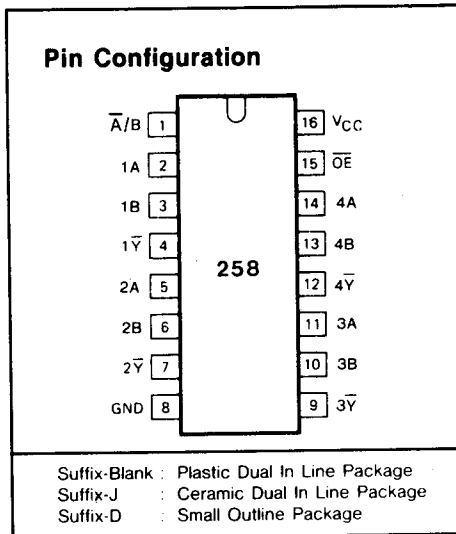


GD54/74HC258, GD54/74HCT258

QUAD 2-INPUT SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS

General Description

These devices are identical in pinout to the 54/74LS258. They consist of four 2-input multiplexers with common select and enable inputs, and inverted outputs. When the enable input is low, the four outputs assume the value as selected from the inputs. When the enable input is high, the outputs become high impedance state regardless of any other input values. Select decoding is done internally resulting in a single select input only. The HC/HCT 258 are similar in function to the HC/HCT 157 & 158 which do not have 3 state outputs, and to the HC/HCT 257 which have noninverted 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				OUTPUT
OE-bar	A/B	nA	nB	nY
H	X	X	X	Z
L	H	X	L	H
L	H	X	H	L
L	L	L	X	H
L	L	H	X	L

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

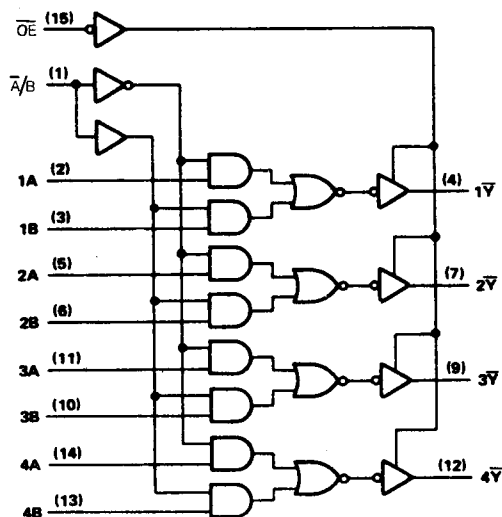


Fig. 1 Logic diagram

DC Electrical Characteristics for HC

SYMBOL	PARAMETER	TEST CONDITION	V _{CC} (V)	T _A =25°C			GD74HC258		GD54HC258		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	V	
			4.5						0.9	0.9		
			6.0						1.2	1.2		
V _{OH}	HIGH level output voltage	V _{IN} =V _{IH} or V _{IL}	I _{OH} =-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 _{OH} =-6mA I _{OH} =-7.8mA	4.5	3.98	4.3		3.84		3.7			
			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} =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 _{OL} =6mA I _{OL} =7.8mA	4.5		0.17	0.26		0.33		0.4		
			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} =0μA	6.0			8		80		160	μA	

DC Electrical Characteristics for HCT

SYMBOL	PARAMETER	TEST CONDITION	V _{CC} (V)	T _A =25°C			GD74HCT258		GD54HCT258		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} =-20μA	4.5	4.4	4.5		4.4		4.4	V	
			I _{OH} =-6mA	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} =20μA	4.5			0.1		0.1		0.1	V
			I _{OL} =6mA	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} =0μA	5.5			8		80		160	μA	

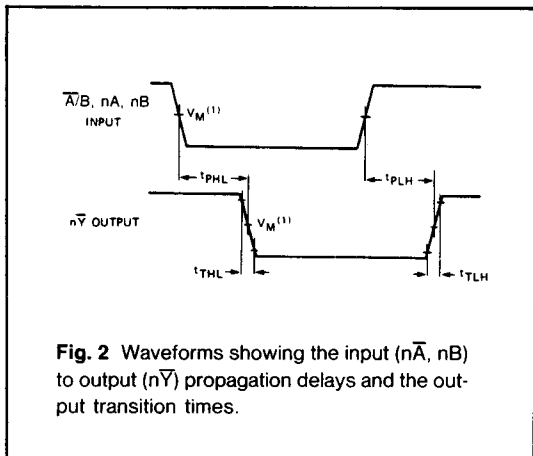
AC Characteristics for HC: $t_r=t_f=6ns$ $C_L=50$ pF

SYMBOL	PARAMETER	V _{CC} (V)	T _A =25°C			GD74HC258		GD54HC258		UNIT
			MIN.	TYP.	MAX.	MIN.	MAX.	MIN.	MAX.	
t _{PLH} / t _{PHL}	Propagation Delay Time nA,nB to n \bar{Y}	2.0		38	100		125		150	ns
		4.5		12	22		27		32	
		6.0		11	19		23		25	
t _{PLH} / t _{PHL}	Propagation Delay Time \bar{A}/B to n \bar{Y}	2.0		49	100		125		150	ns
		4.5		14	26		31		34	
		6.0		12	22		27		31	
t _{PZH} / t _{PZL}	3-state Output Enable Time $\bar{O}E$ to n \bar{Y}	2.0		35	150		190		225	ns
		4.5		14	32		40		45	
		6.0		12	28		34		40	
t _{PLZ} / t _{PHZ}	3-state Output Disable Time $\bar{O}E$ to n \bar{Y}	2.0		45	150		190		225	ns
		4.5		17	32		40		45	
		6.0		14	28		34		40	
t _{TLH} / t _{THL}	Output Transition Time	2.0		28	60		75		90	ns
		4.5		7	12		15		18	
		6.0		6	10		13		15	

AC Characteristics for HCT: $t_r=t_f=6ns$ $C_L=50$ pF

SYMBOL	PARAMETER	V _{CC} (V)	T _A =25°C			GD74HCT258		GD54HCT258		UNIT
			MIN.	TYP.	MAX.	MIN.	MAX.	MIN.	MAX.	
t _{PLH} / t _{PHL}	Propagation Delay Time nA,nB to n \bar{Y}	4.5		17	32		40		45	ns
				19	34		46		53	
t _{PLH} / t _{PHL}	Propagation Delay Time \bar{A}/B to n \bar{Y}	4.5		19	34		46		53	ns
				16	32		40		45	
t _{PZH} / t _{PZL}	3-state Output Enable Time $\bar{O}E$ to n \bar{Y}	4.5		16	32		40		45	ns
				17	32		40		45	
t _{PLZ} / t _{PHZ}	3-state Output Disable Time $\bar{O}E$ to n \bar{Y}	4.5		17	32		40		45	ns
				7	12		15		18	
t _{TLH} / t _{THL}	Output Transition Time	4.5		7	12		15		18	ns

AC Waveforms



Note to AC waveforms

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

