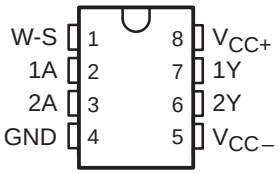
SLLS110B – OCTOBER 1980 – REVISED MAY 1995

- **Meets or Exceeds the Requirements of ANSI Standards EIA/TIA-423-B and -232-E and ITU Recommendations V.10 and V.28**
- **Output Slew Rate Control**
- **Output Short-Circuit-Current Limiting**
- **Wide Supply Voltage Range**
- **8-Pin Package**
- **Designed to Be Interchangeable With National DS9636A**

D OR P PACKAGE
(TOP VIEW)

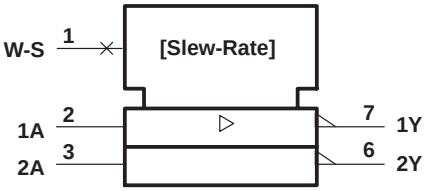


description

The uA9636AC is a dual, single-ended line driver designed to meet ANSI Standards EIA/TIA-423-B and EIA/TIA-232-E and ITU Recommendations V.10 and V.28. The slew rates of both amplifiers are controlled by a single external resistor, $R_{(WS)}$, connected between the wave-shape-control (W-S) terminal and GND. Output current limiting is provided. Inputs are compatible with TTL and CMOS and are diode protected against negative transients. This device operates from ±12 V and is supplied in an 8-pin package.

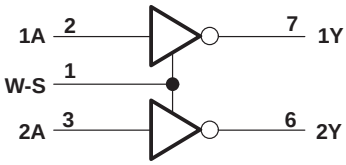
The uA9636AC is characterized for operation from 0°C to 70°C.

logic symbol†

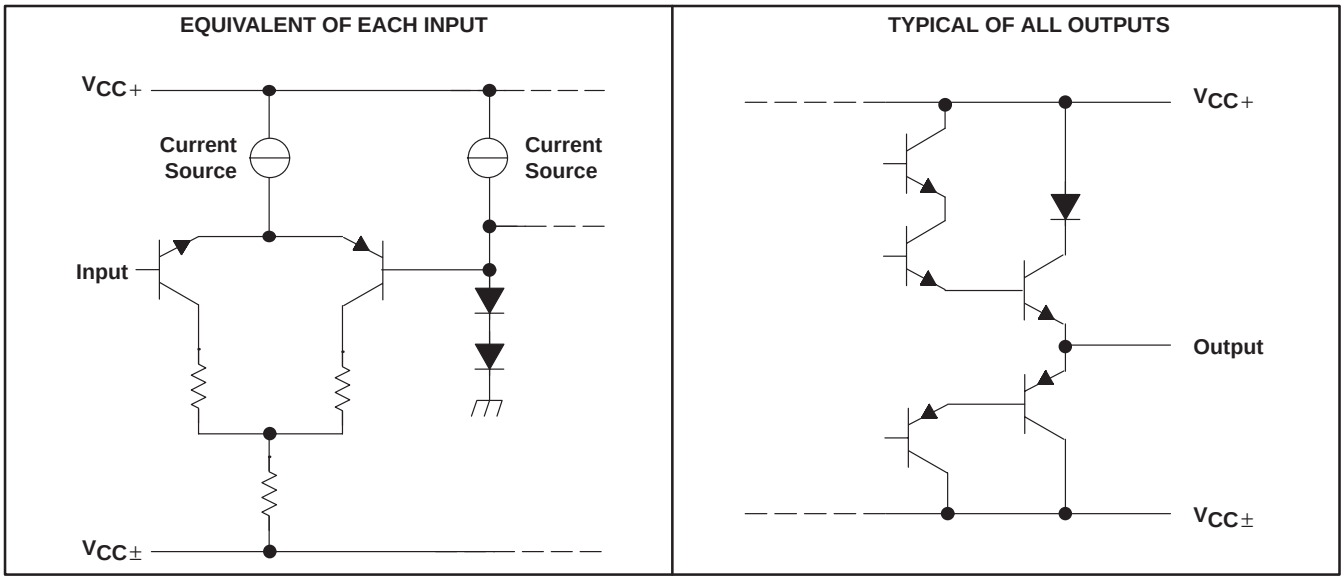


† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram



schematics of inputs and outputs



absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†

Positive supply voltage range, V_{CC+} (see Note 1) . . . . . V_{CC-} to 15 V
Negative supply voltage range, V_{CC-} . . . . . 0.5 V to –15 V
Output voltage, V_O . . . . . ±15 V
Output current, I_O . . . . . ±150 mA
Continuous total power 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.

NOTE 1: All voltage values are with respect to the network ground terminal.

DISSIPATION RATING TABLE

PACKAGE	$T_A \le 25°C$ POWER RATING	DERATING FACTOR ABOVE $T_A = 25°C$	$T_A = 70°C$ POWER RATING
D	725 mW	5.8 mW/°C	464 mW
P	1000 mW	8.0 mW/°C	640 mW

recommended operating conditions

	MIN	NOM	MAX	UNIT
Positive supply voltage, V_{CC+}	10.8	12	13.2	V
Negative supply voltage, V_{CC-}	–10.8	–12	–13.2	V
High-level input voltage, V_{IH}	2			V
Low-level input voltage, V_{IL}			0.8	V
Wave-shaping resistor, $R_{(WS)}$	10		1000	kΩ
Operating free-air temperature, T_A	0		70	°C

electrical characteristics over recommended ranges of free-air temperature, supply voltage, and wave-shaping resistance (unless otherwise noted)

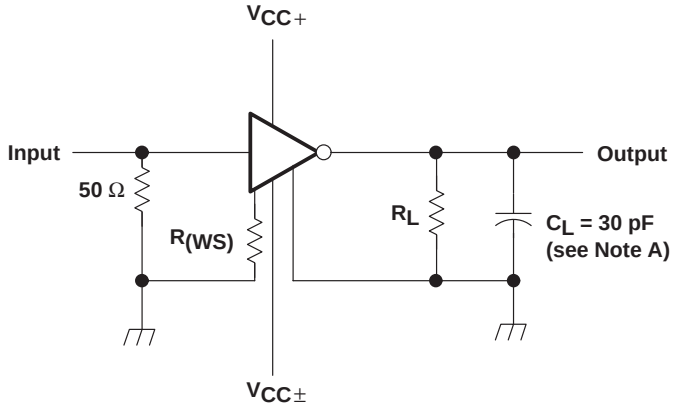
PARAMETER		TEST CONDITIONS		MIN	TYP†	MAX	UNIT
V_{IK}	Input clamp voltage	I_I = –15 mA			–1.1	–1.5	V
V_{OH}	High-level output voltage	V_I = 0.8 V	R_L = ∞	5	5.6	6	V
			R_L = 3 kΩ to GND	5	5.6	6	
			R_L = 450 Ω to GND	4	5.4	6	
V_{OL}	Low-level output voltage	V_I = 2 V	R_L = ∞	–6‡	–5.7	–5	V
			R_L = 3 kΩ to GND	–6‡	–5.6	–5	
			R_L = 450 Ω to GND	–6‡	–5.4	–4	
I_{IH}	High-level input current	V_I = 2.4 V				10	μA
		V_I = 5.5 V				100	
I_{IL}	Low-level input current	V_I = 0.4 V			–20	–80	μA
I_O	Output current (power off)	$V_{CC\pm}$ = 0,	V_O = ± 6 V			±100	μA
I_{OS}	Short-circut output current§	V_I = 2 V		15	25	150	mA
		V_I = 0		–15	–40	–150	
r_O	Output resistance	R_L = 450 Ω			25	50	Ω
I_{CC+}	Positive supply current	V_{CC} = ±12 V, $R_{(WS)}$ = 100 kΩ,	V_I = 0, Output open		13	18	mA
I_{CC-}	Negative supply current	V_{CC} = ±12 V, $R_{(WS)}$ = 100 kΩ,	V_I = 0, Output open		–13	–18	mA

† All typical values are at V_{CC} = ±12 V, T_A = 25°C.
‡ The algebraic convention, in which the less-positive (more-negative) limit is designated as minimum, is used in this data sheet for logic voltage levels, e.g., when –5 V is the maximum, the minimum is a more-negative voltage.
§ Not more than one output should be shorted to ground at a time.

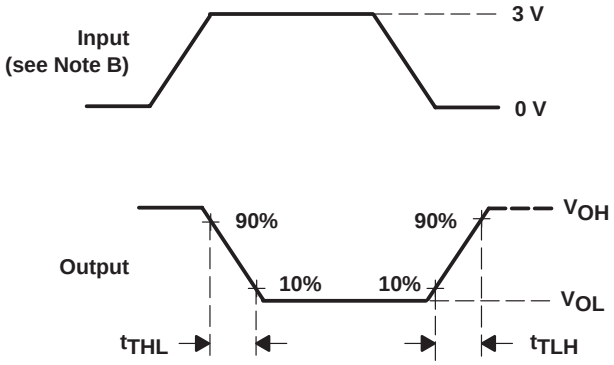
switching characteristics, $V_{CC\pm}$ = ±12 V, T_A = 25°C (see Figure 1)

PARAMETER		TEST CONDITIONS			MIN	TYP	MAX	UNIT
t_{TLH}	Transition time, low- to high-level output	R_L = 450 kΩ,	C_L = 30 pF	$R_{(WS)}$ = 10 kΩ	0.8	1.1	1.4	μs
				$R_{(WS)}$ = 100 kΩ	8	11	14	
				$R_{(WS)}$ = 500 kΩ	40	55	70	
				$R_{(WS)}$ = 1 MΩ	80	110	140	
t_{THL}	Transition time, high- to low-level output	R_L = 450 kΩ,	C_L = 30 pF	$R_{(WS)}$ = 10 kΩ	0.8	1.1	1.4	μs
				$R_{(WS)}$ = 100 kΩ	8	11	14	
				$R_{(WS)}$ = 500 kΩ	40	55	70	
				$R_{(WS)}$ = 1 MΩ	80	110	140	

PARAMETER MEASUREMENT INFORMATION



TEST CIRCUIT



VOLTAGE WAVEFORMS

NOTES: A. C_L includes probe and jig capacitance.
B. The input pulse is supplied by a generator having the following characteristics: $t_r \le 10$ ns, $t_f \le 10$ ns, $Z_O = 50\ \Omega$, PRR ≤ 1 kHz, duty cycle = 50%.

Figure 1. Test Circuit and Voltage Waveforms

TYPICAL CHARACTERISTICS

OUTPUT VOLTAGE vs INPUT VOLTAGE

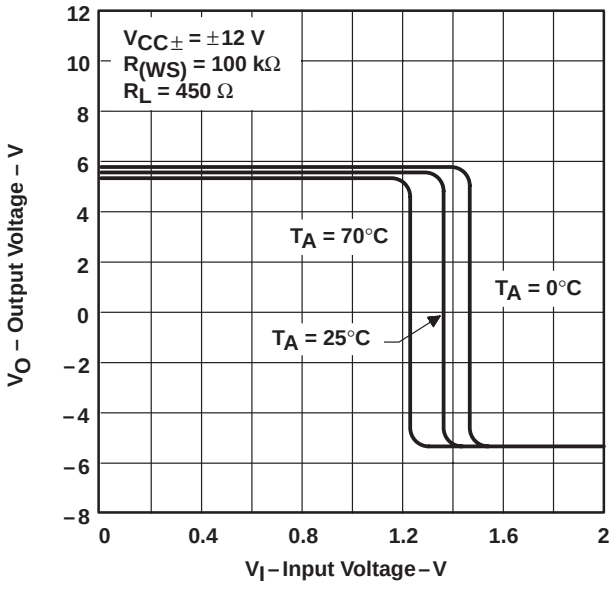


Figure 2

INPUT CURRENT vs INPUT VOLTAGE

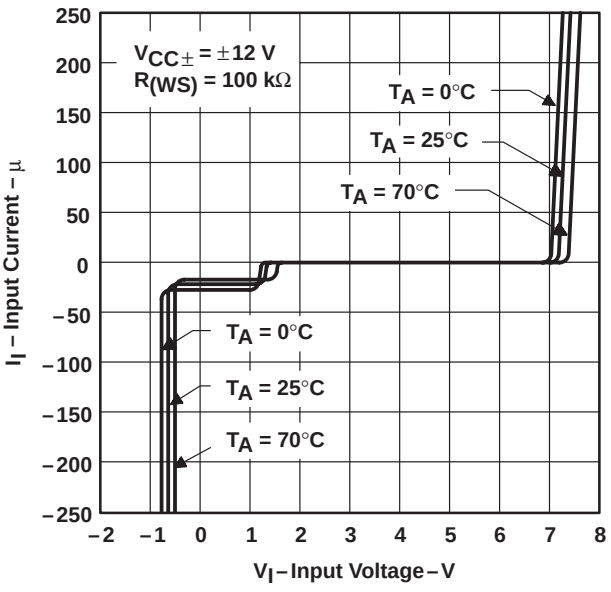


Figure 3

TYPICAL CHARACTERISTICS

OUTPUT CURRENT vs OUTPUT VOLTAGE (POWER ON)

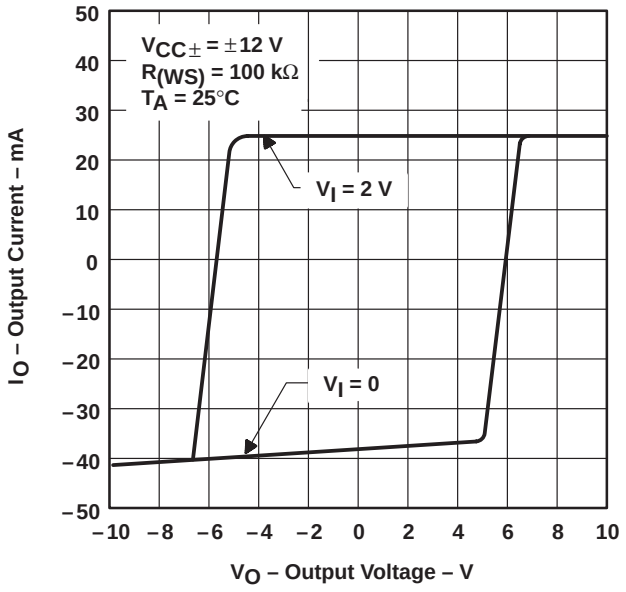


Figure 4

OUTPUT CURRENT vs OUTPUT VOLTAGE (POWER OFF)

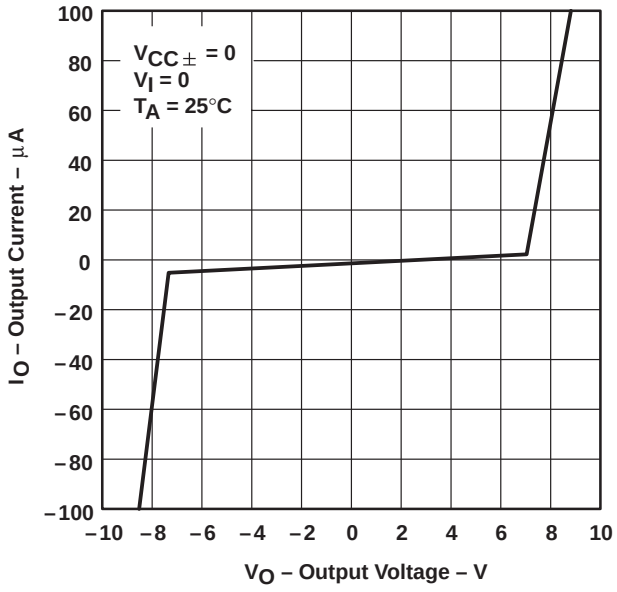


Figure 5

TRANSITION TIME vs WAVE-SHAPING RESISTANCE

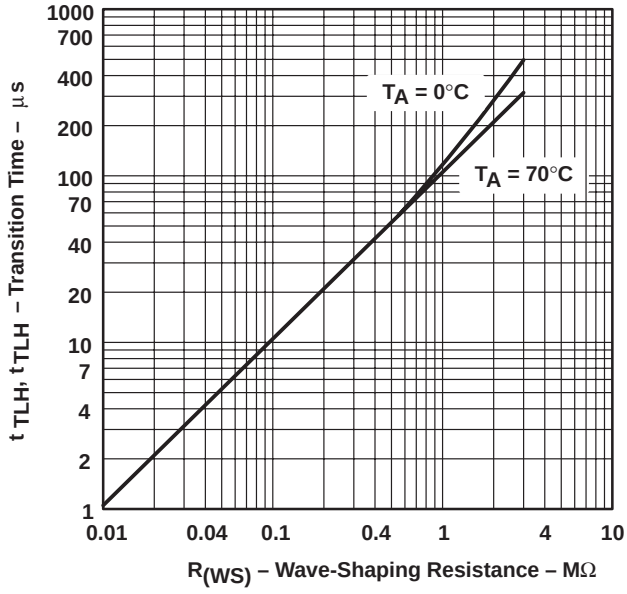


Figure 6

APPLICATION INFORMATION

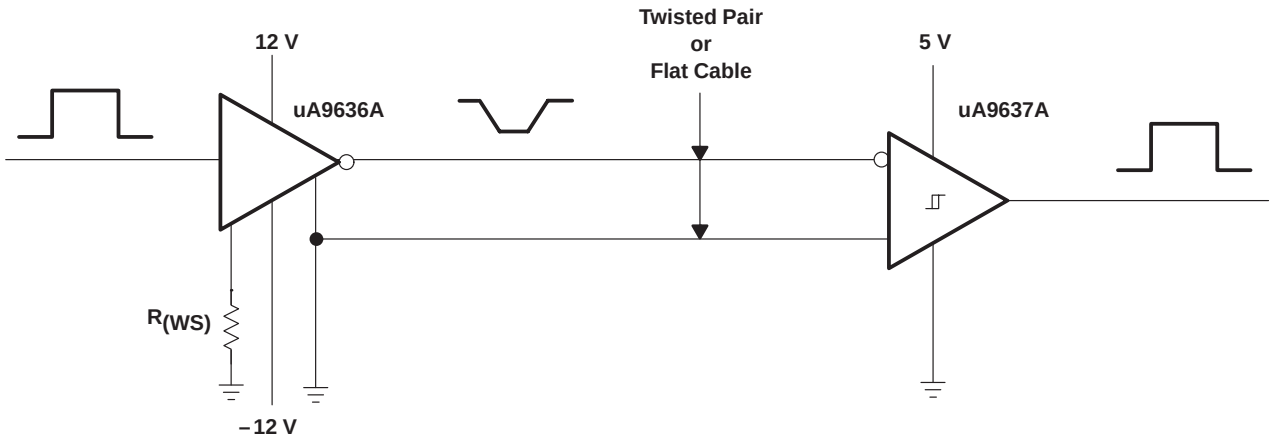


Figure 7. EIA/TIA-423-B System Application

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