

# GD54/74HC34, GD54/74HCT34

## HEX BUFFERS

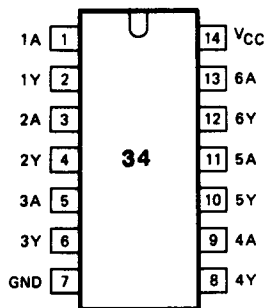
### General Description

These devices are identical in pinout to the 54/74LS34. They contain six independent noninverting buffers. Especially, the HCT 34 can be used for interfacing between TTL and NMOS components and standard CMOS devices. These devices are characterized for operation over wide temperature ranges to meet industry and military specifications.

### 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:  $1\mu\text{A}$  Max.
- Low quiescent current:  $20\mu\text{A}$  Max. (74HC)
- High noise immunity characteristic of CMOS
- Diode protection on all inputs

### Pin Configuration



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

### Logic Diagram

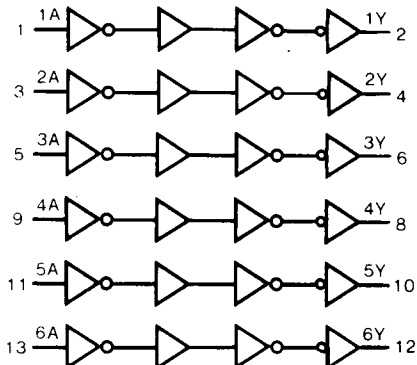


Fig. 1 Logic Diagram

### Function Table

INPUT	OUTPUT
nA	nY
H	H
L	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 $1/16 \pm 1/32$ 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 GD54/74HCT Types	2 4.5	6 5.5	V
DC Input or Output Voltage $V_i, V_o$	0	$V_{CC}$	V
Operating Temperature $T_A$ : GD74 Types GD54 Types	-40 -55	+85 +125	°C
Input Rise and Fall times $t_r, t_f$ : GD54/74HC Types at 2V at 4.5V at 6V GD54/74HCT Types at 4.5 V		1000 500 400 500	ns

DC Electrical Characteristics for HC

SYMBOL	PARAMETER	TEST CONDITION	V <sub>CC</sub> (V)	T <sub>A</sub> =25°C			GD74HC34		GD54HC34		UNIT	
				MIN.	TYP.	MAX.	MIN.	MAX.	MIN.	MAX.		
V <sub>IH</sub>	HIGH level input Voltage		2.0	1.5			1.5		1.5		V	
			4.5	3.15			3.15		3.15			
			6.0	4.2			4.2		4.2			
V <sub>IL</sub>	LOW level input voltage		2.0			0.3		0.3		0.3	V	
			4.5			0.9		0.9		0.9		
			6.0			1.2		1.2		1.2		
V <sub>OH</sub>	HIGH level output voltage	V <sub>IN</sub> =V <sub>IH</sub>	I <sub>OH</sub> =-20μA	2.0	1.9	2.0		1.9		1.9	V	
			I <sub>OH</sub> =-4mA	4.5	4.4	4.5		4.4		4.4		
		or V <sub>IL</sub>	I <sub>OH</sub> =-5.2mA	6.0	5.9	6.0		5.9		5.9		
			I <sub>OH</sub> =-4mA	4.5	3.98	4.3		3.84		3.7		
		or V <sub>IL</sub>	I <sub>OH</sub> =-5.2mA	6.0	5.48	5.2		5.34		5.2		
			I <sub>OH</sub> =-5.2mA	6.0	5.48	5.2		5.34		5.2		
V <sub>OL</sub>	LOW level output voltage	V <sub>IN</sub> =V <sub>IH</sub>	I <sub>OL</sub> =20μA	2.0			0.1		0.1		V	
			I <sub>OL</sub> =20μA	4.5			0.1		0.1			
		or V <sub>IL</sub>	I <sub>OL</sub> =4mA	4.5		0.17	0.26		0.33			0.4
			I <sub>OL</sub> =5.2mA	6.0		0.15	0.26		0.33			0.4
		or V <sub>IL</sub>	I <sub>OL</sub> =4mA	4.5		0.17	0.26		0.33			0.4
			I <sub>OL</sub> =5.2mA	6.0		0.15	0.26		0.33			0.4
I <sub>IN</sub>	Input leakage Current	V <sub>IN</sub> =V <sub>CC</sub> or GND	6.0			0.1		1.0		1.0	μA	
I <sub>CC</sub>	Quiescent Supply Current	V <sub>IN</sub> =V <sub>CC</sub> or GND I <sub>out</sub> =0μA	6.0			2		20		40	μA	

DC Electrical Characteristics for HCT

SYMBOL	PARAMETER	TEST CONDITION	V <sub>CC</sub> (V)	T <sub>A</sub> =25°C			GD74HCT34		GD54HCT34		UNIT	
				MIN.	TYP.	MAX.	MIN.	MAX.	MIN.	MAX.		
V <sub>IH</sub>	HIGH level input Voltage		4.5								V	
			5.5	2.0			2.0		2.0			
V <sub>IL</sub>	LOW level input voltage		4.5								V	
			5.5			0.8		0.8		0.8		
V <sub>OH</sub>	HIGH level output voltage	V <sub>IN</sub> =V <sub>IH</sub>	I <sub>OH</sub> =-20μA	4.5	4.4	4.5		4.4		4.4	V	
			I <sub>OH</sub> =-4mA	4.5	3.98	4.3		3.84		3.7		
		or V <sub>IL</sub>	I <sub>OH</sub> =-4mA	4.5	3.98	4.3		3.84		3.7		
			I <sub>OH</sub> =-4mA	4.5	3.98	4.3		3.84		3.7		
		or V <sub>IL</sub>	I <sub>OH</sub> =-4mA	4.5	3.98	4.3		3.84		3.7		
			I <sub>OH</sub> =-4mA	4.5	3.98	4.3		3.84		3.7		
V <sub>OL</sub>	LOW level output voltage	V <sub>IN</sub> =V <sub>IH</sub>	I <sub>OL</sub> =20μA	4.5			0.1		0.1		V	
			I <sub>OL</sub> =20μA	4.5			0.1		0.1			
		or V <sub>IL</sub>	I <sub>OL</sub> =4mA	4.5		0.17	0.26		0.33			0.4
			I <sub>OL</sub> =4mA	4.5		0.17	0.26		0.33			0.4
		or V <sub>IL</sub>	I <sub>OL</sub> =4mA	4.5		0.17	0.26		0.33			0.4
			I <sub>OL</sub> =4mA	4.5		0.17	0.26		0.33			0.4
I <sub>IN</sub>	Input leakage Current	V <sub>IN</sub> =V <sub>CC</sub> or GND	5.5			0.1		1.0		1.0	μA	
I <sub>CC</sub>	Quiescent Supply Current	V <sub>IN</sub> =V <sub>CC</sub> or GND I <sub>out</sub> =0μA	5.5			2		20		40	μA	

AC Characteristics for HC:  $t_r=t_f=6\text{ns}$   $C_L=50\text{ pF}$

SYMBOL	PARAMETER	V <sub>CC</sub> (V)	T <sub>A</sub> =25°C			GD74HC34		GD54HC34		UNIT
			MIN.	TYP.	MAX.	MIN.	MAX.	MIN.	MAX.	
t <sub>PLH</sub> / t <sub>PHL</sub>	Propagation Delay Time nA to nY	2.0		25	80		105		125	ns
		4.5		8	16		21		26	
		6.0		7	14		18		23	
t <sub>TLH</sub> / t <sub>THL</sub>	Output Transition Time	2.0		25	70		85		100	ns
		4.5		8	15		18		22	
		6.0		7	13		16		19	

AC Characteristics for HCT:  $t_r=t_f=6\text{ns}$   $C_L=50\text{ pF}$

SYMBOL	PARAMETER	V <sub>CC</sub> (V)	T <sub>A</sub> =25°C			GD74HCT34		GD54HCT34		UNIT
			MIN.	TYP.	MAX.	MIN.	MAX.	MIN.	MAX.	
t <sub>PLH</sub> / t <sub>PHL</sub>	Propagation Delay Time nA to nY	4.5		12	20		24		28	ns
t <sub>TLH</sub> / t <sub>THL</sub>	Output Transition Time	4.5		8	15		19		22	ns

AC Waveform

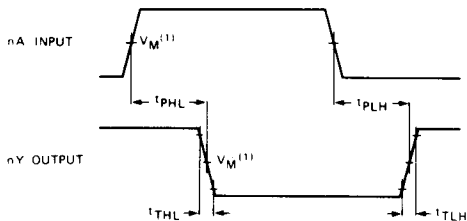


Fig. 3 Waveforms showing the input (nA) to output (nY) propagation delays and the output transition times.

Note to AC waveform

- (1) HC :  $V_M=50\%$ ;  $V_i=GND$  to  $V_{CC}$   
HCT:  $V_M=1.3V$ ;  $V_i=GND$  to  $3V$ .