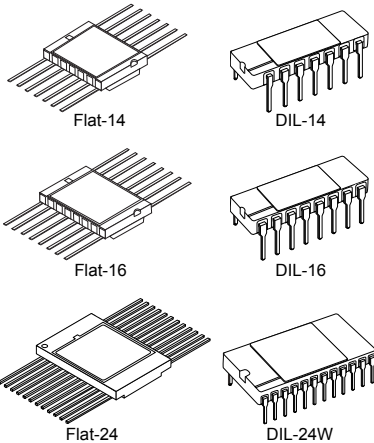


Rad-hard, high voltage, CMOS4000B logic series



The upper metallic lid is not electrically connected to any pins, nor to the IC die inside the package

Maturity status link

[HCC40xxB, HCC45xxB](#)

Features

- ESCC qualified
- 18 V absolute maximum ratings
- 3 V to 15 V operating voltage
- Hermetic packages
- Rad-hard 100 krad (Si) TID
- SEL immune up to 119 MeV.cm²/mg
- SEU immune up to 119 MeV.cm²/mg
- -55 °C to +125 °C temperature range
- ESCC specification available on ESCC website for each part

Description

The **HCC40xxB** and **HCC45xxB** series are legacy high-voltage CMOS logic gate and functions also known as the CMOS4000B series. The parts have a guaranteed radiation hardness for both single event effects (SEE) and total ionization dose (TID), guaranteed in the -55 °C to +125 °C range, and are packaged in ceramic hermetic packages. They are ESCC qualified, allowing straightforward use in spacecrafts and other harsh environments.

They offer a wide set of highly noise tolerant gates, flip-flops, multiplexers, counters, bus interfaces, and several other functions.

The complete, detailed specification of each type is available from the ESCC (European Space Components Coordination) website.

The following dedicated technical notes provide additional information:

- **TN1181**: Engineering model quality level
- **TN0873**: Manufacturing and quality specification of products in die form
- **TN0985**: "Class S equivalent" flow specification, for use of ESCC products in a MILSTD-883 environment

1 Input equivalent circuit diagram

The generic input equivalent circuits of the series are provided in Figure 1. Three products have a specific equivalent circuit shown in Figure 2.

Figure 1. Input equivalent circuits

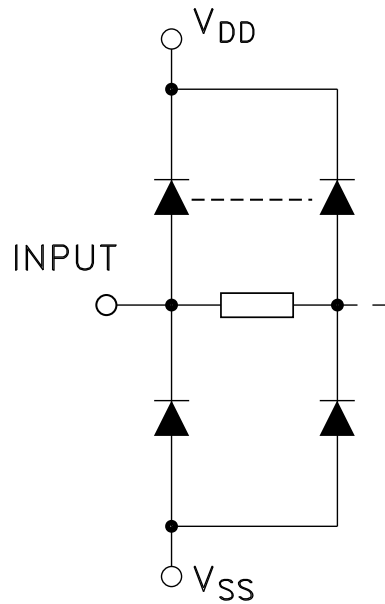
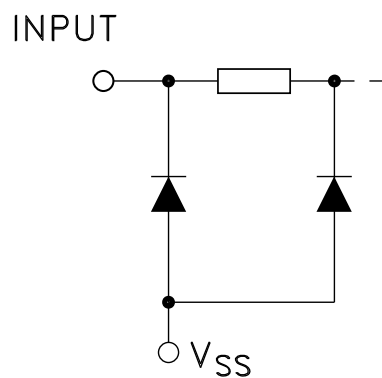


Figure 2. HCC4049UB, HCC4050B, and HCC109B input equivalent circuits



2 Maximum ratings

Stressing the device above the derating listed in the "absolute maximum ratings" in Table 1 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 Table 2 is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Table 1. Absolute maximum ratings - M54HC series

Symbol	Parameter	Value	Unit
V_{DD}	Supply voltage	-0.5 to +18	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	200	mW
T_{OP}	Storage temperature	-55 to +125	°C
T_{STG}	Storage temperature	-65 to +150	°C

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

Table 2. Recommended operating conditions

Symbol	Parameter	Value	Unit
V_{DD}	Supply voltage	3 to 15	V
V_I	Input voltage	0 to V_{DD}	V
T_{OP}	Operating temperature	-55 to +125	°C

Table 3. CMOS4000B series - thermal resistance

Type	ESCC generic specification	R _{thj-c} ⁽¹⁾ °C/W	Type	ESCC generic specification	R _{thj-c} ⁽¹⁾ °C/W
HCC4001B	9201/041	54	HCC4063B	9209/001	31
HCC4002B	9201/042	54	HCC4066B	9408/005	54
HCC4011B	9201/043	54	HCC4067B	9408/009	27
HCC4013B	9203/023	54	HCC4068B	9201/061	54
HCC4014B	9306/014	27	HCC4069UB	9401/010	54
HCC4015B	9306/015	27	HCC4070B	9201/048	54
HCC4017B	9204/020	31	HCC4071B	9201/063	54
HCC4018B	9204/021	31	HCC4072B	9201/082	54
HCC4019B	9202/051	54	HCC4073B	9201/064	54
HCC4020B	9204/022	31	HCC4075B	9201/065	54
HCC4021B	9306/016	31	HCC4077B	9201/055	54
HCC4022B	9204/023	27	HCC4081B	9201/052	54
HCC4024B	9204/024	54	HCC4093B	9409/002	54
HCC4027B	9203/022	31	HCC4094B	9306/026	31
HCC4028B	9205/010	54	HCC4098B	9206/003	31
HCC4029B	9204/025	54	HCC40103B	9204/036	27
HCC4030B	9201/047	54	HCC40106B	9409/005	54
HCC4040B	9204/026	31	HCC40109B	9407/003	31
HCC4041UB	9202/040	31	HCC40174B	9203/038	31
HCC4043B	9202/042	31	HCC4503B	9401/030	31
HCC4046B	9202/044	31	HCC4512B	9408/006	54
HCC4047B	9207/003	31	HCC4514B	9408/012	31
HCC4049UB	9202/045	54	HCC4516B	9204/045	27
HCC4050B	9202/046	54	HCC4520B	9204/028	31
HCC4051B	9202/047	31	HCC4538B	9207/007	27
HCC4052B	9202/048	31	HCC4555B	9408/011	31
HCC4053B	9202/049	31	HCC4556B	9408/025	31
HCC4060B	9204/052	31			

1. Typical max values for the flat packaged versions of the products, extrapolated from the measurement of a few test vehicles conservatively selected (smaller die size). The package top is used as a cold plate (reference temperature), as per the JESD51 best practice guidelines, to provide the worst case data, as in all the products of the series, the die is mounted on the package bottom.

3 Device summary

Table 4. CMOS4000B series - device summary

Type	General description	TID [krad(Si)]	SEL/SET/SEU threshold ⁽¹⁾ [MeV.cm ² /mg]	ESCC generic specification	Package ⁽²⁾
HCC4001B	Rad-hard quad 2-input NOR gate	100	120/120/120	9201/041	Flat-14E, DIL-14
HCC4002B	Rad-hard dual 4-input NOR gate		120/120/120	9201/042	Flat-14E, DIL-14
HCC4011B	Rad-hard quad 2-input NAND gate		120/120/120	9201/043	Flat-14E, DIL-14
HCC4013B	Rad-hard dual D flip-flop		120/120/120	9203/023	Flat-14E, DIL-14
HCC4014B	Rad-hard 8-stage static synchronous shift register		120/120/60	9306/014	Flat-16E, DIL-16
HCC4015B	Rad-hard dual 4-stage static shift register		120/120/60	9306/015	Flat-16E, DIL-16
HCC4017B	Rad-hard decade counter/divider		120/120/120	9204/020	Flat-16E
HCC4018B	Rad-hard presettable divide-by N counter		120/120/120	9204/021	Flat-16E
HCC4019B	Rad-hard quad AND/OR select gate		120/120/120	9202/051	Flat-16E
HCC4020B	Rad-hard 14-stage binary/ripple counter		120/120/36	9204/022	Flat-16E
HCC4021B	Rad-hard 8-stage static shift register		120/120/60	9306/016	Flat-16E
HCC4022B	Rad-hard divide-by-8 counter/divider		120/120/120	9204/023	Flat-16E
HCC4024B	Rad-hard 7-stage binary/ripple counter		120/120/36	9204/024	Flat-14E, DIL-14
HCC4027B	Rad-hard dual J-K master-slave flip-flop		120/120/120	9203/022	Flat-16E, DIL-16
HCC4028B	Rad-hard BCD-to-decimal decoder		120/120/120	9205/010	Flat-16E
HCC4029B	Rad-hard presettable up/down counter		120/120/120	9204/025	Flat-16E, DIL-16
HCC4030B	Rad-hard quad exclusive OR gate		120/120/120	9201/047	Flat-14E, DIL-14
HCC4040B	Rad-hard 12-stage binary/ripple counter		120/120/36	9204/026	Flat-16E, DIL-16
HCC4041UB	Rad-hard quad true/complement buffer		120/120/120	9202/040	Flat-14E
HCC4043B	Rad-hard quad 3-state NOR R/S latch		120/120/120	9202/042	Flat-16E, DIL-16
HCC4046B	Rad-hard micropower phase locker loop		120/120/120	9202/044	Flat-16E, DIL-16
HCC4047B	Rad-hard monostable/astable multivibrator		120/120/120	9207/003	Flat-14E, DIL-14
HCC4049UB	Rad-hard hex inverting buffer/converter		120/120/120	9202/045	Flat-16E, DIL-16
HCC4050B	Rad-hard hex non-inverting buffer/converter		120/120/120	9202/046	Flat-16E, DIL-16
HCC4051B	Rad-hard single 8-channel analog mux/demux		120/120/120	9202/047	Flat-16E, DIL-16
HCC4052B	Rad-hard different 4-channel analog mux/demux		120/120/120	9202/048	Flat-16E, DIL-16
HCC4053B	Rad-hard triple 2-channel analog mux/demux		120/120/120	9202/049	Flat-16E, DIL-16
HCC4060B	Rad-hard 14-stage counter/divider AND oscillator		120/120/120	9202/052	Flat-16E
HCC4063B	Rad-hard 4-bit magnitude comparator		120/120/120	9209/001	Flat-16E, DIL-16
HCC4066B	Rad-hard quad bilateral switch		120/120/120	9408/005	Flat-14E, DIL-14
HCC4067B	Rad-hard single 16-channel analog mux/demux		120/120/120	9408/009	Flat-24, DIL-24
HCC4068B	Rad-hard 8-input NAND/AND gate		120/120/120	9201/061	Flat-14E
HCC4069UB	Rad-hard hex inverter		120/120/120	9401/010	Flat-14E
HCC4070B	Rad-hard quad exclusive OR gate		120/120/120	9201/048	Flat-14E, DIL-14
HCC4071B	Rad-hard quad 2-input OR gate		120/120/120	9201/063	Flat-14E, DIL-14
HCC4072B	Rad-hard dual 4-input OR gate		120/120/120	9201/082	Flat-14E, DIL-14
HCC4073B	Rad-hard triple 3-input AND gate		120/120/120	9201/064	Flat-14E, DIL-14

Type	General description	TID [krad(Si)]	SEL/SET/SEU threshold ⁽¹⁾ [MeV.cm ² /mg]	ESCC generic specification	Package ⁽²⁾
HCC4075B	Rad-hard triple 3-input OR gate	100	120/120/120	9201/065	Flat-14E
HCC4077B	Rad-hard quad exclusive NOR gate		120/120/120	9201/055	Flat-14E, DIL-14
HCC4081B	Rad-hard quad 2-input AND gate		120/120/120	9201/052	Flat-14E, DIL-14
HCC4093B	Rad-hard quad 2-input NAND Schmitt trigger		120/120/120	9409/002	Flat-14E, DIL-14
HCC4094B	Rad-hard 8-stage shift-and-store bus register		120/120/60	9306/026	Flat-16E, DIL-16
HCC4098B	Rad-hard dual monostable multivibrator		120/120/120	9206/003	Flat-16E, DIL-16
HCC40103B	Rad-hard presettable 8-bit binary down counter		120/120/120	9204/036	Flat-16E
HCC40106B	Rad-hard hex Schmitt trigger		120/120/120	9409/005	Flat-14E, DIL-14
HCC40109B	Rad-hard quad low-to-high voltage level shifter		120/120/120	9407/003	Flat-16E, DIL-16
HCC40174B	Rad-hard hex D flip-flop		120/120/120	9203/038	Flat-16E
HCC4503B	Rad-hard hex buffer 3-state		120/120/120	9401/030	Flat-16E, DIL-16
HCC4512B	Rad-hard 8-channel data select. with 3-state output		120/120/120	9408/006	Flat-16E
HCC4514B	Rad-hard 4-bit latch/4-to-16 line decoder output high		120/120/120	9408/012	Flat-24, DIL-24
HCC4516B	Rad-hard presettable 4-bit binary up/down counter		120/120/120	9404/045	Flat-16E
HCC4520B	Rad-hard dual binary up-down counter		120/120/120	9404/028	Flat-16E
HCC4538B	Rad-hard dual precision monostable multivibrator		120/120/120	9207/007	Flat-16E, DIL-16
HCC4555B	Rad-hard dual 1-of-4 decoder/demux output high		120/120/120	9408/011	Flat-16E
HCC4556B	Rad-hard dual 1-of-4 decoder/demux output low		120/120/120	9408/025	Flat-16E

1. See the datasheet for details on the test conditions and Weibull parameters. The radiation report (available on request), provides the complete characterization.
2. Contact an ST sales representative for availability of DIL versions on other products.

4 Electrical characteristics

The complete specification of each type is available from the ESCC (European Space Components Coordination) website: <https://escies.org> using its ESCC part number with the format xxxx/xxx. STMicroelectronics® guarantees full compliance of qualified parts with these ESCC specifications.

4.1 Maximum frequency

The detailed specifications of each product provides the maximum authorized value at 5 V/25 °C of the rise and fall times on the inputs and the maximum transition time, allowing an estimation of the maximum frequency at which the product can be used.

The legacy datasheets of the products provide the same values at 5 V, 10 V, and 15 V. For some products, they additionally provide the minimum value of the maximum frequency. These pre-radiation values at 25 °C, on a 50 pF charge capacitance are referred to for guidance only. They are not simulated, characterized, or tested in production. ST assumes no liability for their use.

The maximum frequency of all the parts of the series decreases when the temperature increases. The typical decrease was originally 0.3%/°C. This value, provided for guidance only, has not been simulated or characterized during the successive fab transfers and is not tested in production. ST assumes no liability for its use.

5 Radiations

5.1 Total ionizing dose

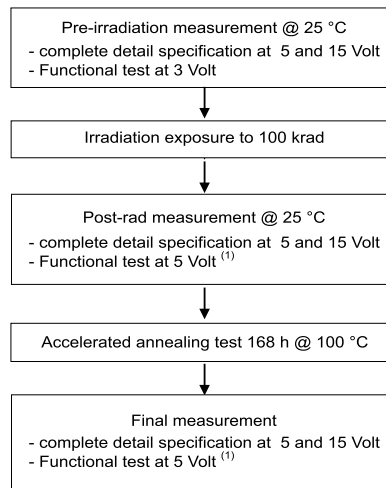
All the devices of the HCC series are 100 krad(Si) guaranteed as per the test methods described in Table 1 and illustrated in Figure 3.

Table 5. TID test conditions for the CMOS4000B family

Test parameter	Test conditions
Total dose	100 krad(Si)
Dose rate	40 krad(Si)/h
Sampling	4 biased parts by wafer on 3 wafer per diffusion lot plus 1 control part to qualify the wafer lot. In case one wafer fails, qualification is done wafer-per-wafer on 4 biased parts.
Bias conditions ⁽¹⁾	$V_{DD} = 10\text{ V}$ ⁽²⁾ input sat V_{DD} ⁽³⁾
Limits	V_{THN} , V_{THP} , I_{OL} , I_{OH} , T_{PHL} , T_{PLH} , V_{OL} , V_{OH} , V_N , V_P , V_H : see "ESCC detail specifications," limits $\pm 35\%$ for high and low limits.
	Other tests performed as defined in the "ESCC detail specification" with corresponding limits.

1. During irradiation.
2. $V_{DD} = 10\text{ volts}$ has been demonstrated to be the worst case condition during characterization.
3. Whenever functionally pertinent.

Figure 3. Irradiation test flow



1. The post rad guaranteed $V_{cc\ min.}$ is therefore 5 V.

5.2 Single event effects (SEE)

The HCC logic series is characterized under heavy ions through four test vehicles, representative of the four device classes that the series can be divided into. Table 6 provides the test vehicles and their corresponding SEE class. The SEE performance of each class is provided in Table 7. Table 8 provides for each product the class it belongs to. The SEE performance of any HCC device is the performance of its class.

Table 6. HCC series, SEE class summary

Test vehicle	SEE class
HCC4014B	1
HCC4017B	2
HCC4093B	3
HCC4020B	4

Table 7. SEE performance of HCC series SEE classes

Type	Class	Conditions	Result
SEL	1, 2, 3, 4	125 °C, $V_{CC} = 20\text{ V}$, LET = 119 MeV.cm ² /mg, ion range = 20 μm, 45 ° tilt	No event
SEU	1	25 °C, LET = 61 MeV.cm ² /mg, $V_{CC} = 5\text{ V}$, $V_{IN} = 2.5\text{ V} \pm 2.5\text{ V}$, $f_{IN} = 50\text{ kHz}$, $f_{CLOCK} = 500\text{ kHz}$, $V_{CC} = 15\text{ V}$, $V_{IN} = 7.5\text{ V} \pm 7.5\text{ V}$, $f_{IN} = 100\text{ kHz}$, $f_{CLOCK} = 1\text{ MHz}$, ion range = 20 μm, 45 ° tilt	LET _{th} > 60 MeV.cm ² /mg, $\sigma_{sat} = 8 \times 10^{-6}\text{ cm}^2$
	2, 3	25 °C, LET = 119 MeV.cm ² /mg, $V_{CC} = 5\text{ V}$, $V_{IN} = 2.5\text{ V} \pm 2.5\text{ V}$, $f_{IN} = 50\text{ kHz}$, $f_{CLOCK} = 500\text{ kHz}$, $V_{CC} = 15\text{ V}$, $V_{IN} = 7.5\text{ V} \pm 7.5\text{ V}$, $f_{IN} = 100\text{ kHz}$, $f_{CLOCK} = 1\text{ MHz}$, ion range = 20 μm, 45 ° tilt	No event
	4	25 °C, LET = 36 MeV.cm ² /mg, $V_{CC} = 5\text{ V}$, $V_{IN} = 2.5\text{ V} \pm 2.5\text{ V}$, $f_{IN} = 50\text{ kHz}$, $f_{CLOCK} = 500\text{ kHz}$, $V_{CC} = 15\text{ V}$, $V_{IN} = 7.5\text{ V} \pm 7.5\text{ V}$, $f_{IN} = 100\text{ kHz}$, $f_{CLOCK} = 1\text{ MHz}$, ion range = 20 μm, 45 ° tilt	LET _{th} > 36 MeV.cm ² /mg, $\sigma_{sat} = 1 \times 10^{-4}\text{ cm}^2$
SET	1, 2, 3, 4	25 °C, LET = 119 MeV.cm ² /mg, trigger = ±5 mV $V_{CC} = 5\text{ V}$, $V_{IN} = 2.5\text{ V} \pm 2.5\text{ V}$, $f_{IN} = 50\text{ kHz}$, $V_{CC} = 15\text{ V}$, $V_{IN} = 7.5\text{ V} \pm 7.5\text{ V}$, $f_{IN} = 100\text{ kHz}$	No event

5.3 Radiation drivers

Table 8. Radiation drivers

RPN	Description	Class	Test vehicle
HCC4001B	Rad-hard quad 2-input NOR gate	3	HCC4093B
HCC4002B	Rad-hard dual 4-input NOR gate	3	HCC4093B
HCC4011B	Rad-hard quad 2-input NAND gate	3	HCC4093B
HCC4013B	Rad-hard dual D flip-flop	3	HCC4093B
HCC4014B	Rad-hard 8-stage static synchronous shift register	1	HCC4014B
HCC4015B	Rad-hard dual 4-stage static shift register	1	HCC4014B
HCC4017B	Rad-hard decade counter/divider	2	HCC4017B
HCC4018B	Rad-hard presettable divide-by N counter	2	HCC4017B
HCC4019B	Rad-hard quad AND/OR select gate	3	HCC4093B
HCC4020B	Rad-hard 14-stage binary/ripple counter	4	HCC4020B
HCC4021B	Rad-hard 8-stage static shift register	1	HCC4014B
HCC4022B	Rad-hard divide-by-8 counter/divider	2	HCC4017B
HCC4024B	Rad-hard 7-stage binary/ripple counter	4	HCC4020B
HCC4027B	Rad-hard dual J-K master-slave flip-flop	3	HCC4093B
HCC4028B	Rad-hard BCD-to-decimal decoder	3	HCC4093B
HCC4029B	Rad-hard presettable up/down counter	3	HCC4093B
HCC4030B	Rad-hard quad exclusive OR gate	3	HCC4093B
HCC4040B	Rad-hard 12-stage binary/ripple counter	4	HCC4020B
HCC4041UB	Rad-hard quad true/complement buffer	3	HCC4093B
HCC4043B	Rad-hard quad 3-state NOR R/S latch	3	HCC4093B
HCC4046B	Rad-hard micropower phase locker loop	3	HCC4093B
HCC4047B	Rad-hard monostable/astable multivibrator	3	HCC4093B
HCC4049UB	Rad-hard hex inverting buffer/converter	3	HCC4093B
HCC4050B	Rad-hard hex non-inverting buffer/converter	3	HCC4093B
HCC4051B	Rad-hard single 8-channel analog mux/demux	3	HCC4093B
HCC4052B	Rad-hard different 4-channel analog mux/demux	3	HCC4093B
HCC4053B	Rad-hard triple 2-channel analog mux/demux	3	HCC4093B
HCC4060B	Rad-hard 14-stage counter/divider AND oscillator	2	HCC4017B
HCC4063B	Rad-hard 4-bit magnitude comparator	3	HCC4093B
HCC4066B	Rad-hard quad bilateral switch	3	HCC4093B
HCC4067B	Rad-hard single 16-channel analog mux/demux	3	HCC4093B
HCC4068B	Rad-hard 8-input NAND/AND gate	3	HCC4093B
HCC4069UB	Rad-hard hex inverter	3	HCC4093B
HCC4070B	Rad-hard quad exclusive OR gate	3	HCC4093B
HCC4071B	Rad-hard quad 2-input OR gate	3	HCC4093B
HCC4072B	Rad-hard dual 4-input OR gate	3	HCC4093B
HCC4073B	Rad-hard triple 3-input AND gate	3	HCC4093B
HCC4075B	Rad-hard triple 3-input OR gate	3	HCC4093B

RPN	Description	Class	Test vehicle
HCC4077B	Rad-hard quad exclusive NOR gate	3	HCC4093B
HCC4081B	Rad-hard quad 2-input AND gate	3	HCC4093B
HCC4093B	Rad-hard quad 2-input NAND Schmitt trigger	3	HCC4093B
HCC4094B	Rad-hard 8-stage shift-and-store bus register	1	HCC4014B
HCC4098B	Rad-hard dual monostable multivibrator	3	HCC4093B
HCC40103B	Rad-hard presettable 8-bit binary down counter	3	HCC4093B
HCC40106B	Rad-hard hex Schmitt trigger	3	HCC4093B
HCC40109B	Rad-hard quad low-to-high voltage level shifter	3	HCC4093B
HCC40174B	Rad-hard hex D flip-flop	3	HCC4093B
HCC4503B	Rad-hard hex buffer 3-state	3	HCC4093B
HCC4512B	Rad-hard 8-channel data select with 3-state output	3	HCC4093B
HCC4514B	Rad-hard 4-bit latch/4-to-16 line decoder output high	3	HCC4093B
HCC4516B	Rad-hard presettable 4-bit binary up/down counter	3	HCC4093B
HCC4520B	Rad-hard dual binary up-down counter	3	HCC4093B
HCC4538B	Rad-hard dual precision monostable multivibrator	3	HCC4093B
HCC4555B	Rad-hard dual 1-of-4 decoder/demux output high	3	HCC4093B
HCC4556B	Rad-hard dual 1-of-4 decoder/demux output low	3	HCC4093B

6 Package information

In order to meet environmental requirements, ST offers these devices in different grades of **ECOPACK** packages, depending on their level of environmental compliance. ECOPACK specifications, grade definitions and product status are available at: www.st.com. ECOPACK is an ST trademark.

6.1 Ceramic Flat-14E package information

Figure 4. Ceramic Flat-14E package outline

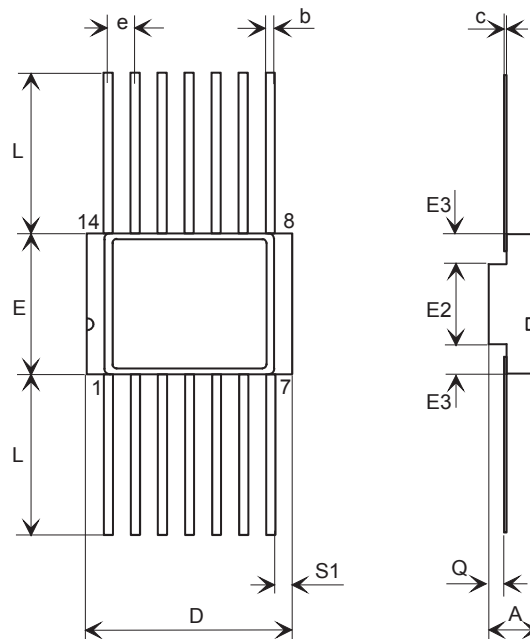


Table 9. Ceramic Flat-14E mechanical data

Symbol	Dimensions (mm)			Dimensions (inches)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.31		2.72	0.091		0.107
b	0.38		0.48	0.015		0.019
c	0.10		0.18	0.004		0.007
D	9.27		9.73	0.365		0.383
E	6.19		6.50	0.244		0.256
E2		3.68			0.145	
E3	0.76			0.030		
e		1.27			0.050	
L	6.86		7.62	0.250		0.300
Q	0.66		1.14	0.026		0.045
S1	0.13			0.005		

6.2 Ceramic Flat-16E package information

Figure 5. Ceramic Flat-16E package outline

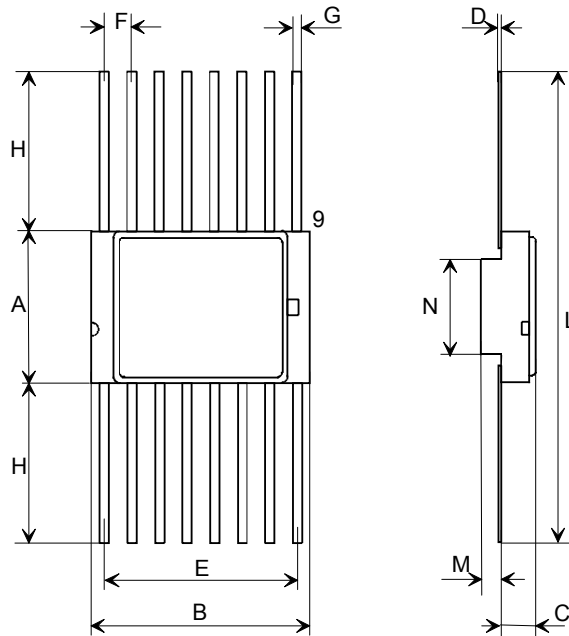
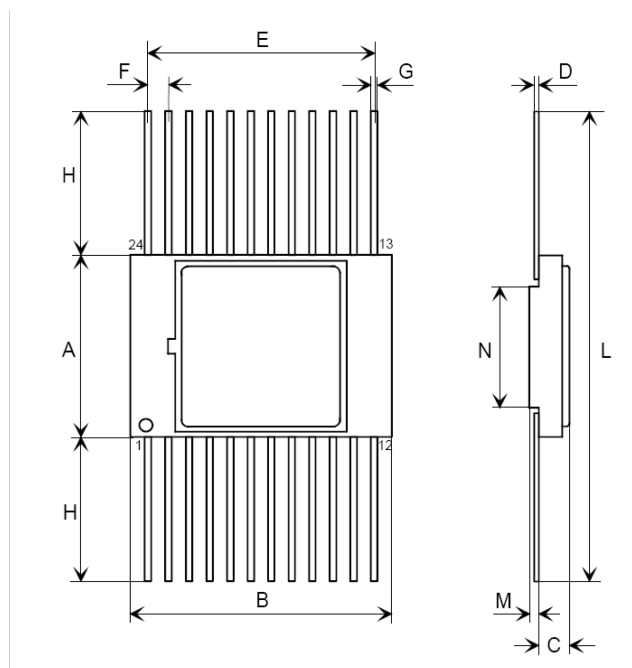


Table 10. Ceramic Flat-16E package mechanical data

Symbol	Dimensions (mm)			Dimensions (inches)		
	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	0.391	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			0.236		
L	18.75		22.0	0.738		0.866
M	0.33	0.38	0.43	0.013	0.015	0.017
N		4.31			0.170	

6.3 Ceramic Flat-24 package information

Figure 6. Ceramic Flat-24 package outline



1. The upper metallic lid is not electrically connected to any pins, nor to the IC die inside the package. Connecting unused pins or metal lid to ground or to the power supply does not affect the electrical characteristics.

Table 11. Ceramic Flat-24 package mechanical data

Symbol	Dimensions (mm)		
	Min.	Typ.	Max.
A	10.70	11.00	11.30
B	15.30	15.49	15.70
C	1.45		1.90
D	0.23	0.254	0.30
E	13.84	13.97	14.10
F	1.22	1.27	1.32
G	0.45	0.508	0.55
H	7.25		8.25
L	25.00		28.00
M	0.45	0.508	0.55
N		7.01	

Lead finishing is provided below. It is compliant with ECSS23500 iss8.

- Gold finish: gold plating. Minimum thickness: 60 mils
- Solder dip finish: Sn63Pb37 plating. Minimum thickness: 100 mils

6.4 Ceramic DIL-14 package information

Figure 7. Ceramic DIL-14 package outline

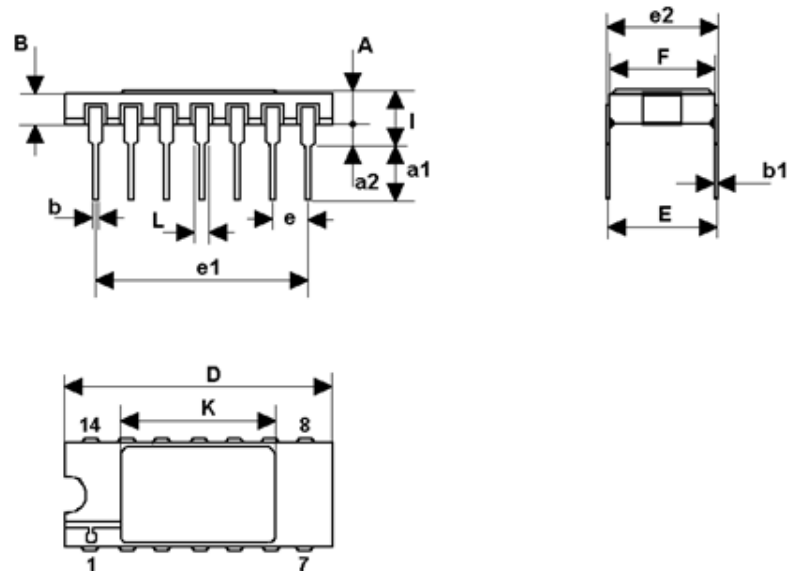


Table 12. Ceramic DIL-14 package mechanical data

Symbol	Dimensions (mm)			Dimensions (inches)		
	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

6.5 Ceramic DIL-16 package information

Figure 8. Ceramic DIL-16 package outline

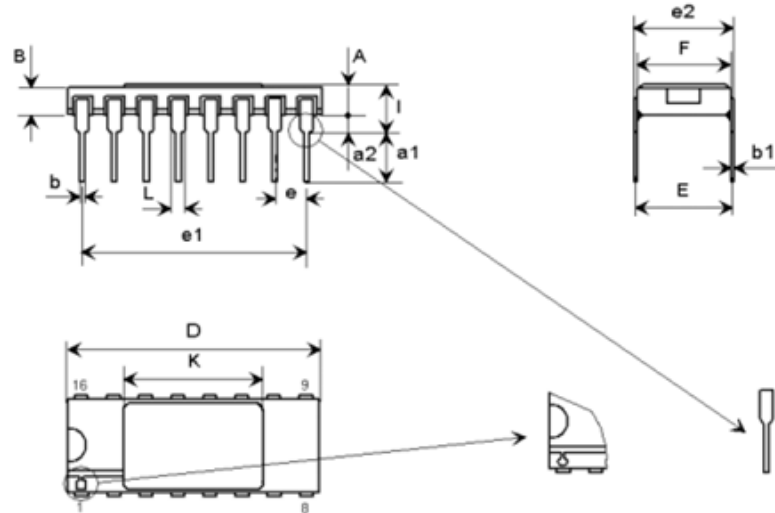


Table 13. Ceramic DIL-16 package mechanical data

Symbol	Dimensions(mm)			Dimensions (inches)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.71	0.083		0.107
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		2.39	0.072		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	20.06	20.32	20.58	0.790	0.800	0.810
E	7.36	7.62	7.87	0.290	0.300	0.310
e		2.54			0.100	
e1	17.65	17.78	17.90	0.695	0.700	0.705
e2	7.62	7.87	8.12	0.300	0.310	0.320
F	7.29	7.49	7.70	0.287	0.295	0.303
I			3.83			0.151
K	10.90		12.10	0.429		0.476
L	1.14		1.50	0.045		0.059

6.6 Ceramic DIL-24W package information

Figure 9. Ceramic DIL-24W package outline

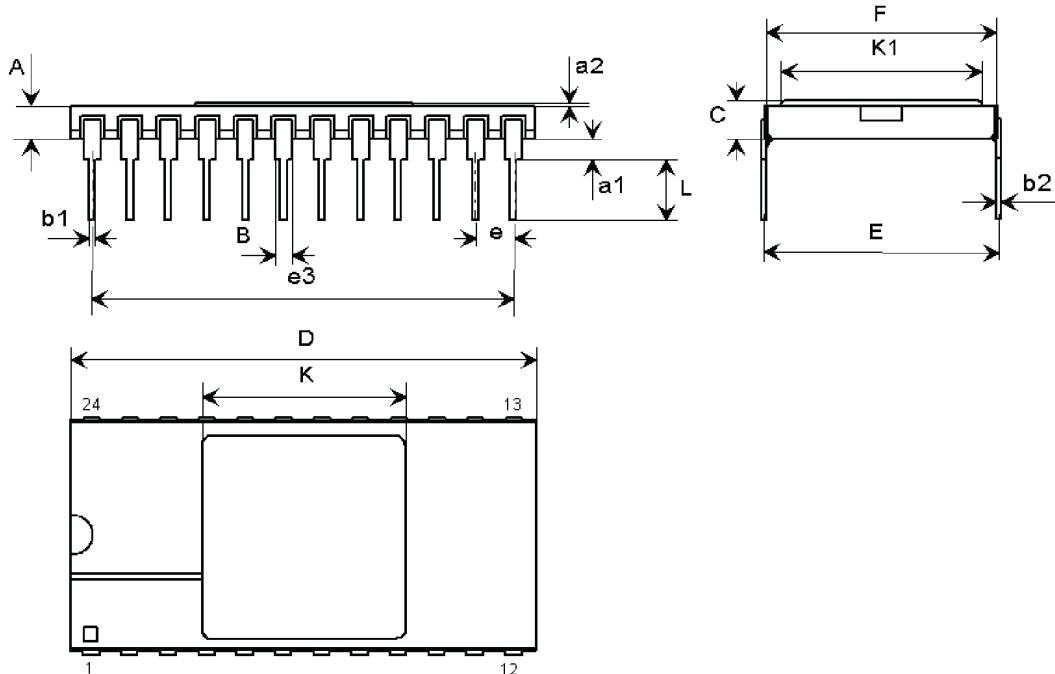


Table 14. Ceramic DIL-24W package mechanical data

Symbol	Dimensions (mm)		
	Min.	Typ.	Max.
A	2.159	1.931	2.387
a1	1.270	1.016	1.524
a2	0.307	0.274	0.340
B	1.270		
b1	0.457	0.407	0.507
b2	0.254	0.229	0.304
C	2.466	2.205	2.727
D	30.48	30.17	30.78
E	15.24	14.98	15.49
e	2.540	2.410	2.670
e3	27.94	27.81	28.06
F	15.11	14.85	15.36
K	12.80	12.60	13.00
K1	12.80	12.60	13.00
L	3.300	3.300	3.800

Lead finishing is provided below. It is compliant with ECSS23500 iss8.

- Gold finish: gold plating. Minimum thickness: 60 mils
- Solder dip finish: Sn63Pb37 plating. Minimum thickness: 100 mils

7 Ordering information

Table 15. Ordering information

ST part number	ESCC part number	Quality level	Package	Finishing	Marking ⁽¹⁾	Packing	Mass g
HCC4001BK1	-	Engineering Model	Flat-14E	Gold	HCC4001BK1	Strip pack	0.48
HCC4001BKG	920104101	ESCC	Flat-14E	Gold	920104101	Strip pack	0.48
HCC4001BKT	920104102	ESCC	Flat-14E	Solder dip	920104102	Strip pack	0.48
HCC4001BDG	920104103	ESCC	DIL-14	Gold	920104103	Strip pack	1.26
HCC4001BDT	920104104	ESCC	DIL-14	Solder dip	920104104	Strip pack	1.26
HCC4002BK1	-	Engineering Model	Flat-14E	Gold	HCC4002BK1	Strip pack	0.48
HCC4002BKG	920104201	ESCC	Flat-14E	Gold	920104201	Strip pack	0.48
HCC4002BKT	920104202	ESCC	Flat-14E	Solder dip	920104202	Strip pack	0.48
HCC4002BDG	920104203	ESCC	DIL-14	Gold	920104203	Strip pack	1.26
HCC4002BDT	920104204	ESCC	DIL-14	Solder dip	920104204	Strip pack	1.26
HCC4011BK1	-	Engineering Model	Flat-14E	Gold	HCC4011BK1	Strip pack	0.48
HCC4011BKG	920104301	ESCC	Flat-14E	Gold	920104301	Strip pack	0.48
HCC4011BKT	920104302	ESCC	Flat-14E	Solder dip	920104302	Strip pack	0.48
HCC4011BDG	920104303	ESCC	DIL-14	Gold	920104303	Strip pack	1.26
HCC4011BDT	920104304	ESCC	DIL-14	Solder dip	920104304	Strip pack	1.26
HCC4013BK1	-	Engineering Model	Flat-14E	Gold	HCC4013BK1	Strip pack	0.48
HCC4013BKG	920302301	ESCC	Flat-14E	Gold	920302301	Strip pack	0.48
HCC4013BKT	920302302	ESCC	Flat-14E	Solder dip	920302302	Strip pack	0.48
HCC4013BDG	920302303	ESCC	DIL-14	Gold	920302303	Strip pack	1.26
HCC4013BDT	920302304	ESCC	DIL-14	Solder dip	920302304	Strip pack	1.26
HCC4014BK1	-	Engineering Model	Flat-16E	Gold	HCC4014BK1	Strip pack	0.50
HCC4014BKG	930601401	ESCC	Flat-16E	Gold	930601401	Strip pack	0.50
HCC4014BKT	930601402	ESCC	Flat-16E	Solder dip	930601402	Strip pack	0.50
HCC4014BDG	930601408	ESCC	DIL-16	Gold	930601408	Strip pack	1.40
HCC4014BDT	930601409	ESCC	DIL-16	Solder dip	930601409	Strip pack	1.40
HCC4015BK1	-	Engineering Model	Flat-16E	Gold	HCC4015BK1	Strip pack	0.50
HCC4015BKG	930601501	ESCC	Flat-16E	Gold	930601501	Strip pack	0.50
HCC4015BKT	930601502	ESCC	Flat-16E	Solder dip	930601502	Strip pack	0.50
HCC4015BDG	930601508	ESCC	DIL-16	Gold	930601508	Strip pack	1.40
HCC4015BDT	930601509	ESCC	DIL-16	Solder dip	930601509	Strip pack	1.40
HCC4017BK1	-	Engineering Model	Flat-16E	Gold	HCC4017BK1	Strip pack	0.50
HCC4017BKG	920402001	ESCC	Flat-16E	Gold	920402001	Strip pack	0.50
HCC4017BKT	920402002	ESCC	Flat-16E	Solder dip	920402002	Strip pack	0.50



ST part number	ESCC part number	Quality level	Package	Finishing	Marking ⁽¹⁾	Packing	Mass g
HCC4018BK1	-	Engineering Model	Flat-16E	Gold	HCC4018BK1	Strip pack	0.50
HCC4018BKG	920402101	ESCC	Flat-16E	Gold	920402101	Strip pack	0.50
HCC4018BKT	920402102	ESCC	Flat-16E	Solder dip	920402102	Strip pack	0.50
HCC4019BK1	-	Engineering Model	Flat-16E	Gold	HCC4019BK1	Strip pack	0.50
HCC4019BKG	920205101	ESCC	Flat-16E	Gold	920205101	Strip pack	0.50
HCC4019BKT	920205102	ESCC	Flat-16E	Solder dip	920205102	Strip pack	0.50
HCC4020BK1	-	Engineering Model	Flat-16E	Gold	HCC4020BK1	Strip pack	0.50
HCC4020BKG	920402201	ESCC	Flat-16E	Gold	920402201	Strip pack	0.50
HCC4020BKT	920402202	ESCC	Flat-16E	Solder dip	920402202	Strip pack	0.50
HCC4021BK1	-	Engineering Model	Flat-16E	Gold	HCC4021BK1	Strip pack	0.50
HCC4021BKG	930601601	ESCC	Flat-16E	Gold	930601601	Strip pack	0.50
HCC4021BKT	930601602	ESCC	Flat-16E	Solder dip	930601602	Strip pack	0.50
HCC4022BK1	-	Engineering Model	Flat-16E	Gold	HCC4022BK1	Strip pack	0.50
HCC4022BKG	920402301	ESCC	Flat-16E	Gold	920402301	Strip pack	0.50
HCC4022BKT	920402302	ESCC	Flat-16E	Solder dip	920402302	Strip pack	0.50
HCC4024BK1	-	Engineering Model	Flat-14E	Gold	HCC4024BK1	Strip pack	0.48
HCC4024BKG	920402401	ESCC	Flat-14E	Gold	920402401	Strip pack	0.48
HCC4024BKT	920402402	ESCC	Flat-14E	Solder dip	920402402	Strip pack	0.48
HCC4024BDG	920402403	ESCC	DIL-14	Gold	920402403	Strip pack	1.26
HCC4024BDT	920402404	ESCC	DIL-14	Solder dip	920402404	Strip pack	1.26
HCC4027BK1	-	Engineering Model	Flat-16E	Gold	HCC4027BK1	Strip pack	0.50
HCC4027BKG	920302201	ESCC	Flat-16E	Gold	920302201	Strip pack	0.50
HCC4027BKT	920302202	ESCC	Flat-16E	Solder dip	920302202	Strip pack	0.50
HCC4027BDG	920302208	ESCC	DIL-16	Gold	920302208	Strip pack	1.40
HCC4027BDT	920302209	ESCC	DIL-16	Solder dip	920302209	Strip pack	1.40
HCC4028BK1	-	Engineering Model	Flat-16E	Gold	HCC4028BK1	Strip pack	0.50
HCC4028BKG	920501001	ESCC	Flat-16E	Gold	920501001	Strip pack	0.50
HCC4028BKT	920501002	ESCC	Flat-16E	Solder dip	920501002	Strip pack	0.50
HCC4029BK1	-	Engineering Model	Flat-16E	Gold	HCC4029BK1	Strip pack	0.50
HCC4029BKG	920402501	ESCC	Flat-16E	Gold	920402501	Strip pack	0.50
HCC4029BKT	920402502	ESCC	Flat-16E	Solder dip	920402502	Strip pack	0.50
HCC4029BDG	920402508	ESCC	DIL-16	Gold	920402508	Strip pack	1.40
HCC4029BDT	920402509	ESCC	DIL-16	Solder dip	920402509	Strip pack	1.40
HCC4030BK1	-	Engineering Model	Flat-14E	Gold	HCC4030BK1	Strip pack	0.48
HCC4030BKG	920104701	ESCC	Flat-14E	Gold	920104701	Strip pack	0.48



ST part number	ESCC part number	Quality level	Package	Finishing	Marking ⁽¹⁾	Packing	Mass g
HCC4030BKT	920104702	ESCC	Flat-14E	Solder dip	920104702	Strip pack	0.48
HCC4030BDG	920104703	ESCC	DIL-14	Gold	920104703	Strip pack	1.26
HCC4030BDT	920104704	ESCC	DIL-14	Solder dip	920104704	Strip pack	1.26
HCC4040BK1	-	Engineering Model	Flat-16E	Gold	HCC4040BK1	Strip pack	0.50
HCC4040BKG	920402601	ESCC	Flat-16E	Gold	920402601	Strip pack	0.50
HCC4040BKT	920402602	ESCC	Flat-16E	Solder dip	920402602	Strip pack	0.50
HCC4040BDG	920402608	ESCC	DIL-16	Gold	920402608	Strip pack	1.40
HCC4040BDT	920402609	ESCC	DIL-16	Solder dip	920402609	Strip pack	1.40
HCC4041UBK1	-	Engineering Model	Flat-14E	Gold	HCC4041UBK1	Strip pack	0.48
HCC4041UBKG	920204001	ESCC	Flat-14E	Gold	920204001	Strip pack	0.48
HCC4041UBKT	920204002	ESCC	Flat-14E	Solder dip	920204002	Strip pack	0.48
HCC4043BK1	-	Engineering Model	Flat-16E	Gold	HCC4043BK1	Strip pack	0.50
HCC4043BKG	920204201	ESCC	Flat-16E	Gold	920204201	Strip pack	0.50
HCC4043BKT	920204202	ESCC	Flat-16E	Solder dip	920204202	Strip pack	0.50
HCC4043BDG	920204208	ESCC	DIL-16	Gold	920204208	Strip pack	1.40
HCC4043BDT	920204209	ESCC	DIL-16	Solder dip	920204209	Strip pack	1.40
HCC4046BK1	-	Engineering Model	Flat-16E	Gold	HCC4046BK1	Strip pack	0.50
HCC4046BKG	920204401	ESCC	Flat-16E	Gold	920204401	Strip pack	0.50
HCC4046BKT	920204402	ESCC	Flat-16E	Solder dip	920204402	Strip pack	0.50
HCC4046BDG	920204408	ESCC	DIL-16	Gold	920204408	Strip pack	1.40
HCC4046BDT	920204409	ESCC	DIL-16	Solder dip	920204409	Strip pack	1.40
HCC4047BK1	-	Engineering Model	Flat-14E	Gold	HCC4047BK1	Strip pack	0.48
HCC4047BKG	920700301	ESCC	Flat-14E	Gold	920700301	Strip pack	0.48
HCC4047BKT	920700302	ESCC	Flat-14E	Solder dip	920700302	Strip pack	0.48
HCC4047BDG	920700303	ESCC	DIL-14	Gold	920700303	Strip pack	1.26
HCC4047BDT	920700304	ESCC	DIL-14	Solder dip	920700304	Strip pack	1.26
HCC4049UBK1	-	Engineering Model	Flat-16E	Gold	HCC4049UBK1	Strip pack	0.50
HCC4049UBKG	920204501	ESCC	Flat-16E	Gold	920204501	Strip pack	0.50
HCC4049UBKT	920204502	ESCC	Flat-16E	Solder dip	920204502	Strip pack	0.50
HCC4049UBDG	920204508	ESCC	DIL-16	Gold	920204508	Strip pack	1.40
HCC4049UBDT	920204509	ESCC	DIL-16	Solder dip	920204509	Strip pack	1.40
HCC4050BK1	-	Engineering Model	Flat-16E	Gold	HCC4050BK1	Strip pack	0.50
HCC4050BKG	920204601	ESCC	Flat-16E	Gold	920204601	Strip pack	0.50
HCC4050BKT	920204602	ESCC	Flat-16E	Solder dip	920204602	Strip pack	0.50
HCC4050BDG	920204608	ESCC	DIL-16	Gold	920204608	Strip pack	1.40
HCC4050BDT	920204609	ESCC	DIL-16	Solder dip	920204609	Strip pack	1.40



ST part number	ESCC part number	Quality level	Package	Finishing	Marking ⁽¹⁾	Packing	Mass g
HCC4051BK1	-	Engineering Model	Flat-16E	Gold	HCC4051BK1	Strip pack	0.50
HCC4051BKG	920204701	ESCC	Flat-16E	Gold	920204701	Strip pack	0.50
HCC4051BKT	920204702	ESCC	Flat-16E	Solder dip	920204702	Strip pack	0.50
HCC4051BDG	920204708	ESCC	DIL-16	Gold	920204708	Strip pack	1.40
HCC4051BDT	920204709	ESCC	DIL-16	Solder dip	920204709	Strip pack	1.40
HCC4052BK1	-	Engineering Model	Flat-16E	Gold	HCC4052BK1	Strip pack	0.50
HCC4052BKG	920204801	ESCC	Flat-16E	Gold	920204801	Strip pack	0.50
HCC4052BKT	920204802	ESCC	Flat-16E	Solder dip	920204802	Strip pack	0.50
HCC4052BDG	920204808	ESCC	DIL-16	Gold	920204808	Strip pack	1.40
HCC4052BDT	920204809	ESCC	DIL-16	Solder dip	920204809	Strip pack	1.40
HCC4053BK1	-	Engineering Model	Flat-16E	Gold	HCC4053BK1	Strip pack	0.50
HCC4053BKG	920204901	ESCC	Flat-16E	Gold	920204901	Strip pack	0.50
HCC4053BKT	920204902	ESCC	Flat-16E	Solder dip	920204902	Strip pack	0.50
HCC4053BDG	920204908	ESCC	DIL-16	Gold	920204908	Strip pack	1.40
HCC4053BDT	920204909	ESCC	DIL-16	Solder dip	920204909	Strip pack	1.40
HCC4060BK1	-	Engineering Model	Flat-16E	Gold	HCC4060BK1	Strip pack	0.50
HCC4060BKG	920405201	ESCC	Flat-16E	Gold	920405201	Strip pack	0.50
HCC4060BKT	920405202	ESCC	Flat-16E	Solder dip	920405202	Strip pack	0.50
HCC4063BK1	-	Engineering Model	Flat-16E	Gold	HCC4063BK1	Strip pack	0.50
HCC4063BKG	920900101	ESCC	Flat-16E	Gold	920900101	Strip pack	0.50
HCC4063BKT	920900102	ESCC	Flat-16E	Solder dip	920900102	Strip pack	0.50
HCC4063BDG	920900108	ESCC	DIL-16	Gold	920900108	Strip pack	1.40
HCC4063BDT	920900109	ESCC	DIL-16	Solder dip	920900109	Strip pack	1.40
HCC4066BK1	-	Engineering Model	Flat-14E	Gold	HCC4066BK1	Strip pack	0.48
HCC4066BKG	940800501	ESCC	Flat-14E	Gold	940800501	Strip pack	0.48
HCC4066BKT	940800502	ESCC	Flat-14E	Solder dip	940800502	Strip pack	0.48
HCC4066BDG	940800503	ESCC	DIL-14	Gold	940800503	Strip pack	1.26
HCC4066BDT	940800504	ESCC	DIL-14	Solder dip	940800504	Strip pack	1.26
HCC4067BK1	-	Engineering Model	Flat-24	Gold	HCC4067BK1	Strip pack	1.50
HCC4067BKG	940800901	ESCC	Flat-24	Gold	940800901	Strip pack	1.50
HCC4067BKT	940800902	ESCC	Flat-24	Solder dip	940800902	Strip pack	1.50
HCC4067BDG	940800903	ESCC	DIL-24	Gold	940800903	Strip pack	2.10
HCC4067BDT	940800904	ESCC	DIL-24	Solder dip	940800904	Strip pack	2.10
HCC4068BK1	-	Engineering Model	Flat-14E	Gold	HCC4068BK1	Strip pack	0.48
HCC4068BKG	920106101	ESCC	Flat-14E	Gold	920106101	Strip pack	0.48
HCC4068BKT	920106102	ESCC	Flat-14E	Solder dip	920106102	Strip pack	0.48



ST part number	ESCC part number	Quality level	Package	Finishing	Marking ⁽¹⁾	Packing	Mass g
HCC4069UBK1	-	Engineering Model	Flat-14E	Gold	HCC4069UBK1	Strip pack	0.48
HCC4069UBKG	940101001	ESCC	Flat-14E	Gold	940101001	Strip pack	0.48
HCC4069UBKT	940101002	ESCC	Flat-14E	Solder dip	940101002	Strip pack	0.48
HCC4070BK1	-	Engineering Model	Flat-14E	Gold	HCC4070BK1	Strip pack	0.48
HCC4070BKG	920104801	ESCC	Flat-14E	Gold	920104801	Strip pack	0.48
HCC4070BKT	920104802	ESCC	Flat-14E	Solder dip	920104802	Strip pack	0.48
HCC4070BDG	920104803	ESCC	DIL-14	Gold	920104803	Strip pack	1.26
HCC4070BDT	920104804	ESCC	DIL-14	Solder dip	920104804	Strip pack	1.26
HCC4071BK1	-	Engineering Model	Flat-14E	Gold	HCC4071BK1	Strip pack	0.48
HCC4071BKG	920106301	ESCC	Flat-14E	Gold	920106301	Strip pack	0.48
HCC4071BKT	920106302	ESCC	Flat-14E	Solder dip	920106302	Strip pack	0.48
HCC4071BDG	920106303	ESCC	DIL-14	Gold	920106303	Strip pack	1.26
HCC4071BDT	920106304	ESCC	DIL-14	Solder dip	920106304	Strip pack	1.26
HCC4072BK1	-	Engineering Model	Flat-14E	Gold	HCC4072BK1	Strip pack	0.48
HCC4072BKG	920108201	ESCC	Flat-14E	Gold	920108201	Strip pack	0.48
HCC4072BKT	920108202	ESCC	Flat-14E	Solder dip	920108202	Strip pack	0.48
HCC4072BDG	920108203	ESCC	DIL-14	Gold	920108203	Strip pack	1.26
HCC4072BDT	920108204	ESCC	DIL-14	Solder dip	920108204	Strip pack	1.26
HCC4073BK1	-	Engineering Model	Flat-14E	Gold	HCC4073BK1	Strip pack	0.48
HCC4073BKG	920106401	ESCC	Flat-14E	Gold	920106401	Strip pack	0.48
HCC4073BKT	920106402	ESCC	Flat-14E	Solder dip	920106402	Strip pack	0.48
HCC4073BDG	920106403	ESCC	DIL-14	Gold	920106403	Strip pack	1.26
HCC4073BDT	920106404	ESCC	DIL-14	Solder dip	920106404	Strip pack	1.26
HCC4075BK1	-	Engineering Model	Flat-14E	Gold	HCC4075BK1	Strip pack	0.48
HCC4075BKG	920106501	ESCC	Flat-14E	Gold	920106501	Strip pack	0.48
HCC4075BKT	920106502	ESCC	Flat-14E	Solder dip	920106502	Strip pack	0.48
HCC4077BK1	-	Engineering Model	Flat-14E	Gold	HCC4077BK1	Strip pack	0.48
HCC4077BKG	920105501	ESCC	Flat-14E	Gold	920105501	Strip pack	0.48
HCC4077BKT	920105502	ESCC	Flat-14E	Solder dip	920105502	Strip pack	0.48
HCC4077BDG	920105503	ESCC	DIL-14	Gold	920105503	Strip pack	1.26
HCC4077BDT	920105504	ESCC	DIL-14	Solder dip	920105504	Strip pack	1.26
HCC4081BK1	-	Engineering Model	Flat-14E	Gold	HCC4081BK1	Strip pack	0.48
HCC4081BKG	920105201	ESCC	Flat-14E	Gold	920105201	Strip pack	0.48
HCC4081BKT	920105202	ESCC	Flat-14E	Solder dip	920105202	Strip pack	0.48
HCC4081BDG	920105203	ESCC	DIL-14	Gold	920105203	Strip pack	1.26
HCC4081BDT	920105204	ESCC	DIL-14	Solder dip	920105204	Strip pack	1.26



ST part number	ESCC part number	Quality level	Package	Finishing	Marking ⁽¹⁾	Packing	Mass g
HCC4093BK1	-	Engineering Model	Flat-14E	Gold	HCC4093BK1	Strip pack	0.48
HCC4093BKG	940900201	ESCC	Flat-14E	Gold	940900201	Strip pack	0.48
HCC4093BKT	940900202	ESCC	Flat-14E	Solder dip	940900202	Strip pack	0.48
HCC4093BDG	940900203	ESCC	DIL-14	Gold	940900203	Strip pack	1.26
HCC4093BDT	940900204	ESCC	DIL-14	Solder dip	940900204	Strip pack	1.26
HCC4094BK1	-	Engineering Model	Flat-16E	Gold	HCC4094BK1	Strip pack	0.50
HCC4094BKG	930602601	ESCC	Flat-16E	Gold	930602601	Strip pack	0.50
HCC4094BKT	930602602	ESCC	Flat-16E	Solder dip	930602602	Strip pack	0.50
HCC4094BDG	930602608	ESCC	DIL-16	Gold	930602608	Strip pack	1.40
HCC4094BDT	930602609	ESCC	DIL-16	Solder dip	930602609	Strip pack	1.40
HCC4098BK1	-	Engineering Model	Flat-16E	Gold	HCC4098BK1	Strip pack	0.50
HCC4098BKG	920600301	ESCC	Flat-16E	Gold	920600301	Strip pack	0.50
HCC4098BKT	920600302	ESCC	Flat-16E	Solder dip	920600302	Strip pack	0.50
HCC4098BDG	920600308	ESCC	DIL-16	Gold	920600308	Strip pack	1.40
HCC4098BDT	920600309	ESCC	DIL-16	Solder dip	920600309	Strip pack	1.40
HCC40103BK1	-	Engineering Model	Flat-16E	Gold	HCC40103BK1	Strip pack	0.50
HCC40103BKG	920403601	ESCC	Flat-16E	Gold	920403601	Strip pack	0.50
HCC40103BKT	920403602	ESCC	Flat-16E	Solder dip	920403602	Strip pack	0.50
HCC40106BK1	-	Engineering Model	Flat-14E	Gold	HCC40106BK1	Strip pack	0.48
HCC40106BKG	940900501	ESCC	Flat-14E	Gold	940900501	Strip pack	0.48
HCC40106BKT	940900502	ESCC	Flat-14E	Solder dip	940900502	Strip pack	0.48
HCC40106BDG	940900503	ESCC	DIL-14	Gold	940900503	Strip pack	1.26
HCC40106BDT	940900504	ESCC	DIL-14	Solder dip	940900504	Strip pack	1.26
HCC40109BK1	-	Engineering Model	Flat-16E	Gold	HCC40109BK1	Strip pack	0.50
HCC40109BKG	940700301	ESCC	Flat-16E	Gold	940700301	Strip pack	0.50
HCC40109BKT	940700302	ESCC	Flat-16E	Solder dip	940700302	Strip pack	0.50
HCC40109BDG	940700308	ESCC	DIL-16	Gold	940700308	Strip pack	1.40
HCC40109BDT	940700309	ESCC	DIL-16	Solder dip	940700309	Strip pack	1.40
HCC40174BK1	-	Engineering Model	Flat-16E	Gold	HCC40174BK1	Strip pack	0.50
HCC40174BKG	920303801	ESCC	Flat-16E	Gold	920303801	Strip pack	0.50
HCC40174BKT	920303802	ESCC	Flat-16E	Solder dip	920303802	Strip pack	0.50
HCC4503BK1	-	Engineering Model	Flat-16E	Gold	HCC4503BK1	Strip pack	0.50
HCC4503BKG	940103001	ESCC	Flat-16E	Gold	940103001	Strip pack	0.50
HCC4503BKT	940103002	ESCC	Flat-16E	Solder dip	940103002	Strip pack	0.50
HCC4503BDG	940103008	ESCC	DIL-16	Gold	940103008	Strip pack	1.40
HCC4503BDT	940103009	ESCC	DIL-16	Solder dip	940103009	Strip pack	1.40



ST part number	ESCC part number	Quality level	Package	Finishing	Marking ⁽¹⁾	Packing	Mass g
HCC4512BK1	-	Engineering Model	Flat-16E	Gold	HCC4512BK1	Strip pack	0.50
HCC4512BKG	940800601	ESCC	Flat-16E	Gold	940800601	Strip pack	0.50
HCC4512BKT	940800602	ESCC	Flat-16E	Solder dip	940800602	Strip pack	0.50
HCC4514BK1	-	Engineering Model	Flat-24	Gold	HCC4514BK1	Strip pack	1.50
HCC4514BKG	940801201	ESCC	Flat-24	Gold	940801201	Strip pack	1.50
HCC4514BKT	940801202	ESCC	Flat-24	Solder dip	940801202	Strip pack	1.50
HCC4514BDG	940801203	ESCC	DIL-24	Gold	940801203	Strip pack	2.10
HCC4514BDT	940801204	ESCC	DIL-24	Solder dip	940801204	Strip pack	2.10
HCC4516BK1	-	Engineering Model	Flat-16E	Gold	HCC4516BK1	Strip pack	0.50
HCC4516BKG	920404501	ESCC	Flat-16E	Gold	920404501	Strip pack	0.50
HCC4516BKT	920404502	ESCC	Flat-16E	Solder dip	920404502	Strip pack	0.50
HCC4520BK1	-	Engineering Model	Flat-16E	Gold	HCC4520BK1	Strip pack	0.50
HCC4520BKG	920402801	ESCC	Flat-16E	Gold	920402801	Strip pack	0.50
HCC4520BKT	920402802	ESCC	Flat-16E	Solder dip	920402802	Strip pack	0.50
HCC4538BK1	-	Engineering Model	Flat-16E	Gold	HCC4538BK1	Strip pack	0.50
HCC4538BKG	920700701	ESCC	Flat-16E	Gold	920700701	Strip pack	0.50
HCC4538BKT	920700702	ESCC	Flat-16E	Solder dip	920700702	Strip pack	0.50
HCC4538BDG	920700708	ESCC	DIL-16	Gold	920700708	Strip pack	1.40
HCC4538BDT	920700709	ESCC	DIL-16	Solder dip	920700709	Strip pack	1.40
HCC4555BK1	-	Engineering Model	Flat-16E	Gold	HCC4555BK1	Strip pack	0.50
HCC4555BKG	940801101	ESCC	Flat-16E	Gold	940801101	Strip pack	0.50
HCC4555BKT	940801102	ESCC	Flat-16E	Solder dip	940801102	Strip pack	0.50
HCC4556BK1	-	Engineering Model	Flat-16E	Gold	HCC4556BK1	Strip pack	0.50
HCC4556BKG	940802501	ESCC	Flat-16E	Gold	940802501	Strip pack	0.50
HCC4556BKT	940802502	ESCC	Flat-16E	Solder dip	940802502	Strip pack	0.50

1. Specific markings only. See section 8.1 for complete marking.

Note: Contact your ST representative for information about the specific conditions for other versions and for products in die form.

8 Other information

8.1 Product marking and traceability

Figure 10. Product marking outline, flight model top view

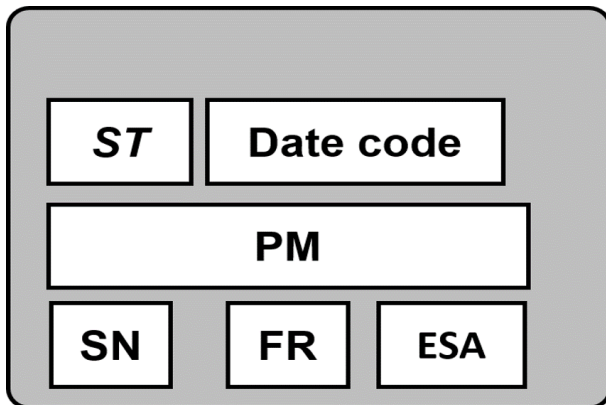


Figure 11. Product marking outline, engineering model top view

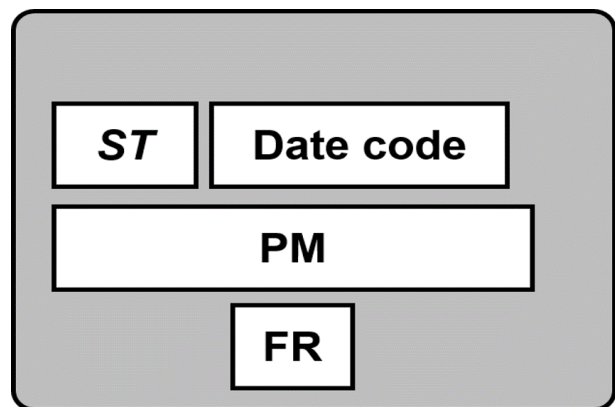


Table 16. Product marking description

Field	Model	Description
ST	Engineering and flight	Standard ST logo
PM	Engineering	Product part number
	Flight	ESCC part number
Datecode	Engineering	3yywwN ⁽¹⁾
	Flight	yywwN ⁽²⁾
SN	Flight	Serialization number
ESA	Flight	ESA logo
FR	Engineering and flight	Country of origin

1. yy = year; ww = week; N = alfa-numeric digit for lot of week; 3 = EM type

2. yy = year; ww = week; N = alfa-numeric for lot of week

Note: Black dot marks terminal 1 position underneath.

8.2 Product documentation

Product documentation

Products are delivered with their default documentation and possibly optional documentation ordered separately. The documentation is provided on CD-ROMs shipped in an envelope placed in the shipment box of the parts. An additional paper copy of the certificate of conformance is provided in the envelope.

The documentation depends on the quality level of the parts, as described in the table below:

Table 17. Product documentation

Quality level	Documentation
Engineering model	Certificate of conformance including: <ul style="list-style-type: none"> • Customer name • Customer purchase order number • ST sales order number and item • ST commercial product code • Quantity delivered • Date code • Reference datasheet • Reference to TN1181 on engineering models • ST Rennes assembly lot ID
ESCC Flight	Certificate of conformance including: <ul style="list-style-type: none"> • Customer name • Customer purchase order number • ST sales order number and item • ST commercial product code • Quantity delivered • Date code • Serial numbers • Wafer diffusion plant location and wafer size • Wafer diffusion lot ID number and wafer ID number • Reference of the applicable ESCC qualification maintenance lot • Reference to the ESCC detail specification • ST Rennes assembly lot ID

Revision history

Table 18. Document revision history

Date	Revision	Changes
07-May-2024	1	Initial release.
22-May-2024	2	Updated maturity status link on the cover page.

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