DCR Attachment - Draft specification for review.
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Steve Thacker: ESCC Technical Writer - 18/06/2012

CAPACITORS, FIXED, CHIPS, CERAMIC DIELECTRIC,

TYPE II

BASED ON TYPE 1812

ESCC Detail Specification No. 3009/010

DRAFT

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DCR No.	CHANGE DESCRIPTION
TBD	Specification updated to incorporate editorial and technical 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. 3009.

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: 300901001223KA

- Detail Specification Reference: 3009009
- Component Type Variant Number: 01 (as required)
- Characteristic code: Capacitance Value (22000pF): 223 (as required)
- Characteristic code: Capacitance Tolerance (±10%): K (as required)
- Rating code: Rated Voltage (25V): A (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) Rated Capacitance Value C_n 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_n (pF)	Code
XX 10^2	XX2
XX 10^3	XX3
XX 10^4	XX4
XX 10^5	XX5

(b) Capacitance Tolerance expressed by the following codes in accordance with ESCC Basic Specification No. 21700:

Tolerance (± %)	Code Letter
5	J
10	K
20	M

(c) Rated Voltage expressed by the following codes:

Rated Voltage (V)	Code Letter
16	X
25	A
50	C
100	E
200	G
400	K

1.4.2 Component Type Variants and Range of Components

The component type variants and range of components applicable to this specification are as follows:

Variant Number	Style	Capacitance Range, Tolerance, Rated Voltage	Temperature Characteristic for $V_T = U_R$ (%)	Dimensions (mm) (Note 3)			Terminal Material and Finish		Weight Max (g)
				L Max	l Max	e Max	End Terminations	Termination Finish	
01	1812	See Note 1	-30, +20	5	3.6	2.3	Ag/Pd	No finish	0.2
02	1812	See Note 1	-30, +20	5.5	4.1	2.3	Ag/Pd	Sn62 solder	0.2
03	1812	See Note 1	-30, +20	5	3.6	2.3	Ag/Pd/Pt	No finish	0.2
04	1812	See Note 1	-30, +20	5.5	4.1	2.3	Ag/Pd/Pt	Sn62 solder	0.2
05	1812	See Note 1	-30, +20	5.5	4.1	2.3	Ag + Ni barrier	Sn62 solder	0.2
06	1812	See Note 1	-30, +20	5	3.6	2.3	Ag + Ni barrier	Sn/Pb coating (Note 4)	0.2
07	1812	See Note 1	Not Applicable (Note 2)	5.5	3.6	1.8	Ag + Ni barrier	Sn/Pb coating (Note 4)	0.2

NOTES:

1. Available rated voltages, capacitance values and tolerances are as follows:

Rated Voltage U_R (V)	Capacitance Range C_n (pF)		Tolerance (± %)	Value Series
	Min	Max		
400	3300	10000	5	E24
			10	E12
			20	E6
200	3300	470000	5	E24
			10	E12
			20	E6
100	2700	1000000	5	E24
			10	E12
	3300	1000000	20	E6
50	3900	2200000	5	E24
			10	E12
			20	E6
25	3900	2200000	5	E24
			10	E12
			20	E6
16	3900	3300000	5	E24
			10	E12
			20	E6

2. X7R dielectric. Temperature Characteristic for $V_T = U_R$ is typically -60%.
3. See Physical Dimensions.
4. Sn/Pb coating, near eutectic with minimum 10% Pb.

1.5 MAXIMUM RATINGS

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

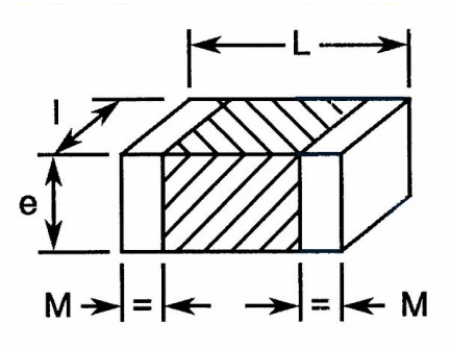
Maximum ratings shall only be exceeded during testing to the extent specified in this specification and when stipulated in Test Methods and Procedures of the ESCC Generic Specification.

Characteristics	Symbols	Maximum Ratings	Units	Remarks
Rated Voltage	U_R	16, 25, 50, 100, 200, 400	V	Note 1
Operating Temperature Range	T_{op}	-55 to +125	°C	Without derating. T_{amb}
Storage Temperature Range	T_{stg}	-55 to +125	°C	
Soldering Temperature	T_{sol}	+260	°C	Note 2

NOTES:

1. As required; See Component Type Variants and Range of Components.
2. Duration 10 seconds maximum.

1.6 PHYSICAL DIMENSIONS



Symbols	Dimensions (mm)	
	Min	Max
L	4	Note 1
l	2.8	Note 1
e	-	Note 1
M	0.2	0.75

NOTES:

1. See Component Type Variants and Range of Components for dimensions L Max, l Max, e Max.

1.7 FUNCTIONAL DIAGRAM

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

None.

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) The ESCC qualified components symbol (for ESCC qualified components only).
(b) The ESCC Component Number.
(c) Traceability information.

2.3 ELECTRICAL MEASUREMENTS AT ROOM, HIGH AND LOW TEMPERATURES

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

2.3.1 Room Temperature Electrical Measurements

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

Characteristics	Symbols	Test Method and Conditions	Tolerance (± %)	Limits		Units
				Min	Max	
Capacitance (Note 1)	C_A	ESCC No. 3009				pF
			5	$0.95C_n$	$1.05C_n$	
			10	$0.9C_n$	$1.1C_n$	
			20	$0.8C_n$	$1.2C_n$	
Tangent of Loss Angle	tgδ	ESCC No. 3009	All	-	25×10^{-3}	-
Insulation Resistance	R_I	ESCC No. 3009	All			
		For $C_n \leq$ 10000pF		100	-	GΩ
		For $C_n >$ 10000pF		1000	-	MΩ.µF
Voltage Proof	VP	ESCC No. 3009	All	$2.5U_R$	-	V

NOTES:

1. Capacitance limits for any test performed prior to Burn-in during Screening Tests, for all tolerances, shall be as follows:
   - $C_A = 0.95C_n$ minimum; $1.2C_n$ maximum.

2.3.2 High and Low Temperatures Electrical Measurements

Characteristics	Symbols	Test Method and Conditions (Note 1)	Limits		Units
			Min	Max	
Temperature Characteristic	TC	ESCC No. 3009 Note 2 For V_T = no voltage applied For $V_T = U_R$	-20 Note 3	+20	%

NOTES:

1. The measurements shall be performed on a sample of 5 components from each manufacturing lot with 0 failures allowed. In the event of any failure a 100% inspection may be performed.
2. In the case of a 100% inspection, a 1% total percent defective is allowed.
3. See Component Type Variants and Range of Components for TC limit values for $V_T = U_R$. Temperature Characteristic measurements with rated voltage applied are not required for Variant 07.

2.4 INTERMEDIATE AND END-POINT ELECTRICAL MEASUREMENTS

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

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

Test Reference per ESCC No. 3009	Characteristics	Symbols	Limits		Units
			Min	Max	
Mounting Final Measurements	Capacitance	C_A	Record Values		
	Tangent of Loss Angle	tgδ	Note 1		
	Insulation Resistance	R_I	Note 1		
Robustness of Terminations Final Measurements	Capacitance	C_A	Note 1		
Climatic Test Sequence Initial Measurements	Capacitance	C_A	Notes 1, 2		
Final Measurements	Capacitance	C_A	Note 1		
	Change in Capacitance	$\Delta C_A/C_A$	-10	+10	%
	Tangent of Loss Angle	tgδ	-	50×10^{-3}	-
	Insulation Resistance:				
	For $C_n \leq 10000$pF	R_I	3	-	GΩ
	For $C_n > 10000$pF	R_I	30	-	MΩ.μF
Rapid Change of Temperature Initial Measurements	Capacitance	C_A	Notes 1, 2		
Final Measurements	Capacitance	C_A	Note 1		
	Change in Capacitance	$\Delta C_A/C_A$	-10	+10	%
	Tangent of Loss Angle	tgδ	-	50×10^{-3}	-

Test Reference per ESCC No. 3009	Characteristics	Symbols	Limits		Units
			Min	Max	
Damp Heat Steady State					
Initial Measurements	Capacitance	C_A	Notes 1, 2		
Final Measurements	Capacitance	C_A	Note 1		
	Change in Capacitance	$\Delta C_A/C_A$	-10	+10	%
	Tangent of Loss Angle	tgδ	-	50×10^{-3}	-
	Insulation Resistance:				
	For $C_n \leq 10000$pF	R_I	3	-	GΩ
	For $C_n > 10000$pF	R_I	30	-	MΩ.μF
Operating Life					
Initial Measurements	Capacitance	C_A	Notes 1, 2		
Intermediate Measurements (1000 hours)	Capacitance	C_A	Note 1		
	Change in Capacitance	$\Delta C_A/C_A$	-15	+15	%
	Insulation Resistance:				
	For $C_n \leq 10000$pF	R_I	10	-	GΩ
	For $C_n > 10000$pF	R_I	100	-	MΩ.μF
Final Measurements (2000 hours)	Capacitance	C_A	Note 1		
	Change in Capacitance	$\Delta C_A/C_A$	-15	+15	%
	Tangent of Loss Angle	tgδ	-	50×10^{-3}	-
	Insulation Resistance:				
	For $C_n \leq 10000$pF	R_I	10	-	GΩ
	For $C_n > 10000$pF	R_I	100	-	MΩ.μF
	Voltage Proof	VP	Note 1		
Capacitance-Temperature Characteristics	Temperature Characteristic	TC	Note 3		

NOTES:

1. As specified in Room Temperature Electrical Measurements.
2. Capacitance values recorded during Mounting may be used as initial measurements.
3. As specified in High and Low Temperatures Electrical Measurements.

2.5 BURN-IN

The requirements for Burn-in are specified in the ESCC Generic Specification. The following conditions shall also apply:

- After Burn-in, the components shall be removed from the chamber and allowed to cool under normal atmospheric conditions for recovery for 24±2 hours.