

# GD54/74HC244, GD54/74HCT244

## OCTAL NONINVERTING 3-STATE BUFFERS

### General Description

These devices are identical in pinout to the 54/74LS244. They contain eight noninverting buffers with two active-low enables. Each enable independently controls 4 buffers. These octal noninverting buffers/line drivers/line receivers are designed to be used with 3-state memory address drivers. Clock drivers, and other bus-oriented systems. Refer to the other devices for similar functionality;

HC/HCT 240 Inverting, active-low enables  
 HC/HCT 241 Noninverting, active-low  
 & active-high enables

These devices are characterized for operation over wide temperature ranges to meet industry and military specifications.

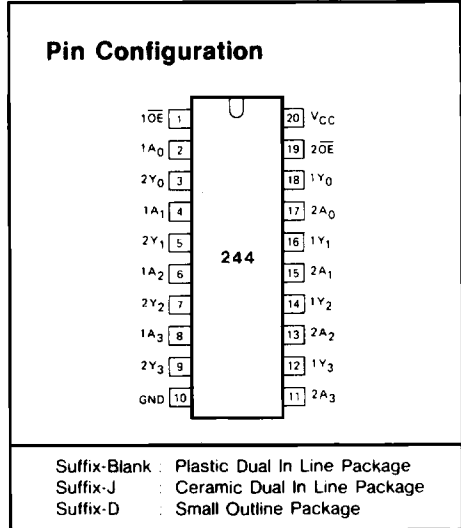
### Features

- 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: 1µA Max.
- Low quiescent current: 80µA Max. (74HC)
- High noise immunity characteristic of CMOS
- Diode protection on all inputs

### Function Table

INPUTS		OUTPUT
$\overline{nOE}$	$nA_n$	$nY_n$
L	L	L
L	H	H
H	X	Z

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



### Logic Diagram

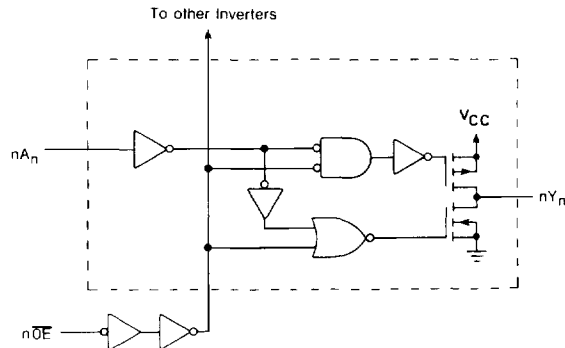


Fig. 1 Logic diagram(one gate)

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## 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

## Logic Diagram

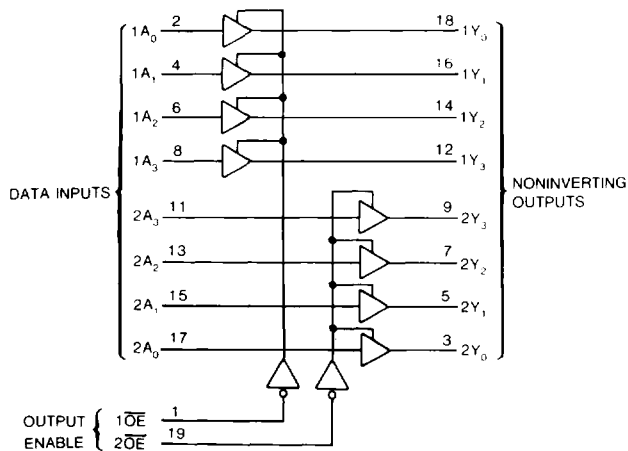


Fig. 2 Logic diagram

DC Electrical Characteristics for HC

SYMBOL	PARAMETER	TEST CONDITION	V <sub>CC</sub> (V)	T <sub>A</sub> =25°C			GD74HC244		GD54HC244		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> or V <sub>IL</sub>	I <sub>OH</sub> =-20μA	2.0	1.9	2.0		1.9		1.9	V	
			I <sub>OH</sub> =-6mA	4.5	4.4	4.5		4.4		4.4		
			I <sub>OH</sub> =-7.8mA	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> or V <sub>IL</sub>	I <sub>OL</sub> =20μA	2.0			0.1		0.1		V	
			I <sub>OL</sub> =6mA	4.5		0.17	0.26		0.33			0.4
			I <sub>OL</sub> =7.8mA	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			GD74HCT244		GD54HCT244		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V <sub>IH</sub>	HIGH level input Voltage		4.5								V
			5.0	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> or V <sub>IL</sub>	I <sub>OH</sub> =-20μA	4.5	4.4	4.5		4.4		4.4	V
			I <sub>OH</sub> =-6mA	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> or V <sub>IL</sub>	I <sub>OL</sub> =20μA	4.5			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

# GD54/74HC244, GD54/74HCT244

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

SYMBOL	PARAMETER	$V_{CC}$ (V)	$T_A=25^\circ\text{C}$			GD74HC244		GD54HC244		UNIT
			MIN.	TYP.	MAX.	MIN.	MAX.	MIN.	MAX.	
$t_{PLH}$ / $t_{PHL}$	Propagation Delay Time $nA_n$ to $nY_n$	2.0 4.5 6.0		30 9 8	100 18 16		120 24 20		140 28 25	ns
$t_{PZH}$ / $t_{PZL}$	3-state Output Enable Time $n\overline{OE}$ to $nY_n$	2.0 4.5 6.0		35 10 9	140 28 26		180 36 32		210 42 36	ns
$t_{PLZ}$ / $t_{PHZ}$	3-state Output Disable Time $n\overline{OE}$ to $nY_n$	2.0 4.5 6.0		35 10 9	140 28 26		180 36 32		210 42 36	ns
$t_{TLH}$ / $t_{THL}$	Output Transition Time	2.0 4.5 6.0		15 6 5	60 12 10		75 15 13		90 18 15	ns

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

SYMBOL	PARAMETER	$V_{CC}$ (V)	$T_A=25^\circ\text{C}$			GD74HCT244		GD54HCT244		UNIT
			MIN.	TYP.	MAX.	MIN.	MAX.	MIN.	MAX.	
$t_{max}$	Propagation Delay Time $nA_n$ to $nY_n$	4.5		12	22		26		30	ns
$t_{PLH}$ / $t_{PHL}$	Propagation Delay Time $n\overline{OE}$ to $nY_n$	4.5		18	30		38		45	ns
$t_{PLH}$ / $t_{PHL}$	Propagation Delay Time $n\overline{OE}$ to $nY_n$	4.5		15	25		32		38	ns
$t_{TLH}$ / $t_{THL}$	Output Transition Time	4.5		7	12		15		18	ns

## AC Waveforms

