

HEF 4000 Series LOC MOS (Locally Oxidised CMOS)

GENERAL DESCRIPTION

LOC MOS is completely pin, function and type number compatible with the 4000 and 14000 families.

Compared with ordinary CMOS, LOC MOS circuit geometries are smaller and stray capacitances consequently lower. Switching speeds are thus faster and power consumption lower. Furthermore, LOC MOS has an almost ideal output characteristic making it the obvious choice in noisy environments.

When it comes to comparison with TTL, LOC MOS has a much lower power consumption—almost zero on standby. Noise immunity is higher, and the operating range of 3 to 15V is easier to cope with.

If you are still committed to TTL, LOC MOS offers a better interface than any other CMOS range, including 74C. The higher speed of LOC MOS brings it much nearer to TTL speeds, typical flip-flop frequency is twice that of other CMOS families.

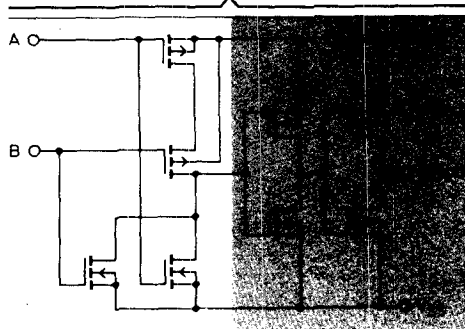
Signetics LOC MOS satisfies the requirements of the JEDEC 'B' Specification.

The Mullard range of LOC MOS ICs is known as the HE = 4000 series.

MAXIMUM RATINGS

Supply voltage	V_{DD}	-0.5 to +11V
Voltage on any input	V_i	-0.5 to $V_{DD} + 2.5V$
Current into any input	$\pm I_i$ max	10mA
Power dissipation (per package)	P_{tot} max	400mW
Operating ambient temperature	T_{amb}	-40 +85°C
Storage temp.	T_{stp}	-65 to +150°C

LOC MOS

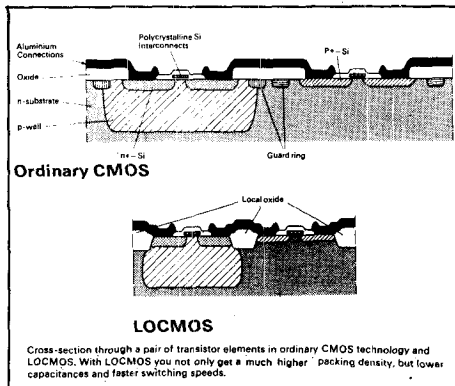


CMOS

A two-input NOR gate in ordinary CMOS and in LOC MOS technology

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With all LOC MOS ICs the outputs of all circuits are buffered. All outputs are therefore standardised. Transfer characteristics are nearly ideal and noise immunity very high.



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D.C. CHARACTERISTICS AT $V_{SS} = 0V$.

		Operating ambient temperature						Supply voltage	Conditions
		-40°C		+25°C		+85°C			
		min.	max.	min.	max.	min.	max.		
Quiescent device current:									
Gates	(μA)	—	1.0	—	1.0	—	7.5	5	all valid input combinations; $V_I = V_{SS}$ or V_{DD}
	(μA)	—	2.0	—	2.0	—	15.0	10	
	(μA)	—	4.0	—	4.0	—	30.0	15	
Buffers & Flip-flops	(μA)	—	4.0	—	4.0	—	30.0	5	
	(μA)	—	8.0	—	8.0	—	60.0	10	
	(μA)	—	16.0	—	16.0	—	120.0	15	
MSI devices	(μA)	—	20.0	—	20.0	—	150.0	5	
	(μA)	—	40.0	—	40.0	—	300.0	10	
	(μA)	—	80.0	—	80.0	—	600.0	15	
Output voltage LOW	(V)	—	0.05	—	0.05	—	0.05	5	$V_I = V_{SS}$ or V_{DD} ; $I_{OL} < 1\mu A$
	(V)	—	0.05	—	0.05	—	0.05	10	
	(V)	—	0.05	—	0.05	—	0.05	15	
Output voltage HIGH	(V)	4.95	—	4.95	—	4.95	—	5	$V_I = V_{SS}$ or V_{DD} ; $I_{OL} < 1\mu A$
	(V)	9.95	—	9.95	—	9.95	—	10	
	(V)	14.95	—	14.95	—	14.95	—	15	
Input Voltage LOW	(V)	—	1.5	—	1.5	—	1.5	5	$V_O = 0.5V$ or $4.5V$ $V_O = 1.0V$ or $9.0V$ $V_O = 1.5V$ or $13.5V$ $I_{OL} < 1\mu A$
	(V)	—	3.0	—	3.0	—	3.0	10	
	(V)	—	4.0	—	4.0	—	4.0	15	
Input voltage HIGH	(V)	3.5	—	3.5	—	3.5	—	5	$V_O = 0.5V$ or $4.5V$ $V_O = 1.0V$ or $9.0V$ $V_O = 1.5V$ or $13.5V$ $I_{OL} < 1\mu A$
	(V)	7.0	—	7.0	—	7.0	—	10	
	(V)	11.0	—	11.0	—	11.0	—	15	
Output (sink) current LOW	(mA)	0.52	—	0.44	—	0.36	—	5	$V_O = 0.4V$; $V_I = 0$ or $5V$ $V_O = 0.5V$; $V_I = 0$ or $10V$ $V_O = 1.5V$; $V_I = 0$ or $15V$
	(mA)	1.3	—	1.1	—	0.9	—	10	
	(mA)	3.6	—	3.0	—	2.4	—	15	
Output (source) current HIGH	(mA)	-0.2	—	-0.16	—	-0.12	—	5	$V_O = 4.8V$; $V_I = 0$ or $5V$ $V_O = 9.5V$; $V_I = 0$ or $10V$ $V_O = 13.5V$; $V_I = 0$ or $15V$
	(mA)	-0.5	—	-0.4	—	-0.3	—	10	
	(mA)	-1.4	—	-1.2	—	-1.0	—	15	
Input current	(μA)	—	± 0.3	—	± 0.3	—	± 1.0	15	$V_I = 0$ or $15V$
Input capacitance per unit load	(pF)	—	—	—	7.5	—	—	—	any input

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Integrated Circuits – LOCMOS

REFERENCE TABLE	DESCRIPTION	STOCK NO.	OUTLINE DRWG. NO.	CONNECTION DIAG. NO.
HEF 4008BP	Dual 3-Input NOR gate plus inverter	54015D	1	A1
HEF 4001BP	Quad 2-Input NOR gate	53576R	1	A2
HEF 4002BP	Dual 4-Input NOR gate	53577G	1	A3
HEF 4006BP	18-stage static shift register	54429D	1	A4
HEF 4007UBP	Dual complementary pair plus inverter	54016B	1	A5
HEF 4008BP	4-bit full adder with parallel carry	54017X	2	A6
HEF 4011BP	Quad 2-Input NAND gate	53578E	1	A7
HEF 4012BP	Dual 4-input NAND gate	53579C	1	A8
HEF 4013BP	Dual 'D' flip-flop with set/reset	53580F	1	A9
HEF 4014BP	8-stage static shift register	53581D	2	A10
HEF 4015BP	Dual 4-stage static shift register	53582B	2	A11
HEF 4016BP	Quad bilateral switch	53583X	1	A12
HEF 4017BP	Decade counter/divider	53584R	2	A13
HEF 4018BP	Presetable divide-by-N counter	53585G	2	A14
HEF 4019BP	Quad AND-OR select gate	53586E	2	A15
HEF 4020BP	14-stage binary ripple counter	53587C	2	A16
HEF 4021BP	8-stage static shift register	53588A	2	A17
HEF 4022BP	Divide-by-8 counter/divider	53589X	2	A18
HEF 4023BP	Triple 3-input NAND gate	53590B	1	A19
HEF 4024BP	7-stage binary counter	53591X	1	A20
HEF 4025BP	Triple 3-input NOR gate	53592R	1	A21
HEF 4027BP	Dual J-K master-slave flip-flop	53593G	2	A22
HEF 4028BP	BCD to decimal decoder	53627H	2	A23
HEF 4029BP	Synchronous up/down binary/decade counter	53594E	2	A24
HEF 4030BP	Quad exclusive-OR gate	53595C	1	A24
HEF 4031BP	64-stage static shift register	53596A	2	A26
HEF 4035BP	4-stage-parallel-in/out shift register	53597X	2	A27
HEF 4040BP	12-stage binary ripple counter	53598H	2	A28
HEF 4041BP	Quad true/complement buffer	54430G	1	A29
HEF 4042BP	Quad clocked 'D' latch	53599F	2	A30
HEF 4043BP	Quad NOR R/S latch 3-state	54431E	2	A31
HEF 4044BP	Quad NAND R/S latch 3-state output	54432C	2	A32
HEF 4046BP	Phase locked loop	53628F	2	A33
HEF 4047BP	Monostable/astable multivibrator	54433A	1	A34
HEF 4049BP	Hex buffer/converter (inverting)	53600H	2	A35
HEF 4050BP	Hex buffer/converter (non-inverting)	53601F	2	A36
HEF 4051BP	Single 8-channel analog multiplexer	53602D	2	A37
HEF 4052BP	Differential 4-channel analog multiplexer	53603B	2	A38
HEF 4053BP	Triple 2-channel analog multiplexer	53604X	2	A39
HEF 4066BP	Quad bilateral switch	54014F	1	A40
HEF 4067BP	1-16 analog multiplexer/demultiplexer	54018R	3	A41
HEF 4068BP	8-input NAND gate	53605R	1	A42
HEF 4069BP	Hex inverter (single stage)	54019G	1	A43
HEF 4070BP	Quad exclusive OR gate	54013H	1	A44
HEF 4071BP	Quad 2-input OR gate	53606G	1	A45
HEF 4072BP	Dual 4-input OR gate	53629D	1	A46
HEF 4073BP	Triple 3-input AND gate	54020X	1	A47
HEF 4075BP	Triple 3-input OR gate	54021H	1	A48
HEF 4076BP	Quad D-type flip-flop	54908G	2	A79
HEF 4077BP	Quad exclusive NOR	54907R	1	A80
HEF 4078BP	8-input NOR gate	53607E	1	A49
HEF 4081BP	Quad 2-input AND gate	53608C	1	A50
HEF 4082BP	Dual 4-input AND gate	53609A	1	A51
HEF 4085BP	Quad two-wide two-input AND/OR inverter gate	53610D	1	A52
HEF 4086BP	Expandable 4-wide, 2-input AOI gate	54434X	1	A53
HEF 4093BP	Quad 2-input NAND Schmitt trigger	54022F	1	A54
HEF 4094BP	8-stage shift and store bus register	55759G	2	A81
HEF 4104BP	Quad low voltage to high voltage translator with 3-state output	54060E	2	A55
HEF 4502BP	Strobed hex inverter	54906X	2	A82
HEF 4505BP	64-bit, 1 bit/word ram	55130D	1	A83

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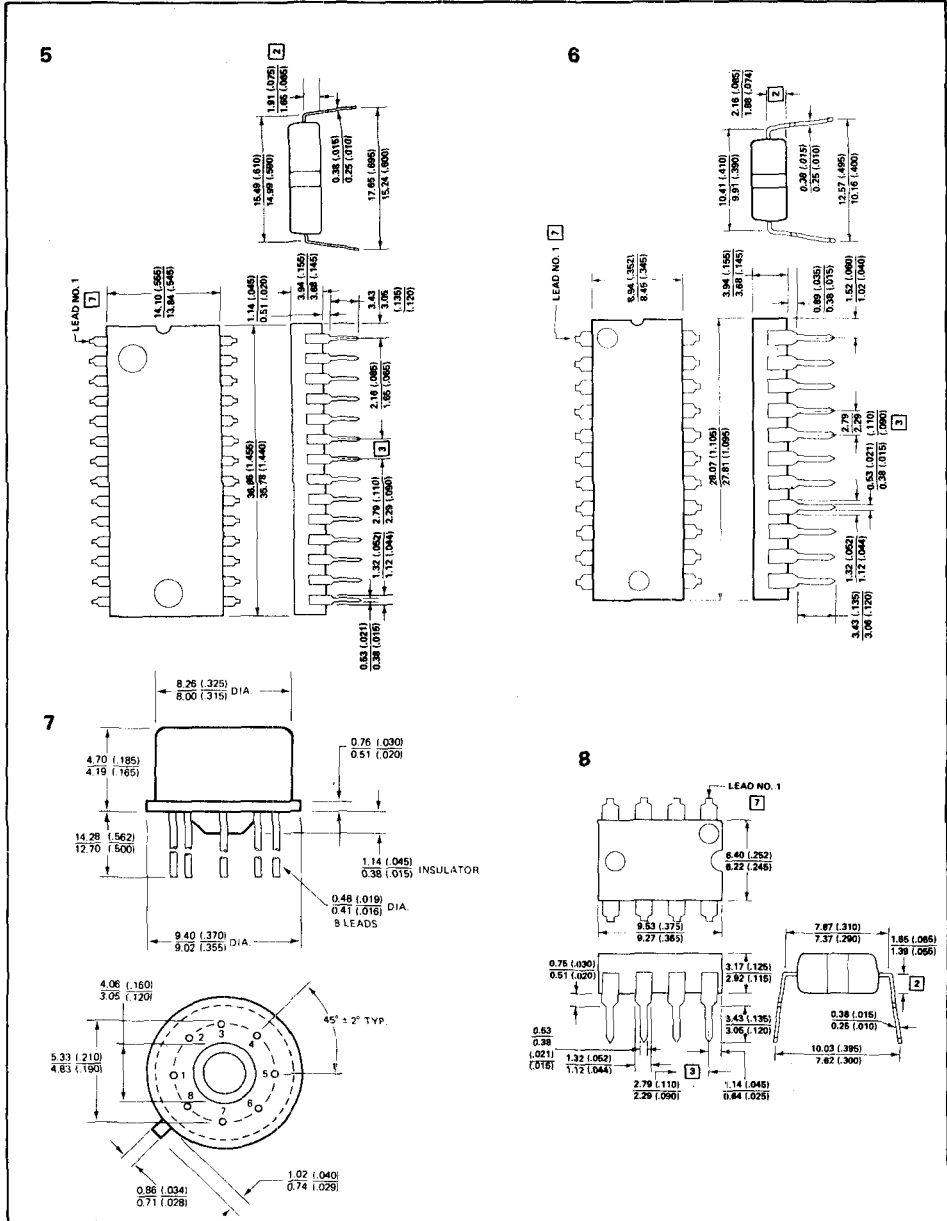
REFERENCE TABLE	DESCRIPTION	STOCK NO.	OUTLINE DRWG. NO.	CONNECTION DIAG. NO.
HEF 4508BP	Dual 4-bit latch	55131B	3	A84
HEF 4510BP	BCD up/down counter	54435H	2	A56
HEF 4511BP	BCD to 7-segment latch/decoder	54436F	2	A57
HEF 4512BP	8-input multiplexer 3-state output	54915R	2	A85
HEF 4514BP	4-bit latch/4-to-16 line decoder (high)	53612X	3	A58
HEF 4515BP	4-bit latch/4-to-16 line decoder (low)	53613R	3	A59
HEF 4516BP	Binary up/down counter	54437D	2	A60
HEF 4517BP	Dual 64-bit static shift register	55760X	2	A86
HEF 4518BP	Dual BCD up counter	53614G	2	A61
HEF 4519BP	4-bit AND/OR selector or quad 2-channel data selector or quad exclusive-NOR gate	53615E	2	A62
HEF 4520BP	Dual binary up counter	53616C	2	A63
HEF 4521BP	24 stage divider	55761H	2	A87
HEF 4522BP	Presetable divide-by-N 4-bit counter BCD	55762F	2	A88
HEF 4526BP	Presetable divid-by-N 4-bit counter (binary)	55763D	2	A89
HEF 4528BP	Dual monostable multivibrator	54438B	1	A64
HEF 4531BP	13-input parity checker/generator	55764B	2	A90
HEF 4532BP	8-input priority encoder	54916G	2	A91
HEF 4534BP	Real time 5 decade counter	55765X	3	A92
HEF 4537BP	Quad static decade counter	55766R	2	A92
HEF 4543BP	BCD to 7-segt. latch/decoder driver	54914X	2	A105
HEF 4539BP	Dual 4-channel data selector multiplexer	53617A	2	A65
HEF 4555BP	Dual binary-to-1 of 4 decoder demultiplexer	53618X	2	A66
HEF 4556BP	Dual binary-to-1 of 4 decoder/demultiplexer (inverting)	53619H	2	A67
HEF 4557BP	1-to-64-bit variable length shift register	54913B	2	A93
HEF 4583BP	Dual Schmitt trigger	55767G	2	A94
HEF 4585BP	4-bit magnitude comparator	54804A	2	A95
HEF 4720BV	256 x 1-bit static RAM	53927F	2	A68
HEF 4721BP	256 x 4 static RAM (5101)	54439X	2	A69
HEF 4724BP	Eight-bit addressable latch	54440C	2	A70
HEF 4731BV	Quad 64-bit static shift register	55768E	1	A96
HEF 4736BP	1024-bit, 1 word RAM	55769C	2	A97
HEF 4737BV	Quad static decade counter	56426X	2	A104
HEF 4738VP	IEC/IEEE bus interface	55342B	20	A104
HEF 4738VE	IEC/IEEE bus interface	55128C	20	A104
HEF 4739BV	Digital voltmeter circuit	55770F	5	A98
HEF 40097BP	Hex 3-state buffer	53620X	2	A71
HEF 40098BP	Hex 3-state inverting buffer	53621R	2	A72
HEF 40106BP	Hex Schmitt trigger inverter	55771D	2	A99
HEF 40160BP	4-bit synchronous decade counter-- asynchronous reset	55772B	2	A100
HEF 40161BP	4-bit synchronous binary counter-- asynchronous reset	55773X	2	A101
HEF 40162BP	4-bit synchronous decade counter synchronous reset	55774R	2	A102
HEF 40163BP	4-bit synchronous binary counter synchronous reset	55775G	2	A103
HEF 40174BP	Hex D flip/flop	54441A	2	A73
HEF 40175BP	Quad D flip/flop with complementary outputs	54442X	2	A74
HEF 40192BP	4-bit up/down synchronous decade counter	53622G	2	A75
HEF 40193BP	4-bit up/down synchronous binary counter	53623E	2	A76
HEF 40194BP	Four-bit bidirectional universal shift register	53624C	2	A77
HEF 40195BP	four-bit universal shift register	53625A	2	A78

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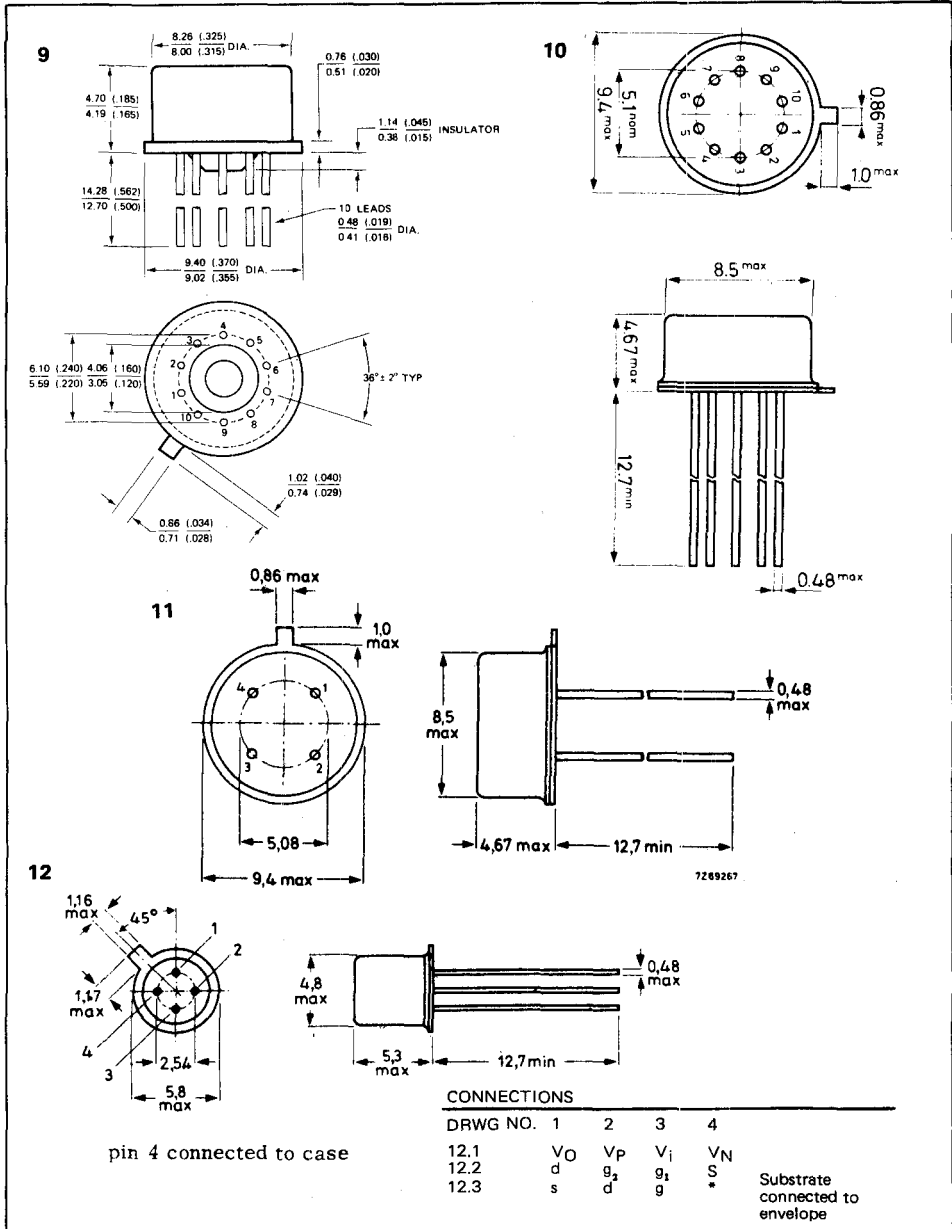
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Outline Drawings



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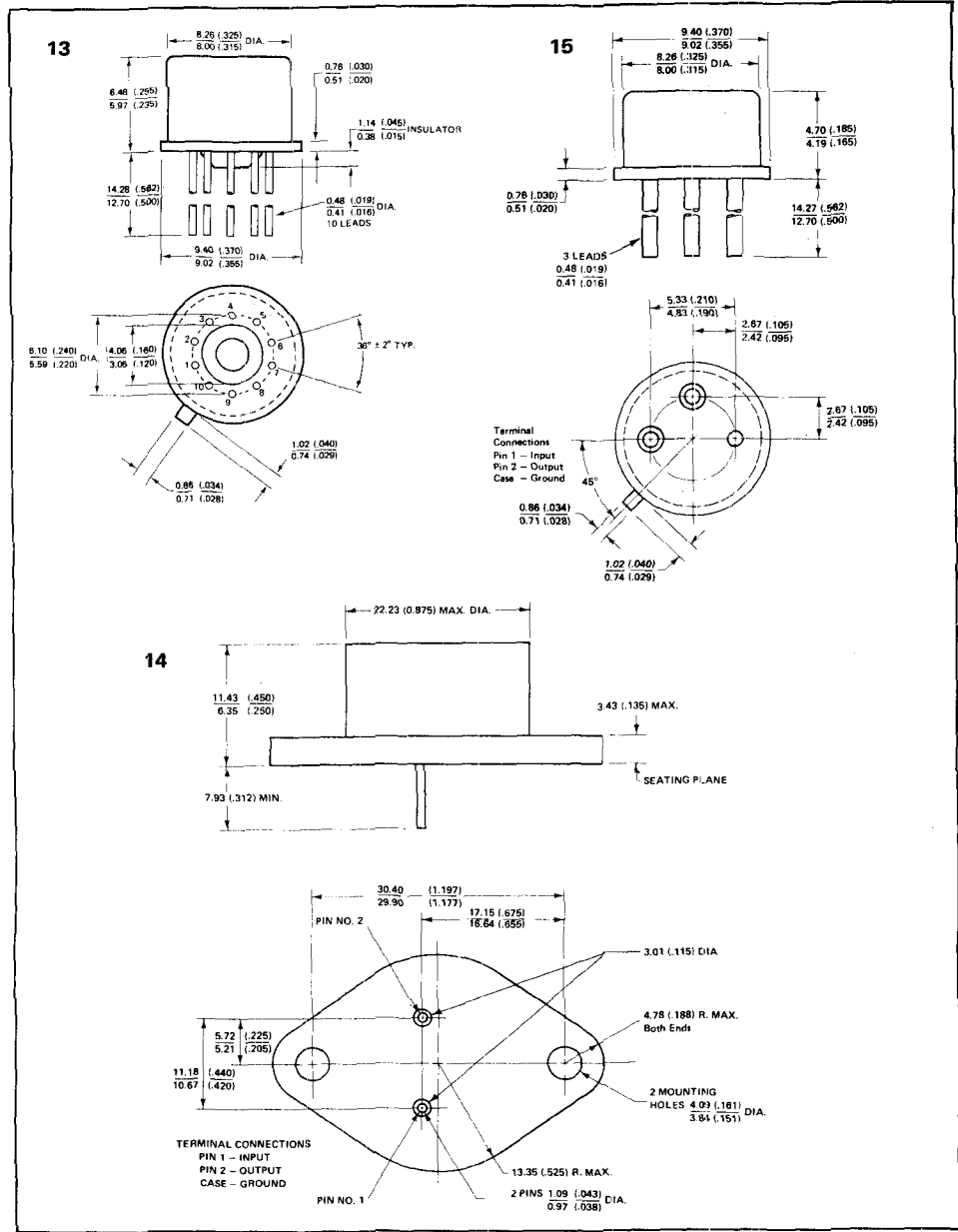


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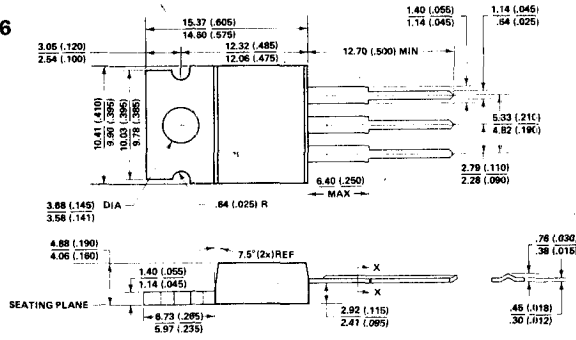
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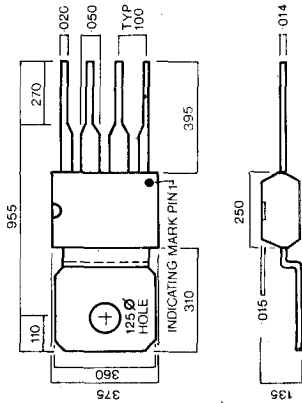


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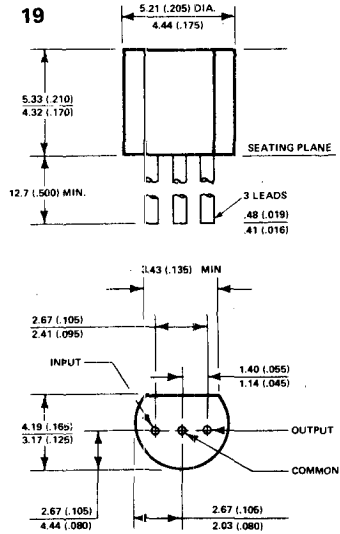
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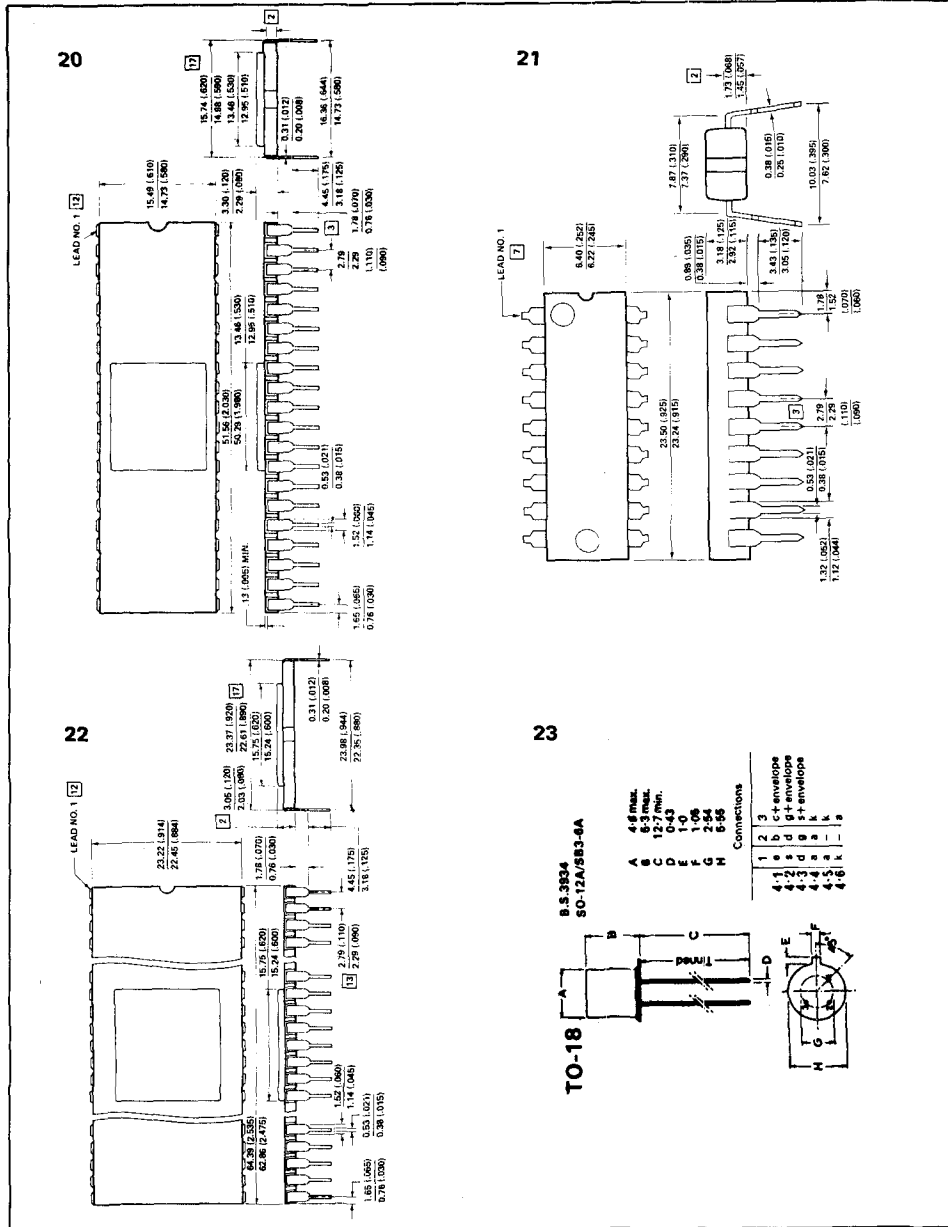


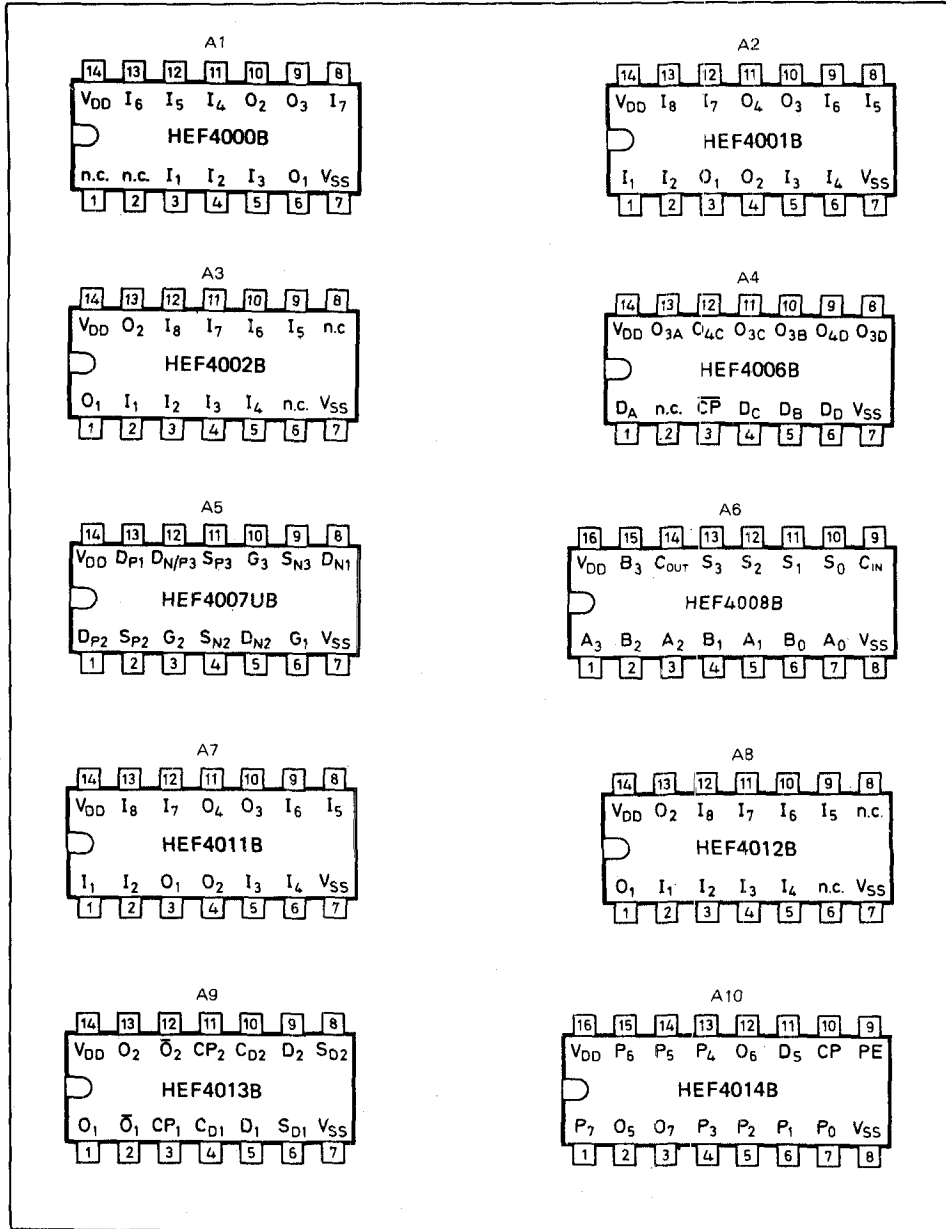
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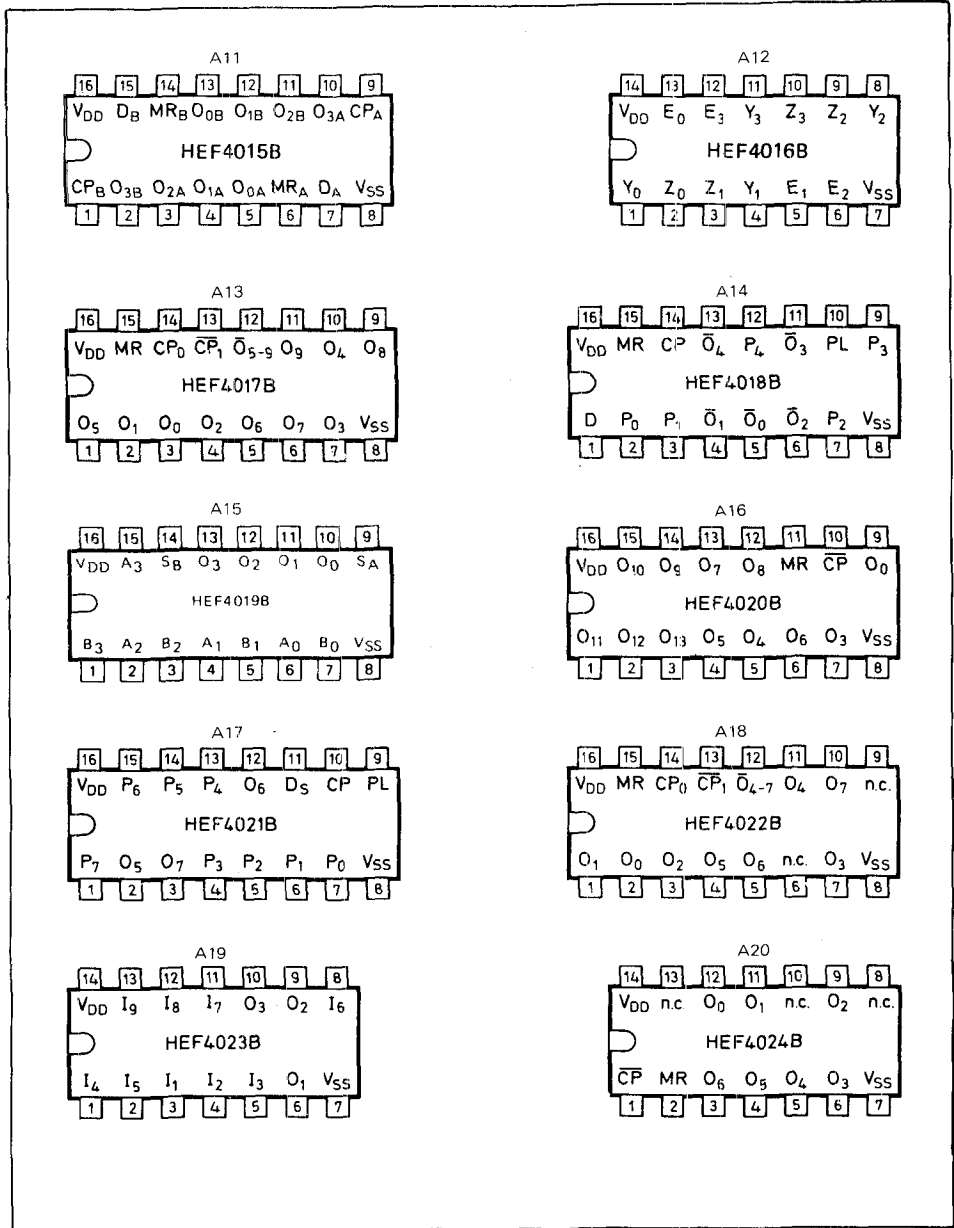


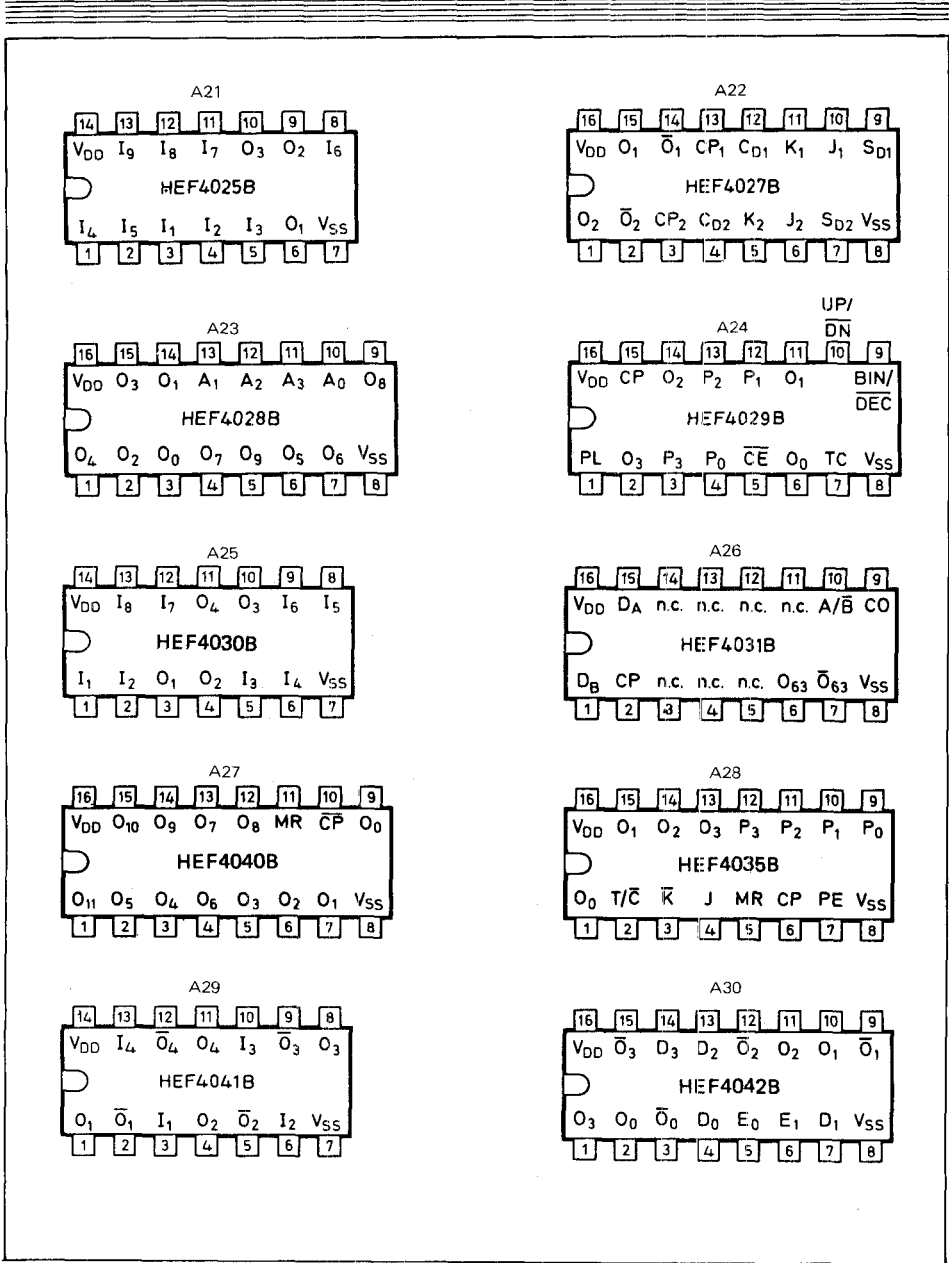
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Connection Diagram



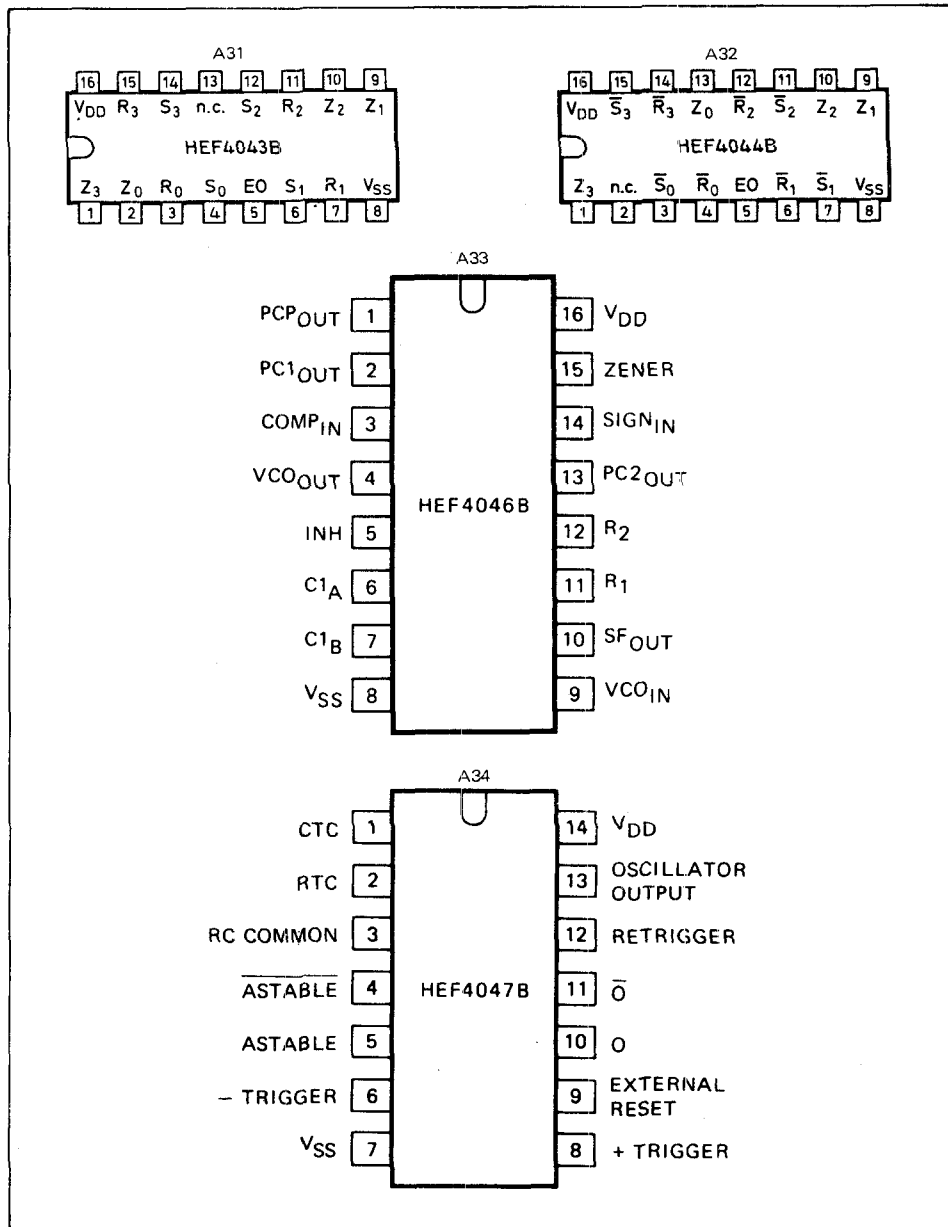


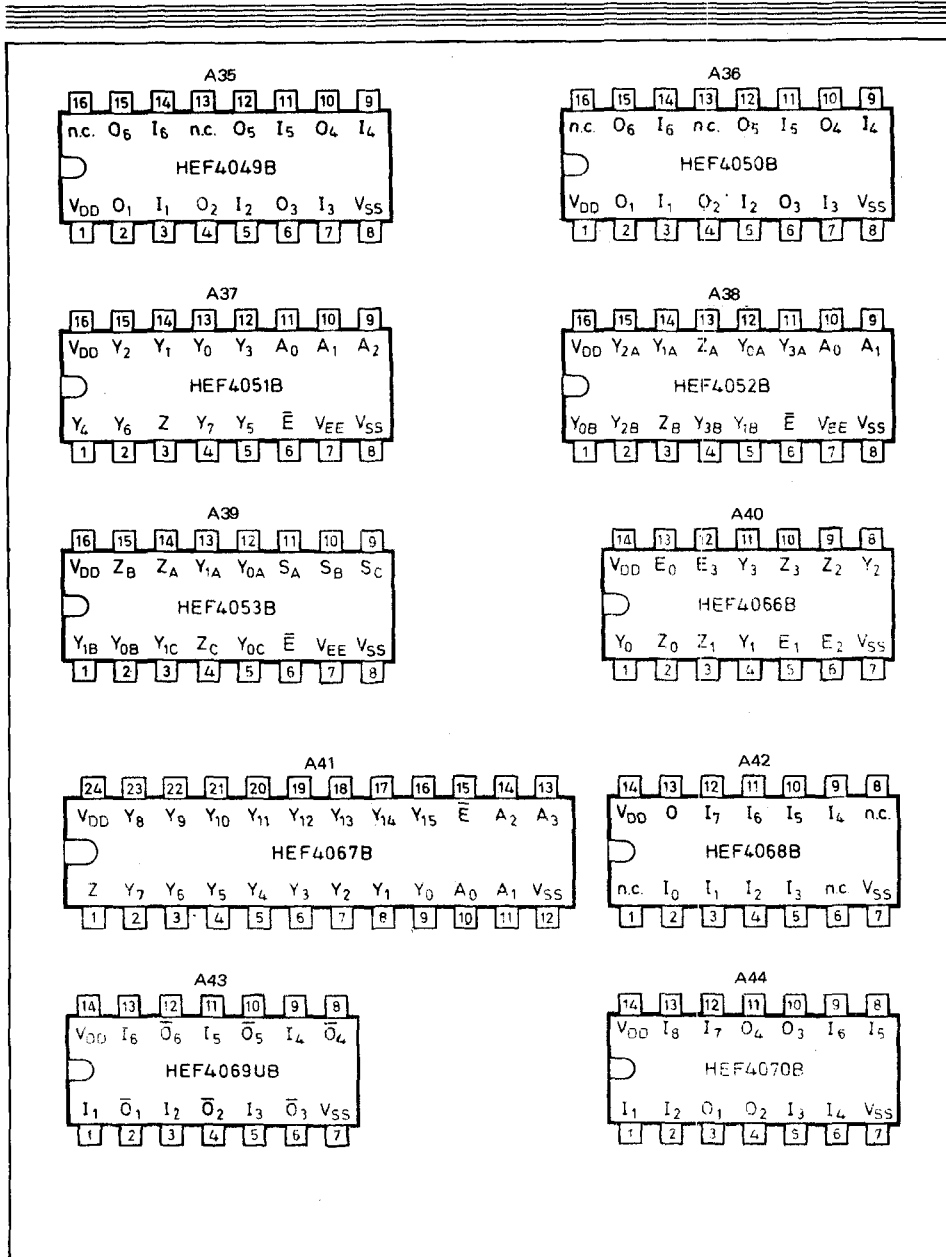
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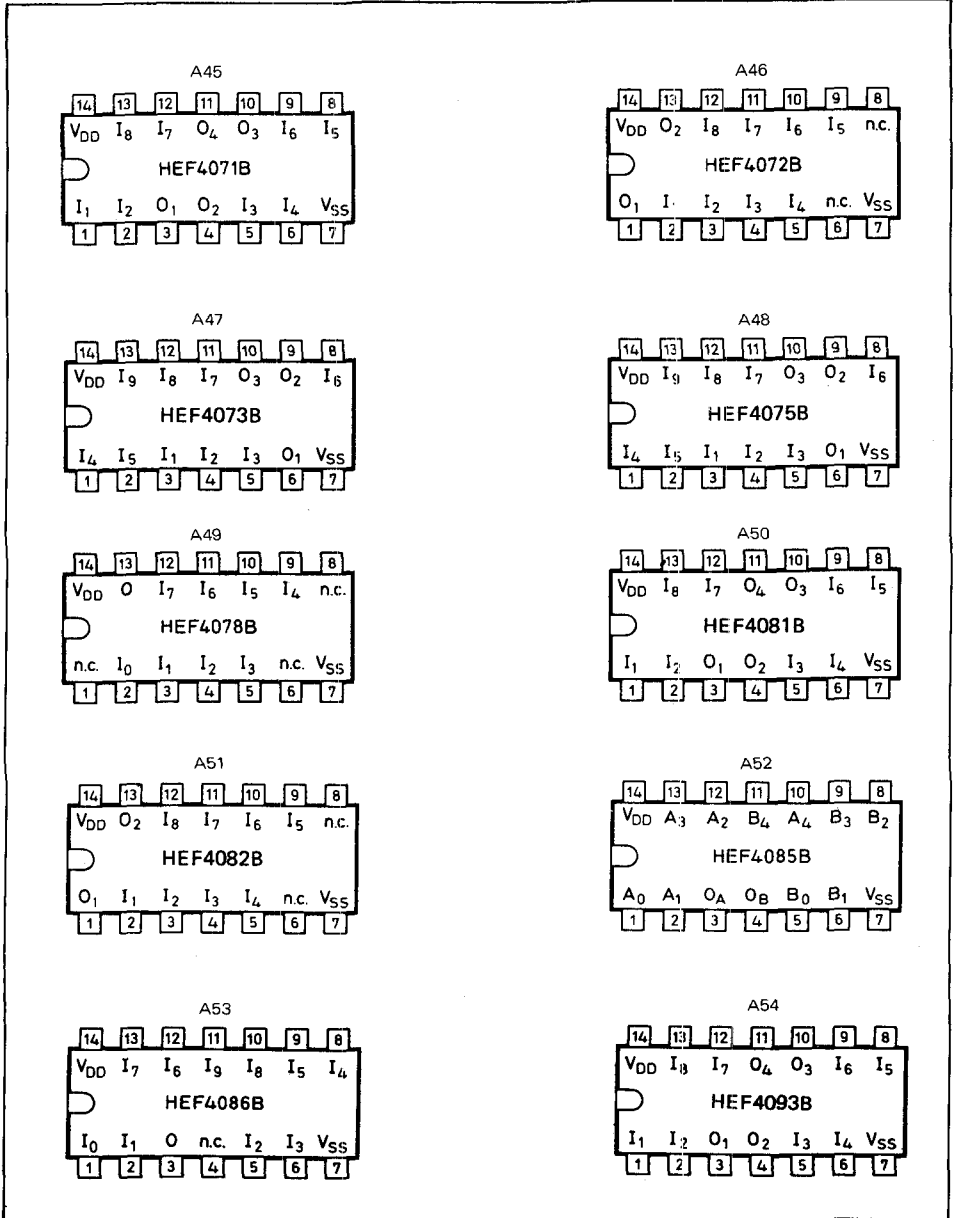


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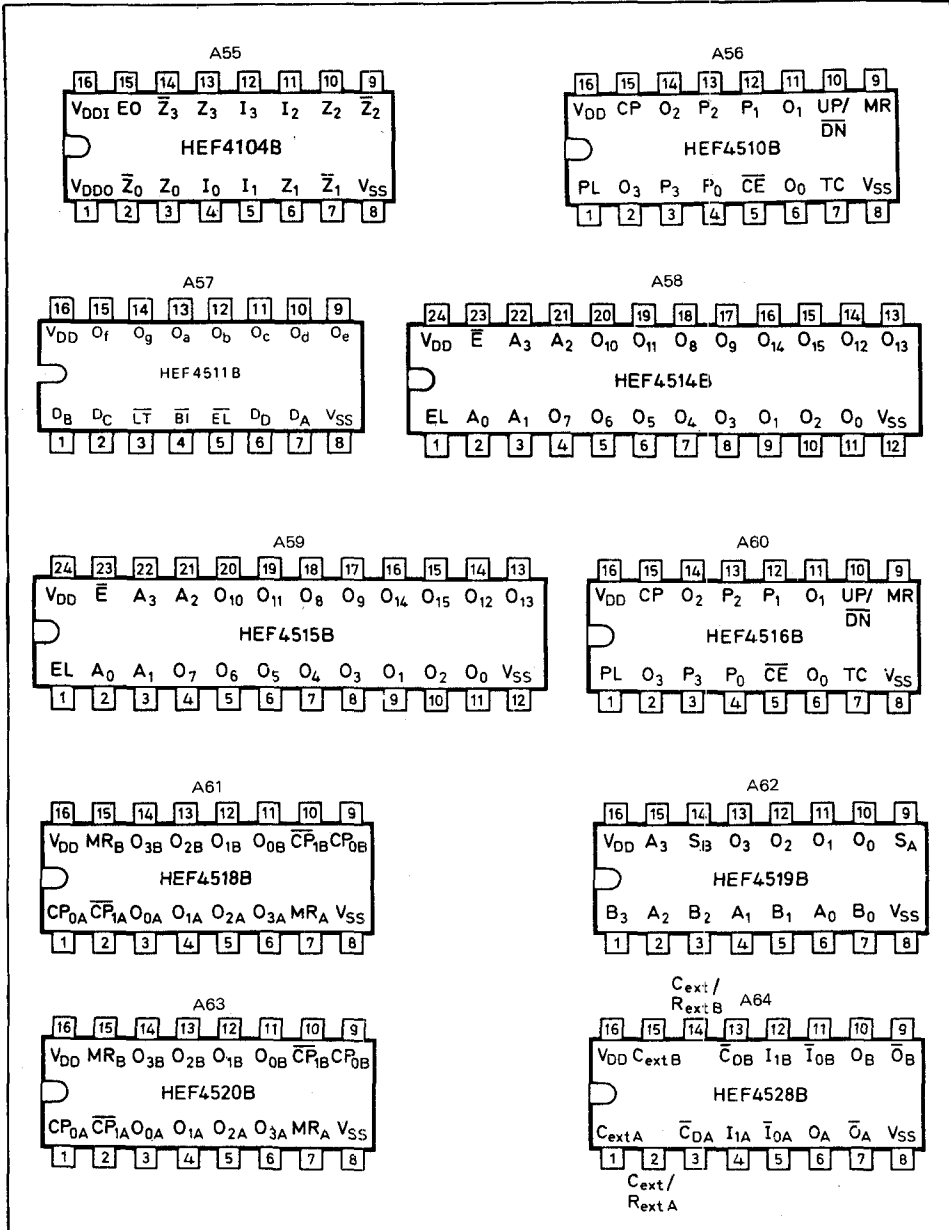
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Connection Diagram



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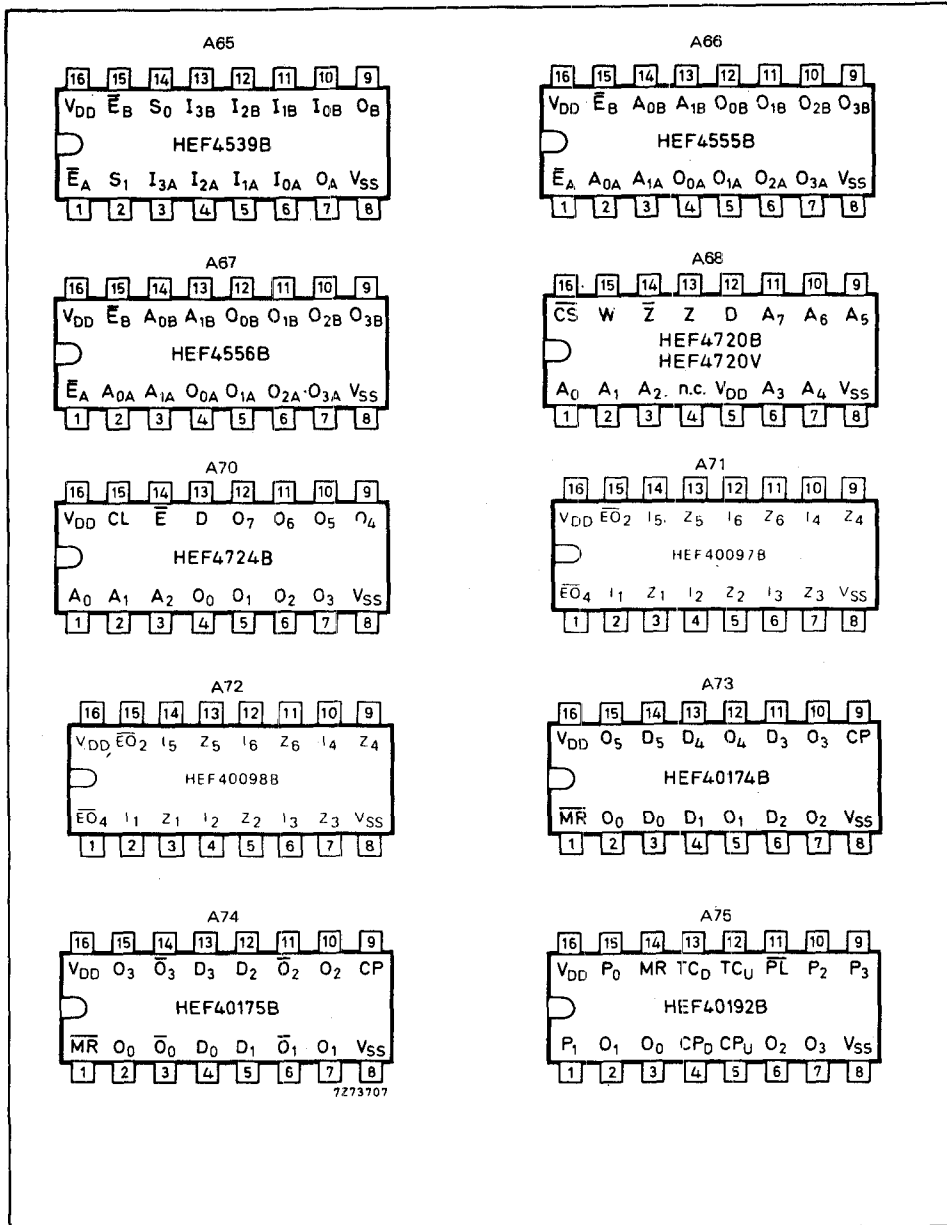


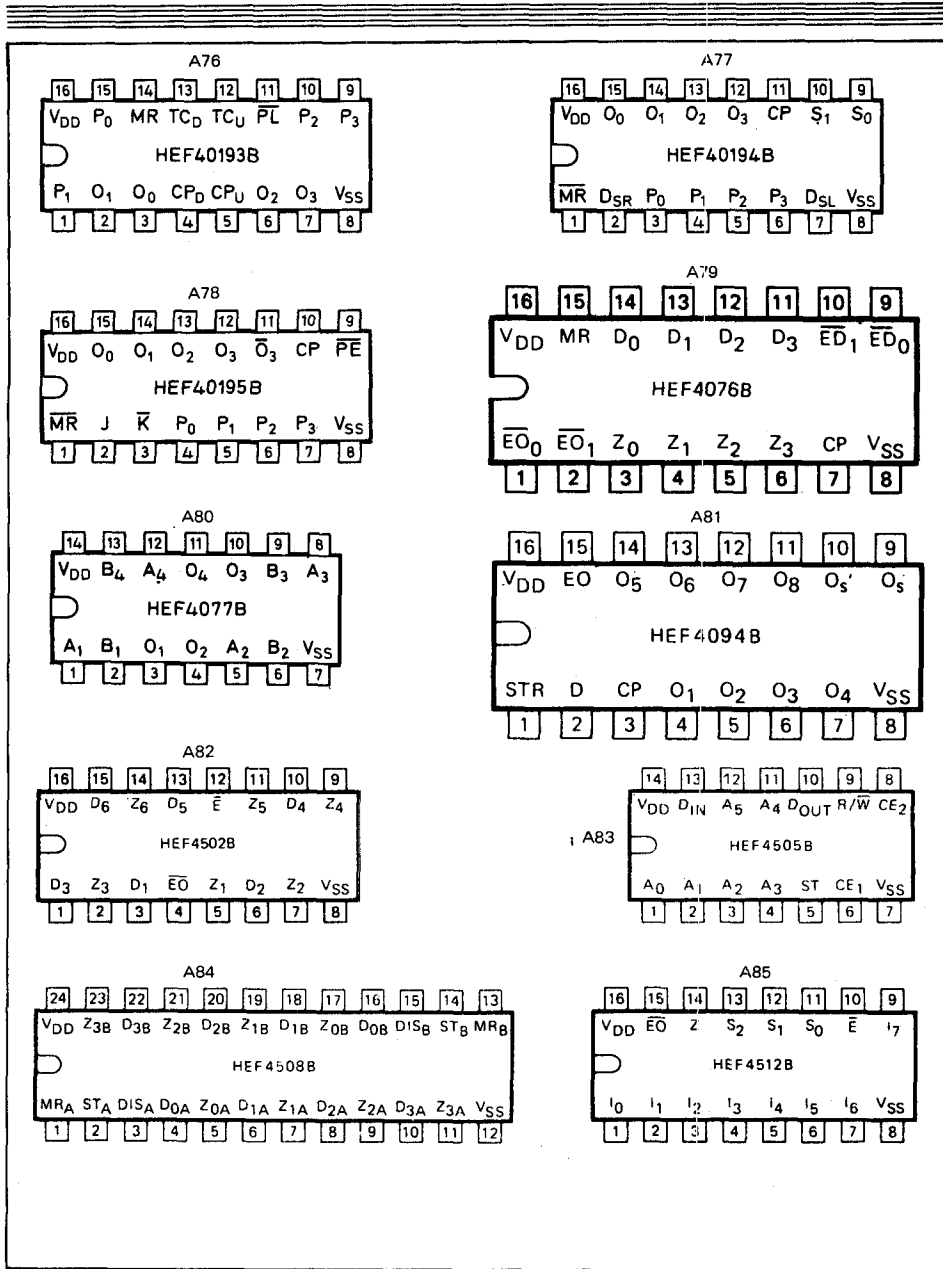
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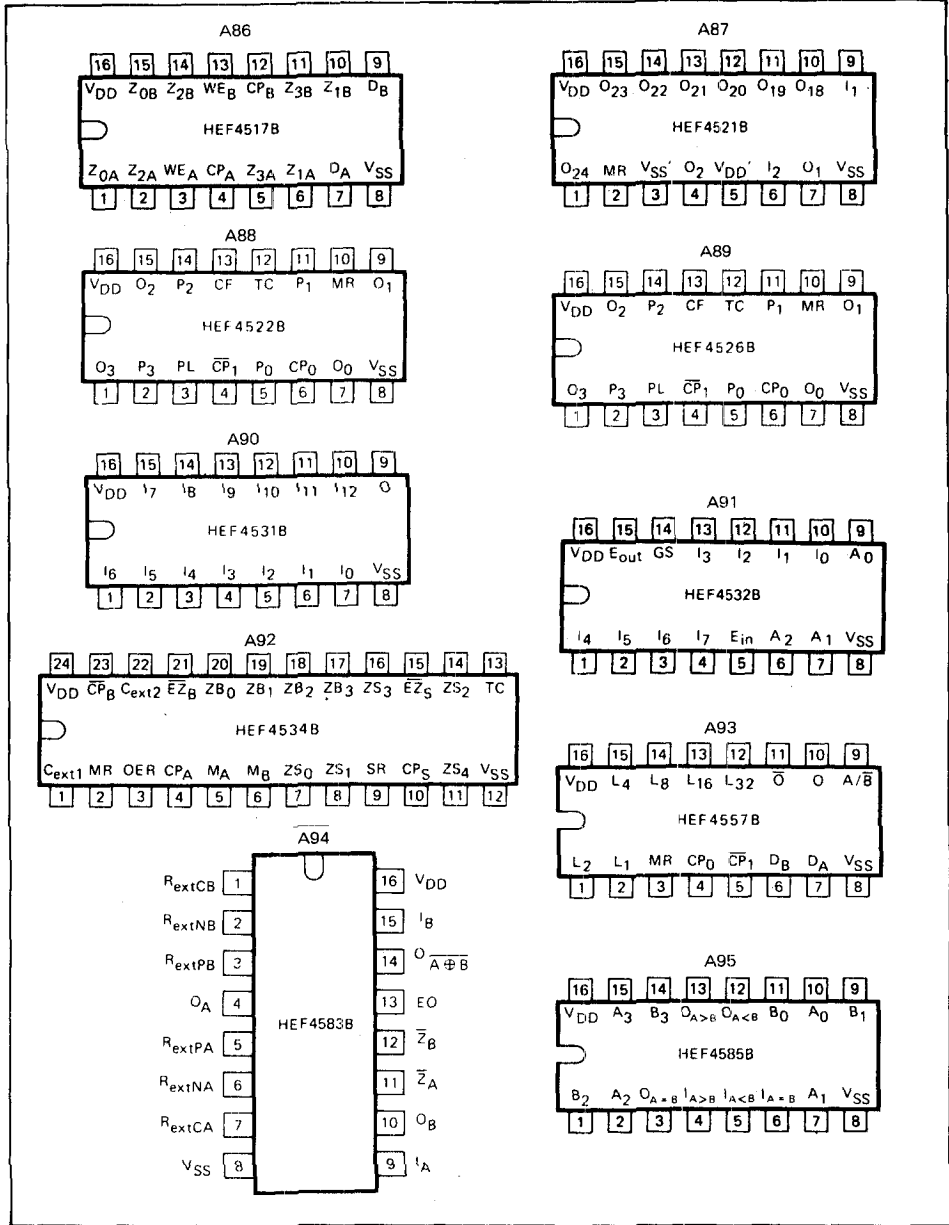


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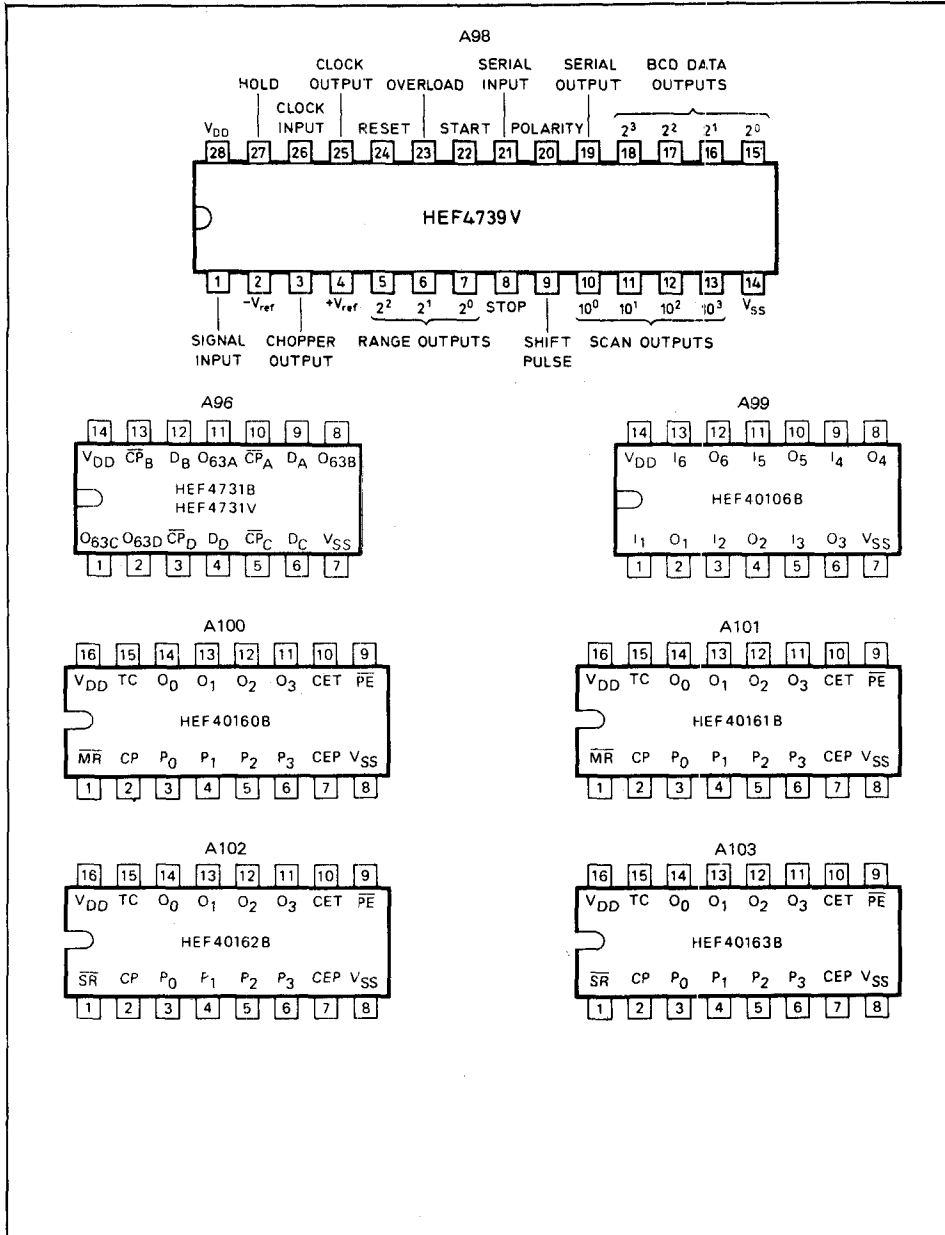


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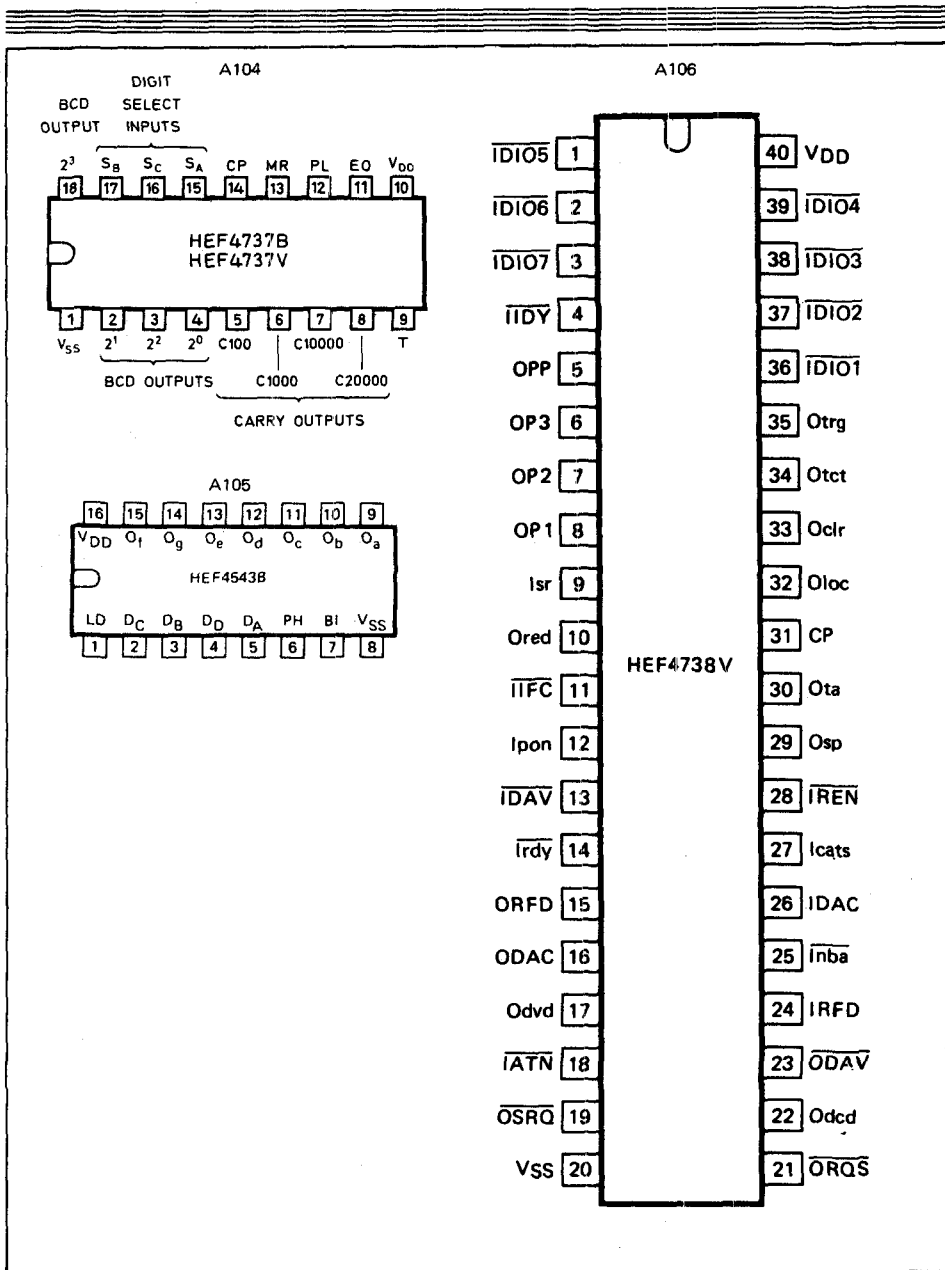


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