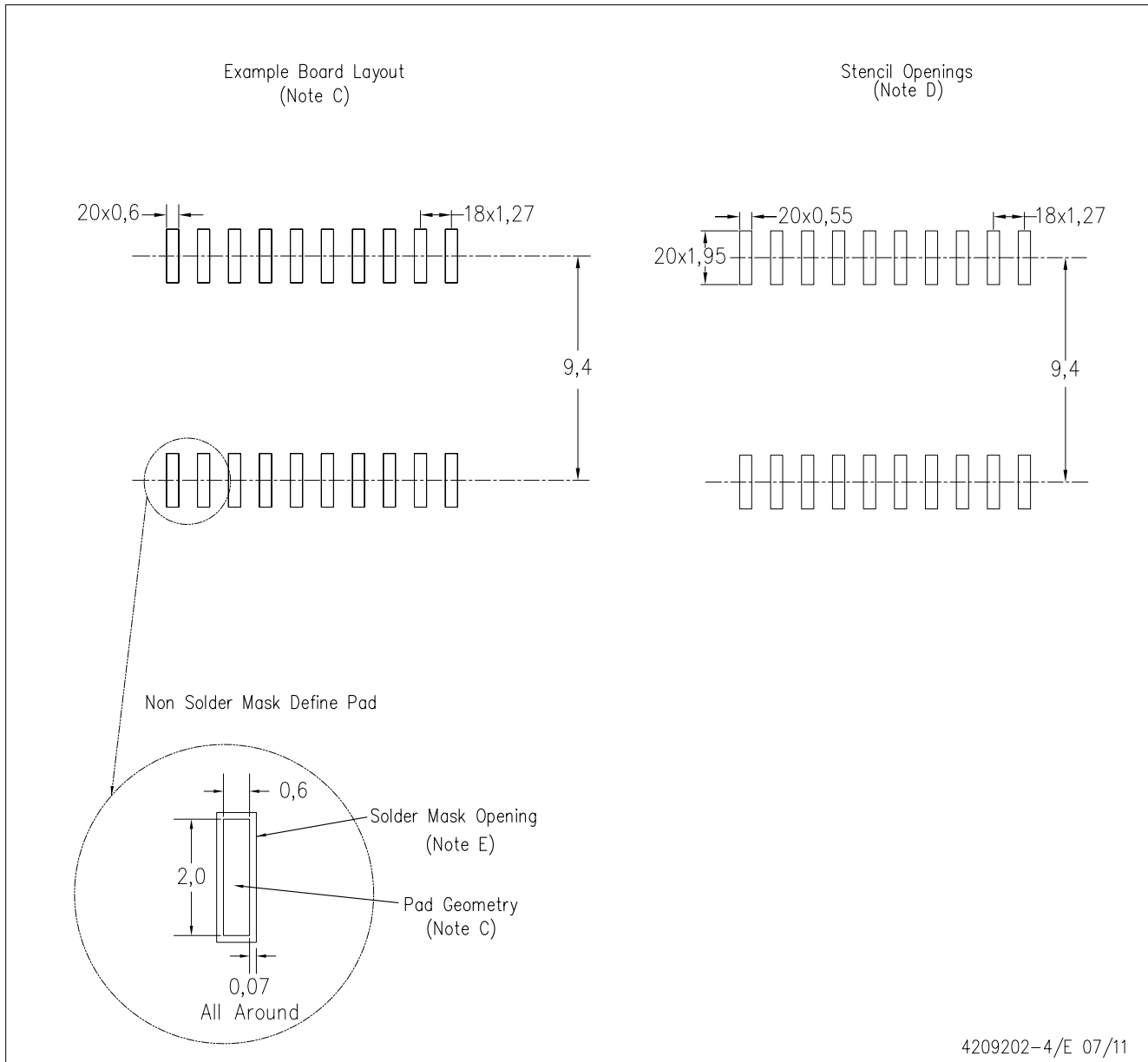
PLASTIC SMALL OUTLINE



- NOTES:
- A. All linear dimensions are in inches (millimeters). Dimensioning and tolerancing per ASME Y14.5M-1994.
  - B. This drawing is subject to change without notice.
  - C. Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
  - D. Falls within JEDEC MS-013 variation AC.

DW (R-PDSO-G20)

PLASTIC SMALL OUTLINE



- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Refer to IPC7351 for alternate board design.
  - D. 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
  - E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.

## IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

TI products are not authorized for use in safety-critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, unless officers of the parties have executed an agreement specifically governing such use. Buyers represent that they have all necessary expertise in the safety and regulatory ramifications of their applications, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of TI products in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by TI. Further, Buyers must fully indemnify TI and its representatives against any damages arising out of the use of TI products in such safety-critical applications.

TI products are neither designed nor intended for use in military/aerospace applications or environments unless the TI products are specifically designated by TI as military-grade or "enhanced plastic." Only products designated by TI as military-grade meet military specifications. Buyers acknowledge and agree that any such use of TI products which TI has not designated as military-grade is solely at the Buyer's risk, and that they are solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI products are neither designed nor intended for use in automotive applications or environments unless the specific TI products are designated by TI as compliant with ISO/TS 16949 requirements. Buyers acknowledge and agree that, if they use any non-designated products in automotive applications, TI will not be responsible for any failure to meet such requirements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

### Products

|                             |                                                                    |
|-----------------------------|--------------------------------------------------------------------|
| Audio                       | <a href="http://www.ti.com/audio">www.ti.com/audio</a>             |
| Amplifiers                  | <a href="http://amplifier.ti.com">amplifier.ti.com</a>             |
| Data Converters             | <a href="http://dataconverter.ti.com">dataconverter.ti.com</a>     |
| DLP® Products               | <a href="http://www.dlp.com">www.dlp.com</a>                       |
| DSP                         | <a href="http://dsp.ti.com">dsp.ti.com</a>                         |
| Clocks and Timers           | <a href="http://www.ti.com/clocks">www.ti.com/clocks</a>           |
| Interface                   | <a href="http://interface.ti.com">interface.ti.com</a>             |
| Logic                       | <a href="http://logic.ti.com">logic.ti.com</a>                     |
| Power Mgmt                  | <a href="http://power.ti.com">power.ti.com</a>                     |
| Microcontrollers            | <a href="http://microcontroller.ti.com">microcontroller.ti.com</a> |
| RFID                        | <a href="http://www.ti-rfid.com">www.ti-rfid.com</a>               |
| RF/IF and ZigBee® Solutions | <a href="http://www.ti.com/lprf">www.ti.com/lprf</a>               |

### Applications

|                               |                                                                                          |
|-------------------------------|------------------------------------------------------------------------------------------|
| Communications and Telecom    | <a href="http://www.ti.com/communications">www.ti.com/communications</a>                 |
| Computers and Peripherals     | <a href="http://www.ti.com/computers">www.ti.com/computers</a>                           |
| Consumer Electronics          | <a href="http://www.ti.com/consumer-apps">www.ti.com/consumer-apps</a>                   |
| Energy and Lighting           | <a href="http://www.ti.com/energy">www.ti.com/energy</a>                                 |
| Industrial                    | <a href="http://www.ti.com/industrial">www.ti.com/industrial</a>                         |
| Medical                       | <a href="http://www.ti.com/medical">www.ti.com/medical</a>                               |
| Security                      | <a href="http://www.ti.com/security">www.ti.com/security</a>                             |
| Space, Avionics and Defense   | <a href="http://www.ti.com/space-avionics-defense">www.ti.com/space-avionics-defense</a> |
| Transportation and Automotive | <a href="http://www.ti.com/automotive">www.ti.com/automotive</a>                         |
| Video and Imaging             | <a href="http://www.ti.com/video">www.ti.com/video</a>                                   |
| Wireless                      | <a href="http://www.ti.com/wireless-apps">www.ti.com/wireless-apps</a>                   |

TI E2E Community Home Page

[e2e.ti.com](http://e2e.ti.com)

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265  
Copyright © 2011, Texas Instruments Incorporated