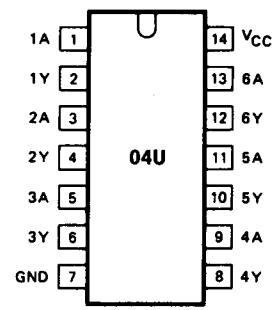
GD54/74HCU04

HEX UNBUFFERED INVERTERS

General Description

These devices are identical in pinout to the 54/74 LSO4. They contain six independent unbuffered inverters. These inverters are well suited for use as oscillators, pulse shapers and in many other applications requiring a high-input impedance amplifier. These devices are characterized for over wide temperature ranges to meet industry and ation over military specifications.

Pin Configuration



Suffix-Blank : Plastic Dual In Line Package
Suffix-J : Ceramic Dual In Line Package
Suffix-D : Small Outline Package

Features

- Low Power consumption characteristic of CMOS devices
- Output drive capability: 10 LS TTL Loads Min.
- Operating speed superior to LS TTL
- Wide operating voltage range: for HC 2 to 6 volts
  for HCT 4.5 to 5.5 volts
- Low input current: 1μA Max.
- Low quiescent current: 20μA Max (74HCU)
- High noise immunity characteristic of CMOS
- Diode protection on all inputs

Logic Diagram

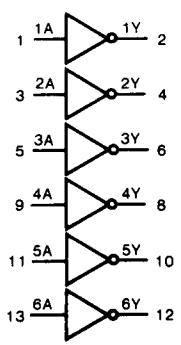


Fig. 1 Logic diagram

Function Table

INPUT	OUTPUT
nA	nY
L	H
H	L

H=HIGH Voltage level
L=LOW Voltage level

Absolute Maximum Ratings

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CC}	DC Supply voltage		−0.5	+7	V
I_{IK}, I_{OK}	DC input or output diode current	for $V_I < -0.5$ or $V_I > V_{CC}+0.5V$		|20|	mA
I_O	DC output source or sink current	for $-0.5V < V_O < V_{CC}+0.5V$		|25|	mA
I_{CC}	DC V_{CC} or GND current			|50|	mA
T_{stg}	Storage temperature range		−65	150	°C
P_D	Power dissipation per package	above +70°C: derate linearly with 8mW/K		500	mW
T_L	Lead temperature	At distance 1/16±1/32 in. from case for 60 sec(CERAMIC) 10 sec(PLASTIC)		300 260	°C

Recommended Operating Conditions

CHARACTERISTIC	LIMITS		UNITS
	MIN.	MAX.	
Supply-Voltage Range V_{CC}: GD54/74HC Types	2	6	V
GD54/74HCT Types	4.5	5.5	
DC Input or Output Voltage V_I, V_O	0	V_{CC}	V
Operating Temperature T_A: GD74 Types	−40	+85	°C
GD54 Types	−55	+125	
Input Rise and Fall times t_r, t_f: GD54/74HC Types at 2V		1000	ns
at 4.5V		500	
at 6V		400	
GD54/74HCT Types at 4.5 V		500	

DC Electrical Characteristics for HCU: $t_r=t_f=6ns$ $C_L=50$ pF

SYMBOL	PARAMETER	TEST CONDITION		V_{CC} (V)	$T_A=25°C$			GD74HCU04		GD54HCU04		UNIT
					MIN.	TYP.	MAX.	MIN.	MAX.	MIN.	MAX.	
V_{IH}	HIGH level input Voltage			2.0 4.5 6.0	1.7 3.6 4.8			1.7 3.6 4.8		1.7 3.6 4.8		V
V_{IL}	LOW level input voltage			2.0 4.5 6.0			0.3 0.8 1.1		0.3 0.8 1.1		0.3 0.8 1.1	V
V_{OH}	HIGH level output voltage	$V_{IN}=V_{IH}$ or V_{IL}	$I_{OH}=-20\mu A$	2.0 4.5 6.0	1.8 4.0 5.5			1.8 4.0 5.5		1.8 4.0 5.5		V
			$I_{OH}=-4mA$ $I_{OH}=-5.2mA$	4.5 6.0	3.98 5.48			3.84 5.34		3.7 5.2		
V_{OL}	LOW level output voltage	$V_{IN}=V_{IH}$ or V_{IL}	$I_{OL}=20\mu A$	2.0 4.5 6.0			0.2 0.5 0.5		0.2 0.5 0.5		0.2 0.5 0.5	V
			$I_{OL}=4mA$ $I_{OL}=5.2mA$	4.5 6.0			0.26 0.26		0.33 0.33		0.4 0.4	
$\|I_{IN}\|$	Input leakage Current	$V_{IN}=V_{CC}$ or GND		6.0			0.1		1.0		1.0	μA
I_{CC}	Quiescent Supply Current	$V_{IN}=V_{CC}$ or GND $I_{out}=0\mu A$		6.0			2		20		40	μA

AC Characteristics for HCU: $t_r=t_f=6ns$ $C_L=50$ pF

SYMBOL	PARAMETER	V_{CC} (V)	$T_A=25°C$			GD74HCU04		GD54HCU04		UNIT
			MIN.	TYP.	MAX.	MIN.	MAX.	MIN.	MAX.	
t_{PLH}/ t_{PHL}	Propagation Delay Time nA to nY	2.0 4.5 6.0		23 7 6	75 15 13		95 19 16		110 22 19	ns
t_{TLH}/ t_{THL}	Output Transition Time	2.0 4.5 6.0		25 8 7	70 15 13		85 18 16		100 22 19	ns

AC Waveforms

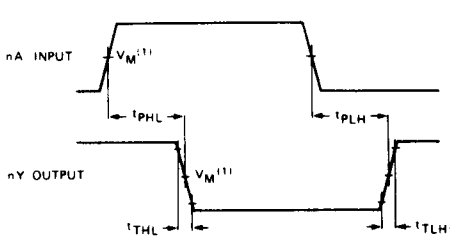


Fig. 2 Waveforms showing the input (nA) to output (nY) propagation delays and the output transition times.

Note to AC waveform

(1) HCU: $V_M=50\%$, $V_I=GND$ to V_{CC}