

To all our customers

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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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Keep safety first in your circuit designs!

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Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

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HD74HC442/HD74HC443/HC74HC444

Quad. Tridirectional Bus Transceiver
(with noninverted 3-state outputs)
Quad. Tridirectional Bus Transceiver
(with inverted 3-state outputs)
Quad Tridirectional Bus Transceiver
(with noninverted/inverted 3-state outputs)



ADE-205-506 (Z)
1st. Edition
Sep. 2000

Description

These bus transceivers are designed for a synchronous three-way communication between four-line data buses. They give the designer a choice of selecting inverting, noninverting or a combination of inverting and noninverting data paths with 3-state outputs.

The S_0 and S_1 inputs select the bus from which data are to be transferred. The $\overline{G}$ inputs enable the bus or buses to which data are to be transferred. The port for any bus selected for input and any other bus not enabled for output will be at high impedance.

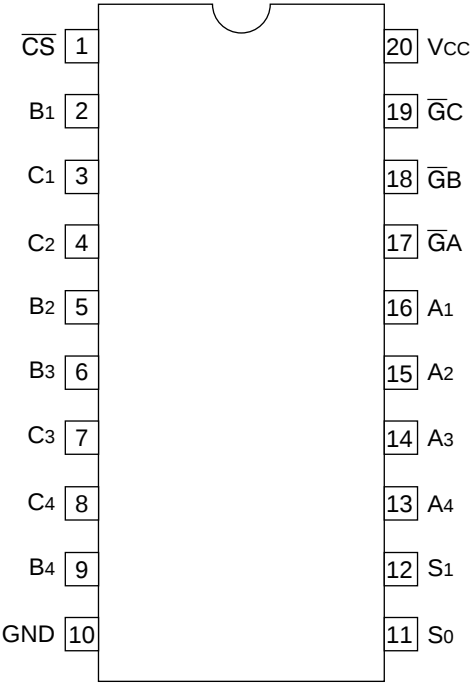
Features

- High Speed Operation
- High Output Current: Fanout of 15 LSTTL Loads
- Wide Operating Voltage: $V_{CC} = 2$ to 6 V
- Low Input Current: 1 μ A max
- Low Quiescent Supply Current: I_{CC} (static) = 4 μ A max ($T_a = 25^\circ\text{C}$)

Function Table

Inputs			Transfers Between Buses					
$\overline{\text{CS}}$	S_1	S_0	$\overline{\text{GA}}$	$\overline{\text{GB}}$	$\overline{\text{GC}}$	HD74HC442	HD74HC443	HD74HC444
H	X	X	X	X	X	None	None	None
X	H	H	X	X	X	None	None	None
X	X	X	H	H	H	None	None	None
X	L	L	X	H	H	None	None	None
X	L	H	H	X	H	None	None	None
X	H	L	H	H	X	None	None	None
L	L	L	X	L	L	$A \rightarrow B, A \rightarrow C$	$\overline{A} \rightarrow B, \overline{A} \rightarrow C$	$\overline{A} \rightarrow B, \overline{A} \rightarrow C$
L	L	H	L	X	L	$B \rightarrow C, B \rightarrow A$	$\overline{B} \rightarrow C, \overline{B} \rightarrow A$	$B \rightarrow C, \overline{B} \rightarrow A$
L	H	L	L	L	X	$C \rightarrow A, C \rightarrow B$	$\overline{C} \rightarrow A, \overline{C} \rightarrow B$	$\overline{C} \rightarrow A, C \rightarrow B$
L	L	L	X	L	H	$A \rightarrow B$	$\overline{A} \rightarrow B$	$\overline{A} \rightarrow B$
L	L	H	H	X	L	$B \rightarrow C$	$\overline{B} \rightarrow C$	$B \rightarrow C$
L	H	L	L	H	X	$C \rightarrow A$	$\overline{C} \rightarrow A$	$\overline{C} \rightarrow A$
L	L	L	X	H	L	$A \rightarrow C$	$\overline{A} \rightarrow C$	$\overline{A} \rightarrow C$
L	L	H	L	X	H	$B \rightarrow A$	$\overline{B} \rightarrow A$	$\overline{B} \rightarrow A$
L	H	L	H	L	X	$C \rightarrow B$	$\overline{C} \rightarrow B$	$C \rightarrow B$

Pin Arrangement



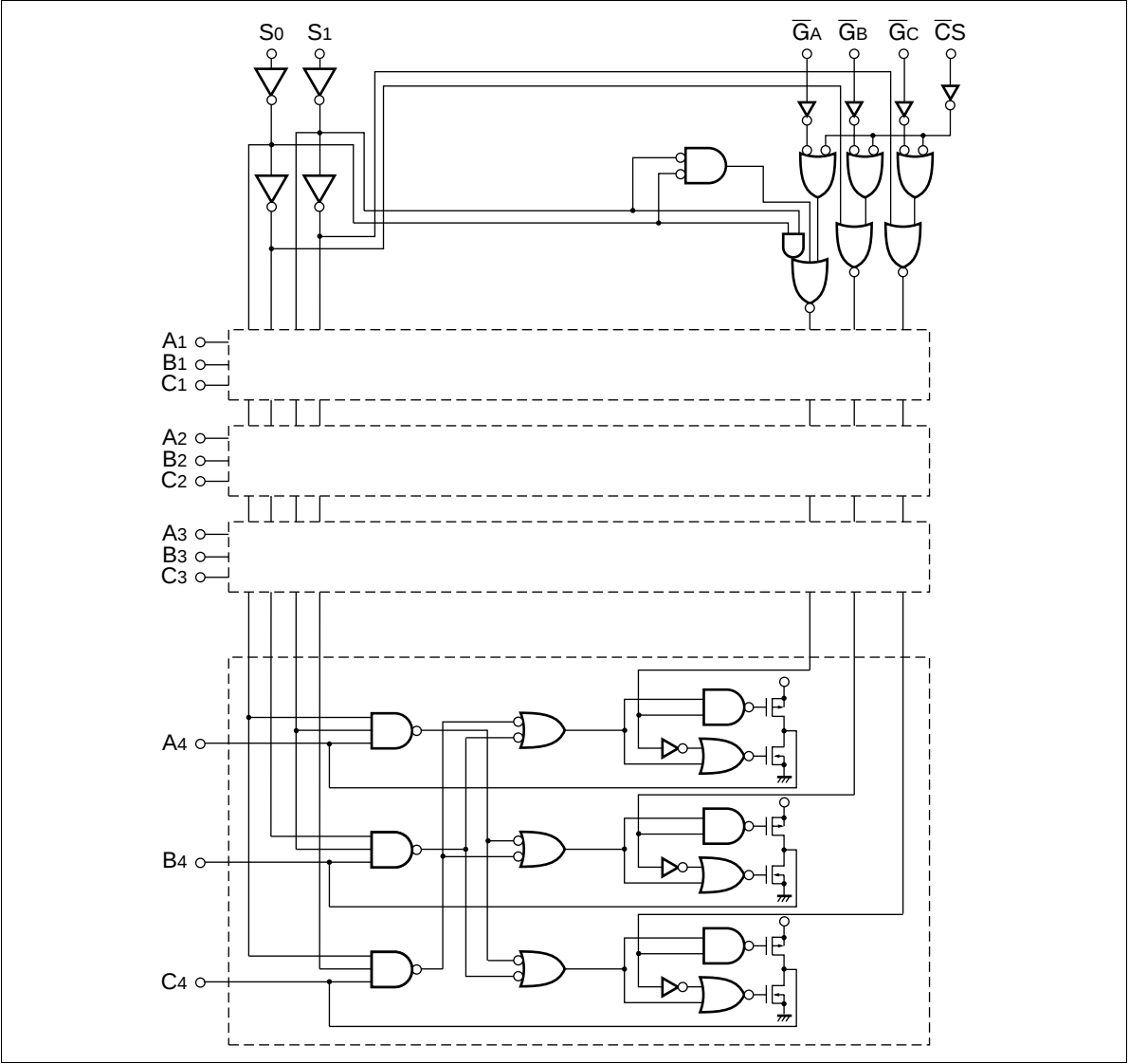
(Top view)

Absolute Maximum Ratings

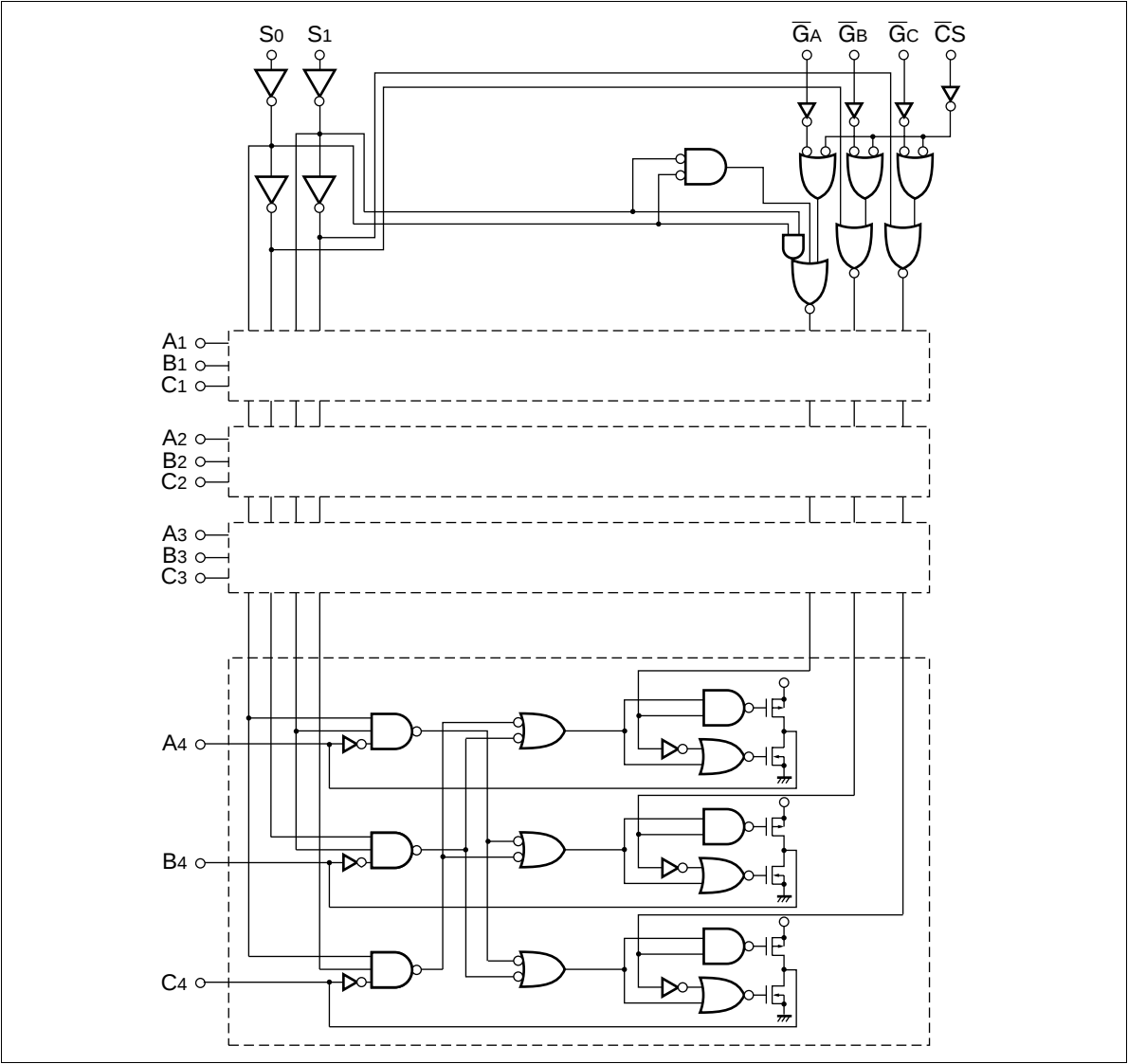
Item	Symbol	Rating	Unit
Supply voltage range	V_{CC}	-0.5 to +7.0	V
Input voltage	V_{IN}	-0.5 to $V_{CC} + 0.5$	V
Output voltage	V_{OUT}	-0.5 to $V_{CC} + 0.5$	V
Output current	I_{OUT}	±35	mA
DC current drain per V_{CC} GND	I_{CC}, I_{GND}	±75	mA
DC input diode current	I_{IK}	±20	mA
DC output diode current	I_{OK}	±20	mA
Power Dissipation per package	P_T	500	mW
Storage temperature	T_{stg}	-65 to +150	°C

Logic Diagram

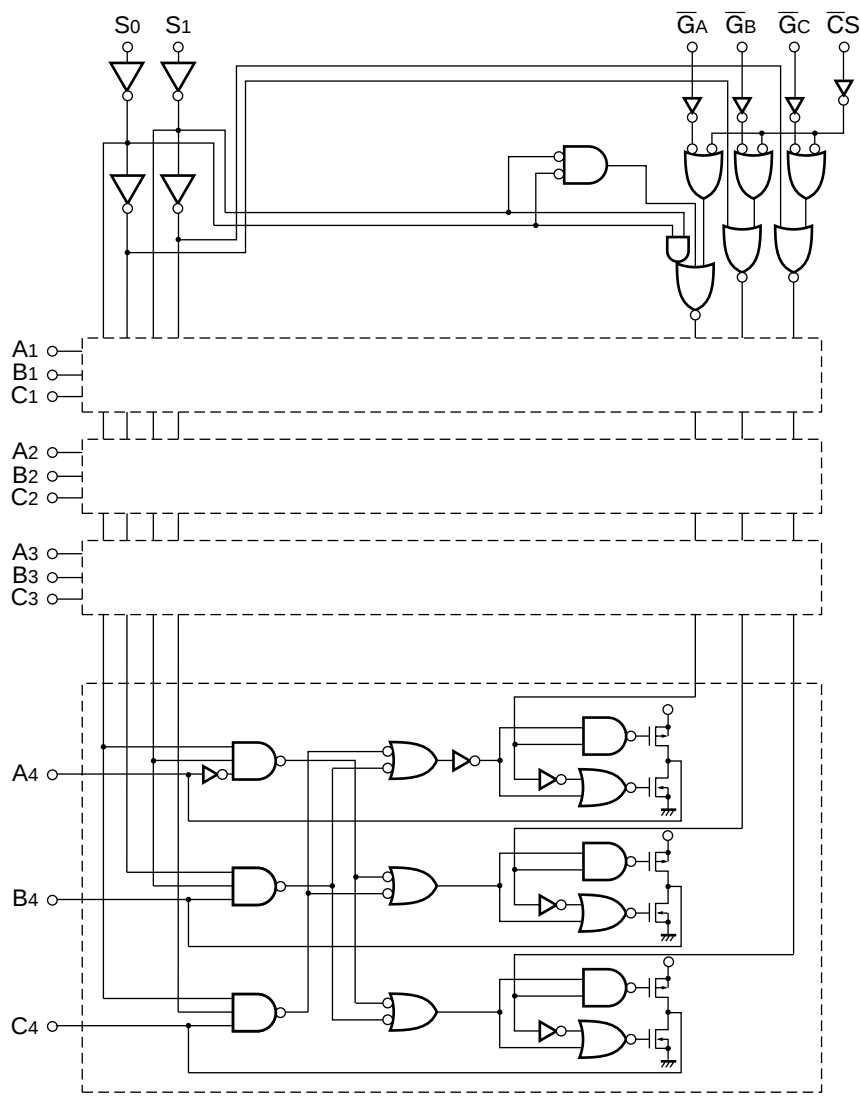
HD74HC442



HD74HC443



HD74HC444



DC Characteristics

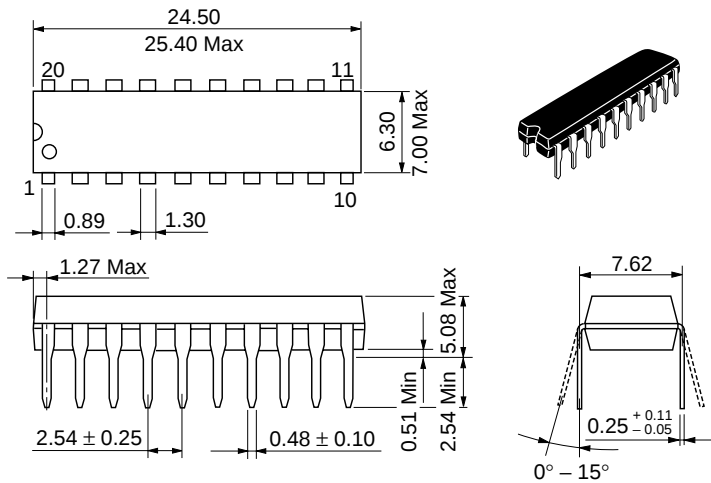
Item	Symbol	V _{CC} (V)	Ta = 25°C			Ta = -40 to +85°C		Unit	Test Conditions
			Min	Typ	Max	Min	Max		
Input voltage	V _{IH}	2.0	1.5	—	—	1.5	—	V	
		4.5	3.15	—	—	3.15	—		
		6.0	4.2	—	—	4.2	—		
	V _{IL}	2.0	—	—	0.5	—	0.5	V	
		4.5	—	—	1.35	—	1.35		
		6.0	—	—	1.8	—	1.8		
Output voltage	V _{OH}	2.0	1.9	2.0	—	1.9	—	V	Vin = V _{IH} or V _{IL} I _{OH} = -20 μA
		4.5	4.4	4.5	—	4.4	—		
		6.0	5.9	6.0	—	5.9	—		
		4.5	4.18	—	—	4.13	—		
		6.0	5.68	—	—	5.63	—		
	V _{OL}	2.0	—	0.0	0.1	—	0.1	V	Vin = V _{IH} or V _{IL} I _{OL} = 20 μA
		4.5	—	0.0	0.1	—	0.1		
		6.0	—	0.0	0.1	—	0.1		
		4.5	—	—	0.26	—	0.33		
		6.0	—	—	0.26	—	0.33		
Off-state output current	I _{OZ}	6.0	—	—	±0.5	—	±5.0	μA	Vin = V _{IH} or V _{IL} , Vout = V _{CC} or GND
Input current	I _{in}	6.0	—	—	±0.1	—	±1.0	μA	Vin = V _{CC} or GND
Quiescent supply current	I _{CC}	6.0	—	—	4.0	—	40	μA	Vin = V _{CC} or GND, Iout = 0 μA

AC Characteristics (C_L = 50 pF, Input t_r = t_f = 6 ns)

Item	Symbol	V _{CC} (V)	Ta = −40 to +85°C						Unit	Test Conditions
			Ta = 25°C							
			Min	Typ	Max	Min	Max			
Propagation delay time	t _{PLH}	2.0	—	—	200	—	250	ns		
	t _{PHL}	4.5	—	—	40	—	50			
		6.0	—	—	34	—	43			
Output enable time	t _{ZH}	2.0	—	—	150	—	190	ns		
	t _{ZL}	4.5	—	—	30	—	38			
		6.0	—	—	26	—	33			
Output disable time	t _{HZ}	2.0	—	—	150	—	190	ns		
	t _{LZ}	4.5	—	—	30	—	38			
		6.0	—	—	26	—	33			
Output rise/fall time	t _{TLH}	2.0	—	—	60	—	75	ns		
	t _{THL}	4.5	—	—	12	—	15			
		6.0	—	—	10	—	13			
Input capacitance	C _{in}	—	—	5	10	—	10	pF		

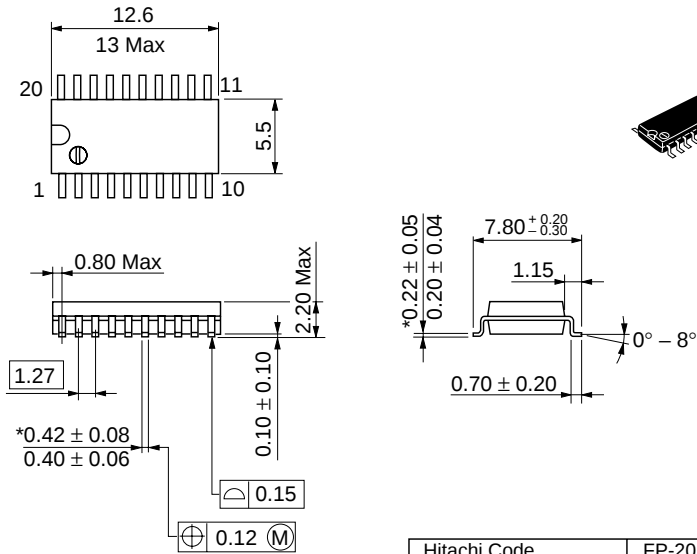
Package Dimensions

Unit: mm



Hitachi Code	DP-20N
JEDEC	—
EIAJ	Conforms
Mass (reference value)	1.26 g

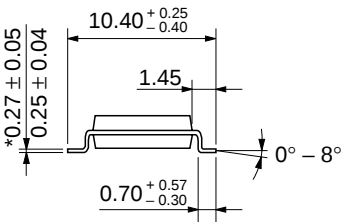
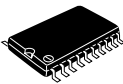
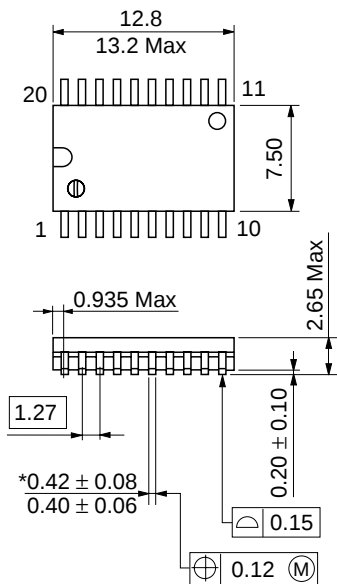
Unit: mm



*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-20DA
JEDEC	—
EIAJ	Conforms
Mass (reference value)	0.31 g

Unit: mm



*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-20DB
JEDEC	Conforms
EIAJ	—
Mass (reference value)	0.52 g

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