



**CAPACITORS, VARIABLE, CONCENTRIC  
TRIMMER, AIR DIELECTRIC, 1 TO 10pF,  
BODY DIAMETER 7.6mm**

**ESCC Detail Specification No. 3010/004**

|         |               |
|---------|---------------|
| Issue 2 | November 2013 |
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## 1 GENERAL

### 1.1 SCOPE

This specification details the ratings, physical and electrical characteristics, test and inspection data for Capacitors, Variable, Concentric Trimmer, Air Dielectric, 1 to 10 pF. It shall be read in conjunction with ESCC Generic Specification No. 3010, the requirements of which are supplemented herein.

### 1.2 TYPE VARIANTS

The type variants covered by this specification are scheduled in Table 1(a).

### 1.3 MAXIMUM RATINGS

The maximum ratings, which shall not be exceeded at any time during use or storage, applicable to the capacitors specified herein are scheduled in Table 1(b).

### 1.4 PARAMETER DERATING INFORMATION (FIGURE 1)

Not applicable.

### 1.5 PHYSICAL DIMENSIONS

The physical dimensions of the capacitors specified herein are shown in Figure 2.

### 1.6 FUNCTIONAL DIAGRAM

The functional diagram for the capacitors specified herein is shown in Figure 3.

## 2 APPLICABLE DOCUMENTS

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

- (a) ESCC Generic Specification No. 3010 for Capacitors, Variable, Concentric Trimmer.
- (b) IEC Publication No. 68-2-21, Robustness of Terminations.

## 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. In addition the following symbols are used:

$T_{q0}$  = Operating Torque.

$V_T$  = Test Voltage.

**TABLE 1(a) - TYPE VARIANTS**

| Variant | Capacitance (pF) |      | Temperature Coefficient (10 <sup>-6</sup> /°C) | Figure |
|---------|------------------|------|--|--------|
|         | Min.             | Max. |  |        |
| 01      | 1                | 10   | ±15  | 2(a)   |
| 02      | 1                | 10   | ±15  | 2(b)   |
| 03      | 1                | 10   | ±15  | 2(c)   |
| 04      | 1.5              | 10   | ±15  | 2(d)   |
| 05      | 1.5              | 10   | ±15  | 2(e)   |
| 06      | 1                | 10   | ±15  | 2(f)   |

**TABLE 1(b) - MAXIMUM RATINGS**

| No. | Characteristics                      | Symbol           | Limits |      | Unit | Remarks          |
|-----|--------------------------------------|------------------|--------|------|------|------------------|
|     |                                      |                  | Min.   | Max. |      |                  |
| 1   | Rated Voltage                        | U <sub>R</sub>   | -      | 250  | V    | -                |
| 2   | Operating Temperature Range          | T <sub>op</sub>  | -55    | +125 | °C   | Without derating |
| 3   | Storage Temperature Range            | T <sub>stg</sub> | -55    | +125 | °C   | -                |
| 4   | Soldering Temperature                | T <sub>sol</sub> | -      | +260 | °C   | Note 1           |
| 5   | Panel Mounting Nut Tightening Torque | -                | -      | 40   | cm.N | Note 2           |
| 6   | Sealing Cap Tightening Torque        | -                | -      | 10   | cm.N | Note 2           |

**NOTES**

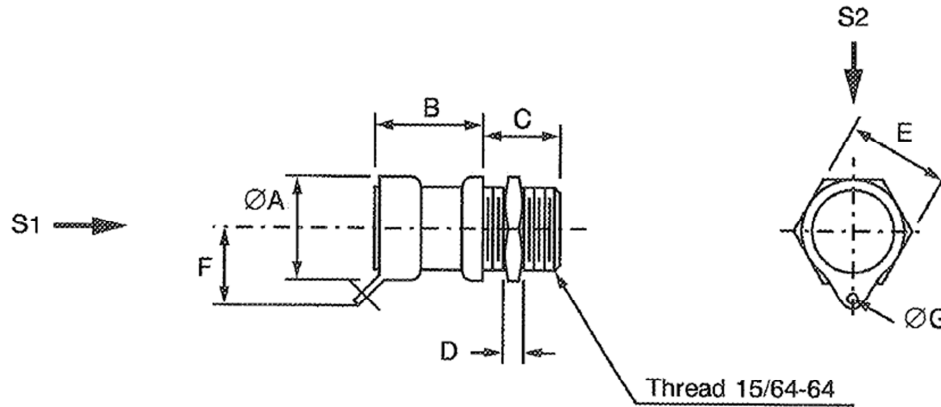
1. Duration 5 seconds maximum.
2. Handling precautions:
  - Use appropriate turning tool.
  - Rotor shall not be disconnected from stator.
  - When cleaning with solvent, it is absolutely necessary to screw on a sealing cap.
  - Sealing cap shall not be used on flight units.
  - Sealing cap shall be supplied with all units.

**FIGURE 1 - PARAMETER DERATING INFORMATION**

Not applicable.

**FIGURE 2 - PHYSICAL DIMENSIONS**

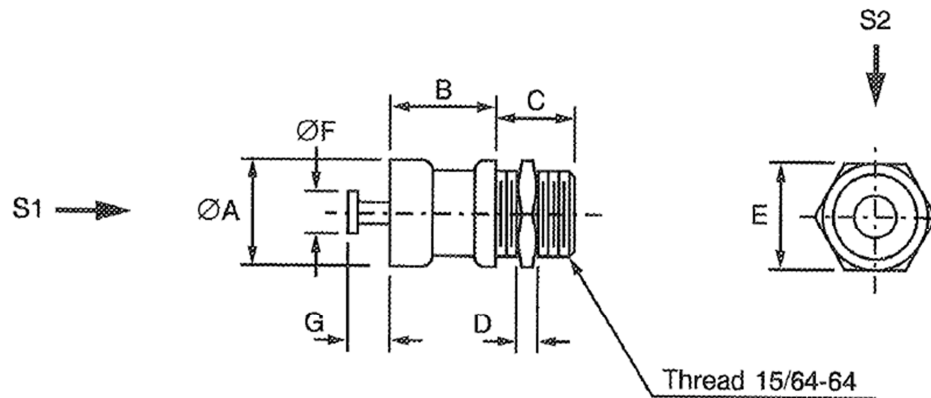
**FIGURE 2(a) - VARIANT 01, LUG PANEL MOUNT**



S1, S2 - Vibration and shock axis

|    |     | ØA  | B   | C   | D   | E   | F | ØG  |
|----|-----|-----|-----|-----|-----|-----|---|-----|
| mm | Min | -   | -   | 4.5 | 0.9 | 6.9 | - | 1.1 |
|    | Max | 7.6 | 7.7 | 4.7 | 1.1 | 7.1 | 6 | 1.3 |

**FIGURE 2(b) - VARIANT 02, TURRET PANEL MOUNT**

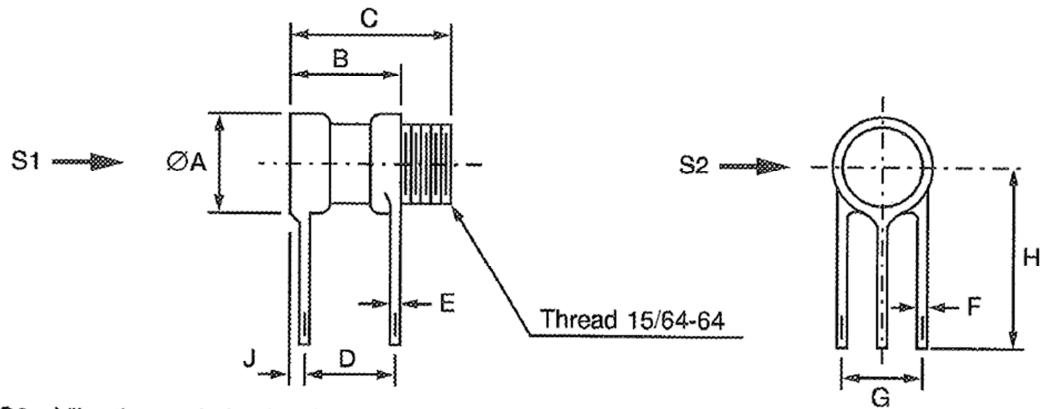


S1, S2 - Vibration and shock axis

|    |     | ØA  | B   | C   | D   | E   | ØF  | G   |
|----|-----|-----|-----|-----|-----|-----|-----|-----|
| mm | Min | -   | 7   | 4.5 | 0.9 | 6.9 | 2.3 | 2.7 |
|    | Max | 7.6 | 7.4 | 4.7 | 1.1 | 7.1 | 2.5 | 2.9 |



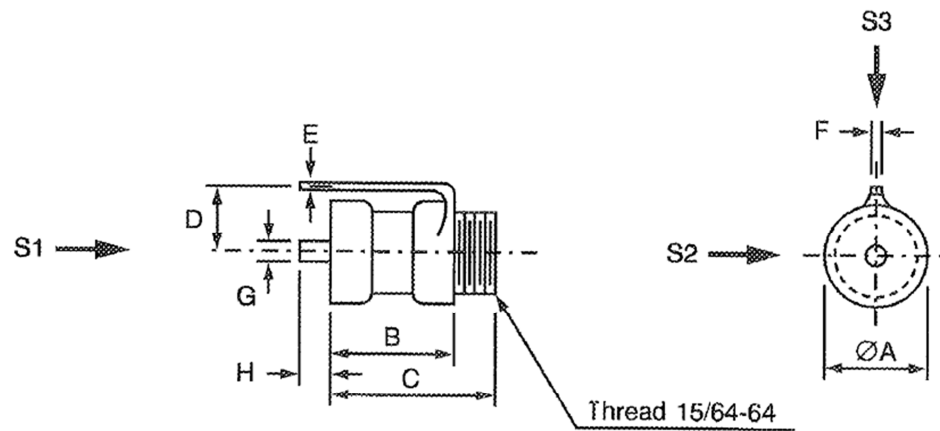
FIGURE 2(c) - VARIANT 03, PCB MOUNT



S1, S2 - Vibration and shock axis

|    |     | $\varnothing A$ | B   | C    | D   | E    | F    | G   | H   | J   |
|----|-----|-----------------|-----|------|-----|------|------|-----|-----|-----|
| mm | Min | -               | 7.8 | 11.8 | 7   | 0.35 | 0.75 | 5.5 | 7.9 | -   |
|    | Max | 7.6             | 8.2 | 12.2 | 7.4 | 0.45 | 0.85 | 5.7 | -   | 0.5 |

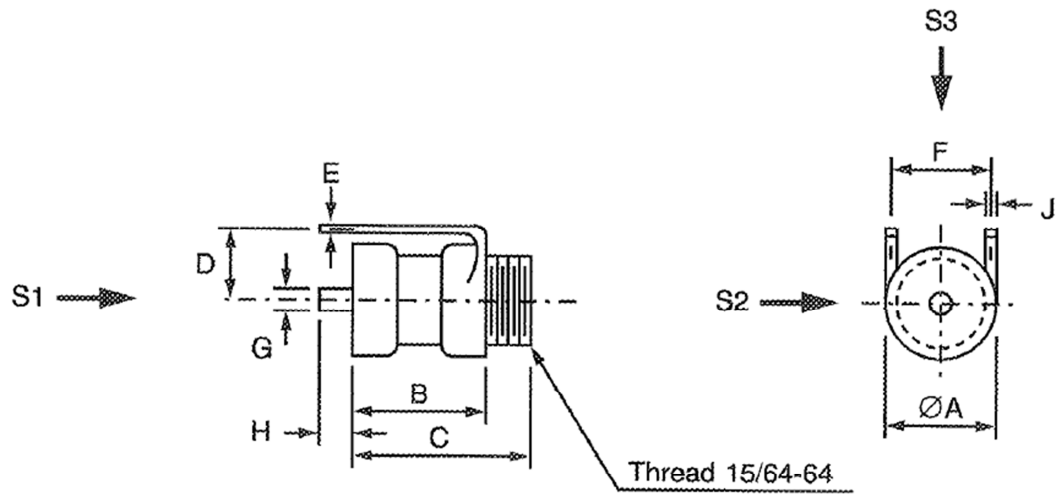
FIGURE 2(d) - VARIANT 04, VERTICAL MOUNT



S1, S2, S3 - Vibration and shock axis

|    |     | $\varnothing A$ | B   | C    | D   | E    | F    | G   | H   |
|----|-----|-----------------|-----|------|-----|------|------|-----|-----|
| mm | Min | -               | 7.3 | 11.8 | 5   | 0.35 | 0.95 | 1.4 | -   |
|    | Max | 7.6             | 7.7 | 12.2 | 5.4 | 0.45 | 1.05 | 1.6 | 2.8 |

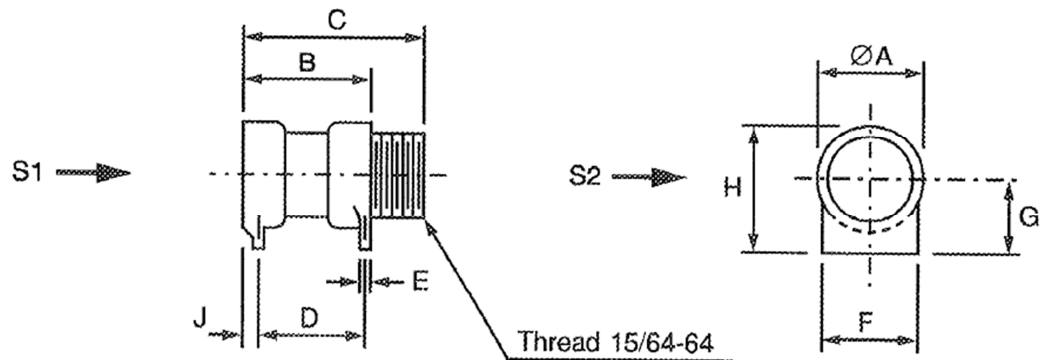
**FIGURE 2(e) - VARIANT 05, SPECIAL VERTICAL MOUNT**



S1, S2, S3 - Vibration and shock axis

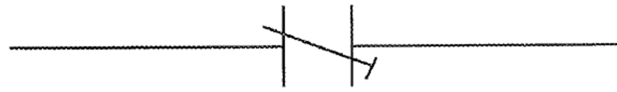
|    |     | ØA  | B   | C    | D   | E    | F   | G   | H   | J    |
|----|-----|-----|-----|------|-----|------|-----|-----|-----|------|
| mm | Min | -   | 7.3 | 11.5 | 5   | 0.35 | 5.5 | 1.4 | -   | 0.95 |
|    | Max | 7.6 | 7.7 | 11.9 | 5.4 | 0.45 | 5.7 | 1.6 | 2.8 | 1.05 |

**FIGURE 2(f) - VARIANT 06, STRIP LINE MOUNT**



S1, S2 - Vibration and shock axis

|    |     | ØA  | B   | C    | D   | E    | F   | G    | H | J   |
|----|-----|-----|-----|------|-----|------|-----|------|---|-----|
| mm | Min | -   | 7.8 | 11.8 | 7   | 0.35 | -   | 3.85 | - | -   |
|    | Max | 7.6 | 8.2 | 12.2 | 7.4 | 0.45 | 7.3 | 3.95 | 8 | 0.5 |

**FIGURE 3 - FUNCTIONAL DIAGRAM**

## 4 REQUIREMENTS

### 4.1 GENERAL

The complete requirements for procurement of the capacitors specified herein are stated in this specification and ESCC Generic Specification No. 3010 for Capacitors, Variable, Concentric Trimmer. Deviations from the Generic Specification, applicable to this specification only, are listed in Para. 4.2.

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

### 4.2 DEVIATIONS FROM GENERIC SPECIFICATION

#### 4.2.1 Deviations from Special In-process Controls

None.

#### 4.2.2 Deviations from Final Production Tests (Chart II)

(a) Serialisation: Not applicable.

#### 4.2.3 Deviations from Burn-in and Electrical Measurements (Chart III)

(a) Para. 7.1, "Burn-in": Not applicable.

(b) Para. 9.3.2, "Parameter Drift Value Measurements": Not applicable.

#### 4.2.4 Deviations from Qualification Tests (Chart IV)

None.

#### 4.2.5 Deviations from Lot Acceptance Tests (Chart V)

None.

### 4.3 MECHANICAL REQUIREMENTS

#### 4.3.1 Dimension Check

The dimensions of the capacitors specified herein shall be verified in accordance with the requirements set out in Para. 9.5 of ESCC Generic Specification No. 3010 and they shall conform to those shown in Figure 2 of this specification.

#### 4.3.2 Weight

The maximum weight of the capacitors specified herein shall be 2.5 grammes.

#### 4.3.3 Robustness of Terminations

The requirements for robustness of terminations are specified in Section 9 of ESCC Generic Specification No. 3010.

Applicable to Variants 03 and 04 only.

#### 4.3.4 Resistance to Soldering Heat

The requirements for resistance to soldering heat are specified in Section 9 of ESCC Generic Specification No. 3010. The test conditions shall be as follows:

Immersion Depth: To within 1mm from the body.

Immersion Time:  $3.5 \pm 0.5$  seconds.

### 4.4 MATERIALS AND FINISHES

The materials and finishes shall be as specified herein. Where a definite material is not specified, a material which will enable the capacitors specified herein to meet the performance requirements of this specification shall be used. Acceptance or approval of any constituent material does not guarantee acceptance of the finished product.

#### 4.4.1 Body

Ceramic.

#### 4.4.2 Terminals

Terminals shall be gold-plated or tinned.

### 4.5 MARKING

#### 4.5.1 General

The marking of components delivered to this specification shall be in accordance with the requirements of ESCC Basic Specification No. 21700 and the following paragraphs. When the component is too small to accommodate all of the marking specified, as much as space permits shall be marked and the marking information, in full, shall accompany the component in its primary package.

The information to be marked and the order of precedence, shall be as follows:

- (a) The ESCC Component Number.
- (b) Traceability Information.

#### 4.5.2 The ESCC Component Number

The ESCC Component Number shall be constituted and marked as follows:

Example: 301000403B

- Detail Specification Number: 3010004
- Type Variant (See Table 1(a)): 03
- Testing Level (B or C, as applicable): B

4.5.3 Traceability Information

Traceability information shall be marked in accordance with the requirements of ESCC Basic Specification No. 21700.

- (a) Manufacturing Date Code.
- (b) Serial Number.
- (c) Manufacturer's Name.

4.6 ELECTRICAL MEASUREMENTS

4.6.1 Electrical Measurements at Room Temperature

The parameters to be measured at room temperature are scheduled in Table 2. Unless otherwise specified, measurements shall be performed at  $T_{amb} = + 22 \pm 3 \text{ }^\circ\text{C}$ .

4.6.2 Electrical Measurements at High and Low Temperatures

The parameters to be measured at high and low temperatures are scheduled in Table 3.

4.6.3 Circuits for Electrical Measurements

Not applicable.

4.7 BURN-IN TESTS

Not applicable.

**TABLE 2 - ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE**

| No. | Characteristics       | Symbol          | ESCC 3010 Test Method | Test Conditions      | Limits          |       | Unit |
|-----|-----------------------|-----------------|-----------------------|----------------------|-----------------|-------|------|
|     |                       |                 |                       |                      | Min             | Max   |      |
| 1   | Minimum Capacitance   | C <sub>m</sub>  | Para. 9.3.1.1         | 1 ±0.1 MHz           | -               | 1 (1) | pF   |
| 2   | Maximum Capacitance   | CM              | Para. 9.3.1.1         | 1 ±0.1 MHz           | 10              | -     | pF   |
| 3   | Change in Capacitance | -               | Para. 9.3.1.2         | 1 ±0.1 MHz<br>Note 2 | -               | -     | -    |
| 4   | Insulation Resistance | R <sub>i</sub>  | Para. 9.3.1.3         | 500V ±25V            | 10 <sup>6</sup> | -     | MΩ   |
| 5   | Voltage Proof         | VP              | Para. 9.3.1.4         | -                    | 500             | -     | V    |
| 6   | Quality Factor        | Q               | Para. 9.3.1.5         | 100 ±5 MHz<br>Note 3 | 5000            | -     | -    |
| 7   | Operating Torque      | T <sub>qo</sub> | Para. 9.3.1.6         | C minimum to maximum | 0.7             | 3.5   | N.cm |

**NOTES**

1. 1.5pF for Variants 04 and 05.
2. No change of sign over the entire adjustment range.
3. Sampling Level II, AQL = 1.0%.

**TABLE 3 - ELECTRICAL MEASUREMENTS AT HIGH AND LOW TEMPERATURES**

| No.   | Characteristics  | Symbol | ESCC 3010 Test Method | Test Conditions (Note 1)                        | Limits |     | Unit                     |
|-------|--|--------|-----------------------|---|--------|-----|--------------------------|
|       |  |        |                       |   | Min    | Max |                          |
| 4     | Insulation Resistance at $T_{amb} = +125 \pm 3 \text{ }^\circ\text{C}$ | $R_i$  | Para. 9.3.1.3         | 500V $\pm 25\text{V}$                           | $10^5$ | -   | M $\Omega$               |
| 8(i)  | Temperature Coefficient  | TC1    | Para. 9.18            | Between -55 and +22 $^\circ\text{C}$<br>Note 2  | -15    | +15 | $10^{-6}/^\circ\text{C}$ |
| 8(ii) | Temperature Coefficient  | TC2    | Para. 9.18            | Between +22 and +125 $^\circ\text{C}$<br>Note 2 | -15    | +15 | $10^{-6}/^\circ\text{C}$ |

**NOTES**

1. Inspection Level II, AQL 2.5%.
2. Trimmers set at approx. 75% of rated max. capacitance.

**FIGURE 4 - CIRCUITS FOR ELECTRICAL MEASUREMENTS**

Not applicable.

**TABLE 4 - PARAMETER DRIFT VALUES**

Not applicable.

**TABLE 5 - CONDITIONS FOR OPERATING LIFE TESTS**

| No. | Characteristic      | Symbol    | Condition    | Unit             |
|-----|---------------------|-----------|--------------|------------------|
| 1   | Ambient Temperature | $T_{amb}$ | +125 (+0 -3) | $^\circ\text{C}$ |
| 2   | Test Voltage        | $V_T$     | 375          | V                |

**FIGURE 5 - ELECTRICAL CIRCUIT FOR OPERATING LIFE TESTS**

Not applicable.

4.8 ENVIRONMENTAL AND ENDURANCE TESTS (CHARTS IV AND V OF ESCC GENERIC SPECIFICATION NO. 3010)

4.8.1 Measurements and Inspections on Completion of Environmental Tests

The parameters to be measured and inspections to be performed on completion of environmental tests are scheduled in Table 6. Unless otherwise specified, the measurements shall be performed at  $T_{amb} = +22 \pm 3 \text{ }^\circ\text{C}$ .

4.8.2 Measurements and Inspections at Intermediate Points during Endurance Tests

The parameters to be measured and inspections to be performed at intermediate points during endurance tests are scheduled in Table 6. Unless otherwise specified, the measurements shall be performed at  $T_{amb} = +22 \pm 3 \text{ }^\circ\text{C}$ .

4.8.3 Measurements and Inspections on Completion of Endurance Tests

The parameters to be measured and inspections to be performed on completion of endurance testing are scheduled in Table 6. Unless otherwise specified, the measurements shall be performed at  $T_{amb} = +22 \pm 3 \text{ }^\circ\text{C}$ .

4.8.4 Conditions for Operating Life Tests (Part of Endurance Testing)

The requirements for operating life testing are specified in Section 9 of ESCC Generic Specification No. 3010. The conditions for operating life testing shall be as specified in Table 5 for the Burn-in test.

4.8.5 Electrical Circuit for Operating Life Tests (Figure 5)

Not applicable.

**TABLE 6 - MEASUREMENTS AND INSPECTIONS ON COMPLETION OF ENVIRONMENTAL TESTS AND AT INTERMEDIATE POINTS AND ON COMPLETION OF ENDURANCE TESTING**

| No. | ESCC Generic Spec. No. 3010            |                                       | Measurements and Inspections                   |  | Symbol     | Limits                       |               | Unit |               |                |
|-----|--|---------------------------------------|--|--|------------|------------------------------|---------------|------|---------------|----------------|
|     | Environmental and Endurance Tests (1)  | Test Method and Conditions            | Identification                                 | Conditions   |            | Min.                         | Max.          |      |               |                |
| 01  | Rapid Change of Temperature            | Para. 9.2                             | <b>Initial Measurements</b><br>Capacitance     | Table 2 Items 1 & 2  | CM<br>& Cm | Table 2                      |               | pF   |               |                |
|     |  |                                       | <b>Final Measurements</b><br>Capacitance Drift | After a recovery period of 24 $\pm$ 3 hrs<br>Table 2 Items 1 & 2       |            | $\Delta$ CM<br>& $\Delta$ Cm | -0.05<br>-0.5 |      | +0.05<br>+0.5 | pF or (4)<br>% |
| 02  | Electrical and Mechanical Measurements | Para. 9.3.4                           | Electrical and Mechanical Measurements         | Table 2  |            | Table 2                      |               |      |               |                |
| 03  | Robustness of Terminations             | Para. 9.6 & Para. 4.3.3 of this spec. | None   | -  | -          | -                            | -             | -    |               |                |
| 04  | Solderability                          | Para. 9.7                             | Visual Examination                             | Magn. 10X to 30X   | -          | -                            | -             | -    |               |                |
| 05  | Resistance to Soldering Heat           | Para. 9.8 & Para. 4.3.4 of this spec  | <b>Initial Measurements</b><br>Capacitance     | Table 2 Item 1 at 0.75 CM  | C          | -                            | -             | pF   |               |                |
|     |  |                                       | <b>Final Measurements</b><br>Capacitance Drift | After a recovery period of 24 $\pm$ 3 hrs<br>Table 2 Item 1 at 0.75 CM |            | $\Delta$ C                   | -0.05<br>-1   |      | +0.05<br>+1   | pF or (4)<br>% |
|     |  |                                       | Voltage Proof                                  | Table 2 Item 5   |            | VP                           | 500           |      | -             | V              |
|     |  |                                       | Quality Factor                                 | Table 2 Item 6   |            | Q                            | 5000          |      | -             | -              |

| No.                   | ESCC Generic Spec. No. 3010           |                            | Measurements and Inspections |                                      | Symbol | Limits      |             | Unit           |   |
|-----------------------|---------------------------------------|----------------------------|------------------------------|--------------------------------------|--------|-------------|-------------|----------------|---|
|                       | Environmental and Endurance Tests (1) | Test Method and Conditions | Identification               | Conditions                           |        | Min.        | Max.        |                |   |
| 06                    | Vibration                             | Para. 9.9                  | <b>Initial Measurements</b>  |                                      |        |             |             |                |   |
|                       |                                       |                            | Capacitance                  | Table 2 Item 1 at 0.75 CM            | C      | -           | -           | pF             |   |
|                       |                                       |                            | <b>During Test</b>           |                                      |        |             |             |                |   |
|                       |                                       |                            | Visual Examination           | No arcing or shorting > 0.5ms        | -      | -           | -           | -              |   |
|                       |                                       |                            | <b>Final Measurements</b>    |                                      |        |             |             |                |   |
|                       |                                       |                            | Capacitance Drift            | Table 2 Item 1 at 0.75 CM            | ΔC     | -0.05<br>-1 | +0.05<br>+1 | pF or (4)<br>% |   |
| 07                    | Shock or Bump                         | Para. 9.10                 | <b>Initial Measurements</b>  |                                      |        |             |             |                |   |
|                       |                                       |                            | Capacitance                  | Table 2 Item 1 at 0.75 CM            | C      | -           | -           | pF             |   |
|                       |                                       |                            | <b>During Test</b>           |                                      |        |             |             |                |   |
|                       |                                       |                            | Visual Examination           | No arcing or shorting > 0.5ms        | -      | -           | -           | -              |   |
|                       |                                       |                            | <b>Final Measurements</b>    |                                      |        |             |             |                |   |
|                       |                                       |                            | Capacitance Drift            | Table 2 Item 1 at 0.75 CM            | ΔC     | -0.05<br>-1 | +0.05<br>+1 | pF or (4)<br>% |   |
| 08                    | Climatic Sequence                     | Para. 9.11                 | <b>Initial Measurements</b>  |                                      |        |             |             |                |   |
|                       |                                       |                            | Capacitance                  | Table 2 Item 1 at 0.75 CM            | C      | -           | -           | pF             |   |
|                       |                                       |                            | <b>During Test</b>           |                                      |        |             |             |                |   |
|                       |                                       |                            |                              | Post Dry Heat & Cold Tests           | -      | -           | -           | -              | - |
|                       |                                       |                            | Visual Examination           | No evidence of mechanical damage     | -      | -           | -           | -              | - |
|                       |                                       |                            | <b>Final Measurements</b>    |                                      |        |             |             |                |   |
|                       |                                       |                            |                              | After a recovery period of 24 ±3 hrs |        |             |             |                |   |
|                       |                                       |                            | Visual Examination           | No evidence of damage                | -      | -           | -           | -              | - |
|                       |                                       |                            | Capacitance Drift            | Table 2 Item 1 at 0.75 CM            | ΔC     | -0.05<br>-1 | +0.05<br>+1 | pF or (4)<br>% |   |
| Quality Factor        | Table 2 Item 6                        | Q                          | 5000                         | -                                    | -      | -           |             |                |   |
| Insulation Resistance | Table 2 Item 4                        | R <sub>i</sub>             | 10 <sup>5</sup>              | -                                    | MΩ     |             |             |                |   |
| Voltage Proof         | Table 2 Item 5                        | VP                         | 500                          | -                                    | V      |             |             |                |   |
| Operating Torque      | Table 2 Item 7                        | T <sub>qo</sub>            | 0.7                          | 3.5                                  | N.cm   |             |             |                |   |



| No.                   | ESCC Generic Spec. No. 3010           |  | Measurements and Inspections |   | Symbol            | Limits                  |          | Unit      |
|-----------------------|---------------------------------------|--|------------------------------|---|-------------------|-------------------------|----------|-----------|
|                       | Environmental and Endurance Tests (1) | Test Method and Conditions   | Identification               | Conditions  |                   | Min.                    | Max.     |           |
|                       |                                       |  |                              |   |                   |                         |          |           |
| 09                    | Damp Heat, Steady State               | Para. 9.12 and Para. 4.3.5 of this specification. Half of components with U <sub>R</sub> applied, half of components without U <sub>R</sub> applied. | <b>Initial Measurements</b>  | Table 2 Items 1 & 2                                   | CM & Cm           | Table 2                 |          | pF        |
|                       |                                       |  | Capacitance                  |   |                   |                         |          |           |
|                       |                                       |  | <b>Final Measurements</b>    | After a recovery period of 24 ±2 hrs                  |                   |                         |          |           |
|                       |                                       |  | Capacitance Drift            | Table 2 Items 1 & 2                                   | ΔCM & ΔCm         | -0.05                   | +0.05    | pF or (4) |
|                       |                                       |  | Quality Factor               | Table 2 Item 6  | Q                 | -2                      | +2       | %         |
|                       |                                       |  | Insulation Resistance        | Table 2 Item 4  | R <sub>i</sub> Cm | 5000                    | -        | -         |
|                       |                                       |  | Insulation Resistance        | Table 2 Item 4  | R <sub>i</sub> CM | 10 <sup>5</sup>         | -        | MΩ        |
|                       |                                       |  | Voltage Proof                | Table 2 Item 5  | VP                | 10 <sup>5</sup>         | -        | MΩ        |
| Operating Torque      | Table 2 Item 7                        | T <sub>qo</sub>  | 500                          | -   | V                 |                         |          |           |
|                       |                                       |  |                              |   | 0.7               | 3.5                     | N.cm     |           |
| 10                    | End Stop Torque                       | Para. 9.13 Torque: 5 N.cm Duration: 5 ±1s  | <b>Final Measurements</b>    |   |                   |                         |          |           |
|                       |                                       |  | Minimum Capacitance          | Table 2 Item 1  | Cm                | -                       | Tab.1(a) | pF        |
|                       |                                       |  | Maximum Capacitance          | Table 2 Item 2  | CM                | Tab.1(a)                | -        | pF        |
|                       |                                       |  | External Visual Inspection   | Para. 9.4 of ESCC 3010                                | -                 | -                       | -        | -         |
| 11                    | Axial Thrust                          | Para. 9.14 Thrust: 10 N max.   | <b>Initial Measurements</b>  |   |                   |                         |          |           |
|                       |                                       |  | Capacitance                  | Table 2 Item 1 at 0.75 CM                             | C                 | -                       | -        | pF        |
|                       |                                       |  | <b>During Test</b>           | With Thrust applied                                   |                   |                         |          |           |
| Capacitance Drift     | Table 2 Items 1 & 2                   | ΔC   | -0.05                        | +0.05   | pF or (4)         |                         |          |           |
|                       |                                       |  |                              |   | -1                | +1                      | %        |           |
| 12                    | Mechanical Endurance                  | Para. 9.15   | <b>During Test</b>           | After initial 50 cycles                               |                   |                         |          |           |
|                       |                                       |  | Voltage Proof                | Table 2 item 5  | VP                | 500                     | -        | V         |
|                       |                                       |  | Capacitance vs Rotation      | Para. 9.15 of ESCC 3010                               | ΔC                | Deviation ±10% max. (2) |          | -         |
|                       |                                       |  | Operating Torque             | Table 2 Item 7  | T <sub>qo</sub>   | 0.35                    | 4.75     | N.cm      |
|                       |                                       |  | Insulation Resistance        | Between rotor screw and base, Para. 9.15 of ESCC 3010 | R <sub>i</sub>    | Table 2 Item 4          |          | MΩ        |
|                       |                                       |  | <b>Final Measurements</b>    |   |                   |                         |          |           |
|                       |                                       |  | Voltage Proof                | Table 2 Item 5  | VP                | 500                     | -        | V         |
|                       |                                       |  | Minimum Capacitance          | Table 2 Item 1  | Cm                | -                       | Tab.1(a) | pF        |
|                       |                                       |  | Maximum Capacitance          | Table 2 Item 2  | CM                | Tab.1(a)                | -        | pF        |
|                       |                                       |  | Insulation Resistance        | Table 2 Item 4  | R <sub>i</sub> Cm | 10 <sup>6</sup>         | -        | MΩ        |
| Insulation Resistance | Table 2 Item 4                        | R <sub>i</sub> CM  | 10 <sup>6</sup>              | -   | MΩ                |                         |          |           |
| Quality Factor        | Table 2 Item 6                        | Q  | 5000                         | -   | -                 |                         |          |           |

| No.              | ESCC Generic Spec. No. 3010           |   | Measurements and Inspections     |  | Symbol            | Limits          |       | Unit                 |
|------------------|---------------------------------------|---|----------------------------------|--|-------------------|-----------------|-------|----------------------|
|                  | Environmental and Endurance Tests (1) | Test Method and Conditions  | Identification                   | Conditions   |                   | Min.            | Max.  |                      |
| 13               | Operating Life                        | Para. 9.16<br>Change limits relate to initial (0 – hour) measurements | <b>Initial Measurements</b>      | Table 2 Item 1<br>500 & 1000 hrs (3)<br>After a recovery period of 4 ±2 hrs<br><br>Table 2 Item 1<br><br>Table 2 Item 4<br>Table 2 Item 5<br>Table 2 Item 6<br>Table 2 Item 7<br><br>1000 & 2000 hrs (3)<br>After a recovery period of 24 ±2 hrs<br><br>Table 2 Item 1<br><br>Table 2 Item 4<br>Table 2 Item 5<br>Table 2 Item 6<br>Table 2 Item 7 | CM                | Table 2         |       | pF                   |
|                  |                                       |   | Capacitance                      |  | ΔCM               | -0.05           | +0.05 | pF or (4)            |
|                  |                                       |   | <b>Intermediate Measurements</b> |  |                   |                 |       |                      |
|                  |                                       |   | Capacitance Drift                |  |                   | -2              | +2    | %                    |
|                  |                                       |   | Insulation Resistance            |  | R <sub>i</sub> CM | 10 <sup>6</sup> | -     | MΩ                   |
|                  |                                       |   | Voltage Proof                    |  | VP                | 500             | -     | V                    |
|                  |                                       |   | Quality Factor                   |  | Q                 | 5000            | -     | -                    |
|                  |                                       |   | Operating Torque                 |  | T <sub>qo</sub>   | 0.7             | 3.5   | N.cm                 |
|                  |                                       |   | <b>Final Measurements</b>        |  |                   |                 |       |                      |
|                  |                                       |   | Capacitance Drift                |  | ΔCM               | -0.05           | +0.05 | pF or (4)            |
|                  |                                       |   |                                  |  |                   | -2              | +2    | %                    |
|                  |                                       |   | Insulation Resistance            |  | R <sub>i</sub> CM | 10 <sup>6</sup> | -     | MΩ                   |
|                  |                                       |   | Voltage Proof                    |  | VP                | 500             | -     | V                    |
|                  |                                       |   | Quality Factor                   |  | Q                 | 5000            | -     | -                    |
| Operating Torque | T <sub>qo</sub>                       | 0.7   | 3.5                              | N.cm   |                   |                 |       |                      |
| 14               | Temperature Coefficient               | Para. 9.18  | Temperature Coefficient          | Table 3<br>Item 8(i) or 8(ii)  | TC                | Table 1(a)      |       | 10 <sup>-6</sup> /°C |

**NOTES**

1. The tests in this Table refer to either Chart IV or V and shall be used as applicable.
2. No change of sign over the entire adjustment range.
3. 1000 hrs Intermediate and 2000 hrs Final relate to Qualification Testing (Chart IV) only.
4. Whichever is greater.

**APPENDIX A**  
**AGREED DEVIATIONS FOR TEKELEC (F)**

Para. 9.3.1.5, Quality Factor of ESCC Generic Specification No. 3010 and Table 2 of this specification.

Measurement of the Q factor shall be performed at frequencies comprised between 100 and 400 MHz.

The value of the Q factor shall be determined at 100MHz by using the following formula:

$$Q_{fo} = Q_m \times (f_m/f_o)^{3/2}$$

where  $Q_m$  is the Q factor read at frequency  $f_m$  ( $f_m$  is that frequency where the quarter-wave line, including the capacitance being measured, is resonating) and  $f_o = 100\text{MHz}$ .

The record sheet shall indicate the Q factor at 100MHz, as required by Table 2 of this specification, as well as the frequency  $f_m$  at which the Q factor was read.

For LAT level 3: The measurements of the Q factor required by Table 2 of this specification must be done before Solderability.