



**CAPACITOR FILTERS, C-TYPE, FEEDTHROUGH,
ELECTROMAGNETIC INTERFERENCE
SUPPRESSION**

BASED ON TYPE SFC035

ESCC Detail Specification No. 3008/031

| | |
|---------|----------|
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DOCUMENTATION CHANGE NOTICE

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| DCR No. | CHANGE DESCRIPTION |
|----------------------|--|
| 1630 | 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. [3008](#).
- (b) [MIL-STD-202](#), Test Methods for Electronic and Electrical Component Parts.

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: 300803101682MC

- Detail Specification Reference: 3008031
- Component Type Variant Number: 01 (as required)
- Characteristic code: Capacitance Value (6800pF): 682 (as required)
- Characteristic code: Capacitance Tolerance ($\pm 20\%$): M
- Rating code: Rated DC Voltage (50V): C (as required)

1.4.1.1 *Characteristics and Ratings Codes*

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

- (a) Capacitance Value expressed by means of the following codes in accordance with ESCC Basic Specification No. [21700](#). The unit quantity shall be picofarad (pF):

| Capacitance Value (C) (pF) | Code |
|-------------------------------|------|
| XX 10 ¹ | XX1 |
| XX 10 ² | XX2 |
| XX 10 ³ | XX3 |

- (b) Capacitance Tolerance expressed by the following code in accordance with ESCC Basic Specification No. [21700](#):

| Tolerance (\pm %) | Code Letter |
|----------------------|-------------|
| 20 | M |

(c) Rated DC Voltage expressed by the following codes:

| Rated DC Voltage (U_R) (V) | Code Letter |
|-----------------------------------|-------------|
| 50 | C |
| 100 | E |
| 200 | G |

1.4.2 Component Type Variants and Range of Components

The Component Type Variants applicable to this specification are as follows:

| Type Variants (Note 1) | Case Description and Terminal Configuration (Note 2) | Weight Max. (g) |
|---------------------------|---|--------------------|
| 01 to 03 | Non-hermetically sealed feedthrough case with M3.5×0.35 thread and straight terminals | 2 |
| 04 to 06 | Non-hermetically sealed feedthrough case with M3.5×0.35 thread, button body-end terminal and straight thread-end terminal | |

NOTES:

1. The available range of components and the Insertion Loss requirements for each available capacitance value are as follows:

| Type Variants | Rated DC Voltage U_R (V) (at $T_{amb} \leq +85^\circ\text{C}$) | Range of Capacitance Values C (pF) E6 Series Tolerance $\pm 20\%$ | Voltage Proof V_P (V) |
|---------------|---|---|----------------------------|
| 01, 04 | 50 | 470 to 22000 | 125 |
| 02, 05 | 100 | 470 to 6800 | 250 |
| 03, 06 | 200 | 470 to 2200 | 500 |

| Capacitance Value C (pF) E6 Series | Insertion Loss I _L (dB) | | | |
|------------------------------------|------------------------------------|--------|------|-------|
| | 10MHz | 100MHz | 1GHz | 10GHz |
| 470 | - | 14 | 34 | 54 |
| 680 | - | 17 | 37 | 57 |
| 1000 | - | 21 | 41 | 61 |
| 1500 | - | 24 | 44 | 64 |
| 2200 | - | 27 | 48 | 68 |
| 3300 | 11 | 31 | 52 | 70 |
| 4700 | 14 | 34 | 54 | 70 |
| 6800 | 17 | 37 | 57 | 70 |
| 10000 | 21 | 41 | 61 | 70 |
| 15000 | 25 | 45 | 65 | 70 |
| 22000 | 28 | 48 | 68 | 70 |

2. See Para. 1.6 for physical dimensions.

1.5 **MAXIMUM RATINGS**

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

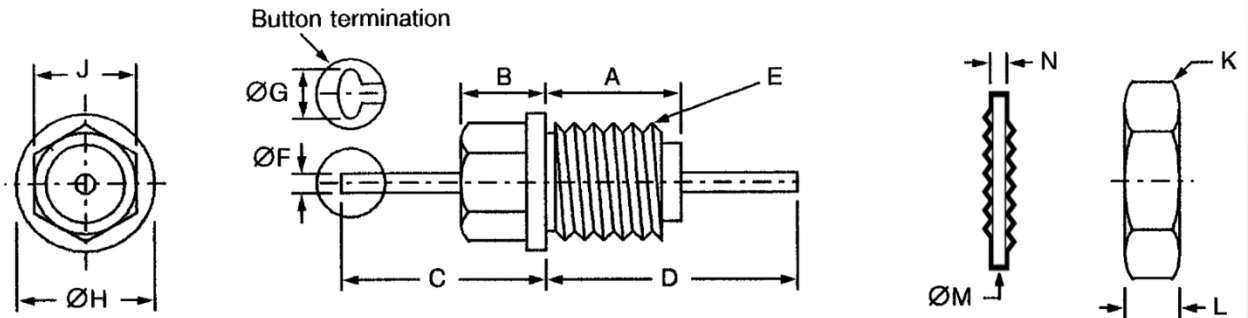
Maximum ratings shall only be exceeded during testing to the extent specified in this specification and when stipulated in Test Methods and Procedures of the ESCC Generic Specification.

| Characteristics | Symbols | Maximum Ratings | Units | Remarks |
|-----------------------------|------------------|---------------------------|-------|----------------------|
| Rated DC Voltage | U _R | See Note 1 of Para. 1.4.2 | V | Notes 1, 2 |
| Voltage Drop | V _{dr} | 0.1 | V | DC |
| DC Resistance | R _s | 10 | mΩ | |
| Rated Current | I _R | 10 | A | DC and Low Frequency |
| Torque | T _{qe} | 0.3 | Nm | |
| Operating Temperature Range | T _{op} | -55 to +125 | °C | T _{amb} |
| Storage Temperature Range | T _{stg} | -55 to +125 | °C | |
| Soldering Temperature | T _{sol} | +260 | °C | Note 3 |

NOTES:

- At T_{amb} ≤ +85°C. For T_{amb} > +85°C, the following derating shall apply:
 - For Variants with U_R = 200V at T_{amb} ≤ +85°C, derate linearly to 100V at T_{amb} = +125°C.
 - For Variants with U_R = 100V at T_{amb} ≤ +85°C, derate linearly to 70V at T_{amb} = +125°C.
 - For Variants with U_R = 50V at T_{amb} ≤ +85°C, derate linearly to 25V at T_{amb} = +125°C.
- The addition of DC applied voltage and ripple voltage shall never exceed the rated DC voltage.
- Duration 10 seconds maximum at a distance of not less than 2mm from the body and the same lead shall not be resoldered until 3 minutes have elapsed.

1.6 PHYSICAL DIMENSIONS

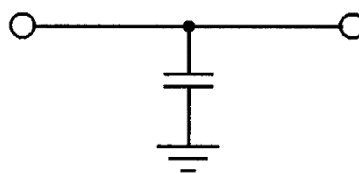


| Symbols | Dimensions (mm) | | Remarks |
|--------------------|-----------------|------|-------------------|
| | Min | Max | |
| A | 4.9 | 5.1 | |
| B | 2.9 | 3.1 | |
| C | 6 | 8 | |
| D | 14 | 17 | |
| E | M3.5×0.35 | | Thread |
| ØF (Notes 1, 2) | 0.72 | 0.88 | |
| ØG | N/A | N/A | Variants 01 to 03 |
| | 1 | 1.2 | Variants 04 to 06 |
| ØH | 3.9 | 4.1 | |
| J | - | 3 | |
| K | - | 6 | Across flats |
| L | - | 2 | |
| ØM (Note 3) | - | 6.6 | |
| N (Note 3) | - | 0.4 | |

NOTES:

1. Lead finish shall commence not more than 1.5mm from encapsulant.
2. Applies to both leads.
3. Internal fan lock-washer.

1.7 FUNCTIONAL DIAGRAM



1.8 MATERIALS AND FINISHES

1.8.1 Case

The case shall be silver plated brass with potting encapsulant sealing the filter element.

1.8.2 Lead Material and Finish

The lead material shall be Type A with Type 10 finish in accordance with the requirements of ESCC Basic Specification No. [23500](#).

1.8.3 Accessories

The materials and finishes of the accessories shown in Para. 1.6 shall be as follows:

- Nut: silver plated brass.
- Lock-washer: silver plated bronze.

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 Deviations from the Generic Specification

2.1.1.1 *Deviations from Screening Tests - Chart F3*

- (a) Vibration: Shall not be performed.
- (b) External Visual Inspection: Any discolouration of the silver plating of the case is acceptable.

2.1.1.2 *Deviations from Qualification and Periodic Tests – Chart F4B*

- (a) Where Insertion Loss measurements are required during Qualification Testing and Periodic Testing for renewal of qualification after lapse, they shall be made at only four test frequencies. See Note 1 of Para. 1.4.2 and 2.5.1.
- (b) Operating Life, Intermediate and Final Measurements: Insertion Loss measurements shall not be performed.

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 or its primary package shall be:

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

2.3 SOLDERABILITY

The test conditions for Solderability shall be as specified in the ESCC Generic Specification and as follows:

- Test Method 1. Terminals shall be immersed up to 2mm from the body.
- A 1.6mm thermal screen may be used.

2.4 ROBUSTNESS OF TERMINATIONS

The leads of the components are rigid.

The test conditions for Robustness of Terminations shall be as specified in the ESCC Generic Specification and as follows:

- Test U_{a1} , tensile, with an applied force of 10N and a duration of 10 ± 1 seconds.

2.5 ELECTRICAL MEASUREMENTS AT ROOM, HIGH AND LOW TEMPERATURES

The measurements shall be performed at room, high and low temperatures.

2.5.1 Room Temperature Electrical Measurements

The measurements shall be performed at $T_{amb} = +22 \pm 3^{\circ}C$.

| Characteristics | Symbols | Test Method and Conditions | Limits | | Units |
|-----------------------|----------|---------------------------------------|--------|-----|-------|
| | | | Min | Max | |
| Voltage Drop | V_{dr} | ESCC No. 3008 | - | 0.1 | V |
| Voltage Proof | V_P | ESCC No. 3008 $V = 2.5 \times U_R$ | Note 1 | - | V |
| Insulation Resistance | R_i | ESCC No. 3008 | 10^4 | - | MΩ |
| Insertion Loss | I_{L1} | $f = 10MHz$ (Notes 2, 3) | Note 1 | - | dB |
| | I_{L2} | $f = 100MHz$ (Notes 2, 3) | Note 1 | - | dB |
| | I_{L3} | $f = 1GHz$ (Notes 2, 3) | Note 1 | - | dB |
| | I_{L4} | $f = 10GHz$ (Notes 2, 4) | Note 1 | - | dB |
| Capacitance | C | ESCC No. 3008 | Note 1 | | pF |

NOTES:

1. See Note 1 of Para. 1.4.2.
2. For Qualification Testing and Periodic Testing for renewal of qualification after lapse, measurements shall be made with a load current of zero and, during either Subgroup 1B or Subgroup 1C of Chart F4B in the Generic Specification, measurements shall also be made at the rated current specified in Para. 1.5.
3. For Screening and Periodic Testing for extension of qualification, I_{L1} , I_{L2} and I_{L3} shall be measured with no load current applied.
4. For Screening and Periodic Testing for extension of qualification, I_{L4} is guaranteed but not tested.

2.5.2 High and Low Temperatures Electrical Measurements

| Characteristics | Symbols | Test Method and Conditions (Note 1) | Limits | | Units |
|-----------------------|---|--|-----------------|-----|-------|
| | | | Min | Max | |
| Insulation Resistance | R _i | ESCC No. 3008 T _{amb} = +125 (+0 -3)°C | 10 ³ | - | MΩ |
| Insertion Loss | I _{L1} I _{L2} I _{L3} | ESCC No. 3008 T _{amb} = +125 (+0 -3)°C and T _{amb} = -55 (+3 -0)°C | Note 2 | - | dB |
| | | f = 10MHz (Note 3) | | | |
| | | f = 100MHz (Note 3) | | | |
| | | f = 1GHz (Note 3) | Note 2 | - | dB |

NOTES:

1. Measurements shall be performed on a sample of 5 components. In the event of any failure a 100% inspection shall be performed.
2. See Note 1 of Para. 1.4.2.
3. Measurements shall be made with no load current applied.

2.6 PARAMETER DRIFT VALUES

The measurements shall be performed at T_{amb} = +22 ±3°C.

The test methods and test conditions shall be as per the corresponding test defined in Para. 2.5.1, Room Temperature Electrical Measurements.

The drift values (Δ) shall not be exceeded for each characteristic where specified. The corresponding absolute limit values for each characteristic shall not be exceeded.

| Characteristics | Symbols | Drift Value Δ | Units |
|-----------------------|---------|---------------|-------|
| Change in Capacitance | ΔC/C | ±10 | % |

2.7 INTERMEDIATE AND END-POINT ELECTRICAL MEASUREMENTS

Unless otherwise specified, the measurements shall be performed at T_{amb} = +22 ±3°C.

Unless otherwise specified, test methods and test conditions shall be as per the corresponding test defined in Para. 2.5.1, Room Temperature Electrical Measurements.

The drift values (Δ) shall not be exceeded for each characteristic where specified. The corresponding absolute limit values for each characteristic shall not be exceeded.

| Test Reference per ESCC No. 3008 | Characteristics | Symbols | Limits | | Units |
|----------------------------------|-----------------------|-----------------|---------------------|--------|-------|
| | | | Min | Max | |
| Overload | Voltage Drop | V _{dr} | - | Note 1 | V |
| | Insulation Resistance | R _i | Note 1 | - | MΩ |
| Low Air Pressure | Voltage Proof | V _P | 125% U _R | - | V |

| Test Reference per ESCC No. 3008 | Characteristics | Symbols | Limits | | Units | | |
|-------------------------------------|--|--|-----------------------|--------------------|--------------------|-----|---|
| | | | Min | Max | | | |
| Damp Heat | Insulation Resistance | R _i | Note 2 | - | MΩ | | |
| Resistance to Soldering Heat | Insulation Resistance | R _i | Note 1 | - | MΩ | | |
| | Insertion Loss | I _L | Note 3 | - | dB | | |
| Shock | Insertion Loss | I _L | Note 3 | - | dB | | |
| Vibration | Insertion Loss | I _L | Note 3 | - | dB | | |
| Accelerated Damp Heat | Voltage Proof | V _P | 90% U _R | - | V | | |
| | Insulation Resistance | R _i | Note 5 | - | MΩ | | |
| | Insertion Loss | I _L | Note 3 | - | dB | | |
| Operating Life | Initial Measurements | Capacitance | C | Note 3 | pF | | |
| | Intermediate Measurements (at 500 hours (Note 6)) / (at 1000 hours (Note 7)) | Insulation Resistance at +125 (+0 -3)°C | R _i | Note 4 | - | MΩ | |
| | | After recovery | Capacitance | C | Note 3 | pF | |
| | | Change in Capacitance | ΔC/C | - | ±10 | % | |
| | | Voltage Proof | V _P | 90% U _R | - | V | |
| | | Insulation Resistance | R _i | Note 5 | - | MΩ | |
| | Final Measurements (at 1000 or 2000 hours (Note 8)) | Insulation Resistance at +125 (+0 -3)°C | R _i | Note 4 | - | MΩ | |
| | | After recovery | Capacitance | C | Note 3 | pF | |
| | | | Change in Capacitance | ΔC/C | - | ±10 | % |
| | | | Voltage Proof | V _P | 90% U _R | - | V |
| | | Insulation Resistance | R _i | Note 5 | - | MΩ | |
| | Robustness of Terminations | Voltage Drop | V _{dr} | - | Note 1 | V | |

NOTES:

1. See Para. 2.5.1.
2. > 10% of the value given in Para. 2.5.1.
3. See Note 1 of Para. 1.4.2.
4. See Para. 2.5.2.
5. > 50% of the value given in Para. 2.5.1.
6. 500 hours is applicable to Qualification Testing, Periodic Testing for extension of qualification and to Periodic Testing for renewal of qualification after lapse.
7. 1000 hours is applicable to Qualification Testing, and to Periodic Testing for renewal of qualification after lapse.
8. 1000 hours is applicable to Periodic Testing for extension of qualification. 2000 hours is applicable to Qualification Testing, and to Periodic Testing for renewal of qualification after lapse.

2.8 BURN-IN CONDITIONS

| Characteristics | Symbols | Test Conditions | Units |
|---------------------|-----------|-----------------|-------|
| Ambient Temperature | T_{amb} | +125 (+0 -3) | °C |
| Applied Voltage | U_A | | V |
| Variants 03, 06 | | 300 | |
| Variants 02, 05 | | 150 | |
| Variants 01, 04 | | 50 | |
| | | (Note 1) | |

NOTES:

1. Between one terminal and the case.

2.9 OPERATING LIFE CONDITIONS

| Characteristics | Symbols | Test Conditions | Units |
|---------------------|-----------|-----------------|-------|
| Ambient Temperature | T_{amb} | +125 (+0 -3) | °C |
| Applied Voltage | U_A | | V |
| Variants 03, 06 | | 300 | |
| Variants 02, 05 | | 150 | |
| Variants 01, 04 | | 50 | |
| | | (Note 1) | |
| Rated Current | I_R | 10 (Note 2) | A |

NOTES:

1. Between one terminal and the case.
2. To flow between the terminals.

APPENDIX 'A'
AGREED DEVIATIONS FOR EXXELIA TECHNOLOGIES (F)

| Item Affected | Description of Deviations |
|---|---|
| Para. 2.1.1.1, Deviations from Screening Tests – Chart F3 | Room Temperature Electrical Measurements: <ul style="list-style-type: none">• The Voltage Drop measurements may be replaced by DC Resistance measurements in accordance with MIL-STD-202, Test Method 303, with a limit of 10mΩ maximum.• Insertion Loss may be performed on a sample of 5 components. In the event of any failure a 100% inspection shall be performed. |
| Para. 2.1.1.2, Deviations from Qualification and Periodic Tests – Chart F4B | Overload and Robustness of Terminations (Intermediate and End-Point Electrical Measurements): The Voltage Drop measurements may be replaced by DC Resistance measurements in accordance with MIL-STD-202, Test Method 303, with a limit of 10mΩ maximum. |