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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)

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### 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  $\bar{G}$  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  $\mu$ A max
- Low Quiescent Supply Current:  $I_{CC}(\text{static}) = 4 \mu\text{A max}$  ( $T_a = 25^\circ\text{C}$ )

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### Function Table

Inputs			Transfers Between Buses					
$\overline{CS}$	$S_1$	$S_0$	$\overline{GA}$	$\overline{GB}$	$\overline{GC}$	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	$C \rightarrow B$	$\overline{C} \rightarrow B$	$C \rightarrow B$

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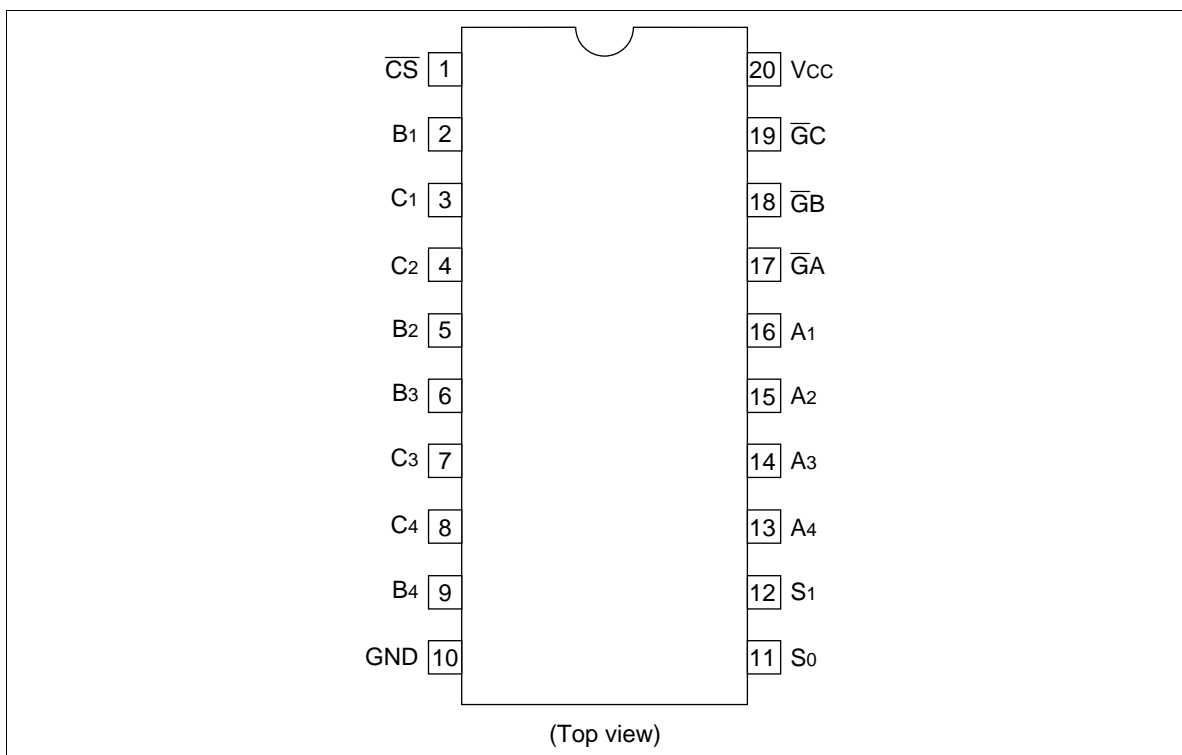
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### Pin Arrangement



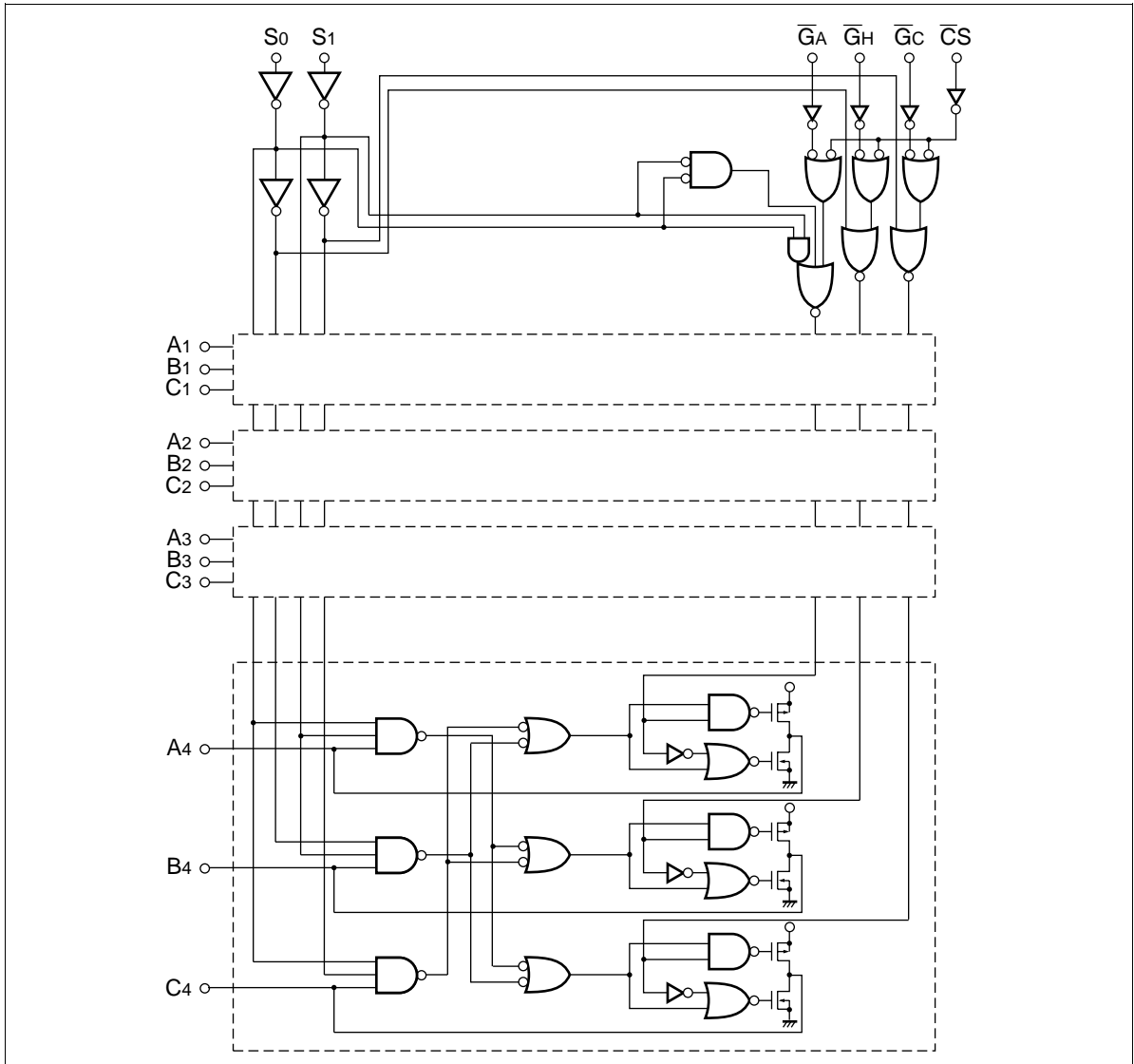
### Absolute Maximum Ratings

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	$I_{OUT}$	$\pm 35$	mA
DC current drain per $V_{CC}$ GND	$I_{CC}, I_{GND}$	$\pm 75$	mA
DC input diode current	$I_{IK}$	$\pm 20$	mA
DC output diode current	$I_{OK}$	$\pm 20$	mA
Power Dissipation per package	$P_T$	500	mW
Storage temperature	Tstg	-65 to +150	$^{\circ}C$

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## Logic Diagram

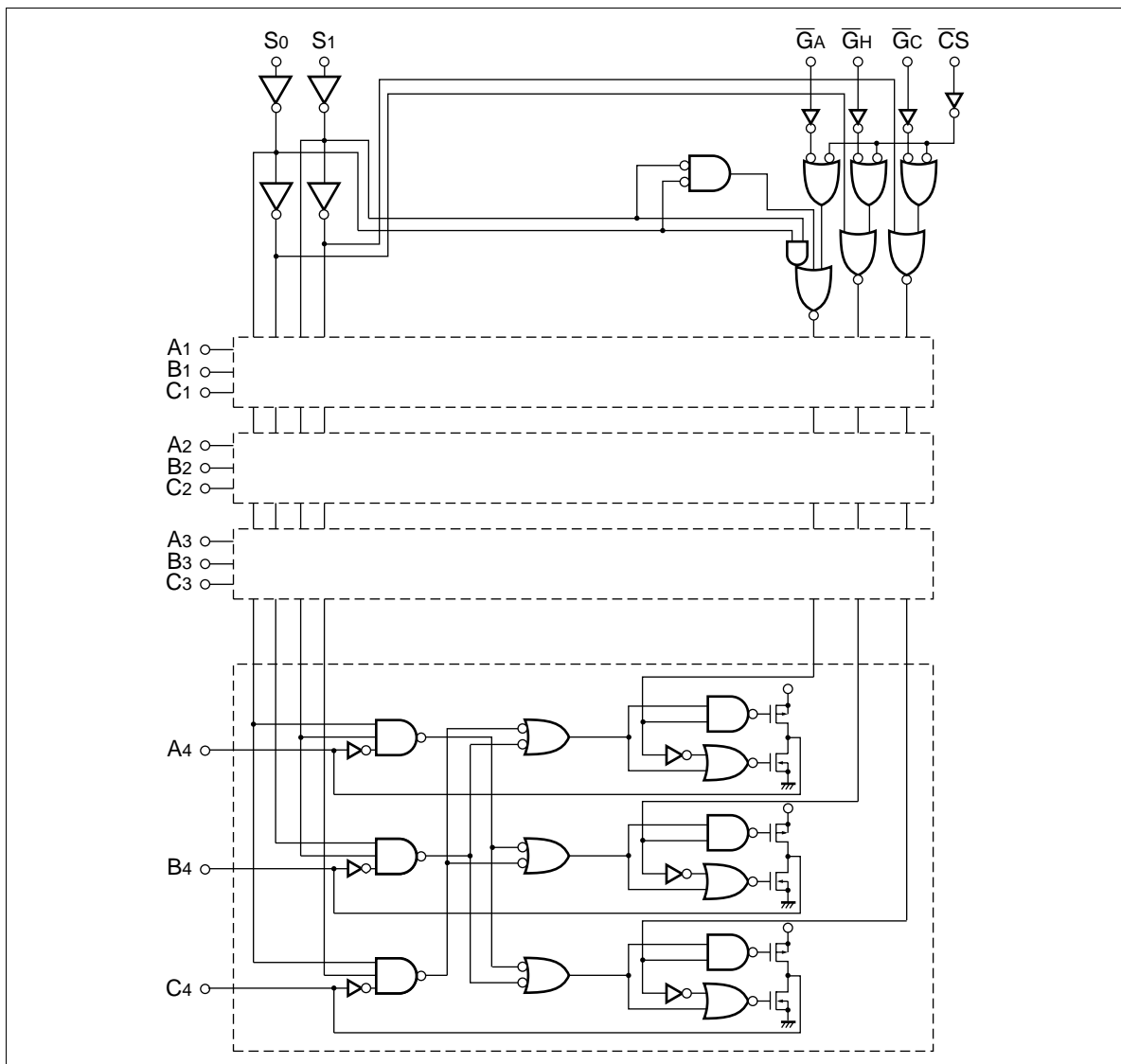
### HD74HC442



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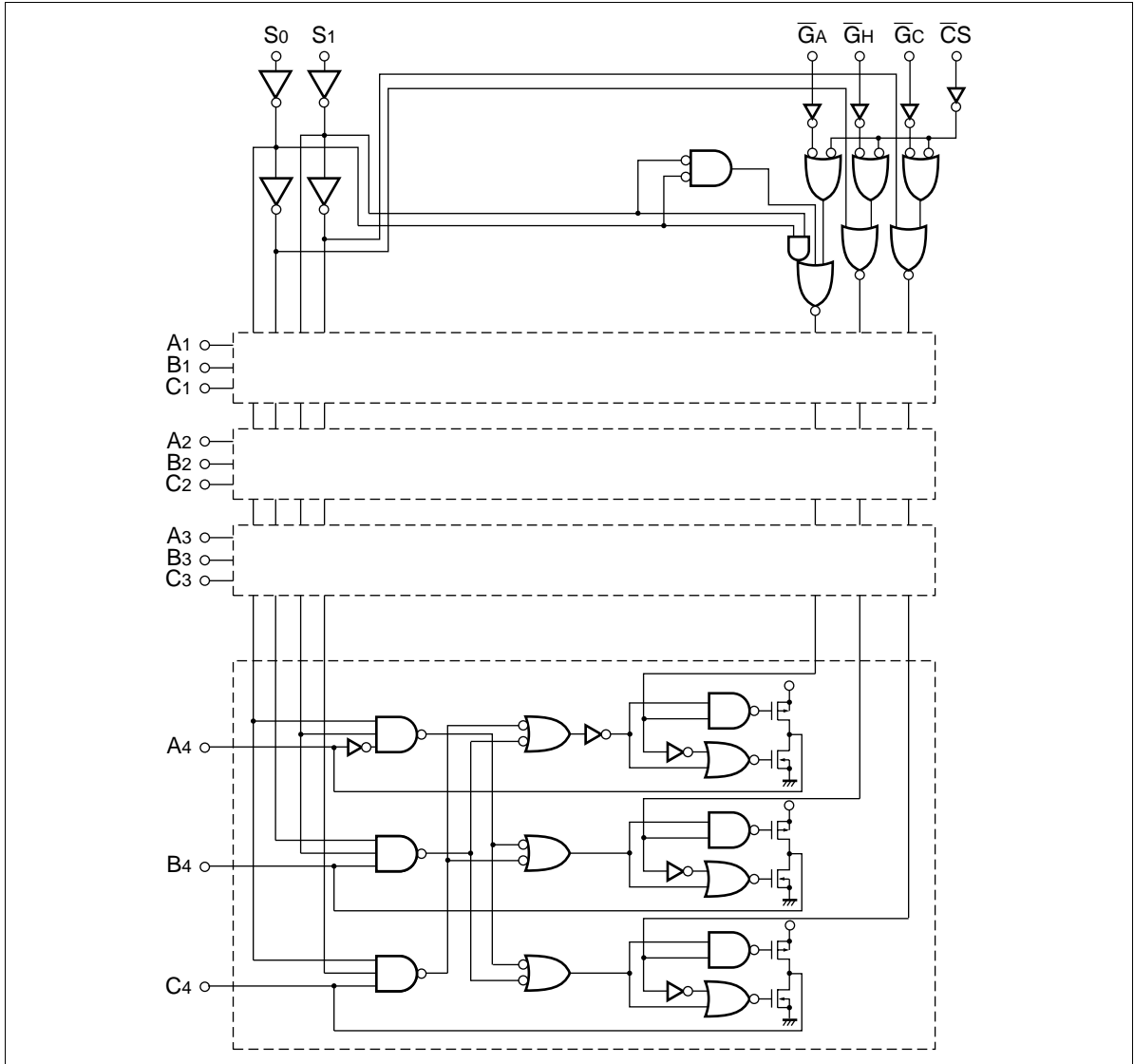
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## HD74HC443



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## HD74HC444



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## HD74HC442/HD74HC443/HD74HC444

### DC Characteristics

Item	Symbol	V <sub>CC</sub> (V)	Ta = 25°C		Ta = -40 to +85°C		Unit	Test Conditions		
			Min	Typ	Max	Min			Max	
Input voltage	V <sub>IH</sub>	2.0	1.5	—	—	1.5	—	V		
		4.5	3.15	—	—	3.15	—			
		6.0	4.2	—	—	4.2	—			
	V <sub>IL</sub>	2.0	—	—	0.5	—	0.5		V	
		4.5	—	—	1.35	—	1.35			
		6.0	—	—	1.8	—	1.8			
Output voltage	V <sub>OH</sub>	2.0	1.9	2.0	—	1.9	—	V		Vin = V <sub>IH</sub> or V <sub>IL</sub> I <sub>OH</sub> = -20 μA
		4.5	4.4	4.5	—	4.4	—			
		6.0	5.9	6.0	—	5.9	—			
		4.5	4.18	—	—	4.13	—		I <sub>OH</sub> = -6 mA	
		6.0	5.68	—	—	5.63	—		I <sub>OH</sub> = -7.8 mA	
		6.0	—	0.0	0.1	—	0.1		V	
	4.5	—	0.0	0.1	—	0.1				
	6.0	—	0.0	0.1	—	0.1				
	4.5	—	—	0.26	—	0.33	I <sub>OL</sub> = 6 mA			
	6.0	—	—	0.26	—	0.33	I <sub>OL</sub> = 7.8 mA			
	6.0	—	—	±0.5	—	±5.0	μA	Vin = V <sub>IH</sub> or V <sub>IL</sub> , Vout = V <sub>CC</sub> or GND		
	Input current	I <sub>in</sub>	6.0	—	—	±0.1	—	±1.0	μA	Vin = V <sub>CC</sub> or GND
Quiescent supply current	I <sub>CC</sub>	6.0	—	—	4.0	—	40	μA	Vin = V <sub>CC</sub> or GND, Iout = 0 μA	

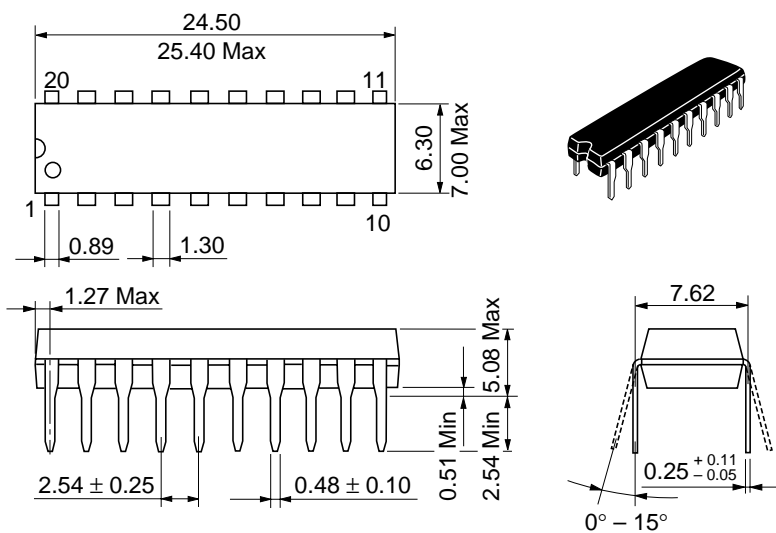
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AC Characteristics ( $C_L = 50$  pF, Input  $t_r = t_f = 6$  ns)

Item	Symbol	$V_{CC}$ (V)	Ta = 25°C			Ta = -40 to +85°C		Unit	Test Conditions
			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	

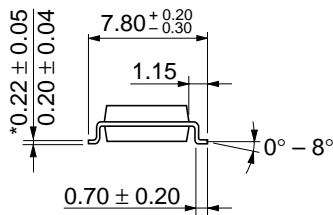
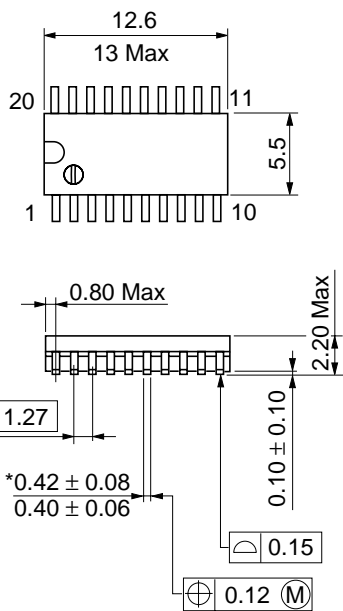


Unit: mm



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

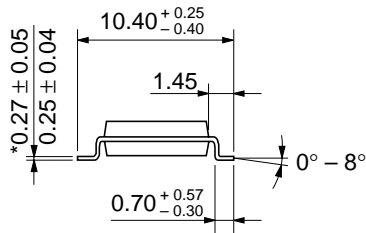
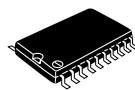
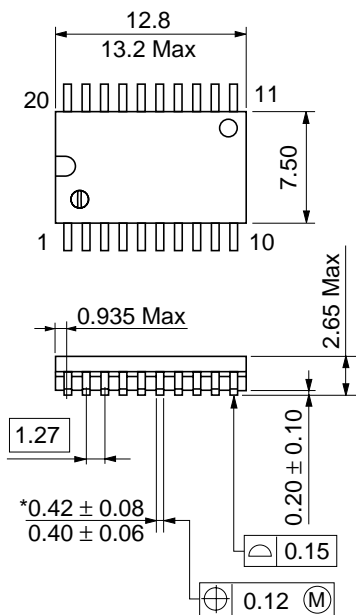
Unit: mm



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

\*Dimension including the plating thickness  
 Base material dimension

Unit: mm



\*Dimension including the plating thickness  
 Base material dimension

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

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## Hitachi, Ltd.

Semiconductor & Integrated Circuits.  
Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan  
Tel: Tokyo (03) 3270-2111 Fax: (03) 3270-5109

URL      NorthAmerica      : <http://semiconductor.hitachi.com/>  
             Europe                : <http://www.hitachi-eu.com/hel/ecg>  
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### For further information write to:

Hitachi Semiconductor  
(America) Inc.  
179 East Tasman Drive,  
San Jose, CA 95134  
Tel: <1> (408) 433-1990  
Fax: <1> (408) 433-0223

Hitachi Europe GmbH  
Electronic components Group  
Dornacher StraÙe 3  
D-85622 Feldkirchen, Munich  
Germany  
Tel: <49> (89) 9 9180-0  
Fax: <49> (89) 9 29 30 00

Hitachi Europe Ltd.  
Electronic Components Group.  
Whitebrook Park  
Lower Cookham Road  
Maidenhead  
Berkshire SL6 8YA, United Kingdom  
Tel: <44> (1628) 585000  
Fax: <44> (1628) 778322

Hitachi Asia Pte. Ltd.  
16 Collyer Quay #20-00  
Hitachi Tower  
Singapore 049318  
Tel: 535-2100  
Fax: 535-1533

Hitachi Asia Ltd.  
Taipei Branch Office  
3F, Hung Kuo Building, No.167,  
Tun-Hwa North Road, Taipei (105)  
Tel: <886> (2) 2718-3666  
Fax: <886> (2) 2718-8180

Hitachi Asia (Hong Kong) Ltd.  
Group III (Electronic Components)  
7/F., North Tower, World Finance Centre,  
Harbour City, Canton Road, Tsim Sha Tsui,  
Kowloon, Hong Kong  
Tel: <852> (2) 735 9218  
Fax: <852> (2) 730 0281  
Telex: 40815 HITEC HX

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