

TTL/CMOS/ECL

Logic Products Cross Reference Characteristics



Technology	Hitachi	On Semi	Toshiba	TI	Philips	Fairchild
TTL	HD74LS	SN74LS	SN74LS	SN74LS	74LS	DM74LS
Bi-CMOS	HD74BC	MC74BC	TC74BC	SN74BCT		74BCT
			TC74ABT	SN74ABT	74ABT	
CMOS 4000	HD14	MC14	TC4		HEF4	CD4
High-Speed CMOS	HD74HC	MC74HC	TC74HC	SN74HC	74HC	MM74HC
	HD74HCT	MC74HCT	TC74HCT	SN74HCT	74HCT	MM74HCT
	HD74AC	MC74AC	TC74AC	SN74AC		74AC
	HD74ACT	MC74ACT	TC74ACT	SN74ACT		74ACT
Low-Voltage CMOS	HD74LV-A	MC74VHC	TC74VHC	SN74LV-A/AHC	74AHC	74AHC
		MC74VHCT	TC74VHCT	SN74AHCT	74AHCT	74VHCT
	HD74LV	MC74LVX	TC74LVX		74LV	74LVX
	HD74LVC	MC74LCX	TC74LCX	SN74LVC	74LVC	74LCX
	HD74ALVC	TC74VCX	TC74VCX	SN74ALVC	74ALVC	74VCX
Single-Gate CMOS	HD74UH	SC7S	TC7S		74HC1G	

Package Suffix per Manufacturers

Family	Package	PINs	ON Semi	Hitachi	Philips	Toshiba	TI	Fairchild	ST Micro
MG, LS, HC, FACT, VHC, LVX, LCX, VCX	PDIP	14	N,CP	P	N	P	N	N,P	B, B1R, EY
		16	N,CP	P	N	-	N	P	
		18	N,CP	-	-	-	-	-	
		20	N,CP	P	N	-	N	P	
		24	N,CP	P	N2	-	NT	SP	
	SOIC	14	D	RP	D	FN	D	M,S	M, M1, M1R, M013, RM13
		16	D	RP	D	FN	D	M,S	
		16	DW	-	-	-	DW	-	
		20	DW	RP	DW	FW	DW	WM	
		24	DW	RP	DW	-	DW	WM	
	TSSOP	14	DT	T	PW, DH	FS	PW	MTC	T
		16	DT	T	PW, DH	FS	PW	MTC	T
		20	DT	T	PW, DH	FS	PW	MTC	T
		24	DT	T	PW, DH	-	PW	MTC	T
	SO EIAJ		F	FP	-	F	NS	SJ	-
			M	FP	-	F	NS	SJ	-
One-gate	TSOP-5 / SOT-23	5	DT	MPAK	-	F	DBV	M5	S
	SC88A / SC70	5	DF	CMPAK	DCK	FU	DCK	P5	C
Tape & Reel Suffix			T1, T2, T4, R2, EL	R	T	EL	LE / R	X	TR, TR2

Hitachi Logic Characteristics Table



Parameter		LS	HC	HCT	AC	ACT	LVC	ALVC	BC
Supply Voltage	4.5V to 5.5V	●		●		●			●
	2.0V to 6.0V		●		●				
	2.7V to 5.5V						●		
	2.3V to 3.6V							●	
Output Current (IOH/IOL) Vcc = 5 V	-15/24 mA	●							
	-4/4 mA		●	●					
	-15/64 mA								●
	-24/24 mA				●	●	● (*)	●	●
Input Level	TTL	●		●		●			●
	CMOS		●		●		●	●	
Propagation Delay (typical)	> 10 ns	●	●	●					
	5 ns				●	●			●
	4 ns						● (*)		
	2 ns							●	

(*) Vcc = 3.3 +/- 0.3 V

TTL/CMOS Logics



Part No.	Description	Pin	LS	HC	HCT	AC	ACT	VHC/LVA	VHCT	LVX/LV	LCX/LVC
00	Quad.2-input Positive NAND Gates	14	●	●		●	●	●	●	●	●
01	Quad.2-input Positive NAND Gates (with open drain outputs)	14	●	●							
02	Quad.2-input Positive NOR Gates	14	●	●		●	●	●		●	●
03	Quad.2-input Positive NAND Gates (with open collector outputs)	14	●	●							
04	Hex Inverters	14	●	●	●	●	●	●	●	●	●
05	Hex Inverters(with open collector outputs)	14	●	●		●	●	●			
06	Hex Inverters Buffers/Drivers (Open collector High-Voltage output)	14	●					●			
07	Hex Buffers/Drivers (Open collector High-Voltage output)	14	●					●			
08	Quad.2-input Positive AND Gates	14	●	●		●	●	●		●	●
09	Quad.2-input AND Gates (With Open Collector)	14	●	●							
10	Triple 3-input Positive NAND Gates	14	●	●		●	●	●			
11	Triple 3-input Positive AND Gates	14	●	●		●	●	●			
12	Triple 3-input Positive NAND Gates (with open collector outputs)	14	●								
13	Dual 4-input NAND Gates Schmitt Triggers	14	●								
14	Hex Schmitt-trigger Inverters	14	●	●	●	●	●	●		●	●
15	Triple 3-input AND Gates(Open Collector output)	14	●								
20	Dual 4-input Positive NAND Gates	14	●	●		●	●	●			
21	Dual 4-input Positive AND Gates	14	●	●				●			
22	Dual 4-input NAND Gates(Open Collector output)	14	●								
26	Quad. 2-input High-Voltage Interface NAND Gates	14	●								
27	Triple 3 input NOR Gates	14	●	●				●			
30	8-input Positive NAND Gates	14	●	●							
32	Quad.2-input Positive OR Gates	14	●	●		●	●	●		●	●
37	Quad.2-input Positive NAND Buffers	14	●								
38	Quad.2-input Positive NAND Buffers (with open collector outputs)	14	●								
40	Dual. 4-input NAND Buffers (Open Collector output)	14	●								
42	BCD-to-Decimal Decoders	16	●	●							
47	BCD-to-Seven Segment Decoders/Drivers (with 15V outputs)	16	●								
48	BCD-to-Seven Segment Decoders/Drivers (Internal Pull-Up outputs)	14	●								
49	BCD-to-Seven Segment Decoders/Drivers (Open Collector outputs)	14	●								
51	2-wide 2-input, 2-wide 3-input AND-OR-INVERT Gates	14	●	●							
54	2-wide 2-input, 3-input AND-OR-INVERT Gates	14	●								
55	2-wide 4-input AND-OR-INVERT Gates	14	●								
73	Dual J-K Flip-Flops (with Clear)	14	●	●							
74	Dual D-type Edge-triggered Flip-Flops	14	●	●	●	●	●	●	●	●	●
75	Quad. Bistable Latches	16	●	●							
76	Dual J-K Flip-Flops (with PR and CLR)	16	●	●							
77	4-bit Bistable Latches	14	●	●							
78	Dual J-K Flip-Flops (with Preset, Common clear, Common Clock)	14	●	●							
83	4-bit Binary Full Adder (Fast Carry)	16	●	●							
85	4-bit Magnitude Comparators	16	●	●							
86	Quad.2-input Exclusive-OR Gates	14	●	●		●	●	●		●	●
90	Decade Counters	14									
91	8-bit Shift Register	14	●	●							
92	Divide-by Twelve Counters	14	●								
93	4-bit Binary Counters (with Clear)	14	●	●							
95	4-bit Parallel Access Shift Register	14	●	●							
107	Dual J-K Flip-Flops (with Clear)	14	●	●			●				
108	Dual J-K Flip-Flops (with Preset, Common Clear, Common Clock)	14		●							
109	Dual Positive Edge-trig. J-K Flip-Flops(with Preset and Clear)	16	●	●			●				

Part No.	Description	Pin	LS	HC	HCT	AC	ACT	VHC/LVA	VHCT	LVX/LV	LCX/LVC
112	Dual Negative Edge-trig. J-K Flip-Flops(with Preset and Clear)	14	●	●		●	●				
113	Dual J-K Flip-Flops(with Preset)	14	●	●							
114	Dual J-K Flip-Flops (with Preset, Common Clear, Common Clock)	14	●	●							
122	Retriggerable Monostable Multivibrators(with Clear)	14	●								
123	Dual Retriggerable Monostable Multivibrators (with Clear)	16	●	●		●		●			
125	Quad. Bus Buffer Gates with three-state outputs(inverting)	14	●	●	●	●	●	●		●	●
126	Quad. Bus Buffer Gates with three-state outputs(noninverting)	14	●	●	●	●	●	●			
131	3 to 8 Line Decoder / Demultiplexer	14		●							
132	Quad. 2-input Positive NAND Schmitt Triggers	14	●	●		●	●	●			
133	13-input NAND Gate	16		●							
136	Quad. 2-input Exclusive-OR Gates (with open collector outputs)	14	●								
137	3-to-8 line Decoder/Demultiplexer with Address Latch	16		●	●						
138	3-to-8-line Decoders	16	●	●	●	●	●	●	●	●	●
139	Dual 2-to-4-line Decoders/Demultiplexers	16	●	●		●	●	●			●
145	BCD-to-Decimal Decoders/Drivers(with 15V outputs)	16	●								
147	10-to-4 line Priority Encoder	16		●							
148	8-to-3-line Priority Encoder	16	●	●							
149	8-to-8 line Priority Encoder	20		●							
151	8-bit Data Selectors/Multiplexers(with strobe)	16	●	●		●	●				
152	1-of-8 line Data Selector/Multiplexer	14	●	●							
153	Dual 4-to-1-line Data Selectors/Multiplexers	16	●	●		●	●				
154	4-to-16-line Decoders/Demultiplexers	24		●							
155	Dual 2-to-4-line Decoders/Demultiplexers	16	●	●							
156	Dual 2-to-4-line Decoders/Demultiplexers (with open collector outputs)	16	●								
157	Quad. 2-to-1-line Data Selectors/Multiplexers	16	●	●		●	●	●		●	●
158	Quad. 2-to-1-line Data Selectors/Multiplexers (Inverted outputs)	16	●	●		●					
160	Synchronous Decade Counters	16	●	●							
161	Synchronous 4-bit Binary Counters (Asynchronous clear)	16	●	●		●	●	●			
162	Synchronous Decade Counter(Synchronous Clear)	16	●	●							
163	Synchronous 4-bit Binary Counters (Synchronous clear)	16	●	●		●	●	●			
164	8-bit Parallel-out Shift Registers	14	●	●		●	●	●			
165	8-bit Parallel in/Serial out Shift Registers	16	●	●		●	●	●			
166	Parallel-load 8-bit Shift Registers	16	●	●		●	●	●			
170	4-by-4 Register File(Open Collector output)	16	●								
173	4-bit D-type Register(with 3-state outputs)	16		●							
174	Hex D-type Flip-Flops(with CLR)	16	●	●		●	●	●			
175	Quad. D-type Flip-Flops(with CLR)	16	●	●		●	●	●			
180	8-bit Odd/Even Parity Generator/Checker	14		●							
181	4-bit Arithmetic Logic Unit	24									
182	Look-ahead carry Generator	16		●		●	●				
190	Synchronous Decade Up/Down Counters	16	●	●							
191	Synchronous 4-bit Up/down Counters	16	●	●							
192	Synchronous BCD Decade Up / Down counter	16	●	●							
193	Up/Down Binary Counter w/Separate Up/Down Clocks	16	●	●							
194	4-bit Bidirectional Universal Shift Register	16	●	●		●					
195	4-bit Parallel-Access Shift Register	16	●	●		●					
221	Dual Monostable Multivibrators (with Schmitt trigger inputs)	16	●	●				●			
237	3-to-8 line Decoder/Demultiplexer with Address Latch (not invertive)	16		●	●						
238	3-to-8 line Decoder/Demultiplexer(not invertive)	16		●	●						
240	Octal Buffers/Line Drivers/Line Receivers (inverted three-state outputs)	20	●	●	●	●	●	●	●	●	●
241	Octal Buffers/Line Drivers/Line Receivers (noninverted three-state outputs)	20	●	●	●	●	●				
242	Quad. Bus Transceivers(inverted 3-state outputs)	14	●	●	●						
243	Quad. Bus Transceivers(non-inverted 3-state outputs)	14	●	●	●						

TTL/CMOS Logics(cont.)



Part No.	Description	Pin	LS	HC	HCT	AC	ACT	VHC/LVA	VHCT	LVX/LV	LCX/LVC
244	Octal Buffers/Line Drivers/Line Receivers (noninverted three-state outputs)	20	•	•	•	•	•	•	•	•	•
245	Octal Bus Transceivers(noninverted three-state outputs)	20	•	•	•	•	•	•	•	•	•
247	BCD-to-Seven Segment Decoders/Drivers (with 15V outputs)	16	•								
248	BCD-to-Seven Segment Decode/Drivers (Internal Pull-up outputs)	16	•								
249	BCD-to-Seven Segment Decoder/Drivers (Open Collector outputs)	16	•								
251	1-of-8 line Data Selector/Multiplexer (with 3-state outputs)	16	•	•	•		•				
253	Dual 4-to-1 line Data Selector/Multiplexer (with 3-state outputs)	16	•	•	•	•	•				
257	Quad 2-input Multiplexer w/Output Enable	16	•	•	•	•	•				•
258	Quad. 2-to-1 line Data Selector/Multiplexer (with Inverted 3-state outputs)	16	•	•	•		•				
259	8-bit Addressable Latches	16	•	•	•	•	•				
266	Quad. 2-input Exclusive-NOR Gates (Open Collector output)	14	•								
273	Octal D-type Positive-edge-triggered Flip-Flops (with clear)	20	•	•	•	•	•	•			
279	Quad S-R Latches	16	•	•							
280	9-bit Odd/Even Parity Generator/Checker	14	•	•		•	•				
283	4-bit Binary Full Adders	16	•	•		•	•				
290	Decade Counters	14									
292	Programmable Frequency Divider/Digital Timer	16		•							
293	4-bit binary Counter	14	•								
294	Programmable Frequency Divider/Digital Timer	16		•							
297	Digital Phase-Locked Loop Filter	16									
298	Quad.2-input Multiplexers(with Storage)	16	•	•							
299	8-Input Universal Shift Register w/Common Parallel I/O Pins (with 3-stste out puts)	20	•	•		•	•				
323	8-bit Universal shift/Storage Register (with 3-state outputs)	20		•							
352	Dual 4-to-1 line Data Selector/Multiplexer	16		•							
353	Dual 4-to-1 line Data Selector/Multiplexer (with 3-state outputs)	16		•							
354	8-to-1 line data Selector/Multiplexer/Register (with 3-state outputs)	20		•							
356	8-input Multiplexer/Register (with 3-state Outputs)	20		•							
365	Hex Bus Drivers(non-inverted 3-state Outputs)	16	•	•		•	•				
366	Hex Bus Drivers(inverted 3-state Outputs)	16	•	•		•	•				
367	Hex Bus Drivers(non-inverted data Outputs with three-state Outputs)	16	•	•		•	•				
368	Hex Bus Drivers(with inverted data outputs three-state Outputs)	16	•	•		•	•				
373	Octal D-type Transparent Latches (with three-state Outputs)	20	•	•	•	•	•	•	•	•	•
374	Octal D-type Edge-triggered Flip-Flops (with three-state Outputs)	20	•	•	•	•	•	•	•	•	•
375	Quad. Bistable Latches	16	•	•							
377	Octal D Flip-Flop w/Clock Enable	20	•	•		•	•				
386	Quadruple 2-input Exclusive-OR Gates	14	•	•							
390	Dual Decade Counters	16	•	•							
393	Dual 4-bit Binary Counters	14	•	•		•	•	•			
399	Quad Dual-Port Register										
423	Dual Retriggerable Monostable Multivibrators	16		•							
442	Quad. Tridirectional Bus Transceivers	20		•							
443	Quad. Tridirectional Bus Transceivers	20		•							
444	Quad. Tridirectional Bus Transceivers	20		•							
449	Quad. Bus Transceivers with Individual Direction Controls	16			•						
490	Dual 4-bit Decade Counters	16		•							
521	8-bit Identity Comparator	20									
533	Inverting Octal Transparent Latch w/3-State	20		•	•						•
534	Inverting Octal D Flip-Flop w/3-State	20		•	•						•
538	1-to-8 line Decoder with 3-State Output	20				•					

Part No.	Description	Pin	LS	HC	HCT	AC	ACT	VHC/LVA	VHCT	LVX/LV	LCX/LVC
539	Dual 1-to-4 line Decoder with 3-State Output	20				•					
540	Octal Buffer and Line driver, 3-state	20		•	•	•	•	•			•
541	Octal with 3-state Outputs Noninverting Buffer/LineDriver/Line Receiver	20	•	•	•	•	•	•	•		•
543	Octal Latched Transceiver	24									
563	Octal Transparent Latches(with inverted 3-state output)	20		•	•						
564	Octal D-type Flip-Flops(with inverted 3-state output)	20		•	•		•				
573	Octal with 3-state Outputs Noninverting Transparent Latch	20		•	•	•	•	•	•	•	•
574	Octal D-type Flip-Flop, 3-state, Positive-edge triggered	20		•	•	•	•	•	•	•	•
583	4-bit BCD Full Adder with Fast Carry	16									
589	8-bit Serial or Parallel-input/serial-output Shift Register(with 3-state outputs)	16		•							
590	8-bit Binary Counter/Register(with 3-state outputs)	16		•							
592	8-bit Register/Binary Counter	16		•							
595	8-bit Shift Register/Latch(with 3-state outputs)	16		•				•			
597	8-bit Latch/Shift Register	16		•							
620	Octal Bus Transceiver(with inverted 3-state outputs)	20		•	•						
621	Octal Bus Transceiver(Open Drain)	20									
623	Octal Transceiver w/3-State	20		•	•						
640	Octal Bus Transceiver (with Inverting 3-state outputs)	20	•	•	•		•				
640-1	Octal Bus Transceivers(with inverting 3-state outputs)	20	•								
641	Octal Bus Transceivers (non-inverted open-collector outputs)	20	•								
641-1	Octal Bus Transceivers (non-inverted open-collector outputs)	20	•								
642	Octal Bus Transceivers (inverted open-collector outputs)	20	•								
642-1	Octal Bus Transceivers (inverted open-collector outputs)	20	•								
643	Octal Bus Transceivers(with 3-state outputs)	20		•	•						
645	Octal Bus Transceivers(non-inverted 3-state outputs)	20	•								
645-1	Octal Bus Transceivers(non-inverted 3-state outputs)	20	•								
646	Octal Registered Transceiver w/Bypass and Direction Control	24		•		•	•				•
647	Octal-Bus Transceiver/Register with Open Drain, Non-Inverting	24					•				
648	Inverting Octal Registered Transceiver w/Bypass and Direction Control	24		•							
651	Octal Bus Transceivers and Registers (with 3-state outputs)	24		•							
652	Octal Registered Transceiver w/Bypass and Direction Control	24		•		•	•				•
653	Octal-Bus Transceiver/Register;Open-Drain(A-side); Three-State(B-side);Inverting	24									
654	Octal-Bus Transceiver/Register;Open-Drain(A-side); Three-State(B-side);Non-Inverting	24									
668	Synchronous Up/Down Decade Counter	16	•	•							
669	Synchronous Up/Down 4-bit Binary Counter	16	•	•							
670	4-by-4 Register File(with 3-state outputs)	16	•	•		•					
673	16-bit Shift Register	24		•							
674	16-bit Shift Register	24		•							
677	16-bit Address Comparator	24		•							
678	16-bit Address Comparator	24		•							
679	12-bit Address Comparator	20		•							
680	12-bit Address Comparator	20		•							
682	8-bit Magnitude Comparator	20	•	•							
684	8-bit Magnitude Comparator	20	•	•							
688	8-bit Magnitude Comparator	20	•	•	•						
807	1:10 Clock Driver w/TTL Outputs	20									
810	Dual 1:5 Inverting/Non-inverting Clock Driver w/TTL outputs	20									
821	10-Bit Register w/3-State	24									
822A	10-Bit D-Type Flip-Flop,Three-State, Inverting	24									
823	9-Bit Register w/Clear & 3-State	24									

TTL/CMOS Logics(cont.)



Part No.	Description	Pin	LS	HC	HCT	AC	ACT	VHC/LVA	VHCT	LVX/LV	LCX/LVC
824	9-Bit Inverting Register w/Clear & 3-State	24									
825	8-Bit Register	24									
827	10-Bit Buffer	24									
833	8-Bit Transceiver w/Parity	24									
841	10-Bit Latch	24									
842A	10-Bit Transparent Latch, three-State, Inverting	24									
843A	9-Bit Transparent Latch, Three-State	24									
844A	9-Bit Transparent Latch, Three-State, Inverting	24									
861	10-Bit Transceiver	24									
863	9-Bit Transceiver	24									
2240	Octal Inverting Buffer/Line Driver	20									
2244	Octal Buffer/Line driver	20									
2245	Octal Buffered Transceiver	20									
2257	Quad 2-Input Multiplexer w/Output Enable	16									
2373	Octal Transparent Latch	20									
2374	Octal Register	20									
2541	Octal Buffer/Line Driver w/Dual Output Enable	20									
2543	Octal Latched Transceiver w/Chip Enable	24									
2573	Octal Transparent Latch w/Flow Through Pin Out	20									
2574	Octal Register w/Flow Through Pin Out	20									
2646	Octal Registered Transceiver w/Bypass and Direction Control	24									
2652	Octal Registered Transceiver w/Bypass and Separate Output Enables	24									
2827	10-Bit Buffer w/ Dual Output Enable	24									
2952A	Octal Register/Transceiver, Three-State	24									
3125	4-Bit Bus Switch w/ Individual Enable										
3244	Octal Bus Switch (Dual out put Enable)	20									
3245	Octal Bus Switch (Single out put Enable)	20								●	
3257	Quad. 2:1 Mux/Demux Bus Switch	16									
3383	Octal Bus Exchange Switch	24									
3384	10-Bit Bus Switch	24									
3390	Octal 2:1 Multiplexer Bus Switch	28									
3573	Octal Transparent Latch	20									
3574	Octal D Register w/3-State	20									
3807	1:10 Clock Driver	20									
3827	10-Bit Buffer (3.3V)	24									
3932	Low Skew PLL Clock Generator w/3-Stage and TTL-Outputs	48									
4002	Dual 4-input NOR Gate	14									
4015	Dual 4-stage Static Shift Register	16									
4016	Quad Bilateral Switch	14									
4017	Decade Counter/Divider	16		●							
4020	14-stage binary Counter	16		●							
4022	Octal Counter/Dividers	16		●							
4024	7-stage Binary Counter	14		●		●					
4040	12-stage Binary Counter	16		●				●			
4046	Phase-Locked Loop with VCO	16		●							
4049	Hex Inverting High-to-Low Level Shifter	16									
4050	Hex High-to-Low Level Shifter	16									
4051	Analog Multiplexer/Demultiplexer	16		●				●			
4052	Dual 4-channel Analog Multiplexers/Demultiplexers	16		●				●			
4053	Analog Multiplexer/Demultiplexer	16		●				●			
4059	Programmable Divide by "N" Counter	24		●							
4060	14-stage Binary Counter	16		●							
4066	Quad. Analog Switches/Quad.Multiplexers	14		●						●	
4067	16-Channel Analog Multiplexer/Demultiplexer	24									
4075	Triple 3-input OR Gate	14									
4094	8-Stage Shift-and-Store Bus Register	16									
4245	Dual Supply Octal Translating Transceiver	24								●	

Part No.	Description	Pin	LS	HC	HCT	AC	ACT	VHC/LVA	VHCT	LVX/LV	LCX/LVC
4316	Quad Analog Switch	16		●							
4351	Analog MUX with Latch	20									
4352	Analog MUX with Latch	20									
4353	Analog MUX with Latch	20									
4510	Up/Down Counter, BCD	16									
4511	BCD-to-Seven Segment Latch/Decode/Driver	16		●							
4514	4bit Latch/4-to-16 line Decoder	24		●		●					
4515	4bit Latch/4-to-16 line Decoder	24		●							
4516	Up/Down Counter, Binary	16									
4518	Dual BCD Up Counters	16		●							
4520	Dual Binary Up Counters	16		●							
4538	Dual Precision Retriggerable/Resettable Monostable Multivibrators	16		●							
4543	BCD-to-Seven Segment latch/Decode/Driver	16		●							
6800	10-Bit Switch w/Precharge	24									
7030	9-bit x 64 Word FIFO Register, Three-State	28									
7046	Phase-Locked Loop with In-Lock Detection	16									
7060	14-Stage Binary Counter with Oscillator	20									
7266	Quad Exclusive-NOR Gate	14									
7623	Octal-Bus Transceiver/Register/Open-Drain(A-side); Three-State(B-side); Non-Inverting	20									
8051	Analog Multiplexer/Demultiplexer	16								●	
8053	Analog Multiplexer/Demultiplexer	16								●	

Wide-bit Logic Products (Hitachi HD74ALVC Series)

Part No	Package	Description	Hitachi HD74ALVC Series				On Semi. 74VCX Series			
			ALVC16-	ALVC162-	ALVCH16-	ALVCH162-	74VCX16-	74VCX162-	VCXH16-	VCXH162-
240	TSSOP-48	16-bit Buffer					●	●	●	
244	TSSOP-48	16-bit Buffer / Driver with 3-state Outputs	●	●	●	●	●	●	●	
245	TSSOP-48	16-bit Bus Transceiver with 3-state Outputs			●		●		●	●
260	TSSOP-56	12-bit to 24-bit Multiplexed D-type Latch with 3-state Outputs			●	●				
269	TSSOP-56	12-bit to 24-bit Registerd Bus Transceiver with 3-state Outputs			●	●				
270	TSSOP-56	12-bit to 24-bit Registerd Bus Exchanger with 3-state Outputs			●	●				
334	TSSOP-48	16-bit Universal Bus Driver with 3-state Outputs for PC100	●	●	●	●				
373	TSSOP-48	16-bit Transparent D-type Latch with 3-state Outputs			●	●	●	●	●	
374	TSSOP-48	16-bit Edge-Triggered D-type Flip-Flop with 3-state Outputs			●	●	●	●	●	
500	TSSOP-56	18-bit Universal Bus Transceiver with 3-state Outputs			●	●				
501	TSSOP-56	18-bit Universal Bus Transceiver with 3-state Outputs			●	●				
543	TSSOP-56	16-bit Registerd Transceiver with 3-state Outputs			●	●				
721	TSSOP-56	3.3V 20-bit Flip-Flop with 3-state Outputs			●	●				
820	TSSOP-56	3.3V 10-bit Flip-Flop with 3-state Outputs			●	●				
821	TSSOP-56	3.3V 20-bit Bus Interface Flip-Flop with 3-state Outputs			●	●				
825	TSSOP-56	18-bit Buffer / Driver with 3-state Outputs			●	●				
827	TSSOP-56	20-bit Buffer / Driver with 3-state Outputs			●	●				
830	TVSOP-80	1-to-2 Address Driver with 3-state Outputs			●	●				
831	TVSOP-80	1-to-4 Address Register Driver with 3-state Outputs			●	●				
832	TSSOP-64	1-to-4 Address Register Driver with 3-state Outputs			●	●				
834	TSSOP-56	ALVC16835 with inverted LE for PC100	●	●						
835	TSSOP-56	18-bit Universal Bus Driver with 3-state Outputs for PC100	●	●	●	●				
836	TSSOP-56	20-bit Universal Bus Driver with 3-state Outputs for PC100	●	●	●	●				

ALVC162 - outputs have equivalent 26 ohm series resistors

ALVCH16 - bus hold circuit on inputs

ALVCH162 - bus hold circuit on inputs, outputs have equivalent 26 ohm series resistors



On Semiconductor Single-Gate Logic Products

On Semi. Part No	Description	Hitachi Part No	On Semi. Part No	Description	Hitachi Part No
MC74VHC1G00	2-Input NAND Gate	HD74UH00	MC74VHC1G86	2-Input Exclusive OR Gate	
MC74VHC1G01	2-Input NAND Gate with Open Drain Output		MC74VHC1GT00	2-Input NAND Gate / CMOS Logic Level Shifter with LSTTL-Compatible Inputs	
MC74VHC1G02	2-Input NOR Gate	HD74UH02	MC74VHC1GT02	2-Input NOR Gate / CMOS Logic Level Shifter	
MC74VHC1G03	2-Input NOR Gate with Open Drain Output		MC74VHC1GT04	Single-Gate Inverting Buffer / CMOS Logic Level Shifter with LSTTL-Compatible Inputs	
MC74VHC1G04	Inverter	HD74UH04	MC74VHC1GT125	NonInverting Buffer / CMOS Logic Level Shifter	
MC74VHC1G05	Inverter with Open Drain Output		MC74VHC1GT126	NonInverting Buffer / CMOS Logic Level Shifter	
MC74VHC1G07	Noninverting Buffer with Open Drain Output		MC74VHC1GT114	Schmitt Trigger Inverter / Logic Level Shifter with LSTTL-Compatible Inputs	
MC74VHC1G08	2-Input AND Gate	HD74UH08	MC74VHC1GT50	Single-Gate Non-Inverting Buffer / CMOS Logic level Shifter with LSTTL-Compatible Inputs	
MC74VHC1G09	2-Input AND Gate with Open Drain Output		MC74VHC1GT66	Analog Switch	
MC74VHC1G125	NonInverting 3-State Buffer		MC74VHC1GT86	Single-Gate 2-Input XOR Gate / CMOS Logic Level Shifter with LSTTL-Compatible Inputs	
MC74VHC1G126	NonInverting 3-State Buffer		MC74VHC1GU04	Single-Gate Unbuffered Inverter	
MC74VHC1G132	2-Input NAND, Schmitt trigger				
MC74VHC1G135	2-Input NAND Schmitt-Trigger with Open Drain Output				
MC74VHC1G14	Single Gate inverter, Schmitt trigger Input				
MC74VHC1G32	2-Input OR Gate	HD74UH32			
MC74VHC1G50	Buffer				
MC74VHC1G66	Analog Switch	HD74UH4066			

CMOS 4000 Series Logic Products

On Semi. Part No	Description	On Semi. Part No	Description
MC14001B/UB	Quad 2-Input NOR Gate	MC14077B	Quad Exclusive NOR Gate
MC14007UB	Dual Comparator Pair Plus Inverter	MC14081B	Quad 2-Input AND Gate
MC14008B	4-Bit Full Adder	MC14082B	Dual 4-Input AND Gate
MC14011A	Quad 2-Input NAND Gate	MC14093B	Quad 2-Input NAND Schmitt Trigger
MC14011B/UB	Quad 2-Input NAND Gate	MC14094B	8-Bit Shift/Store Register with Three-State Outputs
MC14012B	B-Suffix Series CMOS Gates	MC14099B	8-Bit Addressable Latches
MC14013B	Dual D-Type Flip-Flop	MC14106B	Hex Schmitt Trigger
MC14014B	8-Bit Static S/R	MC14174B	Hex D-Type Flip-Flop
MC14015B	Dual 4-Bit Static Shift Register	MC14175B	Quad D-Type Flip Flop
MC14016B	Quad Analog Switch / Quad Multiplexer	MC14490	Hex Bounce Eliminator
MC14017B	Decade Counter/Divider	MC14503B	Hex 3-State Buffer
MC14018B	Preset Divide By N Counter	MC14504B	Hex Level Shifter
MC14020B	14-Bit Binary Counter	MC14511B	BCD/7 Segment LAT/Decoder/Driver
MC14021B	8-Bit Static Shift Register	MC14512B	8-Channel Data Selector
MC14022B	Octal Counter	MC14513B	BCD To 7-Segment Driver
MC14023B	Triple 3-Input NAND Gate	MC14514B	4-Bit Transparent Latch/4-to-16 Line Decoder
MC14024B	7-Segment Ripple Counter	MC14515B	4-Bit Transparent Latch/4-to-16 Line Decoder
MC14025B	Triple 3-Input NOR Gate	MC14516B	Binary Up/Down Counter
MC14027B	Dual J-K Flip-Flop	MC14517B	Dual 64-Bit Static Shift Register
MC14028B	BCD-to-Decimal Decoder	MC14518B	Dual BCD Up Counter
MC14029B	Binary/Decade Up/Down Counter	MC14520B	Dual Binary Up Counter
MC14040B	12-Bit Binary Counter	MC14521B	24-Stage Frequency Divider
MC14042B	Quad Latch	MC14526B	Presetable 4-Bit Down Counters
MC14043B	Quad R-S Latches	MC14528B	Dual Monstable Multivibrator
MC14044B	Quad R-S Latches	MC14532B	8-Bit Priority Encoder
MC14046B	Phase Locked Loop	MC14536B	Programmable Timer
MC14049B/UB	Hex Buffer	MC14538B	Dual Precision Monstable
MC14050B	Hex Non-Inverter Buffer	MC14541B	Programmable Oscillator-Timer
MC14051B	Analog Multiplexer/Demultiplexer	MC14543B	BCD-to-7 Segment Latch/Decoder/Driver for Liquid Crystals
MC14052B	Dual 4-Channel Multiplexer	MC14551B	Quad 2-Input Analog Multiplexer
MC14053B	Triple 2-Channel Multiplexer	MC14553B	3-Digit BCD Counter
MC14060B	14-Stage Binary Counter/Oscillator	MC14555B	Dual Binary to 1-of-4 Decoder/Demultiplexer
MC14066B	Quad Analog Switch/Quad Multiplexer	MC14557B	1 To 64 Bit Variable Length Shift Register
MC14067B	Analog Multiplexers/Demultiplexers	MC14562B	128-Bit Static Shift Register
MC14069UB	Hex Inverter	MC14569B	Programmable Divide-By-N Dual 4-Bit Binary/BCD Down Counter
MC14070B	Quad XOR Gate	MC14572UB	Hex Gate
MC14071B	Quad 2-Input OR Gate	MC14584B	Hex Schmitt Trigger
MC14073B	Triple 3-Input AND Gate	MC14585B	4-Bit Magnitude Comparator
MC14076B	4-Bit D-Type Register with Three-State Outputs	MC14598B	9-Bit Bus-Compatible Latches

On Semiconductor ECL Families Comparison



Product Family	MECL10H	ECLinPS Lite / ECLinPS	ECLinPS Plus
Technology	MOSAIC 1	MOSAIC 3	MOSAIC 5
Package	16-pin Cer 20-pin PLCC	8/16/20-pin SOIC 20/28-pin PLCC 32-pin TQFP	8-pin SOIC/TSSOP 20-pin TSSOP 32-pin TQFP
Power Supply	5V	3.3V / 5V	2.5V / 3.3V / 5V
Speed	1,100 ps	300 ps	150 ps
Current	30 mA	30 mA	30 mA
Toggle Frequency	0.5 GHz	2.0 GHz	3.0 GHz

Product Families

ECLinPS Plus™

Base Part	Short Description	Base Part	Short Description
MC100EP01	3.3V / 5V ECL 4-Input OR/NOR	MC100EPT26	1:2 Fanout Differential LVPECL to LVTTTL Translator
MC100EP016	3.3V / 5V ECL 8-Bit Synchronous Binary Up Counter	MC100LVPEP11	2.5V / 3.3V ECL 1:2 Differential Fanout Buffer
MC100EP05	3.3V / 5V 2-Input Differential AND/NAND	MC100LVPEP111	2.5V / 3.3V 1:10 Differential ECL/PECL/HSTL Clock Driver
MC100EP08	3.3V / 5V Differential 2-Input XOR/XNOR	MC100LVPEP14	Low-Voltage 1:5 Differential LVECL/LVPECL/LVEPECL/HSTL Clock Driver
MC100EP101	3.3V / 5V ECL Quad 4-Input OR/NOR	MC100LVPEP16	2.5V / 3.3V ECL Differential Receiver/Driver
MC100EP105	3.3V / 5V ECL Quad 2-Input Differential AND/NAND	MC100LVPEP210	2.5V / 3.3V 1:5 Dual Differential ECL/PECL/HSTL Clock Driver
MC100EP11	3.3V / 5V ECL 1:2 Differential Fanout Buffer	MC10EP01	3.3V / 5V ECL 4-Input OR/NOR
MC100EP116	3.3V / 5V Hex Differential Line Receiver / Driver	MC10EP016	3.3V / 5V ECL 8-Bit Synchronous Binary Up Counter
MC100EP131	3.3V / 5V ECL Quad D Flip Flop with Set, Reset, and Differential Clock	MC10EP05	3.3V / 5V 2-Input Differential AND/NAND
MC100EP139	Divide by 2/4, Divide by 4/5/6 Clock Generation Chip	MC10EP08	3.3V / 5V Differential 2-Input XOR/XNOR
MC100EP140	3.3V / 5V ECL Differential Phase-Frequency Detector	MC10EP101	3.3V / 5V ECL Quad 4-Input OR/NOR
MC100EP16	3.3V / 5V ECL Differential Receiver/Driver	MC10EP105	3.3V / 5V ECL Quad 2-Input Differential AND/NAND
MC100EP16F	3.3V / 5V ECL Differential Receiver/Driver With Reduced Output Swing	MC10EP11	3.3V / 5V 1:2 Differential Fanout Buffer
MC100EP16VS	3.3V / 5V ECL Differential Receiver/Driver with Variable Output Swing	MC10EP116	3.3V / 5V Hex Differential Line Receiver / Driver
MC100EP17	3.3V / 5V ECL Quad Differential Receiver / Driver	MC10EP131	3.3V / 5V ECL Quad D Flip Flop with Set, Reset, and Differential Clock
MC100EP195	3.3V/5V ECL Programmable Delay Chip	MC10EP16	3.3V / 5V ECL Differential Receiver/Driver
MC100EP29	3.3V / 5V ECL Dual Differential Data and Clock D Flip-Flop With Set and Reset	MC10EP17	3.3V / 5V ECL Quad Differential Receiver / Driver
MC100EP31	3.3V / 5V ECL D Flip-Flop with Set and Reset	MC10EP195	3.3V/5V ECL Programmable Delay Chip
MC100EP32	3.3V / 5V ECL Divide By 2 Divider	MC10EP29	3.3V / 5V ECL Dual Differential Data and Clock D Flip-Flop With Set and Reset
MC100EP33	3.3V / 5V ECL Divide By 4 Divider	MC10EP31	3.3V / 5V ECL D Flip-Flop with Set and Reset
MC100EP40	3.3V / 5V ECL Differential Phase-Frequency Detector	MC10EP32	3.3V / 5V ECL Divide By 2 Divider
MC100EP56	3.3V / 5V ECL Dual Differential 2:1 Multiplexer	MC10EP33	3.3V / 5V ECL Divide By 4 Divider
MC100EP57	3.3V / 5V ECL 4:1 Differential Multiplexer	MC10EP35	3.3V / 5V ECL JK Flip Flop
MC100EP58	3.3V / 5V ECL 2:1 Multiplexer	MC10EP51	3.3V / 5V ECL D Flip Flop with Reset and Differential Clock
MC100EP90	3.3V / 5V Triple ECL Input to LVPECL/PECL Output Translator	MC10EP52	3.3V / 5V ECL Differential Data and Clock D Flip Flop
MC100EPT20	3.3V TTL/CMOS to Differential PECL Translator	MC10EP56	3.3V / 5V ECL Dual Differential 2:1 Multiplexer
MC100EPT21	Differential LVPECL to LVTTTL Translator	MC10EP57	3.3V / 5V ECL 4:1 Differential Multiplexer
MC100EPT22	Dual LVTTTL/LVto Differential LVPECL Translator	MC10EP58	3.3V / 5V ECL 2:1 Multiplexer
MC100EPT23	Dual Differential PECL to TTL Translator	MC10EP89	3.3V / 5V ECL Coaxial Cable Driver
MC100EPT24	LVTTTL/LVCMOS to Differential LVECL Translator	MC10EP90	3.3V / 5V Triple ECL Input to LVPECL/PECL Output Translator
MC100EPT25	Differential LVECL/ECL to LVTTTL Translator	MC10EPT20	3.3V TTL/CMOS to Differential PECL Translator
		MC10LVPEP11	2.5V / 3.3V ECL 1:2 Differential Fanout Buffer
		MC10LVPEP16	2.5V / 3.3V ECL 1:2 Differential Fanout Buffer

Low-Voltage ECLinPS Lite™

Base Part	Short Description	Base Part	Short Description
MC100LEVEL01	3.3V ECL 4-Input OR/NOR	MC100LEVEL37	3.3V ECL 1:4 ÷ 1/ ÷ 2 Clock Fanout Buffer
MC100LEVEL05	3.3V ECL 2-Input Differential AND/NAND	MC100LEVEL38	3.3V ECL ÷ 2, ÷ 4/6 Clock Generator Chip
MC100LEVEL11	3.3V ECL 1:2 Differential Fanout Buffer	MC100LEVEL39	3.3V ECL ÷ 2/4, ÷ 4/6 Clock Generation Chip
MC100LEVEL12	3.3V ECL Low Impedance Driver	MC100LEVEL40	3.3/5V ECL Differential Phase-Frequency Detector
MC100LEVEL13	3.3V ECL Dual 1:3 Fanout Buffer	MC100LEVEL51	3.3V ECL Differential Clock D Flip-Flop
MC100LEVEL14	3.3V ECL 1:5 Clock Distribution Chip	MC100LEVEL56	3.3V ECL Dual Differential 2:1 Multiplexer
MC100LEVEL16	3.3V ECL Differential Receiver	MC100LEVEL58	3.3V ECL 2:1 Multiplexer
MC100LEVEL17	3.3V ECL Quad Differential Receiver	MC100LEVEL59	3.3V ECL Triple 2:1 Multiplexer
MC100LEVEL29	3.3V ECL Dual Differential Data and Clock D-Type Flip-Flop with Set and Reset	MC100LEVEL90	-3.3V/-5V Triple ECL Input to LVPECL Output Translator
MC100LEVEL30	3.3V ECL Triple D-Type Flip-Flop with Set and Reset	MC100LEVEL91	3.3V/5V Triple LVPECL / PECL Input to -3.3V ECL Output Translator
MC100LEVEL31	3.3V ECL D-Type Flip-Flop with Set and Reset	MC100LEVEL92	5V Triple PECL Input to LVPECL Output Translator
MC100LEVEL32	3.3V ECL ÷2 Divider	MC100LEVELT22	3.3V Dual LVTTTL/LVC MOS to Differential LVPECL Translator
MC100LEVEL33	3.3V ECL ÷4 divider	MC100LEVELT23	3.3V Dual Differential LVPECL to LVTTTL Translator

ECLinPS Lite™

Base Part	Short Description	Base Part	Short Description
MC100EL01	5V ECL 4-Input OR/NOR	MC100ELT23	5V Dual Differential PECL to TTL Translator
MC100EL04	2-Input AND/NAND	MC100ELT24	5V TTL to Differential ECL Translator
MC100EL05	5V ECL 2-Input Differential AND/NAND	MC100ELT25	Differential -5V ECL To TTL Translator
MC100EL07	5V ECL 2-Input XOR/XNOR	MC100ELT26	5V 1:2 Fanout Differential PECL to TTL Translator
MC100EL11	5V ECL 1:2 Differential Fanout Buffer	MC100ELT28	5V TTL to Differential PECL and Differential PECL to TTL Translator
MC100EL12	5V ECL Low Impedance Driver	MC100LEVELT23	3.3V Dual Differential LVPECL to LVTTTL Translator
MC100EL13	5V ECL Dual 1:3 Fanout Buffer	MC10EL01	5V ECL 4-Input OR/NOR
MC100EL14	5V ECL 1:5 Clock Distribution Chip	MC10EL04	5V ECL 2-Input AND/NAND
MC100EL15	5V ECL 1:4 Clock Distribution Chip	MC10EL05	5V ECL 2-Input Differential AND/NAND
MC100EL16	5V ECL Differential Receiver	MC10EL07	5V ECL 2-Input XOR/XNOR
MC100EL1648	5V ECL Voltage Controlled Oscillator	MC10EL11	5V ECL 1:2 Differential Fanout Buffer
MC100EL17	5V ECL Quad Differential Receiver	MC10EL12	5V ECL Low Impedance Driver
MC100EL29	5V ECL Dual Differential Data and Clock D Flip-Flop With Set and Reset	MC10EL15	5V ECL 1:4 Clock Distribution Chip
MC100EL30	5V ECL Triple D Flip-Flop with Set and Reset	MC10EL16	5V ECL Differential Receiver
MC100EL31	5V ECL D-Type Flip-Flop with Set and Reset	MC10EL31	5V ECL D-Type Flip-Flop with Set and Reset
MC100EL32	5V ECL Divide by 2 Divider	MC10EL32	5V ECL Divide by 2 Divider
MC100EL33	5V ECL Divide by 4 Divider	MC10EL33	5V ECL Divide by 4 Divider
MC100EL34	5V ECL Divide by 2, Divide by 4, Divide by 8 Clock Generation Chip	MC10EL34	5V ECL Divide by 2, Divide by 4, Divide by 8 Clock Generation Chip
MC100EL35	5V ECL JK Flip-Flop	MC10EL35	5V ECL JK Flip-Flop
MC100EL38	5V ECL Divide by 2, Divide by 4/6 Clock Generation Chip	MC10EL51	5V ECL Differential Clock D Flip-Flop
MC100EL39	Divide by 2/4, Divide by 4/6 Clock Generation Chip	MC10EL52	5V ECL Differential Data and Clock D Flip-Flop
MC100EL51	5V ECL Differential Clock D Flip-Flop	MC10EL57	5V ECL 4:1 Differential Multiplexer
MC100EL52	5V ECL Differential Data and Clock D Flip-Flop	MC10EL58	2:1 Multiplexer
MC100EL56	5V ECL Dual Differential 2:1 Multiplexer	MC10EL89	5V ECL Coaxial Cable Driver
MC100EL57	5V ECL 4:1 Differential Multiplexer	MC10ELT20	TTL To Differential PECL Translator
MC100EL58	5V ECL 2:1 Multiplexer	MC10ELT21	5V Differential PECL To TTL Translator
MC100EL59	5V ECL Triple 2:1 Multiplexer	MC10ELT22	5V Dual TTL to Differential PECL Translator
MC100EL90	-3.3V / -5V Triple ECL Input to PECL Output Translator	MC10ELT24	5V TTL to Differential ECL Translator
MC100EL91	-3.3V / -5V Triple ECL Input to PECL Output Translator	MC10ELT25	Differential -5V ECL to TTL Translator
MC100ELT20	5V TTL To Differential PECL Translator	MC10ELT26	5V 1:2 Fanout Differential PECL to TTL Translator
MC100ELT21	5V Differential PECL To TTL Translator	MC10ELT28	5V TTL to Differential PECL and Differential PECL to TTL Translator
MC100ELT22	5V Dual TTL to Differential PECL Translator		



Low-Voltage ECLinPS™

Base Part	Short Description	Base Part	Short Description
MC100LVE111	3.3V ECL 1:9 Differential Clock Driver	MC100LVE222	3.3V 1:15 Differential Divided-by 1/Divide-by 2 ECL/PECL Clock Driver
MC100LVE164	3.3V ECL 16:1 Multiplexer		
MC100LVE210	3.3V Dual 1:4, 1:5 Differential Fanout Buffer	MC100LVE310	3.3V ECL 2:8 Differential

ECLinPS™

Base Part	Short Description	Base Part	Short Description
MC100E016	5V ECL 8-Bit Synchronous Binary Up Counter	MC100E431	5V ECL 3-Bit Differential Flip-Flop
MC100E101	5V ECL Quad 4-Input OR/NOR Gate	MC100E445	5V ECL 4-Bit Serial/Parallel Converter
MC100E104	Quint 2-Input AND/NAND Gate	MC100E446	5V ECL 4-Bit Parallel/Serial Converter
MC100E107	5V ECL Quint 2-Input XOR/XNOR Gate	MC100E451	5V ECL 6-Bit D Register Differential Data and Clock
MC100E111	5V ECL 1:9 Differential Clock Driver	MC100E452	5V ECL 5-Bit Differential Register
MC100E112	5V ECL Quad Driver	MC100E457	5V ECL Triple Differential 2:1 Multiplexer
MC100E116	5V ECL Quint Differential Line Receiver	MC10E016	5V ECL 8-Bit Synchronous Binary Up Counter
MC100E122	5V ECL 9-Bit Buffer	MC10E101	Quad 4-Input OR/NOR Gate
MC100E131	5V ECL 4-Bit D-Type Flip-Flop	MC10E104	5V ECL Quint 2-Input AND/NAND Gate
MC100E136	5V ECL 6-Bit Universal Up/Down Counter	MC10E107	5V ECL Quint 2-Input XOR/XNOR Gate
MC100E137	5V ECL 8-Bit Ripple Counter	MC10E111	5V ECL 1:9 Differential Clock Driver
MC100E141	5V ECL 8-Bit Shift Register	MC10E112	5V ECL Quad Driver
MC100E142	5V ECL 9-Bit Shift Register	MC10E116	5V ECL Quint Differential Line Receiver
MC100E143	5V ECL 9-Bit Hold Register	MC10E122	5V ECL 9-Bit Buffer
MC100E150	5V ECL 6-Bit D Latch	MC10E131	5V ECL 4-Bit D-Type Flip-Flop
MC100E151	5V ECL 6-Bit D Register	MC10E136	5V ECL 6-Bit Universal Up/Down Counter
MC100E154	5V ECL 5-Bit 2:1 Mux Latch	MC10E137	5V ECL 8-Bit Ripple Counter
MC100E155	5V ECL 6-Bit 2:1 Mux Latch	MC10E141	5V ECL 8-Bit Shift Register
MC100E156	5V ECL 3-Bit 4:1 Mux-Latch	MC10E142	5V ECL 9-Bit Shift Register
MC100E157	5V ECL Quad 2:1 Multiplexer	MC10E143	5V ECL 9-Bit Hold Register
MC100E158	5V ECL 5-Bit 2:1 Multiplexer	MC10E150	5V ECL 6-Bit D Latch
MC100E160	5V ECL 12-Bit Parity Generator/Checker	MC10E151	5V ECL 6-Bit D Register
MC100E163	5V ECL 2-Bit 8:1 Multiplexer	MC10E154	5V ECL 5-Bit 2:1 Mux Latch
MC100E164	5V ECL 16:1 Multiplexer	MC10E155	5V ECL 6-Bit 2:1 Mux Latch
MC100E166	5V ECL 9-Bit Magnitude Comparator	MC10E156	5V ECL 3-Bit 4:1 Mux-Latch
MC100E167	5V ECL 6-Bit 2:1 Mux-Register	MC10E157	5V ECL Quad 2:1 Multiplexer
MC100E171	5V ECL 3-Bit 4:1 Multiplexer	MC10E158	5V ECL 5-Bit 2:1 Multiplexer
MC100E175	5V ECL 9-Bit Latch With Parity	MC10E160	5V ECL 12-Bit Parity Generator/Checker
MC100E193	5V ECL Error Detection/Correction Circuit	MC10E163	5V ECL 2-Bit 8:1 Multiplexer
MC100E195	5V ECL Programmable Delay Chip	MC10E164	5V ECL 16:1 Multiplexer
MC100E196	5V ECL Programmable Delay Chip	MC10E1651	5V, -5V ECL Dual ECL Output Comparator With Latch
MC100E210	5V ECL Dual 1:4, 1:5 Differential Fanout Buffer	MC10E1652	5V ECL Dual ECL Output Comparator With Latch
MC100E211	5V ECL 1:6 Differential Clock Distribution Chip	MC10E166	5V ECL 9-Bit Magnitude Comparator
MC100E212	5V ECL 3-Bit Scannable Registered Address Driver	MC10E167	5V ECL 6-Bit 2:1 Mux-Register
MC100E241	5V ECL 8-Bit Scannable Register	MC10E171	5V ECL 3-Bit 4:1 Multiplexer
MC100E256	5V ECL 3-Bit 4:1 Mux-Latch	MC10E175	5V ECL 9-Bit Latch With Parity
MC100E310	2:8 Differential Fanout Buffer	MC10E193	5V ECL Error Detection/Correction Circuit
MC100E336	5V ECL 3-Bit Registered Bus Transceiver	MC10E195	5V ECL Programmable Delay Chip
MC100E337	5V ECL 3-Bit Scannable Registered Bus Transceiver	MC10E196	5V ECL Programmable Delay Chip
MC100E404	5V ECL Quad Differential AND/NAND	MC10E197	5V ECL Data Separator
MC100E416	5V ECL Quint Differential Line Receiver	MC10E211	5V ECL 1:6 Differential Clock Distribution Chip

ECLinPS™ (cont.)

Base Part	Short Description	Base Part	Short Description
MC10E212	5V ECL 3-Bit Scannable Registered Address Driver	MC10E416	5V ECL Quint Differential Line Receiver
MC10E241	5V ECL 8-Bit Scannable Register	MC10E431	5V ECL 3-Bit Differential Flip-Flop
MC10E256	5V ECL 3-Bit 4:1 Mux-Latch	MC10E445	5V ECL 4-Bit Serial/Parallel Converter
MC10E336	3-Bit Registered Bus Transceiver	MC10E446	5V ECL 4-Bit Parallel/Serial Converter
MC10E337	5V ECL 3-Bit Scannable Registered Bus Transceiver	MC10E451	5V ECL 6-Bit D Register Differential Data and Clock
MC10E404	5V ECL Quad Differential AND/NAND	MC10E452	5V ECL 5-Bit Differential Register
MC10E411	5V ECL 1:9 Differential PECL/NECL RAMBus Clock Buffer	MC10E457	5V ECL Triple Differential 2:1 Multiplexer

MECL-10KH™ / MECL-100KH™

Base Part	Short Description	Base Part	Short Description
MC100H600	9-Bit TTL-ECL Translator	MC10H158	Quad 2-Input Multiplexer (Non-Inverting)
MC100H601	9-Bit ECL-TTL Translator	MC10H159	Quad 2-Input Multiplexer (Inverting)
MC100H605	Registered Hex ECL/TTL Translator	MC10H161	Binary to 1-8 Decoder (Low)
MC100H606	Registered Hex TTL/PECL Translator	MC10H162	Binary to 1-8 Decoder (High)
MC100H607	Registered Hex PECL/TTL Translator	MC10H164	8-Line Multiplexer
MC100H640	ECL/TTL Clock Driver	MC10H165	8 Input Priority Encoder
MC100H641	1:9 Clock Driver	MC10H166	5-Bit Magnitude Comparator
MC100H642	ECL/TTL Clock Driver	MC10H171	Dual Binary 1-4 Decoder (Low)
MC100H643	1:8 Clock Driver	MC10H172	Dual Binary 1-4-Decoder (High)
MC100H644	PECL/TTL Clock Driver	MC10H173	Quad 2-Input Multiplexer/Latch
MC100H646	PECL/TTL-TTL 1:8 Distribution Chip	MC10H174	Dual 4:1 Multiplexer
MC100H680	4-Bit Differential ECL Bus/TTL Bus Transceiver	MC10H175	Quint Latch
MC10H016	4-Bit Binary Counter	MC10H176	Hex D-Type Master-Slave Flip-Flop
MC10H100	Quad 2-Input NOR Gate With Strobe	MC10H179	Look-Ahead Carry Block
MC10H101	Quad OR/NOR Gate	MC10H180	Dual 2-Bit Adder/Subtractor
MC10H102	Quad 2-Input NOR Gate	MC10H181	4-Bit Arithmetic Logic Unit/Function Generator
MC10H103	Quad 2-Input OR Gate	MC10H186	Hex D Master-Slave Flip-Flop with Reset
MC10H104	Quad 2-Input AND Gate	MC10H188	Hex Buffer with Enable
MC10H105	Triple 2-3-2-Input OR/NOR Gate	MC10H189	Hex Inverter with Enable
MC10H107	Triple 2-Input XOR/XNOR Gate	MC10H209	Dual 4-5-Input OR/NOR
MC10H109	Dual 4-5-Input OR/NOR Gate	MC10H210	3-Input 3-Output OR Gate
MC10H113	Quad XOR Gate	MC10H211	Dual 3-Input 3-Output NOR Gate
MC10H115	Quad Line Receiver	MC10H330	Quad MSTR
MC10H116	Triple Line Receiver	MC10H332	Dual Bus Driver/Receiver
MC10H117	Dual 2-Wide 2-3-Input OR-AND/OR-AND-Invert Gate	MC10H334	Quad Bus Driver/Receiver Translator
MC10H123	Triple 4-3-3-Input Bus Driver	MC10H350	To TTL Translator
MC10H124	Quad TTL to ECL Translator	MC10H351	TTL, NMOS To ECL Translator
MC10H125	Quad ECL to TTL Translator	MC10H352	To ECL Translator
MC10H131	Dual Type D Master-Slave Flip-Flop	MC10H424	Quad TTL-ECL Translator
MC10H135	Dual J-K Master-Slave Flip-Flop	MC10H600	9-Bit TTL-ECL Translator
MC10H136	Universal Hexadecimal Counter	MC10H601	9-Bit ECL-TTL Translator
MC10H141	4-Bit Universal Shift Register	MC10H602	9-Bit Latch/TTL-ECL Translator
MC10H145	16 X 4 Register File	MC10H603	9-Bit Latch/ECL-TTL Translator



Base Part	Short Description
MC10H604	Registered Hex TTL/ECL Translator
MC10H605	REG Hex ECL/TTL Translator
MC10H606	Registered Hex TTL/PECL Translator
MC10H607	Registered Hex PECL/TTL Translator
MC10H640	ECL/TTL Clock Driver
MC10H641	1:9 Clock Driver
MC10H642	ECL/TTL Clock Driver

Base Part	Short Description
MC10H643	1:8 Clock Driver
MC10H644	PECL/TTL Clock Driver
MC10H645	1:9 TTL Clock Driver
MC10H646	PECL/TTL-TTL 1:8 Distribution Chip
MC10H680	Quad Bus TRS/Rectifier ECL Differential
MC10H681	Hex ECL/TTL Transceiver with Latches

MECL-10K™

Base Part	Short Description
MC10101	Quad OR/NOR Gate
MC10102	Quad 2-Input NOR Gate
MC10103	Quad 2-Input OR Gate
MC10104	Quad 2-Input AND Gate
MC10105	Triple 2-3-2-Input OR/NOR Gate
MC10106	Triple 4-3-3-Input NOR Gate
MC10107	Triple 2-Input XOR/XNOR Gate
MC10109	Dual 4-5-Input OR/NOR Gate
MC10110	Dual 3-Input/3-Output OR Gate
MC10111	Dual 3-Input/3-Output NOR Gate
MC10113	Quad XOR Gate
MC10114	Triple Line Receiver
MC10115	Quad Line Receiver
MC10116	Triple Line Receiver
MC10117	Dual 2-Wide 2-3-Input OR-AND/OR-AND-Invert Gate
MC10121	4-Wide OR-AND/OR-AND-Invert Gate
MC10123	Triple 4-3-3-Input Bus Driver
MC10124	Quad TTL to ECL Translator
MC10125	Quad ECL to TTL Translator
MC10131	Dual D-Type Master-Slave Flip-Flop
MC10135	Dual J-K Master-Slave Flip-Flop
MC10136	Universal Hexadecimal Counter
MC10138	Bi-Quinary Counter

Base Part	Short Description
MC10141	4-Bit Universal Shift Register
MC10153	Quad Latch
MC10158	Quad 2-Input Multiplexer (Non-Inverting)
MC10159	Quad 2-Input Multiplexer (Inverting)
MC10161	Binary to 1-8 Decoder (Low)
MC10162	Binary to 1-8 Decoder (High)
MC10164	8-Line Multiplexer
MC10166	5-Bit Magnitude Comparator
MC10171	Dual Binary to 1:4 Decoder (Low)
MC10173	Quad 2-Input Multiplexer/Latch
MC10174	Dual 4:1 Multiplexer
MC10175	Quint Latch
MC10176	Hex D-Type Master-Slave Flip-Flop
MC10178	Binary Counter
MC10186	Hex D-Type Master-Slave Flip-Flop with Reset
MC10188	Hex Buffer with Enable
MC10189	Hex Inverter with Enable
MC10192	Quad Bus Driver
MC10195	Hex Inverter/Buffer
MC10197	Hex AND Gate
MC10198	Monostable Multivibrator
MC10216	High Speed Triple Line Receiver
MC10231	High Speed Dual Type D-Type Master-Slave Flip-Flop

PLD

Lattice PLD Products

For Today's Designs



Lattice ISP CPLDs	ispMACH 4A	ispLSI 2000E/VE	ispLSI 5000V	ispLSI 8000/V
Logic Density				
Medium(32-192 Macrocells)	•	•		
High(256-512 Macrocells)	•		•	
Very High(>512 Macrocells)				•
I/O				
Low (32-128)	•	•		
Medium(>128-256)	•		•	•
High(>256)			•	•
Power Supply				
5Volt	•	•		•
3.3Volt	•	•	•	•
2.5Volt		•		
I/O Capability				
5Volt	•	•	•	•
3.3Volt	•	•	•	•
2.5Volt		•	•	•



For Today's Designs (cont.)

Lattice ISP CPLDs	ispMACH 4A	ispLSI 2000E/VE	ispLSI 5000V	ispLSI 8000V
Performance	5ns/182MHz	3.5ns/250MHz	7.5ns/125MHz	8.5ns/125MHz
Wide Logic Capability(Logic Block Inputs)			● (68)	● (44)
SpeedLocking Performance	●			
Internal Tri-State Bus				●
Low Power	●			●
Industrial Temperature Range	●	●	●	

ispMACH 4A (3.3V) Family

	Speed Grade							Package(I/O + Dedicated Inputs)										Macro-cells	Total Registers	ISP Programming	IEEE 1149.1 Boundary Scan Test	Output Enables	I/O(V) Compatibility	Typ Icc (mA)				
	-5	-55	-65	-7*	-10*	-12*	-14**	JC 44	VC 44	VC 48	YC 100	VC 100	VC 144	VC 208	VC 256	VC 256	VC 388								VC 388			
t _{pd} (ns)	5	5.5	6.5	7.5	10	12	14	44-pin PLCC	44-pin TQFP	48-pin TQFP	100-pin PQFP	100-pin TQFP	100-ball ca BGA	144-pin TQFP	144-ball fp BGA	208-pin PQFP	256-ball BGA	256-ball fp BGA	388-ball fp BGA									
t _{ss} (ns)	3	3.5	3.5	5	5.5	7	10																					
t _{cos} (ns)	4	4	5	5.5	6	6.5	6.5																					
f _{max} (MHz)	182	167	154	125	118	95	74																					
M4A3-32/32	●			●	●	●		32+2	32+2	32+2										32	32	JTAG	●	32	5/3.3	20		
M4A3-64/32		●		●	●	●		32+2	32+2	32+2										64	96	JTAG	●	32	5/3.3	25		
M4A3-64/64***		●		●	●	●					64+6***										128	JTAG	●	64	5/3.3	TBD		
M4A3-96/48		●		●	●	●					48+8									96	144	JTAG	●	48	5/3.3	40		
M4A3-128/64		●		●	●	●					64+6	64+6	64+6***							128	192	JTAG	●	64	5/3.3	55		
M4A3-192/96			●	●	●	●							96+16	96+16***						192	288	JTAG	●	96	5/3.3	85		
M4A3-256/128			●	●	●	●									128+14	128+14	128+14***			256	384	JTAG	●	128	5/3.3	100		
M4A3-256/160***			●	●	●	●									160						256	JTAG	●	160	5/3.3	100		
M4A3-256/192***			●	●	●	●											192				256	JTAG	●	192	5/3.3	150		
M4A3-384/160***				●	●	●	●								160					384	576	JTAG	●	192	5/3.3	150		
M4A3-384/192***				●	●	●	●									192	192				384	JTAG	●	192	5/3.3	150		
M4A3-512/160***				●	●	●	●								160					512	768	JTAG	●	256	5/3.3	TBD		
M4A3-512/192***				●	●	●	●										192				512	JTAG	●	256	5/3.3	TBD		
M4A3-512/256***				●	●	●	●											256			512	JTAG	●	256	5/3.3	TBD		

* Available In industrial Grades
 ** Available In Industrial Grade Only
 *** Advance Information

All ispMACH 4A devices have SpeedLocked™ performance at ≤ 20 product terms per output.
 All ispMACH 4A devices have IEEE 1149.1-compliant ISP capability.

ispMACH 4A (5V) Family

	Speed Grade						Package(I/Os + Dedicated Inputs)								Macro-cells	Total Registers	ISP Programming	IEEE 1149.1 Boundary Scan Test	Output Enables	I/O(V) Compatibility	Typical ICC(mA)						
	-5	-55	-65	-7*	-10*	-12*	JC 44	VC 44	VC 48	YC 100	VC 100	VC 144	VC 208	VC 256													
t _{pd} (ns)	5	5.5	6.5	7.5	10	12	44-pin PLCC	44-pin TQFP	48-pin TQFP	100-pin PQFP	100-pin TQFP	144-pin TQFP	208-pin PQFP	256-ball BGA													
t _{ss} (ns)	3	3.5	3.5	5	5.5	7																					
t _{cos} (ns)	4	4	5	5.5	6	6.5																					
f _{max} (MHz)	182	167	154	125	118	95																					
M4A5-32/32	●			●	●	●		32+2	32+2	32+2										32	32	JTAG	●	32	5/3.3	20	
M4A5-64/32		●		●	●	●		32+2	32+2	32+2										64	96	JTAG	●	32	5/3.3	25	
M4A5-96/48		●		●	●	●						48+8								96	144	JTAG	●	48	5/3.3	40	
M4A5-128/64		●		●	●	●					64+6	64+6								128	192	JTAG	●	64	5/3.3	55	
M4A5-192/96***			●	●	●	●							96+16							192	288	JTAG	●	96	5/3.3	85	
M4A5-256/128			●	●	●	●								128+14	128+14					256	384	JTAG	●	128	5/3.3	100	

* Available In industrial Grades
 ** Available In Industrial Grade Only
 *** Advance Information

All ispMACH 4A devices have SpeedLocked™ performance at ≤ 20 product terms per output.
 All ispMACH 4A devices have IEEE 1149.1-compliant ISP capability.



ispLSI 2000VE(3.3V) Family

	Speed Grade							Package(I/O + Dedicated Inputs)										Macr-ocells	Total Regis-ters	ISP Progr-aming	IEEE1149.1 Boundary Scan Test	Output Enables	I/O(V) Compa-tibility	Typ Icc (mA)		
	-250	-225	-200	-180	-135	-110	-100	LJ 44	LT 44	LT 48	LB 49	LT 100	LB 100	LT 128	LB 144	PQ 160	LT 176								LB 208	
	t _{PD} (ns)	4	4	4.5	5	7.5	10	10	44-pin PLCC	44-pin TQFP	48-pin TQFP	49-ball caBGA	100-pin TQFP	100-ball caBGA	128-pin TQFP	144-ball fpBGA	160-pin PQFP								176-pin TQFP	208-ball fpBGA
ispLSI 2032VE		●		●	●	●		32+2	32+2	32+2	32+2									32	32	JTAG	●	1	5/3.3	65
ispLSI 2064VE			●		●		●	32+2	32+2			64+4	64+4							64	64	JTAG	●	2	5/3.3	90
ispLSI 2096VE			●		●		●							96+6						96	96	JTAG	●	2	5/3.3	125
ispLSI 2128VE	●			●	●		●					64+4	64+4			128+8	128+8	128+8		128	128	JTAG	●	2	5/3.3	195
ispLSI 2192VE				●	●		●							96+9	96+9					192	192	JTAG	●	2	5/3.3	275

ispLSI 2000VL(2.5V) Family

	Speed Grade						Package(I/O + Dedicated Inputs)												Macr-ocells	Total Regis-ters	ISP Progr-aming	IEEE 1149.1 Boundary Scan Test	Output Enables	I/O(V) Compa-tibility	Typ Icc (mA)
	-180	-165	150	-135	-110	-100	LJ 44	LT 44	LT 48	LB 49	LT 100	LB 100	LT 128	LB 144	LQ 160	LT 176	LB 208								
	t _{PD} (ns)	5	5.5	6	7.5	10	10	44-pin PLCC	44-pin TQFP	48-pin TQFP	49-ball caBGA	100-pin TQFP	100-ball caBGA	128-pin TQFP	144-ball fpBGA	160-pin PQFP	176-pin TQFP	208-ball fpBGA							
ispLSI 2032VL	●			●	●		32+2	32+2	32+2	32+2									32	32	JTAG	●	1	3.3/2.5	45
ispLSI 2064VL		●		●		●	32+2	32+2			64+4	64+4							64	64	JTAG	●	2	3.3/2.5	60
ispLSI 2096VL		●		●		●							96+6						96	96	JTAG	●	2	3.3/2.5	85
ispLSI 2128VL			●	●		●					64+4	64+4			128+8	128+8	128+8		128	128	JTAG	●	2	3.3/2.5	125
ispLSI 2192VL			●	●		●							96+9	96+9					192	192	JTAG	●	2	3.3/2.5	175

*3.3V Tolerant Inputs

ispLSI 5000V(3.3V) Family

	Speed Grade				Package (I/Os)				Macrocells	Total Registers	ISP Program-ing	IEEE 1149.1 Boundary Scan Test	Output Enables	I/O (V) Compa-tibility	Typical Static Icc(mA) Low Power /High Speed	
	-125	-110	-100	-70*	LQ 208	LB 208	LB 272	LB 388								
	t _{PD} (ns)	7.5	8.5	10	15	208-pin PQFP	208-ball fpBGA	272-ball BGA								388-ball BGA
	t _{SS} (ns)	6	6	8	12											
	t _{cos} (ns)	4	4	5.5	8											
f _{MAX} (MHz)	125	110	100	70												
ispLSI 5256VA	●		●	●	144	144	192		256	256	JTAG	●	2	5/3.3/2.5	140/255	
ispLSI 5384VA	●		●	●	144	144	192	288	384	384	JTAG	●	2	5/3.3/2.5	160/360	
ispLSI 5512VA		●	●	●	144		192	288	512	512	JTAG	●	2	5/3.3/2.5	240/520	

ispLSI 8000(5.0V) & 8000V(3.3V) Family

	Speed Grade				Package (I/Os)			Macro-cells	Total Registers	ISP Program-ing	IEEE 1149.1 Boundary Scan Test	Output Enables	I/O (V) Compa-tibility	Typical Static Icc (mA) Low Power /High Speed	
	-125	-110	-90	-60	LB 272	LB 432	LB 492								
	t _{PD} (ns)	8.5	8.5	10	15	272-ball BGA	432-ball BGA								492-ball BGA
	t _{SS} (ns)	4.5	5	7	10										
	t _{cos} (ns)	8	8	10	15										
f _{MAX} (MHz)	125	110	90	60											
ispLSI 8840		●	●	●		312		840	1152	ISP/JTAG	●	4	5/3.3	340/630	
ispLSI 8600V	●		●	●	192		264	600	864	JTAG	●	4	5/3.3/2.5	160/330	
ispLSI 8840V	●		●	●	192		312	840	1152	JTAG	●	4	5/3.3/2.5	220/460	
ispLSI 81080V	●		●	●	192		360	1080	1440	JTAG	●	4	5/3.3/2.5	250/590	

*Available in Industrial Grade



ispGDXV (3.3V) Family

	Speed Grade				Package (I/O)			I/O	Dedicated Clocks	ISP Programming	IEEE 1149.1 Boundary Scan Test	I/O (V) Compatibility
	-3	-5*	-7*	-9**	Q 208	B 208	B 272					
	t _{PD} (ns)	3.5	5	7	9	208-pin PQFP	208-ball fpBGA					
f _{MAX} (MHz)	250	143	100	83								
ispGDX160VA	●	●	●	●	160	160	160	160	4	JTAG	●	3.3/2.5

*Available in Industrial Grade
 **Available in Industrial Grade Only

ispGDX(5V) Family

	Speed Grade		Package (I/O)					I/O	Dedicated Clocks	ISP Programming	IEEE 1149.1 Boundary Scan Test	I/O (V) Compatibility
	-5	-7	T 100	Q 160	T 176	Q 208	B 272					
	t _{PD} (ns)	5	7	100-pin TQFP	160-pin PQFP	176-pin TQFP	208-pin PQFP					
f _{MAX} (MHz)	143	100										
ispGDX80A	●	●	80					80	2	ISP/JTAG	-	5
ispGDX120A	●	●		120	120			120	4	ISP/JTAG	-	5
ispGDX160A	●	●				160	160	160	4	ISP/JTAG	-	5

ispLSI 1000E/EA (5V) Family

	Speed Grade								Package(I/Os + Dedicated Inputs)								Macr-ocells	Total Registers	ISP Programming	IEEE 1149.1 Boundary Scan Test	Output Enables	I/O (V) Compatibility	Typical Icc(mA)
	-200	-170	-125	-100	-90	-80*	-70*	-60*	LJ 44	LT 44	LJ 68	LJ 84	LT 100	LQ 128	LT 128								
	t _{PD} (ns)	4.5	5	7.5	10	12	15	15	15	20	44-pin PLCC	44-pin TQFP	68-pin PLCC	84-pin PLCC	100-pin TQFP	128-pin PQFP							
f _{MAX} (MHz)	200	170	125	100	91	80	84	70	60														
ispLSI 1016E			●	●			●			32+4	32+4						64	96	ISP	-	1	5	90
ispLSI 1024					●	●		●				48+6		48+6			96	144	ISP	-	0	5	130
ispLSI 1032E			●	●			●					64+8	64+8				128	192	ISP	-	2	5	190
ispLSI 1048E			●	●			●							96+12	96+12		192	288	ISP	-	2	5	175
ispLSI 1016EA	●		●	●						32+1	32+1						64	96	JTAG	●	1	5/3.3	91
ispLSI 1024EA	●		●	●										48+2			96	144	JTAG	●	2	5/3.3	152
ispLSI 1032EA	●		●	●									64+4				128	192	JTAG	●	2	5/3.3	153
ispLSI 1048EA		●	●	●										96+8	96+8		192	288	JTAG	●	2	5/3.3	190

*Available in Industrial Grade

ispLSI 2000A (5V) Family

	Speed Grade							Package (I/O + Dedicated Inputs)									Macr-ocells	Total Registers	ISP Programming	IEEE 1149.1 Boundary Scan Test	Output Enables	I/O (V) Compatibility	Typical Icc(mA)
	180	150	135	125	110	100	80	LJ 44	LT 44	LT 48	LJ 84	LT 100	LQ 128	LT 128	PQ 160	LT 176							
	t _{PD} (ns)	5	5.5	7.5	7.5	10	10	15	44-pin PLCC	44-pin TQFP	48-pin TQFP	84-pin PLCC	100-pin TQFP	128-pin PQFP	128-pin TQFP	160-pin PQFP							
f _{MAX} (MHz)	180	154	137	125	111	111	84																
ispLSI 2032A	●	●	●		●		●	32+2	32+2	32+2							32	32	ISP	-	1	5	65
ispLSI 2064A				●		●	●				64+4	64+4					64	64	ISP	-	2	5	95
ispLSI 2096A				●		●	●						96+6	96+6			96	96	ISP	-	2	5	150
ispLSI 2128A					●	●									128+8	128+8	128	128	ISP	-	2	5	195



ispLSI 2000E (5V) Family

	Speed Grade						Package (I/O + Dedicated Inputs)							Macrocells	Total Registers	ISP Programming	IEEE 1149.1 Boundary Scan Test	Output Enables	I/O (V) Compatibility	Typ Icc (mA)
	-225	-200	-180	-135	-110	-100	LJ44	LT44	LT48	LT100	LQ128	LT128	LT176							
	t _{pd} (ns)	3.5	4.5	5	7.5	10	10	44-pin PLCC	44-pin TQFP	48-pin TQFP	100-pin TQFP	128-Pin PQFP	128-pin TQFP							
ispLSI 2032E	●		●	●	●		32+2	32+2	32+2					32	32	JTAG	-	1	5	85* 65
ispLSI 2064E		●		●		●				64+4				64	64	JTAG	-	2	5	100
ispLSI 2096E			●	●		●					96+6	96+6		96	96	JTAG	-	2	5	130
ispLSI 2128E			●	●		●							128+8	128	128	JTAG	-	2	5	165

*Fastest Speed Only

ispLSI 3000 (5V) Family

	Speed Grade					Package (I/Os)								Macro-cells	Total Registers	ISP Programming	IEEE 1149.1 Boundary Scan Test	Output Enables	I/O (V) Compatibility	Typ Static Icc (mA)
	-125	-100	-90	-70*		LQ 160	LQ 208	LM 240	LB 272	LM 304	LB 320	LB 432								
	t _{pd} (ns)	7.5	10	12	15	15	160-pin PQFP	208-pin PQFP	240-pin MQFP	272-ball BGA	304-pin MQFP	320-ball BGA	432-ball BGA							
ispLSI 3160	●	●			●		160		160				160	320	ISP/JTAG	●	2	5	275	
ispLSI 3192		●			●			192	192				192	384	ISP/JTAG	●	2	5	320	
ispLSI 3256A			●	●		128							256	384	ISP/JTAG	●	2	5	200	
ispLSI 3256E		●			●				256	256			256	512	ISP/JTAG	●	2	5	310	
ispLSI 3320		●			●		160				160		320	480	ISP/JTAG	●	2	5	370	
ispLSI 3448					●							224	448	672	ISP/JTAG	●	2	5	470	

** Available in Industrial Grade

CMOS GAL & PAL Families

		Commercial	Industrial	20-pin PLCC	20-pin PDIP	20-pin SOIC	Tpd (ns)	Fmax (MHz)	Icc Typ (mA)	Icc Max (mA)	I/Os	Dedicated Inputs	MAX.PT per Output	Features
16V8	GAL16V8D-3L	●		●			3.5	250	75	115	8	10	8	High-Performance Industry Standard Architecture (5V; Half Power)
	GAL16V8D-5L	●		●			5	166	75	115				
	PALCE16V8H-5	●		●					125					
	GAL16V8D-7L	●	●	●	●		7.5	100	75	115				
	PALCE16V8H-7	●		●	●	●		125						
	GAL16V8D-10L	●	●	●	●		10	62.5	75	115				
	PALCE16V8H-10	●	●	●	●	●		83.3						
	GAL16V8D-15L	●	●	●	●		15	62.5	75	90				
	PALCE16V8H-15	●	●	●	●	●								
	GAL16V8D-25L	●	●	●	●		25	41.6	75	90				
PALCE16V8H-25	●	●	●	●	●									



CMOS GAL & PAL Families(cont.)

		Comm- ercial	Indus- trial	20-pin PLCC	20-pin PDIP	20-pin SOIC	Tpd (ns)	Fmax (MHz)	Icc Typ (mA)	Icc Max (mA)	I/Os	Dedicated Inputs	MAX.PT per Output	Features	
16V8	GAL16V8D-10Q	●		●	●		10	62.5	45	55	8	10	8	High-Performance Industry Standard Architecture (5V; Quarter Power)	
	PALCE16V8Q-10	●		●				83.3							
	GAL16V8D-15Q	●		●	●		15	62.5	45	55					
	PALCE16V8Q-15	●		●	●										
	GAL16V8D-20Q		●	●	●		20	50	45	65					
	PALCE16V8Q-20		●	●	●										
	GAL16V8D-25	●	●	●	●		25	41.6	45	55					
	PALCE16V8Q-25	●	●	●	●										
16LV8	GAL16LV8D-3L	●		●			3.5	250	45	65	8	10	8		High-Performance Industry Standard Architecture (3.3V; Half Power)
	GAL16LV8D-5L	●		●			5	166	45	65					
	GAL16LV8C-7L	●		●			7.5	100	45	65					
	GAL16LV8C-10L	●		●			10	83.3	45	65					
	PALLV16-V8-10	●		●	●	●				55					
	GAL16LV8C-15L	●		●			15	62.5	45	65					
16V8Z	GAL16V8Z-12Q	●		●	●	●	12	83.3	0.05	0.1	8	10	8		Zero Power
	PALCE16V8Z-12		●	●	●			100		0.03					
	GAL16V8Z-15Q	●		●	●	●	15	62.5	0.05	0.1					
	PALCE16V8Z-15		●	●	●				0.15						
	PALCE16V8Z-25	●	●	●	●	●	25	50							
16V8ZD	GAL16V8ZD-12Q	●		●	●		12	83.3	0.05	0.1	8	9	8	Zero Power	
	GAL16V8ZD-15Q	●		●	●		15	62.5							
16LV8ZD	GAL16LV8ZD-15Q	●		●			15	62.5	0.05	0.1	8	9	8	3/3V, Zero Power	
	PALLV16V8Z-20	●		●			20	66.7		45					
	GAL16LV8ZD-25Q	●		●			25	41.6	0.05	0.1		9			
16VP8	GAL16VP8-15L	●		●	●		15	80	90	115	8	10	8	TTL Compatible 64mA High Output drive	
	GAL16VP8-25L	●		●	●		25	50							

		Comm- ercial	Indus- trial	24-pin PDIP	28-pin PLCC	Tpd (ns)	Fmax (MHz)	Icc Typ (mA)	Icc Max (mA)	I/Os	Dedicated Inputs	MAX. PT per Output	Features
20V8	GAL20V8C-5L	●			●	5	166	75	115	8	12	8	Half-Power
	PALCE20V8H-5	●							125				
	GAL20V8B-7L	●		●	●	7.5	100	75	115				
	GAL20V8C-7L	●			●								
	PALCE20V8H-7	●		●	●		125						
	GAL20V8B-10L	●	●	●	●	10	62.5	75	115				
	GAL20V8C-10L	●	●		●								
	PALCE20V8H-10	●		●	●		83.3						
	GAL20V8B-15L	●	●	●	●	15	62.5	75	90				
	PALCE20V8H-15	●	●	●	●								
	GAL20V8B-25L	●	●	●	●	25	41.6	75	90				
	PALCE20V8H-25	●	●	●	●								
	GAL20V8B-15Q	●		●	●	15	62.5	45	55				
	PALCE20V8Q-15	●		●	●								
	GAL20V8B-20Q		●	●	●	20	50	45	65				
	PALCE20V8Q-20		●	●	●								
	GAL20V8B-25Q	●	●	●	●	25	41.6	45	55				
	PALCE20V8Q-25	●	●	●	●								



		Commercial	Industrial	24-pin PDIP	28-pin PLCC	Tpd (ns)	Fmax (MHz)	Icc Typ (mA)	Icc Max (mA)	I/Os	Dedicated Inputs	MAX. PT per Output	Features
20LV8	GAL20LV8D-3L	●			●	3.5	250	45	70	8	12	8	3.3V
	GAL20LV8D-5L	●			●	5	166						
	GAL20LV8D-7L	●			●	7.5	125						
20V8Z	GAL20V8Z-12Q	●		●	●	12	83.3	0.5	0.1	8	11	8	Zero Power
	GAL20V8Z-15Q	●		●	●	15	62.5						
20V8ZD	GAL20V8ZD-12Q	●		●	●	12	83.3	0.5	0.1	8	11	8	Zero Power
	GAL20V8ZD-15Q	●		●	●	15	62.5						
20LV8ZD	GAL20LV8ZD-15Q	●			●	15	62.5	0.5	0.1	8	12	8	3.3V, Zero Power
	GAL20LV8ZD-25Q	●			●	25	41.6						
20VP8	GAL20VP8-15L	●		●	●	15	80	90	115	8	12	8	TTL Compatible 64mA High Output Drive
	GAL20VP8B-25L	●		●	●	25	50						

		Commercial	Industrial	24-pin PDIP	24-pin SOIC	28-pin PLCC	28-pin SSOP	Tpd (ns)	Fmax (MHz)	Icc Typ (mA)	Icc Max (mA)	I/Os	Dedicated Inputs	MAX. PT per Output	Features
22V10	GAL22V10D-4L	●				●		4	250	90	140	10	12	8-16	Half-Power
	GAL22V10D-5L	●	●	●		●		5	200	90	140				
	PALCE22V10H-5	●				●									
	GAL22V10D-7L	●	●	●		●		7.5	166	90	140				
	PALCE22V10H-7	●		●		●			142.8						
	GAL22V10D-10L	●	●	●		●		10	105	90	130				
	PALCE22V10H-10	●	●	●	●	●			125		120				
	GAL22V10D-15L	●	●	●		●		15	83.3	90	130				
	PALCE22V10H-15	●	●	●	●	●			58.8		90				
	GAL22V10D-20L		●	●		●		20	50	75	150				
	PALCE22V10H-20		●	●		●					130				
	GAL22V10D-25L	●	●	●		●		25	38.5	75	90				
	PALCE22V10H-25	●	●	●	●	●			35.7						
	GAL22V10D-10Q	●		●		●		10	105	45	55				
	PALCE22V10Q-10	●		●		●			125						
	GAL22V10D-15Q	●		●		●		15	83.3	45	55				
	PALCE22V10Q-15	●		●		●			58.8						
	GAL22V10D-25Q	●		●		●		25	38.5	45	55				
PALCE22V10Q-25	●		●		●			35.7							
22LV10	GAL22LV10D-4L	●				●		4	250	90	130	10	12	8-16	3.3V
	GAL22LV10D-5L	●				●		5	200	90	130				
	GAL22LV10C-7L	●				●		7.5	125	45	75				
	PALLV22V10-7	●				●			143						
	GAL22LV10C-10L	●				●		10	111	45	75				
	PALLV22V10-10	●		●		●			125		60				
	GAL22LV10C-15L	●				●		15	83	45	75				
	PALLV22V10-15	●	●	●		●			83.3		60				



CMOS GAL & PAL Families(cont.)

		Comm- ercial	Indus- trial	24-pin PDIP	24-pin SOIC	28-pin PLCC	28-pin SSOP	Tpd (ns)	Fmax (MHz)	Icc Typ (mA)	Icc Max (mA)	I/Os	Dedi- cated Inputs	MAX. PT per Output	Features
22V10Z	PALCE22V10Z-15		●	●		●		15	62.5		0.03	10	12	8-16	Zero Power
	PALCE22V10Z-25	●	●	●	●	●		25	50		0.03				
22LV10Z	GAL22LV10Z-15Q	●				●		15	71.4	0.05	0.1	10	12	8-16	3.3V, Zero Power
	GAL22LV10Z-25Q	●				●		25	50						
	PALLV2210Z-25		●	●		●									
22LV10ZD	GAL22LV10ZD-15Q	●				●		15	71.4	0.05	0.1	10	11	8-16	3.3V, Zero Power
	GAL22LV10ZD-25Q	●				●		25	50						
ispGAL 22V10	ispGAL22V10C-7L	●				●	●	7.5	111	90	140	10	11	8-16	5V In-System Programmable 22V10
	ispGAL22V10C-10L	●				●	●	10	105						
	ispGAL22V10C-15L	●	●			●	●	15	83.3						
ispGAL 22LV10	ispGAL22LV10-4L	●				●	●	4	250	90	130	10	11	8-16	3.3V In-System Programmable 22V10
	ispGAL22LV10-5L	●				●	●	5	200						
	ispGAL22LV10-7L	●	●			●	●	7.5	166						
	ispGAL22LV10-10L	●	●			●	●	10	111						
	ispGAL22LV10-15L	●	●			●	●	15	83.3						

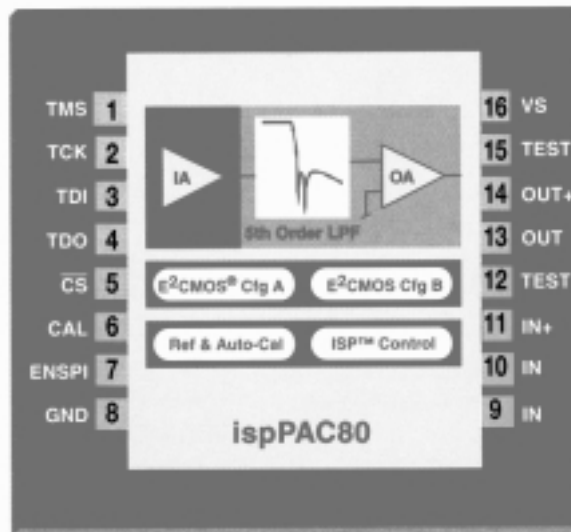
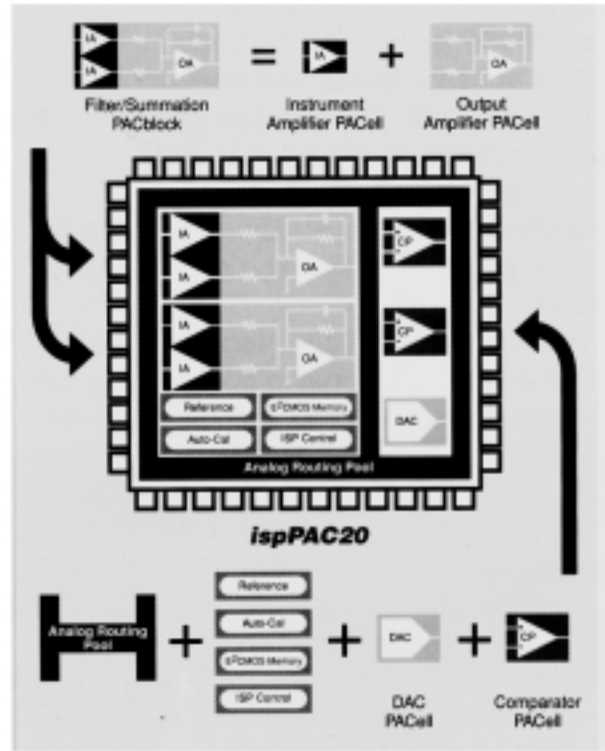
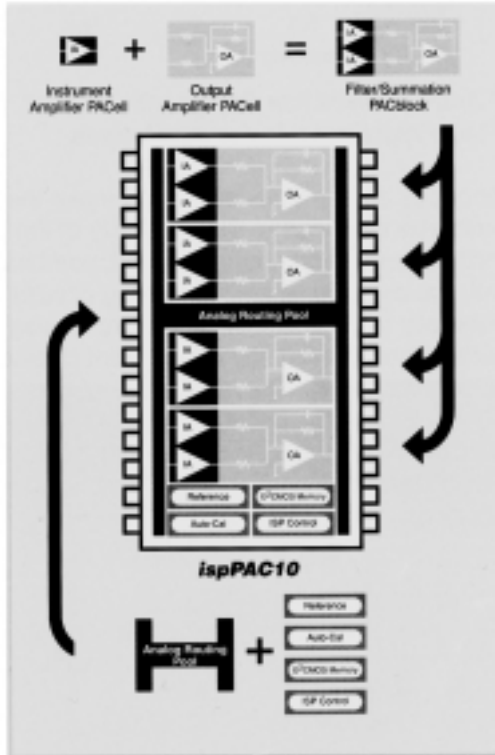
ispPAC Family - Programmable Analog Circuit

Features	ispPAC10	ispPAC20	ispPAC80
PACblocks	4 Filter/Summation	2 Filter/Summation	1 Fifth-Order Filter
Precision Filter Range	10kHz - 100kHz	10kHz - 100kHz	50kHz - 500kHz
Max. Bandwidth	550kHz	550kHz	-
Linearity	-88dB THD @ 10kHz	-88dB THD @ 10kHz	-90dB THD @ 10kHz
Dynamic Range	>100 dB	>100 dB	>90 dB
Comparators	-	2 Differential Input, 5mV Offset Typ	-
Digital-to-Analog(DAC)	-	8-Bit, INL < 0.5 LSB	-
Power Supply	+5V	+5V	+5V
Operating Temperature	Industrial	Industrial	Industrial
Packaging	28-pin PDIP, 28-pin SOIC	44-pin PLCC	16-pin PDIP, 16-pin SOIC

ispPAC Ordering Information

Product	Ordering No.	Description
ispPAC Device	ispPAC10-01PI	ispPAC10 in-system programmable analog device in 28-pin DIP package.
	ispPAC10-01SI	ispPAC10 in-system programmable analog device in 28-pin SOIC package.
	ispPAC20-01JI	ispPAC20 in-system programmable analog device in 44-pin PLCC package.
	ispPAC80-01PI	ispPAC80 in-system programmable fifth-order filter in 16-pin PDIP package.
	ispPAC80-01SI	ispPAC10 in-system programmable fifth-order filter in 16-pin SOIC package.
ispPAC System Design Kit	PAC-SYSTEM10	ispPAC10 System Design Kit: Complete design kit for programming the ispPAC10 device.
	PAC-SYSTEM20	ispPAC10 System Design Kit: Complete design kit for programming the ispPAC20 device.
	PAC-SYSTEM80	ispPAC10 System Design Kit: Complete design kit for programming the ispPAC80 device.

* ispPAC Block Diagrams



(16-pin SOIC)