



**CAPACITOR FILTERS, C-TYPE, SURFACE MOUNT,
ELECTROMAGNETIC INTERFERENCE
SUPPRESSION**

BASED ON TYPE SFCMS 35 TYPE C

ESCC Detail Specification No. 3008/034

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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: 300803401682MC

- Detail Specification Reference: 3008034
- 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 Voltage (50V): C (as applicable)

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

Capacitance Value (pF)	Code
XX10 ¹	XX1
XX10 ²	XX2
XX10 ³	XX3

- (b) Capacitance Tolerance of $\pm 20\%$, expressed by the code M in accordance with ESCC Basic Specification No. [21700](#).

(c) Rated Voltage, U_R , expressed by the following codes:

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

1.4.2 Component Type Variants

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 case, length 12 millimetres, surface mount, with square section body terminal and round section tab terminals	2
04 to 06	Non-hermetically sealed case, length 7.5 millimetres, surface mount, with square section body terminal and round section tab terminals	1

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) E12 Series Tolerance $\pm 20\%$	Voltage Proof V_P (V)
01, 04	50	470 to 22000	125
02, 05	100	470 to 18000	250
03, 06	200	470 to 8200	500

Capacitance C (pF)	Insertion Loss I _L (dB)						
	10MHz	50MHz	100MHz	500MHz	1GHz	5GHz	10GHz
470	-	8	14	28	34	48	54
560	-	9	15	29	35	49	55
680	-	11	17	31	37	51	57
820	-	13	19	33	39	53	59
1000	-	15	21	35	41	55	61
1200	-	16	22	36	42	56	62
1500	-	18	24	38	44	58	64
1800	-	19	25	39	46	59	66
2200	-	21	27	41	48	61	68
2700	9	23	29	43	50	63	70
3300	11	25	31	45	52	60	70
3900	12	26	32	46	53	66	70
4700	14	28	34	48	54	68	70
5600	15	29	35	49	55	69	70
6800	17	31	37	51	57	70	70
8200	19	33	39	53	59	70	70
10000	21	35	41	43	61	70	70
12000	23	37	43	45	63	70	70
15000	25	39	45	47	65	70	70
18000	26	40	46	52	66	70	70
22000	28	42	48	54	68	70	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.

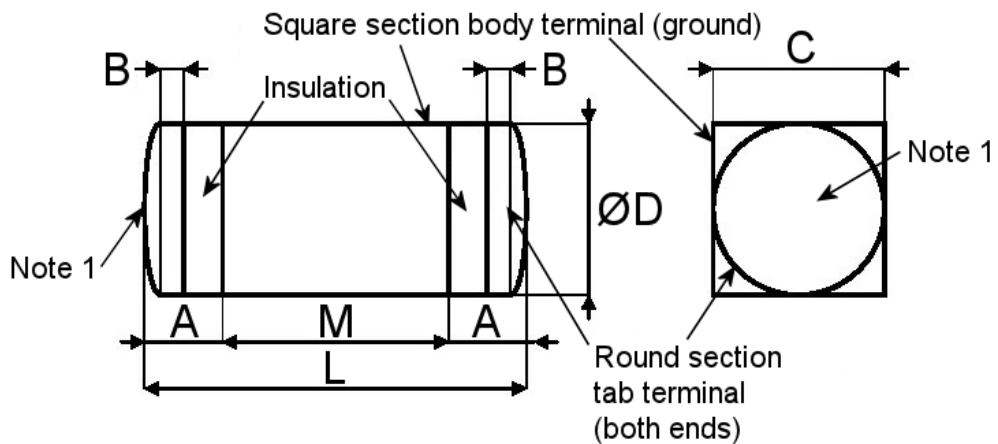
Characteristics	Symbols	Maximum Ratings	Units	Remarks
Rated DC Voltage	U _R	See Note 1 of Para. 1.4.2	V	Notes 1, 2
Voltage Drop	V _{dr}	50	mV	
DC Resistance	R _s	5	mΩ	
DC and Low Frequency Current	I _R	10	A	

Characteristics	Symbols	Maximum Ratings	Units	Remarks
Operating Temperature Range	T_{op}	-55 to +125	°C	T_{amb}
Storage Temperature Range	T_{stg}	-55 to +125	°C	
Soldering Temperature	T_{sol}	+280	°C	Note 3

NOTES:

- At $T_{amb} \leq +85^{\circ}\text{C}$. For $T_{amb} > +85^{\circ}\text{C}$, the following derating shall apply:
 - For Variants with $U_R = 200\text{V}$ at $T_{amb} \leq +85^{\circ}\text{C}$, derate linearly to 100V at $T_{amb} = +125^{\circ}\text{C}$.
 - For Variants with $U_R = 100\text{V}$ at $T_{amb} \leq +85^{\circ}\text{C}$, derate linearly to 70V at $T_{amb} = +125^{\circ}\text{C}$.
 - For Variants with $U_R = 50\text{V}$ at $T_{amb} \leq +85^{\circ}\text{C}$, derate linearly to 25V at $T_{amb} = +125^{\circ}\text{C}$.
- The addition of DC applied voltage and ripple voltage shall never exceed the rated DC voltage.
- Duration 6 seconds maximum and the same terminal shall not be resoldered until 3 minutes have elapsed.

1.6 PHYSICAL DIMENSIONS

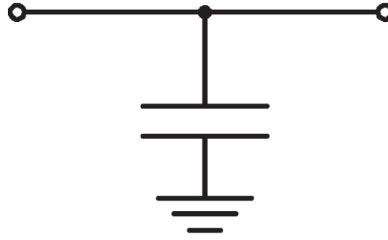


Symbols	Dimensions (mm)				Notes
	Variants 01, 02 and 03		Variants 04, 05 and 06		
	Min	Max	Min	Max	
A	1.9	2.6	1.9	2.6	
B	0.7	0.9	0.7	0.9	
C	3.5	3.6	3.5	3.6	Note 2
$\varnothing D$	3.5	3.6	3.5	3.6	Note 3
L	11.3	12.7	6.5	8.5	
M	7.4	7.6	2.7	3.3	

NOTES:

- For both tab terminals, only the end-faces are solder plated.
- This dimension applies to the square-section body terminal (ground), over dimension M.
- This dimension (diameter) applies to both tab terminals and the insulation.

1.7 FUNCTIONAL DIAGRAM



1.8 MATERIALS AND FINISHES

1.8.1 Terminal Material and Finish

The body terminal shall be silver plated brass. The end tab terminals' material shall be brass with each end-face plated with Sn5Pb95.

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) Rapid Change of Temperature: Components may not be mounted.
- (b) Vibration: Not applicable.
- (c) Room Temperature Electrical Measurements: Voltage Drop shall be replaced by a DC resistance measurement performed in accordance with [MIL-STD-202, Test Method 303](#).
- (d) Room, High and Low Temperature Electrical Measurements: Insertion Loss is considered destructive and therefore components so measured cannot be delivered as flight models. Insertion Loss may be measured after External Visual Inspection, and any parts rejected during External Visual Inspection or Radiographic Inspection, but electrically acceptable after Burn-in, may be used. Components subjected to Insertion Loss Measurements shall not be submitted to Check for Lot Failure, see Paras. 2.5.1 and 2.5.2.
- (e) External Visual Inspection: Any discolouration of the silver plating of the square section body terminal is acceptable.

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

- (a) Intermediate and End-Point Electrical Measurements: Voltage Drop shall be replaced by a DC resistance measurement performed in accordance with [MIL-STD-202, Test Method 303](#).
- (b) Resistance to Soldering Heat: May be performed prior to Vibration. Capacitance shall be measured instead of Insertion Loss.
- (c) Accelerated Damp Heat: Voltage Proof and Insertion Loss shall not be measured.
- (d) Operating Life, Intermediate and Final Measurements: Insertion Loss measurements shall not be performed.
- (e) Robustness of Terminations: The components shall be mounted on a suitable substrate. After mounting, examination shall be made for good tinning as evidenced by flowing of the solder with wetting of the terminals. A force of 10N shall be applied normal to the line joining the terminals and in a plane parallel to the substrate, for a duration of 10 ± 1 s. The components shall then be examined and there shall be no evidence of damage or loosening of the components from the substrate.

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 AND RESISTANCE TO SOLDERING HEAT

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

- Test Ta, Method 2
- Size of soldering iron tip: B
- Temperature of soldering iron tip: +350°C
- Duration: 5 ± 1 seconds.

2.4 ROBUSTNESS OF TERMINATIONS

The tab terminals of the components are rigid.

- The test conditions for Robustness of Terminations shall be as specified in the ESCC Generic Specification. Required deviations are as described in Para. 2.1.1.2.

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	
DC Resistance	R_s	MIL-STD-202, Test Method 303	-	Note 1	m Ω
Voltage Proof	V_P	ESCC No. 3008 $2.5 \times U_R$	Note 1	-	V
Insulation Resistance	R_i	ESCC No. 3008	Note 1	-	G Ω
Insertion Loss	I_{L1}	f = 10MHz (Notes 2, 3)	Note 1	-	dB
	I_{L2}	f = 50MHz (Notes 2, 4, 5)	Note 1	-	dB
	I_{L3}	f = 100MHz (Notes 2, 4, 5)	Note 1	-	dB
	I_{L4}	f = 500MHz (Notes 2, 3)	Note 1	-	dB
	I_{L5}	f = 1GHz (Notes 2, 4, 5)	Note 1	-	dB
Capacitance	C	ESCC No. 3008 f = 1000 \pm 100Hz V = 0.1 to 1.2Vrms	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} and I_{L4} are guaranteed but not tested.
4. For Screening, measurements shall be made on a sample of 5 components. If one or more samples fail, another 5 samples shall be selected and measured. Lot failure will occur if any of these additional samples fail. Samples shall be mounted on a suitable substrate prior to the measurements.
5. For Screening and Periodic Testing for extension of qualification, I_{L2} , I_{L3} and I_{L5} shall be measured with no load current applied.

2.5.2 High and Low Temperatures Electrical Measurements

Characteristics	Symbols	Test Method and Conditions	Limits		Units
			Min	Max	
Insulation Resistance	R _i	ESCC No. 3008 T _{amb} = +125 (+0 -3)°C (Note 1)	Note 2	-	GΩ
Insertion Loss	I _{L2} I _{L3} I _{L5}	ESCC No. 3008 T _{amb} = +125 (+0 -3)°C and T _{amb} = -55 (+3 -0)°C f = 50MHz (Notes 3, 4)	Note 2	-	dB
		f = 100MHz (Notes 3, 4)	Note 2	-	dB
		f = 1GHz (Notes 3, 4)	Note 2	-	dB

NOTES:

1. Insulation Resistance measurements shall only be performed immediately on completion of Burn in, as specified in the ESCC Generic Specification. Insulation Resistance shall not be measured again during testing per Chart F3 of the ESCC Generic Specification.
2. See Note 1 of Para. 1.4.2.
3. Measurements shall be made on a sample of 5 components. If one or more samples fail, another 5 samples shall be selected and measured. Lot failure will occur if any of these additional samples fail. Samples shall be mounted on a suitable substrate prior to the measurements.
4. 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. 2.4.1, 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 $T_{amb} = +22 \pm 3^{\circ}\text{C}$.

Unless otherwise specified, test methods and test conditions shall be as per the corresponding test defined in Para. 2.4.1, 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	DC Resistance	R_s	-	Note 1	m Ω
	Insulation Resistance	R_i	Note 1	-	G Ω
Low Air Pressure	Voltage Proof	V_P	125% U_R	-	V
Damp Heat	Insulation Resistance	R_i	Note 2	-	G Ω
Resistance to Soldering Heat	Insulation Resistance	R_i	Note 1	-	G Ω
	Insertion Loss	I_L	Note 1	-	dB
Shock	Insertion Loss	I_L	Note 1	-	dB
Vibration	Insertion Loss	I_L	Note 1	-	dB
Accelerated Damp Heat	Voltage Proof	V_P	90% U_R	-	V
	Insulation Resistance	R_i	Note 3	-	G Ω
	Insertion Loss	I_L	Note 1	-	dB
Operating Life Initial Measurements Intermediate Measurements (at 500 hours (Note 4)) / (at 1000 hours (Note 5)) After recovery Final Measurements (at 1000 or 2000 hours (Note 6))	Capacitance	C	Note 1	-	pF
	Insulation Resistance at +125 (+0 -3) $^{\circ}\text{C}$	R_i	Note 1	-	G Ω
	Capacitance	C	Note 1	-	pF
	Change in Capacitance	$\Delta C/C$	-	± 10	%
	Voltage Proof	V_P	90% U_R	-	V
	Insulation Resistance	R_i	Note 3	-	G Ω
	Insertion Loss	I_L	Note 1	-	dB
	Insulation Resistance at +125 (+0 -3) $^{\circ}\text{C}$	R_i	Note 1	-	G Ω
	Capacitance	C	Note 1	-	pF
	Change in Capacitance	$\Delta C/C$	-	± 10	%
	Voltage Proof	V_P	90% U_R	-	V
	Insulation Resistance	R_i	Note 3	-	G Ω
	Insertion Loss	I_L	Note 1	-	dB
	Robustness of Terminations	DC Resistance	R_s	-	Note 1

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, 08, 13, 18, 23, 28, 33, 38		300	
Variants 01, 02, 05, 06, 07, 09, 10, 11, 12, 15, 16, 17, 19, 20, 21, 22, 25, 26, 27, 29, 30, 31, 32, 35, 26, 37, 39, 40		200	
Variants 04, 14, 24, 34		140 (Note 1)	
Current	I_{LF}	10 (Note 2)	A

NOTES:

1. Between one tab terminal and the body terminal. The voltage polarity shall be positive on the body terminal during the first 24 to 72 hours and then negative on the body terminal for the remaining operating life period.
2. Current flow between the terminals.