



## UCD40106B

Preliminary

CMOS IC

### HEX SCHMITT TRIGGERS

#### DESCRIPTION

The **UCD40106B** is a high speed Si-gate CMOS device which contains six independent Schmitt-trigger inverters and they perform the function  $Y=\bar{A}$ .

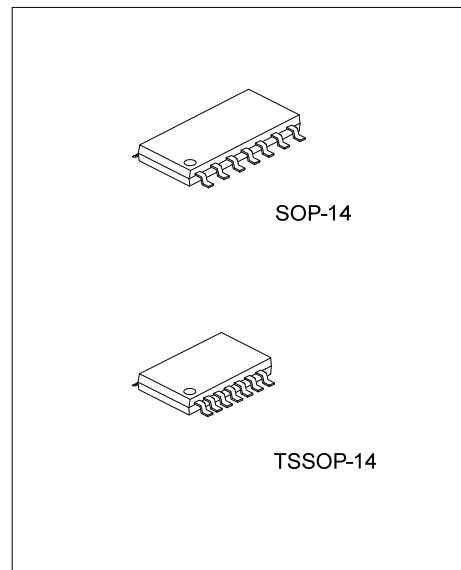
The device have different input threshold levels for positive-going ( $V_{T+}$ ) and negative-going ( $V_{T-}$ ) signals because of the Schmitt-trigger action in the input.

#### FEATURES

- \* High voltage type (20V rating)
- \* All inputs have Schmitt-trigger action
- \* Hysteresis Voltage(TYP): 0.9V at  $V_{CC}=5V$   
2.3V at  $V_{CC}=10V$   
3.5V at  $V_{CC}=15V$
- \* Wide supply voltage range from 3V to 18V
- \* Inputs are TTL-Voltage compatible
- \* Noise immunity greater than 50%

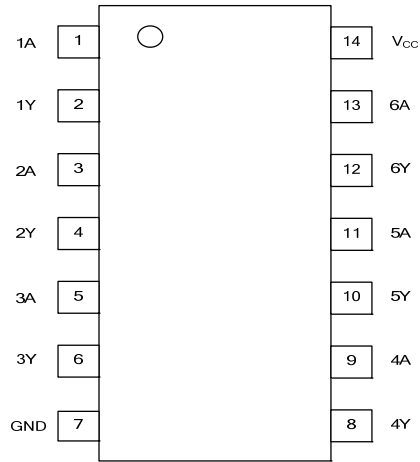
#### ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
UCD40106BL-S14-R	UCD40106BG-S14-R	SOP-14	Tape Reel
UCD40106BL-S14-T	UCD40106BG-S14-T	SOP-14	Tube
UCD40106BL-P14-R	UCD40106BG-P14-R	TSSOP-14	Tape Reel
UCD40106BL-P14-T	UCD40106BG-P14-T	TSSOP-14	Tube



<p>UCD40106BG-S14-T</p>	<p>(1) T: Tube, R: Tape Reel (2) S14: SOP-14, P14: TSSOP-14 (3) L: Lead Free, G: Halogen Free</p>
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■ PIN CONFIGURATION

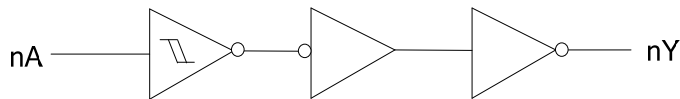


■ FUNCTION TABLE (each gate)

INPUT	OUTPUT
A	Y
L	H
H	L

Note: H: HIGH voltage level; L: LOW voltage level

■ LOGIC DIAGRAM (positive logic)



■ ABSOLUTE MAXIMUM RATING ( $T_A = 25^\circ\text{C}$ , unless otherwise specified)(Note 1)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V_{CC}$	-0.5 ~ 20	V
Input Voltage	$V_{IN}$	-0.5~ $V_{CC}+0.5$	V
DC Input Current, Any One Input	$I_{IN}$	$\pm 10$	mA
Power Dissipation	$P_D$	500	mW
Storage Temperature	$T_{STG}$	-65 ~ +150	$^\circ\text{C}$

Note 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	$V_{CC}$	Operating	3		18	V
Input Voltage	$V_{IN}$		0		$V_{CC}$	V
Operating Temperature	$T_{OPR}$		-40		+85	$^\circ\text{C}$

■ STATIC CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Positive-Going Input Threshold Voltage	$V_{T+}$	$V_{CC}=5\text{V}$	2.2	2.9	3.6	V
		$V_{CC}=10\text{V}$	4.6	5.9	7.1	
		$V_{CC}=15\text{V}$	6.6	8.8	10.8	
Negative-Going Input Threshold Voltage	$V_{T-}$	$V_{CC}=5\text{V}$	0.9	1.9	2.8	V
		$V_{CC}=10\text{V}$	2.5	3.9	5.2	
		$V_{CC}=15\text{V}$	4.0	5.8	7.4	
Hysteresis Voltage ( $V_{T+}-V_{T-}$ ) (see figure 3)	$\Delta V_T$	$V_{CC}=5\text{V}$	0.3	0.9	1.6	V
		$V_{CC}=10\text{V}$	1.2	2.3	3.6	
		$V_{CC}=15\text{V}$	1.6	3.5	5.0	
High-Level Output Voltage	$V_{OH}$	$V_{CC}=5\text{V},  I_O  < 1\mu\text{A}$	4.95	5		V
		$V_{CC}=10\text{V},  I_O  < 1\mu\text{A}$	9.95	10		
		$V_{CC}=15\text{V},  I_O  < 1\mu\text{A}$	14.95	15		
Low-Level Output Voltage	$V_{OL}$	$V_{CC}=5\text{V},  I_O  < 1\mu\text{A}$		0	0.05	V
		$V_{CC}=10\text{V},  I_O  < 1\mu\text{A}$		0	0.05	
		$V_{CC}=15\text{V},  I_O  < 1\mu\text{A}$		0	0.05	
High-level Output Current	$I_{OH}$	$V_{CC}=5\text{V}, V_O=4.6\text{V}$	-0.51	-1		mA
		$V_{CC}=5\text{V}, V_O=2.5\text{V}$	-1.6	-3.2		
		$V_{CC}=10\text{V}, V_O=9.5\text{V}$	-1.3	-2.6		
		$V_{CC}=15\text{V}, V_O=13.5\text{V}$	-3.4	-6.8		
Low-level Output Current	$I_{OL}$	$V_{CC}=5\text{V}, V_O=0.4\text{V}$	0.51	1.0		mA
		$V_{CC}=10\text{V}, V_O=0.5\text{V}$	1.3	2.6		
		$V_{CC}=15\text{V}, V_O=1.5\text{V}$	3.4	6.8		
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=18\text{V}, V_{IN}=V_{CC}$ or GND		$\pm 0.01$	$\pm 100$	nA
Quiescent Supply Current	$I_{DD}$	$V_{CC}=5\text{V}, V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$		0.02	1	uA
		$V_{CC}=10\text{V}, V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$		0.02	2	
		$V_{CC}=15\text{V}, V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$		0.02	4	
		$V_{CC}=20\text{V}, V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$		0.04	20	

■ DYNAMIC CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ , unless otherwise specified; Input:  $t_R, t_F = 20\text{ns}$ )

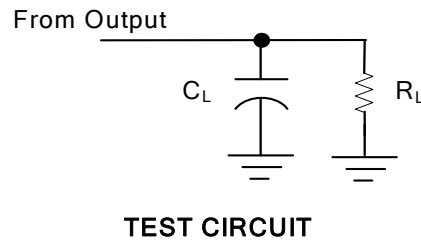
See Fig. 1 and Fig. 2 for test circuit and waveforms.

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input (A) to output(Y)	$t_{PLH}/t_{PHL}$	$V_{CC}=5\text{V}, C_L=50\text{Pf}, R_L=200\text{K}\Omega$		140	280	ns
		$V_{CC}=10\text{V}, C_L=50\text{Pf}, R_L=200\text{K}\Omega$		70	140	
		$V_{CC}=15\text{V}, C_L=50\text{Pf}, R_L=200\text{K}\Omega$		60	120	
Output Transition Time	$t_{TLH}/t_{THL}$	$V_{CC}=5\text{V}, C_L=50\text{Pf}, R_L=200\text{K}\Omega$		100	200	ns
		$V_{CC}=10\text{V}, C_L=50\text{Pf}, R_L=200\text{K}\Omega$		50	100	
		$V_{CC}=15\text{V}, C_L=50\text{Pf}, R_L=200\text{K}\Omega$		40	80	

■ OPERATING CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Average Input Capacitance	$C_{IN}$	Any Input		5	7.5	pF
Power Dissipation Capacitance	$C_{PD}$	Any Gate		14		pF

■ TEST CIRCUIT AND WAVEFORMS



Note:  $C_L$  includes probe and jig capacitance.

Fig. 1 Load circuitry for switching times.

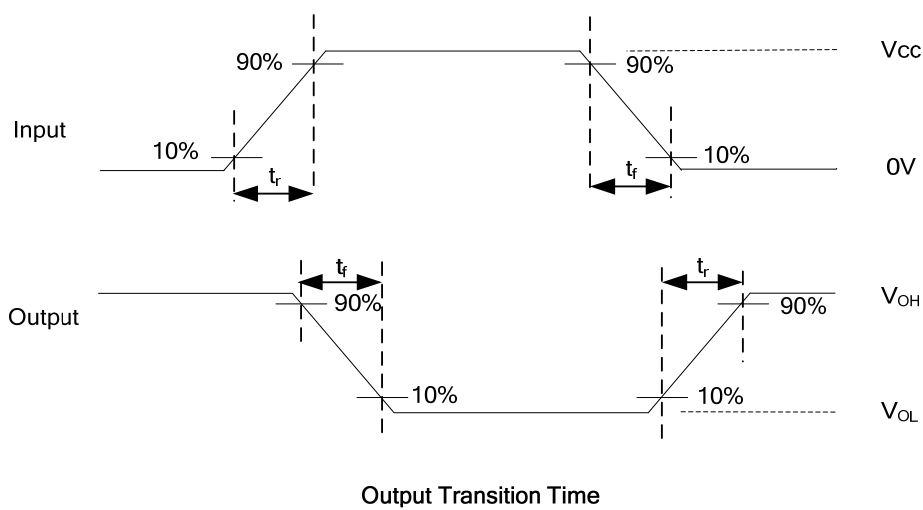
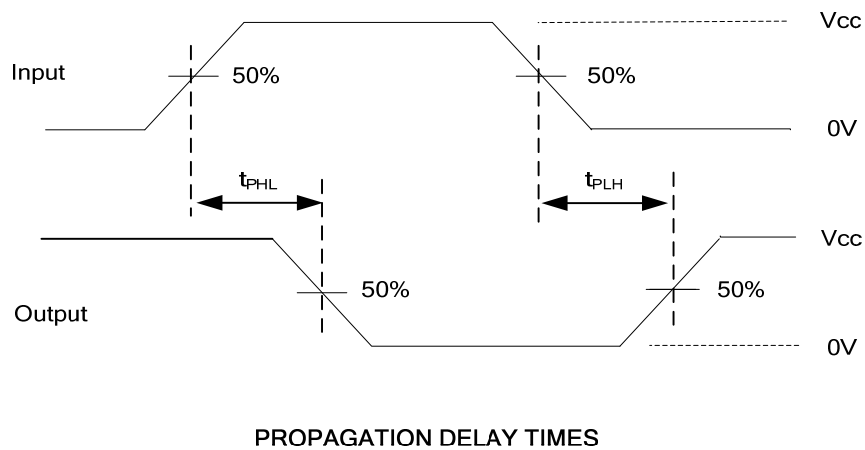


Fig. 2 Propagation delay from input(A) to output(Y) and Output transition time.

■ TEST CIRCUIT AND WAVEFORMS(Cont.)

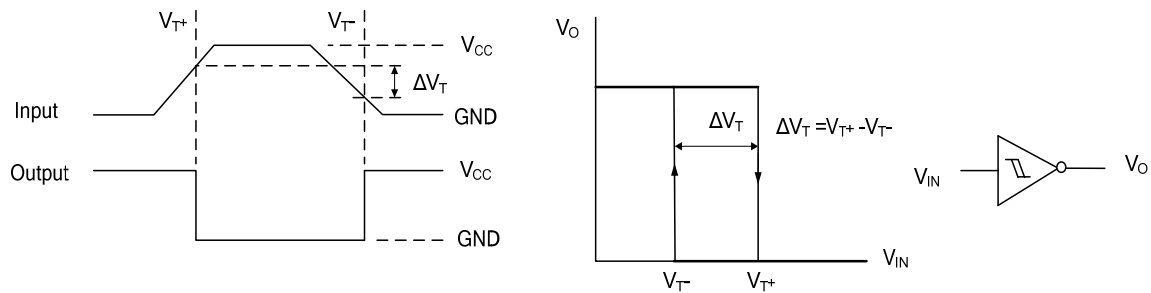


Fig. 3 Hysteresis definition, characteristics, and test setup

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