

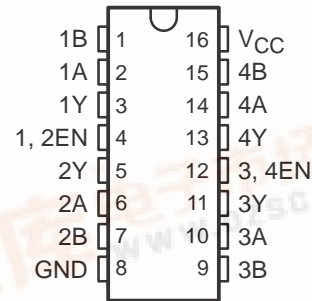
SN75ALS199 QUADRUPLE DIFFERENTIAL LINE RECEIVER

SLLS046C – JANUARY 1989 – REVISED MAY 1995

查询"SN75ALS199"供应商

- Meets or Exceeds the Requirements of ITU Recommendations V.10, V.11, X.26, and X.27
- Designed to Operate Up To 20 Mbaud
- -7 V to 7 V Common-Mode Input Voltage Range With 300-mV Sensitivity
- 3-State TTL-Compatible Outputs
- High Input Impedance . . . 12 kΩ Min
- Input Hysteresis . . . 120 mV Typ
- Single 5-V Supply Operation
- Low Supply Current Requirement
35 mA Max
- Improved Speed and Power Consumption Compared to MC3486

D OR N PACKAGE
(TOP VIEW)



description

The SN75ALS199 is a monolithic, quadruple line receiver with 3-state outputs designed using advanced, low-power, Schottky technology. This technology provides combined improvements in bar design, tooling production, and wafer fabrication, providing significantly less power consumption and permitting much higher data throughput than other designs. The device meets the specification of ITU Recommendations V.10, V.11, X.26, and X.27.

The SN75ALS199 features 3-state outputs that permit direct connection to a bus-organized system with a fail-safe design that ensures the outputs will always be high if the inputs are open. The device is optimized for balanced multipoint bus transmission at rates up to 20 megabits per second. The input features high-input impedance, input hysteresis for increased noise immunity, and an input sensitivity of ± 300 mV over a common-mode input voltage range of ± 7 V. It also features an active-high enable function for each of two receiver pairs. The SN75ALS199 is designed for optimum performance when used with the SN75ALS194 quadruple, differential line driver.

The SN75ALS199 is characterized for operation from 0°C to 70°C.

FUNCTION TABLE
(each receiver)

| DIFFERENTIAL INPUTS A-B | EN | OUTPUT Y |
|-----------------------------|----|-------------|
| $V_{ID} \geq 0.3$ V | H | H |
| -0.3 V $< V_{ID} < 0.3$ V | H | ? |
| $V_{ID} \leq -0.3$ V | H | L |
| X | L | Z |
| Open | H | H |

H = high level, L = low level, X = irrelevant,
? = indeterminate, Z = high impedance (off)



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.

TEXAS
INSTRUMENTS

POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

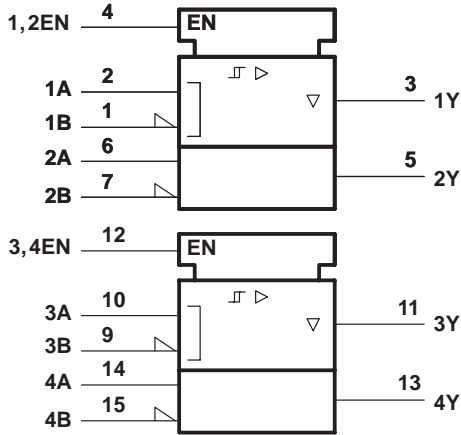
Copyright © 1995, Texas Instruments Incorporated



SN75ALS199 QUADRUPLE DIFFERENTIAL LINE RECEIVER

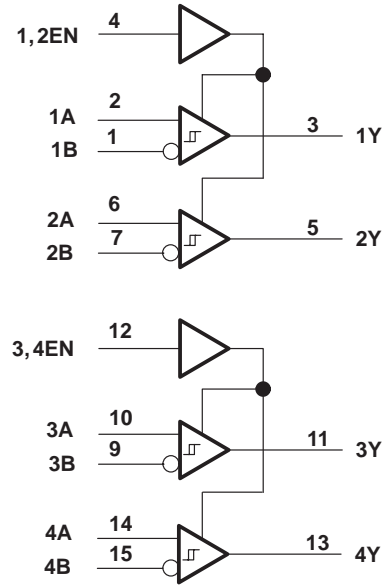
SLLS462C "SN75ALS199" OCTOBER 1989
www.ti.com/lit/gpn/sn75als199 1995

logic symbol†

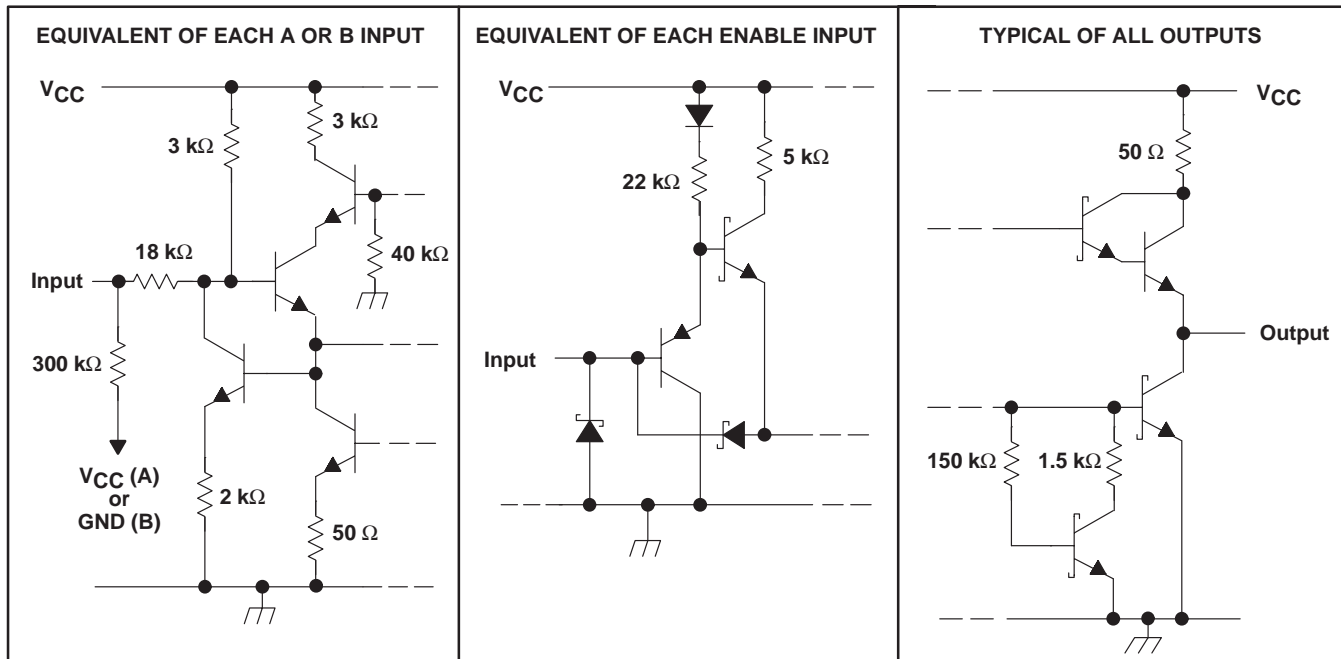


† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram



schematics of inputs and outputs



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 (A or B inputs) | ± 15 V |
| Differential input voltage, V_{ID} (see Note 2) | ± 15 V |
| Enable input voltage, V_I | 7 V |
| Low-level output current, I_{OL} | 50 mA |
| Continuous total dissipation | See Dissipation Rating Table |
| Operating free-air temperature range, T_A | 0°C to 70°C |
| Storage temperature range, T_{stg} | -65°C to 150°C |
| Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds | 260°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, except differential input voltage, are with respect to network ground terminal.
2. Differential input voltage is measured at the noninverting input with respect to the corresponding inverting input.

DISSIPATION RATING TABLE

| PACKAGE | $T_A \leq 25^\circ\text{C}$ POWER RATING | DERATING FACTOR | $T_A = 70^\circ\text{C}$ POWER RATING |
|---------|---|--------------------------|--|
| D | 950 mW | 7.6 mW/ $^\circ\text{C}$ | 608 mW |
| N | 1150 mW | 9.2 mW/ $^\circ\text{C}$ | 736 mW |

recommended operating conditions

| | MIN | NOM | MAX | UNIT |
|---------------------------------------|------|-----|----------|------------------|
| Supply voltage, V_{CC} | 4.75 | 5 | 5.25 | V |
| Common-mode input voltage, V_{IC} | | | ± 7 | V |
| Differential input voltage, V_{ID} | | | ± 12 | V |
| High-level input voltage, V_{IH} | 2 | | | V |
| Low-level input voltage, V_{IL} | | | 0.8 | V |
| High-level output current, I_{OH} | | | -400 | μA |
| Low-level output current, I_{OL} | | | 16 | mA |
| Operating free-air temperature, T_A | 0 | | 70 | $^\circ\text{C}$ |

SN75ALS199

QUADRUPLE DIFFERENTIAL LINE RECEIVER

SLLS468C (US) SN75ALS199-Q1-QP 1995 查閱 "SN75ALS199-Q1-QP" 供電器

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

| PARAMETER | TEST CONDITIONS | MIN | TYP† | MAX | UNIT |
|--|--|-------------------|------|------|------------|
| V_{IT+} Positive-going input threshold voltage | | | | 300 | mV |
| V_{IT-} Negative-going input threshold voltage | | -300‡ | | | mV |
| V_{hys} Hysteresis voltage ($V_{IT+} - V_{IT-}$) | | | 120 | | mV |
| V_{IK} Enable-input clamp voltage | $I_I = -18$ mA | | | -1.5 | V |
| V_{OH} High-level output voltage | $V_{ID} = 300$ mV, $I_{OH} = -400$ μ A | 2.7 | 3.6 | | V |
| V_{OL} Low-level output voltage | $V_{ID} = -300$ mV | $I_{OL} = 8$ mA | | 0.45 | V |
| | | $I_{OL} = 16$ mA | | 0.5 | |
| I_{OZ} High-impedance-state output current | $V_{IL} = 0.8$ V, $V_{ID} = -3$ V, $V_O = 2.7$ V | | | 20 | μ A |
| | $V_{IL} = 0.8$ V, $V_{IO} = 3$ V, $V_O = 0.5$ V | | | -20 | |
| I_I Line input current | Other input at 0 V, See Note 3 | $V_I = 15$ V | 0.7 | 1.2 | mA |
| | | $V_I = -15$ V | -1 | -1.7 | |
| I_{IH} High-level enable-input current | | $V_{IH} = 2.7$ V | | 20 | μ A |
| | | $V_{IH} = 5.25$ V | | 100 | |
| I_{IL} Low-level enable-input current | $V_{IL} = 0.4$ V | | | -100 | μ A |
| Input resistance | | 12 | 18 | | k Ω |
| I_{OS} Short-circuit output current§ | $V_{ID} = 3$ V, $V_O = 0$ | -15 | -78 | -130 | mA |
| I_{CC} Supply current | Outputs disabled | | 22 | 35 | mA |

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

‡ The algebraic convention, in which the less positive limit is designated minimum, is used in this data sheet for threshold voltage levels only.

§ Not more than one output should be shorted at a time, and the duration of the short circuit should not exceed one second.

NOTE 3: Refer to ITU Recommendations V.10 and V.11 for exact conditions.

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

| PARAMETER | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|--|-----|-----|-----|------|
| t_{PLH} Propagation delay time, low- to high-level output | $V_{ID} = 0$ V to 3 V, $C_L = 15$ pF, See Figure 2 | | 15 | 22 | ns |
| t_{PHL} Propagation delay time, high- to low-level output | | | 15 | 22 | |
| t_{PZH} Output enable time to high level | $C_L = 15$ pF, See Figure 3 | | 13 | 25 | ns |
| t_{PZL} Output enable time to low level | | | 11 | 25 | |
| t_{PHZ} Output disable time from high level | $C_L = 15$ pF, See Figure 3 | | 13 | 25 | ns |
| t_{PLZ} Output disable time from low level | | | 15 | 22 | |



PARAMETER MEASUREMENT INFORMATION

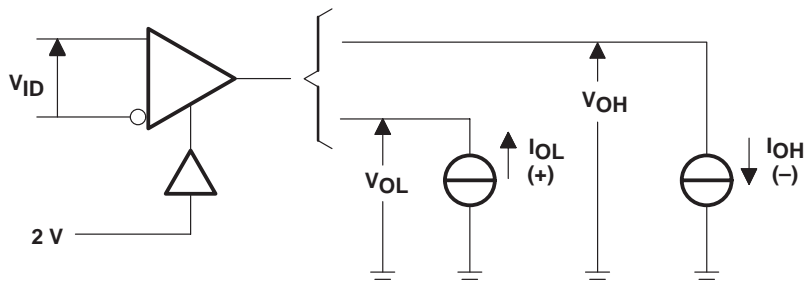
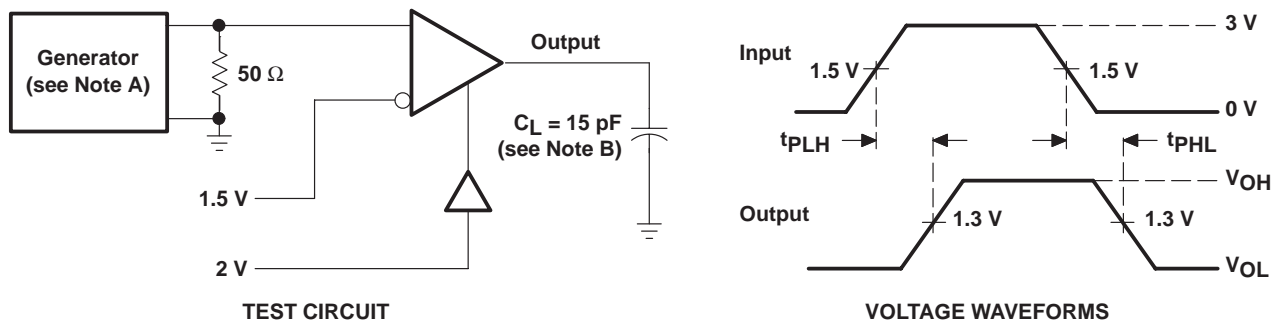


Figure 1. V_{OH} and V_{OL} Test Circuit



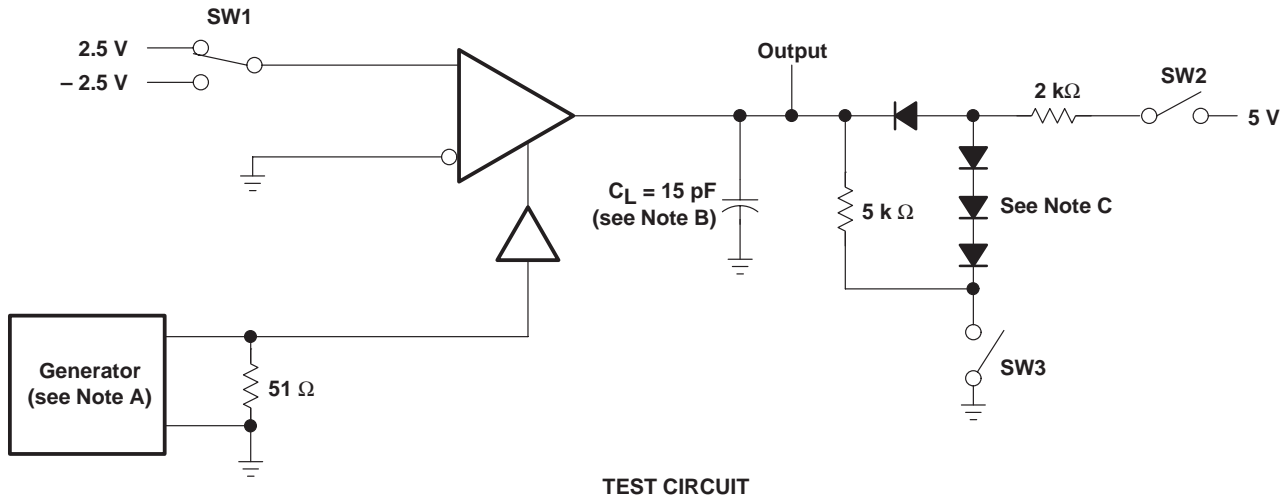
- NOTES: A. The input pulse is supplied by a generator having the following characteristics: $PRR \leq 1 \text{ MHz}$, duty cycle $\leq 50\%$, $Z_O = 50 \Omega$, $t_r \leq 6 \text{ ns}$, $t_f \leq 6 \text{ ns}$.
 B. C_L includes probe and jig capacitance.

Figure 2. Test Circuit and Voltage Waveforms

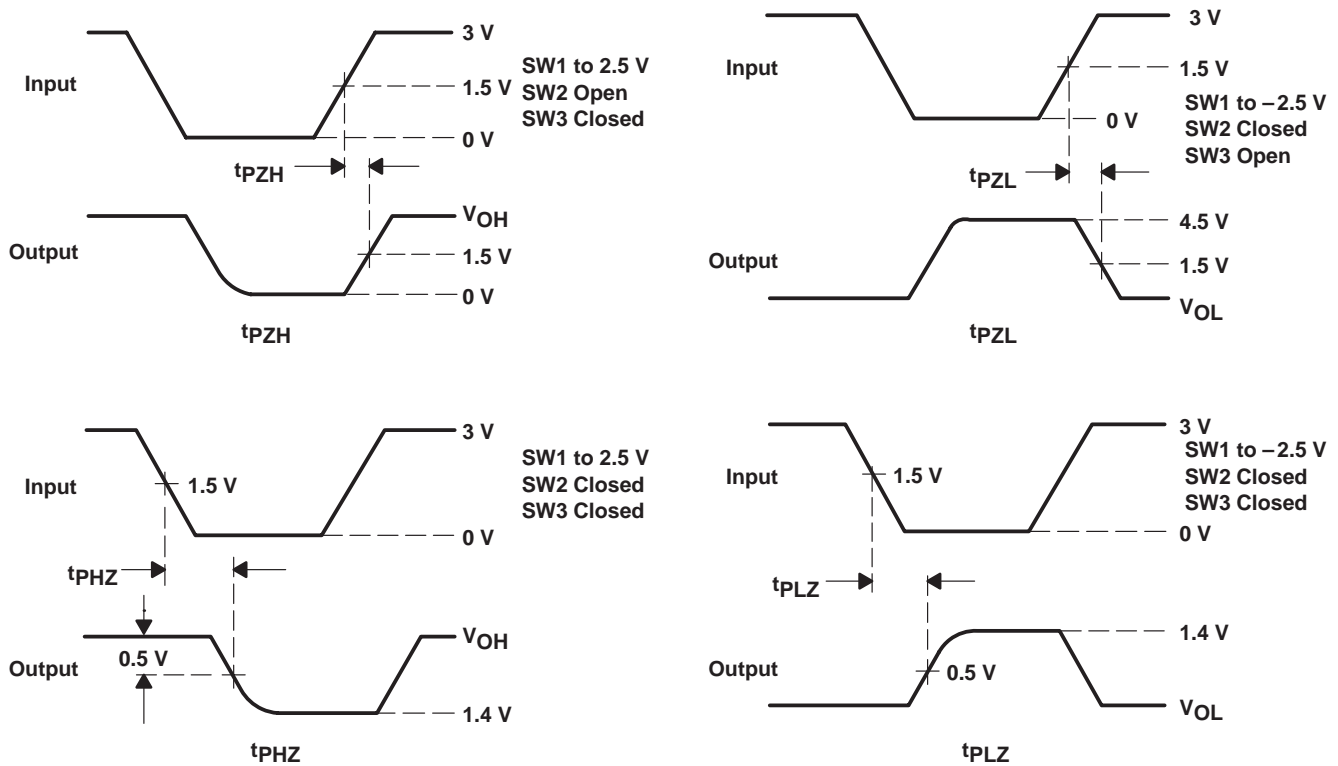
SN75ALS199 QUADRUPLE DIFFERENTIAL LINE RECEIVER

SLLS452C JANUARY 1989 (REVISED) 1995

PARAMETER MEASUREMENT INFORMATION



TEST CIRCUIT



VOLTAGE WAVEFORMS

- NOTES: A. The input pulse is supplied by a generator having the following characteristics: $PRR \leq 1$ MHz, duty cycle $\leq 50\%$, $Z_O = 50 \Omega$, $t_r \leq 6$ ns, $t_f \leq 6$ ns.
 B. C_L includes probe and jig capacitance.
 C. All diodes are 1N3064 or equivalent.

Figure 3. Test Circuit and Voltage Waveforms

TYPICAL CHARACTERISTICS

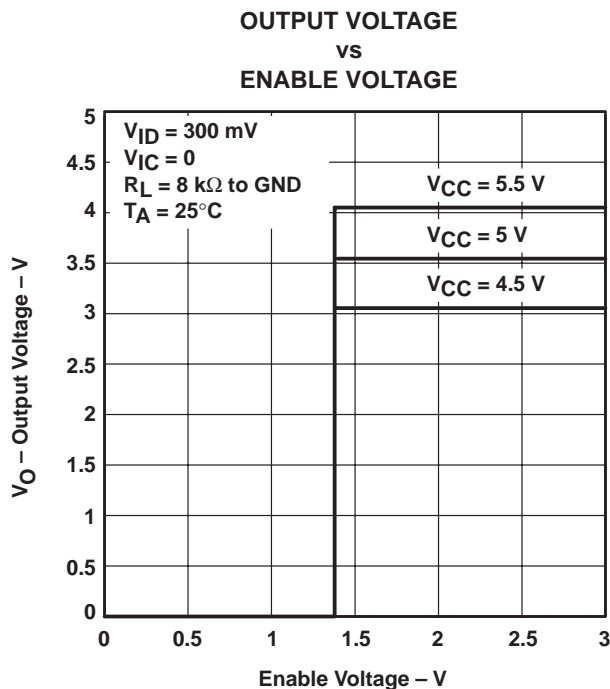


Figure 4

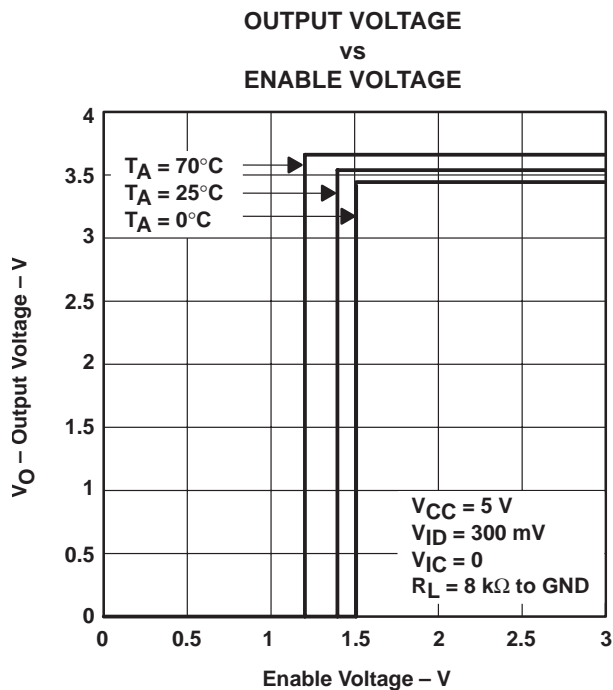


Figure 5

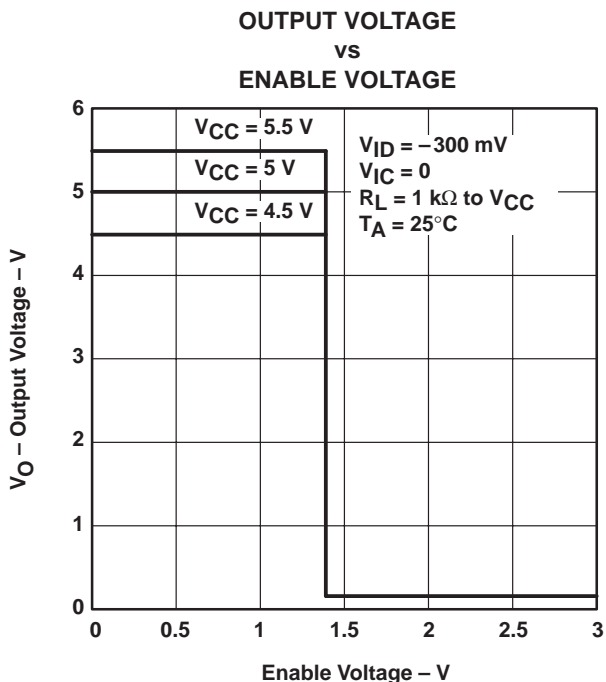


Figure 6

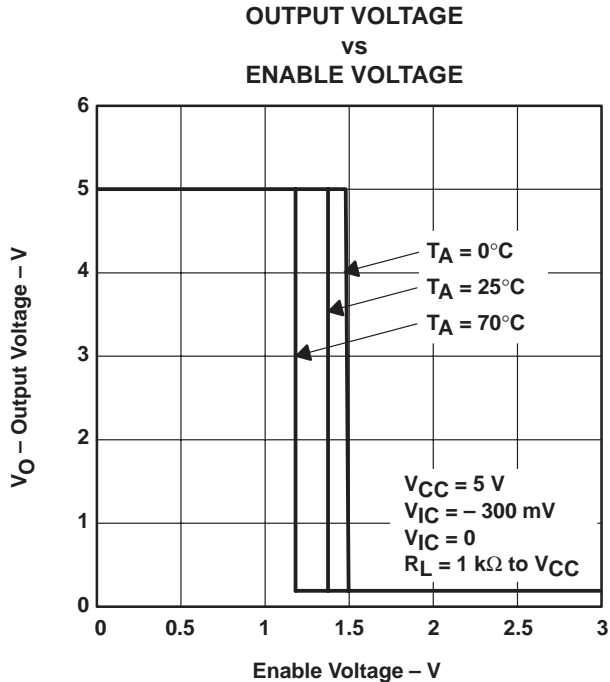


Figure 7

SN75ALS199 QUADRUPLE DIFFERENTIAL LINE RECEIVER

SLLS062C, JANUARY 1989, OCTOBER 1995

TYPICAL CHARACTERISTICS

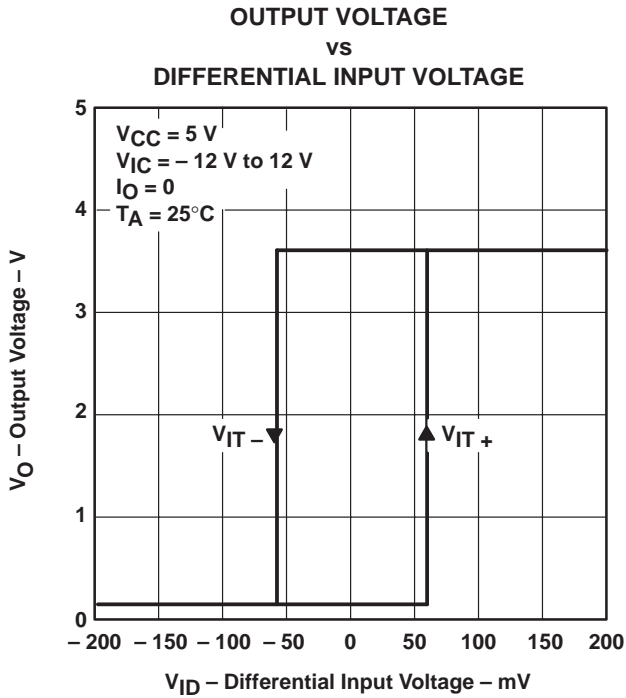


Figure 8

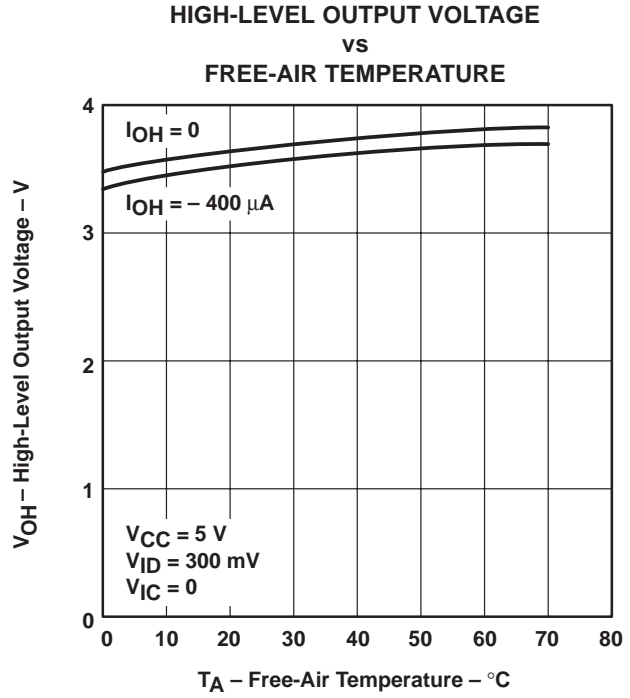


Figure 9

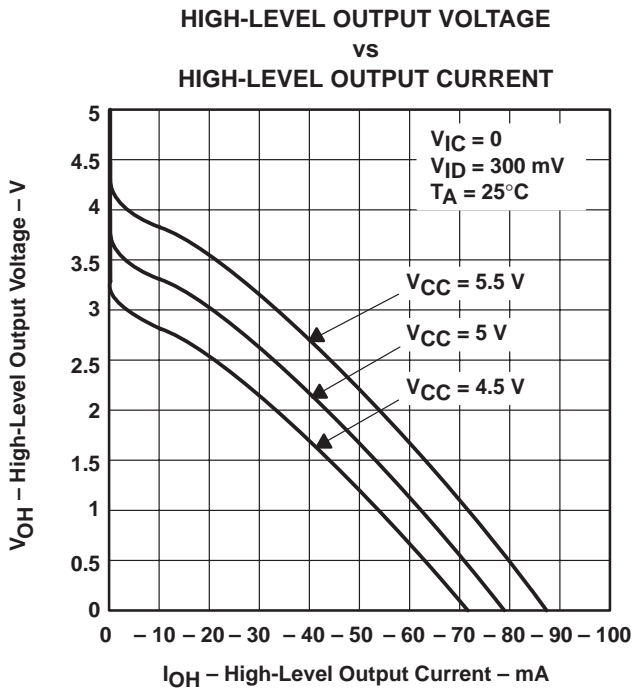


Figure 10

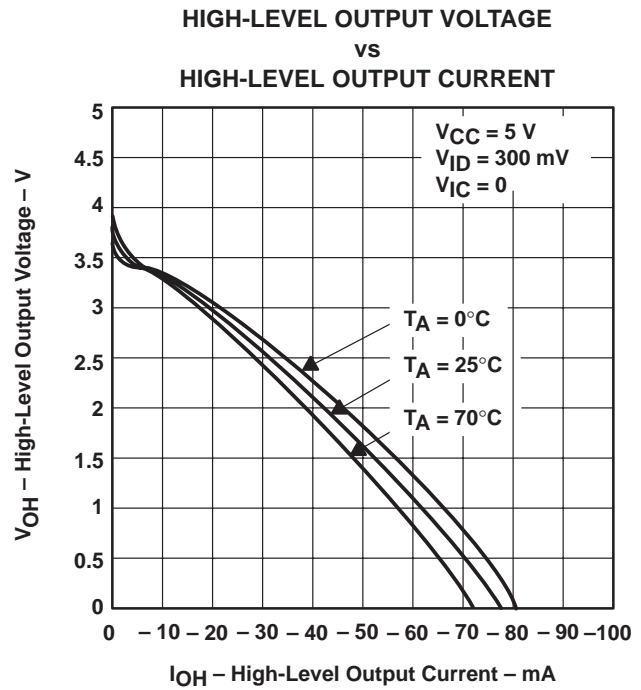


Figure 11

TYPICAL CHARACTERISTICS

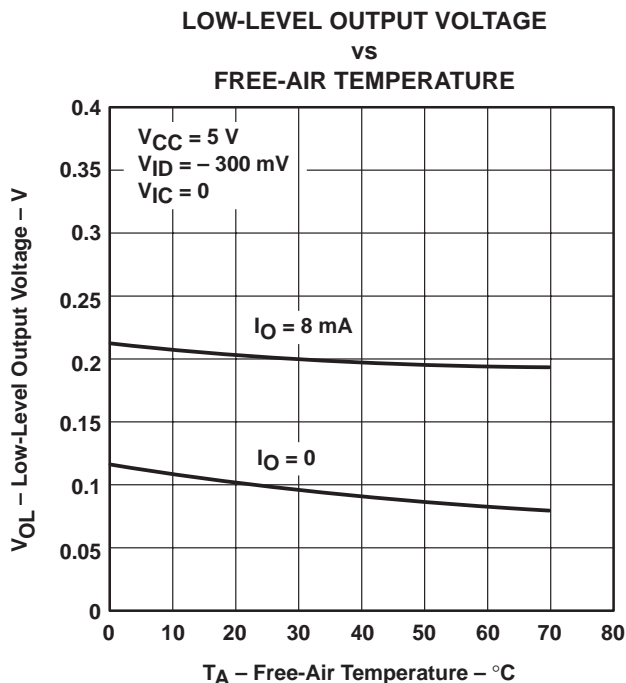


Figure 12

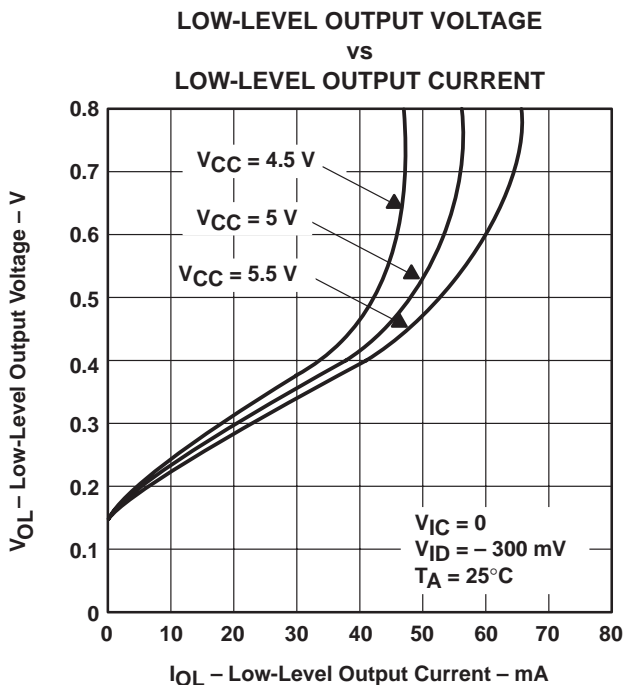


Figure 13

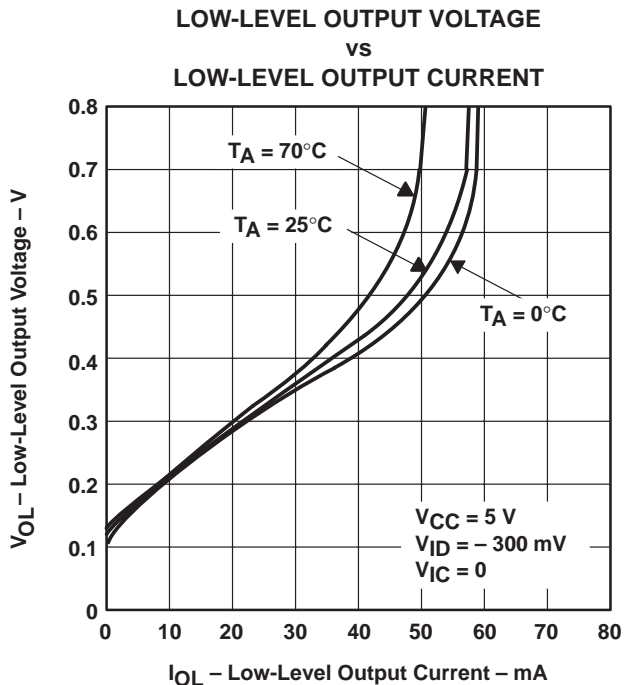


Figure 14

SN75ALS199 QUADRUPLE DIFFERENTIAL LINE RECEIVER

SLLS002, JANUARY 1989, OCEAN VIEW, TEXAS 1995

TYPICAL CHARACTERISTICS

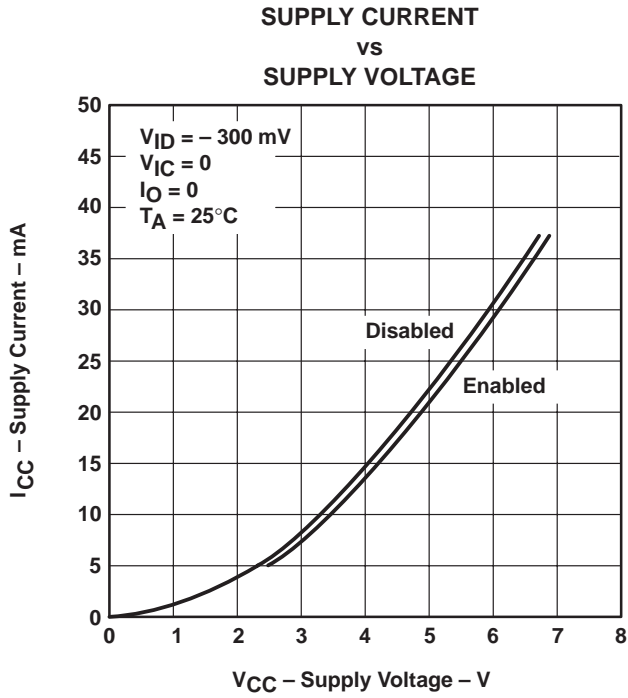


Figure 15

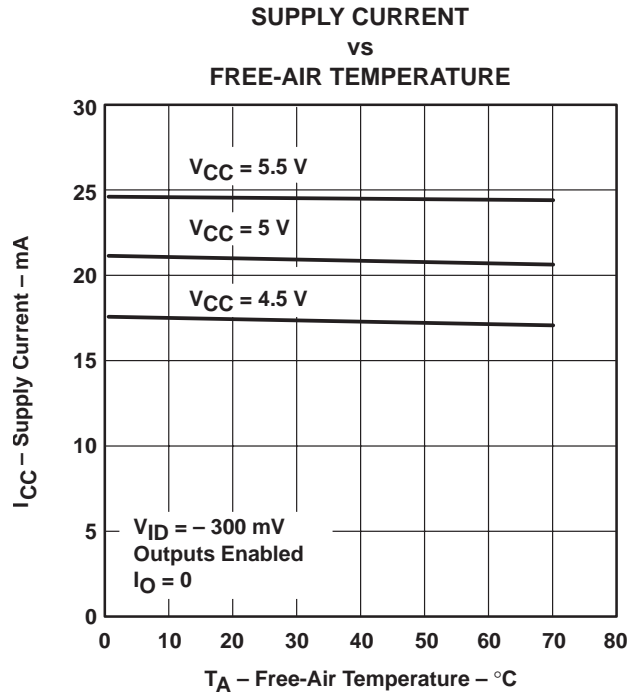


Figure 16

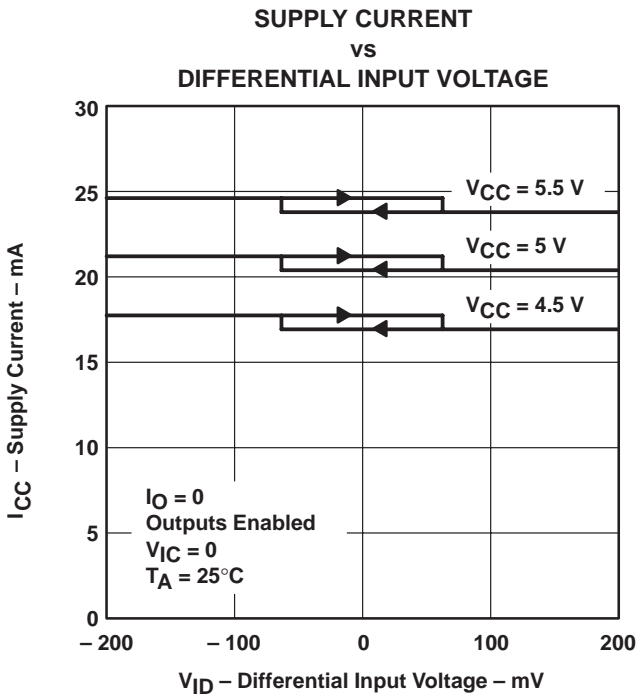


Figure 17

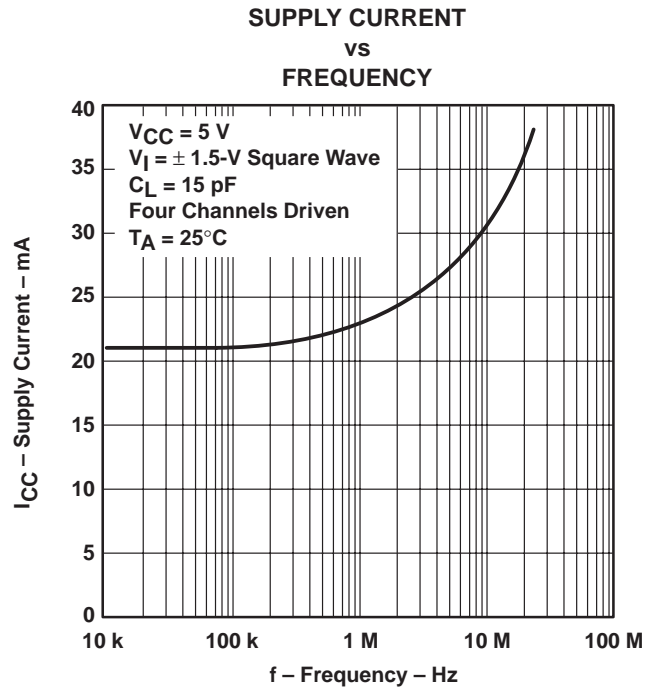


Figure 18



TYPICAL CHARACTERISTICS

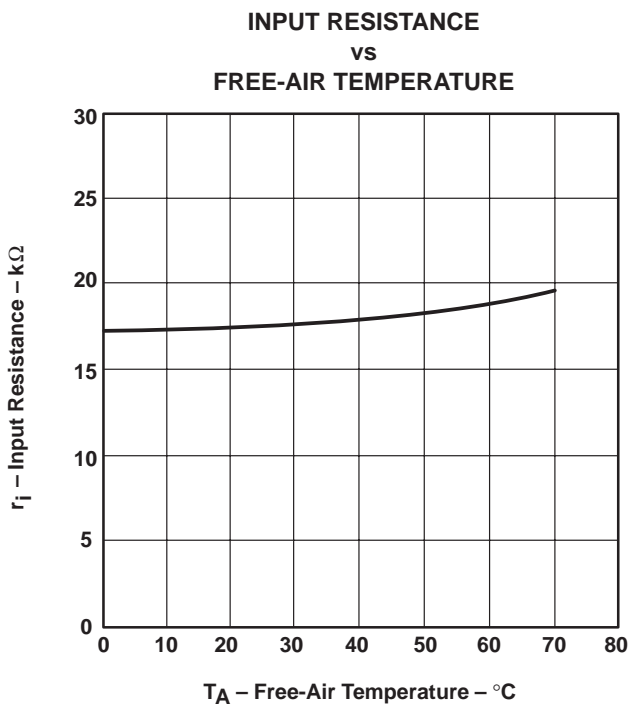


Figure 19

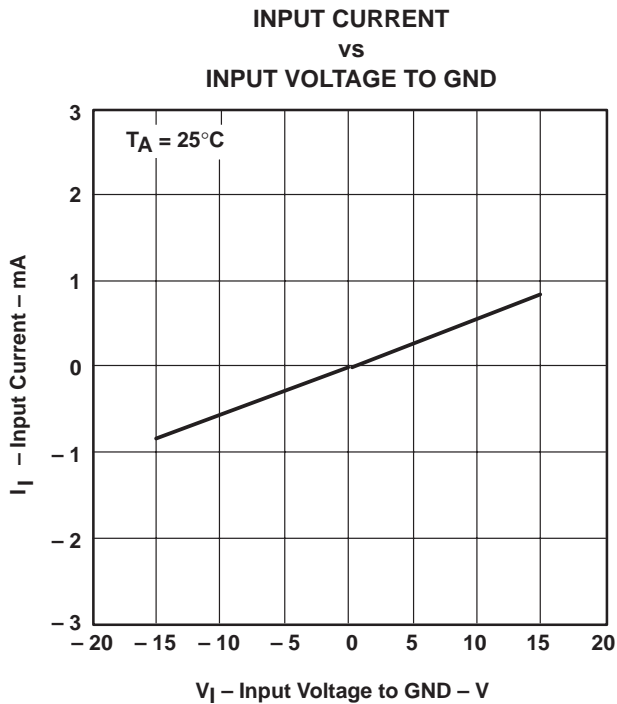


Figure 20

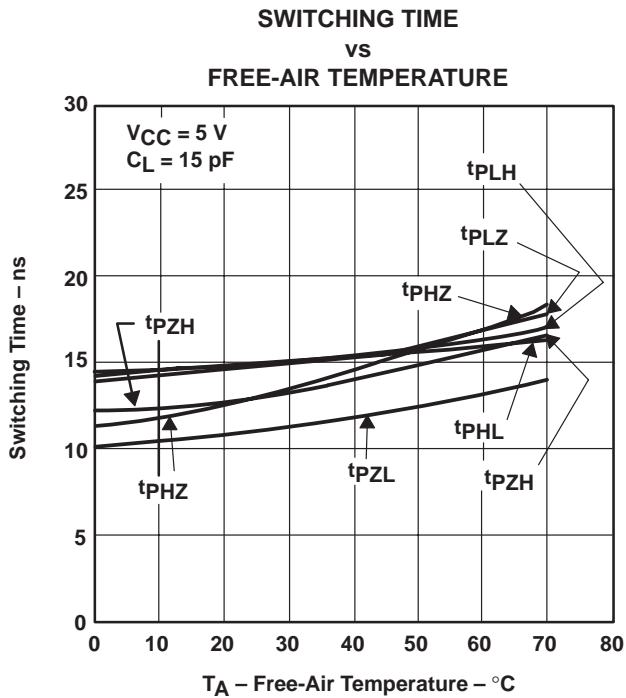


Figure 21

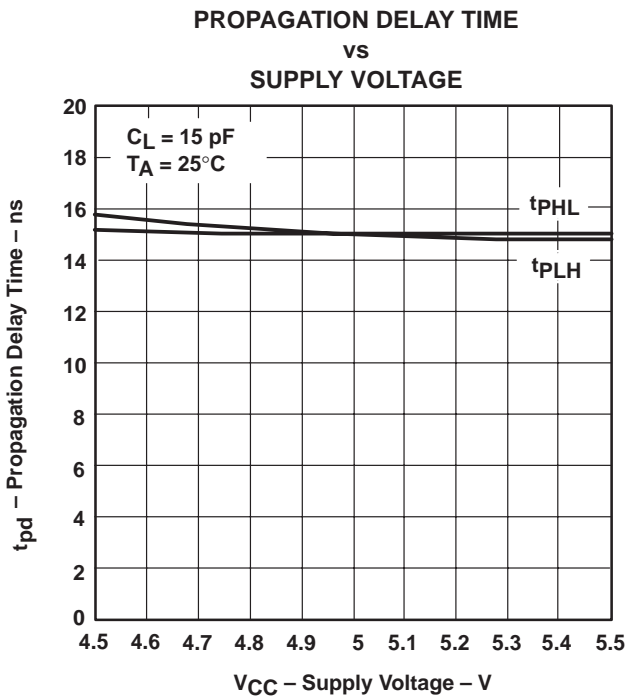


Figure 22

PACKAGING INFORMATION

| Orderable Device | Status ⁽¹⁾ | Package Type | Package Drawing | Pins | Package Qty | Eco Plan ⁽²⁾ | Lead/Ball Finish | MSL Peak Temp ⁽³⁾ |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| SN75ALS199D | ACTIVE | SOIC | D | 16 | 40 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN75ALS199DE4 | ACTIVE | SOIC | D | 16 | 40 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN75ALS199DG4 | ACTIVE | SOIC | D | 16 | 40 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN75ALS199DR | ACTIVE | SOIC | D | 16 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN75ALS199DRE4 | ACTIVE | SOIC | D | 16 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN75ALS199DRG4 | ACTIVE | SOIC | D | 16 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN75ALS199N | ACTIVE | PDIP | N | 16 | 25 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| SN75ALS199NE4 | ACTIVE | PDIP | N | 16 | 25 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |

⁽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⁾ 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.

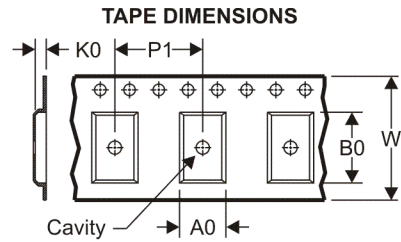
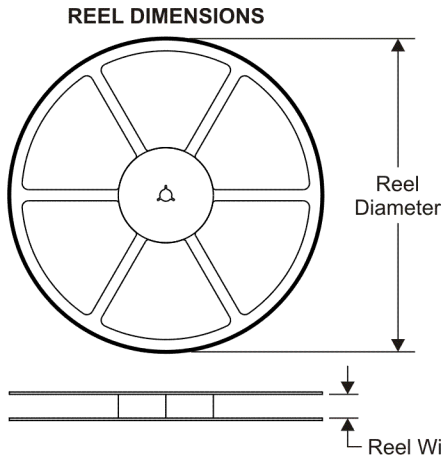
Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

⁽³⁾ 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.

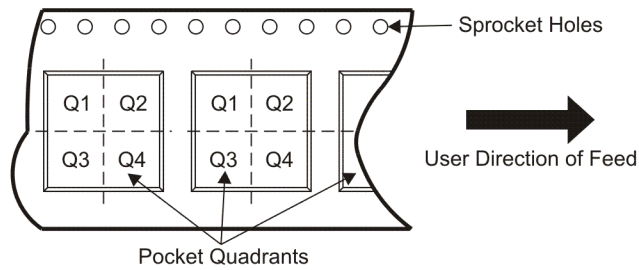
In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

TAPE AND REEL INFORMATION



| | |
|----|---|
| A0 | Dimension designed to accommodate the component width |
| B0 | Dimension designed to accommodate the component length |
| K0 | Dimension designed to accommodate the component thickness |
| W | Overall width of the carrier tape |
| P1 | Pitch between successive cavity centers |

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 |
|--------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| SN75ALS199DR | SOIC | D | 16 | 2500 | 330.0 | 16.4 | 6.5 | 10.3 | 2.1 | 8.0 | 16.0 | Q1 |

TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

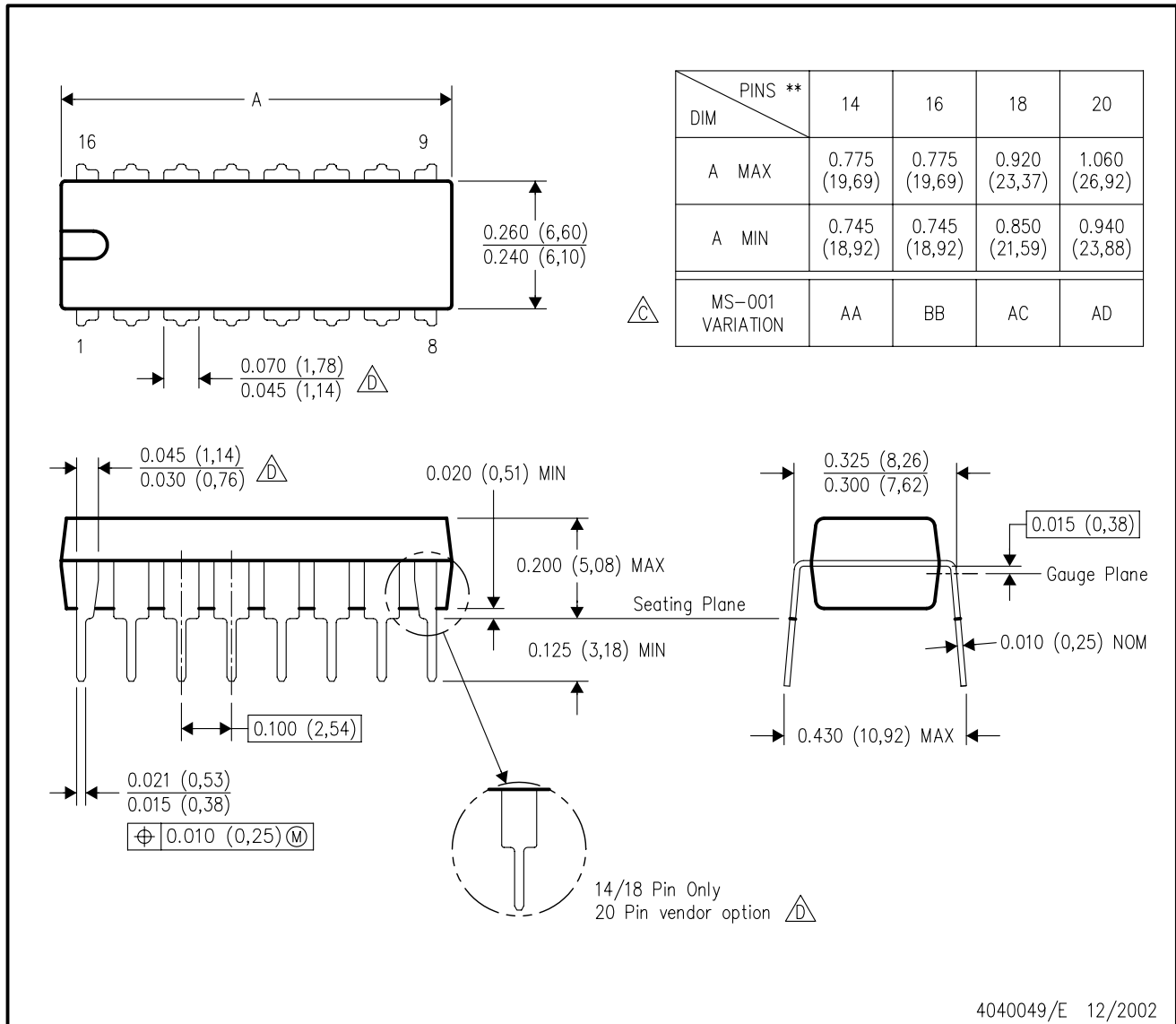
| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|--------------|--------------|-----------------|------|------|-------------|------------|-------------|
| SN75ALS199DR | SOIC | D | 16 | 2500 | 333.2 | 345.9 | 28.6 |

[查询"SN75ALS199"供应商](#)

N (R-PDIP-T**)

PLASTIC DUAL-IN-LINE PACKAGE

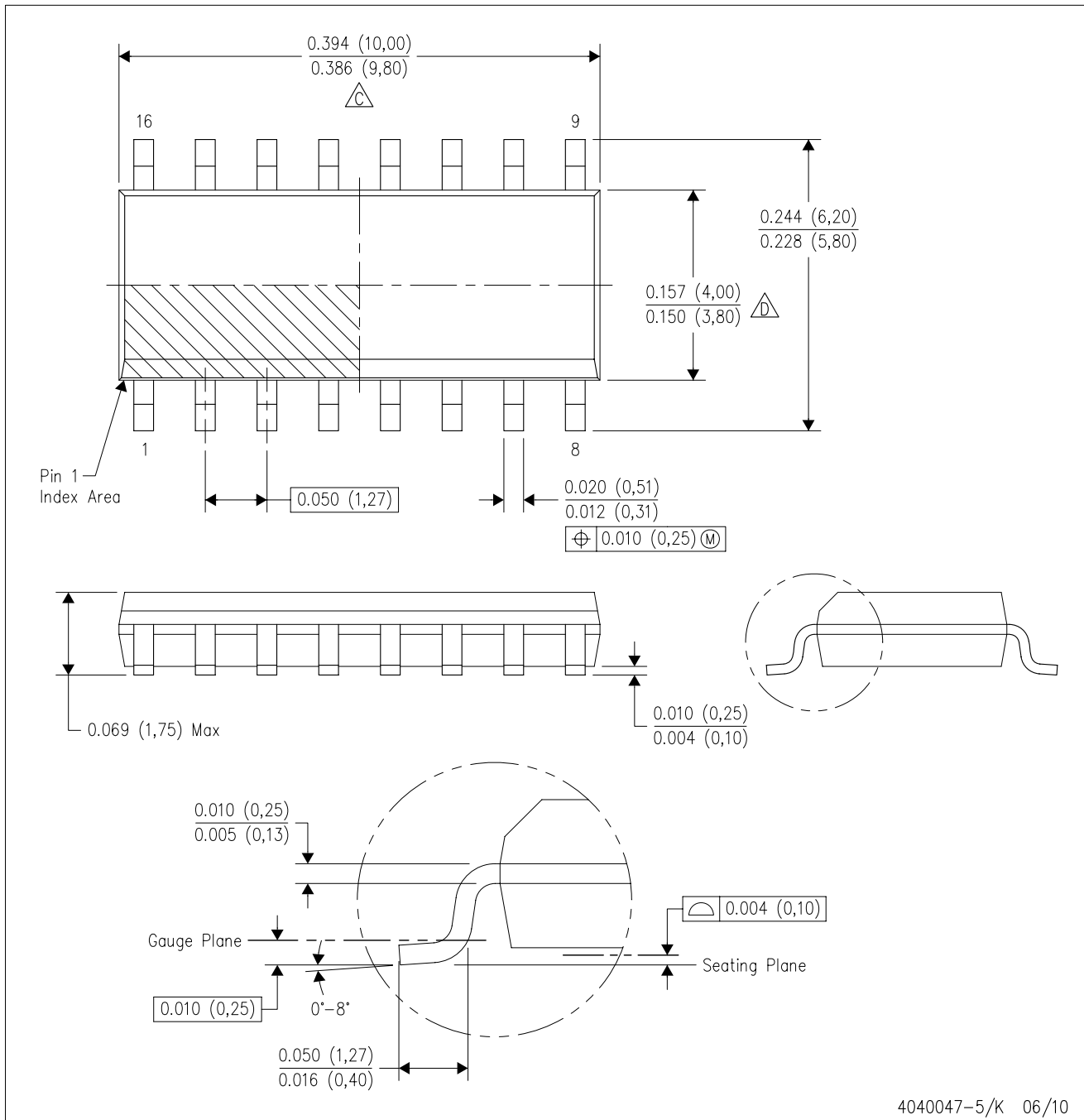
16 PINS SHOWN





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

D (R-PDSO-G16)

PLASTIC SMALL-OUTLINE PACKAGE

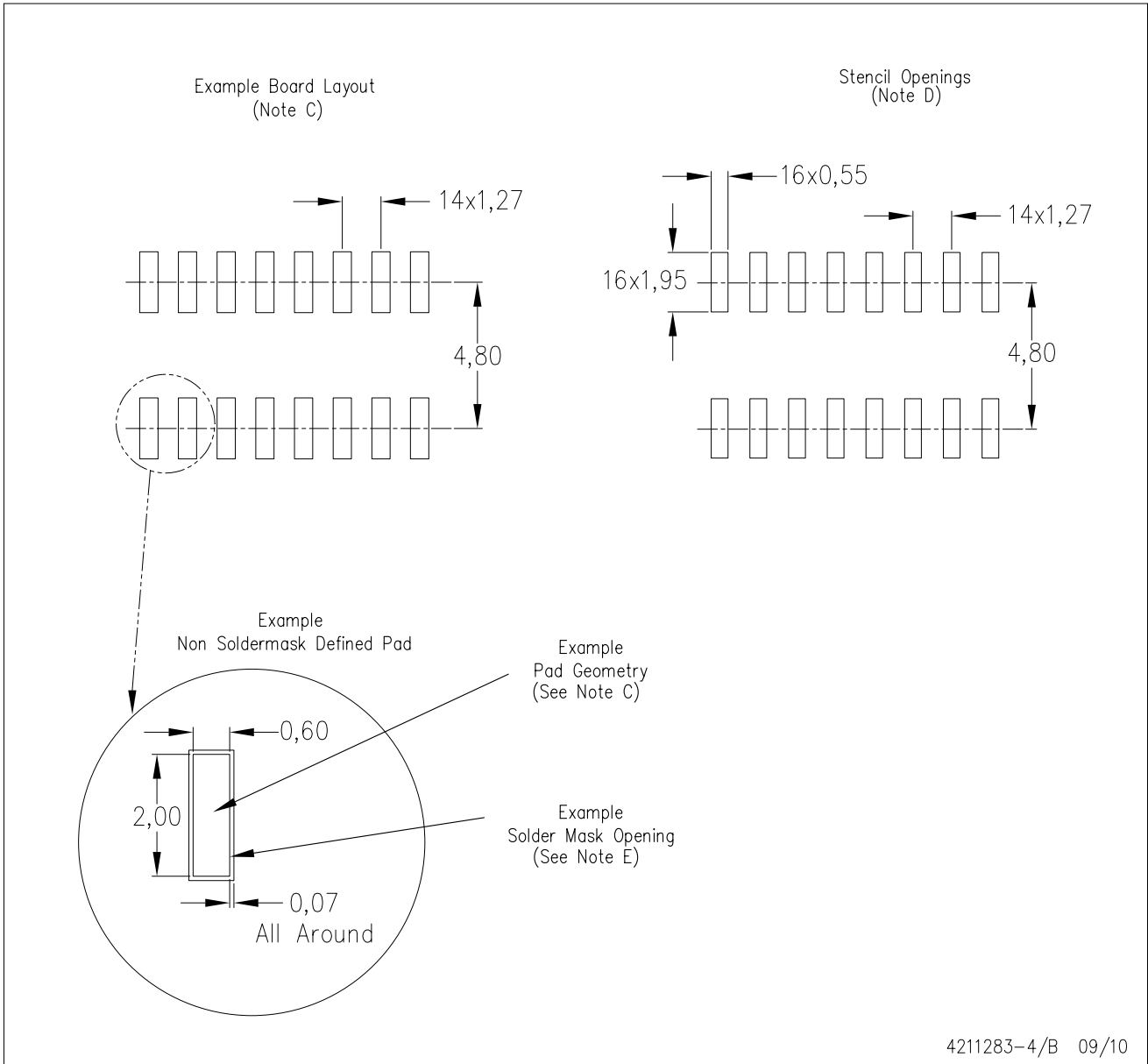


4040047-5/K 06/10

- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 -  C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed .006 (0,15) per end.
 -  D. Body width does not include interlead flash. Interlead flash shall not exceed .017 (0,43) per side.
 - E. Reference JEDEC MS-012 variation AC.

D (R-PDSO-G16)

PLASTIC SMALL OUTLINE



- 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.

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 | | Applications | |
|-----------------------------|--|----------------------------|--|
| Amplifiers | amplifier.ti.com | Audio | www.ti.com/audio |
| Data Converters | dataconverter.ti.com | Automotive | www.ti.com/automotive |
| DLP® Products | www.dlp.com | Communications and Telecom | www.ti.com/communications |
| DSP | dsp.ti.com | Computers and Peripherals | www.ti.com/computers |
| Clocks and Timers | www.ti.com/clocks | Consumer Electronics | www.ti.com/consumer-apps |
| Interface | interface.ti.com | Energy | www.ti.com/energy |
| Logic | logic.ti.com | Industrial | www.ti.com/industrial |
| Power Mgmt | power.ti.com | Medical | www.ti.com/medical |
| Microcontrollers | microcontroller.ti.com | Security | www.ti.com/security |
| RFID | www.ti-rfid.com | Space, Avionics & Defense | www.ti.com/space-avionics-defense |
| RF/IF and ZigBee® Solutions | www.ti.com/lprf | Video and Imaging | www.ti.com/video |
| | | Wireless | www.ti.com/wireless-apps |