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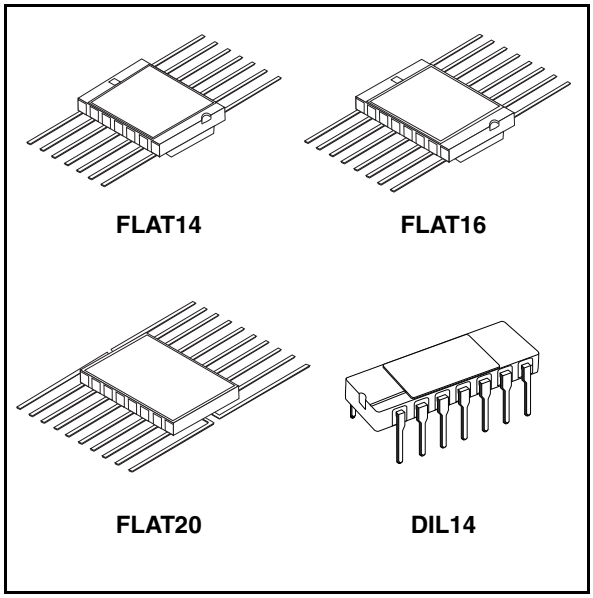
HCC4000B series

RadHardened high voltage complementary MOS logic series

Data Brief

Features

- 20V max operating voltage
- Bufferized inputs and outputs
- Standardized symmetrical outputs characteristic
- 50ns typical propagation delays
- 100nA max 25°C input current
- 20V quescient current, 100% tested
- 5-10-15V parametric testing
- Available in hermetic Flat packages
- Also available in DIL and DIE form upon request
- RadHard 100kRad TID at 11rad/sec dose rate
- SEL-SEU immune to 72MeV/cm²/mg LET ions
- Designed for space use: ESCC qualified
- FM parts are delivered in accordance with ESCC detail specifications, with ESCC marking and ST + ESA logos
- Engineering model parts meet same electrical specifications as FM parts
- Detailed Contractual ESCC detailed specification for each Type shall be downloaded from European Space Agency web.site



Description

The HCC4000B series is composed of close to 80 monolithic types built with Metal Oxide Complementary technology. It provides Designers with high voltage noise tolerant complete Logic series. It radiation hardness and immunity to Heavy Ions make this series to be usable in the most difficult environmental conditions.

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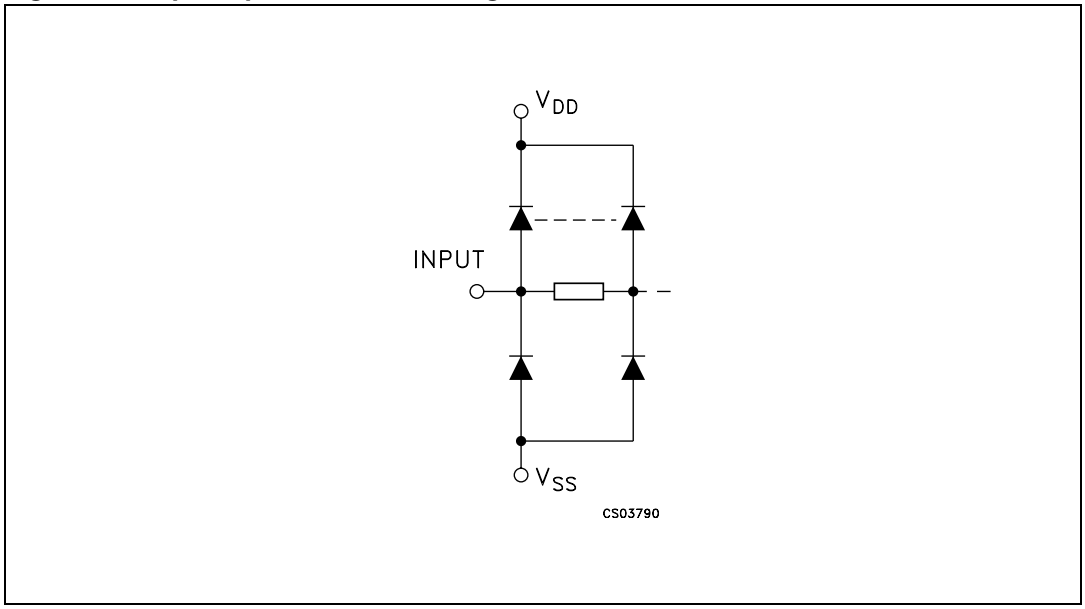
1 Input equivalent circuit diagram

Figure 1. Input equivalent circuit diagram



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2 Maximum rating

Stressing the device above the rating listed in the “absolute maximum ratings” table may cause permanent damage to the device. These are stress ratings only and operation of the device at these or any other conditions above those indicated in the Operating sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability. Refer also to the STMicroelectronics sure program and other relevant quality documents.

Table 1. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DD}	Supply voltage	-0.5 to 22	V
V_I	DC input voltage	-0.5 to V_{DD} + 0.5	V
I_I	DC input current	±10	mA
P_D	Power dissipation per package	100	mW
T_{OP}	Operating temperature	-55 to +125	°C
T_{STG}	Storage temperature	-65 to +150	°C

Note: All voltage values are referred to V_{SS} pin voltage.

2.1 Recommended operating conditions

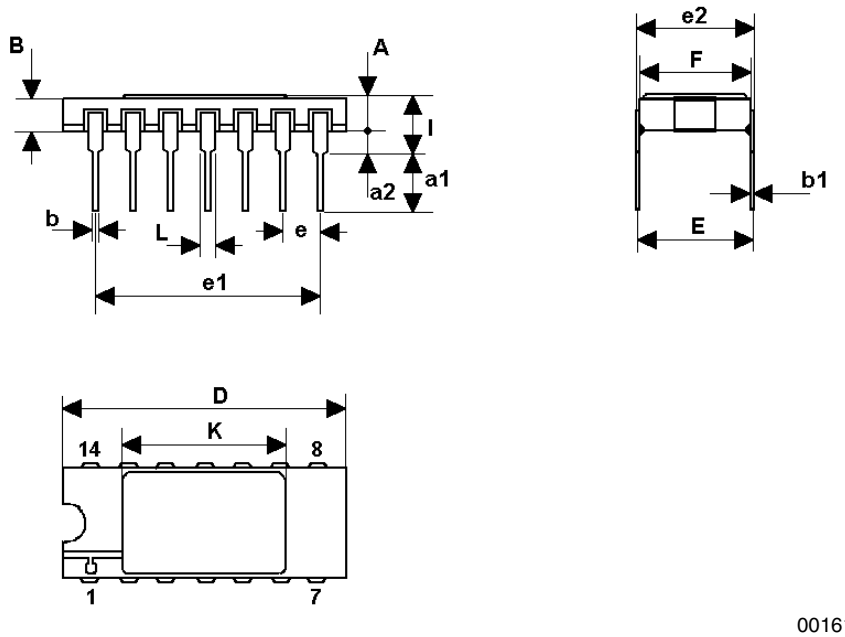
Table 2. Recommended operating conditions

Symsbol	Parameter	Value	Unit
V_{DD}	Supply voltage	20	V
V_I	Input voltage	0 to V_{DD}	V
T_{OP}	Operating temperature	-55 to +125	°C

3 Package mechanical data

DILC-14 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	2.1		2.54	0.083		0.100
a1	3.00		3.70	0.118		0.146
a2	0.63	0.88	1.14	0.025	0.035	0.045
B	1.82	2.03	2.39	0.072	0.080	0.094
b	0.40	0.45	0.50	0.016	0.018	0.020
b1	0.20	0.254	0.30	0.008	0.010	0.012
D	18.79	19.00	19.20	0.740	0.748	0.756
E	7.36	7.62	7.87	0.290	0.300	0.310
e		2.54			0.100	
e1	15.11	15.24	15.37	0.595	0.600	0.605
e2	7.62	7.87	8.12	0.300	0.310	0.320
F	7.11		7.75	0.280		0.305
I			3.70			0.146
K	10.90		12.1	0.429		0.476
L	1.14	1.27	1.5	0.045	0.050	0.059



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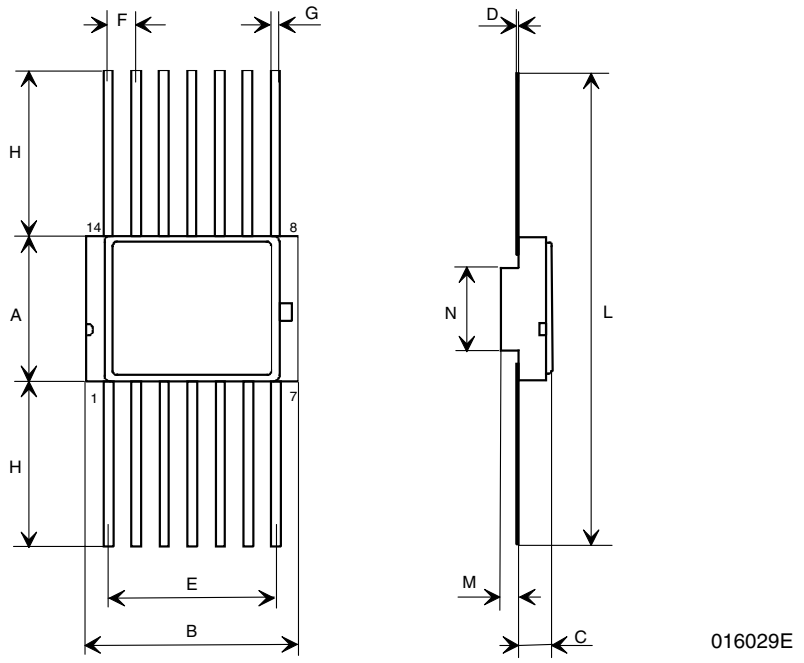
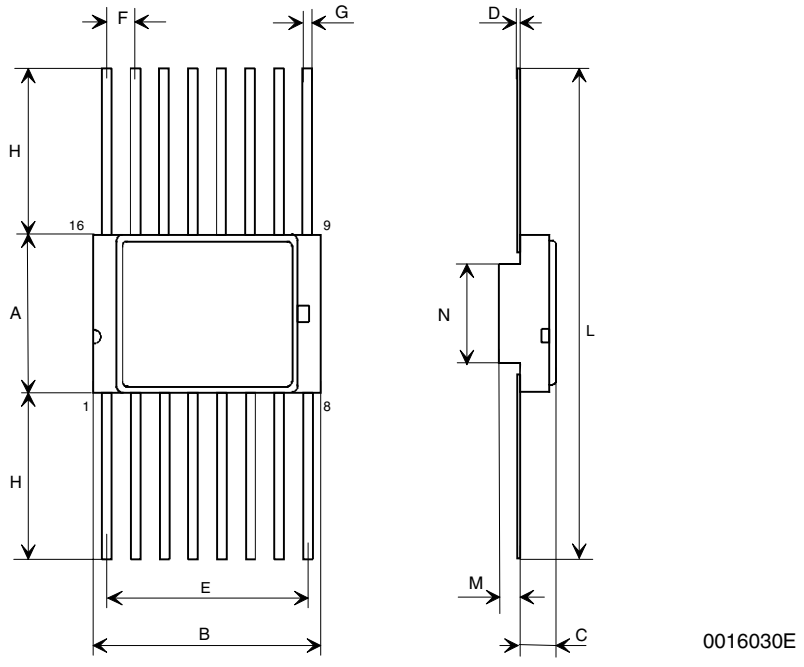
FPC-14 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	6.75	6.91	7.06	0.266	0.272	0.278
B	9.76	9.95	10.14	0.384	0.392	0.399
C	1.49		1.95	0.059		0.077
D	0.10	0.127	0.15	0.004	0.005	0.006
E	7.50	7.62	7.75	0.295	0.300	0.305
F		1.27			0.050	
G	0.38	0.43	0.48	0.015	0.017	0.019
H		6.0			0.236	
L	18.75		22.0	0.738		0.866
M		0.38			0.015	
N		4.31			0.170	



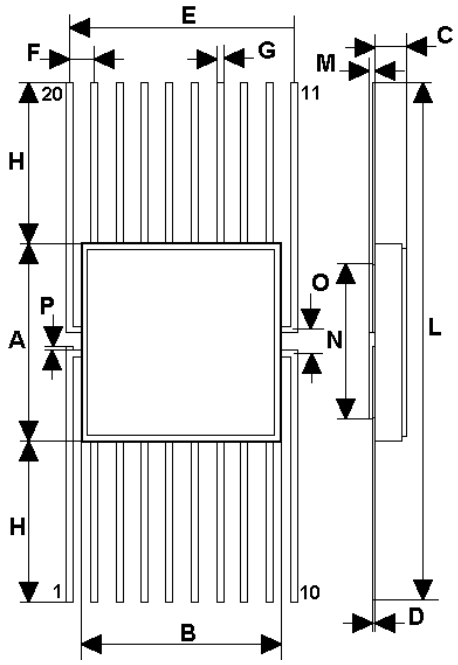
FPC-16 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	6.75	6.91	7.06	0.266	0.272	0.278
B	9.76	9.94	10.14	0.384	0.392	0.399
C	1.49		1.95	0.059		0.077
D	0.102	0.127	0.152	0.004	0.005	0.006
E	8.76	8.89	9.01	0.345	0.350	0.355
F		1.27			0.050	
G	0.38	0.43	0.48	0.015	0.017	0.019
H	6.0			0.237		
L	18.75		22.0	0.738		0.867
M	0.33	0.38	0.43	0.013	0.015	0.017
N		4.31			0.170	



FPC-20 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	9.98	10.16	10.34	0.393	0.400	0.407
B	9.98	10.16	10.34	0.393	0.400	0.407
C	1.45	1.61	1.78	0.57	0.63	0.070
D	0.10	0.127	0.18	0.004	0.005	0.007
E	11.30	11.43	11.56	0.445	0.450	0.455
F		1.27			0.050	
G	0.38	0.43	0.48	0.015	0.017	0.019
H	7.24		8.16	0.285		0.320
L	24.46		26.67	0.960		1.050
M	0.45	0.50	0.55	0.018	0.020	0.022
N		7.87			0.310	
O	1.14	1.27	1.40	0.045	0.050	0.055
P	0.10	0.18	0.25	0.004	0.007	0.010



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4 Type list

Table 3. Type list

Types	ESCC detail spec	Functionality	EM part number
HCC4001B	9201-041	Quad 2-Input Nor gates	HCC4001BK1
HCC4002B	9201-042	Dual 4-Input NOR Gate	HCC4002BK1
HCC4008B	9202-039	4-bit Full Adder	HCC4008BK1
HCC4011B	9201-043	Quad 2-Input NAND Gate	HCC4011BK1
HCC4012B	9201-044	Dual 4-Input NAND Gate	HCC4012BK1
HCC4013B	9203-023	Dual D-Flip Flop	HCC4013BK1
HCC4014B	9306-014	8-stage Static sychronous Shift register	HCC4014BK1
HCC4015B	9306-015	Dual 4-stage Static Shift Register	HCC4015BK1
HCC4016B	9202-050	Quad Bilateral Switch	HCC4016BK1
HCC4017B	9204-020	Decade Counter - Divider	HCC4017BK1
HCC4018B	9204-021	Presettable Divide-by N Counter	HCC4018BK1
HCC4019B	9202-051	Quad AND/OR select Gates	HCC4019BK1
HCC4020B	9204-022	14-stage Binary - Ripple Counter	HCC4020BK1
HCC4021B	9306-016	8-stage Static Shift Register	HCC4021BK1
HCC4022B	9204-023	Divide-by-8 Counter - Divider	HCC4022BK1
HCC4023B	9201-045	Triple 3-Input NAND Gate	HCC4023BK1
HCC4024B	9204-024	7-stage Binary - Ripple Counter	HCC4024BK1
HCC4025B	9201-046	Triple 3-Input NOR Gate	HCC4025BK1
HCC4026B	9406-001	Decade Counter-Div. 7-seg. Display driver	HCC4026BK1
HCC4027B	9203-022	Dual J-K Master-Slave Flip-Flop	HCC4027BK1
HCC4028B	9205-010	BCD-to-Decimal Decoder	HCC4028BK1
HCC4029B	9204-025	Presettable Up-Down Counter	HCC4029BK1
HCC4030B	9201-047	Quad Exclusive-OR Gate	HCC4030BK1
HCC4031B	9306-017	64-stage Static Shift Register	HCC4031BK1
HCC4034B	9306-025	8-stage Static bidirectional Bus Register	HCC4034BK1
HCC4035B	9306-018	4-stage Parallel I/O Shift Register	HCC4035BK1
HCC4040B	9204-026	12-stage Binary - Ripple Counter	HCC4040BK1
HCC4040B	9204-026	12-stage Binary - Ripple Counter	HCC4040BK1
HCC4041UB	9202-040	Quad True -Complement Buffer	HCC4041UBK1
HCC4042B	9202-041	Quad Clocked D Latch	HCC4042BK1
HCC4043B	9202-042	Quad 3-state NOR R/S Latch	HCC4043BK1
HCC4044B	9202-043	Quad 3-state NAND R/S Latch	HCC4044BK1

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Table 3. Type list

Types	ESCC detail spec	Functionality	EM part number
HCC4046B	9202-044	Micropower Phase Locker Loop	HCC4046BK1
HCC4047B	9207-003	Monostable - Astable Multivibrator	HCC4047BK1
HCC4049UB	9202-045	Hex Inverting Buffer - Converter	HCC4049UBK1
HCC4050B	9202-046	Hex Non-Inverting Buffer - Converter	HCC4050BK1
HCC4051B	9202-047	Single 8-channel Analog Mux - DeMux	HCC4051BK1
HCC4052B	9202-048	Different 4-channel Analog Mux - DeMux	HCC4052BK1
HCC4053B	9202-049	Triple 3-channel Analog Mux - Demux	HCC4053BK1
HCC4060B	9204-052	14-stage Counter - Divider AND Oscillator	HCC4060BK1
HCC4063B	9209-001	4-bit Magnitude Comparator	HCC4063BK1
HCC4066B	9408-005	Quad Bi-lateral Switch	HCC4066BK1
HCC4067B	9408-009	Single 16-channel Analog Mux - DeMux	HCC4067BK1
HCC4068B	9201-061	8-Input NAND / AND Gate	HCC4068BK1
HCC4069UB	9401-010	Hex Inverter	HCC4069UBK1
HCC4070B	9201-048	Quad Exclusive-OR Gate	HCC4070BK1
HCC4071B	9201-063	Quad 2-Input OR Gate	HCC4071BK1
HCC4072B	9201-082	Dual 4-Input OR Gate	HCC4072BK1
HCC4073B	9201-064	Triple 3-Input AND Gate	HCC4073BK1
HCC4075B	9201-065	Triple 3-Input OR Gate	HCC4075BK1
HCC4076B	9306-022	4-bit D-type Register	HCC4076BK1
HCC4077B	9201-055	Quad Ex-NOR Gate	HCC4077BK1
HCC4078B	9201-062	8-Input NOR / OR Gate	HCC4078BK1
HCC4081B	9201-052	Quad 2-Input AND Gate	HCC4081BK1
HCC4082B	9201-066	Dual 4-Input AND Gate	HCC4082BK1
HCC4085B	9201-067	Dual 2-wide 2-Input AND-OR Inverter Gate	HCC4085BK1
HCC4093B	9409-002	Quad 2-Input NAND Schmitt Trigger	HCC4093BK1
HCC4094B	9306-026	8-stage Shift AND Store Bus Register	HCC4094BK1
HCC4098B	9206-003	Dual Monostable Multivibrator	HCC4098BK1
HCC4099B	9202-058	8-bit Addressable Latch	HCC4099BK1
HCC40103B	9204-036	Presettable 8-bit Binary Down Counter	HCC40103BK1
HCC40105B	9306-033	4-bit by 16 words	HCC40105BK1
HCC40106B	9409-005	Hex Schmitt Trigger	HCC40106BK1
HCC40107B	9401-013	Dual 2-Input NAND Buffer - Driver	HCC40107BK1
HCC40109B	9407-003	Dual Low-to-High Voltage Level Shifter	HCC40109BK1
HCC40161B	9204-054	Binary Counter with Asynchronous Clear	HCC40161BK1
HCC40163B	9204-046	Binary Counter with Synchronous Clear	HCC40163BK1

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Table 3. Type list

Types	ESCC detail spec	Functionality	EM part number
HCC40174B	9203-038	Hex - D Flip Flop	HCC40174BK1
HCC40193B	9204-041	Presettable 4-bit Binary Up-Down Counter	HCC40193BK1
HCC40257B	9408-017	Quad 2-line-to-1 Line Data Multiplexer	HCC40257BK1
HCC4502B	9401-006	Strobed Hex Inverter - Buffer	HCC4502BK1
HCC4503B	9401-030	Hex Buffer (3-state Non-Inverter)	HCC4503BK1
HCC4508B	9202-063	Dual 4-bit Latch (3-state Outputs)	HCC4508BK1
HCC4512B	9408-006	8-channel Data Selector (3-state Output)	HCC4512BK1
HCC4514B	9408-012	4-bit Latch / 4-to-16 Line Decoder, output high	HCC4514BK1
HCC4515B	9205-011	4-bit Latch / 4-t0-16 Line Decoder, output low	HCC4515BK1
HCC4516B	9204-045	Presettable 4-bit Binary Up-Down Counter	HCC4516BK1
HCC4520B	9204-028	Dual Binary Up-Down Counter	HCC4520BK1
HCC4532B	9202-065	8-Input Priority Encoder	HCC4532BK1
HCC4538B	9207-007	Dual Precision Monostable Multivibrator	HCC4538BK1
HCC4555B	9408-011	Dual 1-of-4 Decoder - Demux, output high	HCC4555BK1
HCC4556B	9408-025	Dual 1-of-4 Decoder - Demux, output low	HCC4556BK1

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5 Revision history

Table 4. Revision history

Date	Revision	Changes
18-Oct-2006	1	First release

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