



**CRYSTAL OSCILLATORS, CLASS 2  
4MHz TO 100MHz  
AHC MOS AND AC MOS COMPATIBLE OUTPUT  
RAD-HARD**

**BASED ON TYPE RK135**

**ESCC Detail Specification No. 3503/001**

|         |               |
|---------|---------------|
| Issue 8 | November 2024 |
|---------|---------------|



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**DOCUMENTATION CHANGE NOTICE**

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| DCR No. | CHANGE DESCRIPTION                                    |
|---------|---|
| 1692    | Specification upissued to incorporate changes per DCR |

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**1 GENERAL**

**1.1 SCOPE**

This specification details the ratings, physical and electrical characteristics and test and inspection data for the component type variants and/or the range of components specified below. It supplements the requirements of, and shall be read in conjunction with, the ESCC Generic Specification listed under Applicable Documents.

**1.2 APPLICABLE DOCUMENTS**

The following documents form part of this specification and shall be read in conjunction with it:

- (a) ESCC Generic Specification No. [3503](#).

**1.3 TERMS, DEFINITIONS, ABBREVIATIONS, SYMBOLS AND UNITS**

For the purpose of this specification, the terms, definitions, abbreviations, symbols and units specified in ESCC Basic Specification No. [21300](#) shall apply.

**1.4 THE ESCC COMPONENT NUMBER AND COMPONENT TYPE VARIANTS**

**1.4.1 The ESCC Component Number**

The ESCC Component Number shall be constituted as follows:

Example: 350300101R100M000000HC

- Detail Specification Reference: 3503001
- Component Type Variant Number: 01 (as required)
- Total Dose Radiation Level Letter (100krad(Si)): R (as required)
- Characteristic code: Nominal Frequency (100MHz): 100M000000 (as required)
- Characteristic code: Output Waveform (AHCMOS): HC (as required)

**1.4.1.1 Characteristics Codes**

Characteristics to be codified as part of the ESCC Component Number shall be as follows:

- (a) Nominal Frequency expressed by means of the following codes. The unit quantity shall be MHz:

| Nominal Frequency<br>f <sub>Nom</sub> (MHz) | Code       |
|---|------------|
| X.XXXXXX                                    | XMXXXXXX   |
| XX.XXXXXX                                   | XXMXXXXXX  |
| XXX.XXXXXX                                  | XXXMXXXXXX |

- (b) Output Waveform type expressed by means of the following codes:

| Output Waveform | Code |
|-----------------|------|
| AHCMOS          | HC   |
| ACMOS           | AC   |

1.4.2 Component Type Variants

The component type variants applicable to this specification are as follows:

| Variant Number | Nominal Output Frequency<br>$f_{Nom}$<br>(MHz) | Case | Nominal Supply Voltage<br>$V_{CCNom}$<br>(V) | Output Waveform | Terminal Material and Finish | Weight max g | Total Dose Radiation Level Letter |
|----------------|--|------|--|-----------------|------------------------------|--------------|-----------------------------------|
| 01             | 4 to 100                                       | FP1  | 3.3  | AHCMOS, ACMOS   | D2                           | 5            | R [100krad(Si)]                   |
| 02             | 4 to 100                                       | FP2  | 3.3  | AHCMOS, ACMOS   | D2                           | 5            | R [100krad(Si)]                   |
| 03             | 4 to 100                                       | FP3  | 3.3  | AHCMOS, ACMOS   | D2                           | 5            | R [100krad(Si)]                   |
| 04             | 4 to 100                                       | FP4  | 3.3  | AHCMOS, ACMOS   | D2                           | 5            | R [100krad(Si)]                   |
| 06             | 4 to 100                                       | JL2  | 3.3  | AHCMOS, ACMOS   | D2                           | 2            | R [100krad(Si)]                   |

The terminal material and finish shall be in accordance with the requirements of ESCC Basic Specification No. [23500](#).

Total dose radiation level letters are defined in ESCC Basic Specification No. [22900](#). If an alternative radiation test level is specified in the Purchase Order the letter shall be changed accordingly.

1.5 MAXIMUM RATINGS

The maximum ratings shall not be exceeded at any time during use or storage.

Maximum ratings shall only be exceeded during testing to the extent specified in this specification and when stipulated in Test Methods and Procedures of the ESCC Generic Specification.

| Characteristics             | Symbols          | Maximum Ratings | Unit | Remarks          |
|-----------------------------|------------------|-----------------|------|------------------|
| Supply Voltage              | V <sub>CC</sub>  | -0.5 to +7      | V    | Note 1           |
| Load Impedance              | C <sub>L</sub>   | 50              | pF   | Note 2           |
| Operating Temperature Range | T <sub>op</sub>  | -55 to +110     | °C   | T <sub>amb</sub> |
| Storage Temperature Range   | T <sub>stg</sub> | -55 to +110     | °C   |                  |
| Soldering Temperature       | T <sub>sol</sub> | +260            | °C   | Note 3           |

**NOTES:**

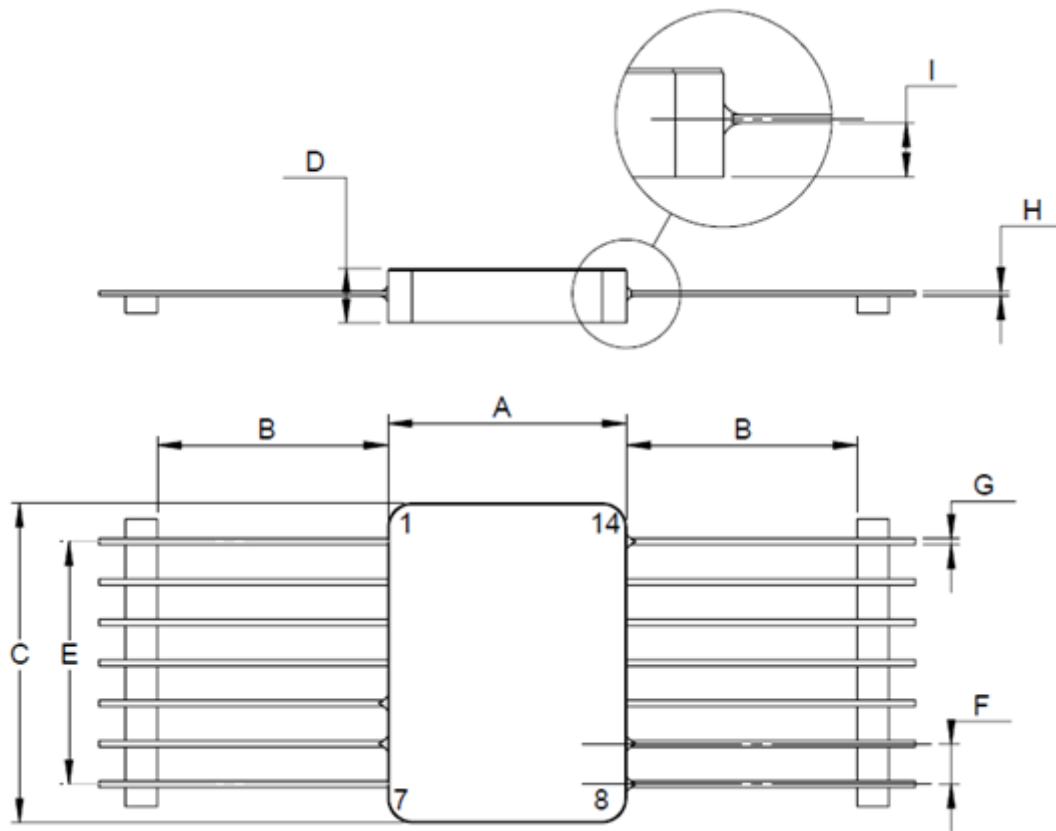
1. Device is functional as follows:  $+3.13V \leq V_{CC} \leq +3.47V$  (where nominal V<sub>CC</sub>, V<sub>CCNom</sub> = +3.3V)
2. Device is functional as follows:

| Output Waveform | Frequency Range                  | Load Impedance   |
|-----------------|----------------------------------|--|
| AHCMOS          | $4MHz \leq f_{Nom} < 80MHz$      | C <sub>LMin</sub> = 13pF ≤ C <sub>L</sub> ≤ C <sub>LMax</sub> = 18pF<br>(load in parallel with R <sub>L</sub> = 1kΩ)<br>(where nominal C <sub>L</sub> , C <sub>LNom</sub> = 15pF)  |
|                 | $80MHz \leq f_{Nom} \leq 100MHz$ | C <sub>LMin</sub> = 8.2pF ≤ C <sub>L</sub> ≤ C <sub>LMax</sub> = 11pF<br>(load in parallel with R <sub>L</sub> = 1kΩ)<br>(where nominal C <sub>L</sub> , C <sub>LNom</sub> = 10pF) |
| ACMOS           | $4MHz \leq f_{Nom} < 100MHz$     | C <sub>LMin</sub> = 13pF ≤ C <sub>L</sub> ≤ C <sub>LMax</sub> = 18pF<br>(load in parallel with R <sub>L</sub> = 1kΩ)<br>(where nominal C <sub>L</sub> , C <sub>LNom</sub> = 15pF)  |

3. Hand soldering: duration 10 seconds maximum at a distance of not less than 1.5mm from the device body and the same lead shall not be resoldered until 3 minutes have elapsed.

1.6 PHYSICAL DIMENSIONS AND TERMINAL IDENTIFICATION

1.6.1 Flat Package (FP1) – 14 leads (Variant 01)



| Symbols | Dimensions mm |       | Notes     |
|---------|---------------|-------|-----------|
|         | Min           | Max   |           |
| A       | 14.86         | 15.12 |           |
| B       | 13            | -     |           |
| C       | 19.94         | 20.2  |           |
| D       | -             | 3.71  |           |
| E       | 15.24 BSC     |       | 2 places  |
| F       | 2.54 BSC      |       | All leads |
| G       | 0.28          | 0.48  | All leads |
| H       | 0.15          | 0.35  | All leads |
| I       | 1.5           | 1.91  | All leads |

**NOTES:**

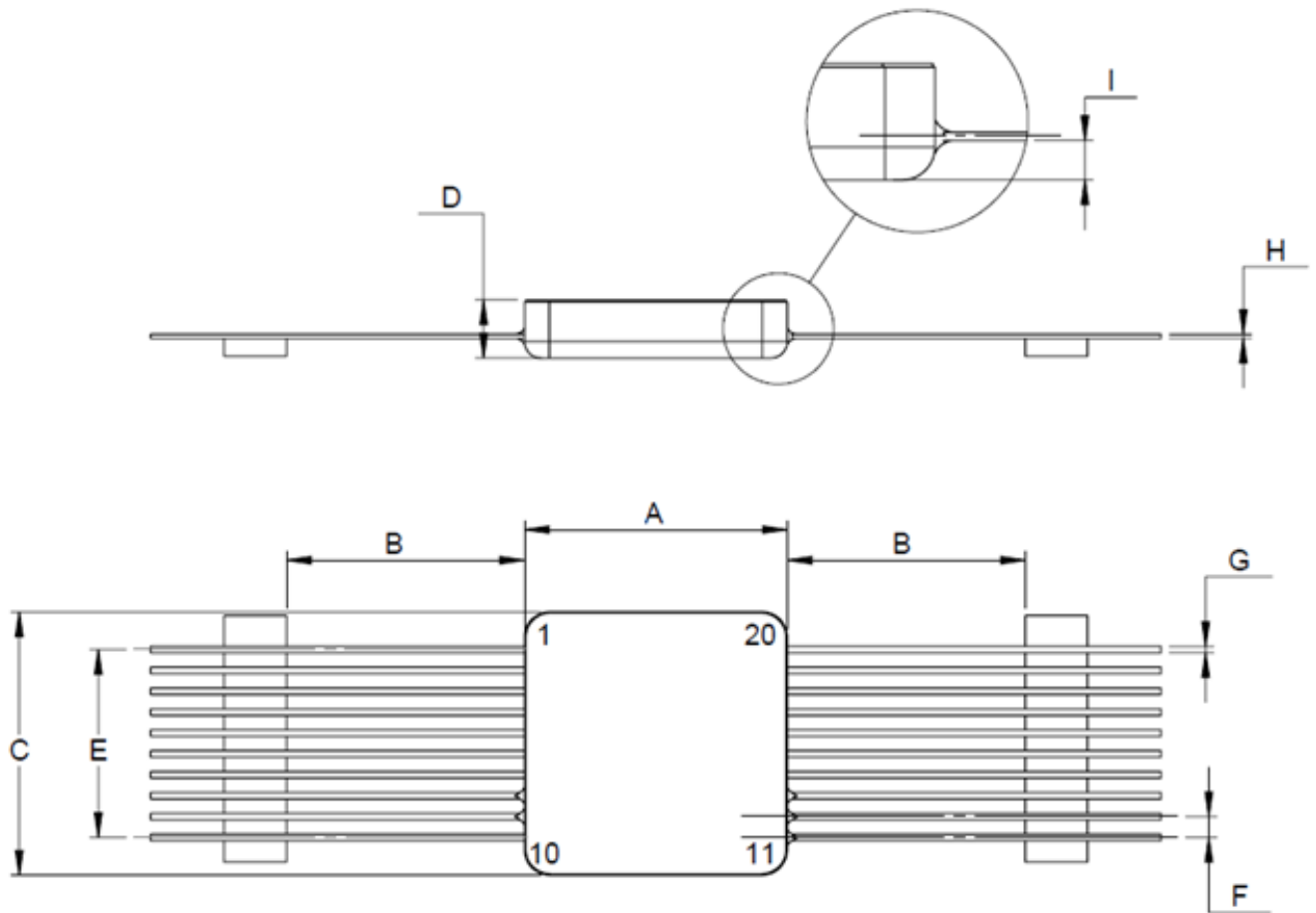
1. The terminal identification is specified by marking of the terminal number on the lid as shown.

**NOTE:** only terminal number 1 is actually marked.

See Para. 1.7 for the terminal connections.



1.6.2 Flat Package (FP2) – 20 leads (Variant 02)



| Symbols | Dimensions mm |       | Notes     |
|---------|---------------|-------|-----------|
|         | Min           | Max   |           |
| A       | 15.75         | 16.01 |           |
| B       | 13            | -     |           |
| C       | 15.75         | 16.01 |           |
| D       | -             | 3.83  |           |
| E       | 11.43 BSC     |       | 2 places  |
| F       | 1.27 BSC      |       | All leads |
| G       | 0.28          | 0.48  | All leads |
| H       | 0.15          | 0.35  | All leads |
| I       | 1             | 1.41  | All leads |

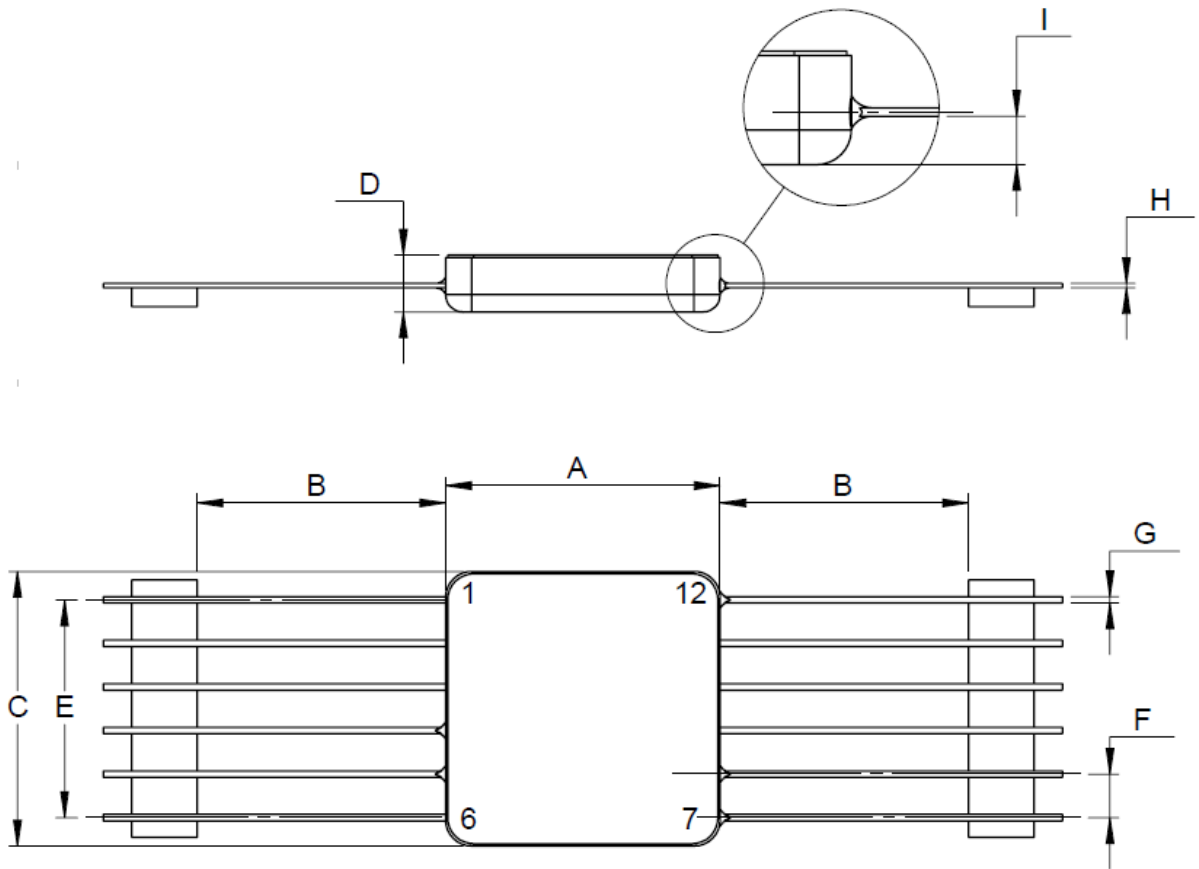
**NOTES:**

1. The terminal identification is specified by marking of the terminal number on the lid as shown.

**NOTE:** only terminal number 1 is actually marked.

See Para. 1.7 for the terminal connections.

1.6.3 Flat Package (FP3) – 12 leads (Variant 03)



| Symbols | Dimensions mm |       | Notes     |
|---------|---------------|-------|-----------|
|         | Min           | Max   |           |
| A       | 15.75         | 16.01 |           |
| B       | 13            | -     |           |
| C       | 15.75         | 16.01 |           |
| D       | -             | 3.58  |           |
| E       | 12.7 BSC      |       | 2 places  |
| F       | 2.54 BSC      |       | All leads |
| G       | 0.28          | 0.48  | All leads |
| H       | 0.15          | 0.35  | All leads |
| I       | 1.2           | 1.61  | All leads |

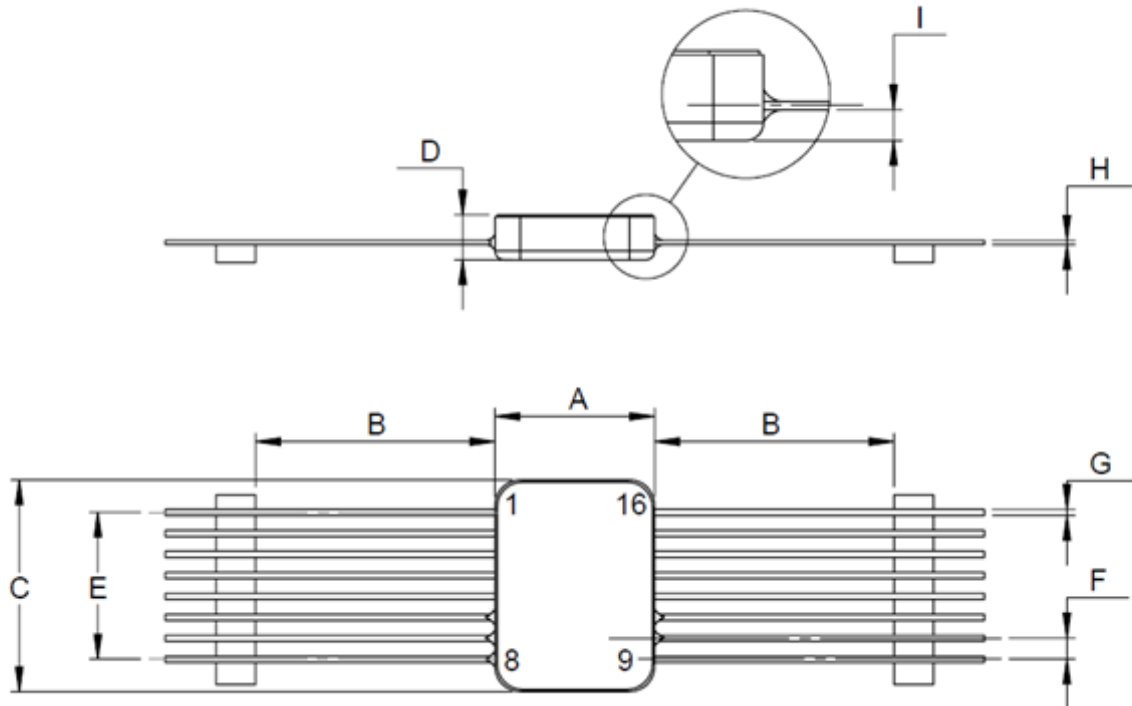
**NOTES:**

1. The terminal identification is specified by marking of the terminal number on the lid as shown.

**NOTE:** only terminal number 1 is actually marked.

See Para. 1.7 for the terminal connections.

1.6.4 Flat Package (FP4) – 16 leads (Variant 04)



| Symbols | Dimensions mm |       | Notes     |
|---------|---------------|-------|-----------|
|         | Min           | Max   |           |
| A       | -             | 9.66  |           |
| B       | 13            | -     |           |
| C       | -             | 12.83 |           |
| D       | -             | 3.1   |           |
| E       | 8.89 BSC      |       | 2 places  |
| F       | 1.27 BSC      |       | All leads |
| G       | 0.28          | 0.48  | All leads |
| H       | 0.15          | 0.35  | All leads |
| I       | 0.73          | 1.14  | All leads |

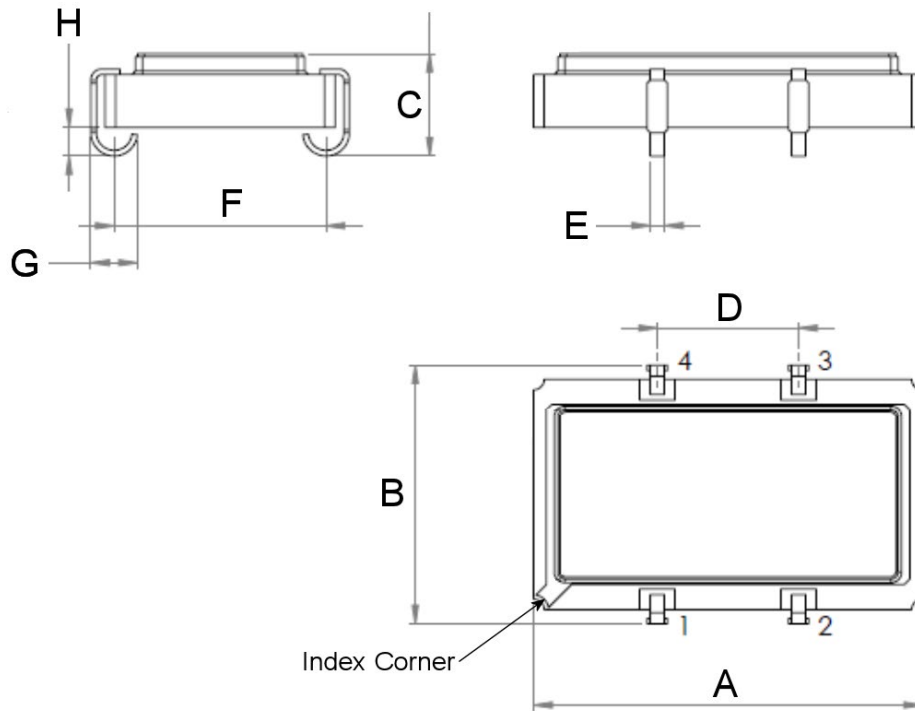
**NOTES:**

1. The terminal identification is specified by marking of the terminal number on the lid as shown.

**NOTE:** only terminal number 1 is actually marked.

See Para. 1.7 for the terminal connections.

1.6.5 J-Lead Package (JL2) – 4 leads (Variant 06)

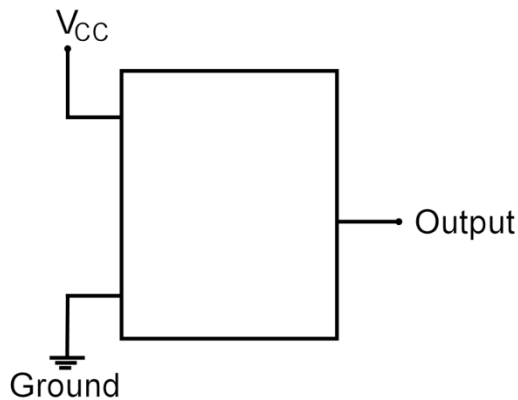


| Symbols | Dimensions mm |       | Notes     |
|---------|---------------|-------|-----------|
|         | Min           | Max   |           |
| A       | 13.72         | 14.22 |           |
| B       | 8.8           | 9.8   | 2 places  |
| C       | -             | 4.2   | All leads |
| D       | 4.93          | 5.23  | 2 places  |
| E       | 0.46          | 0.56  | All leads |
| F       | 7.42          | 7.82  | All leads |
| G       | 1.58          | 1.78  | All leads |
| H       | 0.89          | 1.15  | All leads |

**NOTES:**

- The terminal identification is specified by reference to the index corner as shown.  
See Para. 1.7 for the terminal connections.

1.7 FUNCTIONAL DIAGRAM



| Variant Number | Case | Terminal Number |                 |   |               | Notes |
|----------------|------|-----------------|-----------------|---|---------------|-------|
|                |      | Output          | V <sub>CC</sub> | Ground  | Not Connected |       |
| 01             | FP1  | 8               | 14              | 1, 2, 3, 4, 7, 10, 11, 12, 13                       | 5, 6, 9       | 1, 2  |
| 02             | FP2  | 11              | 13              | 1, 2, 3, 4, 5, 6, 7, 10, 14, 15, 16, 17, 18, 19, 20 | 8, 9, 12      | 1, 2  |
| 03             | FP3  | 7               | 12              | 1, 2, 3, 6, 9, 10, 11                               | 4, 5, 8       | 1, 2  |
| 04             | FP4  | 10              | 8               | 1, 2, 3, 4, 5, 9, 12, 13, 14, 15, 16                | 6, 7, 11      | 1, 2  |
| 06             | JL2  | 3               | 4               | 2   | 1             | 1, 2  |

**NOTES:**

1. The case is connected to Ground.
2. Not Connected pins must be connected to a potential (e.g., Ground)

1.8 MATERIALS AND FINISHES

Materials and finishes shall be as follows:

- (a) Case
 

The FP1, FP2, FP3, FP4 cases (Variants 01, 02, 03, 04 respectively) shall be hermetically sealed, and have a metal body with hard glass seals and a seam sealed metal lid.

The JL2 case (Variant 06) shall be hermetically sealed, and have a ceramic body with brazed leads and a seam sealed lid.
- (b) Terminals
 

As specified in Para. 1.4.2 Component Type Variants.

## 2 REQUIREMENTS

### 2.1 GENERAL

The complete requirements for procurement of the components specified herein are as stated in this specification and the ESCC Generic Specification. Permitted deviations from the Generic Specification, applicable to this specification only, are listed below.

Permitted deviations from the Generic Specification and this Detail Specification, formally agreed with specific Manufacturers on the basis that the alternative requirements are equivalent to the ESCC requirement and do not affect the component's reliability, are listed in the appendices attached to this specification.

#### 2.1.1 Oscillator Class

The components specified herein shall satisfy the requirements Class 2 Oscillators in accordance with the Generic Specification.

#### 2.1.2 Deviations from the Generic Specification

##### 2.1.2.1 *Deviations from Qualification and Periodic Tests - Chart F4*

- (a) Mechanical Shock: the following test conditions shall apply:  
[MIL-STD-202, Test Method 213](#), Test Condition F except that the tests condition values shall be: 2000g, 0.3ms, half-sine.
- (b) Random Vibration: the following test conditions shall apply:  
[MIL-STD-202, Test Method 214](#), Test Condition I-J (37.8grms overall), 3 minutes per axis.

### 2.2 MARKING

The marking shall be in accordance with the requirements of ESCC Basic Specification No. [21700](#) and as follows.

The information to be marked on the component shall be:

- (a) Terminal identification (see Para. 1.6).
- (b) The ESCC Qualified Component symbol (for ESCC qualified components only).
- (c) The ESCC Component Number (see Para. 1.4.1).
- (d) Traceability information.

### 2.3 ELECTRICAL MEASUREMENTS AT ROOM, HIGH AND LOW TEMPERATURES

Electrical measurements shall be performed at room, high and low temperatures. Consolidated notes are given in Para. 2.3.3.

2.3.1 Room Temperature Electrical Measurements

| Characteristics                       | Symbols            | Test Method       | Test Conditions<br>Note 1  | Limits                                 |                                  | Units |
|---------------------------------------|--------------------|-------------------|--|--|----------------------------------|-------|
|                                       |                    |                   |  | Min                                    | Max                              |       |
| Input Current                         | $I_{IN}$           | ESCC<br>No. 24200 | For Output Waveform AHCMOS:<br>For 4MHz $\leq f_{Nom} < 20$ MHz:<br>For 20MHz $\leq f_{Nom} < 50$ MHz:<br>For 50MHz $\leq f_{Nom} \leq 100$ MHz:<br><br>For Output Waveform ACMOS:<br>For 4MHz $\leq f_{Nom} < 100$ MHz: | -<br>-<br>-<br>-                       | 20<br>25<br>30<br>35             | mA    |
| Output Waveform<br>(AHCMOS and ACMOS) | -                  | ESCC<br>No. 24200 |  | Symmetrical<br>Square Wave<br>(Note 2) |                                  | -     |
| Output Voltage High Level             | $V_{OH}$           | ESCC<br>No. 24200 |  | 2.4                                    | -                                | V     |
| Output Voltage Low Level              | $V_{OL}$           | ESCC<br>No. 24200 |  | -                                      | 0.4                              | V     |
| Frequency Accuracy                    | $\Delta f/f_{Nom}$ | ESCC<br>No. 24200 | At $T_{amb} = +25 \pm 1^\circ C$<br>Referred to $f_{Nom}$  | -                                      | $\pm 25$                         | ppm   |
| Frequency-Voltage<br>Tolerance        | $\Delta f/f(V)$    | ESCC<br>No. 24200 | At $T_{amb} = +25 \pm 1^\circ C$<br>Referred to $f$ at $V_{CCNom}$<br>For 3.13V, 3.3V & 3.47V:   | -                                      | $\pm 3$                          | ppm   |
| Frequency-Load Tolerance              | $\Delta f/f(L)$    | ESCC<br>No. 24200 | For $C_L = C_{LMin}, C_{LNom} \& C_{LMax}$ ,<br>$R_L = 1k\Omega$ ,<br>Referred to $f$ at $C_{LNom}$  | -                                      | $\pm 5$                          | ppm   |
| Startup Time                          | $t_{su}$           | ESCC<br>No. 24200 |  | -                                      | 10                               | ms    |
| Rise Time                             | $t_r$              | ESCC<br>No. 24200 | For 4MHz $\leq f_{Nom} < 16$ MHz:<br>For 16MHz $\leq f_{Nom} < 80$ MHz:<br>For 80MHz $\leq f_{Nom} \leq 100$ MHz:  | -<br>-<br>-                            | 10<br>7<br>5                     | ns    |
| Fall Time                             | $t_f$              | ESCC<br>No. 24200 | For 4MHz $\leq f_{Nom} < 16$ MHz:<br>For 16MHz $\leq f_{Nom} < 80$ MHz:<br>For 80MHz $\leq f_{Nom} \leq 100$ MHz:  | -<br>-<br>-                            | 10<br>7<br>5                     | ns    |
| Duty Cycle                            | DC                 | ESCC<br>No. 24200 |  | 45                                     | 55                               | %     |
| Ageing Analysis                       | $\Delta f/f$       | ESCC<br>No. 3503  | Ageing Period = 30 days:<br>Ageing Period = 1 year:<br>Ageing Period = 18 years:   | -<br>-<br>-                            | $\pm 1.5$<br>$\pm 5$<br>$\pm 15$ | ppm   |

2.3.2 High and Low Temperatures Electrical Measurements

| Characteristics                 | Symbols         | Test Method       | Test Conditions<br>Note 1  | Limits                  |                                  | Units |
|---------------------------------|-----------------|-------------------|--|-------------------------|----------------------------------|-------|
|                                 |                 |                   |  | Min                     | Max                              |       |
| Input Current                   | $I_{IN}$        | ESCC<br>No. 24200 | At $T_{amb} = -55 (+5 -0)^{\circ}C$ and $+110 (+0 -5)^{\circ}C$<br>For Output Waveform AHCMOS:<br>For $4MHz \leq f_{Nom} < 20MHz$ :<br>For $20MHz \leq f_{Nom} < 50MHz$ :<br>For $50MHz \leq f_{Nom} \leq 100MHz$ :<br>For Output Waveform ACMOS:<br>For $4MHz \leq f_{Nom} < 100MHz$ :        | -                       | 20<br>25<br>30<br>35             | mA    |
| Output Waveform                 | -               | ESCC<br>No. 24200 | At $T_{amb} = -55 (+5 -0)^{\circ}C$ and $+110 (+0 -5)^{\circ}C$  | Symmetrical Square Wave |                                  | -     |
| Output Voltage High Level       | $V_{OH}$        | ESCC<br>No. 24200 | At $T_{amb} = -55 (+5 -0)^{\circ}C$ and $+110 (+0 -5)^{\circ}C$  | 2.4                     | -                                | V     |
| Output Voltage Low Level        | $V_{OL}$        | ESCC<br>No. 24200 | At $T_{amb} = -55 (+5 -0)^{\circ}C$ and $+110 (+0 -5)^{\circ}C$  | -                       | 0.4                              | V     |
| Frequency-Temperature Stability | $\Delta f/f(T)$ | ESCC<br>No. 24200 | At $T_{amb} = -55 (+1 -0)^{\circ}C$ to $+110 (+0 -1)^{\circ}C$ .<br>Note 3<br>Referred to $f$ at $T_{amb} = +25 \pm 1^{\circ}C$<br>For Variants 01 to 04:<br>For $4MHz \leq f_{Nom} < 80MHz$ :<br>For $80MHz \leq f_{Nom} < 100MHz$ :<br>For Variant 06:<br>For $4MHz \leq f_{Nom} < 100MHz$ : | -                       | $\pm 30$<br>$\pm 40$<br>$\pm 50$ | ppm   |
| Frequency-Voltage Tolerance     | $\Delta f/f(V)$ | ESCC<br>No. 24200 | At $T_{amb} = -55 (+1 -0)^{\circ}C$ to $+110 (+0 -1)^{\circ}C$<br>Referred to $f$ at $V_{CCNom}$<br>For 3.13V, 3.3V & 3.47V:   | -                       | $\pm 4$                          | ppm   |
| Startup Time                    | $t_{su}$        | ESCC<br>No. 24200 | At $T_{amb} = -55 (+5 -0)^{\circ}C$ and $+110 (+0 -5)^{\circ}C$  |                         | 10                               | ms    |
| Rise Time                       | $t_r$           | ESCC<br>No. 24200 | At $T_{amb} = -55 (+5 -0)^{\circ}C$ and $+110 (+0 -5)^{\circ}C$<br>For $4MHz \leq f_{Nom} < 16MHz$ :<br>For $16MHz \leq f_{Nom} < 80MHz$ :<br>For $80MHz \leq f_{Nom} \leq 100MHz$ :   | -                       | 10<br>7<br>5                     | ns    |
| Fall Time                       | $t_f$           | ESCC<br>No. 24200 | At $T_{amb} = -55 (+5 -0)^{\circ}C$ and $+110 (+0 -5)^{\circ}C$<br>For $4MHz \leq f_{Nom} < 16MHz$ :<br>For $16MHz \leq f_{Nom} < 80MHz$ :<br>For $80MHz \leq f_{Nom} \leq 100MHz$ :   | -                       | 10<br>7<br>5                     | ns    |
| Duty Cycle                      | DC              | ESCC<br>No. 24200 | At $T_{amb} = -55 (+5 -0)^{\circ}C$ and $+110 (+0 -5)^{\circ}C$  | 45                      | 55                               | %     |



2.3.3 Notes to Paras. 2.3.1 and 2.3.2 Room, High and Low Electrical Measurements

1. Unless otherwise specified, the measurements shall be performed at  $T_{amb} = +22 \pm 3^{\circ}\text{C}$  and the component under test shall be operated at  $V_{CCNom}$  with an output load of  $C_{LNom}$  in parallel with  $R_L = 1\text{k}\Omega$ .  $V_{CCNom}$  and  $C_{LNom}$  are specified in Para. 1.5 Maximum Ratings.
2. The shape of the output waveform shall conform to the requirements specified in the Manufacturer's PID, as applicable for AHCMOS or AC MOS (see Para. 1.4.1.1(b)).
3. Frequency-Temperature Stability shall be measured at a minimum of 10 equally spaced increments over the specified temperature range.

2.4 PARAMETER DRIFT VALUES

Unless otherwise specified, the measurements shall be performed at  $T_{amb} = +22 \pm 3^{\circ}\text{C}$ .

The test methods and test conditions shall be as per the corresponding test defined in Para. 2.3.1 Room Temperature Electrical Measurements.

The drift values ( $\Delta$ ) shall not be exceeded for each characteristic specified. The corresponding absolute limit values for each characteristic shall not be exceeded.

| Characteristics  | Symbols            | Limits   |                  | Units                |     |
|--|--------------------|--|------------------|----------------------|-----|
|  |                    | Drift Value $\Delta$                             | Absolute         |                      |     |
|  |                    |  | Min              |                      | Max |
| Input Current<br>For Output Waveform AHCMOS:<br>For $4\text{MHz} \leq f_{Nom} < 20\text{MHz}$ :<br>For $20\text{MHz} \leq f_{Nom} < 50\text{MHz}$ :<br>For $50\text{MHz} \leq f_{Nom} \leq 100\text{MHz}$ :<br>For Output Waveform AC MOS:<br>For $4\text{MHz} \leq f_{Nom} < 100\text{MHz}$ : | $I_{IN}$           | $\pm 5\%$<br>$\pm 5\%$<br>$\pm 5\%$<br>$\pm 5\%$ | -<br>-<br>-<br>- | 20<br>25<br>30<br>35 | mA  |
| Frequency Accuracy<br>Initial measurement:<br>Final measurement:   | $\Delta f/f_{Nom}$ | $\pm 10$   | -<br>-           | $\pm 20$<br>$\pm 25$ | ppm |

2.5 INTERMEDIATE AND END-POINT ELECTRICAL MEASUREMENTS

Unless otherwise specified, the measurements shall be performed at  $T_{amb} = +22 \pm 3 \text{ }^\circ\text{C}$ .

The test methods and test conditions shall be as per the corresponding test defined in Para. 2.3.1 Room Temperature Electrical Measurements or Para. 2.3.2 High and Low Temperatures Electrical Measurements, as follows.

The drift values ( $\Delta$ ) shall not be exceeded for each characteristic specified. Unless otherwise specified, the corresponding absolute limit values for each characteristic shall not be exceeded.

| Characteristics   | Symbols            | Test Conditions    | Limits               |                         |                                  | Units |
|---|--------------------|--------------------|----------------------|-------------------------|----------------------------------|-------|
|   |                    |                    | Drift Value $\Delta$ | Absolute                |                                  |       |
|   |                    |                    |                      | Min                     | Max                              |       |
| Input Current<br>For Output Waveform AHCMOS:<br>For 4MHz $\leq$ $f_{Nom}$ < 20MHz:<br>For 20MHz $\leq$ $f_{Nom}$ < 50MHz:<br>For 50MHz $\leq$ $f_{Nom}$ $\leq$ 100MHz:<br>For Output Waveform ACMOS:<br>For 4MHz $\leq$ $f_{Nom}$ < 100MHz: | $I_{IN}$           | As per Para. 2.3.1 | -<br>-<br>-<br>-     | -<br>-<br>-<br>-        | 20<br>25<br>30<br>35             | mA    |
| Output Waveform   | -                  | As per Para. 2.3.1 | -                    | Symmetrical Square Wave |                                  | -     |
| Output Voltage High Level   | $V_{OH}$           | As per Para. 2.3.1 | -                    | 2.4                     | -                                | V     |
| Output Voltage Low Level  | $V_{OL}$           | As per Para. 2.3.1 | -                    | -                       | 0.4                              | V     |
| Frequency Accuracy  | $\Delta f/f_{Nom}$ | As per Para. 2.3.1 | $\pm 8.5$ (1)        | -                       | $\pm 25$ (2)                     | ppm   |
| Frequency-Temperature Stability<br>For Variants 01 to 04:<br>For 4MHz $\leq$ $f_{Nom}$ < 80MHz:<br>For 80MHz $\leq$ $f_{Nom}$ < 100MHz:<br>For Variant 06:<br>For 4MHz $\leq$ $f_{Nom}$ < 100MHz:   | $\Delta f/f(T)$    | As per Para. 2.3.2 | -<br>-<br>-          | -<br>-<br>-             | $\pm 30$<br>$\pm 40$<br>$\pm 50$ | ppm   |
| Rise Time<br>For 4MHz $\leq$ $f_{Nom}$ < 16MHz:<br>For 16MHz $\leq$ $f_{Nom}$ < 80MHz:<br>For 80MHz $\leq$ $f_{Nom}$ $\leq$ 100MHz:   | $t_r$              | As per Para. 2.3.1 | -<br>-<br>-          | -<br>-<br>-             | 10<br>7<br>5                     | ns    |
| Fall Time<br>For 4MHz $\leq$ $f_{Nom}$ < 16MHz:<br>For 16MHz $\leq$ $f_{Nom}$ < 80MHz:<br>For 80MHz $\leq$ $f_{Nom}$ $\leq$ 100MHz:   | $t_f$              | As per Para. 2.3.1 | -<br>-<br>-          | -<br>-<br>-             | 10<br>7<br>5                     | ns    |
| Duty Cycle  | DC                 | As per Para. 2.3.1 | -                    | 45                      | 55                               | %     |

**NOTES:**

1. Drift value ( $\Delta$ ) is only applicable to testing during the Endurance Subgroup.
2. Absolute limit is only applicable to testing during the Environmental/Mechanical Subgroup.

**2.6 BURN-IN CONDITIONS**

The test conditions for Burn-in, tested as specified in the ESCC Generic Specification, shall be as follows:

- (a) Output Load:  $C_{LNom}$  in parallel with  $R_L = 1k\Omega$ .  $C_{LNom}$  is specified in Para. 1.5 Maximum Ratings.

**2.7 FREQUENCY AGEING CONDITIONS**

The test conditions for Frequency Ageing, tested as specified in the ESCC Generic Specification, shall be as follows:

- (a) Output Load:  $C_{LNom}$  in parallel with  $R_L = 1k\Omega$ .  $C_{LNom}$  is specified in Para. 1.5 Maximum Ratings.

**2.8 OPERATING LIFE CONDITIONS**

The test conditions for Operating Life, tested as specified in the ESCC Generic Specification, shall be as follows:

- (a) Output Load:  $C_{LNom}$  in parallel with  $R_L = 1k\Omega$ .  $C_{LNom}$  is specified in Para. 1.5 Maximum Ratings.

**2.9 TOTAL DOSE RADIATION TESTING**

All lots shall be irradiated in accordance with ESCC Basic Specification No. [22900](#), low dose rate (window 2: 36rad(Si) to 360rad(Si) per hour).

**2.9.1 Bias Conditions and Total Dose Level for Total Dose Radiation Testing**

The following bias condition (worst-case) shall be used for Total Dose Radiation Testing at  $T_{amb} = +22 \pm 3^\circ C$ :

With Supply Voltage:  $V_{CC} = 3.47V$  during irradiation.

The total dose level applied shall be as specified in Para. 1.4.2 or in the Purchase Order.

2.9.2 Electrical Measurements for Total Dose Radiation Testing

Prior to irradiation testing the devices shall have successfully met Para. 2.3.1 Room Temperature Electrical Measurements specified herein.

Unless otherwise specified, the measurements shall be performed at  $T_{amb} = +22 \pm 3^{\circ}\text{C}$ .

Unless otherwise specified, the test methods and test conditions shall be as per the corresponding test defined in Para. 2.3.1 Room Temperature Electrical Measurements.

The parameters to be measured during irradiation testing, on completion of irradiation testing, after 24 hours anneal at Room Temperature and after 168 hours anneal at  $T_{amb} = +100 \pm 3^{\circ}\text{C}$  are shown below.

| Characteristics   | Symbols            | Limits                  |                      | Units |
|---|--------------------|-------------------------|----------------------|-------|
|   |                    | Min                     | Max                  |       |
| Input Current<br>For Output Waveform AHCMOS:<br>For $4\text{MHz} \leq f_{Nom} < 20\text{MHz}$ :<br>For $20\text{MHz} \leq f_{Nom} < 50\text{MHz}$ :<br>For $50\text{MHz} \leq f_{Nom} \leq 100\text{MHz}$ :<br>For Output Waveform ACMOS:<br>For $4\text{MHz} \leq f_{Nom} < 100\text{MHz}$ : | $I_{IN}$           | -                       | 20<br>25<br>30<br>35 | mA    |
| Output Waveform   | -                  | Symmetrical Square Wave |                      | -     |
| Output Voltage High Level   | $V_{OH}$           | 2.4                     | -                    | V     |
| Output Voltage Low Level  | $V_{OL}$           | -                       | 0.4                  | V     |
| Frequency Accuracy  | $\Delta f/f_{Nom}$ | -                       | $\pm 25$             | ppm   |
| Rise Time<br>For $4\text{MHz} \leq f_{Nom} < 16\text{MHz}$ :<br>For $16\text{MHz} \leq f_{Nom} < 80\text{MHz}$ :<br>For $80\text{MHz} \leq f_{Nom} \leq 100\text{MHz}$ :  | $t_r$              | -                       | 10<br>7<br>5         | ns    |
| Fall Time<br>For $4\text{MHz} \leq f_{Nom} < 16\text{MHz}$ :<br>For $16\text{MHz} \leq f_{Nom} < 80\text{MHz}$ :<br>For $80\text{MHz} \leq f_{Nom} \leq 100\text{MHz}$ :  | $t_f$              | -                       | 10<br>7<br>5         | ns    |
| Duty Cycle  | DC                 | 45                      | 55                   | %     |

**APPENDIX A**  
**AGREED DEVIATIONS FOR RAKON FRANCE S.A.S. (F)**

| ITEMS AFFECTED   | DESCRIPTION OF DEVIATIONS   |
|--|---|
| Para. 1.4.2 Component Type Variants  | <p>Oscillators with ACMOS outputs (output waveform code AC) are available from Rakon but only with specific frequencies.</p> <p>Customers should contact Rakon to confirm feasibility and availability.</p> <p>Oscillators with Nominal Output Frequencies, <math>f_{NOM}</math>, in the range 4MHz to 100MHz are available from Rakon. However, for frequencies below 24MHz, Customers should contact Rakon to confirm feasibility and availability.</p>   |
| Para. 2.1.2 Deviations from the Generic Specification:<br>Deviations from Screening Tests - Chart F3 | <p>Constant Acceleration:<br/> <a href="#">MIL-STD-883, Test Method 2001</a>, Test Condition A, Y1 axis only shall apply except the stress level shall be 2500g minimum.</p> <p>Frequency Ageing:<br/>           Ageing Analysis: The projected 1 and 18 year total frequency changes shall be determined by means of a logarithmic (rather than linear) extrapolation from the end of the ageing measurement period using the A and B constants determined from the least squares fit.</p> <p>e.g., The frequency change over the period of 1 year (365 days) for a total ageing measurement period of <math>T_a</math>, in days (where <math>T_a</math> is 30 days or longer), is given by:</p> $\Delta f(1yr) = (A \times \ln(B \times (365 + T_a) + 1)) - (A \times \ln(B \times T_a + 1))$ |
| Para. 2.1.2.1 Deviations from Qualification and Periodic Tests - Chart F4                            | <p>Solderability:<br/>           Solderability may be performed in accordance with Test Ta (without ageing) of IEC Publication No. 60068-2-20.</p>  |

ADDITIONAL DATA - RAKON FRANCE S.A.S. (F)

- (a) Electrical Characteristics  
 For information, the following details apply to the components specified herein:
- RMS Jitter:
    - For  $f_{Nom} < 40\text{MHz}$ : 8ps at  $T_{amb} = 25^\circ\text{C}$  typical
    - For  $f_{Nom} \geq 40\text{MHz}$ : 5ps at  $T_{amb} = 25^\circ\text{C}$  typical
- Conditions:  
 Integrated Phase Jitter:
- $f_{Nom} < 16\text{MHz}$ : 1kHz to 100kHz
  - $f_{Nom} \geq 16\text{MHz}$ : 10kHz to 10MHz
- (b) Single Event Effects (SEE) Information  
 These components are susceptible to Single Event Latch-up (SEL) if operated in a space environment.
- Performance:
- SEL Threshold:  $> 60\text{MeV.cm}^2/\text{mg}$