

Integrated Circuits - COS/MOS

HBF4000AE Series

Equivalent to RCA CD4000AE series

DESCRIPTION

The HBF4000AE series is a complementary N and P channel MOS logic family intended for a large number of applications. It second sources the well known 4000A RCA series.

Understanding the operation of COS/MOS devices is relatively simple because of the uncomplicated design that is needed to implement logic elements.

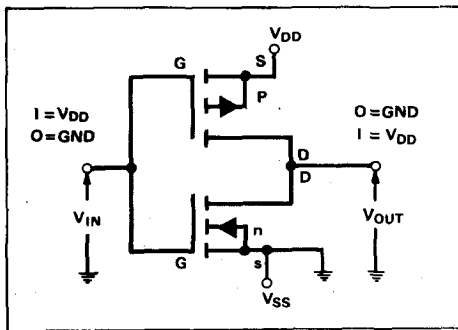


Figure 1

Figure 1 shows a simple COS/MOS inverter. It consists of one P-channel and one N-channel enhancement mode transistor. The substrate of the P-channel device is connected to the V_{DD} supply rail, the substrate of the N-channel transistor being at ground potential. Therefore, when the voltage at the input of the inverter is at logic 0, the P-channel device is turned on and the N-channel device turned off. This creates a low impedance path from V_{DD} to the output and a high impedance path between the output and ground, causing the output voltage to approach V_{DD} (logic 1).

Conversely, when the input voltage is at logic 1, the P-channel transistor is turned off and the N-channel on, creating a low resistance path between output and ground, causing the output to approach 0V. Therefore, as in either logic state one transistor is off, the quiescent power dissipation of the COS/MOS unit is very low, being equal to the product of supply voltage and leakage current.

FEATURES

- Very low power dissipation:
 - 10 nW typ./gate package
 - 10 μ W typ./MSI
- Wide supply voltage range: 3 to 15V
- High noise immunity: 45% of supply voltage (typ.)
- High speed operation:
 - 10 MHz for gates and flip-flops
 - 5 MHz for MSI
- DTL and TTL compatibility
- High fanout
- Excellent temperature stability:
 - $\pm 1.5\%$ shift in transfer characteristics over -40°C to $+85^{\circ}\text{C}$
- Inputs fully protected
- High input impedance: 10^{12} ohms typ.
- Low output impedance
- Single phase clock
- Wide operating temperature range:
 - plastic package types: -40°C to $+85^{\circ}\text{C}$

ABSOLUTE MAXIMUM RATINGS

DC supply voltage range ($V_{DD} - V_{SS}$)	-0.5V to $+15\text{V}$
Device dissipation (per package)	200mW
All device inputs	$V_{SS} < V_i < V_{DD}$
For 4009A and 4010A types	$V_{CC} \leq V_{DD}$
Operating temperature range plastic package	-40°C to $+85^{\circ}\text{C}$
Storage temperature range	-65°C to $+150^{\circ}\text{C}$
Recommended DC supply voltage ($V_{DD} - V_{SS}$)	3V to 15V
Recommended input voltage swing	V_{DD} to V_{SS}

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REFERENCE TABLE (See outline drawings Nos. 117 and 119 for physical dimensions)

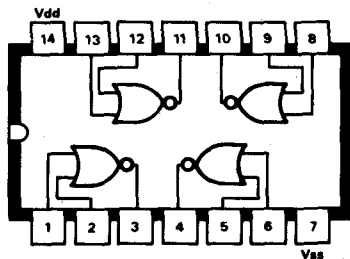
Code	Function	Stock No.	Connection Diagram No.
HBF4001AE	Quad 2-input NOR gate	34280A	E1
HBF4002AE	Dual 4-input NOR gate	34352A	E2
HBF4006AE	18-stage static shift register	34353X	E24
HBF4007AE	Dual compl. pair plus inverter	34281X	E25
HBF4008AE	4-bit full adder with parallel carry	34703R	E26
HBF4009AE	Hex buffer/convertor (inverting)	34282H	E4
HBF4010AE	Hex buffer/convertor (non inverting)	34283F	E5
HBF4011AE	Quad 2-input NAND gate	34284D	E6
HBF4012AE	Dual 4-input NAND gate	34354H	E7
HBF4013AE	Dual "D" flip-flop with set/reset	34355F	E8
HBF4014AE	8-stage static shift register	34704G	E9
HBF4015AE	Dual 4-stage static shift register	34702X	E27
HBF4016AE	Quad bilateral switch	34356D	E10
HBF4017AE	Decade counter/divider	34285B	E11
HBF4018AE	Presetable divide - by - "N" counter	34357B	E28
HBF4019AE	Quad AND/OR select gate	34358X	E12
HBF4020AE	14-stage binary/ripple counter	34286X	E17
HBF4021AE	8-stage static shift register	34705E	E13
HBF4022AE	Divide by 8 counter/divider	34359R	E18
HBF4023AE	Triple 3-input NAND gate	34360A	E14
HBF4024AE	7-stage binary counter	34361X	E15
HBF4025AE	Triple 3-input NOR gate	34287R	E19
HBF4026AE	Decade counter/divider	34709H	E29
HBF4027AE	Dual J-K master-slave flip-flop	34288G	E20
HBF4028AE	BCD to decimal decoder	34289E	E30
HBF4029AE	Presetable up/down counter	34290H	E31
HBF4030AE	Quad exclusive OR gate	34362H	E21
HBF4031AE	64-stage static shift register	34710X	E32
HBF4032AE	Triple serial adder (positive logic)	34711R	E33
HBF4033AE	Decade counter/divider	34363F	E34
HBF4035AE	4-stage parallel in/out shift register	34291F	E16
HBF4037AE	Triple AND/OR bi-phase pairs	34714C	E35
HBF4038AE	Triple serial adder (negative logic)	34715A	E36
HBF4040AE	12-stage binary/ripple counter	34717H	E37
HBF4041AE	Quad true/complement buffer	34718F	E38
HBF4042AE	Quad clocked 'D' latch	34364D	E39
HBF4043AE	Quad 3-state NOR R/S latch	34365B	E40
HBF4045AE	21-stage counter	34292D	E41
HBF4047AE	Monostable/astable multivibrator	34720G	E42
HBF4049AE	Hex buffer/convertor (inverting)	34367R	E22
HBF4050AE	Hex buffer/convertor (non-inverting)	34368G	E23
HBF4051AE	Single 8-channel multiplexer	34721E	E43
HBF4052AE	Differential 4-channel multiplexer	34722C	E44
HBF4053AE	Triple 2-channel multiplexer	34723A	E45
HBF4055AE	7-segment decoder/driver	34724X	E46
HBF4066AE	Quad bilateral switch	34706C	E47

PLEASE QUOTE STOCK NO. AND MANUFACTURER'S CODE WHEN ORDERING

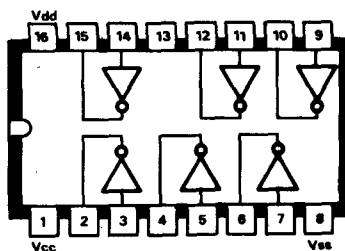
Semiconductors

Connection Diagrams

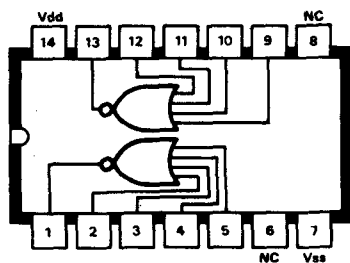
E1 4000AE
Quad 2-input NOR gate



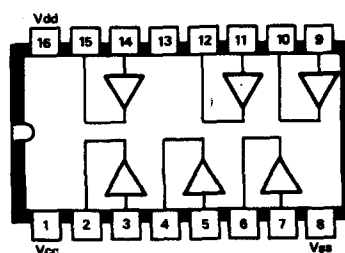
E4 4009AE
Hex buffer (inverting)



E2 4002AE
Dual 4-input NOR gate

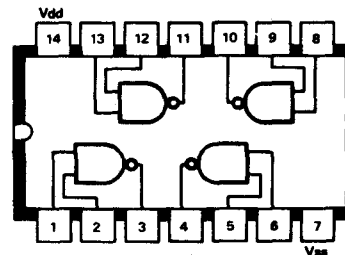


E5 4010AE
Hex buffer (non-inverting)



E3 4004AE

E6 4011AE
Quad 2-input NAND gate



MANUFACTURER'S CURRENT LIST PRICES ARE ALWAYS CHARGED