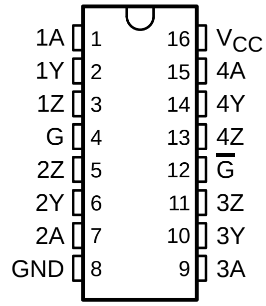
- **Meets or Exceeds the Requirements of ANSI TIA/EIA-422-B and ITU Recommendation V.11**
- **Operates From a Single 5-V Supply**
- **TTL Compatible**
- **Complementary Outputs**
- **High Output Impedance in Power-Off Conditions**
- **Complementary Output-Enable Inputs**

D, DB, N, OR NS PACKAGE
(TOP VIEW)



description

The AM26LS31 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 AM26LS31 is characterized for operation from 0°C to 70°C.

AVAILABLE OPTIONS

T_A	PACKAGED DEVICES		
	PLASTIC SMALL OUTLINE (D, NS)	PLASTIC SHRINK SMALL OUTLINE (DB)	PLASTIC DIP (N)
0°C to 70°C	AM26LS31CD AM26LS31CNS	AM26LS31CDB —	AM26LS31CN —

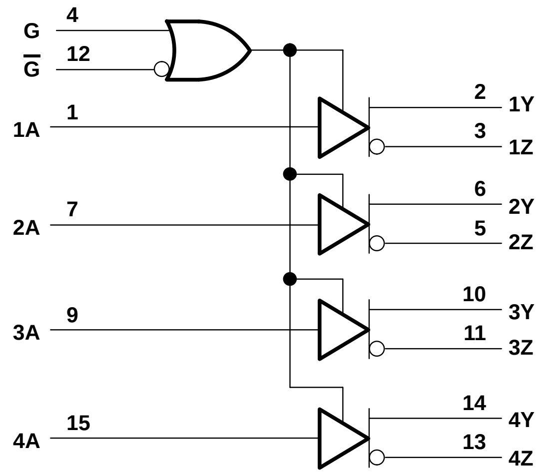
The DB and NS packages are only available taped and reeled. Add the suffix R to the device type (e.g., AM26LS31CDBR).

FUNCTION TABLE
(each driver)

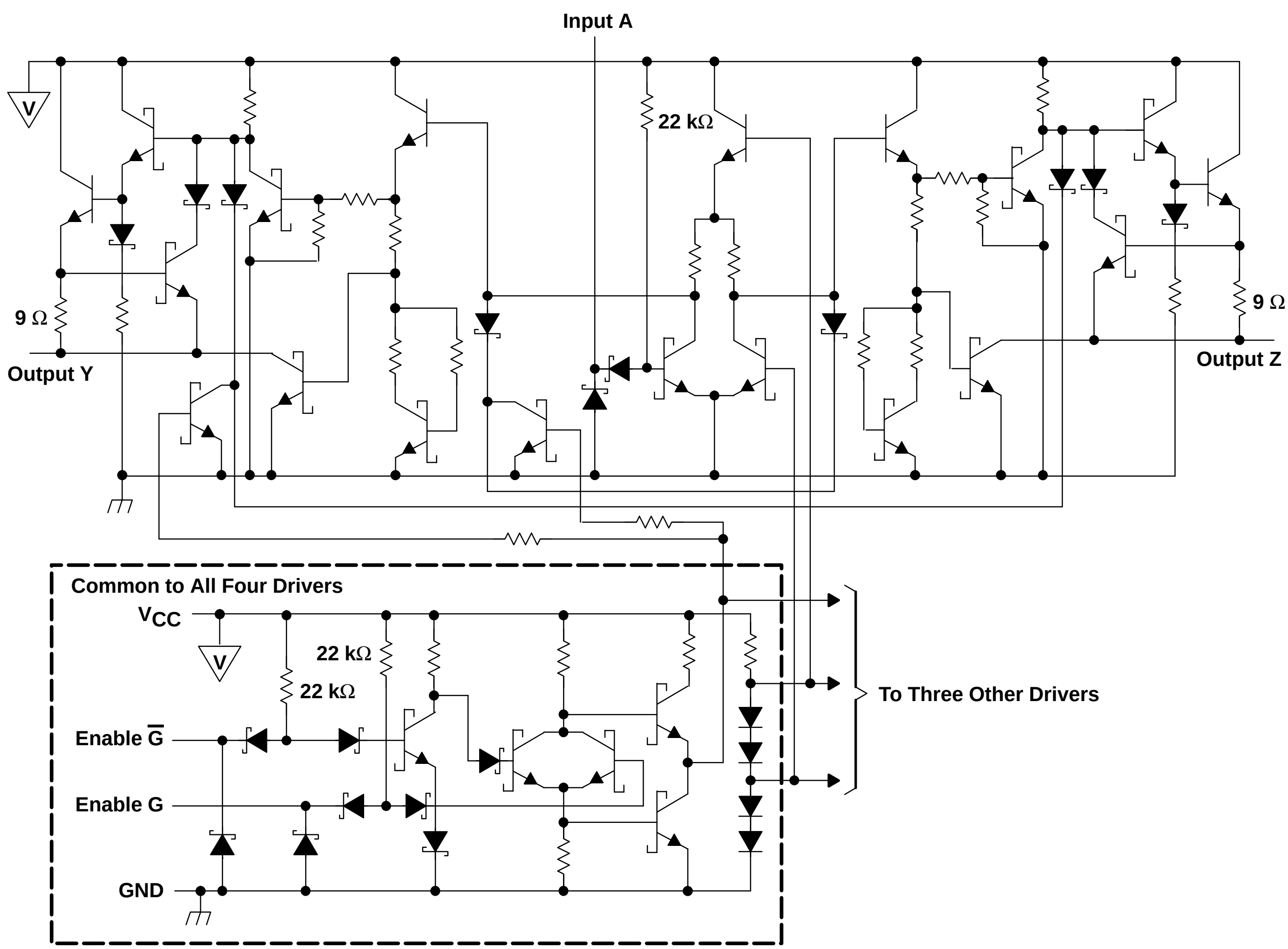
INPUT A	ENABLES		OUTPUTS	
	G	$\overline{G}$	Y	Z
H	H	X	H	L
L	H	X	L	H
H	X	L	H	L
L	X	L	L	H
X	L	H	Z	Z

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

logic diagram (positive logic)



schematic (each driver)



All resistor values are nominal.

TEXAS INSTRUMENTS
POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

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 . . . 73°C/W
DB package . . . 82°C/W
N package . . . 67°C/W
NS package . . . 64°C/W
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds . . . 260°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, except differential output voltage V_{OD}, are with respect to network GND.
2. 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			–20	mA
I_{OL}	Low-level output current			20	mA
T_A	Operating free-air temperature	0		70	°C

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

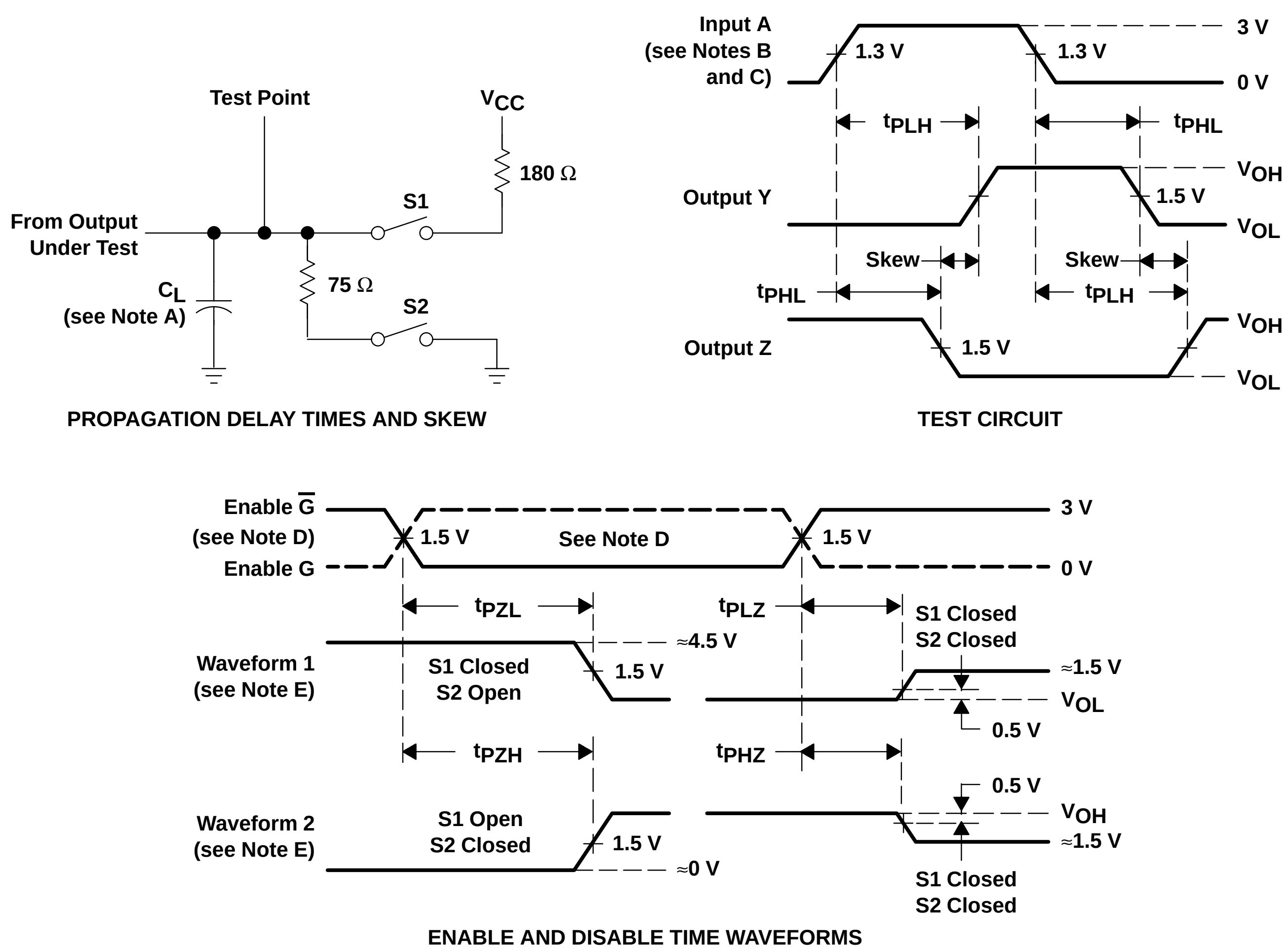
PARAMETER		TEST CONDITIONS		MIN	TYP‡	MAX	UNIT
V_{IK}	Input clamp voltage	V_{CC} = 4.75 V,	I_I = –18 mA			–1.5	V
V_{OH}	High-level output voltage	V_{CC} = 4.75 V,	I_{OH} = –20 mA	2.5			V
V_{OL}	Low-level output voltage	V_{CC} = 4.75 V,	I_{OL} = 20 mA			0.5	V
I_{OZ}	Off-state (high-impedance-state) output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

‡ All typical values are at V_{CC} = 5 V and T_A = 25°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 V, T_A = 25°C (see Figure 1)

PARAMETER		TEST CONDITIONS		MIN	TYP	MAX	UNIT
t_{PLH}	Propagation delay time, low-to-high-level output	C_L = 30 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 pF	R_L = 75 Ω		25	40	ns
t_{PZL}	Output enable time to low level		R_L = 180 Ω		37	45	
t_{PHZ}	Output disable time from high level	C_L = 10 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 pF,	S1 and S2 open		1	6	ns

PARAMETER MEASUREMENT INFORMATION



NOTES: A. C_L includes probe and jig capacitance.
B. All input pulses are supplied by generators having the following characteristics: PRR ≤ 1 MHz, Z_O ≈ 50 Ω, t_r ≤ 15 ns, t_f ≤ 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

TYPICAL CHARACTERISTICS

OUTPUT VOLTAGE vs ENABLE G INPUT VOLTAGE

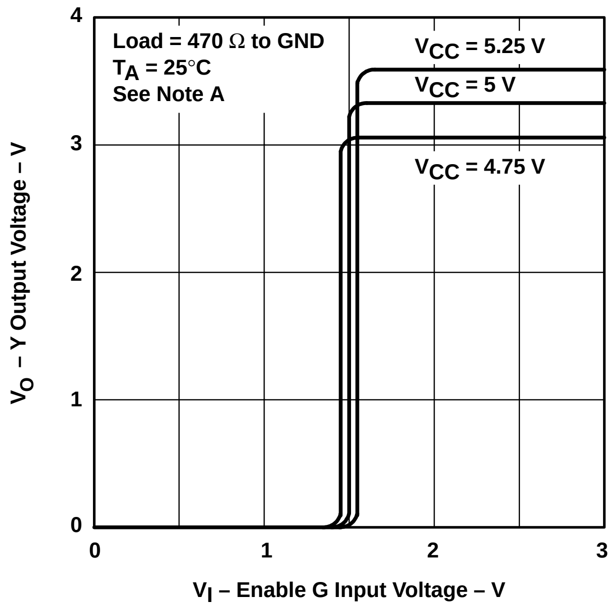


Figure 2

OUTPUT VOLTAGE vs ENABLE G INPUT VOLTAGE

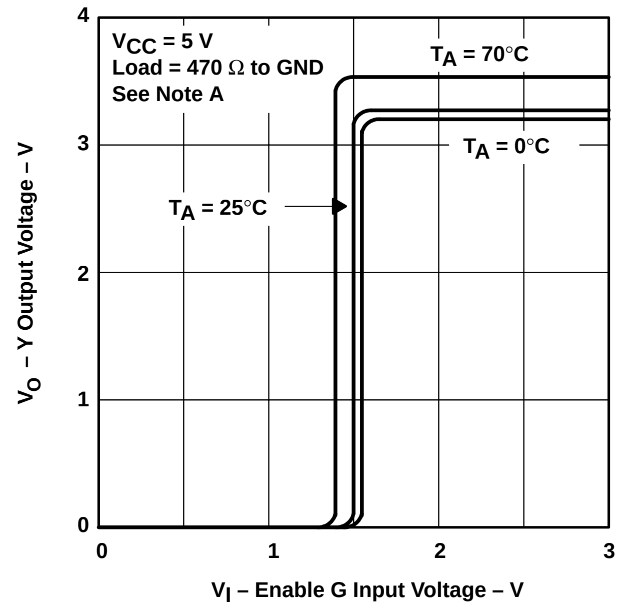


Figure 3

OUTPUT VOLTAGE vs ENABLE G INPUT VOLTAGE

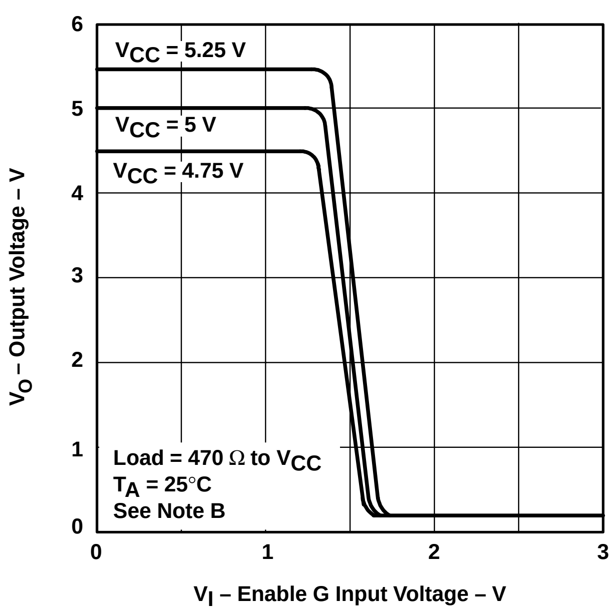


Figure 4

OUTPUT VOLTAGE vs ENABLE G INPUT VOLTAGE

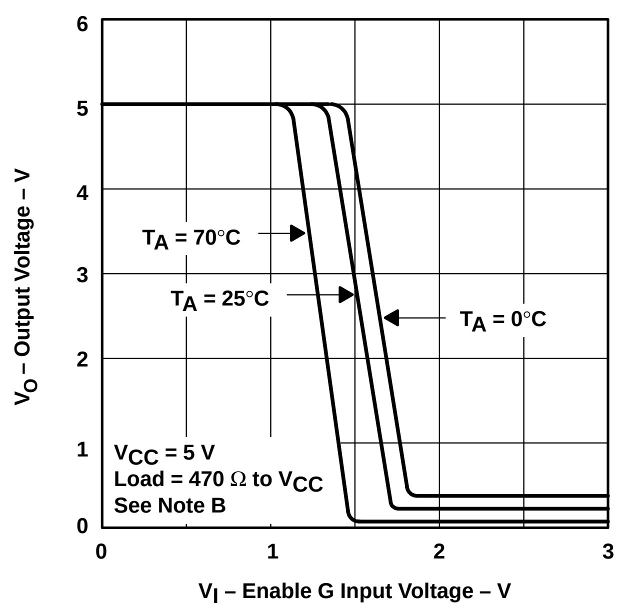


Figure 5

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

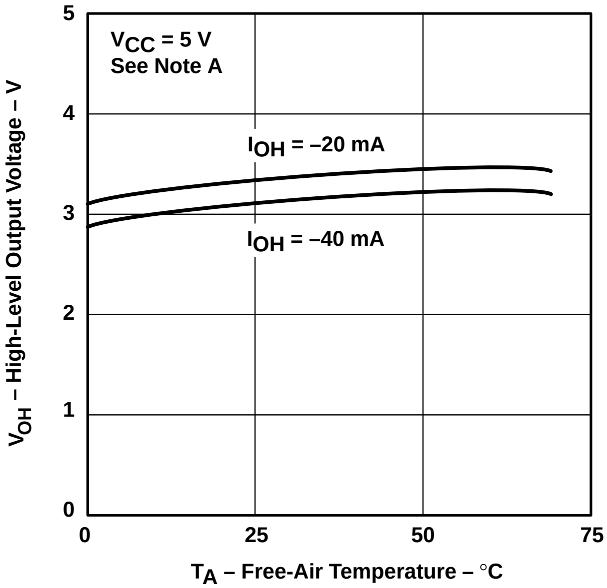


Figure 6

HIGH-LEVEL OUTPUT VOLTAGE
vs
HIGH-LEVEL OUTPUT CURRENT

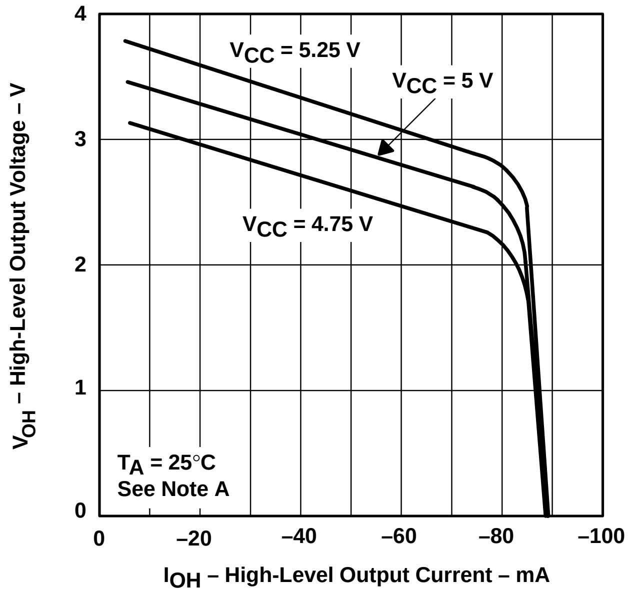


Figure 7

LOW-LEVEL OUTPUT VOLTAGE
vs
FREE-AIR TEMPERATURE

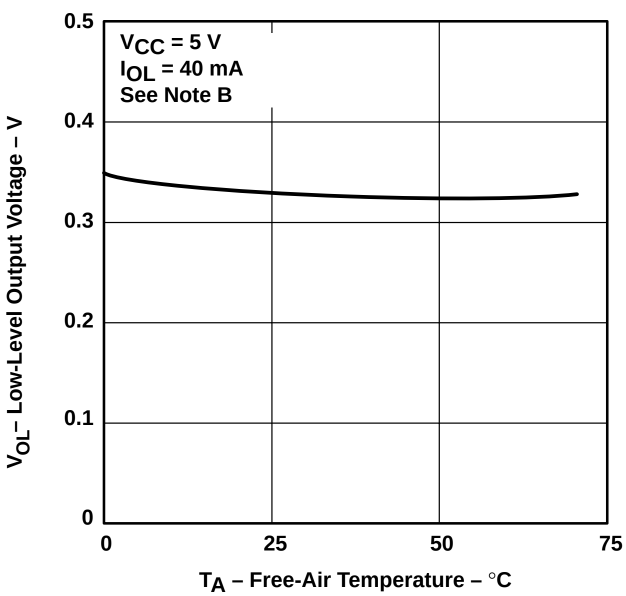


Figure 8

LOW-LEVEL OUTPUT VOLTAGE
vs
LOW-LEVEL OUTPUT CURRENT

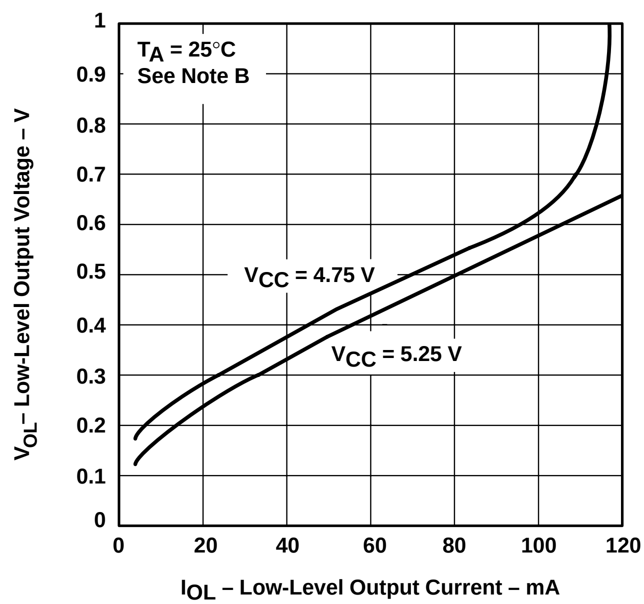


Figure 9

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.

TYPICAL CHARACTERISTICS

Y OUTPUT VOLTAGE vs DATA INPUT VOLTAGE

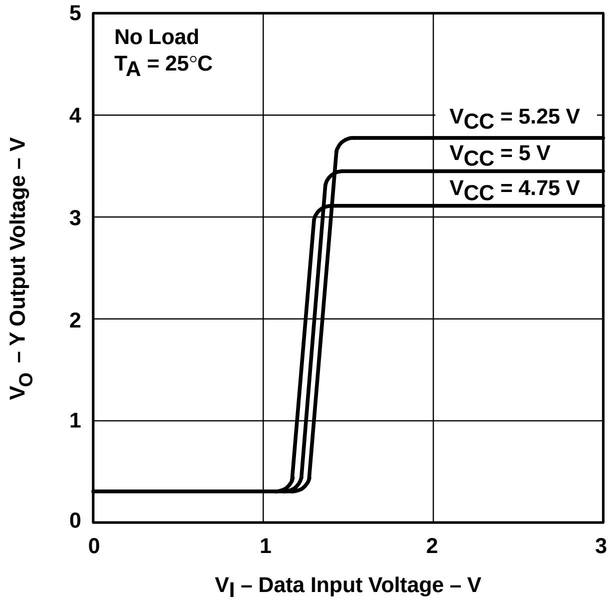


Figure 10

Y OUTPUT VOLTAGE vs DATA INPUT VOLTAGE

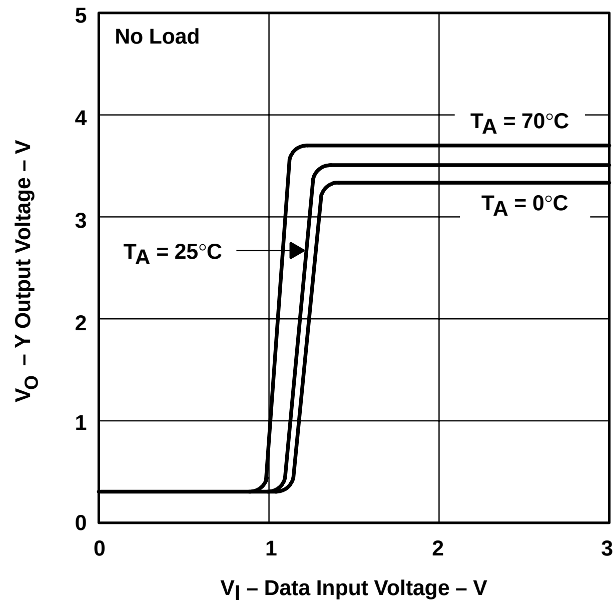


Figure 11

Mailing Address:

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