

GD54/74HC245, GD54/74HCT245

OCTAL NONINVERTING 3-STATE TRANSCEIVERS

General Description

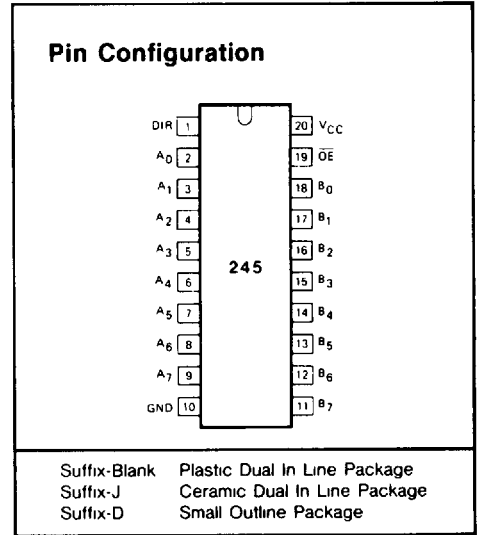
These Devices are identical in pinout to the 54/74LS245. They consist of eight transceivers which are designed for asynchronous two-way communications between data buses. Each device has noninverting outputs, and has an active-low output enable which is used to place the I/O ports into high-impedance states. The direction control determines the directions of data flow. When it is high, data flow from A to B; When it is low, data flow from B to A. Refer to the other devices from similar functionalities;

The HC/HCT 640 All Inverting outputs

The HC/HCT 643 4 Inverting &

4 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 1μA Max
- Low quiescent current 80μA Max (74HC)
- High noise immunity characteristic of CMOS
- Diode protection on all inputs

Function Table

INPUTS		INPUTS/OUTPUTS	
\overline{OE}	DIR	A_n	B_n
L	L	A=B	inputs
L	H	inputs	B=A
H	X	Z	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

Logic Diagram

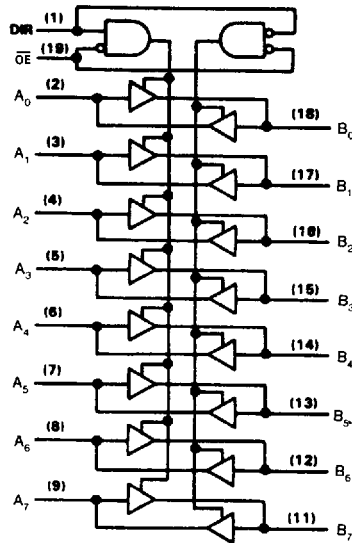


Fig. 1. Logic diagram

DC Electrical Characteristics for HC

SYMBOL	PARAMETER	TEST CONDITION	V _{CC} (V)	T _A = 25 °C			GD74HC245		GD54HC245		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} or V _{IL}	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	
V _{OL}	LOW level output voltage	V _{IN} = V _{IH} or V _{IL}	I _{OH} = -6 mA	4.5	3.98	4.3		3.84		3.7	V
			I _{OH} = -7.8 mA	6.0	5.48	5.2		5.34		5.2	
V _{OL}	LOW level output voltage	V _{IN} = V _{IH} or V _{IL}	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	
V _{OL}	LOW level output voltage	V _{IN} = V _{IH} or V _{IL}	I _{OL} = 6 mA	4.5		0.17	0.26		0.33	0.4	V
			I _{OL} = 7.8 mA	6.0		0.15	0.26		0.33	0.4	
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			GD74HCT245		GD54HCT245		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
			I _{OH} = -6 mA	4.5	3.98	4.3		3.84		3.7	
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
			I _{OL} = 6 mA	4.5		0.17	0.26		0.33	0.4	
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

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

SYMBOL	PARAMETER	V_{CC} (V)	$T_A=25^\circ\text{C}$			GD74HC245		GD54HC245		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH} / t_{PHL}	Propagation Delay Time	2.0		25	90		115		135	ns
	An to Bn, Bn to An	4.5		9	18		23		27	
		6.0		7	15		20		23	
t_{PLZ} / t_{PHZ}	3-state Output Enable Time	2.0		30	150		190		225	ns
	\overline{OE} to An or Bn	4.5		11	30		38		45	
		6.0		9	26		33		38	
t_{PZH} / t_{PZL}	3-state Output Disable Time	2.0		41	150		190		225	ns
	\overline{OE} to An or Bn	4.5		15	30		38		45	
		6.0		12	26		32		33	
t_{TLH} / t_{THL}	Output Transition Time	2.0		14	60		75		90	ns
		4.5		7	12		15		18	
		6.0		6	10		13		15	

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

SYMBOL	PARAMETER	V_{CC} (V)	$T_A=25^\circ\text{C}$			GD74HCT245		GD54HCT245		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH} / t_{PHL}	Propagation Delay Time	4.5		13	25		29		35	ns
	An to Bn, Bn to An									
t_{PZH} / t_{PZL}	3-state Output Enable Time	4.5		16	32		38		45	ns
	\overline{OE} to An or Bn									
t_{PLZ} / t_{PHZ}	3 state Output Disable Time	4.5		15	32		38		45	ns
	\overline{OE} to An or Bn									
t_{TLH} / t_{THL}	Output Transition Time	4.5		7	12		15		18	ns

AC Waveforms

