

CMOS Quad True/Complement Buffer

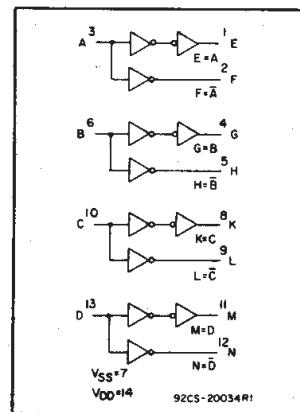
High Voltage Types (20-Volt Rating)

■ CD4041UB types are quad true/complement buffers consisting of n- and p-channel units having low channel resistance and high current (sourcing and sinking) capability. The CD4041UB is intended for use as a buffer, line driver, or CMOS-to-TTL driver. It can be used as an ultra-low power resistor-network driver for A/D and D/A conversion, as a transmission-line driver, and in other applications where high noise immunity and low power dissipation are primary design requirements.

The CD4041UB types are supplied in 14-lead hermetic dual-in-line ceramic packages (D and F suffixes), 14-lead dual-in-line plastic packages (E suffix), 14-lead ceramic flat packages (K suffix), and in chip form (H suffix).

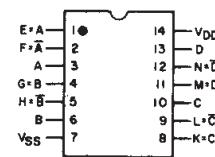
Features:

- Balanced sink and source current; approximately 4 times standard "B" drive
- Equalized delay to true and complement outputs
- 100% tested for quiescent current at 20 V
- Maximum input current of 1 μ A at 18 V over full package temperature range; 100 nA at 18 V and 25°C
- 5-V, 10-V, and 15-V parametric ratings
- Meets all requirements of JEDEC Tentative Standard No. 13B, "Standard Specifications for Description of 'B' Series CMOS Devices"



Applications:

- High current source/sink driver
- CMOS-to-DTL/TTL Converter Buffer
- Display driver
- MOS clock driver
- Resistor network driver (Ladder or weighted R)
- Buffer
- Transmission line driver



92CS-20034R1

TOP VIEW TERMINAL ASSIGNMENT

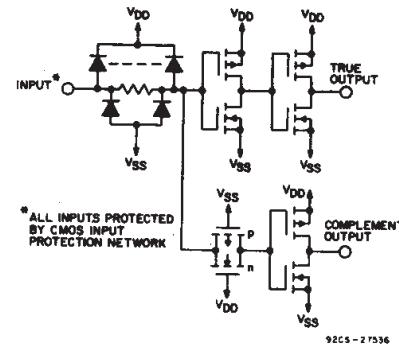


Fig.1 — Schematic diagram 1 of 4 buffers.

MAXIMUM RATINGS, Absolute-Maximum Values:

DC SUPPLY-VOLTAGE RANGE, (V_{DD})

Voltages referenced to V_{SS} Terminal -0.5V to +20V

INPUT VOLTAGE RANGE, ALL INPUTS -0.5V to V_{DD} +0.5V

DC INPUT CURRENT, ANY ONE INPUT $\pm 10\text{mA}$

POWER DISSIPATION PER PACKAGE (P_D):

For $T_A = -55^\circ\text{C}$ to $+100^\circ\text{C}$ 500mW

For $T_A = +100^\circ\text{C}$ to $+125^\circ\text{C}$ Derate Linearity at 12mW/ $^\circ\text{C}$ to 200mW

DEVICE DISSIPATION PER OUTPUT TRANSISTOR

FOR $T_A = \text{FULL PACKAGE TEMPERATURE RANGE}$ (All Package Types) 100mW

OPERATING-TEMPERATURE RANGE (T_A) -55°C to +125°C

STORAGE TEMPERATURE RANGE (T_{stg}) -65°C to +150°C

LEAD TEMPERATURE (DURING SOLDERING):

At distance $1/16 \pm 1/32$ inch (1.59 \pm 0.79mm) from case for 10s max +265°C

RECOMMENDED OPERATING CONDITIONS

For maximum reliability, nominal operating conditions should be selected so that operation is always within the following range:

CHARACTERISTIC	LIMITS		UNITS
	Min.	Max.	
Supply-Voltage Range (For $T_A=\text{Full Package Temperature Range}$)	3	18	V

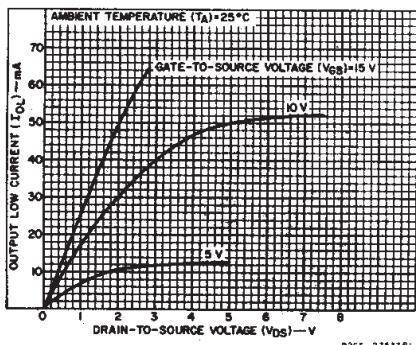


Fig.2 — Typical output low (sink) current characteristics.

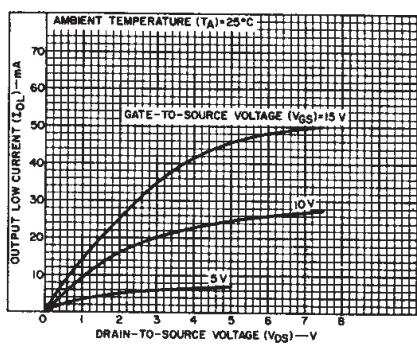


Fig.3 — Minimum low (sink) current characteristics.

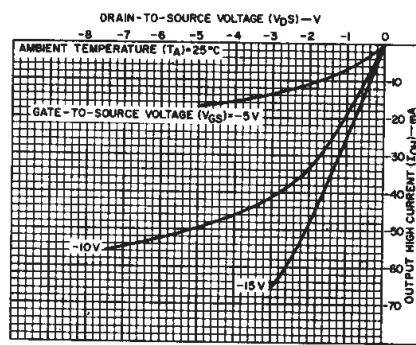


Fig.4 — Typical output high (source) current characteristics.

CD4041UB Types

STATIC ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	CONDITIONS			LIMITS AT INDICATED TEMPERATURES (°C)						UNITS	
				-55	-40	+85	+125	+25			
	V _O (V)	V _{IN} (V)	V _{DD} (V)	Min.	Typ.	Max.					
Quiescent Device Current	-	0.5	5	1	1	30	30	-	0.02	1	μA
	-	0.10	10	2	2	60	60	-	0.02	2	
	-	0.15	15	4	4	120	120	-	0.02	4	
	-	0.20	20	20	20	600	600	-	0.04	20	
Output Low (Sink) Current, I _{OL} Min.	0.4	0.5	5	2.1	1.8	1.3	1.2	1.6	3.2	-	mA
	0.5	0.10	10	6.25	5.6	4	3.5	5	10	-	
	1.5	0.15	15	24	23	15.5	13	19	38	-	
	4.6	0.5	5	-2.1	-1.8	-1.3	-1.2	-1.6	-3.2	-	
Output High (Source) Current, I _{OH} Min.	2.5	0.5	5	-8.4	-6.7	-5.3	-4.6	-6.4	-12.8	-	mA
	9.5	0.10	10	-6.25	-5.6	-4	-3.5	-5	-10	-	
	13.5	0.15	15	-24	-23	-15.5	-13	-19	-38	-	
	-	0.5	5	0.05			-	0	0.05	-	
Output Voltage: Low-Level, V _{OL} Max.	-	0.10	10	0.05			-	0	0.05	-	V
	-	0.15	15	0.05			-	0	0.05	-	
	-	0.5	5	4.95			4.95	5	-	-	
Output Voltage: High-Level, V _{OH} Min.	-	0.10	10	9.95			9.95	10	-	-	V
	-	0.15	15	14.95			14.95	15	-	-	
	-	0.5	5	1			-	-	1	-	
Input Low Voltage, V _{IL} Max.	0.5,4.5	-	5	2			-	-	2	-	V
	1.9	-	10	2.5			-	-	2.5	-	
	1.5,13.5	-	15	4			-	-	-	-	
Input High Voltage, V _{IH} Min.	0.5,4.5	-	5	8			4	-	-	-	V
	1.9	-	10	12.5			8	-	-	-	
	1.5,13.5	-	15	15			12.5	-	-	-	
Input Current, I _{IN} Max.	-	0.18	18	±0.1	±0.1	±1	±1	-	±10 ⁻⁵	±0.1	μA

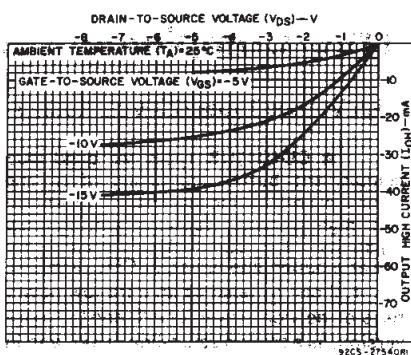


Fig.5 – Minimum output high (source) current characteristics.

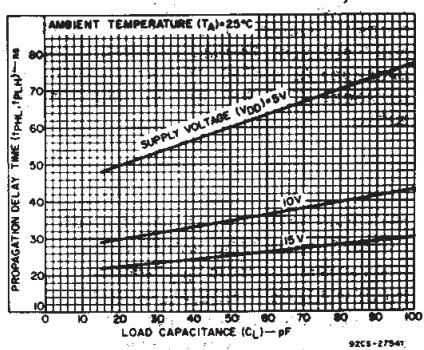


Fig.6 – Typical propagation delay time vs. load capacitance.

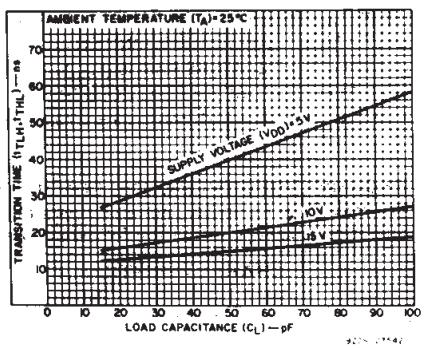


Fig.7 – Typical transition time vs. load capacitance.

DYNAMIC ELECTRICAL CHARACTERISTICS at T_A = 25°C, Input t_r, t_f = 20 ns,
C_L = 50 pF, R_L = 200 kΩ

CHARACTERISTIC	CONDITIONS			LIMITS			UNITS
				V _{DD} Volts	Typ.	Max.	
Propagation Delay Time: t _{PHL} , t _{PLH}				5	60	120	ns
				10	35	70	
				15	25	50	
Transition Time: t _{TTL} , t _{THL}				5	40	80	ns
				10	20	40	
				15	15	30	
Input Capacitance	C _{IN}	Any Input		15	22.5	pF	

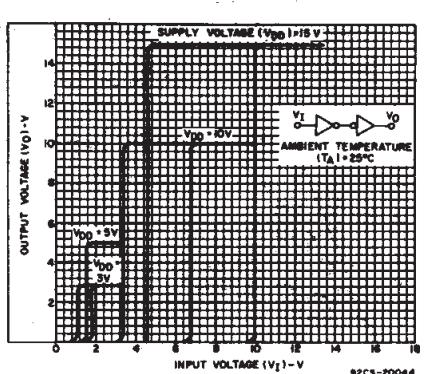
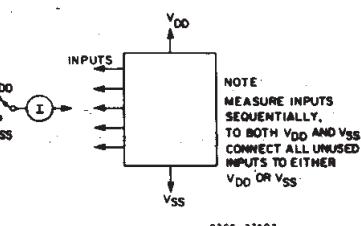
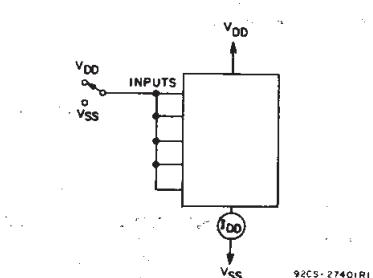
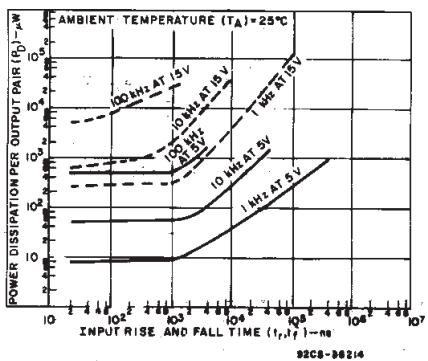
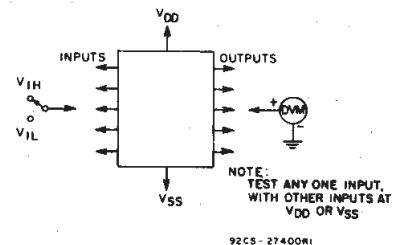
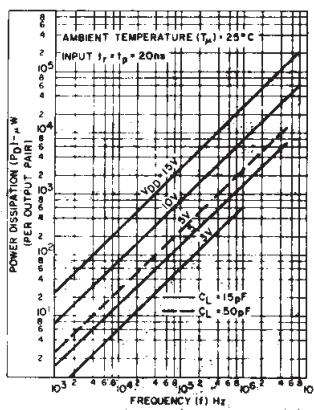
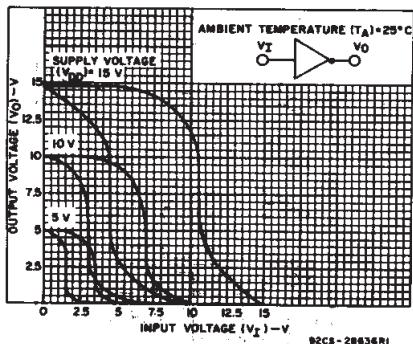
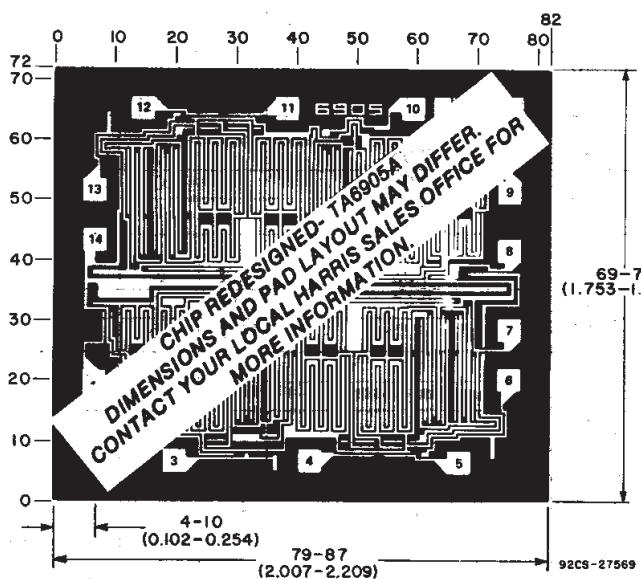


Fig.8 – Minimum and maximum transfer characteristics – true output.

CD4041UB Types



Dimensions and pad layout for the CD4041UBH



Dimensions in parentheses are in millimeters and are derived from the basic inch dimensions as indicated. Grid graduations are in mils (10^{-3} inch).