

GD54/74HC367, GD54/74HCT367

HEX 3-STATE NONINVERTING BUFFERS

General Description

These devices are identical in pinout to the 54/74LS367. They have high drive current outputs which enable high speed operation even when driving large bus capacitances. The HC/HCT 365 and HC/HCT 367 have noninverting outputs, while the HC/HCT 366 and HC/HCT 368 have inverting outputs. The HC/HCT 365 and HC/HCT 366 have two 3-state control inputs which are NORed together to control all 6 gates. The HC/HCT 367 and HC/HCT 368 have two output enables, where one enable controls 4 gates and the other controls the remaining 2 gates. 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 μ A Max.
- Low quiescent current: 80 μ A Max. (74HC)
- High noise immunity characteristic of CMOS
- Diode protection on all inputs

Logic Symbol

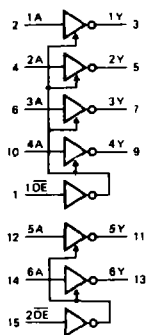
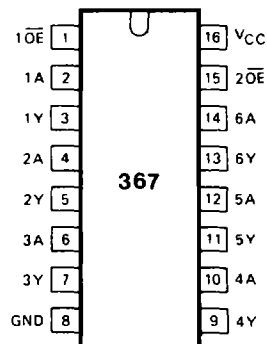


Fig. 1 Logic symbol

Pin Configuration



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

Function Table

INPUTS		OUTPUTS
\overline{nOE}	nA	nY
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

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 ± 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

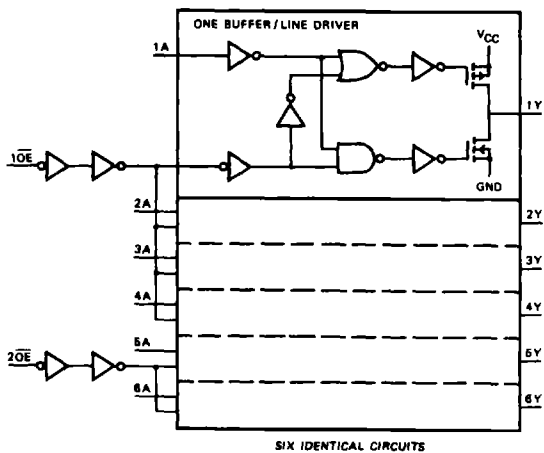


Fig. 2 Logic diagram.

DC Electrical Characteristics for HC

SYMBOL	PARAMETER	TEST CONDITION	V _{CC} (V)	T _A = 25 °C			GD74HC367		GD54HC367		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V _{IH}	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 _{IL}	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 _{OH}	HIGH level output voltage	V _{IN} = V _{IH}	I _{OH} = -20 μA	2.0	1.9	2.0		1.9		1.9	V
				4.5	4.4	4.5		4.4		4.4	
				6.0	5.9	6.0		5.9		5.9	
		or V _{IL}	I _{OH} = -6 mA	4.5	3.98	4.3		3.84		3.7	
				6.0	5.48	5.2		5.34		5.2	
				I _{OH} = -7.8 mA	4.5						
6.0											
V _{OL}	LOW level output voltage	V _{IN} = V _{IH}	I _{OL} = 20 μA	2.0			0.1		0.1	0.1	V
				4.5			0.1		0.1	0.1	
				6.0			0.1		0.1	0.1	
		or V _{IL}	I _{OL} = 6 mA	4.5		0.17	0.26		0.33	0.4	
				6.0		0.15	0.26		0.33	0.4	
				I _{OL} = 7.8 mA	4.5						
6.0											
I _{IN}	Input leakage Current	V _{IN} = V _{CC} or GND	6.0			0.1		1.0		1.0	μA
I _{OZ}	Three-State leakage current	V _{IN} = V _{IH} or V _{IL} V _O = V _{CC} or GND	6.0		0.01	0.5		5.0		10.0	μA
I _{CC}	Quiescent Supply Current	V _{IN} = V _{CC} or GND I _{out} = 0 μA	6.0			8		80		160	μA

DC Electrical Characteristics for HCT

SYMBOL	PARAMETER	TEST CONDITION	V _{CC} (V)	T _A = 25 °C			GD74HCT367		GD54HCT367		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V _{IH}	HIGH level input Voltage		4.5 to 5.0	2.0			2.0		2.0		V
V _{IL}	LOW level input voltage		4.5 to 5.5			0.8		0.8		0.8	V
V _{OH}	HIGH level output voltage	V _{IN} = V _{IH} or V _{IL}	I _{OH} = -20 μA	4.5	4.4	4.5		4.4		4.4	V
				4.5	3.98	4.3		3.84		3.7	
				4.5							
V _{OL}	LOW level output voltage	V _{IN} = V _{IH} or V _{IL}	I _{OL} = 20 μA	4.5			0.1		0.1	0.1	V
				4.5		0.17	0.26		0.33	0.4	
				4.5							
I _{IN}	Input leakage Current	V _{IN} = V _{CC} or GND	5.5			0.1		1.0		1.0	μA
I _{OZ}	Three-State leakage current	V _{IN} = V _{IH} or V _{IL} V _O = V _{CC} or GND	5.5		0.01	0.5		5.0		10.0	μA
I _{CC}	Quiescent Supply Current	V _{IN} = V _{CC} or GND I _{out} = 0 μA	5.5			8		80		160	μA

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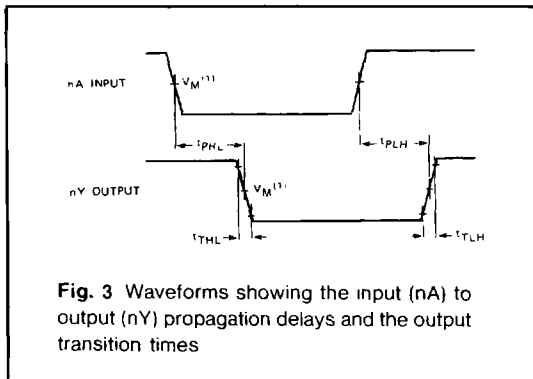
AC Characteristics for HC: $t_r = t_f = 6\text{ns}$ $C_L = 50\text{ pF}$

SYMBOL	PARAMETER	V_{CC} (V)	$T_A = 25^\circ\text{C}$			GD74HC367		GD54HC367		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN.	MAX.	
t_{PLH}	Propagation Delay Time nA to nY	2.0		30	90		120		140	ns
t_{PHL}		4.5		10	19		24		29	
		6.0		9	16		20		25	
t_{PZH}	3-state Output Enable Time nOE to nY	2.0		38	135		175		205	ns
t_{PZL}		4.5		12	24		32		40	
		6.0		11	22		30		38	
t_{PLZ}	3-state Output Disable Time nOE to nY	2.0		38	135		175		205	ns
t_{PHZ}		4.5		12	24		32		40	
		6.0		11	22		30		38	
t_{TLH}	Output Transition Time	2.0		15	60		75		90	ns
		4.5		6	12		15		18	
t_{THL}		6.0		5	10		13		15	

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

SYMBOL	PARAMETER	V_{CC} (V)	$T_A = 25^\circ\text{C}$			GD74HCT367		GD54HCT367		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	Propagation Delay Time nA to nY	4.5		12	22		26		30	ns
t_{PHL}										
t_{PZH}	3-state Output Enable Time nOE to nY	4.5		13	26		34		42	ns
t_{PZL}										
t_{PLZ}	3-state Output Disable Time nOE to nY	4.5		13	26		34		42	ns
t_{PHZ}										
t_{TLH}	Output Transition Time	4.5		7	12		15		18	ns
t_{THL}										

AC Waveforms



Note to AC waveforms

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

