

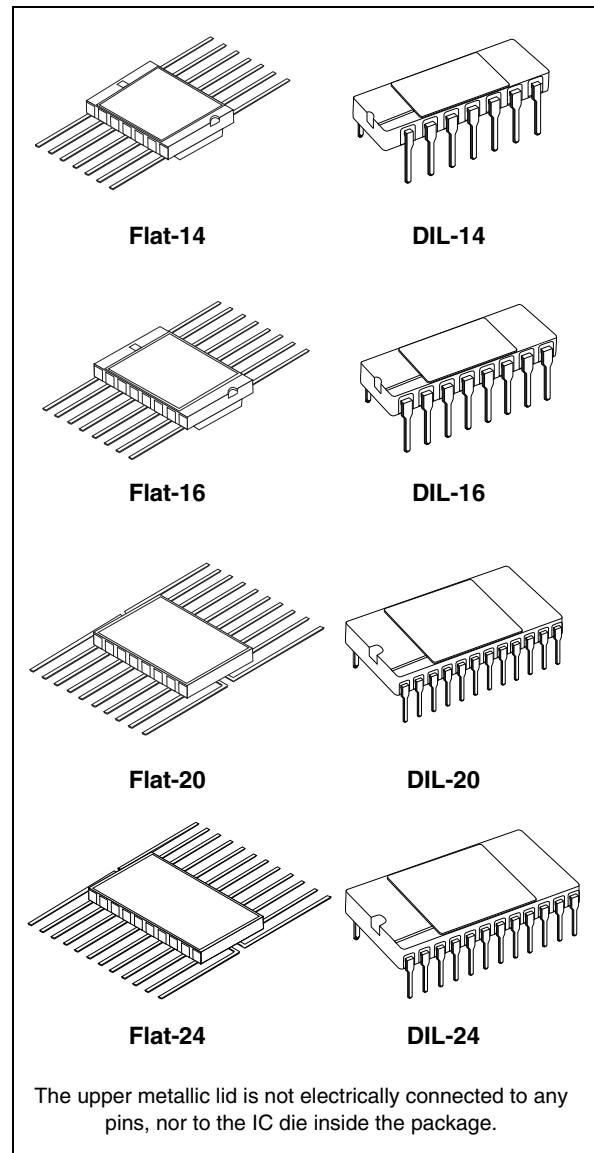
Rad-hard high speed 2 to 6 V CMOS logic series

Features

- 2 to 6 V operating voltage
- Low power DC dissipation: 1 μ A max at 25°C
- High speed $t_{PD} = 8$ ns typ at 25°C
- Symmetrical outputs characteristics
- High noise immunity: 28% of min V_{CC}
- Hermetic packages
- Rad-hard 50 krad (Si)
- SEL immune up to 110 MeV/mg/cm²
- ESCC qualified
- Same die and electrical specification for engineering and flight models
- The complete specification of each type is available from the ESCC web site: <https://escs.org> using its ESCC part number. ST guarantees full compliance of qualified parts with these ESCC specifications

Description

The M54HCxxx and M54HCTxxx series are composed of over 90 types of high speed CMOS functions specifically designed to meet the radiation requirements of the aerospace industry. It includes a large set of gates, Flip-Flops, Multiplexers, Counters, Bus interface and several other functions. The radiation hardness, the single event latch-up (SEL) immunity and the housing in hermetic packages of all types of both series make them ideally suited for use in the most difficult environmental conditions.



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1 M54HC and M54HCT families overview

Table 1. Device summary

| Part number | Description | Radiation level | Agency qualification | EPPL | ESCC specification | Package | Vcc | | Vin range | Other features | Temp. range |
|-------------|---------------------------------------|-----------------|----------------------|------|--------------------|------------------|-----|-----|-----------|-------------------|------------------|
| | | | | | | | Min | Max | | | |
| M54HC00 | Rad-hard quad 2-input NAND gate | 50 krad (Si) | ESCC | Y | 9201/105 | Flat-14 - DIL-14 | 2.0 | 6.0 | 0 to Vcc | | -55 °C to 125 °C |
| M54HC02 | Rad-hard quad 2-input NOR gate | | | Y | 9201/113 | Flat-14 - DIL-14 | 2.0 | 6.0 | | | |
| M54HC03 | Rad-hard quad 2-input NAND open drain | | | Y | 9201/114 | Flat-14 - DIL-14 | 2.0 | 6.0 | | | |
| M54HC04 | Rad-hard Hex inverter | | | Y | 9401/033 | Flat-14 - DIL-14 | 2.0 | 6.0 | | | |
| M54HCU04 | Rad-hard Hex inverter single stage | - | | - | 9401/055 | Flat-14 - DIL-14 | 4.5 | 5.5 | | Unbuffered output | |
| M54HC08 | Rad-hard quad 2-input AND gate | 50 krad (Si) | | Y | 9201/106 | Flat-14 - DIL-14 | 2.0 | 6.0 | | | |
| M54HC10 | Rad-hard triple 3-input NAND gate | | | Y | 9201/107 | Flat-14 - DIL-14 | 2.0 | 6.0 | | | |
| M54HC11 | Rad-hard triple 3-input AND gate | | | Y | 9201/117 | Flat-14 - DIL-14 | 2.0 | 6.0 | | | |
| M54HC14 | Rad-hard Hex Schmitt inverter | | | Y | 9409/007 | Flat-14 - DIL-14 | 2.0 | 6.0 | | | |
| M54HC20 | Rad-hard dual 4-input NAND gate | | | Y | 9201/118 | Flat-14 - DIL-14 | 2.0 | 6.0 | | | |
| M54HC21 | Rad-hard dual 4-input AND gate | | | Y | 9201/108 | Flat-14 - DIL-14 | 2.0 | 6.0 | | | |
| M54HC27 | Rad-hard triple 3-input NOR gate | | | Y | 9201/109 | Flat-14 - DIL-14 | 2.0 | 6.0 | | | |



Table 1. Device summary (continued)

| Part number | Description | Radiation level | Agency qualification | EPPL | ESCC specification | Package | Vcc | | Vin range | Other features | Temp. range |
|-------------|--|-----------------|----------------------|------|--------------------|------------------|-----|-----|-----------|---------------------------------|------------------|
| | | | | | | | Min | Max | | | |
| M54HC30 | Rad-hard 8-input NAND gate | 50 krad (Si) | ESCC | - | 9201/110 | Flat-14 - DIL-14 | 2.0 | 6.0 | 0 to Vcc | | -55 °C to 125 °C |
| M54HC32 | Rad-hard quad 2-input OR gate | | | Y | 9201/111 | Flat-14 - DIL-14 | 2.0 | 6.0 | | | |
| M54HC73 | Rad-hard dual J-K flip-flop with clear | | | - | 9203/071 | Flat-14 - DIL-14 | 2.0 | 6.0 | | Negative-edge | |
| M54HC74 | Rad-hard dual D-Type Flip-Flop with preset & clear | | | Y | 9203/050 | Flat-14 - DIL-14 | 2.0 | 6.0 | | Positive-edge | |
| M54HCT74 | Rad-hard dual D-Type Flip-Flop with preset & clear | | | Y | 9203/070 | Flat-14 - DIL-14 | 4.5 | 5.5 | | Positive-edge TTL compatible | |
| M54HC75 | Rad-hard 4-bit D-type latch | | | - | 9203/065 | Flat-16 - DIL-16 | 2.0 | 6.0 | | | |
| M54HC85 | Rad-hard 4-bit magnitude comparator | | | Y | 9209/004 | Flat-16 - DIL-16 | 2.0 | 6.0 | | | |
| M54HC86 | Rad-hard quad exclusive OR gate | | | Y | 9201/119 | Flat-14 - DIL-14 | 2.0 | 6.0 | | Pinout 1 | |
| M54HC109 | Rad-hard dual J-K Flip-Flop with preset & clear | | | Y | 9306/048 | Flat-16 - DIL-16 | 2.0 | 6.0 | | Positive-edge | |
| M54HC123 | Rad-hard dual retrigger. monostable multivibrator with clear | | | - | 9207/006 | Flat-16 - DIL-16 | 2.0 | 6.0 | | | |
| M54HC125 | Rad-hard quad bus buffer 3-state | | | Y | 9401/039 | Flat-14 | 2.0 | 6.0 | | Inverted enables | |
| M54HC132 | Rad-hard quad 2-input Schmitt NAND gate | | | Y | 9201/120 | Flat-14 - DIL-14 | 2.0 | 6.0 | | | |
| M54HC137 | Rad-hard 3-to-8 line decoder latch inverter | | | - | 9205/013 | Flat-16 - DIL-16 | 2.0 | 6.0 | | | |

Table 1. Device summary (continued)

| Part number | Description | Radiation level | Agency qualification | EPPL | ESCC specification | Package | Vcc | | Vin range | Other features | Temp. range |
|-------------|---|-----------------|----------------------|------|--------------------|------------------|-----|-----|-----------|----------------|------------------|
| | | | | | | | Min | Max | | | |
| M54HC138 | Rad-hard 3-to-8 line decoder inverter | 50 krad (Si) | ESCC | Y | 9408/046 | Flat-16 - DIL-16 | 2.0 | 6.0 | 0 to Vcc | | -55 °C to 125 °C |
| M54HC139 | Rad-hard dual 2-to-4 line decoder/demultiplexer | | | Y | 9205/017 | Flat-16 - DIL-16 | 2.0 | 6.0 | | | |
| M54HC148 | Rad-hard 8-to-3 line priority encoder | | | - | 9410/017 | Flat-16 - DIL-16 | 2.0 | 6.0 | | | |
| M54HC151 | Rad-hard 8-channel multiplexer | | | Y | 9408/054 | Flat-16 - DIL-16 | 2.0 | 6.0 | | | |
| M54HC153 | Rad-hard dual 4-channel multiplexer | | | - | 9408/038 | Flat-16 - DIL-16 | 2.0 | 6.0 | | | |
| M54HC154 | Rad-hard 4-to-16 line decoder/demultiplexer | | | Y | 9205/023 | Flat-24 - DIL-24 | 2.0 | 6.0 | | | |
| M54HC157 | Rad-hard quad 2-channel multiplexer | | | Y | 9408/057 | Flat-16 - DIL-16 | 2.0 | 6.0 | | | |
| M54HC158 | Rad-hard quad 2-channel multiplexer Inverter | | | Y | 9408/059 | Flat-16 - DIL-16 | 2.0 | 6.0 | | | |
| M54HC160 | Rad-hard synchronous decade counter with async. clear | | | - | 9205/062 | DIL-16 | 2.0 | 6.0 | | | |
| M54HC161 | Rad-hard synchronous binary counter with async. clear | | | Y | 9204/059 | Flat-16 - DIL-16 | 2.0 | 6.0 | | | |
| M54HC163 | Rad-hard synchronous binary counter with sync. clear | | | Y | 9204/073 | Flat-16 - DIL-16 | 2.0 | 6.0 | | | |
| M54HC164 | Rad-hard 8-bit SIPO shift register | | | Y | 9306/041 | Flat-14 - DIL-14 | 2.0 | 6.0 | | | |
| M54HC165 | Rad-hard 8-bit PISO shift register | | | Y | 9306/042 | Flat-16 - DIL-16 | 2.0 | 6.0 | | | |
| M54HC166 | Rad-hard 8-bit PISO shift register with clear | | | Y | 9306/043 | Flat-16 - DIL-16 | 2.0 | 6.0 | | | |



Table 1. Device summary (continued)

| Part number | Description | Radiation level | Agency qualification | EPPL | ESCC specification | Package | Vcc | | Vin range | Other features | Temp. range |
|-------------|---|-----------------|----------------------|------|--------------------|------------------|-----|-----|-----------|------------------------------------|------------------|
| | | | | | | | Min | Max | | | |
| M54HC174 | Rad-hard Hex D-Type Flip-Flop with clear | 50 krad (Si) | ESCC | Y | 9306/052 | Flat-16 - DIL-16 | 2.0 | 6.0 | 0 to Vcc | | -55 °C to 125 °C |
| M54HC175 | Rad-Hard Quad D-Type Flip-Flop With Clear | | | Y | 9203/052 | Flat-16 - DIL-16 | 2.0 | 6.0 | | | |
| M54HC191 | Rad-Hard 4-bit synchronous binary up/down counter | | | Y | 9204/066 | Flat-16 - DIL-16 | 2.0 | 6.0 | | | |
| M54HC193 | Rad-hard synchronous up/down binary counter | | | Y | 9204/065 | Flat-16 - DIL-16 | 2.0 | 6.0 | | | |
| M54HC194 | Rad-hard 4-bit PIPO shift register | | | - | 9306/047 | Flat-16 - DIL-16 | 2.0 | 6.0 | | 4 Shift Modes | |
| M54HC237 | Rad-hard 3-to-8 line decoder latch | | | Y | 9205/021 | Flat-16 - DIL-16 | 2.0 | 6.0 | | | |
| M54HC238 | Rad-hard 3-to-8 line decoder | | | Y | 9205/016 | Flat-16 - DIL-16 | 2.0 | 6.0 | | | |
| M54HC240 | Rad-hard octal bus buffer 3-state inverter | | | Y | 9401/034 | Flat-20 - DIL-20 | 2.0 | 6.0 | | Independent enables TTL compatible | |
| M54HCT240 | Rad-hard octal bus buffer 3-state inverter | | | Y | 9401/045 | Flat-20 - DIL-20 | 4.5 | 5.5 | | Complementary enables | |
| M54HC241 | Rad-hard octal bus buffer 3-state | | | - | 9401/035 | Flat-20 - DIL-20 | 2.0 | 6.0 | | | |
| M54HC244 | Rad-hard octal bus buffer 3-state | | | Y | 9401/048 | Flat-20 - DIL-20 | 2.0 | 6.0 | | | |
| M54HCT244 | Rad-hard octal bus buffer 3-state | | | Y | 9402/009 | Flat-20 - DIL-20 | 4.5 | 5.5 | | | |


Table 1. Device summary (continued)

| Part number | Description | Radiation level | Agency qualification | EPPL | ESCC specification | Package | Vcc | | Vin range | Other features | Temp. range |
|-------------|---|-----------------|----------------------|------|--------------------|----------------|-----|-----|-----------|---------------------|------------------|
| | | | | | | | Min | Max | | | |
| M54HC245 | Rad-hard octal bus transceiver 3-state | 50 krad (Si) | ESCC | Y | 9405/013 | Flat-20-DIL-20 | 2.0 | 6.0 | 0 to Vcc | TTL compatible | -55 °C to 125 °C |
| M54HCT245 | Rad-hard octal bus transceiver 3-state | | | Y | 9405/014 | Flat-20-DIL-20 | 4.5 | 5.5 | | | |
| M54HC251 | Rad-hard 8-channel multiplexer 3-state | | | - | 9408/048 | Flat-16-DIL-16 | 2.0 | 6.0 | | | |
| M54HC253 | Rad-hard dual 4-channel multiplexer 3-state | | | - | 9408/058 | Flat-16-DIL-16 | 2.0 | 6.0 | | | |
| M54HC257 | Rad-hard quad 2-channel multiplexer 3-state | | | Y | 9408/047 | Flat-16 | 2.0 | 6.0 | | | |
| M54HC259 | Rad-hard 8-bit addressable latch | | | - | 9203/073 | Flat-16-DIL-16 | 2.0 | 6.0 | | | |
| M54HC273 | Rad-hard octal d-type flip-flop with clear | | | Y | 9203/053 | Flat-20-DIL-20 | 2.0 | 6.0 | | | |
| M54HC283 | Rad-hard 4-bit binary full adder | | | Y | 9202/075 | Flat-16-DIL-16 | 2.0 | 6.0 | | | |
| M54HC365 | Rad-hard Hex bus buffer 3-state | | | - | 9401/052 | Flat-16-DIL-16 | 2.0 | 6.0 | | | |
| M54HC367 | Rad-hard Hex bus buffer 3-state | | | - | 9401/044 | Flat-16-DIL-16 | 2.0 | 6.0 | | Independent enables | |
| M54HC373 | Rad-hard octal D-Type latch 3-state | | | Y | 9203/059 | Flat-20-DIL-20 | 2.0 | 6.0 | | | |
| M54HCT373 | Rad-hard octal D-Type latch 3-state | | | Y | 9203/064 | Flat-20-DIL-20 | 4.5 | 5.5 | | TTL compatible | |
| M54HC374 | Rad-hard octal D-Type Flip-Flop 3-state | | | Y | 9203/060 | Flat-20-DIL-20 | 2.0 | 6.0 | | | |
| M54HCT374 | Rad-hard octal D-Type Flip-Flop 3-state | | | Y | 9203/066 | Flat-20-DIL-20 | 4.5 | 5.5 | | TTL compatible | |



Table 1. Device summary (continued)

| Part number | Description | Radiation level | Agency qualification | EPPL | ESCC specification | Package | Vcc | | Vin range | Other features | Temp. range |
|-------------|--|-----------------|----------------------|------|--------------------|------------------|-----|-----|-----------|----------------------|------------------|
| | | | | | | | Min | Max | | | |
| M54HC390 | Rad-hard dual decade counter | 50 krad (Si) | ESCC | - | 9204/078 | Flat-16 - DIL-16 | 2.0 | 6.0 | 0 to Vcc | | -55 °C to 125 °C |
| M54HC393 | Rad-hard dual binary counter | | | - | 9204/074 | Flat-14 - DIL-14 | 2.0 | 6.0 | | | |
| M54HC540 | Rad-hard octal bus buffer 3-state inverter | | | Y | 9401/049 | Flat-20 - DIL-20 | 2.0 | 6.0 | | | |
| M54HC541 | Rad-hard octal bus buffer 3-state | | | Y | 9401/047 | Flat-20 - DIL-20 | 2.0 | 6.0 | | Non Inverted Enables | |
| M54HC573 | Rad-hard octal D-Type latch 3-state | | | Y | 9202/072 | Flat-20 - DIL-20 | 2.0 | 6.0 | | Through Chip Pinout | |
| M54HC574 | Rad-hard octal D-Type Flip-Flop 3-state | | | Y | 9203/054 | Flat-20 - DIL-20 | 2.0 | 6.0 | | Through Chip Pinout | |
| M54HC590 | Rad-hard 8 bit binary counter register 3-state | | | Y | 9204/071 | Flat-16 - DIL-16 | 2.0 | 6.0 | | | |
| M54HC595 | Rad-hard 8 bit shift register output latch 3-state | | | Y | 9306/051 | Flat-16 - DIL-16 | 2.0 | 6.0 | | | |
| M54HC597 | Rad-hard 8 bit latch/shift register | | | Y | 9306/054 | Flat-16 - DIL-16 | 2.0 | 6.0 | | | |
| M54HC688 | Rad-hard 8 bit equality comparator | | | Y | 9209/005 | Flat-20 - DIL-20 | 2.0 | 6.0 | | | |
| M54HC4002 | Rad-hard dual 4-input NOR gate | | | - | 9201/130 | Flat-14 - DIL-14 | 2.0 | 6.0 | | | |
| M54HC4020 | Rad-hard 14-stage binary counter | | | - | 9204/070 | Flat-16 - DIL-16 | 2.0 | 6.0 | | | |
| M54HC4040 | Rad-hard 12-stage binary counter | | | Y | 9204/069 | Flat-16 - DIL-16 | 2.0 | 6.0 | | | |
| M54HC4049 | Rad-hard hex buffer/converter inverter | | | Y | 9401/037 | Flat-16 - DIL-16 | 2.0 | 6.0 | | | |

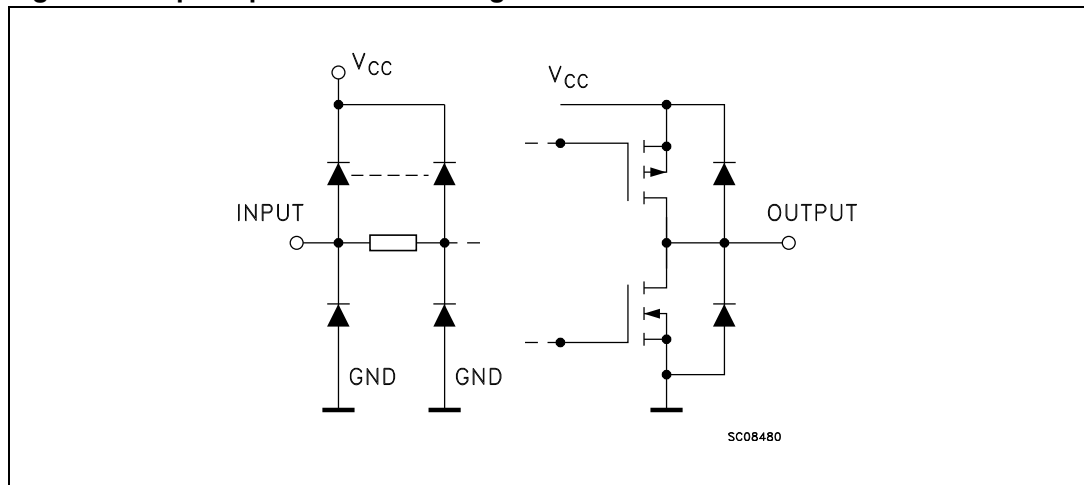
**Table 1. Device summary (continued)**

| Part number | Description | Radiation level | Agency qualification | EPPL | ESCC specification | Package | Vcc | | Vin range | Other features | Temp. range |
|-------------|---|-----------------|----------------------|------|--------------------|------------------|-----|-----|-----------|----------------|------------------|
| | | | | | | | Min | Max | | | |
| M54HC4050 | Rad-hard hex buffer/converter | 50 krad (Si) | ESCC | Y | 9401/038 | Flat-16 - DIL-16 | 2.0 | 6.0 | 0 to Vcc | | -55 °C to 125 °C |
| M54HC4051 | Rad-hard single 8-channel analog mux/demux | | | - | 9408/064 | Flat-16 - DIL-16 | 2.0 | 6.0 | | | |
| M54HC4053 | Rad-hard triple 2-channel analog mux/demux | | | - | 9408/065 | Flat-16 - DIL-16 | 2.0 | 6.0 | | | |
| M54HC4060 | Rad-hard 14-stage binary counter/oscillator | | | - | 9204/076 | Flat-16 - DIL-16 | 2.0 | 6.0 | | | |
| M54HC4066 | Rad-hard quad bilateral switch | | | - | 9408/052 | Flat-14 - DIL-14 | 2.0 | 6.0 | | | |
| M54HC4072 | Rad-hard dual 4-input OR gate | | | - | 9201/124 | Flat-14 - DIL-14 | 2.0 | 6.0 | | | |
| M54HC4075 | Rad-hard triple 3-input OR gate | | | - | 9201/129 | Flat-14 - DIL-14 | 2.0 | 6.0 | | | |
| M54HC4078 | Rad-hard 8-input NOR/OR gate | | | - | 9201/123 | Flat-14 - DIL-14 | 2.0 | 6.0 | | | |
| M54HC4094 | Rad-hard 8-bit SIPO shift register 3-state | | | - | 9306/050 | Flat-16 - DIL-16 | 2.0 | 6.0 | | | |
| M54HC4514 | Rad-hard 4-to-16 line decoder latch | | | - | 9205/019 | Flat-24 - DIL-24 | 2.0 | 6.0 | | | |

Note: Contact ST sales office for information about the specific conditions for other 54AC or 54ACT part number, product in die form and QML-Q versions

2 Input equivalent circuit diagram

Figure 1. Input equivalent circuit diagram



3 Maximum rating

3.1 Absolute maximum ratings

3.1.1 M54HC series

Table 2. Absolute maximum ratings - M54HC series

| Symbol | Parameter | Value | Unit |
|-----------------------|-------------------------------|------------------------|-------------|
| V_{CC} | Supply voltage | -0.5 to +7 | V |
| V_I | DC input voltage | -0.5 to $V_{CC} + 0.5$ | V |
| V_O | DC output voltage | -0.5 to $V_{CC} + 0.5$ | V |
| I_{IK} | DC input diode current | ± 20 | mA |
| I_{OK} | DC output diode current | ± 20 | mA |
| I_O | DC output current | ± 25 | mA |
| I_{CC} or I_{GND} | DC V_{CC} or ground current | ± 50 | mA |
| P_D | Power dissipation | 300 | mW |
| T_{stg} | Storage temperature | -65 to +150 | $^{\circ}C$ |
| T_L | Lead temperature (10 sec) | 265 | $^{\circ}C$ |

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

3.1.2 M54HCT series

Table 3. Absolute maximum ratings - M54HCT series

| Symbol | Parameter | Value | Unit |
|-----------------------|-------------------------------|------------------------|-------------|
| V_{CC} | Supply voltage | -0.5 to +7 | V |
| V_I | DC input voltage | -0.5 to $V_{CC} + 0.5$ | V |
| V_O | DC output voltage | -0.5 to $V_{CC} + 0.5$ | V |
| I_{IK} | DC input diode current | ± 20 | mA |
| I_{OK} | DC output diode current | ± 20 | mA |
| I_O | DC output current | ± 35 | mA |
| I_{CC} or I_{GND} | DC V_{CC} or ground current | ± 70 | mA |
| P_D | Power dissipation | 420 | mW |
| T_{stg} | Storage temperature | -65 to +150 | $^{\circ}C$ |
| T_L | Lead temperature (10 sec) | 265 | $^{\circ}C$ |

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

3.2 Recommended operating conditions

3.2.1 M54HC series

Table 4. Recommended operating conditions

| 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 |

3.2.2 M54HCT series

Table 5. Recommended operating conditions

| 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 $5.5V$) | 0 to 500 | ns |

4 Radiation data

Each wafer lot is qualified at 50 krad (Si) total dose as per ESCC 22900 specification at 210 rad/hour.

The HC/HCT series is characterized under heavy Ion on 4 functions representative of the whole series and qualified as per the results of this characterization.

Detailed results are provided in the table below:

Table 6. Radiation data

| Function | Result |
|---------------------------|--|
| Gate: 54HC08 | SEL and SEU free for LET [111 MeV/mg/cm ² |
| Multiplexer 54HC157 | SEL and SEU free for LET[111 MeV/mg/cm ² |
| Flip-flop 54HC273 | SEL free for LET [111 MeV/mg/cm ² |
| | SEU: LET _{th} = 16MeV/mg/cm ² , $\sigma_{sat} = 1.7 \times 10^{-4} \text{ cm}^2$ |
| Counter 54HC4040 | SEL free for LET [111 MeV/mg/cm ² |
| | SEU: LET _{th} = 34MeV/mg/cm ² , $\sigma_{sat} = 4.2 \times 10^{-4} \text{ cm}^2$ |
| Analog Mux/Demux 54HC4053 | SEL free for LET [111 MeV/mg/cm ² |
| | SEU: LET _{th} = 7MeV/mg/cm ² , $\sigma_{sat} = 2.4 \times 10^{-4} \text{ cm}^2$ |

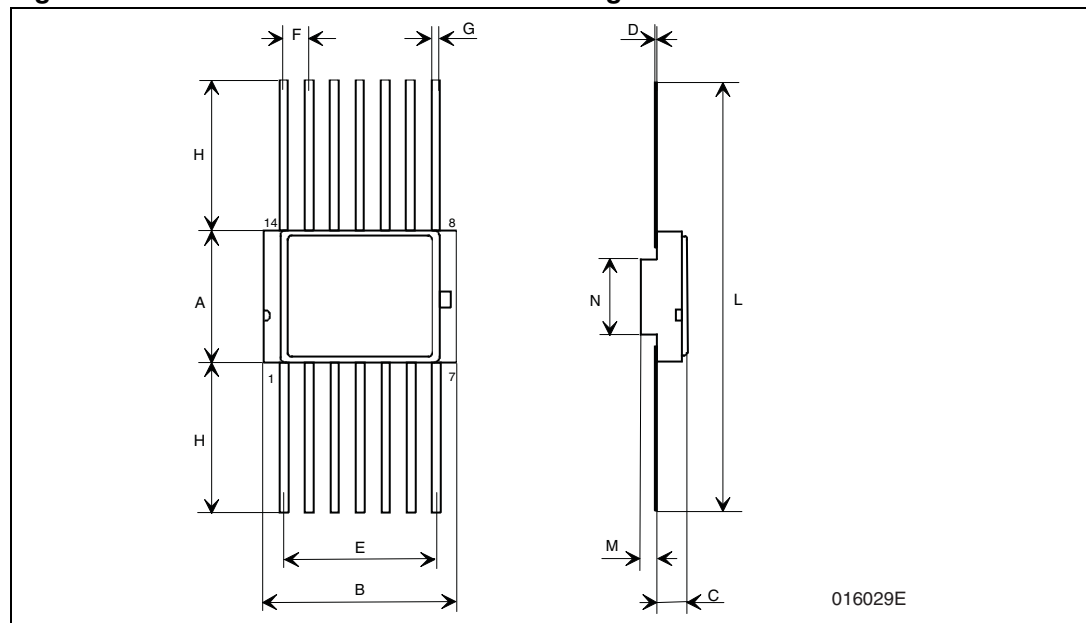
5 Package mechanical data

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

Table 7. Ceramic Flat-14 mechanical data

| Dim. | mm. | | |
|------|-------|-------|-------|
| | Min. | Typ. | Max. |
| A | 6.75 | 6.91 | 7.06 |
| B | 9.76 | 9.95 | 10.14 |
| C | 1.49 | | 1.95 |
| D | 0.10 | 0.127 | 0.15 |
| E | 7.50 | 7.62 | 7.75 |
| F | | 1.27 | |
| G | 0.38 | 0.43 | 0.48 |
| H | | 6.0 | |
| L | 18.75 | en | 22.0 |
| M | | 0.38 | |
| N | | 4.31 | |

Figure 2. Ceramic Flat-14 mechanical drawings

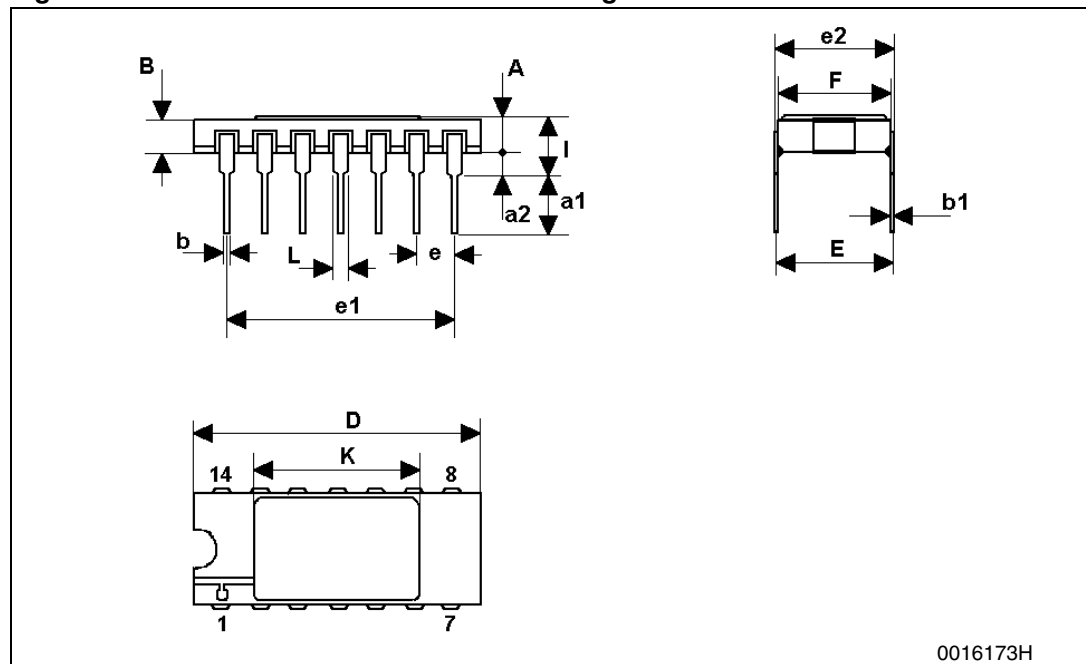


Note: The upper metallic lid is not electrically connected to any pins, nor to the IC die inside the package. Connecting unused pins or metal lid to ground or to the power supply will not affect the electrical characteristics.

Table 8. Ceramic DIL-14 mechanical data

| Dim. | mm. | | |
|------|-------|-------|--------|
| | Min. | Typ | Max. |
| A | 2.1 | | 2.54 |
| a1 | 3.00 | | 3.70 |
| a2 | 0.63 | 0.88 | 1.14 |
| B | 1.82 | 2.03 | 2.39 |
| b | 0.40 | 0.45 | 0.50 |
| b1 | 0.20 | 0.254 | 0.30 |
| D | 18.79 | 19.00 | 19.20 |
| E | 7.36 | 7.62 | 7.87 |
| e | | 2.54 | |
| e1 | 15.11 | 15.24 | 15.37 |
| e2 | 7.62 | 7.87 | 8.12 |
| F | 7.11 | | 7.75 |
| I | | | 3.70 |
| K | 10.90 | | 12.1 n |
| L | 1.14 | 1.27 | 1.5 |

Figure 3. Ceramic DIL-14 mechanical drawings

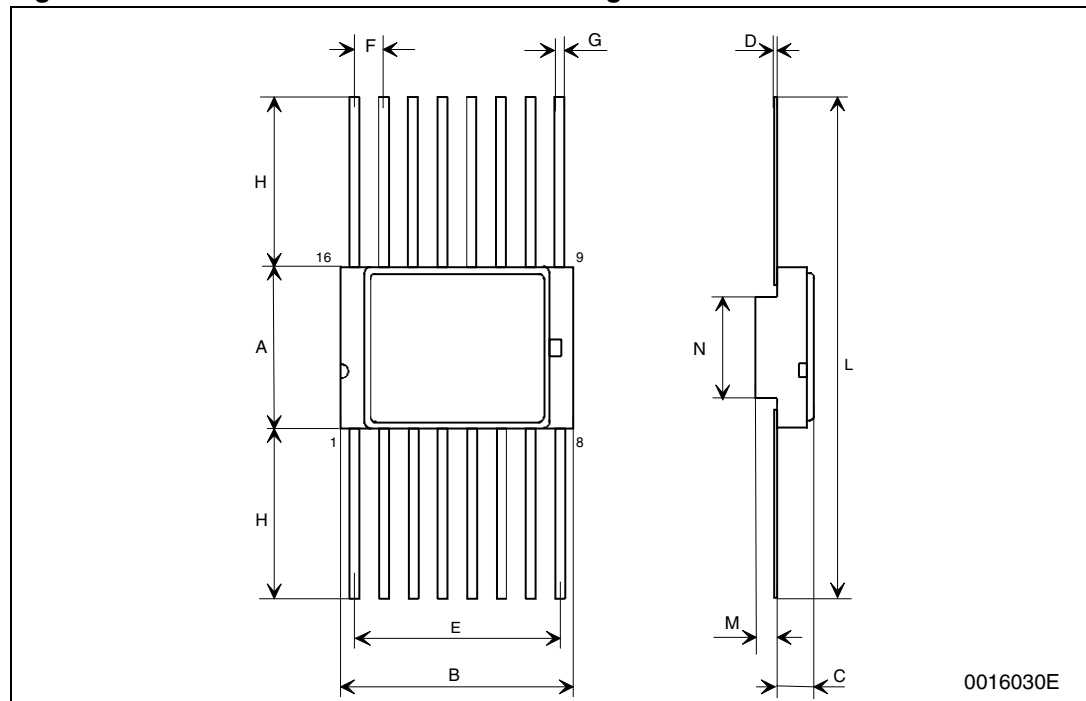


Note: The upper metallic lid is not electrically connected to any pins, nor to the IC die inside the package. Connecting unused pins or metal lid to ground or to the power supply will not affect the electrical characteristics.

Table 9. Ceramic Flat-16 mechanical data

| Dim. | Mm. | | |
|------|-------|-------|-------|
| | Min. | Typ. | Max. |
| A | 6.75 | 6.91 | 7.06 |
| B | 9.76 | 9.94 | 10.14 |
| C | 1.49 | | 1.95 |
| D | 0.102 | 0.127 | 0.152 |
| E | 8.76 | 8.89 | 9.01 |
| F | | 1.27 | |
| G | 0.38 | 0.43 | 0.48 |
| H | 6.0 | | |
| L | 18.75 | en | 22.0 |
| M | 0.33 | 0.38 | 0.43 |
| N | | 4.31 | |

Figure 4. Ceramic Flat-16 mechanical drawings

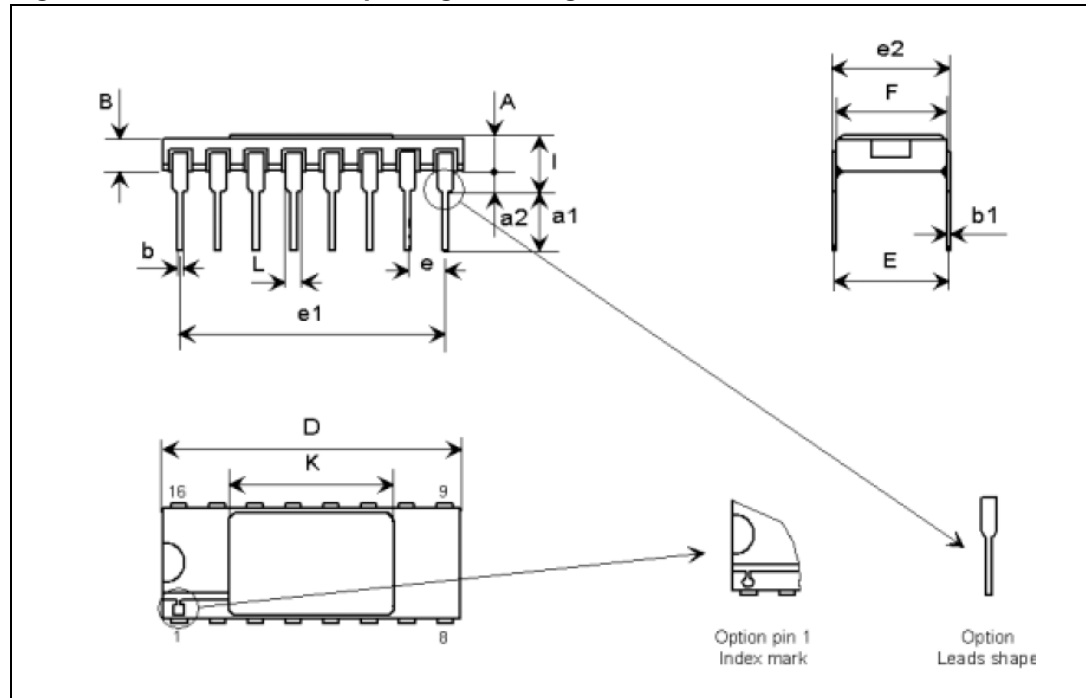


Note: The upper metallic lid is not electrically connected to any pins, nor to the IC die inside the package. Connecting unused pins or metal lid to ground or to the power supply will not affect the electrical characteristics.

Table 10. Ceramic DIL-16 package dimensions

| Dim. | mm. | | |
|------|-------|-------|-------|
| | Min. | Typ. | Max. |
| A | 2.10 | | 2.71 |
| a1 | 3.00 | | 3.70 |
| a2 | 0.63 | 0.88 | 1.14 |
| B | 1.82 | | 2.39 |
| b | 0.40 | 0.45 | 0.50 |
| b1 | 0.20 | 0.254 | 0.30 |
| D | 20.06 | 20.32 | 20.58 |
| E | 7.36 | 7.62 | 7.87 |
| e | | 2.54 | |
| e1 | 17.65 | 17.78 | 17.90 |
| e2 | 7.62 | 7.87 | 8.12 |
| F | 7.29 | 7.49 | 7.70 |
| l | | | 3.83 |
| K | 10.90 | | 12.10 |
| L | 1.14 | | 1.50 |

Figure 5. Ceramic DIL-16 package drawings

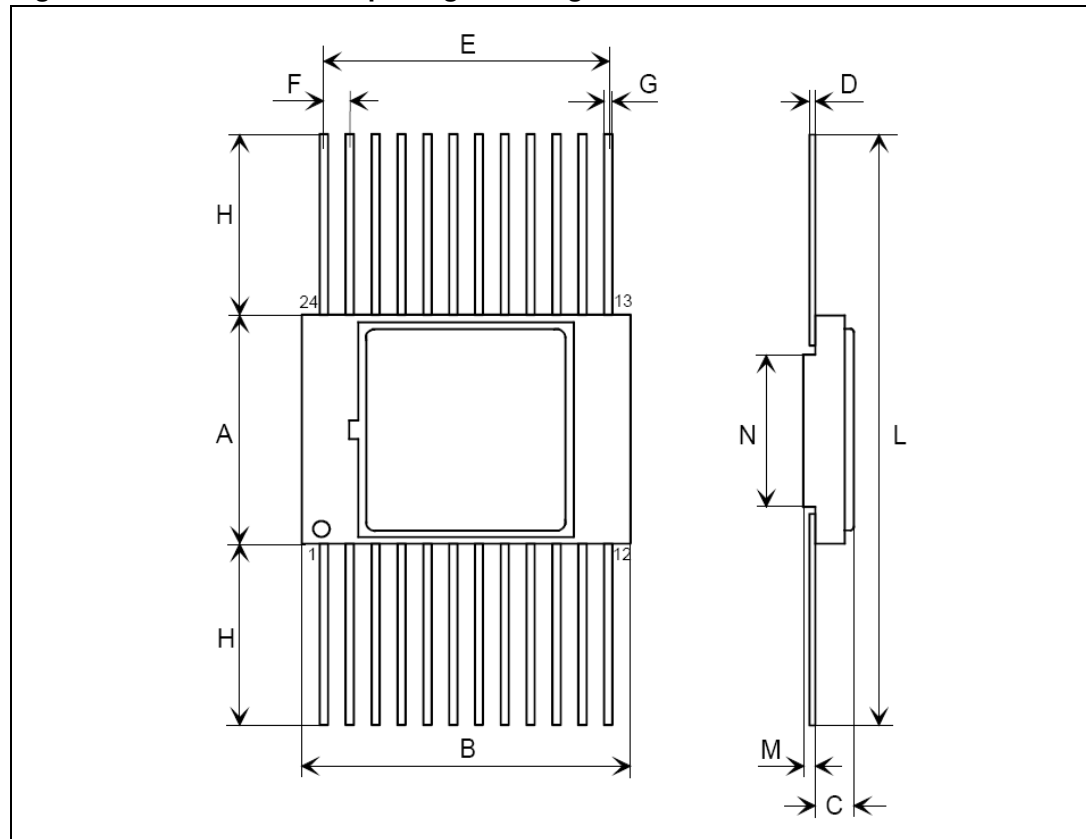


Note: The upper metallic lid is not electrically connected to any pins, nor to the IC die inside the package. Connecting unused pins or metal lid to ground or to the power supply will not affect the electrical characteristics.

Table 11. Ceramic Flat-24 package dimensions

| Dim. | 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 | |

Figure 6. Ceramic Flat-24 package drawings

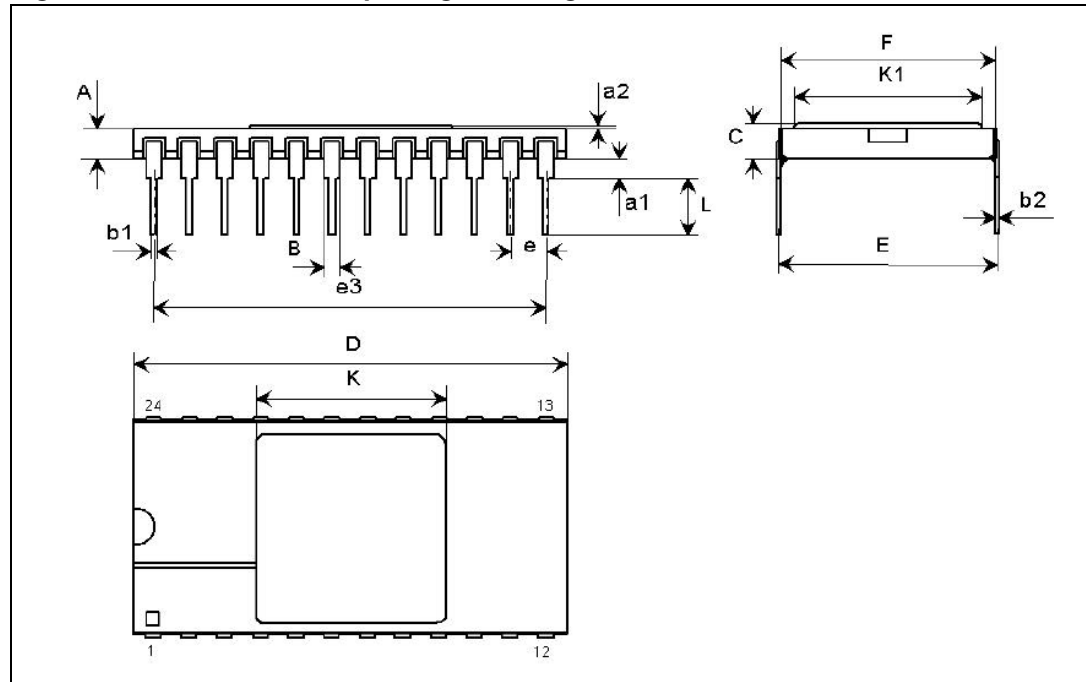


Note: The upper metallic lid is not electrically connected to any pins, nor to the IC die inside the package. Connecting unused pins or metal lid to ground or to the power supply will not affect the electrical characteristics.

Table 12. Ceramic DIL-24 package dimensions

| Dim. | 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 | 3.000 | 3.800 |

Figure 7. Ceramic DIL-24 package drawings



Note: 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 will not affect the electrical characteristics.



6 Order codes

Table 13. Ordering information

| Order codes | ESCC detailed specification | Quality Level | Comment | Package | Lead finish | Marking | Mass (g) | EPPL | Packing |
|-------------|-----------------------------|---------------|-----------------------------------|---------|--------------------|-------------------|----------|------|------------|
| M54HC00K | 9201/105/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-14 | Gold or solder dip | 920110501F or 02F | 0.70 | Y | Strip pack |
| M54HC00D | 9201/105/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-14 | Gold or solder dip | 920110503F or 04F | 2.20 | - | Strip pack |
| M54HC02K | 9201/113/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-14 | Gold or solder dip | 920111301F or 02F | 0.70 | Y | Strip pack |
| M54HC02D | 9201/113/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-14 | Gold or solder dip | 920111303F or 04F | 2.20 | - | Strip pack |
| M54HC03K | 9201/114/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-14 | Gold or solder dip | 920111401F or 02F | 0.70 | Y | Strip pack |
| M54HC03D | 9201/114/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-14 | Gold or solder dip | 920111403F or 04F | 2.20 | - | Strip pack |
| M54HC04K | 9401/033/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-14 | Gold or solder dip | 940103301F or 02F | 0.70 | Y | Strip pack |
| M54HC04D | 9401/033/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-14 | Gold or solder dip | 940103303F or 04F | 2.20 | - | Strip pack |
| M54HCU04K | 9401/055/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-14 | Gold or solder dip | 940105501F or 02F | 0.70 | - | Strip pack |
| M54HCU04D | 9401/055/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-14 | Gold or solder dip | 940105503F or 04F | 2.20 | - | Strip pack |
| M54HC08K | 9201/106/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-14 | Gold or solder dip | 920110601F or 02F | 0.70 | Y | Strip pack |
| M54HC08D | 9201/106/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-14 | Gold or solder dip | 920110603F or 04F | 2.20 | - | Strip pack |
| M54HC10K | 9201/107/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-14 | Gold or solder dip | 920110701F or 02F | 0.70 | Y | Strip pack |
| M54HC10D | 9201/107/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-14 | Gold or solder dip | 920110703F or 04F | 2.20 | - | Strip pack |
| M54HC11K | 9201/117/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-14 | Gold or solder dip | 920111701F or 02F | 0.70 | Y | Strip pack |
| M54HC11D | 9201/117/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-14 | Gold or solder dip | 920111703F or 04F | 2.20 | - | Strip pack |
| M54HC14K | 9409/007/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-14 | Gold or solder dip | 940900701F or 02F | 0.70 | Y | Strip pack |
| M54HC14D | 9409/007/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-14 | Gold or solder dip | 940900703F or 04F | 2.20 | - | Strip pack |
| M54HC20K | 9201/118/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-14 | Gold or solder dip | 920111801F or 02F | 0.70 | Y | Strip pack |
| M54HC20D | 9201/118/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-14 | Gold or solder dip | 920111803F or 04F | 2.20 | - | Strip pack |
| M54HC21K | 9201/108/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-14 | Gold or solder dip | 920110801F or 02F | 0.70 | Y | Strip pack |
| M54HC21D | 9201/108/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-14 | Gold or solder dip | 920110803F or 04F | 2.20 | - | Strip pack |

**Table 13. Ordering information (continued)**

| Order codes | ESCC detailed specification | Quality Level | Comment | Package | Lead finish | Marking | Mass (g) | EPPL | Packing |
|-------------|-----------------------------|---------------|-----------------------------------|---------|--------------------|-------------------|----------|------|------------|
| M54HC27K | 9201/109/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-14 | Gold or solder dip | 920110901F or 02F | 0.70 | Y | Strip pack |
| M54HC27D | 9201/109/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-14 | Gold or solder dip | 920110903F or 04F | 2.20 | - | Strip pack |
| M54HC30K | 9201/110/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-14 | Gold or solder dip | 920111001F or 02F | 0.70 | - | Strip pack |
| M54HC30D | 9201/110/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-14 | Gold or solder dip | 920111003F or 04F | 2.20 | - | Strip pack |
| M54HC32K | 9201/111/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-14 | Gold or solder dip | 920111101F or 02F | 0.70 | Y | Strip pack |
| M54HC32D | 9201/111/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-14 | Gold or solder dip | 920111103F or 04F | 2.20 | - | Strip pack |
| M54HC73K | 9203/071/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-14 | Gold or solder dip | 920307101F or 02F | 0.70 | - | Strip pack |
| M54HC73D | 9203/071/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-14 | Gold or solder dip | 920307103F or 04F | 2.20 | - | Strip pack |
| M54HC74K | 9203/050/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-14 | Gold or solder dip | 920305001F or 02F | 0.70 | Y | Strip pack |
| M54HC74D | 9203/050/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-14 | Gold or solder dip | 920305003F or 04F | 2.20 | - | Strip pack |
| M54HCT74K | 9203/070/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-14 | Gold or solder dip | 920307001F or 02F | 0.70 | Y | Strip pack |
| M54HCT74D | 9203/070/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-14 | Gold or solder dip | 920307003F or 04F | 2.20 | - | Strip pack |
| M54HC75K | 9203/065/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 920306501F or 02F | 0.70 | - | Strip pack |
| M54HC75D | 9203/065/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 920306510F or 11F | 2.20 | - | Strip pack |
| M54HC85K | 9209/004/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 920900401F or 02F | 0.70 | Y | Strip pack |
| M54HC85D | 9209/004/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 920900410F or 11F | 2.20 | - | Strip pack |
| M54HC86K | 9201/119/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-14 | Gold or solder dip | 920111901F or 02F | 0.70 | Y | Strip pack |
| M54HC86D | 9201/119/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-14 | Gold or solder dip | 920111903F or 04F | 2.20 | - | Strip pack |
| M54HC109K | 9306/048/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 930604801F or 02F | 0.70 | Y | Strip pack |
| M54HC109D | 9306/048/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 930604810F or 11F | 2.20 | - | Strip pack |
| M54HC123K | 9207/006/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 920700601F or 02F | 0.70 | - | Strip pack |
| M54HC123D | 9207/006/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 920700610F or 11F | 2.20 | - | Strip pack |
| M54HC125K | 9401/039/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-14 | Gold or solder dip | 940103901F or 02F | 0.70 | Y | Strip pack |
| M54HC132K | 9201/120/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-14 | Gold or solder dip | 920112001F or 02F | 0.70 | Y | Strip pack |
| M54HC132D | 9201/120/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-14 | Gold or solder dip | 920112003F or 04F | 2.20 | - | Strip pack |

**Table 13. Ordering information (continued)**

| Order codes | ESCC detailed specification | Quality Level | Comment | Package | Lead finish | Marking | Mass (g) | EPPL | Packing |
|-------------|-----------------------------|---------------|-----------------------------------|---------|--------------------|--------------------|----------|------|------------|
| M54HC137K | 9205/013/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 920501301F or 02F | 0.70 | - | Strip pack |
| M54HC137D | 9205/013/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 920501310F or 11F | 2.20 | - | Strip pack |
| M54HC138K | 9408/046/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 940804601F or 02F | 0.70 | Y | Strip pack |
| M54HC138D | 9408/046/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 940804610F or 11F | 2.20 | - | Strip pack |
| M54HC139K | 9205/017/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 920501701F or 02F | 0.70 | Y | Strip pack |
| M54HC139D | 9205/017/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 920501710F or 11F | 2.20 | - | Strip pack |
| M54HC148K | 9410/017/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 9410-01701F or 02F | 0.70 | - | Strip pack |
| M54HC148D | 9410/017/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 9410-01710F or 11F | 2.20 | - | Strip pack |
| M54HC151K | 9408/054/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 940805401F or 02F | 0.70 | Y | Strip pack |
| M54HC151D | 9408/054/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 940805410F or 11F | 2.20 | - | Strip pack |
| M54HC153K | 9408/038/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 940803801F or 02F | 0.70 | - | Strip pack |
| M54HC153D | 9408/038/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 940803810F or 11F | 2.20 | - | Strip pack |
| M54HC154K | 9205/023/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-24 | Gold or solder dip | 920502301F or 02F | 1.70 | Y | Strip pack |
| M54HC154D | 9205/023/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-24 | Gold or solder dip | 920502303F or 04F | 5.20 | - | Strip pack |
| M54HC157K | 9408/057/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 940805701F or 02F | 0.70 | Y | Strip pack |
| M54HC157D | 9408/057/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 940805710F or 11F | 2.20 | - | Strip pack |
| M54HC158K | 9408/059/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 940805901F or 02F | 0.70 | Y | Strip pack |
| M54HC158D | 9408/059/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 940805910F or 11F | 2.20 | - | Strip pack |
| M54HC160D | 9204/062/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 920406210F or 11F | 2.20 | - | Strip pack |
| M54HC161K | 9204/059/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 920405901F or 02F | 0.70 | Y | Strip pack |
| M54HC161D | 9204/059/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 920405910F or 11F | 2.20 | - | Strip pack |
| M54HC163K | 9204/073/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 920407301F or 02F | 0.70 | Y | Strip pack |
| M54HC163D | 9204/073/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 920407310F or 11F | 2.20 | - | Strip pack |
| M54HC164K | 9306/041/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-14 | Gold or solder dip | 930604101F or 02F | 0.70 | Y | Strip pack |
| M54HC164D | 9306/041/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-14 | Gold or solder dip | 930604103F or 04F | 2.20 | - | Strip pack |



Table 13. Ordering information (continued)

| Order codes | ESCC detailed specification | Quality Level | Comment | Package | Lead finish | Marking | Mass (g) | EPPL | Packing |
|-------------|-----------------------------|---------------|-----------------------------------|---------|--------------------|-------------------|----------|------|------------|
| M54HC165K | 9306/042/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 930604201F or 02F | 0.70 | Y | Strip pack |
| M54HC165D | 9306/042/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 930604210F or 11F | 2.20 | - | Strip pack |
| M54HC166K | 9306/043/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 930604301F or 02F | 0.70 | Y | Strip pack |
| M54HC166D | 9306/043/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 930604310F or 11F | 2.20 | - | Strip pack |
| M54HC174K | 9306/052/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 930605201F or 02F | 0.70 | Y | Strip pack |
| M54HC174D | 9306/052/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 930605210F or 11F | 2.20 | - | Strip pack |
| M54HC175K | 9203/052/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 920305201F or 02F | 0.70 | Y | Strip pack |
| M54HC175D | 9203/052/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 920305210F or 11F | 2.20 | - | Strip pack |
| M54HC191K | 9204/066/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 920406601F or 02F | 0.70 | Y | Strip pack |
| M54HC191D | 9204/066/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 920406610F or 11F | 2.20 | - | Strip pack |
| M54HC193K | 9204/065/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 920406501F or 02F | 0.70 | Y | Strip pack |
| M54HC193D | 9204/065/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 920406510F or 11F | 2.20 | - | Strip pack |
| M54HC194K | 9306/047/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 930604701F or 02F | 0.70 | - | Strip pack |
| M54HC194D | 9306/047/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 930604710F or 11F | 2.20 | - | Strip pack |
| M54HC237K | 9205/021/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 920502101F or 02F | 0.70 | Y | Strip pack |
| M54HC237D | 9205/021/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 920502110F or 11F | 2.20 | - | Strip pack |
| M54HC238K | 9205/016/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 920501601F or 02F | 0.70 | - | Strip pack |
| M54HC238D | 9205/016/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 920501610F or 11F | 2.20 | - | Strip pack |
| M54HC240K | 9401/034/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-20 | Gold or solder dip | 940103401F or 02F | 0.90 | Y | Strip pack |
| M54HC240D | 9401/034/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-20 | Gold or solder dip | 940103403F or 04F | 3.20 | - | Strip pack |
| M54HCT240K | 9401/045/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-20 | Gold or solder dip | 940104501F or 02F | 0.90 | Y | Strip pack |
| M54HCT240D | 9401/045/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-20 | Gold or solder dip | 940104503F or 04F | 3.20 | - | Strip pack |
| M54HC241K | 9401/035/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-20 | Gold or solder dip | 940103501F or 02F | 0.90 | - | Strip pack |
| M54HC241D | 9401/035/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-20 | Gold or solder dip | 940103503F or 04F | 3.20 | - | Strip pack |
| M54HC244K | 9401/048/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-20 | Gold or solder dip | 940104801F or 02F | 0.90 | Y | Strip pack |

**Table 13. Ordering information (continued)**

| Order codes | ESCC detailed specification | Quality Level | Comment | Package | Lead finish | Marking | Mass (g) | EPPL | Packing |
|-------------|-----------------------------|---------------|-----------------------------------|---------|--------------------|--------------------|----------|------|------------|
| M54HC244D | 9401/048/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-20 | Gold or solder dip | 940104803F or 04F | 3.20 | - | Strip pack |
| M54HCT244K | 9402/009/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-20 | Gold or solder dip | 940200901F or 02F | 0.90 | Y | Strip pack |
| M54HCT244D | 9402/009/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-20 | Gold or solder dip | 9402-00903F or 04F | 3.20 | - | Strip pack |
| M54HC245K | 9405/013/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-20 | Gold or solder dip | 940501301F or 02F | 0.90 | Y | Strip pack |
| M54HC245D | 9405/013/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-20 | Gold or solder dip | 9405-01303F or 04F | 3.20 | - | Strip pack |
| M54HCT245K | 9405/014/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-20 | Gold or solder dip | 940501401F or 02F | 0.90 | Y | Strip pack |
| M54HCT245D | 9405/014/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-20 | Gold or solder dip | 9405-01403F or 04F | 3.20 | - | Strip pack |
| M54HC251K | 9408/048/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 940804801F or 02F | 0.70 | - | Strip pack |
| M54HC251D | 9408/048/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 940804810F or 11F | 2.20 | - | Strip pack |
| M54HC253K | 9408/058/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 940805801F or 02F | 0.70 | - | Strip pack |
| M54HC253D | 9408/058/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 940805810F or 11F | 2.20 | - | Strip pack |
| M54HC257K | 9408/047/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 940804701F or 02F | 0.70 | Y | Strip pack |
| M54HC259K | 9203/073/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 920307301F or 02F | 0.70 | - | Strip pack |
| M54HC259D | 9203/073/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 920307310F or 11F | 2.20 | - | Strip pack |
| M54HC273K | 9203/053/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-20 | Gold or solder dip | 920305301F or 02F | 0.90 | Y | Strip pack |
| M54HC273D | 9203/053/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-20 | Gold or solder dip | 920305303F or 04F | 3.20 | - | Strip pack |
| M54HC283K | 9202/075/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 920207501F or 02F | 0.70 | Y | Strip pack |
| M54HC283D | 9202/075/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 920207510F or 11F | 2.20 | - | Strip pack |
| M54HC365K | 9401/052/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 940105201F or 02F | 0.70 | - | Strip pack |
| M54HC365D | 9401/052/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 940105210F or 11F | 2.20 | - | Strip pack |
| M54HC367K | 9401/044/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 940104401F or 02F | 0.70 | - | Strip pack |
| M54HC367D | 9401/044/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 940104410F or 11F | 2.20 | - | Strip pack |
| M54HC373K | 9203/059/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-20 | Gold or solder dip | 920305901F or 02F | 0.90 | Y | Strip pack |
| M54HC373D | 9203/059/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-20 | Gold or solder dip | 920305903F or 04F | 3.20 | - | Strip pack |
| M54HCT373K | 9203/064/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-20 | Gold or solder dip | 920306401F or 02F | 0.90 | Y | Strip pack |



Table 13. Ordering information (continued)

| Order codes | ESCC detailed specification | Quality Level | Comment | Package | Lead finish | Marking | Mass (g) | EPPL | Packing |
|-------------|-----------------------------|---------------|-----------------------------------|---------|--------------------|-------------------|----------|------|------------|
| M54HCT373D | 9203/064/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-20 | Gold or solder dip | 920306403F or 04F | 3.20 | - | Strip pack |
| M54HC374K | 9203/060/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-20 | Gold or solder dip | 920306001F or 02F | 0.90 | Y | Strip pack |
| M54HC374D | 9203/060/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-20 | Gold or solder dip | 920306003F or 04F | 3.20 | - | Strip pack |
| M54HCT374K | 9203/066/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-20 | Gold or solder dip | 920306601F or 02F | 0.90 | Y | Strip pack |
| M54HCT374D | 9203/066/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-20 | Gold or solder dip | 920306603F or 04F | 3.20 | - | Strip pack |
| M54HC390K | 9204/078/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 920407801F or 02F | 0.70 | - | Strip pack |
| M54HC390D | 9204/078/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 920407810F or 11F | 2.20 | - | Strip pack |
| M54HC393K | 9204/074/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-14 | Gold or solder dip | 920407401F or 02F | 0.70 | - | Strip pack |
| M54HC393D | 9204/074/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-14 | Gold or solder dip | 920407403F or 04F | 2.20 | - | Strip pack |
| M54HC540K | 9401/049/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-20 | Gold or solder dip | 940104901F or 02F | 0.90 | Y | Strip pack |
| M54HC540D | 9401/049/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-20 | Gold or solder dip | 940104903F or 04F | 3.20 | - | Strip pack |
| M54HC541K | 9401/047/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-20 | Gold or solder dip | 940104701F or 02F | 0.90 | Y | Strip pack |
| M54HC541D | 9401/047/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-20 | Gold or solder dip | 940104703F or 04F | 3.20 | - | Strip pack |
| M54HC573K | 9202/072/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-20 | Gold or solder dip | 920207201F or 02F | 0.90 | Y | Strip pack |
| M54HC573D | 9202/072/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-20 | Gold or solder dip | 920207203F or 04F | 3.20 | - | Strip pack |
| M54HC574K | 9203/054/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-20 | Gold or solder dip | 920305401F or 02F | 0.90 | Y | Strip pack |
| M54HC574D | 9203/054/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-20 | Gold or solder dip | 920305403F or 04F | 3.20 | - | Strip pack |
| M54HC590K | 9204/071/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 920407101F or 02F | 0.70 | Y | Strip pack |
| M54HC590D | 9204/071/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 920407110F or 11F | 2.20 | - | Strip pack |
| M54HC595K | 9306/051/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 930605101F or 02F | 0.70 | Y | Strip pack |
| M54HC595D | 9306/051/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 930605110F or 11F | 2.20 | - | Strip pack |
| M54HC597K | 9306/054/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 930605401F or 02F | 0.70 | Y | Strip pack |
| M54HC597D | 9306/054/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 930605410F or 11F | 2.20 | - | Strip pack |
| M54HC688K | 9209/005/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-20 | Gold or solder dip | 920900501F or 02F | 0.90 | Y | Strip pack |
| M54HC688D | 9209/005/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-20 | Gold or solder dip | 920900503F or 04F | 3.20 | - | Strip pack |

**Table 13. Ordering information (continued)**

| Order codes | ESCC detailed specification | Quality Level | Comment | Package | Lead finish | Marking | Mass (g) | EPPL | Packing |
|-------------|-----------------------------|---------------|-----------------------------------|---------|--------------------|-------------------|----------|------|------------|
| M54HC4002K | 9201/130/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-14 | Gold or solder dip | 920113001F or 02F | 0.70 | - | Strip pack |
| M54HC4002D | 9201/130/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-14 | Gold or solder dip | 920113003F or 04F | 2.20 | - | Strip pack |
| M54HC4020K | 9204/070/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 920407001F or 02F | 0.70 | - | Strip pack |
| M54HC4020D | 9204/070/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 920407010F or 11F | 2.20 | - | Strip pack |
| M54HC4040K | 9204/069/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 920406901F or 02F | 0.70 | Y | Strip pack |
| M54HC4040D | 9204/069/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 920406910F or 11F | 2.20 | - | Strip pack |
| M54HC4049K | 9401/037/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 940103701F or 02F | 0.70 | Y | Strip pack |
| M54HC4049D | 9401/037/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 940103710F or 11F | 2.20 | - | Strip pack |
| M54HC4050K | 9401/038/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 940103801F or 02F | 0.70 | Y | Strip pack |
| M54HC4050D | 9401/038/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 940103810F or 11F | 2.20 | - | Strip pack |
| M54HC4051K | 9408/064/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 940806401F or 02F | 0.70 | - | Strip pack |
| M54HC4051D | 9408/064/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 940806410F or 11F | 2.20 | - | Strip pack |
| M54HC4053K | 9408/065/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 940806501F or 02F | 0.70 | - | Strip pack |
| M54HC4053D | 9408/065/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 940806510F or 11F | 2.20 | - | Strip pack |
| M54HC4060K | 9204/076/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 920407601F or 02F | 0.70 | - | Strip pack |
| M54HC4060D | 9204/076/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 920407610F or 11F | 2.20 | - | Strip pack |
| M54HC4066K | 9408/052/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-14 | Gold or solder dip | 940805201F or 02F | 0.70 | - | Strip pack |
| M54HC4066D | 9408/052/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-14 | Gold or solder dip | 940805203F or 04F | 2.20 | - | Strip pack |
| M54HC4072K | 9201/124/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-14 | Gold or solder dip | 920112401F or 02F | 0.70 | - | Strip pack |
| M54HC4072D | 9201/124/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-14 | Gold or solder dip | 920112403F or 04F | 2.20 | - | Strip pack |
| M54HC4075K | 9201/129/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-14 | Gold or solder dip | 920112901F or 02F | 0.70 | - | Strip pack |
| M54HC4075D | 9201/129/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-14 | Gold or solder dip | 920112903F or 04F | 2.20 | - | Strip pack |
| M54HC4078K | 9201/123/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-14 | Gold or solder dip | 920112301F or 02F | 0.70 | - | Strip pack |
| M54HC4078D | 9201/123/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-14 | Gold or solder dip | 920112303F or 04F | 2.20 | - | Strip pack |
| M54HC4094K | 9306/050/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-16 | Gold or solder dip | 930605001F or 02F | 0.70 | - | Strip pack |

**Table 13. Ordering information (continued)**

| Order codes | ESCC detailed specification | Quality Level | Comment | Package | Lead finish | Marking | Mass (g) | EPPL | Packing |
|-------------|-----------------------------|---------------|-----------------------------------|---------|--------------------|-------------------|----------|------|------------|
| M54HC4094D | 9306/050/10F or 11F | ESCC flight | Specify ESCC variant number in PO | DIL-16 | Gold or solder dip | 930605010F or 11F | 2.20 | - | Strip pack |
| M54HC4514K | 9205/019/01F or 02F | ESCC flight | Specify ESCC variant number in PO | Flat-24 | Gold or solder dip | 920501901F or 02F | 1.70 | - | Strip pack |
| M54HC4514D | 9205/019/03F or 04F | ESCC flight | Specify ESCC variant number in PO | DIL-24 | Gold or solder dip | 920501903F or 04F | 5.20 | - | Strip pack |

Note: Contact ST sales office for information about the specific conditions for other 54AC or 54ACT part number, product in die form and QML-Q versions

7 Revision history

Table 14. Document revision history

| Date | Revision | Changes |
|-------------|----------|--|
| 14-Apr-2010 | 1 | First release |
| 10-Aug-2011 | 2 | Added <i>Note: on page 14</i> , <i>Note: on page 15</i> , <i>Note: on page 16</i> , <i>Note: on page 17</i> , <i>Note: on page 18</i> , <i>Note: on page 19</i> and in the "Pin connections" diagram on the coverpage. |

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