

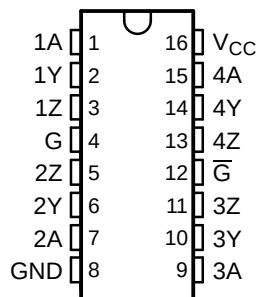
FEATURES

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

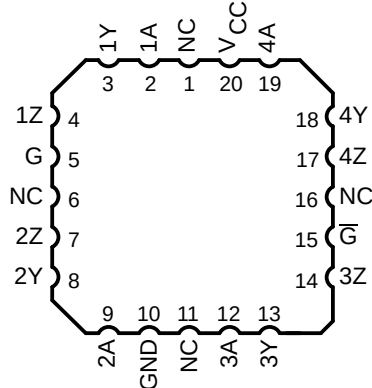
DESCRIPTION/ORDERING INFORMATION

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 are in the 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.

**D, DB, N, NS, J, OR W PACKAGE
(TOP VIEW)**



**FK PACKAGE
(TOP VIEW)**



ORDERING INFORMATION

T_A	PACKAGE ⁽¹⁾		ORDERABLE PART NUMBER	TOP-SIDE MARKING
0°C to 70°C	PDIP – N	Tube	AM26LS31CN	AM26LS31CN
	SOIC – D	Tube	AM26LS31CD	AM26LS31C
		Tape and reel	AM26LS31CDR	
	SOP – NS	Tape and reel	AM26LS31CNSR	26LS31
	SSOP – DB	Tape and reel	AM26LS31CDBR	SA31C
–55°C to 125°C	CDIP – J	Tube	AM26LS31MJB	AM26LS31MJB
	LCCC – FK	Tube	AM26LS31MFKB	AM26LS31MFKB
	CFP – W	Tube	AM26LS31MWB	AM26LS31MWB

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



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AM26LS31C, AM26LS31M

QUADRUPLE DIFFERENTIAL LINE DRIVER

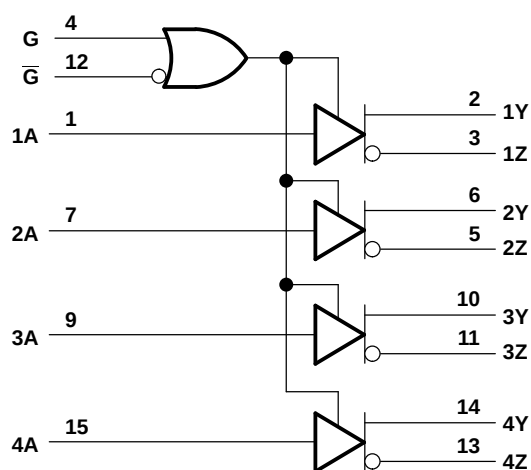
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FUNCTION TABLE⁽¹⁾
(EACH DRIVER)

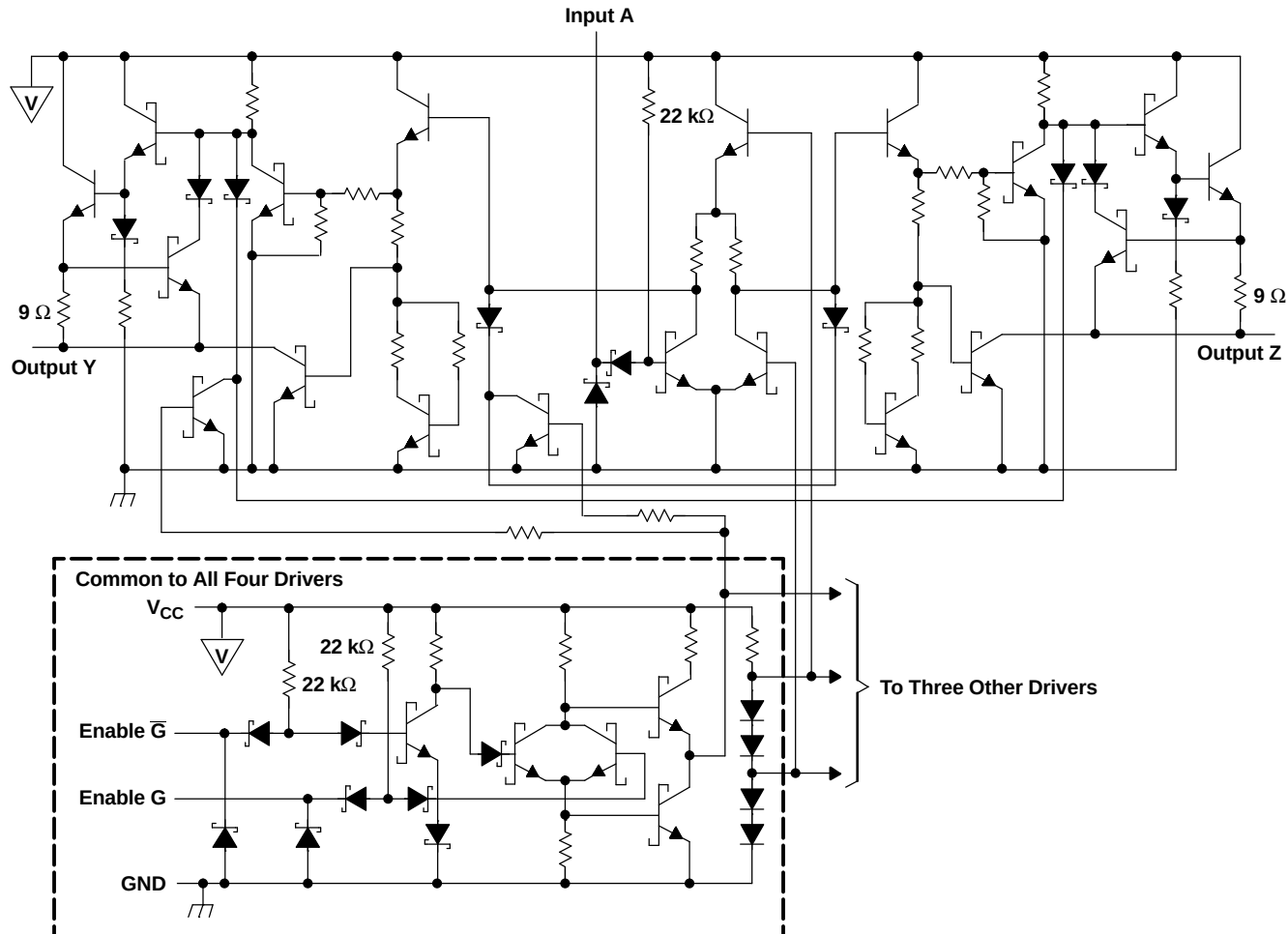
INPUT A	ENABLES		OUTPUTS	
	G	$\overline{G}$	Y	Z
H	H	X	H	L
L	H	X	L	H
H	X	L	H	L
L	X	L	L	H
X	L	H	Z	Z

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

LOGIC DIAGRAM (POSITIVE LOGIC)



SCHEMATIC (EACH DRIVER)



All resistor values are nominal.

Absolute Maximum Ratings⁽¹⁾

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

		MIN	MAX	UNIT
V_{CC}	Supply voltage ⁽²⁾		7	V
V_I	Input voltage		7	V
	Output off-state voltage		5.5	V
θ_{JA}	Package thermal impedance ⁽³⁾		73	°C/W
			82	
			67	
			64	
	Lead temperature 1,6 mm (1/16 in) from case for 10 s		260	°C
	Lead temperature 1,6 mm (1/16 in) from case for 60 s		300	°C
T_{stg}	Storage temperature range	-65	150	°C

- (1) 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.
- (2) All voltage values, except differential output voltage V_{OD} , are with respect to network GND.
- (3) The package thermal impedance is calculated in accordance with JESD 51-7.

AM26LS31C, AM26LS31M QUADRUPLE DIFFERENTIAL LINE DRIVER

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Recommended Operating Conditions

			MIN	NOM	MAX	UNIT
V _{CC}	Supply voltage	AM26LS31C	4.75	5	5.25	V
		AM26LS31M	4.5	5	5.5	
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	AM26LS31C	0		70	°C
		AM26LS31M	−55		125	

Electrical Characteristics⁽¹⁾

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

PARAMETER	TEST CONDITIONS	MIN	TYP ⁽²⁾	MAX	UNIT
V _{IK}	Input clamp voltage	V _{CC} = MIN, I _I = –18 mA		–1.5	V
V _{OH}	High-level output voltage	V _{CC} = MIN, I _{OH} = –20 mA	2.5		V
V _{OL}	Low-level output voltage	V _{CC} = MIN, I _{OL} = 20 mA		0.5	V
I _{OZ}	Off-state (high-impedance-state) output current	V _{CC} = MIN, V _O = 0.5 V		–20	μA
				20	
I _I	Input current at maximum input voltage	V _{CC} = MAX, V _I = 7 V		0.1	mA
I _{IH}	High-level input current	V _{CC} = MAX, V _I = 2.7 V		20	μA
I _{IL}	Low-level input current	V _{CC} = MAX, V _I = 0.4 V		–0.36	mA
I _{OS}	Short-circuit output current ⁽³⁾	V _{CC} = MAX	–30	–150	mA
I _{CC}	Supply current	V _{CC} = MAX, All outputs disabled	32	80	mA

(1) For C-suffix devices, V_{CC} min = 4.75 V and V_{CC} max = 5.25 V. For M-suffix devices, V_{CC} min = 4.5 V and V_{CC} max = 5.5 V.

(2) All typical values are at V_{CC} = 5 V and T_A = 25°C.

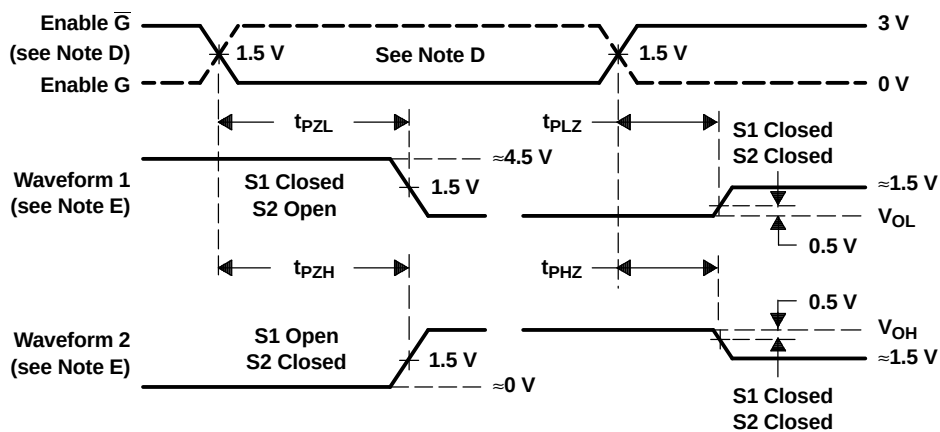
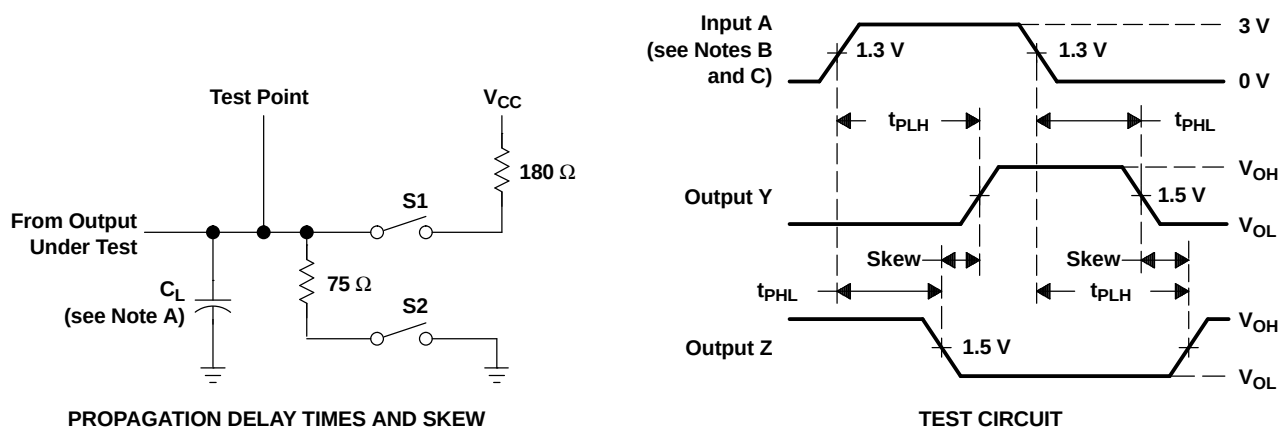
(3) Not more than one output should be shorted at a time, and duration of the short circuit should not exceed one second.

Switching Characteristics

V_{CC} = 5 V (see [Figure 1](#))

PARAMETER	TEST CONDITIONS	T _A = 25°C			AM26LS31M		UNIT
		MIN	TYP	MAX	MIN	MAX	
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		
t _{SKEW}	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: $PRR \leq 1$ 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

TYPICAL CHARACTERISTICS

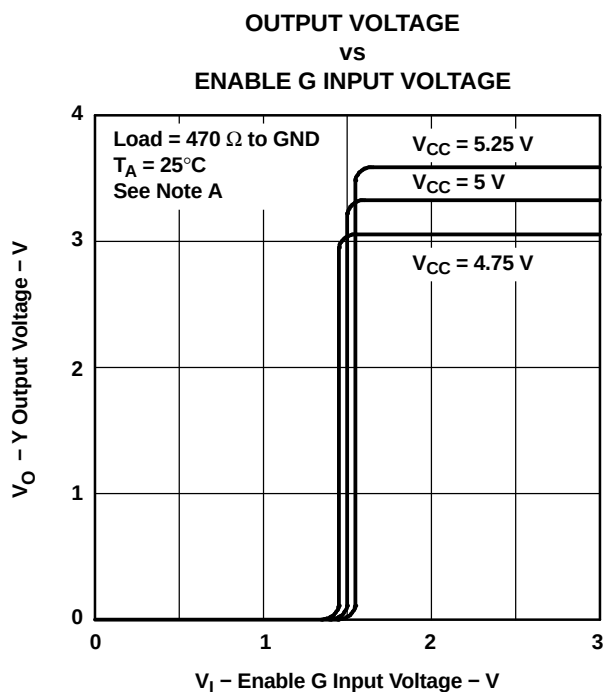


Figure 2.

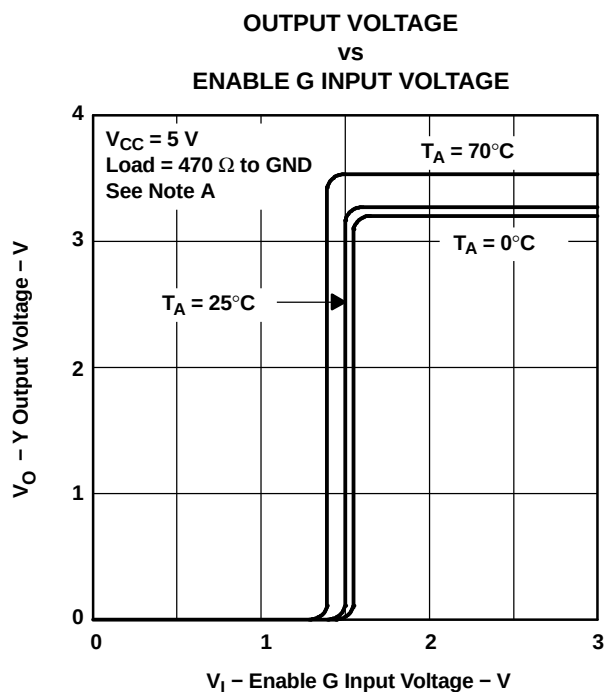


Figure 3.

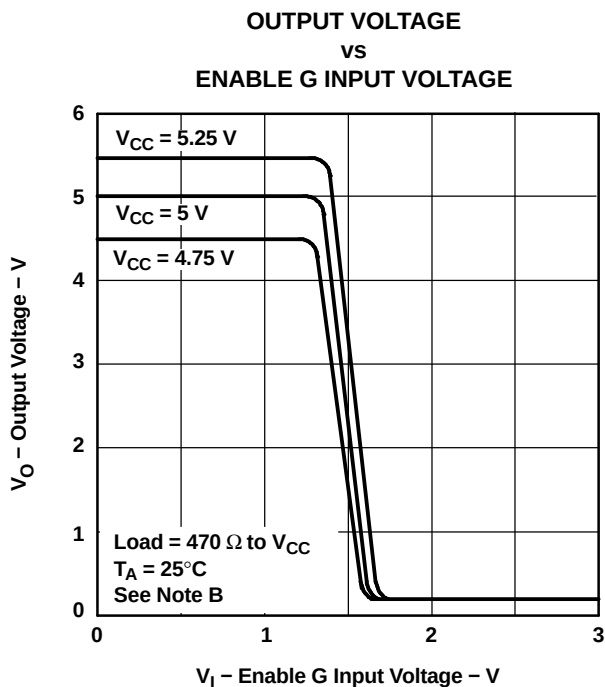


Figure 4.

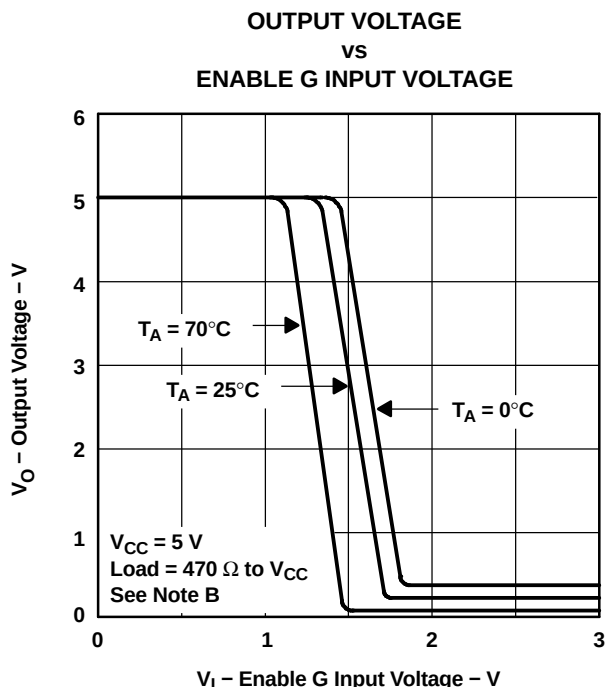


Figure 5.

- 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 (continued)

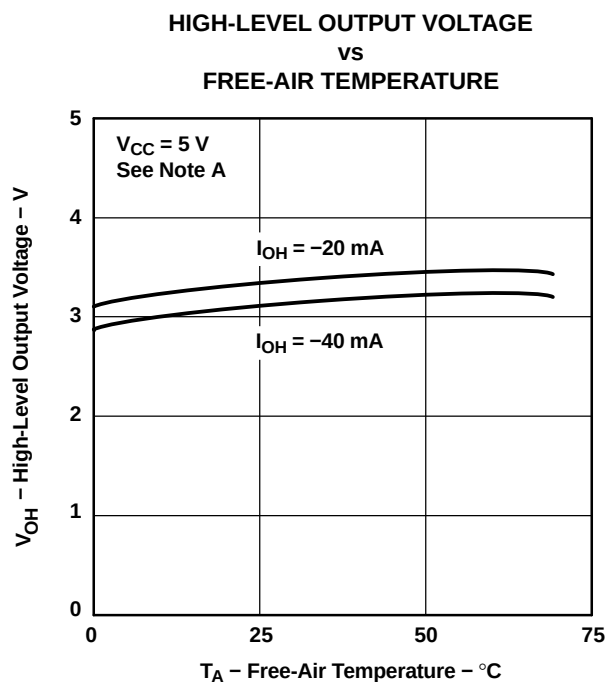


Figure 6.

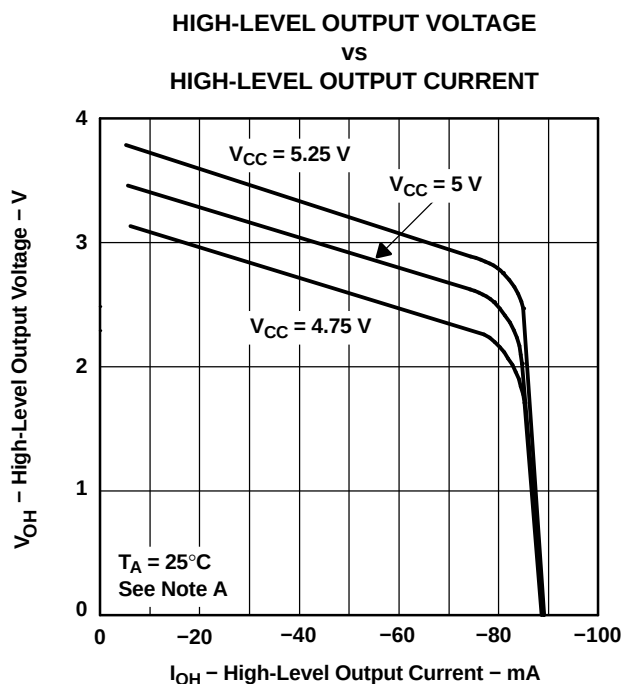


Figure 7.

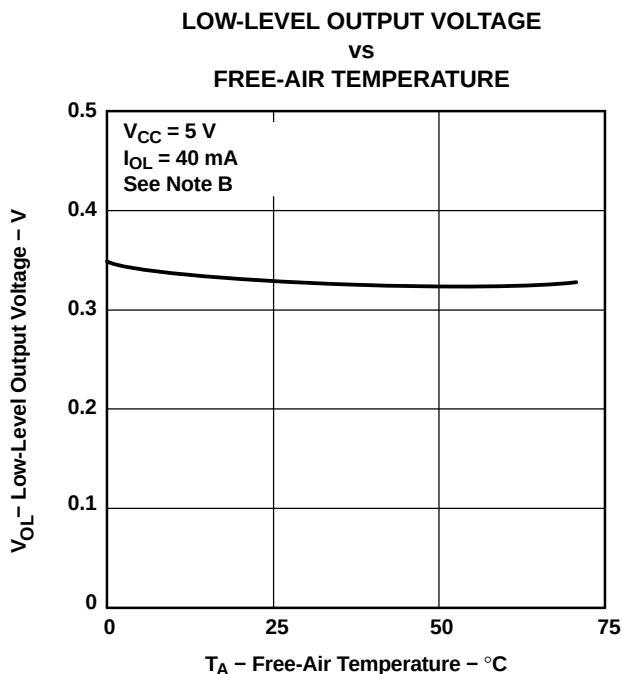


Figure 8.

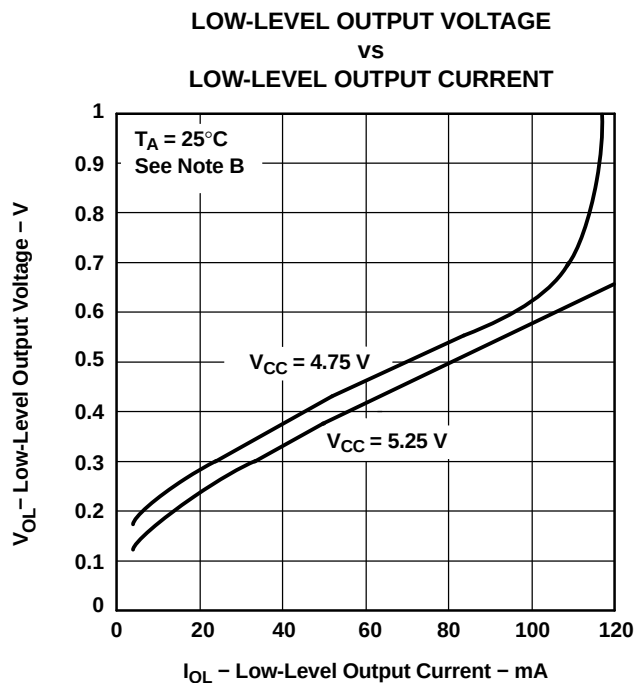


Figure 9.

- 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 (continued)

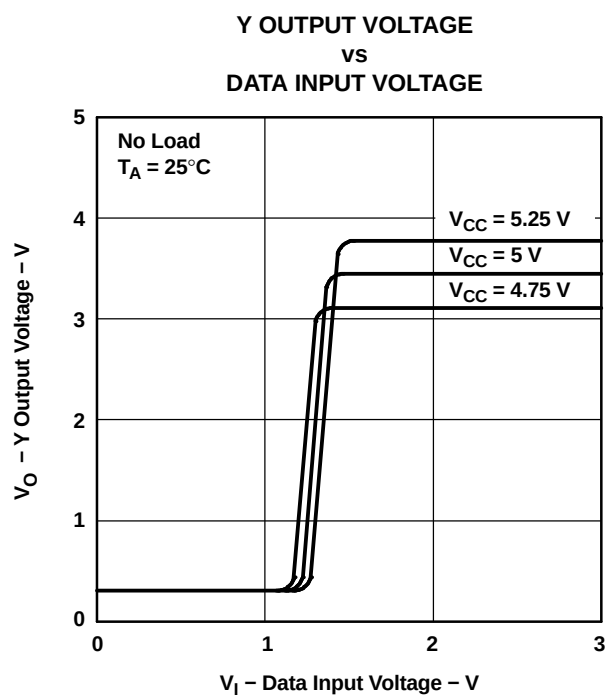


Figure 10.

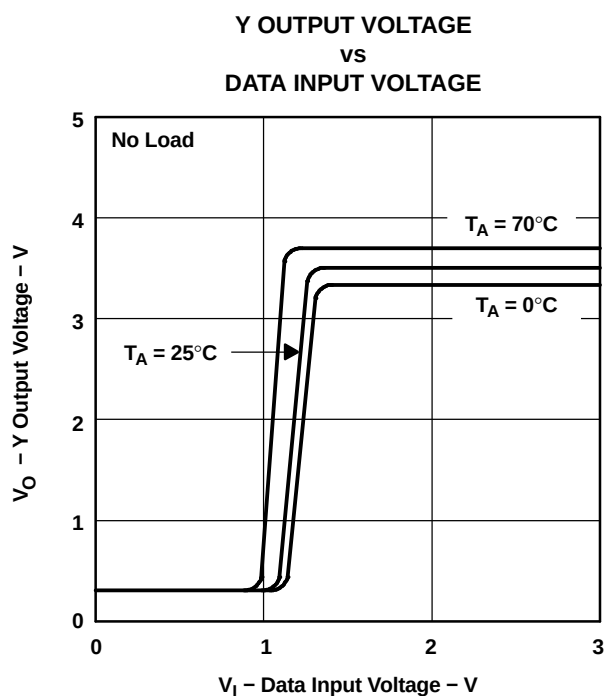


Figure 11.