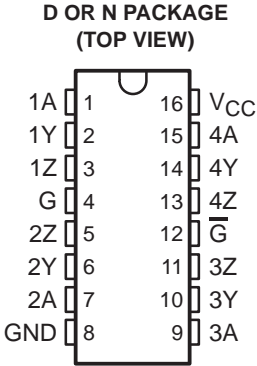


AM26LS31C QUADRUPLE DIFFERENTIAL LINE DRIVER

SLLS114D – JANUARY 1979 – REVISED OCTOBER 1998

- Meets or Exceeds the Requirements of ANSI TIA/EIA-422-B and ITU Recommendation V.11
- Operates From a Single 5-V Supply
- TTL Compatible
- Complementary Outputs
- High Output Impedance in Power-Off Conditions
- Complementary Output-Enable Inputs



description

The AM26LS31C is a quadruple complementary-output line driver designed to meet the requirements of ANSI TIA/EIA-422-B and ITU (formerly CCITT) Recommendation V.11. The 3-state outputs have high-current capability for driving balanced lines such as twisted-pair or parallel-wire transmission lines, and they provide a high-impedance state in the power-off condition. The enable function is common to all four drivers and offers the choice of an active-high or active-low enable (G, \overline{G}) input. Low-power Schottky circuitry reduces power consumption without sacrificing speed.

The AM26LS31C is characterized for operation from 0°C to 70°C.

**FUNCTION TABLE
(each driver)**

INPUT A	ENABLES		OUTPUTS	
	G	\overline{G}	Y	Z
H	H	X	H	L
L	H	X	L	H
H	X	L	H	L
L	X	L	L	H
X	L	H	Z	Z

H = high level, L = low level, X = irrelevant,
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.

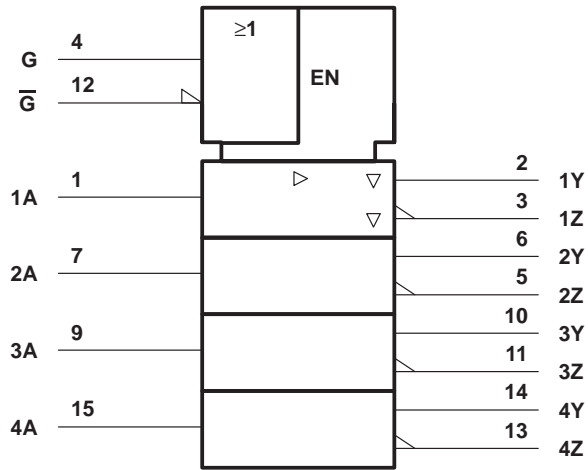
PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.



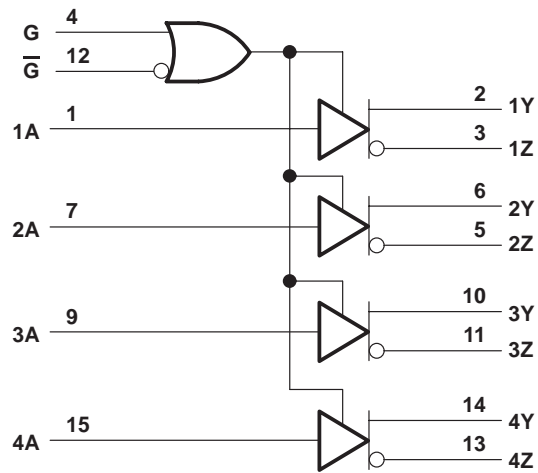
AM26LS31C QUADRUPLE DIFFERENTIAL LINE DRIVER

SLLS114D – JANUARY 1979 – REVISED OCTOBER 1998

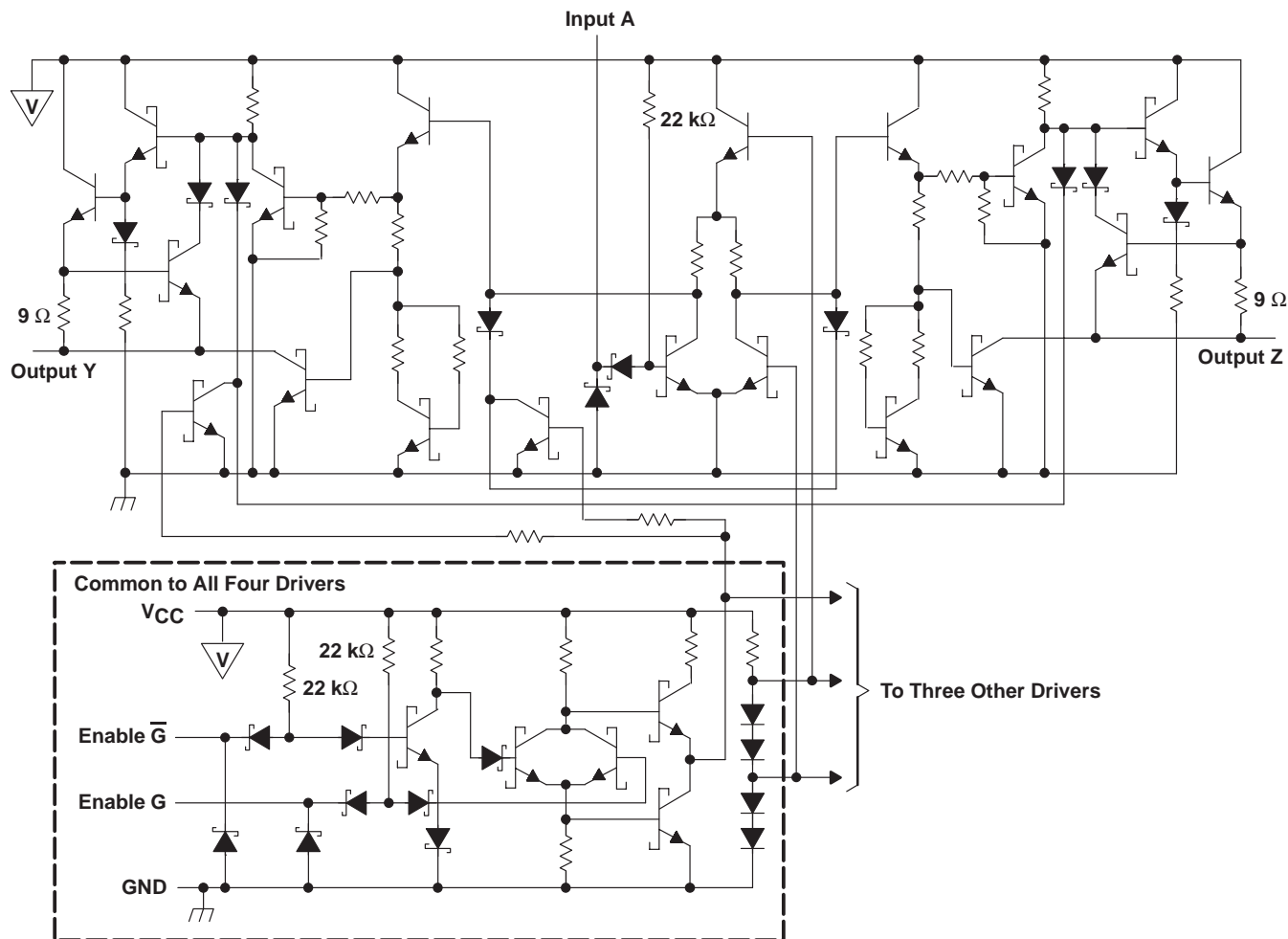
logic symbol†



logic diagram (positive logic)



schematic (each driver)



All resistor values are nominal.

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	7 V
Output off-state voltage	5.5 V
Package thermal impedance, θ_{JA} (see Note 2): D package	113°C/W
N package	78°C/W
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 output voltage V_{OD} , are with respect to network GND.
 2. The package thermal impedance is calculated in accordance with JESD 51, except for through-hole packages, which use a trace length of zero.

AM26LS31C

QUADRUPLE DIFFERENTIAL LINE DRIVER

SLLS114D – JANUARY 1979 – REVISED OCTOBER 1998

recommended operating conditions (unless otherwise noted)

	MIN	NOM	MAX	UNIT
Supply voltage, V_{CC}	4.75	5	5.25	V
High-level input voltage, V_{IH}	2			V
Low-level input voltage, V_{IL}			0.8	V
High-level output current, I_{OH}			-20	mA
Low-level output current, I_{OL}			20	mA
Operating free-air temperature, T_A	0		70	°C

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

PARAMETER	TEST CONDITIONS	MIN	TYP†	MAX	UNIT
V_{IK} Input clamp voltage	$V_{CC} = 4.75\text{ V}$, $I_I = -18\text{ mA}$			-1.5	V
V_{OH} High-level output voltage	$V_{CC} = 4.75\text{ V}$, $I_{OH} = -20\text{ mA}$	2.5			V
V_{OL} Low-level output voltage	$V_{CC} = 4.75\text{ V}$, $I_{OL} = 20\text{ mA}$			0.5	V
I_{OZ} Off-state (high-impedance-state) output current	$V_{CC} = 4.75\text{ V}$			-20	μA
				20	
I_I Input current at maximum input voltage	$V_{CC} = 5.25\text{ V}$, $V_I = 7\text{ V}$			0.1	mA
I_{IH} High-level input current	$V_{CC} = 5.25\text{ V}$, $V_I = 2.7\text{ V}$			20	μA
I_{IL} Low-level input current	$V_{CC} = 5.25\text{ V}$, $V_I = 0.4\text{ V}$			-0.36	mA
I_{OS} Short-circuit output current‡	$V_{CC} = 5.25\text{ V}$	-30		-150	mA
I_{CC} Supply current	$V_{CC} = 5.25\text{ V}$, All outputs disabled		32	80	mA

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

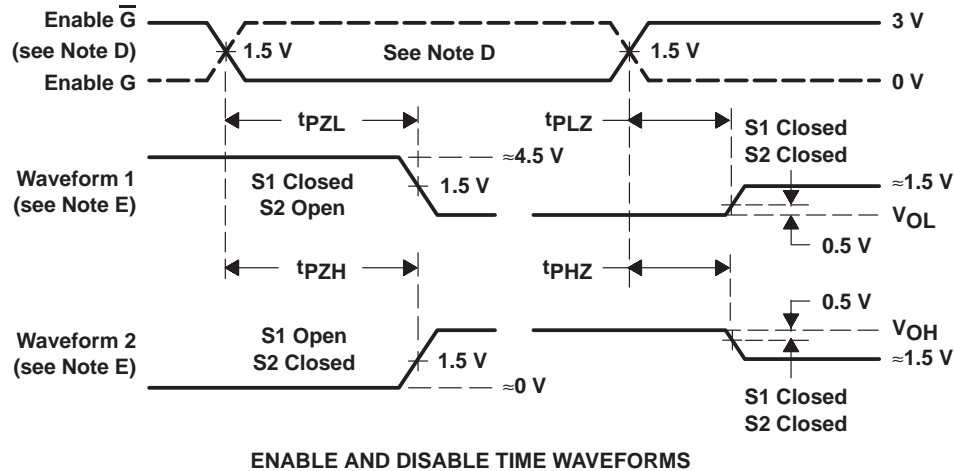
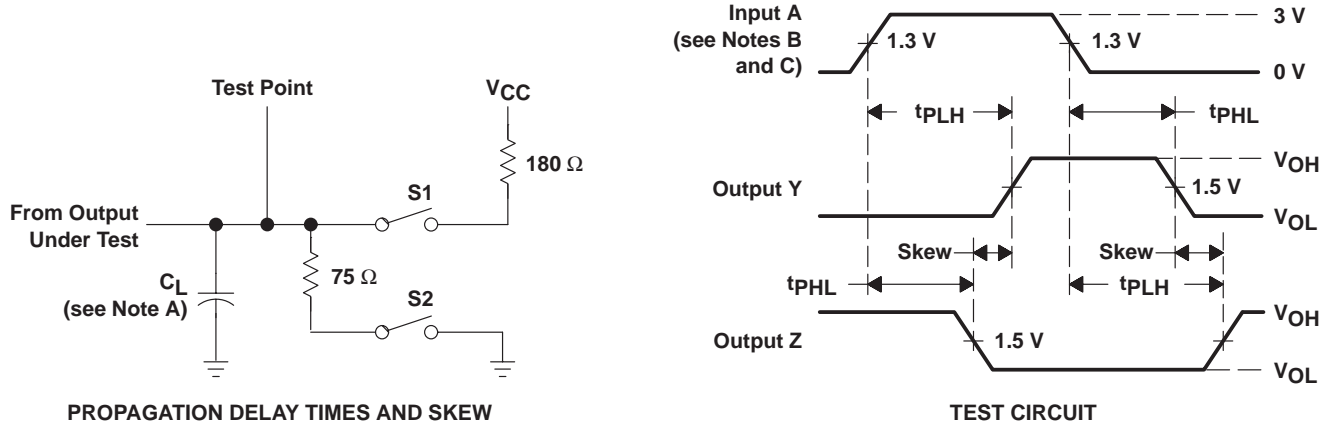
‡ Not more than one output should be shorted at a time, and duration of the short circuit should not exceed one second.

switching characteristics, $V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$ (see Figure 1)

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH} Propagation delay time, low-to-high-level output	$C_L = 30\text{ pF}$, S1 and S2 open		14	20	ns
t_{PHL} Propagation delay time, high-to-low-level output			14	20	
t_{PZH} Output enable time to high level	$C_L = 30\text{ pF}$		25	40	ns
t_{PZL} Output enable time to low level		$R_L = 180\ \Omega$		37	
t_{PHZ} Output disable time from high level	$C_L = 10\text{ pF}$, S1 and S2 closed		21	30	ns
t_{PLZ} Output disable time from low level			23	35	
Output-to-output skew	$C_L = 30\text{ pF}$, S1 and S2 open		1	6	ns



PARAMETER MEASUREMENT INFORMATION



ENABLE AND DISABLE TIME WAVEFORMS

- NOTES:
- A. C_L includes probe and jig capacitance.
 - B. All input pulses are supplied by generators having the following characteristics: $PRR \leq 1$ MHz, $Z_O \approx 50 \Omega$, $t_r \leq 15$ ns, $t_f \leq 6$ ns.
 - C. When measuring propagation delay times and skew, switches S1 and S2 are open.
 - D. Each enable is tested separately.
 - E. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.

Figure 1. Test Circuit and Voltage Waveforms

AM26LS31C QUADRUPLE DIFFERENTIAL LINE DRIVER

SLLS114D – JANUARY 1979 – REVISED OCTOBER 1998

TYPICAL CHARACTERISTICS

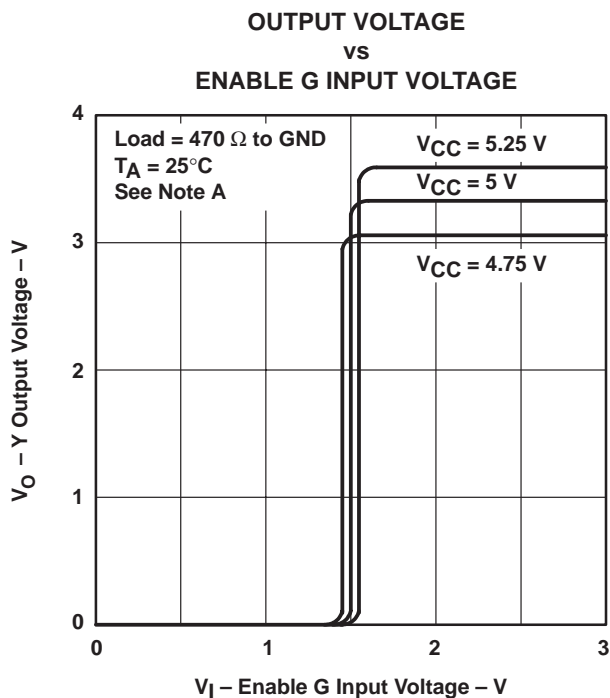


Figure 2

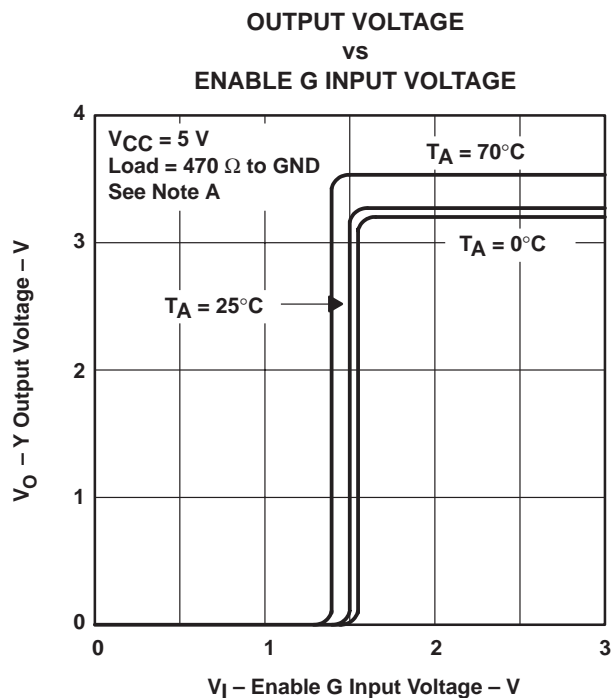


Figure 3

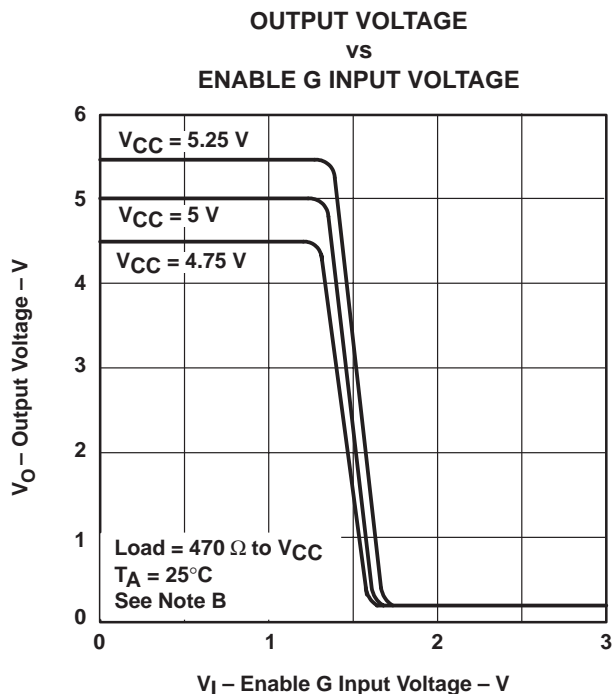


Figure 4

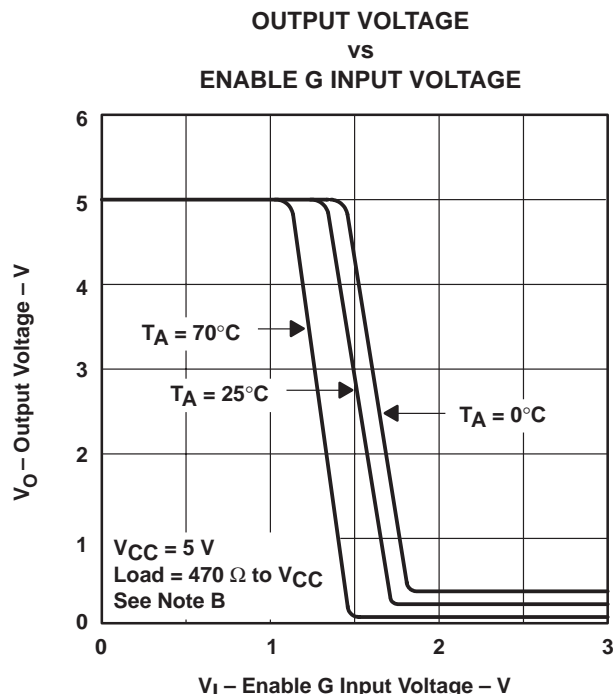


Figure 5

NOTES: A. The A input is connected to V_{CC} during testing of the Y outputs and to ground during testing of the Z outputs.
B. The A input is connected to ground during testing of the Y outputs and to V_{CC} during testing of the Z outputs.

TYPICAL CHARACTERISTICS

HIGH-LEVEL OUTPUT VOLTAGE
 vs
 FREE-AIR TEMPERATURE

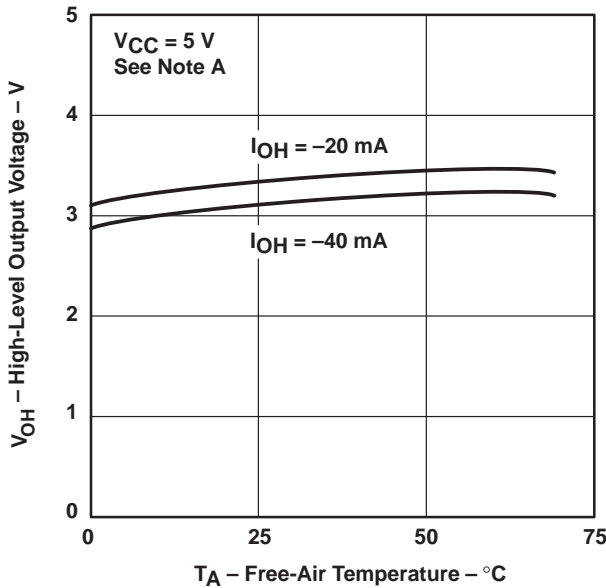


Figure 6

HIGH-LEVEL OUTPUT VOLTAGE
 vs
 HIGH-LEVEL OUTPUT CURRENT

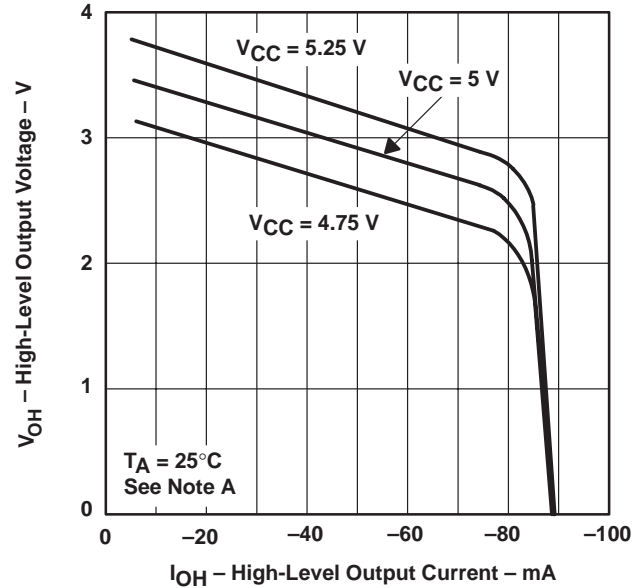


Figure 7

LOW-LEVEL OUTPUT VOLTAGE
 vs
 FREE-AIR TEMPERATURE

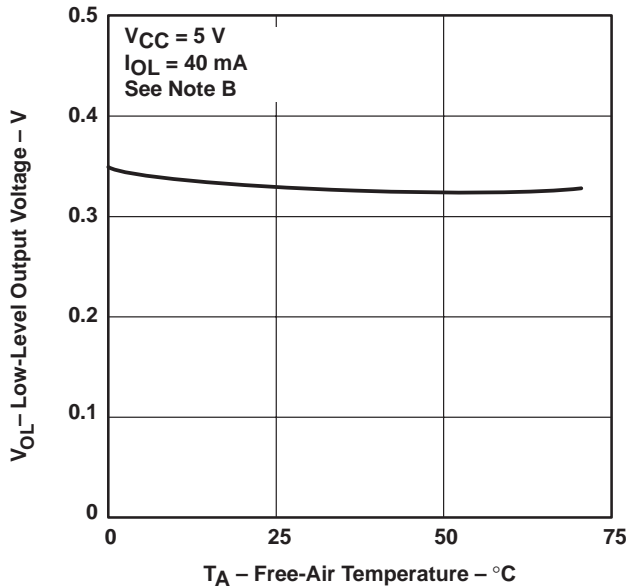


Figure 8

LOW-LEVEL OUTPUT VOLTAGE
 vs
 LOW-LEVEL OUTPUT CURRENT

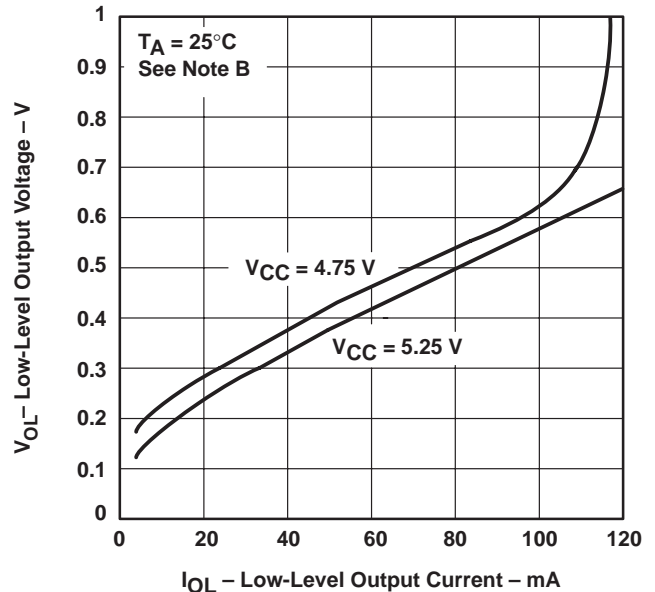


Figure 9

NOTES: A. The A input is connected to V_{CC} during testing of the Y outputs and to ground during testing of the Z outputs.
 B. The A input is connected to ground during testing of the Y outputs and to V_{CC} during testing of the Z inputs.

AM26LS31C QUADRUPLE DIFFERENTIAL LINE DRIVER

SLLS114D – JANUARY 1979 – REVISED OCTOBER 1998

TYPICAL CHARACTERISTICS

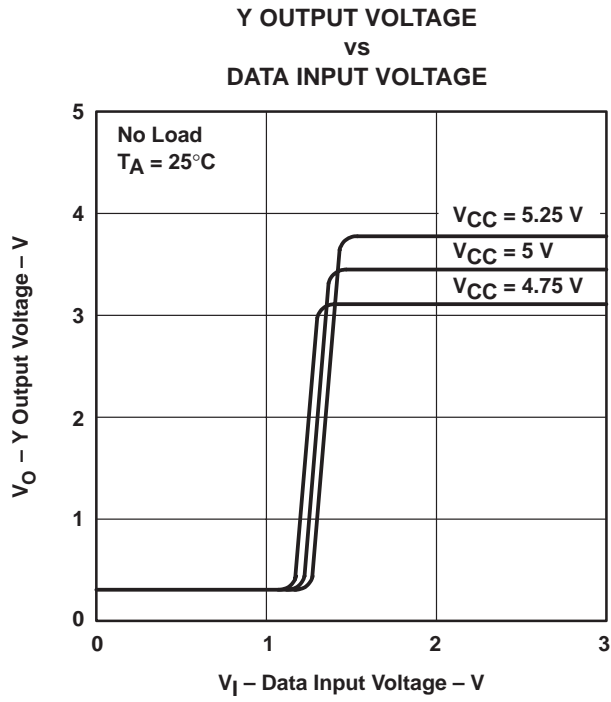


Figure 10

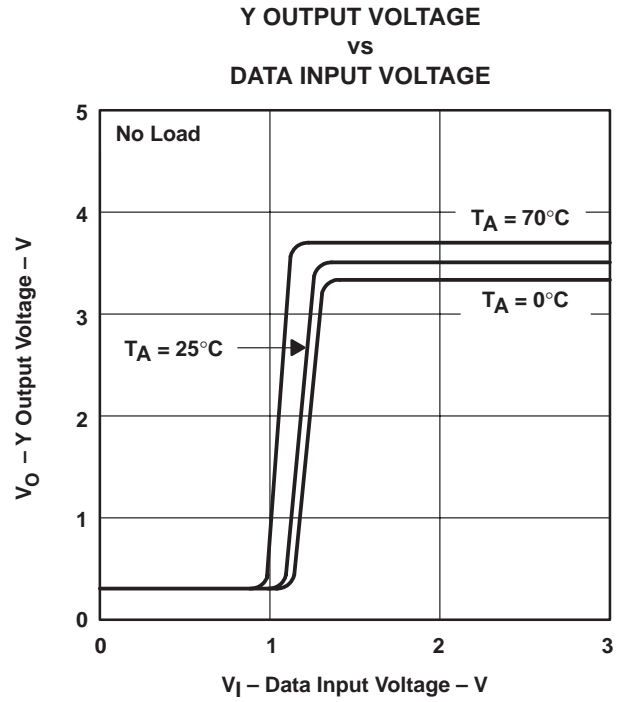


Figure 11

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.