

# GD54/74HC126, GD54/74HCT126

## QUAD 3-STATE (ACT-HIGH) NONINVERTING BUFFERS

### General Description

These devices are identical in pinout to the 54/74LS126. They contain four independent 3-state noninverting buffers which are designed to be used with 3-state memory address drivers, clock drivers, and other bus-oriented systems. The GD54/74 HC/HCT126 requires the 3-state control input to be taken low to put the output into the high impedance state (active-high). Refer to GD54/74 HC/HCT125 for active-low operation with same functionality. Both of them have high current driving capabilities. 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: 15 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 $\mu$ A Max.
- Low quiescent current: 80 $\mu$ A Max. (74HC)
- High noise immunity characteristic of CMOS
- Diode protection on all inputs

### Logic Diagram

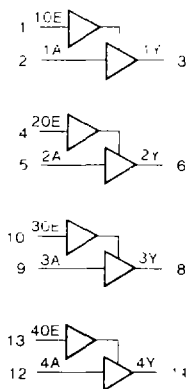
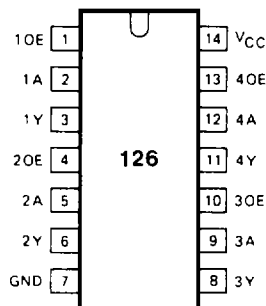


Fig. 1 Logic diagram

### Pin Configuration



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

### Function Table

INPUTS		OUTPUT
nOE	nA	nY
H	L	L
H	H	H
L	X	Z

H = HIGH voltage level  
L = LOW voltage level  
X = don't care  
Z = high impedance OFF-state

**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 $-0.5V < V_O < V_{CC} + 0.5V$		35	mA
$I_{CC}$	DC $V_{CC}$ or GND current			70	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 4.5V		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			GD74HC126		GD54HC126		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	
				4.5	4.4	4.5		4.4		4.4		
		or V <sub>IL</sub>	I <sub>OH</sub> =-6mA	4.5	3.98	4.3		3.84		3.7		
				6.0	5.9	6.0		5.9		5.9		
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	0.1	V	
				4.5			0.1		0.1	0.1		
		or V <sub>IL</sub>	I <sub>OL</sub> =6mA	4.5		0.17	0.26		0.33			0.4
				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>OZ</sub>	Three-State leakage current	V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub> V <sub>O</sub> =V <sub>CC</sub> or GND	6.0		0.01	0.5		5.0		10.0	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			8		80		160	μA	

DC Electrical Characteristics for HCT

SYMBOL	PARAMETER	TEST CONDITION	V <sub>CC</sub> (V)	T <sub>A</sub> =25°C			GD74HCT126		GD54HCT126		UNIT
				MIN	TYP.	MAX	MIN	MAX	MIN	MAX	
V <sub>IH</sub>	HIGH level input Voltage		4.5 to 5.0	2.0			2.0		2.0		V
V <sub>IL</sub>	LOW level input voltage		4.5 to 5.5			0.8		0.8		0.8	V
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
				4.5	3.98	4.3		3.84		3.7	
		or V <sub>IL</sub>	I <sub>OH</sub> =-6mA	4.5			0.1		0.1	0.1	
4.5				0.17	0.26		0.33		0.4		
V <sub>OL</sub>	LOW level output voltage	V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OL</sub> =20μA	4.5			0.1		0.1	0.1	V
			I <sub>OL</sub> =6mA	4.5		0.17	0.26		0.33		
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>OZ</sub>	Three-State leakage current	V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub> V <sub>O</sub> =V <sub>CC</sub> or GND	5.5		0.01	0.5		5.0		10.0	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			8		80		160	μA

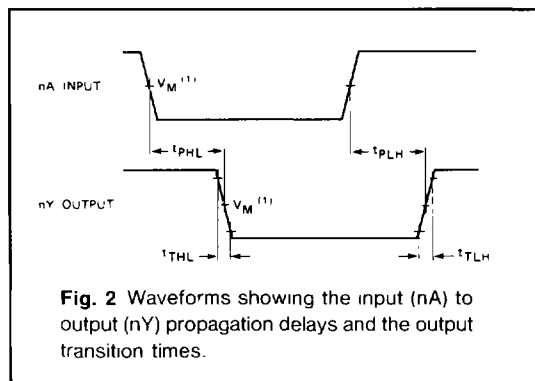
AC Characteristics for HC:  $t_r=t_f=6\text{ns}$   $C_L=50\text{ pF}$

SYMBOL	PARAMETER	$V_{CC}$ (V)	$T_A=25^\circ\text{C}$			GD74HC126		GD54HC126		UNIT
			MIN.	TYP	MAX	MIN.	MAX.	MIN.	MAX.	
$t_{PLH}$ / $t_{PHL}$	Propagation Delay Time nA to nY	2.0 4.5 6.0		30 10 9	100 20 16		125 25 20		150 30 25	ns
$t_{PZH}$ / $t_{PZL}$	3-state Output Enable time nOE to nY	2.0 4.5 6.0		32 11 10	120 24 20		155 30 25		180 38 32	
$t_{PHZ}$ / $t_{PLZ}$	3-state Output Disable Time nOE to nY	2.0 4.5 6.0		32 13 10	120 25 20		155 30 25		180 38 32	ns
$t_{TLH}$ / $t_{THL}$	Output Transition Time	2.0 4.5 6.0		20 7 6	60 12 10		75 15 13		90 18 15	

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

SYMBOL	PARAMETER	$V_{CC}$ (V)	$T_A=25^\circ\text{C}$			GD74HCT126		GD54HCT126		UNIT
			MIN.	TYP	MAX	MIN.	MAX.	MIN.	MAX.	
$t_{PLH}$ / $t_{PHL}$	Propagation Delay Time nA to nY	4.5		14	26		33		38	ns
$t_{PLH}$ / $t_{PHL}$	Propagation Delay Time nOE to nY	4.5		14	28		33		38	
$t_{PLH}$ / $t_{PHL}$	Propagation Delay Time nOE to nY	4.5		15	28		35		40	ns
$t_{TLH}$ / $t_{THL}$	Output Transition Time	4.5		7	12		15		18	

AC Waveforms



Note to AC waveforms

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

