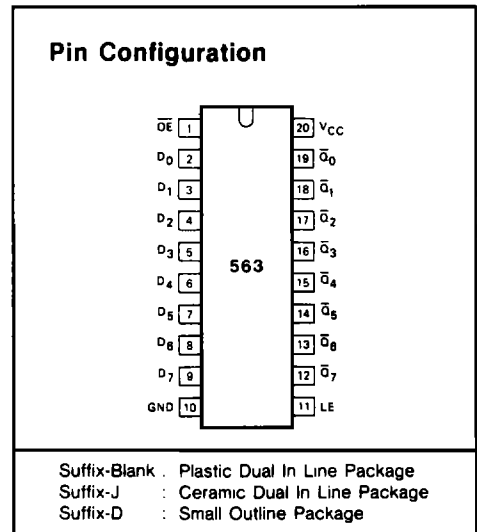


# GD54/74HC563, GD54/74HCT563

## OCTAL 3-STATE INVERTING D-TYPE TRANSPARENT LATCHES

### General Description

These devices are identical in pinout to the 54/74LS563. They contain eight D-type latches, one latch enable, and one output control. These latches appear transparent to data, i.e., The outputs change asynchronously, when latch enable is high. When it is high, all outputs go to the high impedance time becomes latched. The output enable input does not affect the state of the latches when it is low. But when it is high, all outputs go to a high impedance state, regardless of what signals are present at the other inputs and the state of the storage elements. The HC/HCT 563 are similar in function to the HC/HCT 573 which have noninverting outputs. 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

### Function Table

OPERATING MODES	INPUTS			INTERNAL LATCHES	OUTPUTS $\bar{Q}_0$ to $\bar{Q}_7$
	$\bar{OE}$	LE	$D_n$		
enable and read register	L	H	L	L	H
	L	H	H	H	L
latch and read register	L	L	l	L	H
	L	L	h	H	L
latch register and disable outputs	H	L	l	L	Z
	H	L	h	H	Z

H = HIGH voltage level  
 h = HIGH voltage level one set-up time prior to the LOW-to-HIGH LE transition  
 L = LOW voltage level  
 l = LOW voltage level one set-up time prior to the LOW-to-HIGH LE transition  
 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**

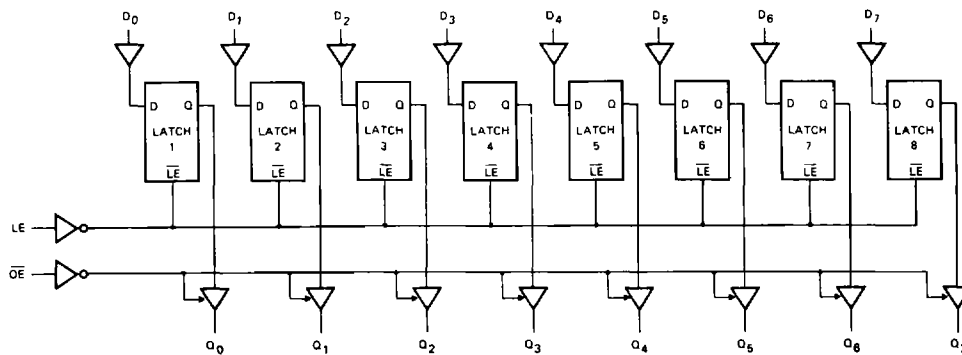


Fig. 1 Logic diagram.

DC Electrical Characteristics for HC

SYMBOL	PARAMETER	TEST CONDITION	V <sub>CC</sub> (V)	T <sub>A</sub> =25°C			GD74HC563		GD54HC563		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
				4.5	4.4	4.5		4.4		4.4	
				6.0	5.9	6.0		5.9		5.9	
			I <sub>OH</sub> =-6mA	4.5	3.98	4.3		3.84		3.7	
				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> or V <sub>IL</sub>	I <sub>OL</sub> =20μA	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	
			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			GD74HCT563		GD54HCT563		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			0.8		0.8		0.8	V
			5.5								
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
				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	0.1	V
				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>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

# GD54/74HC563, GD54/74HCT563

## Timing Requirements for HC: $t_r=t_f=6\text{ns}$ $C_L=50\text{ pF}$

SYMBOL	PARAMETER		$V_{CC}$ (V)	$T_A=25^\circ\text{C}$			GD74HC563		GD54HC563		UNIT
				MIN.	TYP.	MAX.	MIN.	MAX.	MIN.	MAX.	
$t_w$	Pulse width	LE high	2.0	80	30		100		120		ns
			4.5	16	10		20		25		
			6.0	14	8		18		22		
$t_{su}$	Setup time	Data before LE ↓	2.0	60	30		100		120		ns
			4.5	12	10		20		25		
			6.0	10	8		18		22		
$t_h$	Hold time	Data after LE ↓	2.0	3	0		3		3		ns
			4.5	3	0		3		3		
			6.0	3	0		3		3		

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

SYMBOL	PARAMETER		$V_{CC}$ (V)	$T_A=25^\circ\text{C}$			GD74HC563		GD54HC563		UNIT
				MIN.	TYP.	MAX.	MIN.	MAX.	MIN.	MAX.	
$t_{PLH}/$ $t_{PHL}$	Propagation Delay Time $D_n$ to $\bar{Q}_n$		2.0		40	140		180		210	ns
			4.5		14	28		36		40	
			6.0		12	26		33		38	
$t_{PLH}'/$ $t_{PHL}'$	Propagation Delay Time LE to $\bar{Q}_n$		2.0		42	150		190		220	ns
			4.5		16	32		42		50	
			6.0		14	30		38		45	
$t_{PZH}/$ $t_{PZL}$	3-state Output Enable Time $\bar{OE}$ to $\bar{Q}_n$		2.0		45	150		190		220	ns
			4.5		15	30		38		45	
			6.0		14	26		33		38	
$t_{PLZ}/$ $t_{PHZ}$	3-state Output Disable Time $\bar{OE}$ to $\bar{Q}_n$		2.0		45	150		190		220	ns
			4.5		15	30		38		45	
			6.0		14	26		33		38	
$t_{TLH}/$ $t_{THL}$	Output Transition Time		2.0		15	60		75		90	ns
			4.5		6	12		15		18	
			6.0		5	10		13		15	

Timing Requirements for HCT,  $t_r=t_f=6\text{ns}$   $C_L=50\text{ pF}$

SYMBOL	PARAMETER		$V_{CC}$	$T_A=25^\circ\text{C}$			GD74HCT563		GD54HCT563		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
$t_w$	Pulse width	LE high	4.5	16	10		20		25		ns
$t_{su}$	Setup time	Data after LE ↓	4.5	12	10		20		25		ns
$t_h$	Hold time	Data before LE ↓	4.5	3	0		3		3		ns

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

SYMBOL	PARAMETER		$V_{CC}$	$T_A=25^\circ\text{C}$			GD74HCT563		GD54HCT563		UNIT
				MIN.	TYP	MAX.	MIN	MAX	MIN.	MAX.	
$t_{PLH}$ $t_{PHL}$	Propagation Delay Time $D_n$ to $\bar{Q}_n$		4.5		16	30		38		44	ns
$t_{PLH}$ $t_{PHL}$	Propagation Delay Time LE to $\bar{Q}_n$		4.5		19	35		42		48	ns
$t_{PZH}$ $t_{PZL}$	3-state Output Enable Time $\bar{OE}$ to $\bar{Q}_n$		4.5		15	30		38		45	ns
$t_{PLZ}$ $t_{PHZ}$	3-state Output Disable Time $\bar{OE}$ to $\bar{Q}_n$		4.5		15	30		38		45	ns
$t_{TLH}$ $t_{THL}$	Output Transition Time		4.5		6	12		15		18	ns

