EXXELIA

Technical Department

n° : 421.91.390

ind. : P

date : 09/2023

Exxelia detail specification of films capacitors, fixed, reconstituted mica, high voltage based on type HT86PS

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1. Documentation change notice

Indice	Date	Page	Item
A	09/91	All	First issue
B	11/91	all	Reworked, incorporates all modification agreed during the meeting of the 28-29-30/10/91
C	05/92	1-5-14	Type corrected : § 4.2.2 time of transfert amended 1 h instead of 1.5 hour
D	07/93	1-2 13 22	Change notice Size symbols corrected Item 4 - note corrected
E	10/94	1-2 6 7 14	Change notice One item added : 15000pF - 2500V Wrong values of h corrected for 180nF, 220nF, 270nF, 330nF 2.5kV § 4.2.2 : type error corrected
F	09/95	All	New issue + new presentation
G	05/97	1 - 2 13 23	Change notice New rated voltage added (13.4kV) letter code for 13.4kV added (M)
H	02/02	1 - 2 13	Change notice Capacitance range extended to 1000pF
I	03/03	1 - 2 3 - 4 19 19 à 32	Change notice Pages renumbered § 4.2.4 and 4.2.5 amended as per SCC 3006-022 pages renumbered
J	10/03	1 - 2 9 24	Change notice 100pF 4kV added Letter code for 4kV added (S)

K	09/06	1 - 2	Change notice
		all	All ESA/SCC references changed to ESCC without further mention the 12.5kV range extended up to 100pF
		13	§ 4.5 marking component number amended
		22	Table 6: damp heat steady state test deleted as removed from the generic specification
		32	Value of PDM after operating life test amended.
L	03/08	1 – 2	Change notice
		18	§ 4.2.3 : deviation deleted (XRay not applicable) to be consistent with ESCC detail specification
M	07/12	1 – 2 – 3 – 4	Change notice
		13 – 14 – 15	Table 1 (a) 10kV, 12.5kV and 15kV range extended to 100pF
N	01/19	1 – 2 – 15	DDM2019-338/007 : HT86PS 100pF ±20% 15kV dimensions become 25 x 12 x 4 mm
O	03/23	All	Total rewriting versus / evolution of the ESCC 3006 from i.2 to i.3
P	09/23	7	22 000pF, 27 000pF, 150 000L, 220 000L, 680 000pF added in table 2a (1,5kV)
		8	18 000pF, 100 000L and 150 000L added in table 2b (2,5kV)
		9	68 000LpF and 100 000L added in table 2c (3,5kV)
		10	4 700pF, 5 600pF, 33 000LpF and 47 000LpF added in table 2d (5kV)
		11	3 000pF, 10 000L and 15 000L added in table 2e (7,5kV)
		12	820pF, 3 000pF, 4 700LpF and 6 800pF added in table 2f (10kV)
			Weight changed for 470pF and 680pF in table 2f (10kV)
		13	820pF, 1 200pF, 1 800pF, 2 700pF, 3 000pF, 3 300C and 4 700C added in table 2g (12,5kV)
		14	150pF, 820pF, 1200pF, 1 500C, 2 200C and 3000pF added in table 2h (15kV)
		15	3000pF added in table 2i (20kV)

2. General

2.1. Scope

This specification details the ratings, physical and electrical characteristics, and test and inspection data for the component type variants and/or the Component Type Variants and 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.

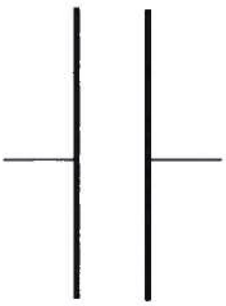
2.2. Applicable documents

The following document forms part of this specification and shall be read in conjunction with it:
- ESCC Basic Specification 23500 - Lead Materials and Finishes
- ESCC Basic Specification 21700 - General Requirements for the Marking of ESCC Components
- ESCC Generic Specification 3006 - Capacitors, fixed, film dielectric
- IEC 270 - Partial discharge measurements

2.3. Terms, definitions, Abbreviations, symbols and units

For the purpose of this specification, the terms, definitions, abbreviations, symbols and units specified in ESCC Basic Specification 21300 shall apply.

2.4. Functional diagram



2.5. Maximum ratings

Table 1 - Maximum ratings

Characteristic	Symbol	Limit rating	Unit	Comment
Rated Voltage	U_R	See Table 1(a)	V	
Ripple Voltage Peak to peak Note 1	U_R	0.2 U_R 0.15 U_R 0.04 U_R 0.01 U_R	V_{pp}	at 50Hz at 100Hz at 1 000Hz at 10 000Hz
Operating air pressure range	Pop	less than 10^{-3} or greater than 750	mbar	Note 2
Operating temperature	T_{amb}	- 55 to + 125	°C	without derating
Storage temperature	T_{stg}	- 55 to + 125	°C	
Maximum soldering temperature	T_{sol}	+ 260	°C	Note 3

Notes:

1. ripple voltage plus applied d.c voltage shall never exceed UR,
2. capacitors are designed for dielectric fluid use or encapsulation,
3. soldering time: ts ≤ 5 s at 4 mm minimum from body.

2.6. Range of components definition

Range of capacitors covered by this specification is scheduled below in Table 2a.

(1) Some values are available in two sizes

- one short (L = 35mm) and wide (h = 30 or 40mm) which is identified by the variant C
- one long (L = 61mm) and narrow (h = 22 or 24mm) which is identified by the variant L

Table 2a - Range of components

Rated voltage U_r	Capacitance (1)	Tolerance	Dimensions (mm)				Weight max
			L	h	e	W	
(V)	(pF)	(%)	± 1	± 1	± 1	+10% - 0.05	(g)
1 500	22 000	10 or 20	25	12	4	1	4.0
	27 000	10	35	10			
	33 000	10 or 20					
	39 000	10		12	6		6.5
	47 000	10 or 20					
	56 000	10		16			8.5
	68 000	10 or 20					
	82 000	10		24			12.5
	100 000	10 or 20					
	120 000	10		30	8		20
	150 000	10 or 20					
	150 000L	10 or 20	61	20	4		14
	180 000	10	35	40	8		26.5
	220 000	10 or 20					
	220 000L	10 or 20	61	22	6		21
	270 000	10		24	8		28
	330 000	10 or 20					
	390 000	10		38			44
	470 000	10 or 20					
	560 000	10	79	45		1.2	67
	680 000	10 or 20					
	820 000	10					
	1 000 000	10 or 20		47	10		85
	1 200 000	10					
	1 500 000	10 or 20	105				115
	1 800 000	10					
	2 200 000	10 or 20		50	14		175

Table 2b - Range of components

Rated voltage U_r	Capacitance (1)	Tolerance	Dimensions (mm)				Weight max
			L	h	e	W	
(V)	(pF)	(%)	± 1	± 1	± 1	+10% - 0.05	(g)
2 500	15 000	10 or 20	25	12	4	1	4.0
	18 000	10	35	10			
	22 000	10 or 20					
	27 000	10		12	6		6.5
	33 000	10 or 20					
	39 000	10		16			8.5
	47 000	10 or 20					
	56 000	10		24			12.5
	68 000	10 or 20					
	82 000	10		30	8		20
	100 000	10 or 20					
	100 000L	10 or 20	61	20	4		14
	120 000	10	35	40	8		26.5
	150 000	10 or 20					
	150 000L	10 or 20	61	22	6		21
	180 000	10		38	8		28
	220 000	10 or 20					
	270 000	10		45			44
	330 000	10 or 20					
	390 000	10	79			1.2	67
	470 000	10 or 20					
	560 000	10		47	10		85
	680 000	10 or 20					
	820 000	10	105				115
	1 000 000	10 or 20					
	1 200 000	10		50	14		175
	1 500 000	10 or 20					

Table 2c - Range of components

Rated voltage U_r	Capacitance (1)	Tolerance	Dimensions (mm)				Weight max
			L	h	e	W	
(V)	(pF)	(%)	± 1	± 1	± 1	- 0.05 / +10%	(g)
3 500	15 000	10 or 20	35	10	4	1	4.0
	18 000	10		12	6		6.5
	22 000	10 or 20					
	27 000	10		16			8.5
	33 000	10 or 20					
	39 000	10		24			12.5
	47 000	10 or 20					
	56 000	10		30	8		20
	68 000	10 or 20					
	68 000L	10 or 20	61	20	4		14
	82 000	10	35	40	8		26.5
	100 000	10 or 20					
	100 000L	10 or 20	61	22	6		21
	120 000	10		24	8		28
	150 000	10 or 20					
	180 000	10		38			44
	220 000	10 or 20					
	270 000	10	79	45		1.2	67
	330 000	10 or 20					
	390 000	10		47	10		85
	470 000	10 or 20					
	560 000	10	105				115
	680 000	10 or 20					
	820 000	10		50	14		175
	1 000 000	10 or 20					
4 000	100	10 or 20	25	12	4	1	4.0

Table 2d - Range of components

Rated voltage U_r	Capacitance (1)	Tolerance	Dimensions (mm)				Weight max
			L	h	e	W	
(V)	(pF)	(%)	± 1	± 1	± 1	- 0.05 / +10%	(g)
5 000	4 700	10 or 20	25	12	4	1	4.0
	5 600	10					
	6 800	10 or 20	35	10			
	8 200	10		12	6		6.5
	10 000	10 or 20					
	12 000	10		16			8.5
	15 000	10 or 20					
	18 000	10		24			12.5
	22 000	10 or 20					
	27 000	10		30	8		21
	33 000	10 or 20					
	33 000L	10 or 20	61	20	4		14
	39 000	10	35	40	8		26.5
	47 000	10 or 20					
	47 000L	10 or 20	61	22	6		21
	56 000	10		24	8		28
	68 000	10 or 20					
	82 000	10		38			44
	100 000	10 or 20					
	120 000	10	79	45		1.2	67
	150 000	10 or 20					
	180 000	10		47	10		85
	220 000	10 or 20					
	270 000	10	105				115
	330 000	10 or 20					
	390 000	10		50	14		175
	470 000	10 or 20					

Table 2e - Range of components

Rated voltage U_r	Capacitance (1)	Tolerance	Dimensions (mm)				Weight max
			L	h	e	W	
(V)	(pF)	(%)	± 1	± 1	± 1	- 0.05 / +10%	(g)
7 500	2 200	10 or 20	35	10	4	1	4.0
	2 700	10		12	6		6.5
	3 000	10 or 20					
	3 300	10 or 20					
	3 900	10		16			8.5
	4 700	10 or 20					
	5 600	10		24			12.5
	6 800	10 or 20					
	8 200	10		30	8		21
	10 000	10 or 20					
	10 000L	10 or 20	61	20	4		14
	12 000	10	35	40	8		26.5
	15 000	10 or 20					
	15 000L	10 or 20	61	22	6		21
	18 000	10		24	8		28
	22 000	10 or 20					
	27 000	10		38			44
	33 000	10 or 20					
	39 000	10		45			52
	47 000	10 or 20					
	56 000	10	79	47		1.2	67
	68 000	10 or 20					
	82 000	10			10		85
	100 000	10 or 20					
	120 000	10	105				115
	150 000	10 or 20					
	180 000	10		50	14		175
	220 000	10 or 20					

Table 2f - Range of components

Rated voltage U_r	Capacitance (1)	Tolerance	Dimensions (mm)				Weight max
			L	h	e	W	
(V)	(pF)	(%)	± 1	± 1	± 1	- 0.05 / +10%	(g)
10 000	100	10 or 20	25	12	4	1	4.0
	150	10 or 20					
	220	10 or 20					
	330	10 or 20					
	470	10 or 20		10			
	680	10 or 20					
	820	10 or 20					
	1 000	10 or 20	35				
	1 200	10		12	6		6.5
	1 500	10 or 20					
	1 800	10		16			8.5
	2 200	10 or 20					
	2 700	10		24			12.5
	3 000	10					
	3 300	10 or 20					
	3 900	10		30	8		21
	4 700	10 or 20					
	4 700L	10 or 20	61	20	4		14
	5 600	10	35	40	8		26.5
	6 800	10 or 20					
	6 800L	10 or 20	61	22	6		21
	8 200	10		24	8		28
	10 000	10 or 20					
	12 000	10		38			44
	15 000	10 or 20					
	18 000	10		45			52
	22 000	10 or 20					
	27 000	10	79			1.2	67
	33 000	10 or 20					
	39 000	10		47	10		85
	47 000	10 or 20					
	56 000	10	105				115
	68 000	10 or 20					
	82 000	10		50	14		175
	100 000	10 or 20					

Table 2g - Range of components

Rated voltage U_r	Capacitance (1)	Tolerance	Dimensions (mm)				Weight max
			L	h	e	W	
(V)	(pF)	(%)	± 1	± 1	± 1	- 0.05 / +10%	(g)
12 500	100	10 or 20	25	12	4	1	4.0
	150	10					
	220	10					
	330	10	35	10			
	470	10					
	680	10 or 20					
	820	10					
	1 000	10 or 20		12	6		6.0
	1 200	10					
	1 500	10 or 20		16			9.0
	1 800	10					
	2 200	10 or 20		24			12.5
	2 700	10	61	20	4		14
	3 000	10					
	3 300C	10 or 20	35	30	8		21
	3 300	10 or 20	61	20	4		14
	3 900	10		22	6		21
	4 700C	10 or 20	35	40	8		26.5
	4 700	10 or 20	61	22	6		21
	5 600	10		24	8		28
	6 800	10 or 20					
	8 200	10		38			44
	10 000	10 or 20					
	12 000	10		45			52
	15 000	10 or 20					
	18 000	10	79			1.2	67
	22 000	10 or 20					
	27 000	10		47	10		85
	33 000	10 or 20					
	39 000	10	105				115
	47 000	10 or 20					
	56 000	10		50	14		175
	68 000	10 or 20					
13 400	1 000	10 or 20	35	10	4.5	1	5.0
	3 300	10 or 20		24	7.5		15

Table 2h - Range of components

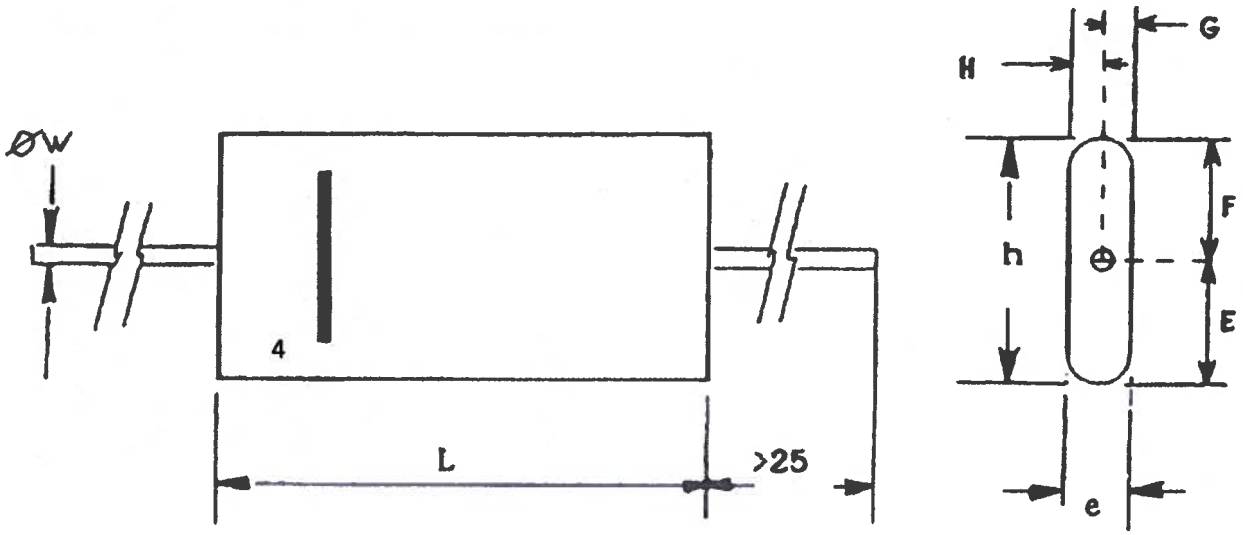
Rated voltage U_r	Capacitance (1)	Tolerance	Dimensions (mm)				Weight max
			L	h	e	W	
(V)	(pF)	(%)	± 1	± 1	± 1	- 0.05 / +10%	(g)
15 000	100	10 or 20	25	12	4	1	4.0
	150	10 or 20	35		6		6.0
	220	10 or 20					
	330	10 or 20					
	470	10 or 20					
	680	10 or 20		16			9.0
	820	10 or 20		24			12.5
	1 000	10 or 20					
	1 200	10 or 20	61	20	4		14
	1 500C	10 or 20	35	30	8		21
	1 500	10 or 20	61	20	4		14
	1 800	10		22	6		21
	2 200C	10 or 20	35	40	8		26.5
	2 200	10 or 20	61	22	6		21
	2 700	10		24	8		28
	3 000	10 or 20					
	3 300	10 or 20					
	3 900	10		38			44
	4 700	10 or 20					
	5 600	10		45			52
	6 800	10 or 20					
	8 200	10	79			1.2	67
	10 000	10 or 20					
	12 000	10		47	10		85
	15 000	10 or 20					
	18 000	10	105				115
	22 000	10 or 20					
	27 000	10		50	14		175
	33 000	10 or 20					

Table 2i - Range of components

Rated voltage U_r	Capacitance (1)	Tolerance	Dimensions (mm)				Weight max
			L	h	e	W	
(V)	(pF)	(%)	± 1	± 1	± 1	- 0.05 / +10%	(g)
20 000	680	10 or 20	61	20	4	1	14
	820	10		22	6		21
	1 000	10 or 20					
	1 200	10		24	8		28
	1 500	10 or 20					
	1 800	10		38			44
	2 200	10 or 20					
	2 700	10		45			52
	3 000	10 or 20					
	3 300	10 or 20					
	3 900	10	79			1.2	67
	4 700	10 or 20					
	5 600	10		47	10		85
	6 800	10 or 20					
	8 200	10	105				115
	10 000	10 or 20					
	12 000	10		50	14		175
	15 000	10 or 20					

2.7. Physical dimensions, terminal, and variants definition

Figure 1 - Physical dimensions (in mm) and variants definition



Notes :

1. dimensions L, h, e, W : see Table 2a to 2i
2. dimensions E, F < 2 mm
3. dimensions G, H < 1 mm
4. terminal identification: a voltage polarity "–" symbol shall be marked on the body to indicate the lead which should be connected to the lowest potential.

2.8. Material and finishes

Materials and finishes shall be as specified herein. Where a defined 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.

2.8.1. Lead / terminal material

Lead material shall be type A with in accordance with ESCC Basic specification n° 23 500.

2.8.2. Lead / terminal finish

Lead finish is type 3 or type 4 in accordance with ESCC Basic specification n° 23 500.

2.9. Exxelia component number

The component identification is constituted and marked as follow:
HT86PS [ ] 01 [ ] XXX [ ] Y [ ] Z

with:
- 01: variant
- [ ] : space
- XXX: coded capacitance
- Y: coded tolerance
- Z: coded rated voltage

Table 3 - Coded capacitance

Capacitance (pF)	Code
XX 10^1	XX1
XX 10^2	XX2
XX 10^3	XX3
XX 10^4	XX4

Table 4 - Coded tolerance

Tolerance (%)	Code
± 10	K
± 20	M

Table 5 - Coded rated voltage

Rated voltage (V)	Code
1 500	C
2 500	D
3 500	E
4 000	S
5 000	F
7 500	G
10 000	H
12 500	J
13 400	M
15 000	K
20 000	L

In accordance with requirements of the ESCC Basic Specification 21700.

3. Requirements

3.1. 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.

3.2. Deviation from the generic specification

3.2.1. Deviations from final production tests (Chart F2)

none

3.2.2. Deviations from burn-in and electrical measurements (Chart F3)

Para § 8.3 - Rapid change of temperature : the duration of exposure at each extreme temperature shall be 3 hours and the transfer time between extremes shall be 1 hour ± 5 min.

Para § 8.5 - Seal test : not applicable.

3.2.3. Deviations from qualification, environmental and endurance tests (Chart F4)

Para § 8.3 - Rapid change of temperature : the duration of exposure at each extreme temperature shall be 3 hours and the transfer time between extremes shall be 1 hour ± 5 min.

Para § 8.5 - Seal test : not applicable.

Para § 8.7 - Vibration: d.c. potential shall not be applied and no monitoring.

Para § 8.8 - Shock: d.c. potential shall not be applied and no monitoring.

Para § 8.9.5 - Climatic Sequence / Low Air Pressure :
- pressure : below 10-5 mbar,
- temperature : +50 (+5-0)°C,
- rated Voltage :applied during the last 5 minutes of the 1.0 hour period,
- duration :1.0 hour.

Para § 8.9.6 - Climatic Sequence / Damp Heat Accelerated :
- the applied voltage shall be 100V instead of U_R.

Para § 8.9.7 - Climatic Sequence / Final electrical measurements :
- Partial Discharge (A.C.) measurements shall be performed as specified in Table 9 of this specification at Vrms = 10% UR.

Para § 8.9.13 - Operating life:
- the applied voltage shall be 1.15 U_R.
- partial Discharge (A.C.) measurements shall be performed as specified in Table 9 of this specification.

3.3. Marking

The marking is as follow:
EFD [ ] "Exxelia component number" [ ] XX.XX

with:
- EFD: acronym of Eurofarad
- [ ] : space
- Exxelia component number: see § 2.10
- XX.XX: date code

3.4. Mechanical characteristics requirements

3.4.1. Dimension

Dimensions of the capacitors specified herein shall be checked.
They shall be in accordance with the figure 1 and the tables 2a to 2i.

3.4.2. Weight

Maximum weight of capacitors in accordance with the tables 2a to 2g is guaranteed but not tested.

3.4.3. Robustness of terminations

requirements for robustness of terminations are specified in para § 8.10 of the ESCC Generic Specification 3006. The test conditions shall be as follow:
- tensile : the loading force shall be 20N during 10 ± 1 seconds,
- torsion : two successive rotations of 180° (half of termination),
- bending : two consecutive bends (other half of the terminations).
After this test, the capacitors shall be examined for evidence of breaking and loosening of terminals.

3.5. Electrical characteristics requirements

3.5.1. Electrical measurements at room temperature

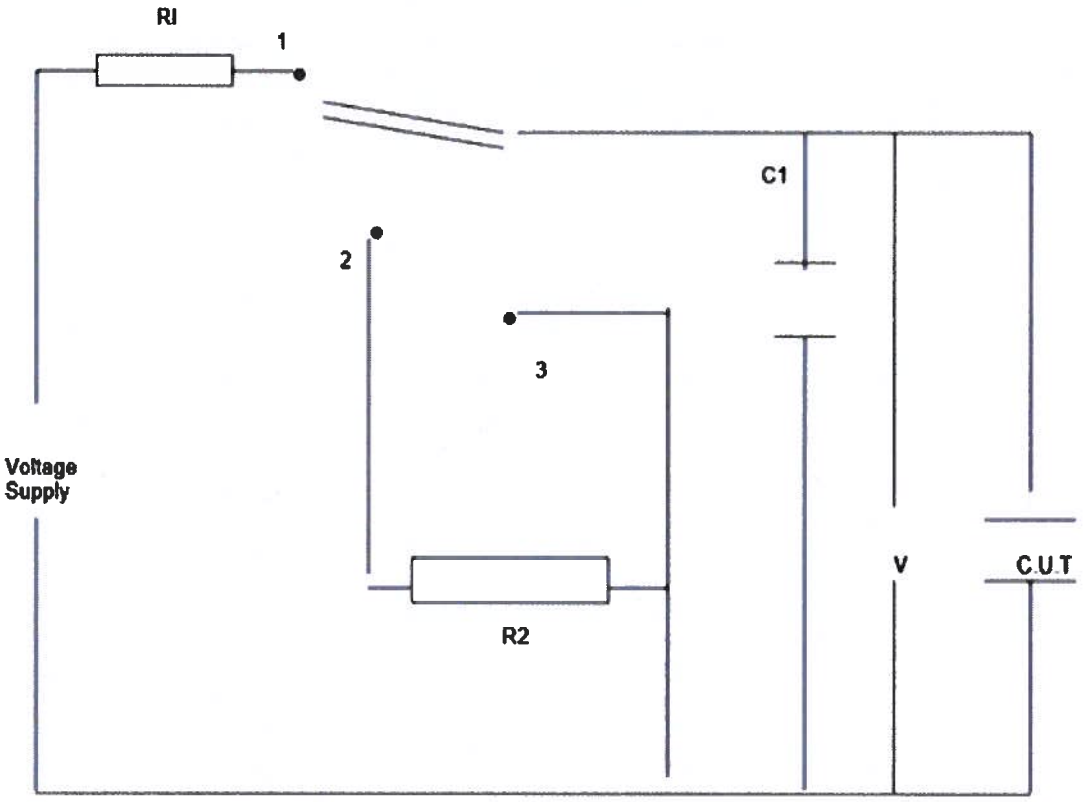
Table 6 - Electrical measurement at Tamb = + 22 ± 3°C

Characteristic	Symbol	Test spec	Test condition	Limit		Unit
				min	max	
Capacitance	C	ESCC 3006	§ 8.4.1.1	- 10 - 20	+ 10 + 20	%
Insulation Resistance	RI	ESCC 3006	§ 8.4.1.3 C ≤ 0.22µF C > 0.22µF	 25 5000	 - -	 GΩ sec
Tangent of loss angle	Tgδ	ESCC 3006	§ 8.4.1.2 1KHz - 1V	-	50	10^{-4}
Voltage Proof	U_{Proof}	ESCC 3006	§ 8.4.1.4 Note 1		1.6 U_R	V
Partial discharge (AC see Note 2)	QAC	IEC 270	VRMS = 10% U_R VRMS = 5% U_R	-	1000 0	pC pC

Notes :

1. duration / chart F2: 1min
   duration / chart F3 / before burn-in: 1 min, 5 seconds for all subsequent measurements according to the figure 2,
2. partial discharge will be measured at two different level of VRMS.

Figure 2 - Test circuit for the voltage proof



(a) The resistance of the voltmeter shall be not less than 100M (HV probe).
The capacitance of C1 shall be at least 5 times that of C.U.T

(b) The resistance of R1 and R2 shall be such that the initial charging and discharging current does not exceed 0.05 A at the highest test voltage.

3.5.2. Electrical measurements at high and low operating temperature range

Table 7 - Electrical measurement at high and low temperatures

Characteristic	Symbol	Test spec	Test Condition (Note1)	Limit		Unit
				min	max	
Capacitance change at - 55 (+3 / -0)°C Note 2	ΔC/C	ESCC 3006	§ 8.4.1.1 Test frequency : 1kHz	-3	0	%
Capacitance change at + 125°C (+0 / - 3)°C Note 2	ΔC/C	ESCC 3006	§ 8.4.1.1 Tamb : + 125°C (+0 / -3)°C	-	+ 10	%
Insulation Resistance at + 125 -0 -5°C	RI	3006	§ 8.4.1.3 C < 0.22µF c > 0.22µF	 250 50	 - -	 MΩ s.
Leakage current	LK	-	125°C - U_R	-	Note 2	nA

Notes :

1. these measurements shall be performed on 6 samples, if one failure occurs out of 6 parts, then test 100%,
2. related to value at 22°C ± 3°C,
3. limit max LK (nA) < U_R (V) x C(nF) / 100.

3.6. Chart F3 / screening / burn-in at high operating temperature range

Table 8 - Burn-in conditions

Characteristic	Symbol	Test condition	Unit
Ambient temperature	Tamb	+ 125 (+0 / -5)	°C
Test voltage	U_T	1.15 U_R (1)	V

Note :

1. series resistor : 1 MΩ minimum.

3.7. Chart F4 / LVT / intermediate and final control

Table 9 - Intermediate and final control

Characteristic	Symbol	Measure	Test condition	Limit		Unit
Robustness of terminations		External Visual Inspection				
Resistance to soldering heat	Δ C/C	Capacitance change	§ 8.4.1.1	- 1	+ 1	%
Solderability		External Visual Inspection	Solder bath method			
Rapid change in temperature	Δ C/C	Capacitance change	§ 8.4.1.1	- 1	+ 1	%
	Δ Tgδ	Tangent of loss angle change	§ 8.4.1.2	-	60	x 10^{-4}
Vibration		External Visual Inspection				
Shock	ΔC/C	Capacitance change	§ 8.4.1.1	- 1	+ 1	%
Climatic sequence	ΔC/C	Capacitance change	§ 8.4.1.1	- 3	+ 3	%
	Δ Tgδ	Tangent of loss angle change	§ 8.4.1.2	-	60	x 10^{-4}
	RI	Insulation resistance	§ 8.4.1.3	50 % (1)	- -	GΩ
	QAC	Partial Discharge (A.C)	IEC 270 EWP 1441 VRMS = 10% U_R	-	2000	pc
High and low temperature Stability	ΔC/C	Capacitance change	§ 8.4.1.1 at -55 (+3/-0)°C	- 3.0	-	%
	ΔC/C		§ 8.4.1.1 at + 125 (+0/-3)°C	-	+ 10	%
Operating life	ΔC/C	Capacitance change	§ 8.4.1.1	- 5	+ 5	%
	Δ Tgδ	Tangent of loss angle change	§ 8.4.1.2	-	60	x 10^{-4}
	RI	Insulation Resistance	§ 8.4.1.3	50 % (1)	- -	GΩ
	QAC	Partial Discharge (A.C)	IEC 270 VRMS = 10% U_R VRMS = 5% U_R	- -	2000 0	pC pC

Note :

1. see limit value in 3.5.1. Electrical measurements at room temperature.

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