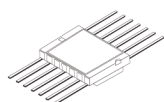
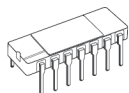


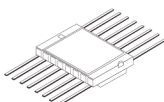
## Rad-hard high speed 2 to 6 V CMOS logic series



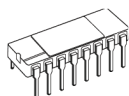
Flat-14E



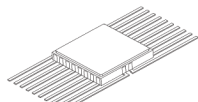
DIL-14



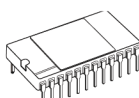
Flat-16E



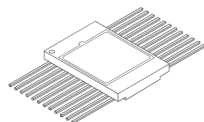
DIL-16



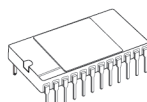
Flat-20E



DIL-20



Flat-24



DIL-24

The upper metallic lid is floating

### Features

- ESCC qualified
- 7 V Absolute maximum ratings
- 2 V to 6 V operating voltage for CMOS M54HCxxx series
- 4.5 V to 5.5 V operating voltage for TTL M54HCTxxx series
- Ceramic hermetic packages
- -55 °C to +125 °C operating temperature range
- Radiation hardness:
  - TID : 50 krad(Si)
  - SEL immune up to 125 MeV.cm<sup>2</sup>/mg
- ESCC qualified

### Description

The M54HCxxx and M54HCTxxx series is composed of CMOS functions specifically designed to meet the radiation requirements of the aerospace industry. They include a large set of gates, flip-flops, multiplexers, counters, bus interface and several other functions.

The maximum operating frequency of the HC/HCT series varies between 20 to 55 MHz at 4.5 V and 25 °C depending on the products.

All types of the series feature a total dose hardness at 50 krad(Si), a high single event latch-up (SEL) immunity and a wide operating temperature range.

Housed in ceramic hermetic packages, all the products of the series are ESCC qualified, making them ideally suited for use in space and other harsh environmental conditions.

The complete specification of each type is available from the ESCC web site: <https://escies.org> using its ESCC part number.

Dedicated technical notes provide additional information on:

- [TN1181](#): Engineering model quality level
- [TN0873](#): Manufacturing and quality specification of products in die form
- [TN1292](#): 100 krad(Si) versions
- [TN0985](#): "Class S equivalent" flow specification, for use of ESCC products in a MIL-STD-883 environment.

#### Product status link

[M54HCxxx, M54HCTxxx](#)

# 1 Device summary

**Table 1. Device summary**

| Part number     | Description                                            | F <sub>max</sub> <sup>(1)</sup><br>[MHz] | TID<br>[krad(Si)] | SEL/SET/SEU<br>threshold<br>[MeV.cm2/mg] | ESCC detail<br>specification <sup>(2)</sup> | Package          |
|-----------------|--------------------------------------------------------|------------------------------------------|-------------------|------------------------------------------|---------------------------------------------|------------------|
| <b>HC Logic</b> |                                                        |                                          |                   |                                          |                                             |                  |
| M54HC00         | Quad 2-input NAND gate                                 | 55                                       | 50                | 125/15/-                                 | 9201/105                                    | Flat-14E; DIL-14 |
| M54HC02         | Quad 2-input NOR gate                                  | 55                                       |                   | 125/15/-                                 | 9201/113                                    | Flat-14E; DIL-14 |
| M54HC03         | Quad 2-input NAND Open drain                           | 40                                       |                   | 125/15/-                                 | 9201/114                                    | Flat-14E; DIL-14 |
| M54HC04         | Hex inverter                                           | 52                                       |                   | 125/15/-                                 | 9401/033                                    | Flat-14E; DIL-14 |
| M54HC08         | Quad 2-input AND gate                                  | 41                                       |                   | 125/15/-                                 | 9201/106                                    | Flat-14E; DIL-14 |
| M54HC10         | Triple 3-input NAND gate                               | 50                                       |                   | 125/15/-                                 | 9201/107                                    | Flat-14E; DIL-14 |
| M54HC11         | Triple 3-input AND gate                                | 40                                       |                   | 125/15/-                                 | 9201/117                                    | Flat-14E; DIL-14 |
| M54HC14         | Hex Schmitt inverter                                   | 35                                       |                   | 125/18/-                                 | 9409/007                                    | Flat-14E; DIL-14 |
| M54HC27         | Triple 3-input NOR gate                                | 52                                       |                   | 125/15/-                                 | 9201/109                                    | Flat-14E; DIL-14 |
| M54HC32         | Quad 2-input OR gate                                   | 50                                       |                   | 125/15/-                                 | 9201/111                                    | Flat-14E; DIL-14 |
| M54HC74         | Dual D-type flip-flop with preset & clear              | 25                                       |                   | 125/18/-                                 | 9203/050                                    | Flat-14E; DIL-14 |
| M54HC85         | 4-bit magnitude comparator                             | 21                                       |                   | 125/15/-                                 | 9209/004                                    | Flat-16E; DIL-16 |
| M54HC86         | Quad exclusive OR gate                                 | 41                                       |                   | 125/15/-                                 | 9201/119                                    | Flat-14E; DIL-14 |
| M54HC109        | Dual J-K flip-flop with preset & clear                 | 27                                       |                   | 125/18/-                                 | 9306/048                                    | Flat-16E; DIL-16 |
| M54HC123        | Dual retriggerable monostable multivibrator with clear | 15                                       |                   | 125/18/-                                 | 9207/006                                    | Flat-16E; DIL-16 |
| M54HC125        | Quad bus buffer 3-state                                | 50                                       |                   | 125/14/-                                 | 9401/039                                    | Flat-14E; DIL-14 |
| M54HC132        | Quad 2-input Schmitt NAND gate                         | 40                                       |                   | 125/18/-                                 | 9201/120                                    | Flat-14E; DIL-14 |
| M54HC138        | 3-to-8 line decoder inverter                           | 25                                       |                   | 125/15/-                                 | 9408/046                                    | Flat-16E; DIL-16 |
| M54HC139        | Dual 2-to-4 line decoder/demultiplexer                 | 22                                       |                   | 125/15/-                                 | 9205/017                                    | Flat-16E; DIL-16 |
| M54HC148        | 8-to-3 line priority encoder                           | 21                                       |                   | 125/15/-                                 | 9410/017                                    | Flat-16E; DIL-16 |
| M54HC151        | 8-channel multiplexer                                  | 23                                       |                   | 125/15/-                                 | 9408/054                                    | Flat-16E; DIL-16 |
| M54HC153        | Dual 4-channel multiplexer                             | 34                                       |                   | 125/15/-                                 | 9408/038                                    | Flat-16E; DIL-16 |
| M54HC154        | 4-to-16 line decoder/demultiplexer                     | 25                                       |                   | 125/15/-                                 | 9205/023                                    | Flat-24E; DIL-24 |
| M54HC157        | Quad 2-channel multiplexer                             | 40                                       |                   | 125/15/-                                 | 9408/057                                    | Flat-16E; DIL-16 |
| M54HC160        | Synchronous decade counter with async. clear           | 25                                       |                   | 125/18/-                                 | 9205/062                                    | Flat-16E; DIL-16 |
| M54HC161        | Synchronous binary counter with async. clear           | 25                                       |                   | 125/18/-                                 | 9204/059                                    | Flat-16E; DIL-16 |
| M54HC164        | 8-bit SIPO shift register                              | 25                                       |                   | 125/18/-                                 | 9306/041                                    | Flat-14E; DIL-14 |
| M54HC165        | 8-bit PISO shift register                              | 25                                       |                   | 125/18/-                                 | 9306/042                                    | Flat-16E; DIL-16 |
| M54HC166        | 8-bit PISO shift register with clear                   | 25                                       |                   | 125/18/-                                 | 9306/043                                    | Flat-16E; DIL-16 |
| M54HC174        | Hex D-type flip-flop with clear                        | 27                                       |                   | 125/18/-                                 | 9306/052                                    | Flat-16E; DIL-16 |
| M54HC175        | Quad D-type flip-flop with clear                       | 30                                       |                   | 125/18/-                                 | 9203/052                                    | Flat-16E; DIL-16 |
| M54HC191        | 4-bit synchronous binary up/down counter               | 20                                       |                   | 125/18/-                                 | 9204/066                                    | Flat-16E; DIL-16 |
| M54HC193        | Synchronous up/down binary counter                     | 16                                       |                   | 125/18/-                                 | 9204/065                                    | Flat-16E; DIL-16 |
| M54HC237        | 3-to-8 line decoder latch                              | 21                                       |                   | 125/15/-                                 | 9205/021                                    | Flat-16E; DIL-16 |
| M54HC240        | Octal bus buffer 3-state inverter                      | 50                                       |                   | 125/14/-                                 | 9401/034                                    | Flat-20E; DIL-20 |

| Part number | Description                               | F <sub>max</sub> <sup>(1)</sup><br>[MHz] | TID<br>[krad(Si)] | SEL/SET/SEU<br>threshold<br>[MeV.cm2/mg] | ESCC detail<br>specification <sup>(2)</sup> | Package          |
|-------------|-------------------------------------------|------------------------------------------|-------------------|------------------------------------------|---------------------------------------------|------------------|
| M54HC244    | Octal bus buffer 3-state                  | 43                                       | 50                | 125/14/-                                 | 9401/048                                    | Flat-20E; DIL-20 |
| M54HC245    | Octal bus transceiver 3-state             | 50                                       |                   | 125/14/-                                 | 9405/013                                    | Flat-20E; DIL-20 |
| M54HC251    | 8-channel multiplexer 3-state             | 23                                       |                   | 125/14/-                                 | 9408/048                                    | Flat-16E; DIL-16 |
| M54HC257    | Quad 2-channel multiplexer 3-state        | 33                                       |                   | 125/14/-                                 | 9408/047                                    | Flat-16E         |
| M54HC259    | 8-bit addressable latch                   | 27                                       |                   | 125/18/-                                 | 9203/073                                    | Flat-16E         |
| M54HC273    | Octal D-type flip-flop with clear         | 27                                       |                   | 125/18/-                                 | 9203/053                                    | Flat-20E; DIL-20 |
| M54HC373    | Octal D-type latch 3-state                | 33                                       |                   | 125/18/-                                 | 9203/059                                    | Flat-20E; DIL-20 |
| M54HC374    | Octal D-type flip-flop 3-state            | 30                                       |                   | 125/18/-                                 | 9203/060                                    | Flat-20E; DIL-20 |
| M54HC393    | Dual binary counter                       | 25                                       |                   | 125/18/-                                 | 9204/074                                    | Flat-14E; DIL-14 |
| M54HC540    | Octal bus buffer 3-state inverter         | 40                                       |                   | 125/14/-                                 | 9401/049                                    | Flat-20E         |
| M54HC541    | Octal bus buffer 3-state                  | 40                                       |                   | 125/14/-                                 | 9401/047                                    | Flat-20E; DIL-20 |
| M54HC573    | Octal D-type latch 3-state                | 28                                       |                   | 125/18/-                                 | 9202/072                                    | Flat-20E; DIL-20 |
| M54HC574    | Octal D-type flip-flop 3-state            | 30                                       |                   | 125/18/-                                 | 9203/054                                    | Flat-20E; DIL-20 |
| M54HC595    | 8-bit shift register output latch 3-state | 27                                       |                   | 125/18/-                                 | 9306/051                                    | Flat-16E; DIL-16 |
| M54HC597    | 8-bit latch/shift register                | 27                                       |                   | 125/18/-                                 | 9306/054                                    | Flat-16E; DIL-16 |
| M54HC688    | 8-bit equality comparator                 | 23                                       |                   | 125/15/-                                 | 9209/005                                    | Flat-20E; DIL-20 |
| M54HC4020   | 14-stage binary counter                   | 25                                       |                   | 125/18/-                                 | 9204/070                                    | Flat-16E; DIL-16 |
| M54HC4040   | 12-stage binary counter                   | 25                                       |                   | 125/18/-                                 | 9204/069                                    | Flat-16E; DIL-16 |
| M54HC4049   | Hex buffer/converter inverter             | 50                                       |                   | 125/15/-                                 | 9401/037                                    | Flat-16E; DIL-16 |
| M54HC4050   | Hex buffer/converter                      | 50                                       |                   | 125/15/-                                 | 9401/038                                    | Flat-16E; DIL-16 |
| M54HC4051   | Single 8-channel analog mux/demux         | 83                                       |                   | 125/15/-                                 | 9408/064                                    | Flat-16E; DIL-16 |
| M54HC4053   | Triple 2-channel analog mux/demux         | 83                                       |                   | 125/15/-                                 | 9408/065                                    | Flat-16E; DIL-16 |
| M54HC4060   | 14-stage binary counter/oscillator        | 20                                       |                   | 125/18/-                                 | 9204/076                                    | Flat-16E; DIL-16 |
| M54HC4066   | Quad bilateral switch                     | 83                                       |                   | 125/15/-                                 | 9408/052                                    | Flat-14E; DIL-14 |
| M54HC4094   | 8-bit SIPO shift register 3-state         | 20                                       |                   | 125/18/-                                 | 9306/050                                    | Flat-16E; DIL-16 |
| M54HC4514   | 4-to-16 line decoder latch                | 18                                       |                   | 125/18/-                                 | 9205/019                                    | Flat-24E; DIL24  |
| HCT Logic   |                                           |                                          |                   |                                          |                                             |                  |
| M54HCT74    | Dual D-type flip-flop with preset & clear | 25                                       | 50                | 125/18/-                                 | 9203/070                                    | Flat-20E, DIL-20 |
| M54HCT244   | Octal bus buffer 3-state                  | 36                                       |                   | 125/14/-                                 | 9402/009                                    | Flat-20E, DIL-20 |
| M54HCT245   | Octal bus transceiver 3-state             | 36                                       |                   | 125/14/-                                 | 9405/014                                    | Flat-20E, DIL-20 |

1. Maximum frequency at 4.5 V / 25 °C as per JESD7a, provided for guidance only. Neither simulated, nor characterized in the successive fab transfers. Not tested in production.

JESD7a derating rules, also provided for guidance only, neither simulated, characterized nor tested in production are:

at 2.0 V / 25 °C : multiply F<sub>max</sub> @ 4.5 V by 0.2;

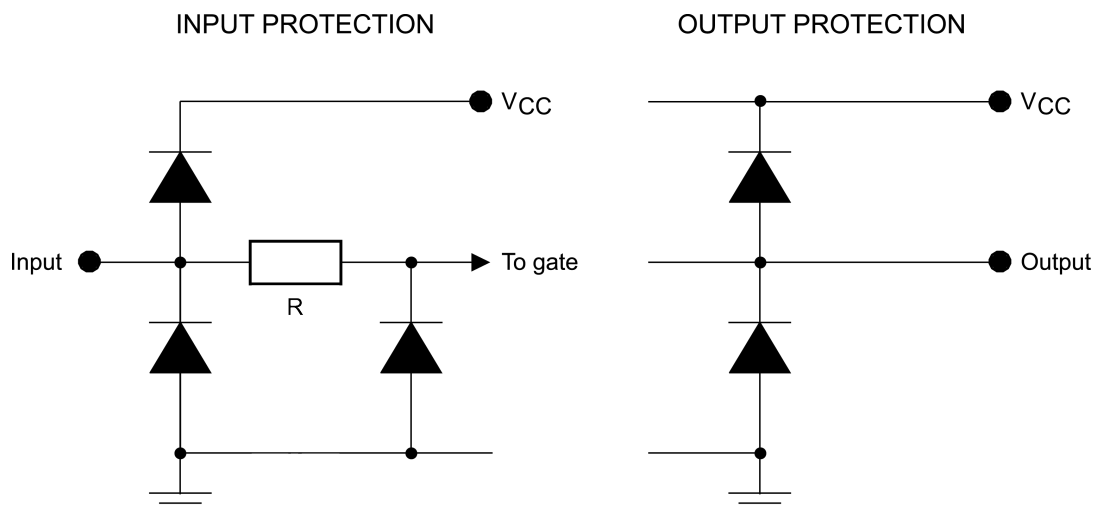
at 6.0 V / 25 °C: multiply F<sub>max</sub> @ 4.5 V by 1.18;

Over -55 to 125 °C : multiply F<sub>max</sub> @ 25 °C by 0.67 (worst case at 125 °C).

2. The ESCC specifications of each product can be obtained from the ESCIES search engine at <https://escies.org/specfamily/view> using the xxxx/xxx format provided in the table.

## 2 Input equivalent circuit diagram

Figure 1. Input and output equivalent circuit diagram



Note: For the 54HC4049 and the 54HC4050 input equivalent circuit, there is no diode connected to  $V_{CC}$ .

### 3 Absolute maximum ratings

**Table 2. Absolute maximum ratings - M54HC and M54HCT series**

| Symbol                | Parameter                    | Value                                 | Unit |
|-----------------------|------------------------------|---------------------------------------|------|
| $V_{CC}$              | Supply voltage               | -0.5 to +7 <sup>(1)</sup>             | V    |
| $V_I$                 | DC input voltage             | -0.5 to $V_{CC} + 0.5$ <sup>(2)</sup> | V    |
| $V_O$                 | DC output voltage            | -0.5 to $V_{CC} + 0.5$                | V    |
| $I_{IK}$              | DC input diode current       | $\pm 20$                              | mA   |
| $I_{OK}$              | DC output diode current      | $\pm 20$                              | mA   |
| $I_O$                 | DC output current            | $\pm 25$                              | mA   |
| $I_{CC}$ or $I_{GND}$ | DC VCC or ground current     | $\pm 50$                              | mA   |
| $P_D$ <sup>(3)</sup>  | Power dissipation            | 300                                   | mW   |
| $T_j$                 | Maximum junction temperature | 150                                   | °C   |
| $T_{stg}$             | Storage temperature          | -65 to +150                           | °C   |
| $T_L$                 | Lead temperature (10 sec.)   | 265                                   | °C   |

1. M54HC4066 : -0.5 to 13.0

2. For HC4049 and HC4050, the  $V_{CC}$  side diodes are designed to allows an absolute max rating of +15 V on the inputs.

3. 500 mW:  $\leq 65$  °C derate to 300 mW by 10 mW/°C: 65 °C to 85 °C.

**Table 3. Recommended operating conditions M54HC series**

| Symbol     | Parameter                                           | Value         | Unit |
|------------|-----------------------------------------------------|---------------|------|
| $V_{CC}$   | Supply voltage                                      | 2 to 6        | V    |
| $V_I$      | Input voltage                                       | 0 to $V_{CC}$ | V    |
| $V_O$      | Output voltage                                      | 0 to $V_{CC}$ | V    |
| $T_{op}$   | Operating temperature                               | -55 to 125    | °C   |
| $t_r, t_f$ | Input rise and fall time ( $V_{CC} = 4.5$ to 5.5 V) | 0 to 500      | ns   |

**Table 4. Recommended operating conditions M54HCT series**

| Symbol     | Parameter                                           | Value         | Unit |
|------------|-----------------------------------------------------|---------------|------|
| $V_{CC}$   | Supply voltage                                      | 4.5 to 5.5    | V    |
| $V_I$      | Input voltage                                       | 0 to $V_{CC}$ | V    |
| $V_O$      | Output voltage                                      | 0 to $V_{CC}$ | V    |
| $T_{op}$   | Operating temperature                               | -55 to 125    | °C   |
| $t_r, t_f$ | Input rise and fall time ( $V_{CC} = 4.5$ to 5.5 V) | 0 to 500      | ns   |

**Table 5. Thermal resistance**

| Device   | Detail Specification | $R_{thj-c}^{(1)} \text{ }^{\circ}\text{C/W}$ | Device    | Detail Specification | $R_{thj-c}^{(1)} \text{ }^{\circ}\text{C/W}$ |
|----------|----------------------|----------------------------------------------|-----------|----------------------|----------------------------------------------|
| M54HC00  | 9201/105             | 49                                           | M54HC191  | 9204/066             | 24                                           |
| M54HC02  | 9201/113             | 41                                           | M54HC193  | 9204/065             | 30                                           |
| M54HC03  | 9201/114             | 57                                           | M54HC237  | 9205/021             | 37                                           |
| M54HC04  | 9401/033             | 40                                           | M54HC240  | 9401/034             | 22                                           |
| M54HC08  | 9201/106             | 49                                           | M54HC244  | 9401/048             | 22                                           |
| M54HC10  | 9201/107             | 45                                           | M54HCT244 | 9402/009             | 20                                           |
| M54HC11  | 9201/117             | 44                                           | M54HC245  | 9405/013             | 15                                           |
| M54HC14  | 9409/007             | 34                                           | M54HCT245 | 9405/014             | 14                                           |
| M54HC27  | 9201/109             | 43                                           | M54HC251  | 9408/048             | 47                                           |
| M54HC32  | 9201/111             | 46                                           | M54HC257  | 9408/047             | 39                                           |
| M54HC74  | 9203/050             | 35                                           | M54HC259  | 9203/073             | 35                                           |
| M54HCT74 | 9203/070             | 35                                           | M54HC273  | 9203/053             | 25                                           |
| M54HC85  | 9209/004             | 42                                           | M54HC373  | 9203/059             | 22                                           |
| M54HC86  | 9201/119             | 35                                           | M54HC374  | 9203/060             | 22                                           |
| M54HC109 | 9306/048             | 44                                           | M54HC393  | 9204/074             | 24                                           |
| M54HC123 | 9207/006             | 32                                           | M54HC540  | 9401/049             | 23                                           |
| M54HC125 | 9401/039             | 32                                           | M54HC541  | 9401/047             | 23                                           |
| M54HC132 | 9201/120             | 35                                           | M54HC573  | 9202/072             | 20                                           |
| M54HC138 | 9408/046             | 42                                           | M54HC574  | 9203/054             | 20                                           |
| M54HC139 | 9205/017             | 47                                           | M54HC595  | 9306/051             | 23                                           |
| M54HC148 | 9410/017             | 34                                           | M54HC597  | 9306/054             | 31                                           |
| M54HC151 | 9408/054             | 47                                           | M54HC688  | 9209/005             | 31                                           |
| M54HC153 | 9408/038             | 41                                           | M54HC4020 | 9204/070             | 26                                           |
| M54HC154 | 9205/023             | 24                                           | M54HC4040 | 9204/069             | 27                                           |
| M54HC157 | 9408/057             | 44                                           | M54HC4049 | 9401/037             | 43                                           |
| M54HC160 | 9204/062             | 36                                           | M54HC4050 | 9401/038             | 39                                           |
| M54HC161 | 9204/059             | 36                                           | M54HC4051 | 9408/064             | 22                                           |
| M54HC164 | 9306/041             | 28                                           | M54HC4053 | 9408/065             | 31                                           |
| M54HC165 | 9306/042             | 51                                           | M54HC4060 | 9204/076             | 28                                           |
| M54HC166 | 9306/043             | 39                                           | M54HC4066 | 9408/052             | 27                                           |
| M54HC174 | 9306/052             | 43                                           | M54HC4094 | 9306/050             | 29                                           |
| M54HC175 | 9203/052             | 37                                           | M54HC4514 | 9205/019             | 21                                           |

1. Calculated typical values for the Flat versions of the products, with the package top as cold plate (reference temperature), as per JESD51 best practice guideline to provide worst case data (in all the product of the series, the die is mounted on the package bottom. Lower  $R_{thj-c}$  must therefore be expected.)

## 4 Radiation data

### 4.1 Total ionization dose

All the products of the series are ESCC qualified at 50 krad(Si) as per ESCC 22900, on 10 pieces, 5 biased and 5 unbiased, at low dose rate (210 rad(Si)/hour).

Each wafer lot is in addition submitted to wafer lot qualification on 5 pieces in the conditions identified during the qualification as worst case, biased, at the same dose rate and with the same test method.

Some products of the series are available upon request at 100 krad(Si), supported by a dedicated wafer qualification as per ESCC 22900, at high dose rate (20 krad(Si)/hour), on 5 pieces, biased as per the detail specification of each product. See TN1292 for details.

### 4.2 Heavy ions

#### 4.2.1 Test strategy

The HC series is characterized under heavy ions as per ESCC25100 through 6 test vehicles covering the whole series by similarity, the M54HC00, M54HC14, M54HC245, M54HC597, M54HC688 and M54HC4066, using dice from the latest AMK6 6" diffusion line.

This characterization applies by similarity to parts using dice from the previous AMK5 5" wafer line, both lines using the same wafer fab, the same technology and mostly the same equipment. Furthermore, an ESA characterization performed in 1997 has validated the similarities using the then applicable test method (biased only...) on 5 test vehicles covering the whole family by similarity, the M54HC08, M54HC157, M54HC273, M54HC4040, M54HC4053. These additional test reports are available upon request.

The products of the series still manufactured with dice from ST legacy Carrollton 4" fab have been SEE qualified through radiation test made using the then applicable test method -Iodine Ion, 70° tilt, biased only, no SET...) on 5 test vehicles covering the whole series by similarity, the M54HC00, M54HC138, M54HC174 and M54HC390. The test results are available upon request.

#### 4.2.2 AMK6 SEE test results summary

The table below provides the AMK6 SEE test results.

| Device type | SEL @ 6V                               | SET @ 2 V |                     | SEU            |                |
|-------------|----------------------------------------|-----------|---------------------|----------------|----------------|
|             |                                        | LETth     | $\sigma$            | LETth          | $\sigma$       |
| M54HC00     | Free up to 125 MeV.cm <sup>2</sup> /mg | 15        | $3.0 \cdot 10^{-4}$ | Not applicable | Not applicable |
| M54HC14     |                                        | 18        | $1.5 \cdot 10^{-4}$ |                |                |
| M54HC245    |                                        | 14        | $2.4 \cdot 10^{-3}$ |                |                |
| M54HC597    |                                        | 18        | $2.2 \cdot 10^{-4}$ |                |                |

**Note:** The test of the M54HC688 and M54HC4066 are not yet available.

**Note:** The change of state of flip-flops or register cells of the M54HC597 and all the sequential products is accounted as SET.



#### 4.2.3 AMK6 SEE test vehicle coverage

The table below provides for each parts number the applicable AMK6 SEE test vehicle.

| Device         | Detail Specification | Class                  |  | Device           | Detail Specification | Class             |
|----------------|----------------------|------------------------|--|------------------|----------------------|-------------------|
| M54HC00        | 9201/105             | Combinational          |  | M54HC193         | 9204/065             | Sequential        |
| M54HC02        | 9201/113             | Combinational          |  | M54HC194         | 9306/047             | Sequential        |
| M54HC03        | 9201/114             | Combinational          |  | M54HC237         | 9205/021             | Combinational     |
| M54HC04        | 9401/033             | Combinational          |  | M54HC240         | 9401/034             | 3-state           |
| M54HC08        | 9201/106             | Combinational          |  | M54HC244         | 9401/048             | 3-state           |
| M54HC10        | 9201/107             | Combinational          |  | M54HCT244        | 9402/009             | 3-state           |
| M54HC11        | 9201/117             | Combinational          |  | <b>M54HC245</b>  | <b>9405/013</b>      | <b>3-state</b>    |
| <b>M54HC14</b> | <b>9409/007</b>      | <b>Schmitt trigger</b> |  | M54HCT245        | 9405/014             | 3-state           |
| M54HC20        | 9201/118             | Combinational          |  | M54HC251         | 9408/048             | 3-state           |
| M54HC21        | 9201/108             | Combinational          |  | M54HC257         | 9408/047             | 3-state           |
| M54HC27        | 9201/109             | Combinational          |  | M54HC259         | 9203/073             | Sequential        |
| M54HC30        | 9201/110             | Combinational          |  | M54HC273         | 9203/053             | Sequential        |
| M54HC32        | 9201/111             | Combinational          |  | M54HC283         | 9202/075             | Combinational     |
| M54HC74        | 9203/050             | Sequential             |  | M54HC367         | 9401/044             | 3-state           |
| M54HCT74       | 9203/070             | Sequential             |  | M54HC373         | 9203/059             | Sequential        |
| M54HC85        | 9209/004             | Combinational          |  | M54HCT373        | 9203/064             | Sequential        |
| M54HC86        | 9201/119             | Combinational          |  | M54HC374         | 9203/060             | Sequential        |
| M54HC109       | 9306/048             | Sequential             |  | M54HC393         | 9204/074             | Sequential        |
| M54HC123       | 9207/006             | Sequential             |  | M54HC540         | 9401/049             | 3-state           |
| M54HC125       | 9401/039             | 3-state                |  | M54HC541         | 9401/047             | 3-state           |
| M54HC132       | 9201/120             | Schmitt trigger        |  | M54HC573         | 9202/072             | Sequential        |
| M54HC137       | 9205/013             | Sequential             |  | M54HC574         | 9203/054             | Sequential        |
| M54HC138       | 9408/046             | Combinational          |  | M54HC590         | 9204/071             | Sequential        |
| M54HC139       | 9205/017             | Combinational          |  | M54HC595         | 9306/051             | Sequential        |
| M54HC148       | 9410/017             | Combinational          |  | <b>M54HC597</b>  | <b>9306/054</b>      | <b>Sequential</b> |
| M54HC151       | 9408/054             | Combinational          |  | <b>M54HC688</b>  | <b>9209/005</b>      | <b>Comparator</b> |
| M54HC153       | 9408/038             | Combinational          |  | M54HC4020        | 9204/070             | Sequential        |
| M54HC154       | 9205/023             | Combinational          |  | M54HC4040        | 9204/069             | Sequential        |
| M54HC157       | 9408/057             | Combinational          |  | M54HC4049        | 9401/037             | Combinational     |
| M54HC158       | 9408/059             | Combinational          |  | M54HC4050        | 9401/038             | Combinational     |
| M54HC160       | 9204/062             | Sequential             |  | M54HC4051        | 9408/064             | Combinational     |
| M54HC161       | 9204/059             | Sequential             |  | M54HC4053        | 9408/065             | Combinational     |
| M54HC164       | 9306/041             | Sequential             |  | M54HC4060        | 9204/076             | Oscillator        |
| M54HC165       | 9306/042             | Sequential             |  | <b>M54HC4066</b> | <b>9408/052</b>      | <b>Switch</b>     |
| M54HC166       | 9306/043             | Sequential             |  | M54HC4078        | 9201/123             | Combinational     |
| M54HC174       | 9306/052             | Sequential             |  | M54HC4094        | 9306/050             | Sequential        |
| M54HC175       | 9203/052             | Sequential             |  | M54HC4514        | 9205/019             | Sequential        |
| M54HC191       | 9204/066             | Sequential             |  |                  |                      |                   |

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## 5 Package information

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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](http://www.st.com). ECOPACK is an ST trademark.

## 5.1 Ceramic Flat-14E package information

**Figure 2. Ceramic Flat-14E package outline**

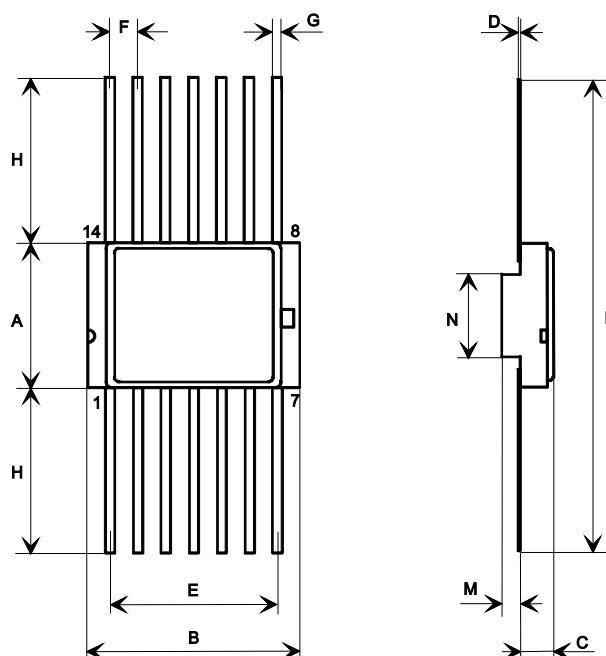


**Table 6. Ceramic Flat-14E mechanical data**

| 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            | 9.95  | 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               |       |       | 0.236               |       |       |
| L      | 18.75           |       | 22.00 | 0.738               |       | 0.866 |
| M      | 0.33            | 0.38  | 0.43  | 0.013               | 0.015 | 0.017 |
| N      |                 | 4.31  |       |                     | 0.170 |       |

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

## 5.2 Ceramic Flat-16E package information

**Figure 3. Ceramic Flat-16E package outline**

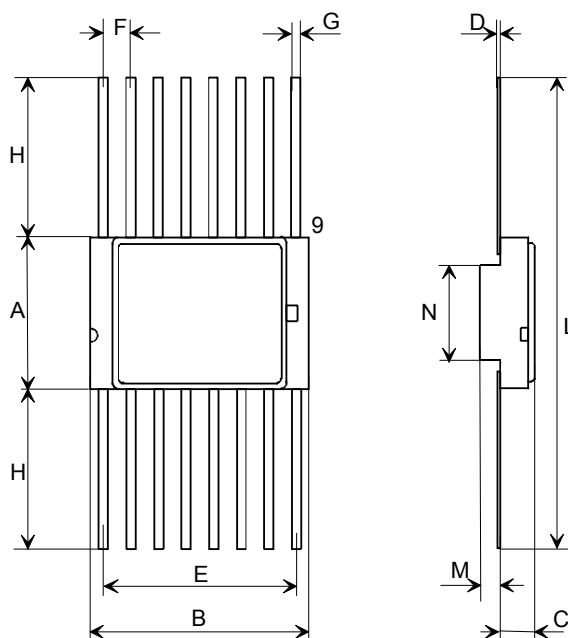


**Table 7. Ceramic Flat-16E package mechanical data**

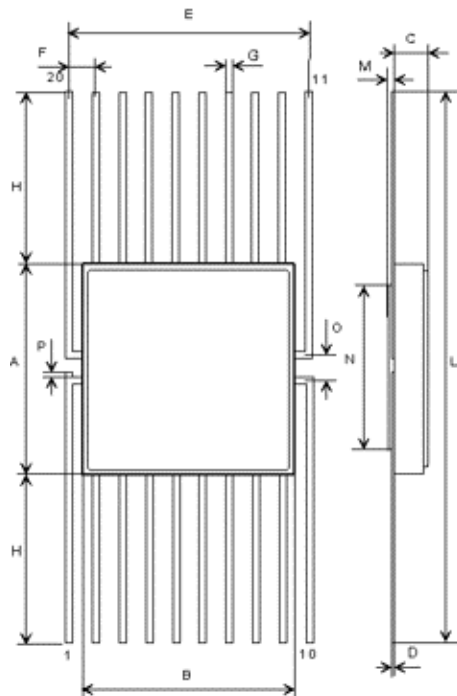
| Symbol | Dimensions (mm) |       |       | Dimensions (inches) |       |       |
|--------|-----------------|-------|-------|---------------------|-------|-------|
|        | Min.            | Typ.  | Max.  | Min.                | Typ.  | Max.  |
| A      | 6.75            | 6.91  | 7.06  | 0.266               | 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 |       |

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

### 5.3 Ceramic Flat-20E package information

**Figure 4. Ceramic Flat-20E package outline**



**Note:** Pin 1 is identified by the 0.18 mm / 0.007 inch extra growth of its lead identified by the letter "P" in the dimension table.

**Table 8. Ceramic Flat-20E package mechanical data**

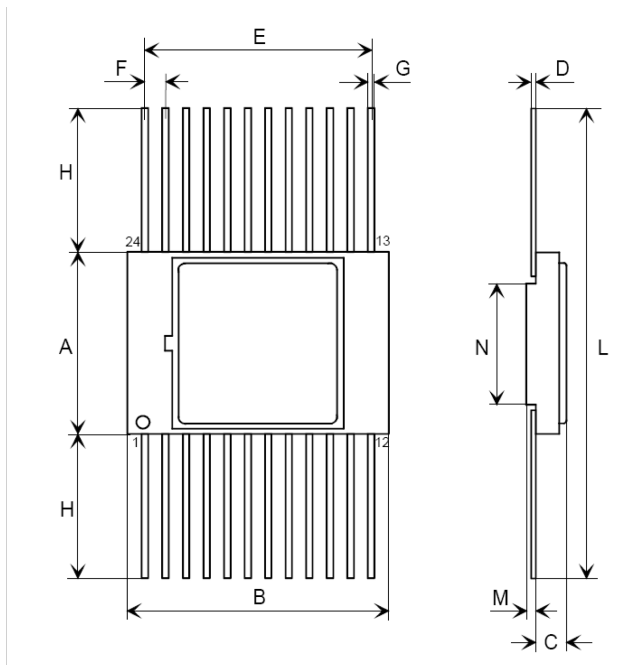
| Symbol | Dimensions (mm) |       |       | Dimensions (inches) |        |       |
|--------|-----------------|-------|-------|---------------------|--------|-------|
|        | Min.            | Typ.  | Max.  | Min.                | Typ.   | Max.  |
| A      | 9.98            | 10.16 | 10.34 | 0.393               | 0.400  | 0.407 |
| B      | 9.98            | 10.16 | 10.34 | 0.393               | 0.400  | 0.407 |
| C      | 1.45            | 1.61  | 1.78  | 0.057               | 0.0635 | 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 | 0.963               |        | 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 |

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

## 5.4 Ceramic Flat-24 package information

**Figure 5. 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 9. 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

## 5.5 Ceramic DIL-14 package information

**Figure 6.** Ceramic DIL-14 package outline

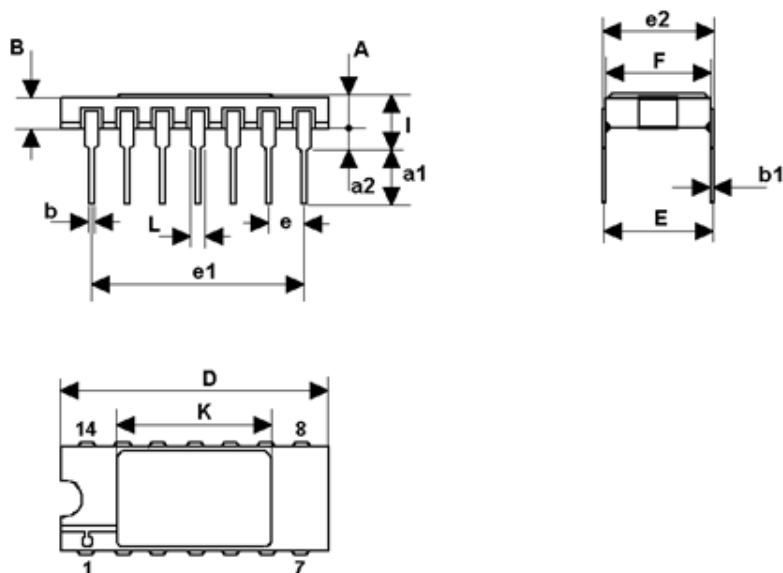


**Table 10.** Ceramic DIL-14 package mechanical data

| 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 |

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

## 5.6 Ceramic DIL-16 package information

**Figure 7. Ceramic DIL-16 package outline**

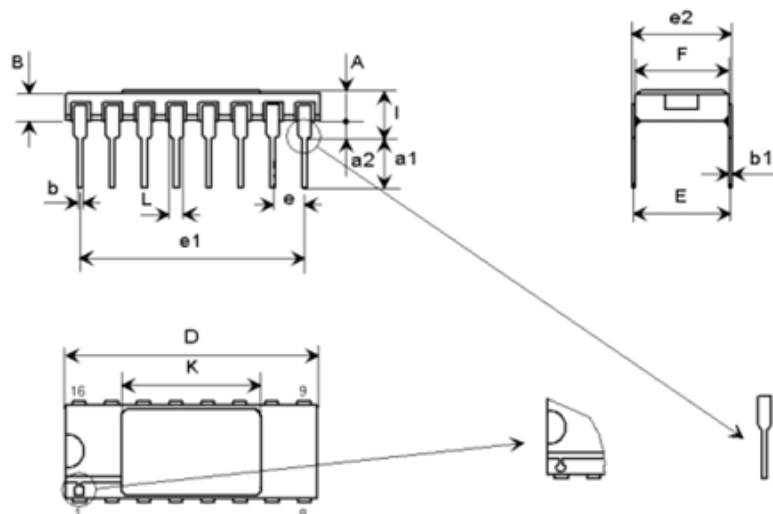


**Table 11. Ceramic DIL-16 package mechanical data**

| 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 |

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

## 5.7 Ceramic DIL-20 package information

**Figure 8. Ceramic DIL-20 package outline**

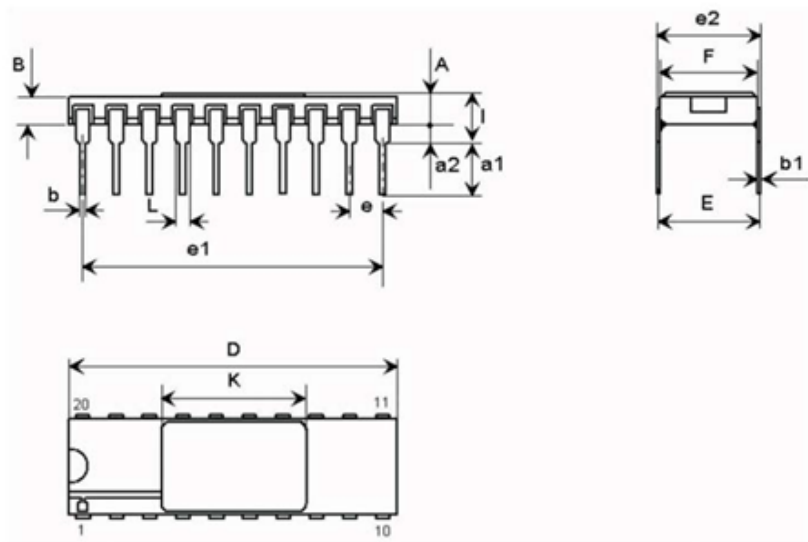


**Table 12. Ceramic DIL-20 package mechanical data**

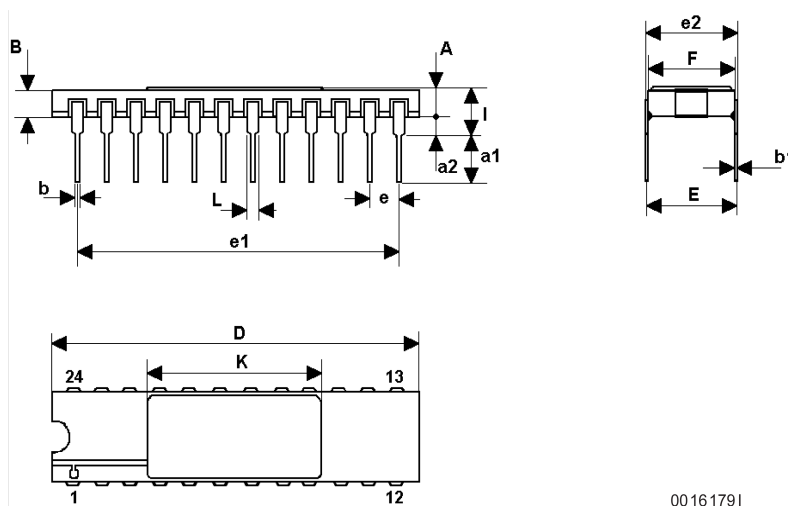
| Symbol | Dimensions (mm) |       |       | Dimensions (inches) |       |       |
|--------|-----------------|-------|-------|---------------------|-------|-------|
|        | Min.            | Typ.  | Max.  | Min.                | Typ.  | Max.  |
| A      | 2.1             |       | 2.72  | 0.083               |       | 0.107 |
| a1     | 3               |       | 3.7   | 0.118               |       | 0.146 |
| a2     | 0.63            | 0.88  | 1.14  | 0.025               | 0.035 | 0.045 |
| B      | 1.93            | 2.03  | 2.23  | 0.076               | 0.080 | 0.088 |
| b      | 0.4             | 0.45  | 0.5   | 0.016               | 0.018 | 0.020 |
| b1     | 0.2             | 0.254 | 0.3   | 0.008               | 0.010 | 0.012 |
| D      | 25.14           | 25.4  | 25.65 | 0.990               | 1.000 | 1.010 |
| E      | 7.36            | 7.62  | 7.87  | 0.290               | 0.300 | 0.310 |
| e      |                 | 2.54  |       |                     | 0.100 |       |
| e1     | 22.73           | 22.86 | 22.99 | 0.895               | 0.900 | 0.905 |
| e2     | 7.62            | 7.87  | 8.12  | 0.300               | 0.310 | 0.320 |
| F      | 7.29            | 7.49  | 7.62  | 0.287               | 0.295 | 0.300 |
| I      |                 |       | 3.86  |                     |       | 0.152 |
| K      | 11.3            |       | 11.56 | 0.445               |       | 0.455 |
| L      | 1.14            | 1.27  | 1.4   | 0.045               | 0.050 | 0.055 |

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

## 5.8 Ceramic DIL-24 package information

**Figure 9. Ceramic DIL-20 package outline**



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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 13. Ceramic DIL-24 package mechanical data**

| Symbol | Dimensions (mm) |       |       |
|--------|-----------------|-------|-------|
|        | Min.            | Typ.  | Max.  |
| A      | 2.159           | 1.931 | 2.387 |
| a1     | 1.270           | 1.016 | 1.524 |
| a2     | .307            | .274  | .340  |
| B      | 1.270           |       |       |
| b1     | 0.457           | 0.407 | 0.507 |
| b2     | .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

## 6 Order codes

**Table 14. Ordering information**

| ST Part Number <sup>(1)</sup> | ESCC part number | Quality Level     | Package <sup>(2)</sup> | Finishing  | Marking <sup>(3)</sup> | Packing    | Mass g |
|-------------------------------|------------------|-------------------|------------------------|------------|------------------------|------------|--------|
| M54HC00K1                     | -                | Engineering Model | Flat-14E               | Gold       | M54HC00K1              | Strip Pack | 0.70   |
| M54HC00KG                     | 920110501F       | ESCC              | Flat-14E               | Gold       | 920110501F             | Strip Pack |        |
| M54HC00KT                     | 920110502F       | ESCC              | Flat-14E               | Solder Dip | 920110502F             | Strip Pack |        |
| M54HC00DG                     | 920110503F       | ESCC              | DIL-14                 | Gold       | 920110503F             | Strip Pack | 2.20   |
| M54HC00DT                     | 920110504F       | ESCC              | DIL-14                 | Solder Dip | 920110504F             | Strip Pack |        |
| M54HC02K1                     | -                | Engineering Model | Flat-14E               | Gold       | M54HC02K1              | Strip Pack | 0.70   |
| M54HC02KG                     | 920111301F       | ESCC              | Flat-14E               | Gold       | 920111301F             | Strip Pack |        |
| M54HC02KT                     | 920111302F       | ESCC              | Flat-14E               | Solder Dip | 920111302F             | Strip Pack |        |
| M54HC02DG                     | 920111303F       | ESCC              | DIL-14                 | Gold       | 920111303F             | Strip Pack | 2.20   |
| M54HC02DT                     | 920111304F       | ESCC              | DIL-14                 | Solder Dip | 920111304F             | Strip Pack |        |
| M54HC03K1                     | -                | Engineering Model | Flat-14E               | Gold       | M54HC03K1              | Strip Pack | 0.70   |
| M54HC03KG                     | 920111401F       | ESCC              | Flat-14E               | Gold       | 920111401F             | Strip Pack |        |
| M54HC03KT                     | 920111402F       | ESCC              | Flat-14E               | Solder Dip | 920111402F             | Strip Pack |        |
| M54HC03DG                     | 920111403F       | ESCC              | DIL-14                 | Gold       | 920111403F             | Strip Pack | 2.20   |
| M54HC03DT                     | 920111404F       | ESCC              | DIL-14                 | Solder Dip | 920111404F             | Strip Pack |        |
| M54HC04K1                     | -                | Engineering Model | Flat-14E               | Gold       | M54HC04K1              | Strip Pack | 0.70   |
| M54HC04KG                     | 940103301F       | ESCC              | Flat-14E               | Gold       | 940103301F             | Strip Pack |        |
| M54HC04KT                     | 940103302F       | ESCC              | Flat-14E               | Solder Dip | 940103302F             | Strip Pack |        |
| M54HC04DG                     | 940103303F       | ESCC              | DIL-14                 | Gold       | 940103303F             | Strip Pack | 2.20   |
| M54HC04DT                     | 940103304F       | ESCC              | DIL-14                 | Solder Dip | 940103304F             | Strip Pack |        |
| M54HC08K1                     | -                | Engineering Model | Flat-14E               | Gold       | M54HC08K1              | Strip Pack | 0.70   |
| M54HC08KG                     | 920110601F       | ESCC              | Flat-14E               | Gold       | 920110601F             | Strip Pack |        |
| M54HC08KT                     | 920110602F       | ESCC              | Flat-14E               | Solder Dip | 920110602F             | Strip Pack |        |
| M54HC08DG                     | 920110603F       | ESCC              | DIL-14                 | Gold       | 920110603F             | Strip Pack | 2.20   |
| M54HC08DT                     | 920110604F       | ESCC              | DIL-14                 | Solder Dip | 920110604F             | Strip Pack |        |
| M54HC10K1                     | -                | Engineering Model | Flat-14E               | Gold       | M54HC10K1              | Strip Pack | 0.70   |
| M54HC10KG                     | 920110701F       | ESCC              | Flat-14E               | Gold       | 920110701F             | Strip Pack |        |
| M54HC10KT                     | 920110702F       | ESCC              | Flat-14E               | Solder Dip | 920110702F             | Strip Pack |        |
| M54HC10DG                     | 920110703F       | ESCC              | DIL-14                 | Gold       | 920110703F             | Strip Pack | 2.20   |
| M54HC10DT                     | 920110704F       | ESCC              | DIL-14                 | Solder Dip | 920110704F             | Strip Pack |        |
| M54HC11K1                     | -                | Engineering Model | Flat-14E               | Gold       | M54HC11K1              | Strip Pack | 0.70   |
| M54HC11KG                     | 920111701F       | ESCC              | Flat-14E               | Gold       | 920111701F             | Strip Pack |        |
| M54HC11KT                     | 920111702F       | ESCC              | Flat-14E               | Solder Dip | 920111702F             | Strip Pack |        |
| M54HC11DG                     | 920111703F       | ESCC              | DIL-14                 | Gold       | 920111703F             | Strip Pack | 2.20   |
| M54HC11DT                     | 920111704F       | ESCC              | DIL-14                 | Solder Dip | 920111704F             | Strip Pack |        |
| M54HC14K1                     | -                | Engineering Model | Flat-14E               | Gold       | M54HC14K1              | Strip Pack | 0.70   |
| M54HC14KG                     | 940900701F       | ESCC              | Flat-14E               | Gold       | 940900701F             | Strip Pack |        |



| ST Part Number <sup>(1)</sup> | ESCC part number | Quality Level     | Package <sup>(2)</sup> | Finishing  | Marking <sup>(3)</sup> | Packing    | Mass g |
|-------------------------------|------------------|-------------------|------------------------|------------|------------------------|------------|--------|
| M54HC14KT                     | 940900702F       | ESCC              | Flat-14E               | Solder Dip | 940900702F             | Strip Pack | 0.70   |
| M54HC14DG                     | 940900703F       | ESCC              | DIL-14                 | Gold       | 940900703F             | Strip Pack | 2.20   |
| M54HC14DT                     | 940900704F       | ESCC              | DIL-14                 | Solder Dip | 940900704F             | Strip Pack |        |
| M54HC27K1                     | -                | Engineering Model | Flat-14E               | Gold       | M54HC27K1              | Strip Pack | 0.70   |
| M54HC27KG                     | 920110901F       | ESCC              | Flat-14E               | Gold       | 920110901F             | Strip Pack |        |
| M54HC27KT                     | 920110902F       | ESCC              | Flat-14E               | Solder Dip | 920110902F             | Strip Pack |        |
| M54HC27DG                     | 920110903F       | ESCC              | DIL-14                 | Gold       | 920110903F             | Strip Pack | 2.20   |
| M54HC27DT                     | 920110904F       | ESCC              | DIL-14                 | Solder Dip | 920110904F             | Strip Pack |        |
| M54HC32K1                     | -                | Engineering Model | Flat-14E               | Gold       | M54HC32K1              | Strip Pack | 0.70   |
| M54HC32KG                     | 920111101F       | ESCC              | Flat-14E               | Gold       | 920111101F             | Strip Pack |        |
| M54HC32KT                     | 920111102F       | ESCC              | Flat-14E               | Solder Dip | 920111102F             | Strip Pack |        |
| M54HC32DG                     | 920111103F       | ESCC              | DIL-14                 | Gold       | 920111103F             | Strip Pack | 2.20   |
| M54HC32DT                     | 920111104F       | ESCC              | DIL-14                 | Solder Dip | 920111104F             | Strip Pack |        |
| M54HC74K1                     | -                | Engineering Model | Flat-14E               | Gold       | M54HC74K1              | Strip Pack | 0.70   |
| M54HC74KG                     | 920305001F       | ESCC              | Flat-14E               | Gold       | 920305001F             | Strip Pack |        |
| M54HC74KT                     | 920305002F       | ESCC              | Flat-14E               | Solder Dip | 920305002F             | Strip Pack |        |
| M54HC74DG                     | 920305003F       | ESCC              | DIL-14                 | Gold       | 920305003F             | Strip Pack | 2.20   |
| M54HC74DT                     | 920305004F       | ESCC              | DIL-14                 | Solder Dip | 920305004F             | Strip Pack |        |
| M54HCT74K1                    | -                | Engineering Model | Flat-14E               | Gold       | M54HCT74K1             | Strip Pack | 0.70   |
| M54HCT74KG                    | 920307001F       | ESCC              | Flat-14E               | Gold       | 920307001F             | Strip Pack |        |
| M54HCT74KT                    | 920307002F       | ESCC              | Flat-14E               | Solder Dip | 920307002F             | Strip Pack |        |
| M54HCT74DG                    | 920307003F       | ESCC              | DIL-14                 | Gold       | 920307003F             | Strip Pack | 2.20   |
| M54HCT74DT                    | 920307004F       | ESCC              | DIL-14                 | Solder Dip | 920307004F             | Strip Pack |        |
| M54HC85K1                     | -                | Engineering Model | Flat-16E               | Gold       | M54HC85K1              | Strip Pack | 0.50   |
| M54HC85KG                     | 920900401F       | ESCC              | Flat-16E               | Gold       | 920900401F             | Strip Pack |        |
| M54HC85KT                     | 920900402F       | ESCC              | Flat-16E               | Solder Dip | 920900402F             | Strip Pack |        |
| M54HC85DG                     | 920900410F       | ESCC              | DIL-16                 | Gold       | 920900410F             | Strip Pack | 2.20   |
| M54HC85DT                     | 920900411F       | ESCC              | DIL-16                 | Solder Dip | 920900411F             | Strip Pack |        |
| M54HC86K1                     | -                | Engineering Model | Flat-14E               | Gold       | M54HC86K1              | Strip Pack | 0.70   |
| M54HC86KG                     | 920111901F       | ESCC              | Flat-14E               | Gold       | 920111901F             | Strip Pack |        |
| M54HC86KT                     | 920111902F       | ESCC              | Flat-14E               | Solder Dip | 920111902F             | Strip Pack |        |
| M54HC86DG                     | 920111903F       | ESCC              | DIL-14                 | Gold       | 920111903F             | Strip Pack | 2.20   |
| M54HC86DT                     | 920111904F       | ESCC              | DIL-14                 | Solder Dip | 920111904F             | Strip Pack |        |
| M54HC109K1                    | -                | Engineering Model | Flat-16E               | Gold       | M54HC109K1             | Strip Pack | 0.50   |
| M54HC109KG                    | 930604801F       | ESCC              | Flat-16E               | Gold       | 930604801F             | Strip Pack |        |
| M54HC109KT                    | 930604802F       | ESCC              | Flat-16E               | Solder Dip | 930604802F             | Strip Pack |        |
| M54HC109DG                    | 930604810F       | ESCC              | DIL-16                 | Gold       | 930604810F             | Strip Pack | 2.20   |
| M54HC109DT                    | 930604811F       | ESCC              | DIL-16                 | Solder Dip | 930604811F             | Strip Pack |        |
| M54HC123K1                    | -                | Engineering Model | Flat-16E               | Gold       | M54HC123K1             | Strip Pack | 0.50   |
| M54HC123KG                    | 920700601F       | ESCC              | Flat-16E               | Gold       | 920700601F             | Strip Pack |        |
| M54HC123KT                    | 920700602F       | ESCC              | Flat-16E               | Solder Dip | 920700602F             | Strip Pack |        |



| ST Part Number <sup>(1)</sup> | ESCC part number | Quality Level     | Package <sup>(2)</sup> | Finishing  | Marking <sup>(3)</sup> | Packing    | Mass g |
|-------------------------------|------------------|-------------------|------------------------|------------|------------------------|------------|--------|
| M54HC123DG                    | 920700610F       | ESCC              | DIL-16                 | Gold       | 920700610F             | Strip Pack | 2.20   |
| M54HC123DT                    | 920700611F       | ESCC              | DIL-16                 | Solder Dip | 920700611F             | Strip Pack |        |
| M54HC125K1                    | -                | Engineering Model | Flat-14E               | Gold       | M54HC125K1             | Strip Pack | 0.70   |
| M54HC125KG                    | 940103901F       | ESCC              | Flat-14E               | Gold       | 940103901F             | Strip Pack |        |
| M54HC125KT                    | 940103902F       | ESCC              | Flat-14E               | Solder Dip | 940103902F             | Strip Pack |        |
| M54HC132K1                    | -                | Engineering Model | Flat-14E               | Gold       | M54HC132K1             | Strip Pack | 0.70   |
| M54HC132KG                    | 920112001F       | ESCC              | Flat-14E               | Gold       | 920112001F             | Strip Pack |        |
| M54HC132KT                    | 920112002F       | ESCC              | Flat-14E               | Solder Dip | 920112002F             | Strip Pack |        |
| M54HC132DG                    | 920112003F       | ESCC              | DIL-14                 | Gold       | 920112003F             | Strip Pack | 2.20   |
| M54HC132DT                    | 920112004F       | ESCC              | DIL-14                 | Solder Dip | 920112004F             | Strip Pack |        |
| M54HC138K1                    | -                | Engineering Model | Flat-16E               | Gold       | M54HC138K1             | Strip Pack | 0.50   |
| M54HC138KG                    | 940804601F       | ESCC              | Flat-16E               | Gold       | 940804601F             | Strip Pack |        |
| M54HC138KT                    | 940804602F       | ESCC              | Flat-16E               | Solder Dip | 940804602F             | Strip Pack |        |
| M54HC138DG                    | 940804610F       | ESCC              | DIL-16                 | Gold       | 940804610F             | Strip Pack | 2.20   |
| M54HC138DT                    | 940804611F       | ESCC              | DIL-16                 | Solder Dip | 940804611F             | Strip Pack |        |
| M54HC139K1                    | -                | Engineering Model | Flat-16E               | Gold       | M54HC139K1             | Strip Pack | 0.50   |
| M54HC139KG                    | 920501701F       | ESCC              | Flat-16E               | Gold       | 920501701F             | Strip Pack |        |
| M54HC139KT                    | 920501702F       | ESCC              | Flat-16E               | Solder Dip | 920501702F             | Strip Pack |        |
| M54HC139DG                    | 920501710F       | ESCC              | DIL-16                 | Gold       | 920501710F             | Strip Pack | 2.20   |
| M54HC139DT                    | 920501711F       | ESCC              | DIL-16                 | Solder Dip | 920501711F             | Strip Pack |        |
| M54HC148K1                    | -                | Engineering Model | Flat-16E               | Gold       | M54HC148K1             | Strip Pack | 0.50   |
| M54HC148KG                    | 941001701F       | ESCC              | Flat-16E               | Gold       | 941001701F             | Strip Pack |        |
| M54HC148KT                    | 941001702F       | ESCC              | Flat-16E               | Solder Dip | 941001702F             | Strip Pack |        |
| M54HC148DG                    | 941001710F       | ESCC              | DIL-16                 | Gold       | 941001710F             | Strip Pack | 2.20   |
| M54HC148DT                    | 941001711F       | ESCC              | DIL-16                 | Solder Dip | 941001711F             | Strip Pack |        |
| M54HC151K1                    | -                | Engineering Model | Flat-16E               | Gold       | M54HC151K1             | Strip Pack | 0.50   |
| M54HC151KG                    | 940805401F       | ESCC              | Flat-16E               | Gold       | 940805401F             | Strip Pack |        |
| M54HC151KT                    | 940805402F       | ESCC              | Flat-16E               | Solder Dip | 940805402F             | Strip Pack |        |
| M54HC151DG                    | 940805410F       | ESCC              | DIL-16                 | Gold       | 940805410F             | Strip Pack | 2.20   |
| M54HC151DT                    | 940805411F       | ESCC              | DIL-16                 | Solder Dip | 940805411F             | Strip Pack |        |
| M54HC153K1                    | -                | Engineering Model | Flat-16E               | Gold       | M54HC153K1             | Strip Pack | 0.50   |
| M54HC153KG                    | 940803801F       | ESCC              | Flat-16E               | Gold       | 940803801F             | Strip Pack |        |
| M54HC153KT                    | 940803802F       | ESCC              | Flat-16E               | Solder Dip | 940803802F             | Strip Pack |        |
| M54HC153DG                    | 940803810F       | ESCC              | DIL-16                 | Gold       | 940803810F             | Strip Pack | 2.20   |
| M54HC153DT                    | 940803811F       | ESCC              | DIL-16                 | Solder Dip | 940803811F             | Strip Pack |        |
| M54HC154K1                    | -                | Engineering Model | Flat-24                | Gold       | M54HC154K1             | Strip Pack | 1.70   |
| M54HC154KG                    | 920502301F       | ESCC              | Flat-24                | Gold       | 920502301F             | Strip Pack |        |
| M54HC154KT                    | 920502302F       | ESCC              | Flat-24                | Solder Dip | 920502302F             | Strip Pack |        |
| M54HC154DG                    | 920502303F       | ESCC              | DIL-24                 | Gold       | 920502303F             | Strip Pack | 5.20   |
| M54HC154DT                    | 920502304F       | ESCC              | DIL-24                 | Solder Dip | 920502304F             | Strip Pack |        |
| M54HC157K1                    | -                | Engineering Model | Flat-16E               | Gold       | M54HC157K1             | Strip Pack | 0.50   |



| ST Part Number <sup>(1)</sup> | ESCC part number | Quality Level     | Package <sup>(2)</sup> | Finishing  | Marking <sup>(3)</sup> | Packing    | Mass g |
|-------------------------------|------------------|-------------------|------------------------|------------|------------------------|------------|--------|
| M54HC157KG                    | 940805701F       | ESCC              | Flat-16E               | Gold       | 940805701F             | Strip Pack | 0.50   |
| M54HC157KT                    | 940805702F       | ESCC              | Flat-16E               | Solder Dip | 940805702F             | Strip Pack |        |
| M54HC157DG                    | 940805710F       | ESCC              | DIL-16                 | Gold       | 940805710F             | Strip Pack | 2.20   |
| M54HC157DT                    | 940805711F       | ESCC              | DIL-16                 | Solder Dip | 940805711F             | Strip Pack |        |
| M54HC160K1                    | -                | Engineering Model | Flat-16E               | Gold       | M54HC160K1             | Strip Pack | 0.50   |
| M54HC160KG                    | 920406201F       | ESCC              | Flat-16E               | Gold       | 920406201F             | Strip Pack |        |
| M54HC160KT                    | 920406202F       | ESCC              | Flat-16E               | Solder Dip | 920406202F             | Strip Pack |        |
| M54HC160DG                    | 920406210F       | ESCC              | DIL-16                 | Gold       | 920406210F             | Strip Pack | 2.20   |
| M54HC160DT                    | 920406211F       | ESCC              | DIL-16                 | Solder Dip | 920406211F             | Strip Pack |        |
| M54HC161K1                    | -                | Engineering Model | Flat-16E               | Gold       | M54HC161K1             | Strip Pack | 0.50   |
| M54HC161KG                    | 920405901F       | ESCC              | Flat-16E               | Gold       | 920405901F             | Strip Pack |        |
| M54HC161KT                    | 920405902F       | ESCC              | Flat-16E               | Solder Dip | 920405902F             | Strip Pack |        |
| M54HC161DG                    | 920405910F       | ESCC              | DIL-16                 | Gold       | 920405910F             | Strip Pack | 2.20   |
| M54HC161DT                    | 920405911F       | ESCC              | DIL-16                 | Solder Dip | 920405911F             | Strip Pack |        |
| M54HC164K1                    | -                | Engineering Model | Flat-14E               | Gold       | M54HC164K1             | Strip Pack | 0.70   |
| M54HC164KG                    | 930604101F       | ESCC              | Flat-14E               | Gold       | 930604101F             | Strip Pack |        |
| M54HC164KT                    | 930604102F       | ESCC              | Flat-14E               | Solder Dip | 930604102F             | Strip Pack |        |
| M54HC164DG                    | 930604103F       | ESCC              | DIL-14                 | Gold       | 930604103F             | Strip Pack | 2.20   |
| M54HC164DT                    | 930604104F       | ESCC              | DIL-14                 | Solder Dip | 930604104F             | Strip Pack |        |
| M54HC165K1                    | -                | Engineering Model | Flat-16E               | Gold       | M54HC165K1             | Strip Pack | 0.50   |
| M54HC165KG                    | 930604201F       | ESCC              | Flat-16E               | Gold       | 930604201F             | Strip Pack |        |
| M54HC165KT                    | 930604202F       | ESCC              | Flat-16E               | Solder Dip | 930604202F             | Strip Pack |        |
| M54HC165DG                    | 930604210F       | ESCC              | DIL-16                 | Gold       | 930604210F             | Strip Pack | 2.20   |
| M54HC165DT                    | 930604211F       | ESCC              | DIL-16                 | Solder Dip | 930604211F             | Strip Pack |        |
| M54HC166K1                    | -                | Engineering Model | Flat-16E               | Gold       | M54HC166K1             | Strip Pack | 0.50   |
| M54HC166KG                    | 930604301F       | ESCC              | Flat-16E               | Gold       | 930604301F             | Strip Pack |        |
| M54HC166KT                    | 930604302F       | ESCC              | Flat-16E               | Solder Dip | 930604302F             | Strip Pack |        |
| M54HC166DG                    | 930604310F       | ESCC              | DIL-16                 | Gold       | 930604310F             | Strip Pack | 2.20   |
| M54HC166DT                    | 930604311F       | ESCC              | DIL-16                 | Solder Dip | 930604311F             | Strip Pack |        |
| M54HC174K1                    | -                | Engineering Model | Flat-16E               | Gold       | M54HC174K1             | Strip Pack | 0.50   |
| M54HC174KG                    | 930605201F       | ESCC              | Flat-16E               | Gold       | 930605201F             | Strip Pack |        |
| M54HC174KT                    | 930605202F       | ESCC              | Flat-16E               | Solder Dip | 930605202F             | Strip Pack |        |
| M54HC174DG                    | 930605210F       | ESCC              | DIL-16                 | Gold       | 930605210F             | Strip Pack | 2.20   |
| M54HC174DT                    | 930605211F       | ESCC              | DIL-16                 | Solder Dip | 930605211F             | Strip Pack |        |
| M54HC175K1                    | -                | Engineering Model | Flat-16E               | Gold       | M54HC175K1             | Strip Pack | 0.50   |
| M54HC175KG                    | 920305201F       | ESCC              | Flat-16E               | Gold       | 920305201F             | Strip Pack |        |
| M54HC175KT                    | 920305202F       | ESCC              | Flat-16E               | Solder Dip | 920305202F             | Strip Pack |        |
| M54HC175DG                    | 920305210F       | ESCC              | DIL-16                 | Gold       | 920305210F             | Strip Pack | 2.20   |
| M54HC175DT                    | 920305211F       | ESCC              | DIL-16                 | Solder Dip | 920305211F             | Strip Pack |        |
| M54HC191K1                    | -                | Engineering Model | Flat-16E               | Gold       | M54HC191K1             | Strip Pack | 0.50   |
| M54HC191KG                    | 920406601F       | ESCC              | Flat-16E               | Gold       | 920406601F             | Strip Pack |        |



| ST Part Number <sup>(1)</sup> | ESCC part number | Quality Level     | Package <sup>(2)</sup> | Finishing  | Marking <sup>(3)</sup> | Packing    | Mass g |
|-------------------------------|------------------|-------------------|------------------------|------------|------------------------|------------|--------|
| M54HC191KT                    | 920406602F       | ESCC              | Flat-16E               | Solder Dip | 920406602F             | Strip Pack | 0.50   |
| M54HC191DG                    | 920406610F       | ESCC              | DIL-16                 | Gold       | 920406610F             | Strip Pack | 2.20   |
| M54HC191DT                    | 920406611F       | ESCC              | DIL-16                 | Solder Dip | 920406611F             | Strip Pack |        |
| M54HC193K1                    | -                | Engineering Model | Flat-16E               | Gold       | M54HC193K1             | Strip Pack | 0.50   |
| M54HC193KG                    | 920406501F       | ESCC              | Flat-16E               | Gold       | 920406501F             | Strip Pack |        |
| M54HC193KT                    | 920406502F       | ESCC              | Flat-16E               | Solder Dip | 920406502F             | Strip Pack |        |
| M54HC193DG                    | 920406510F       | ESCC              | DIL-16                 | Gold       | 920406510F             | Strip Pack | 2.20   |
| M54HC193DT                    | 920406511F       | ESCC              | DIL-16                 | Solder Dip | 920406511F             | Strip Pack |        |
| M54HC237K1                    | -                | Engineering Model | Flat-16E               | Gold       | M54HC237K1             | Strip Pack | 0.50   |
| M54HC237KG                    | 920502101F       | ESCC              | Flat-16E               | Gold       | 920502101F             | Strip Pack |        |
| M54HC237KT                    | 920502102F       | ESCC              | Flat-16E               | Solder Dip | 920502102F             | Strip Pack |        |
| M54HC237DG                    | 920502110F       | ESCC              | DIL-16                 | Gold       | 920502110F             | Strip Pack | 2.20   |
| M54HC237DT                    | 920502111F       | ESCC              | DIL-16                 | Solder Dip | 920502111F             | Strip Pack |        |
| M54HC240K1                    | -                | Engineering Model | Flat-20E               | Gold       | M54HC240K1             | Strip Pack | 0.90   |
| M54HC240KG                    | 940103401F       | ESCC              | Flat-20E               | Gold       | 940103401F             | Strip Pack |        |
| M54HC240KT                    | 940103402F       | ESCC              | Flat-20E               | Solder Dip | 940103402F             | Strip Pack |        |
| M54HC240DG                    | 940103403F       | ESCC              | DIL-20                 | Gold       | 940103403F             | Strip Pack | 3.20   |
| M54HC240DT                    | 940103404F       | ESCC              | DIL-20                 | Solder Dip | 940103404F             | Strip Pack |        |
| M54HC244K1                    | -                | Engineering Model | Flat-20E               | Gold       | M54HC244K1             | Strip Pack | 0.90   |
| M54HC244KG                    | 940104801F       | ESCC              | Flat-20E               | Gold       | 940104801F             | Strip Pack |        |
| M54HC244KT                    | 940104802F       | ESCC              | Flat-20E               | Solder Dip | 940104802F             | Strip Pack |        |
| M54HC244DG                    | 940104803F       | ESCC              | DIL-20                 | Gold       | 940104803F             | Strip Pack | 3.20   |
| M54HC244DT                    | 940104804F       | ESCC              | DIL-20                 | Solder Dip | 940104804F             | Strip Pack |        |
| M54HCT244K1                   | -                | Engineering Model | Flat-20E               | Gold       | M54HCT244K1            | Strip Pack | 0.90   |
| M54HCT244KG                   | 940200901F       | ESCC              | Flat-20E               | Gold       | 940200901F             | Strip Pack |        |
| M54HCT244KT                   | 940200902F       | ESCC              | Flat-20E               | Solder Dip | 940200902F             | Strip Pack |        |
| M54HCT244DG                   | 940200903F       | ESCC              | DIL-20                 | Gold       | 940200903F             | Strip Pack | 3.20   |
| M54HCT244DT                   | 940200904F       | ESCC              | DIL-20                 | Solder Dip | 940200904F             | Strip Pack |        |
| M54HC245K1                    | -                | Engineering Model | Flat-20E               | Gold       | M54HC245K1             | Strip Pack | 0.90   |
| M54HC245KG                    | 940501301F       | ESCC              | Flat-20E               | Gold       | 940501301F             | Strip Pack |        |
| M54HC245KT                    | 940501302F       | ESCC              | Flat-20E               | Solder Dip | 940501302F             | Strip Pack |        |
| M54HC245DG                    | 940501303F       | ESCC              | DIL-20                 | Gold       | 940501303F             | Strip Pack | 3.20   |
| M54HC245DT                    | 940501304F       | ESCC              | DIL-20                 | Solder Dip | 940501304F             | Strip Pack |        |
| M54HCT245K1                   | -                | Engineering Model | Flat-20E               | Gold       | M54HCT245K1            | Strip Pack | 0.90   |
| M54HCT245KG                   | 940501401F       | ESCC              | Flat-20E               | Gold       | 940501401F             | Strip Pack |        |
| M54HCT245KT                   | 940501402F       | ESCC              | Flat-20E               | Solder Dip | 940501402F             | Strip Pack |        |
| M54HCT245DG                   | 940501403F       | ESCC              | DIL-20                 | Gold       | 940501403F             | Strip Pack | 3.20   |
| M54HCT245DT                   | 940501404F       | ESCC              | DIL-20                 | Solder Dip | 940501404F             | Strip Pack |        |
| M54HC251K1                    | -                | Engineering Model | Flat-16E               | Gold       | M54HC251K1             | Strip Pack | 0.50   |
| M54HC251KG                    | 940804801F       | ESCC              | Flat-16E               | Gold       | 940804801F             | Strip Pack |        |
| M54HC251KT                    | 940804802F       | ESCC              | Flat-16E               | Solder Dip | 940804802F             | Strip Pack |        |



| ST Part Number <sup>(1)</sup> | ESCC part number | Quality Level     | Package <sup>(2)</sup> | Finishing  | Marking <sup>(3)</sup> | Packing    | Mass g |
|-------------------------------|------------------|-------------------|------------------------|------------|------------------------|------------|--------|
| M54HC251DG                    | 940804810F       | ESCC              | DIL-16                 | Gold       | 940804810F             | Strip Pack | 2.20   |
| M54HC251DT                    | 940804811F       | ESCC              | DIL-16                 | Solder Dip | 940804811F             | Strip Pack |        |
| M54HC257K1                    | -                | Engineering Model | Flat-16E               | Gold       | M54HC257K1             | Strip Pack | 0.50   |
| M54HC257KG                    | 940804701F       | ESCC              | Flat-16E               | Gold       | 940804701F             | Strip Pack |        |
| M54HC257KT                    | 940804702F       | ESCC              | Flat-16E               | Solder Dip | 940804702F             | Strip Pack |        |
| M54HC259K1                    | -                | Engineering Model | Flat-16E               | Gold       | M54HC259K1             | Strip Pack | 0.50   |
| M54HC259KG                    | 920307301F       | ESCC              | Flat-16E               | Gold       | 920307301F             | Strip Pack |        |
| M54HC259KT                    | 920307302F       | ESCC              | Flat-16E               | Solder Dip | 920307302F             | Strip Pack |        |
| M54HC259DG                    | 920307310F       | ESCC              | DIL-16                 | Gold       | 920307310F             | Strip Pack | 2.20   |
| M54HC259DT                    | 920307311F       | ESCC              | DIL-16                 | Solder Dip | 920307311F             | Strip Pack |        |
| M54HC273K1                    | -                | Engineering Model | Flat-20E               | Gold       | M54HC273K1             | Strip Pack | 0.90   |
| M54HC273KG                    | 920305301F       | ESCC              | Flat-20E               | Gold       | 920305301F             | Strip Pack |        |
| M54HC273KT                    | 920305302F       | ESCC              | Flat-20E               | Solder Dip | 920305302F             | Strip Pack |        |
| M54HC273DG                    | 920305303F       | ESCC              | DIL-20                 | Gold       | 920305303F             | Strip Pack | 3.20   |
| M54HC273DT                    | 920305304F       | ESCC              | DIL-20                 | Solder Dip | 920305304F             | Strip Pack |        |
| M54HC373K1                    | -                | Engineering Model | Flat-20E               | Gold       | M54HC373K1             | Strip Pack | 0.90   |
| M54HC373KG                    | 920305901F       | ESCC              | Flat-20E               | Gold       | 920305901F             | Strip Pack |        |
| M54HC373KT                    | 920305902F       | ESCC              | Flat-20E               | Solder Dip | 920305902F             | Strip Pack |        |
| M54HC373DG                    | 920305903F       | ESCC              | DIL-20                 | Gold       | 920305903F             | Strip Pack | 3.20   |
| M54HC373DT                    | 920305904F       | ESCC              | DIL-20                 | Solder Dip | 920305904F             | Strip Pack |        |
| M54HC374K1                    | -                | Engineering Model | Flat-20E               | Gold       | M54HC374K1             | Strip Pack | 0.90   |
| M54HC374KG                    | 920306001F       | ESCC              | Flat-20E               | Gold       | 920306001F             | Strip Pack |        |
| M54HC374KT                    | 920306002F       | ESCC              | Flat-20E               | Solder Dip | 920306002F             | Strip Pack |        |
| M54HC374DG                    | 920306003F       | ESCC              | DIL-20                 | Gold       | 920306003F             | Strip Pack | 3.20   |
| M54HC374DT                    | 920306004F       | ESCC              | DIL-20                 | Solder Dip | 920306004F             | Strip Pack |        |
| M54HC393K1                    | -                | Engineering Model | Flat-14E               | Gold       | M54HC393K1             | Strip Pack | 0.70   |
| M54HC393KG                    | 920407401F       | ESCC              | Flat-14E               | Gold       | 920407401F             | Strip Pack |        |
| M54HC393KT                    | 920407402F       | ESCC              | Flat-14E               | Solder Dip | 920407402F             | Strip Pack |        |
| M54HC393DG                    | 920407403F       | ESCC              | DIL-14                 | Gold       | 920407403F             | Strip Pack | 2.20   |
| M54HC393DT                    | 920407404F       | ESCC              | DIL-14                 | Solder Dip | 920407404F             | Strip Pack |        |
| M54HC540K1                    | -                | Engineering Model | Flat-20E               | Gold       | M54HC540K1             | Strip Pack | 0.90   |
| M54HC540KG                    | 940104901F       | ESCC              | Flat-20E               | Gold       | 940104901F             | Strip Pack |        |
| M54HC540KT                    | 940104902F       | ESCC              | Flat-20E               | Solder Dip | 940104902F             | Strip Pack |        |
| M54HC540DG                    | 940104903F       | ESCC              | DIL-20                 | Gold       | 940104903F             | Strip Pack | 3.20   |
| M54HC540DT                    | 940104904F       | ESCC              | DIL-20                 | Solder Dip | 940104904F             | Strip Pack |        |
| M54HC541K1                    | -                | Engineering Model | Flat-20E               | Gold       | M54HC541K1             | Strip Pack | 0.90   |
| M54HC541KG                    | 940104701F       | ESCC              | Flat-20E               | Gold       | 940104701F             | Strip Pack |        |
| M54HC541KT                    | 940104702F       | ESCC              | Flat-20E               | Solder Dip | 940104702F             | Strip Pack |        |
| M54HC541DG                    | 940104703F       | ESCC              | DIL-20                 | Gold       | 940104703F             | Strip Pack | 3.20   |
| M54HC541DT                    | 940104704F       | ESCC              | DIL-20                 | Solder Dip | 940104704F             | Strip Pack |        |
| M54HC573K1                    | -                | Engineering Model | Flat-20E               | Gold       | M54HC573K1             | Strip Pack | 0.90   |



| ST Part Number <sup>(1)</sup> | ESCC part number | Quality Level     | Package <sup>(2)</sup> | Finishing  | Marking <sup>(3)</sup> | Packing    | Mass g |
|-------------------------------|------------------|-------------------|------------------------|------------|------------------------|------------|--------|
| M54HC573KG                    | 920207201F       | ESCC              | Flat-20E               | Gold       | 920207201F             | Strip Pack | 0.90   |
| M54HC573KT                    | 920207202F       | ESCC              | Flat-20E               | Solder Dip | 920207202F             | Strip Pack |        |
| M54HC573DG                    | 920207203F       | ESCC              | DIL-20                 | Gold       | 920207203F             | Strip Pack | 3.20   |
| M54HC573DT                    | 920207204F       | ESCC              | DIL-20                 | Solder Dip | 920207204F             | Strip Pack |        |
| M54HC574K1                    | -                | Engineering Model | Flat-20E               | Gold       | M54HC574K1             | Strip Pack | 0.90   |
| M54HC574KG                    | 920305401F       | ESCC              | Flat-20E               | Gold       | 920305401F             | Strip Pack |        |
| M54HC574KT                    | 920305402F       | ESCC              | Flat-20E               | Solder Dip | 920305402F             | Strip Pack | 3.20   |
| M54HC574DG                    | 920305403F       | ESCC              | DIL-20                 | Gold       | 920305403F             | Strip Pack |        |
| M54HC574DT                    | 920305404F       | ESCC              | DIL-20                 | Solder Dip | 920305404F             | Strip Pack | 0.50   |
| M54HC595K1                    | -                | Engineering Model | Flat-16E               | Gold       | M54HC595K1             | Strip Pack |        |
| M54HC595KG                    | 930605101F       | ESCC              | Flat-16E               | Gold       | 930605101F             | Strip Pack | 2.20   |
| M54HC595KT                    | 930605102F       | ESCC              | Flat-16E               | Solder Dip | 930605102F             | Strip Pack |        |
| M54HC595DG                    | 930605110F       | ESCC              | DIL-16                 | Gold       | 930605110F             | Strip Pack | 0.50   |
| M54HC595DT                    | 930605111F       | ESCC              | DIL-16                 | Solder Dip | 930605111F             | Strip Pack |        |
| M54HC597K1                    | -                | Engineering Model | Flat-16E               | Gold       | M54HC597K1             | Strip Pack | 2.20   |
| M54HC597KG                    | 930605401F       | ESCC              | Flat-16E               | Gold       | 930605401F             | Strip Pack |        |
| M54HC597KT                    | 930605402F       | ESCC              | Flat-16E               | Solder Dip | 930605402F             | Strip Pack | 0.90   |
| M54HC597DG                    | 930605410F       | ESCC              | DIL-16                 | Gold       | 930605410F             | Strip Pack |        |
| M54HC597DT                    | 930605411F       | ESCC              | DIL-16                 | Solder Dip | 930605411F             | Strip Pack | 3.20   |
| M54HC688K1                    | -                | Engineering Model | Flat-20E               | Gold       | M54HC688K1             | Strip Pack |        |
| M54HC688KG                    | 920900501F       | ESCC              | Flat-20E               | Gold       | 920900501F             | Strip Pack | 0.50   |
| M54HC688KT                    | 920900502F       | ESCC              | Flat-20E               | Solder Dip | 920900502F             | Strip Pack |        |
| M54HC688DG                    | 920900503F       | ESCC              | DIL-20                 | Gold       | 920900503F             | Strip Pack | 2.20   |
| M54HC688DT                    | 920900504F       | ESCC              | DIL-20                 | Solder Dip | 920900504F             | Strip Pack |        |
| M54HC4020K1                   | -                | Engineering Model | Flat-16E               | Gold       | M54HC4020K1            | Strip Pack | 0.50   |
| M54HC4020KG                   | 920407001F       | ESCC              | Flat-16E               | Gold       | 920407001F             | Strip Pack |        |
| M54HC4020KT                   | 920407002F       | ESCC              | Flat-16E               | Solder Dip | 920407002F             | Strip Pack | 2.20   |
| M54HC4020DG                   | 920407010F       | ESCC              | DIL-16                 | Gold       | 920407010F             | Strip Pack |        |
| M54HC4020DT                   | 920407011F       | ESCC              | DIL-16                 | Solder Dip | 920407011F             | Strip Pack | 0.50   |
| M54HC4040K1                   | -                | Engineering Model | Flat-16E               | Gold       | M54HC4040K1            | Strip Pack |        |
| M54HC4040KG                   | 920406901F       | ESCC              | Flat-16E               | Gold       | 920406901F             | Strip Pack | 2.20   |
| M54HC4040KT                   | 920406902F       | ESCC              | Flat-16E               | Solder Dip | 920406902F             | Strip Pack |        |
| M54HC4040DG                   | 920406910F       | ESCC              | DIL-16                 | Gold       | 920406910F             | Strip Pack | 0.50   |
| M54HC4040DT                   | 920406911F       | ESCC              | DIL-16                 | Solder Dip | 920406911F             | Strip Pack |        |
| M54HC4049K1                   | -                | Engineering Model | Flat-16E               | Gold       | M54HC4049K1            | Strip Pack | 2.20   |
| M54HC4049KG                   | 940103701F       | ESCC              | Flat-16E               | Gold       | 940103701F             | Strip Pack |        |
| M54HC4049KT                   | 940103702F       | ESCC              | Flat-16E               | Solder Dip | 940103702F             | Strip Pack | 0.50   |
| M54HC4049DG                   | 940103710F       | ESCC              | DIL-16                 | Gold       | 940103710F             | Strip Pack |        |
| M54HC4049DT                   | 940103711F       | ESCC              | DIL-16                 | Solder Dip | 940103711F             | Strip Pack | 2.20   |
| M54HC4050K1                   | -                | Engineering Model | Flat-16E               | Gold       | M54HC4050K1            | Strip Pack |        |
| M54HC4050KG                   | 940103801F       | ESCC              | Flat-16E               | Gold       | 940103801F             | Strip Pack |        |



| ST Part Number <sup>(1)</sup> | ESCC part number | Quality Level     | Package <sup>(2)</sup> | Finishing  | Marking <sup>(3)</sup> | Packing    | Mass g |
|-------------------------------|------------------|-------------------|------------------------|------------|------------------------|------------|--------|
| M54HC4050KT                   | 940103802F       | ESCC              | Flat-16E               | Solder Dip | 940103802F             | Strip Pack | 0.50   |
| M54HC4050DG                   | 940103810F       | ESCC              | DIL-16                 | Gold       | 940103810F             | Strip Pack | 2.20   |
| M54HC4050DT                   | 940103811F       | ESCC              | DIL-16                 | Solder Dip | 940103811F             | Strip Pack |        |
| M54HC4051K1                   | -                | Engineering Model | Flat-16E               | Gold       | M54HC4051K1            | Strip Pack | 0.50   |
| M54HC4051KG                   | 940806401F       | ESCC              | Flat-16E               | Gold       | 940806401F             | Strip Pack |        |
| M54HC4051KT                   | 940806402F       | ESCC              | Flat-16E               | Solder Dip | 940806402F             | Strip Pack |        |
| M54HC4051DG                   | 940806410F       | ESCC              | DIL-16                 | Gold       | 940806410F             | Strip Pack | 2.20   |
| M54HC4051DT                   | 940806411F       | ESCC              | DIL-16                 | Solder Dip | 940806411F             | Strip Pack |        |
| M54HC4053K1                   | -                | Engineering Model | Flat-16E               | Gold       | M54HC4053K1            | Strip Pack | 0.50   |
| M54HC4053KG                   | 940806501F       | ESCC              | Flat-16E               | Gold       | 940806501F             | Strip Pack |        |
| M54HC4053KT                   | 940806502F       | ESCC              | Flat-16E               | Solder Dip | 940806502F             | Strip Pack |        |
| M54HC4053DG                   | 940806510F       | ESCC              | DIL-16                 | Gold       | 940806510F             | Strip Pack | 2.20   |
| M54HC4053DT                   | 940806511F       | ESCC              | DIL-16                 | Solder Dip | 940806511F             | Strip Pack |        |
| M54HC4060K1                   | -                | Engineering Model | Flat-16E               | Gold       | M54HC4060K1            | Strip Pack | 0.50   |
| M54HC4060KG                   | 920407601F       | ESCC              | Flat-16E               | Gold       | 920407601F             | Strip Pack |        |
| M54HC4060KT                   | 920407602F       | ESCC              | Flat-16E               | Solder Dip | 920407602F             | Strip Pack |        |
| M54HC4060DG                   | 920407610F       | ESCC              | DIL-16                 | Gold       | 920407610F             | Strip Pack | 2.20   |
| M54HC4060DT                   | 920407611F       | ESCC              | DIL-16                 | Solder Dip | 920407611F             | Strip Pack |        |
| M54HC4066K1                   | -                | Engineering Model | Flat-14E               | Gold       | M54HC4066K1            | Strip Pack | 0.70   |
| M54HC4066KG                   | 940805201F       | ESCC              | Flat-14E               | Gold       | 940805201F             | Strip Pack |        |
| M54HC4066KT                   | 940805202F       | ESCC              | Flat-14E               | Solder Dip | 940805202F             | Strip Pack |        |
| M54HC4066DG                   | 940805203F       | ESCC              | DIL-14                 | Gold       | 940805203F             | Strip Pack | 2.20   |
| M54HC4066DT                   | 940805204F       | ESCC              | DIL-14                 | Solder Dip | 940805204F             | Strip Pack |        |
| M54HC4094K1                   | -                | Engineering Model | Flat-16E               | Gold       | M54HC4094K1            | Strip Pack | 0.50   |
| M54HC4094KG                   | 930605001F       | ESCC              | Flat-16E               | Gold       | 930605001F             | Strip Pack |        |
| M54HC4094KT                   | 930605002F       | ESCC              | Flat-16E               | Solder Dip | 930605002F             | Strip Pack |        |
| M54HC4094DG                   | 930605010F       | ESCC              | DIL-16                 | Gold       | 930605010F             | Strip Pack | 2.20   |
| M54HC4094DT                   | 930605011F       | ESCC              | DIL-16                 | Solder Dip | 930605011F             | Strip Pack |        |
| M54HC4514K1                   | -                | Engineering Model | Flat-24                | Gold       | M54HC4514K1            | Strip Pack | 1.70   |
| M54HC4514KG                   | 920501901F       | ESCC              | Flat-24                | Gold       | 920501901F             | Strip Pack |        |
| M54HC4514KT                   | 920501902F       | ESCC              | Flat-24                | Solder Dip | 920501902F             | Strip Pack |        |
| M54HC4514DG                   | 920501903F       | ESCC              | DIL-24                 | Gold       | 920501903F             | Strip Pack | 5.20   |
| M54HC4514DT                   | 920501904F       | ESCC              | DIL-24                 | Solder Dip | 920501904F             | Strip Pack |        |

1. Refer to the technical notes listed in page 1 for information about the part numbers and specific conditions for other versions including product in die form, 100 krad(Si) versions available on selected products and packages, parts up-screened to a flow similar to class S, and the availability of DIL versions not listed in the table.
2. The upper metallic lid is floating.
3. Specific marking only. See section X for complete marking.

## 7 Other information

### 7.1 Product marking and traceability

Figure 10. Product marking outline, flight model top view

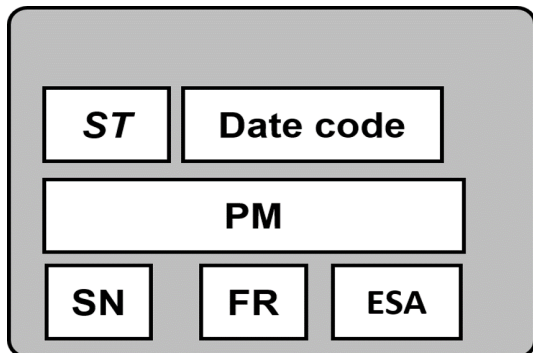


Figure 11. Product marking outline, engineering model top view

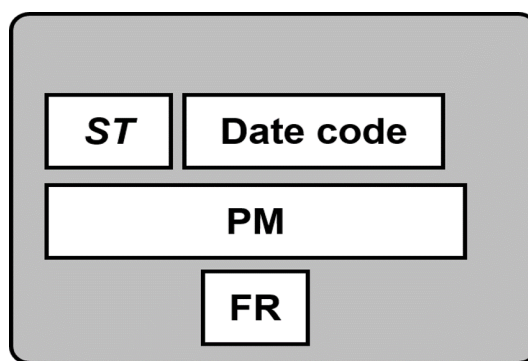


Table 15. Product marking description

| Field    | Model                  | Description           |
|----------|------------------------|-----------------------|
| ST       | Engineering and flight | Standard ST logo      |
| PM       | Engineering            | Product part number   |
|          | Flight                 | ESCC part number      |
| Datecode | Engineering            | 3yywwN <sup>(1)</sup> |
|          | Flight                 | yywwN <sup>(2)</sup>  |
| 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.

## 7.2 Product documentation

### Product documentation

Products are delivered with their default documentation and possibly separately ordered optional documentation. 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 16. Product documentation**

| Quality level     | Documentation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Engineering model | Certificate of conformance including: <ul style="list-style-type: none"> <li>• Customer name</li> <li>• Customer purchase order number</li> <li>• ST sales order number and item</li> <li>• ST commercial product code</li> <li>• Quantity delivered</li> <li>• Date code</li> <li>• Reference data sheet</li> <li>• Reference to TN1181 on engineering models</li> <li>• ST Rennes assembly lot ID</li> </ul>                                                                                                                                                                                                                                                                                                       |
| ESCC Flight       | Certificate of conformance including: <ul style="list-style-type: none"> <li>• Customer name</li> <li>• Customer purchase order number</li> <li>• ST sales order number and item</li> <li>• ST commercial product code</li> <li>• Quantity delivered</li> <li>• Date code</li> <li>• Serial numbers</li> <li>• Wafer diffusion plant location and wafer size</li> <li>• Wafer diffusion lot ID number and wafer ID number</li> <li>• Reference of the applicable ESCC Qualification maintenance lot</li> <li>• Reference to the ESCC detail specification</li> <li>• ST Rennes assembly lot ID</li> <li>• Radiation verification test number</li> <li>• Lead finish : Sn63Pb37 (solder dipped parts only)</li> </ul> |

## Revision history

**Table 17. Document revision history**

| Date        | Version | Changes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 14-Apr-2010 | 1       | Initial release.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 02-Aug-2011 | 2       | Added Note: on page 14, 1. on page 14, 1. on page 15, 1. on page 16, 1. on page 19, 1. on page 20 and in the "Pin connections" diagram on the coverpage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 29-May-2013 | 3       | <p>Updated Flat-24 package in figure on page 1.</p> <p>Updated Section 2: Input and output equivalent circuit diagram (updated titles - added "output", updated Figure 1, added note 1. below Figure 1).</p> <p>Updated Table 1 (removed M54HCU04, M54HC163, M54HC238, M54HC241, M54HC253, M54HC365, M54HCT374, M54HC390, M54HC4002, M54HC4072, and M54HC4075 device).</p> <p>Updated note 1. below Table 1 (removed "QML-Q versions").</p> <p>Added note 2. below Table 3, renumbered notes below Table 3.</p> <p>Added tr,tf symbols, parameters, values and units to Table 4.</p> <p>Updated Section 5: Package information (added Figure 6 and Figure 7, Table 11 and Table 12, reversed order of Figure 2 to Figure 5, Figure 8 and Figure 9, Table 8 to Table 10, Table 13 and Table 14, corrected typ. dimension for symbol "L" in Table 9).</p> <p>Updated Table 15 (removed M54HCU04K/D, M54HC163K/D, M54HC238K/D, M54HC241K/D, M54HC253K/D, M54HC365K/D, M54HCT374K/D, M54HC390K/D, M54HC4002K/D, M54HC4072K/D, and M54HC4075K/D device).</p> <p>Added note 2. below Table 15, updated note 1. (removed "QML-Q versions"), renumbered notes below Table 15.</p> <p>Added Section 7: Other information.</p> <p>Minor corrections throughout document.</p> |
| 01-Apr-2014 | 4       | Table 15: Ordering information: All order codes changed to the new ST ordering code scheme, updated footnote 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 05-Nov-2020 | 5       | <p>Updated cover page.</p> <p>Removed "Device summary" and "Maximum ratings" sections.</p> <p>Updated Order codes and Section 4 Other information.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 17-Oct-2023 | 6       | <p>Updated features and description on the cover page, <a href="#">Section 5.1</a>, <a href="#">Section 5.3</a>, <a href="#">Section 6</a> and <a href="#">Section 7</a>.</p> <p>Added <a href="#">Section 1</a>, <a href="#">Section 3</a>, <a href="#">Section 4.1</a>, <a href="#">Section 4.2</a>, <a href="#">Section 4.2.1</a>, <a href="#">Section 4.2.2</a> and <a href="#">Section 4.2.3</a>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

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