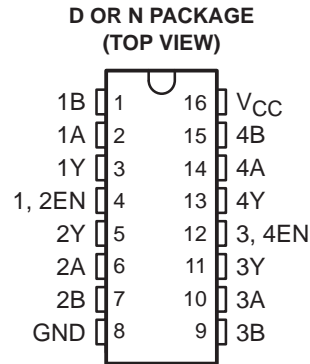


SN75ALS199 QUADRUPLE DIFFERENTIAL LINE RECEIVER

SLLS046C – JANUARY 1989 – REVISED MAY 1995

- 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 k Ω 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



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**

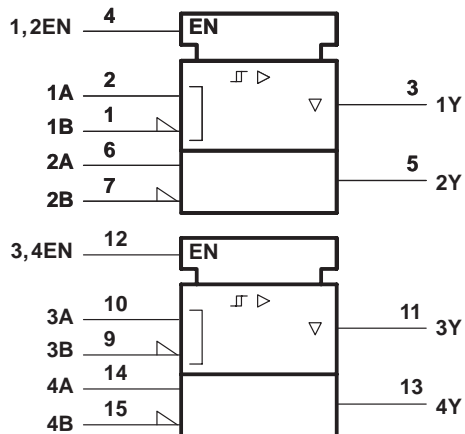
POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

Copyright © 1995, Texas Instruments Incorporated

SN75ALS199 QUADRUPLE DIFFERENTIAL LINE RECEIVER

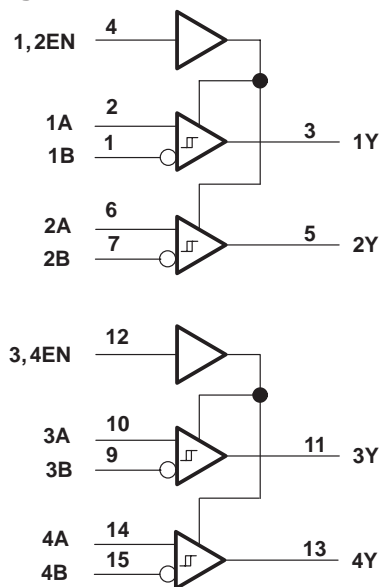
SLLS046C – JANUARY 1989 – REVISED MAY 1995

logic symbol†

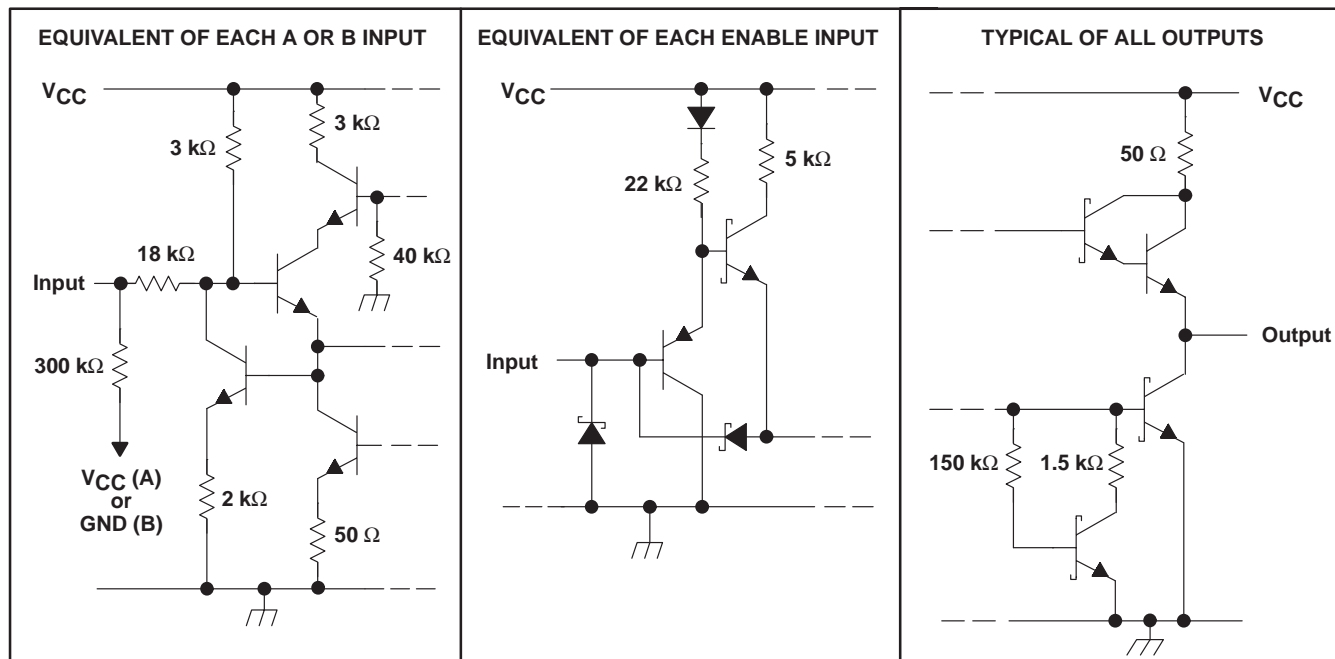


† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram



schematics of inputs and outputs



SN75ALS199 QUADRUPLE DIFFERENTIAL LINE RECEIVER

SLLS046C – JANUARY 1989 – REVISED MAY 1995

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

SLLS046C – JANUARY 1989 – REVISED MAY 1995

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			0.45	V	
			$I_{OL} = 8$ mA		0.5		
I_{OZ}	High-impedance-state output current			20		μ A	
		$V_{IL} = 0.8$ V, $V_{ID} = -3$ V, $V_O = 2.7$ 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			20		μ A	
		$V_{IH} = 2.7$ 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, $T_A = 25^\circ$ 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, $T_A = 25^\circ$ 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

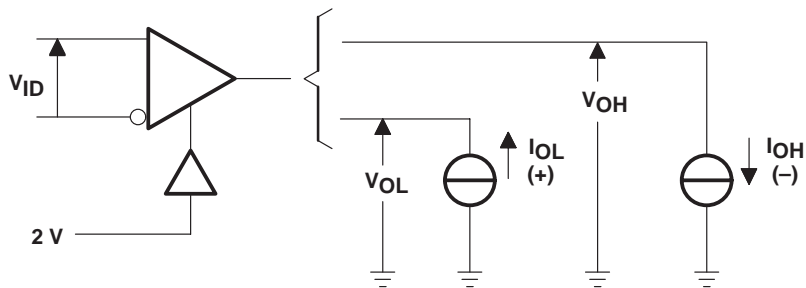
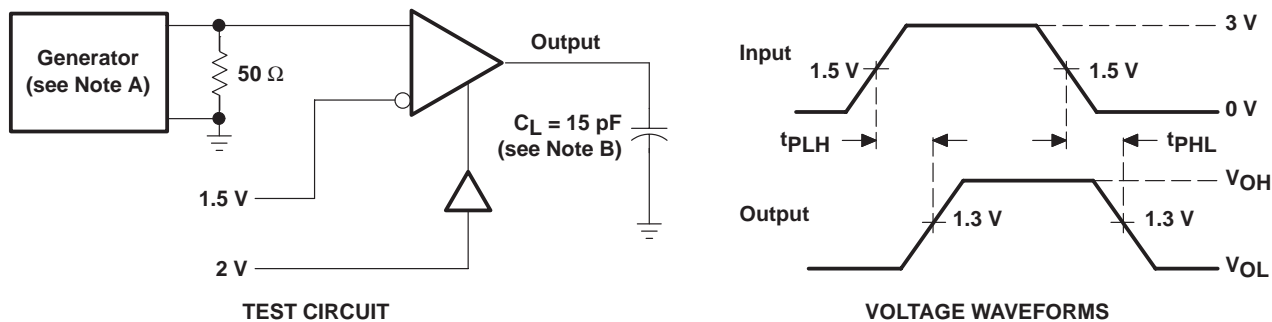


Figure 1. V_{OH} and V_{OL} Test Circuit



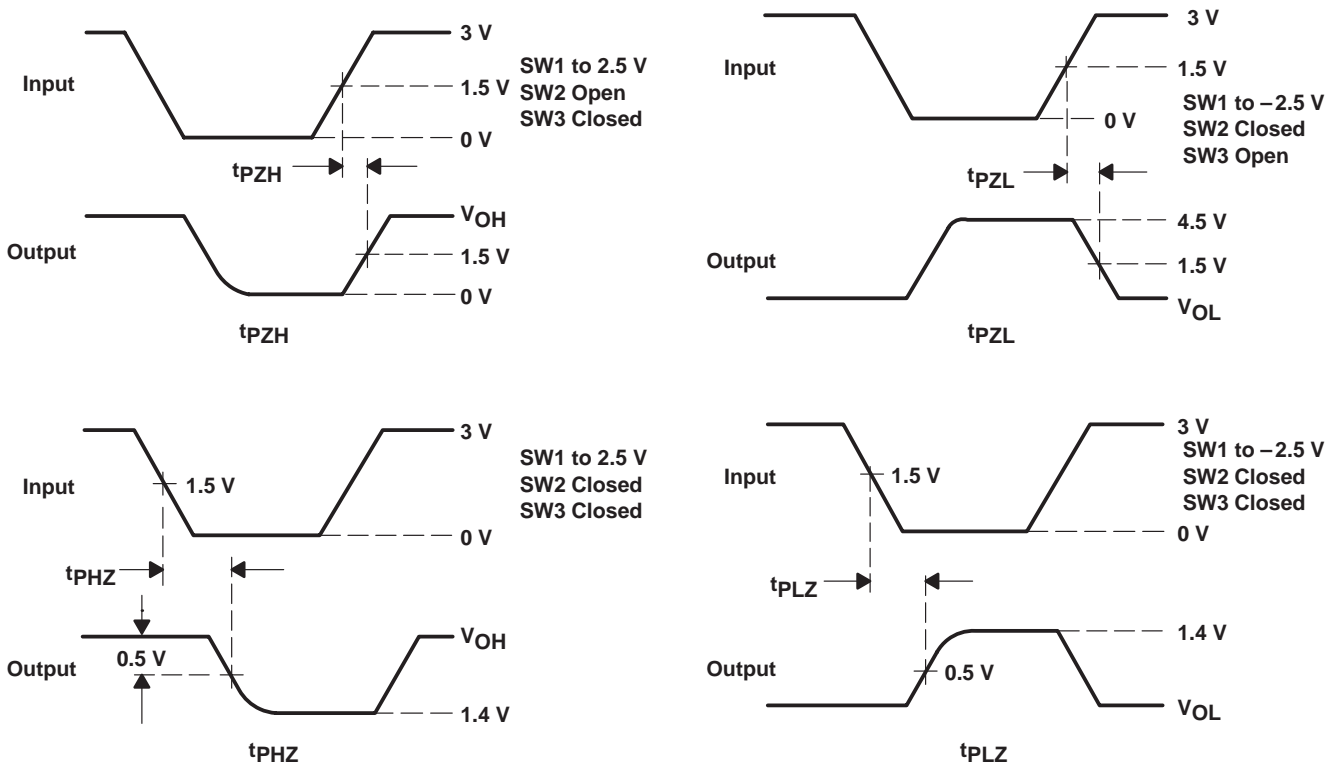
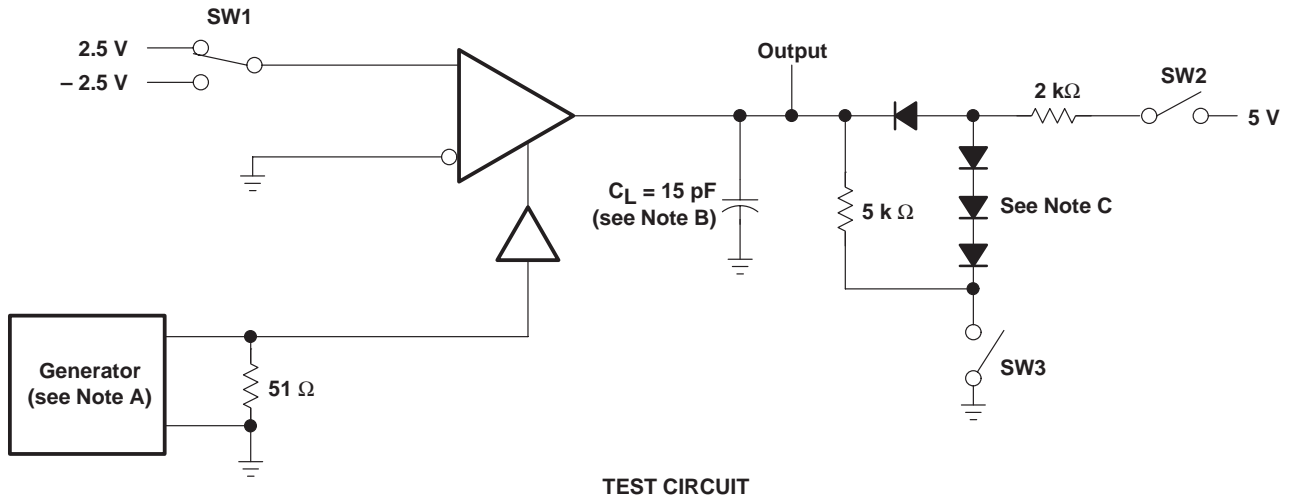
- NOTES: A. The input pulse is supplied by a generator having the following characteristics: $PRR \leq 1$ MHz, duty cycle $\leq 50\%$, $Z_O = 50 \Omega$, $t_r \leq 6$ ns, $t_f \leq 6$ ns.
 B. C_L includes probe and jig capacitance.

Figure 2. Test Circuit and Voltage Waveforms

SN75ALS199 QUADRUPLE DIFFERENTIAL LINE RECEIVER

SLLS046C – JANUARY 1989 – REVISED MAY 1995

PARAMETER MEASUREMENT INFORMATION



- 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.
 C. All diodes are 1N3064 or equivalent.

Figure 3. Test Circuit and Voltage Waveforms

TYPICAL CHARACTERISTICS

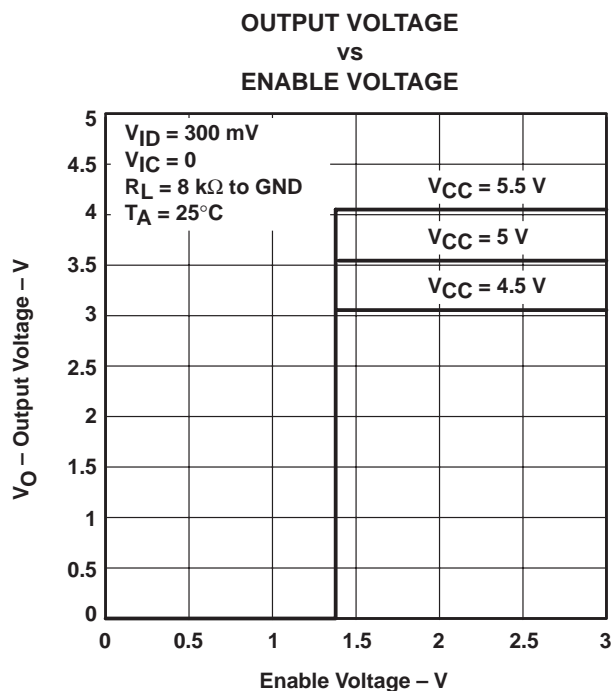


Figure 4

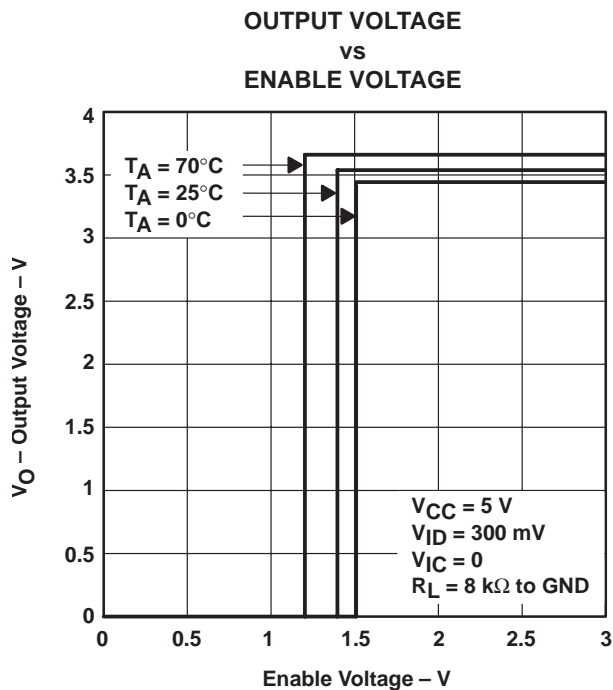


Figure 5

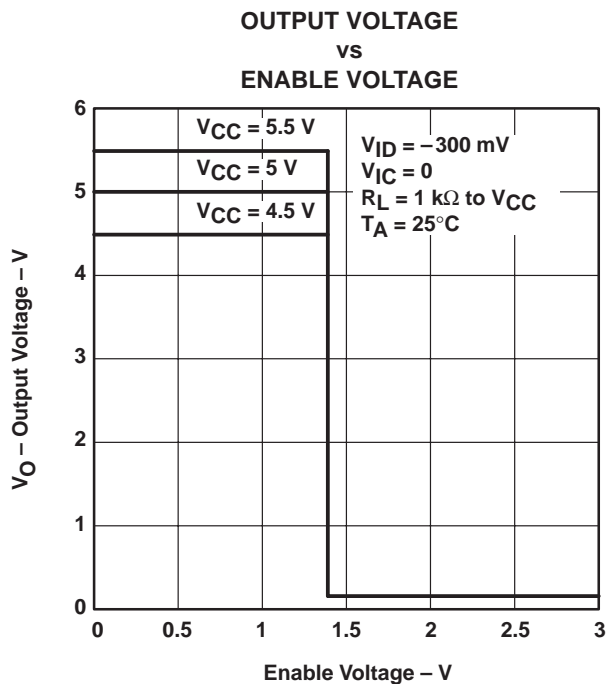


Figure 6

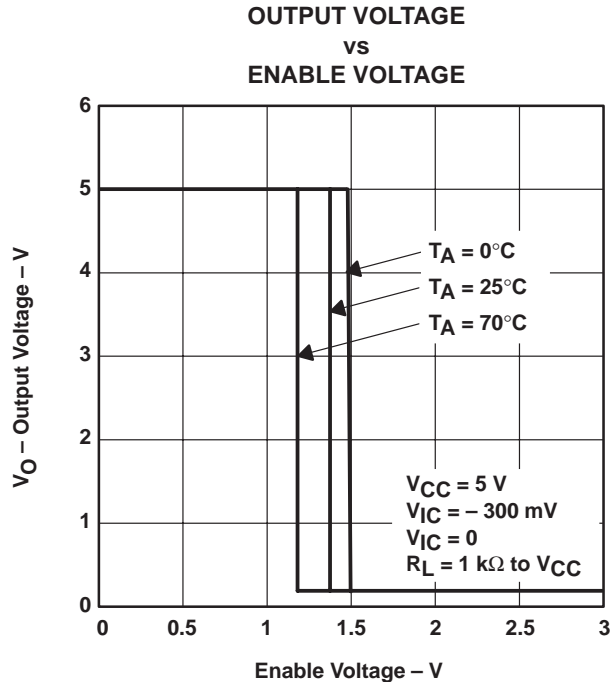


Figure 7

SN75ALS199 QUADRUPLE DIFFERENTIAL LINE RECEIVER

SLLS046C – JANUARY 1989 – REVISED MAY 1995

TYPICAL CHARACTERISTICS

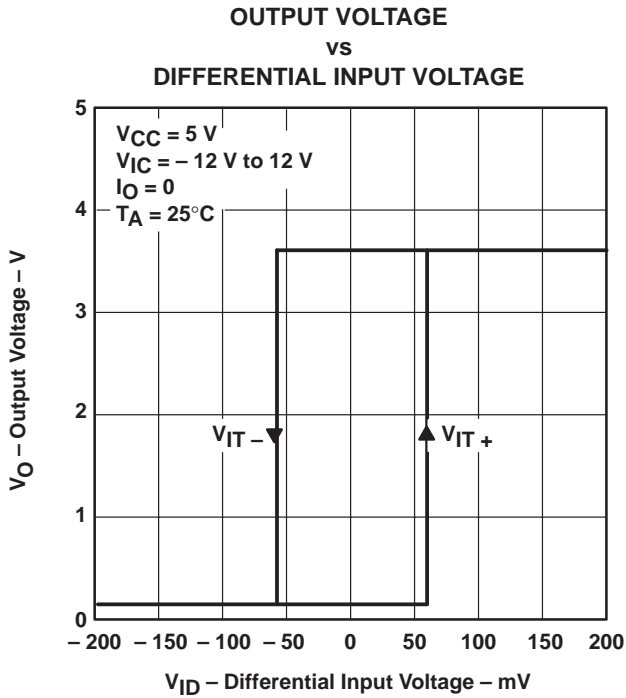


Figure 8

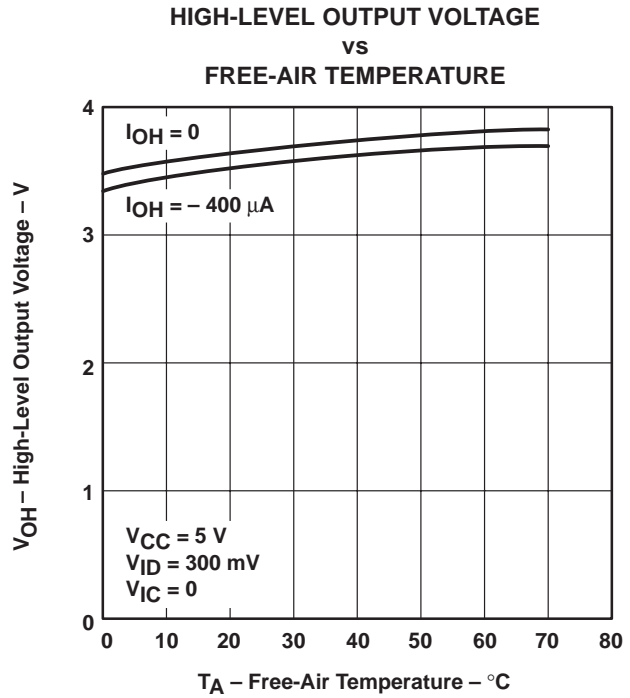


Figure 9

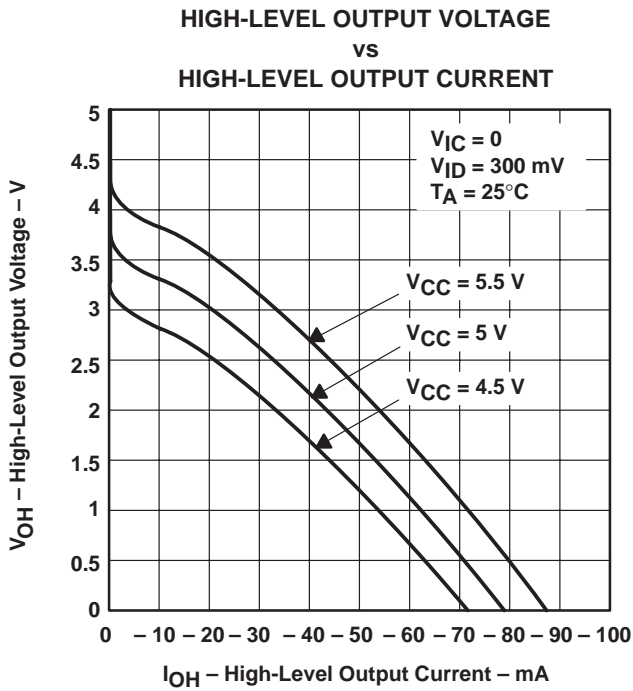


Figure 10

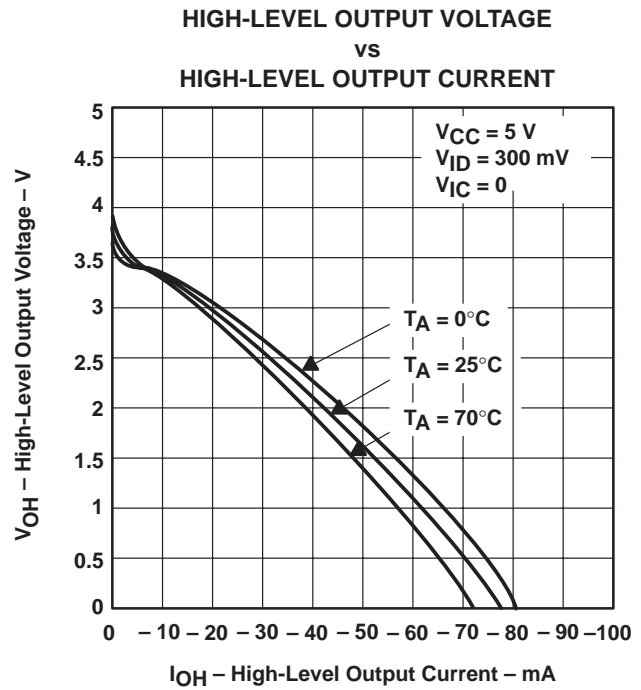


Figure 11

TYPICAL CHARACTERISTICS

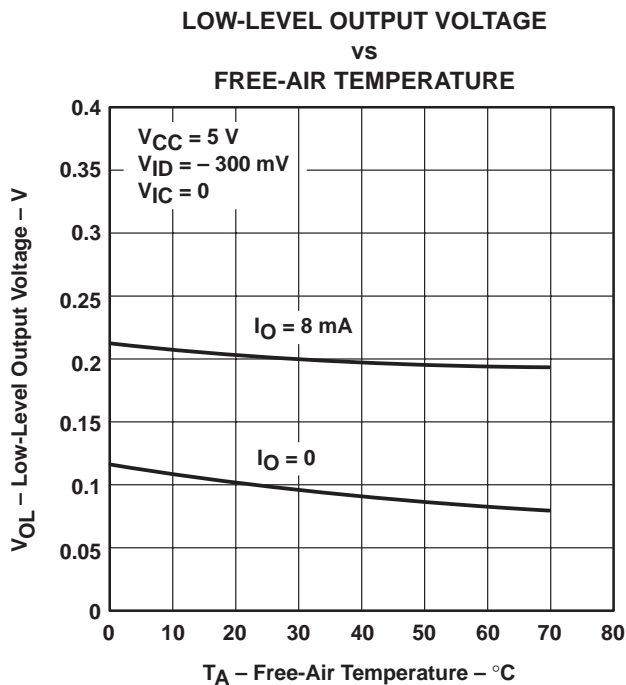


Figure 12

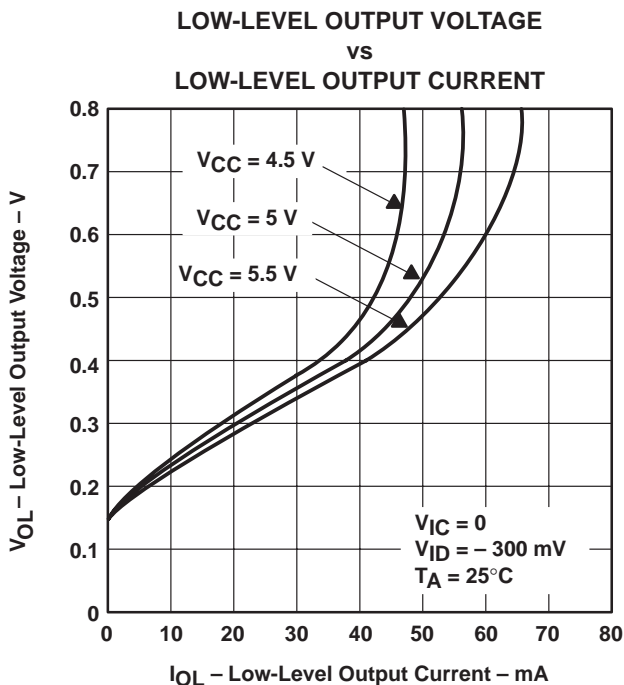


Figure 13

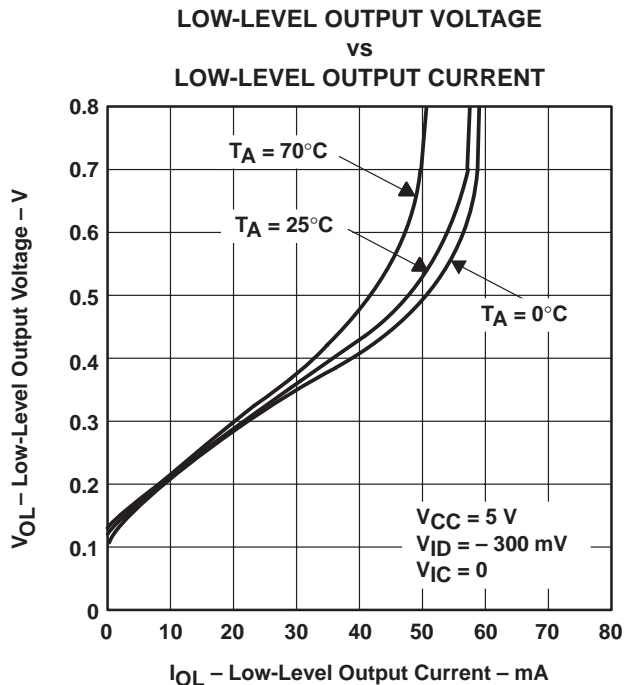


Figure 14

SN75ALS199 QUADRUPLE DIFFERENTIAL LINE RECEIVER

SLLS046C – JANUARY 1989 – REVISED MAY 1995

TYPICAL CHARACTERISTICS

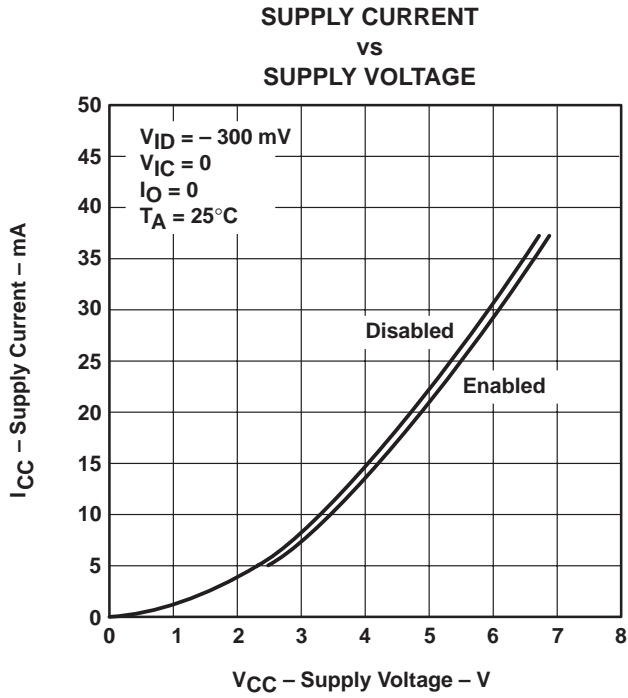


Figure 15

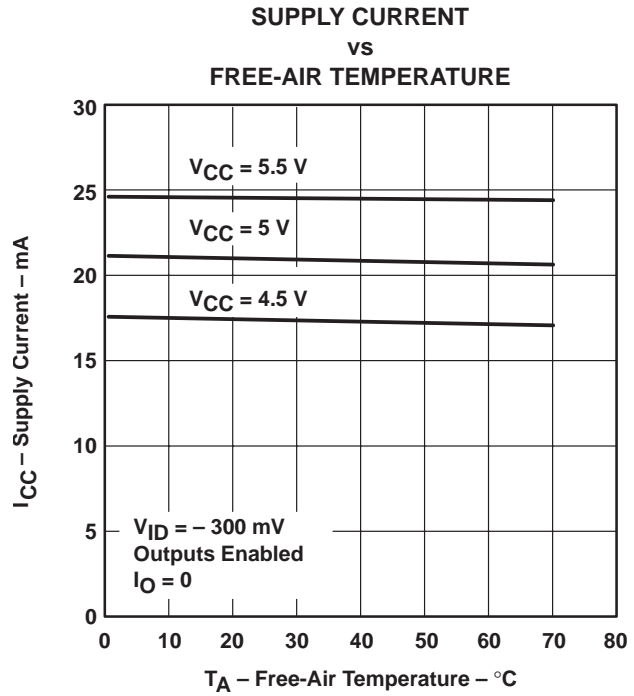


Figure 16

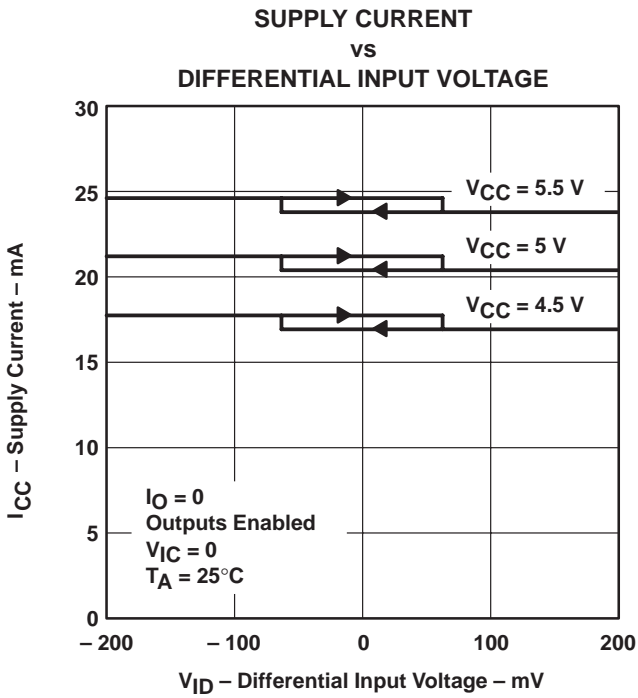


Figure 17

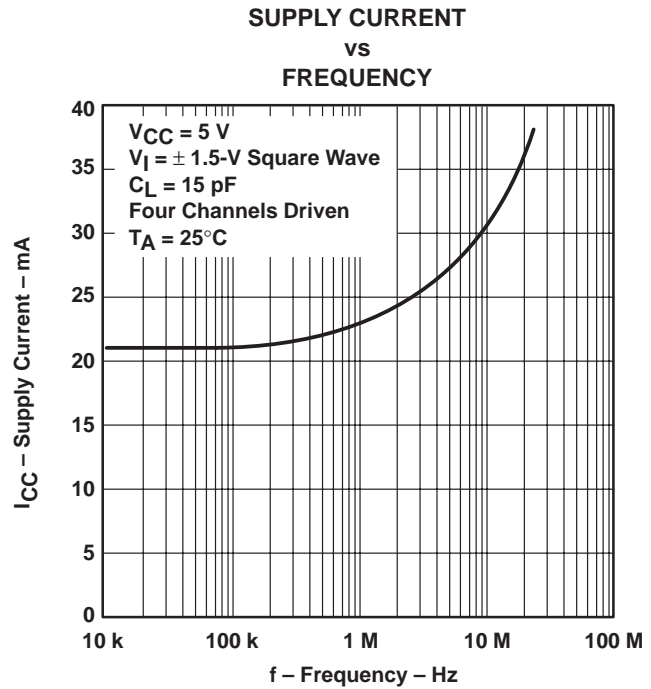


Figure 18

TYPICAL CHARACTERISTICS

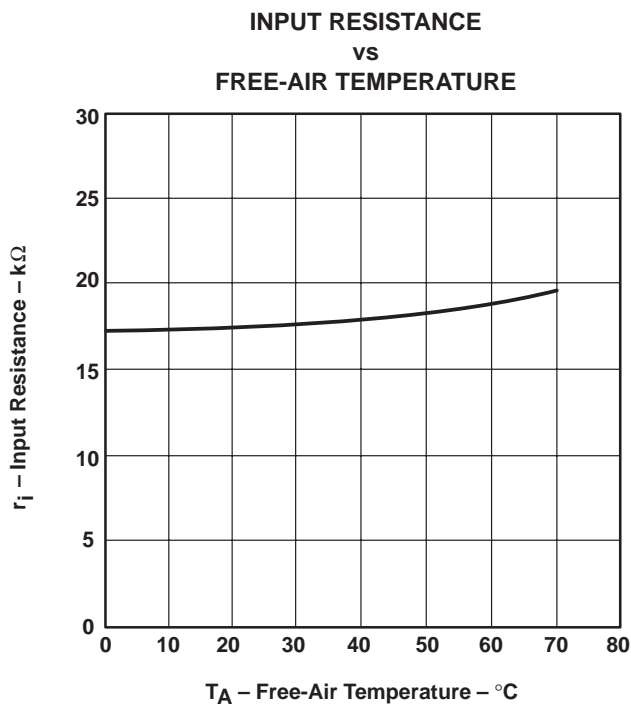


Figure 19

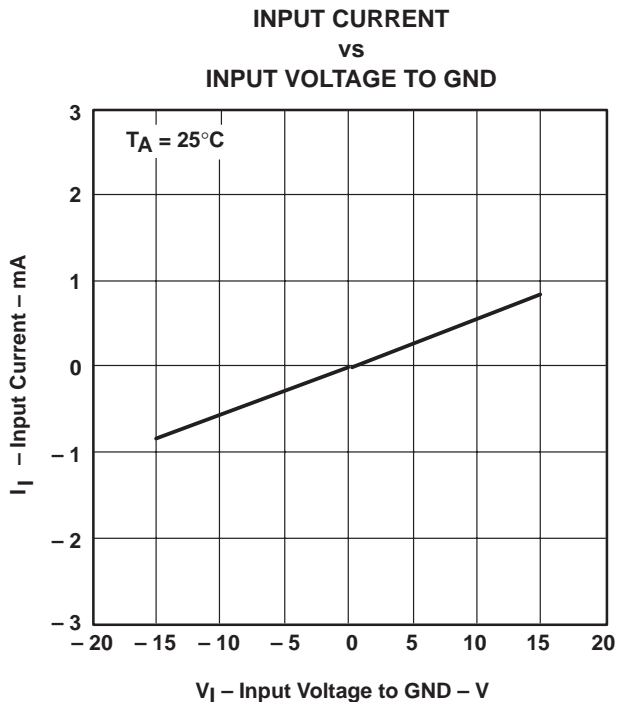


Figure 20

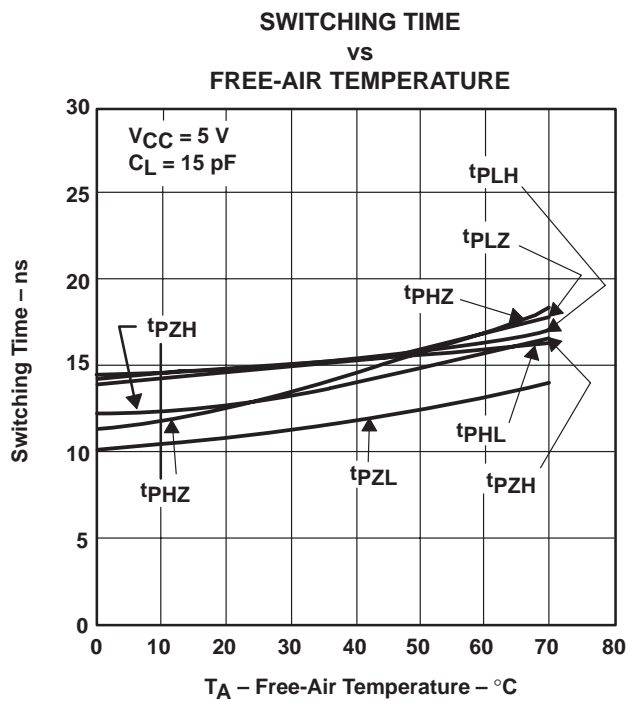


Figure 21

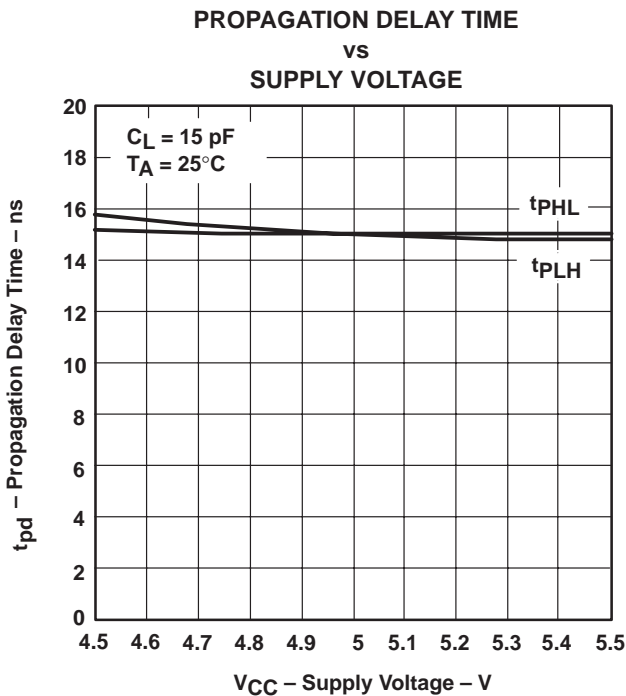


Figure 22

IMPORTANT NOTICE

Texas Instruments and its subsidiaries (TI) reserve the right to make changes to their products or to discontinue any product or service without notice, and advise customers to obtain the latest version of relevant information to verify, before placing orders, that information being relied on is current and complete. All products are sold subject to the terms and conditions of sale supplied at the time of order acknowledgement, including those pertaining to warranty, patent infringement, and limitation of liability.

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

CERTAIN APPLICATIONS USING SEMICONDUCTOR PRODUCTS MAY INVOLVE POTENTIAL RISKS OF DEATH, PERSONAL INJURY, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE ("CRITICAL APPLICATIONS"). TI SEMICONDUCTOR PRODUCTS ARE NOT DESIGNED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT DEVICES OR SYSTEMS OR OTHER CRITICAL APPLICATIONS. INCLUSION OF TI PRODUCTS IN SUCH APPLICATIONS IS UNDERSTOOD TO BE FULLY AT THE CUSTOMER'S RISK.

In order to minimize risks associated with the customer's applications, adequate design and operating safeguards must be provided by the customer to minimize inherent or procedural hazards.

TI assumes no liability for applications assistance or customer product design. TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right of TI covering or relating to any combination, machine, or process in which such semiconductor products or services might be or are used. TI's publication of information regarding any third party's products or services does not constitute TI's approval, warranty or endorsement thereof.