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**CAPACITORS, FIXED, SELF-HEALING, NON-INDUCTIVE,  
POLYETHYLENE TEREPHTALATE DIELECTRIC,  
NON-HERMETICALLY SEALED**

**BASED ON TYPE PM907S**

**ESCC Detail Specification No. 3006/025**

Issue 1	January 2016
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## **1 GENERAL**

### **1.1 SCOPE**

This specification details the ratings, physical and electrical characteristics, test and inspection data for Capacitors, Fixed, Self-Healing, Non-inductive, Polyethylene Terephthalate Dielectric, Non-hermetically Sealed, based on Type PM907S. It shall be read in conjunction with ESCC Generic Specification No. 3006, the requirements of which are supplemented herein.

### **1.2 RANGE OF COMPONENTS AND CASE SIZE VARIANTS**

The range of capacitors and case size 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**

The parameter derating information applicable to the capacitors specified herein, is shown in Figure 1.

### **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. 3006 for Capacitors, Fixed, Film Dielectric.

## **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.

**TABLE 1(a) – RANGE OF COMPONENTS AND CASE SIZE VARIANTS**

DC Rated Voltage $U_R$ (V) (Note 1)	Available Case Size Variants (Note 1)	Capacitance Value C ( $\mu$ F) (Note 2)	AC Current $I_{RA}$ (Arms) Max	Weight (g) Max
50	01, 09, 17, 25	15	5.2	4.9
50	02, 10, 18, 26	18	6.2	6
50	02, 10, 18, 26	22	7.6	6
50	03, 11, 19, 27	27	9.4	9.5
50	03, 11, 19, 27	33	11.5	9.5
50	04, 12, 20, 28	47	12.5	13.6
50	04, 12, 20, 28	56	12.5	13.6
50	04, 12, 20, 28	68	12.5	13.6
50	05, 13, 21, 29	82	12.5	20.4
50	05, 13, 21, 29	100	12.5	20.4
63	01, 09, 17, 25	8.2	3.2	4.9
63	01, 09, 17, 25	10	4	4.9
63	01, 09, 17, 25	12	5	4.9
63	02, 10, 18, 26	15	6.3	6
63	03, 11, 19, 27	18	7.6	9.5
63	03, 11, 19, 27	22	8	9.5
63	04, 12, 20, 28	27	10	13.6
63	04, 12, 20, 28	33	10	13.6
63	04, 12, 20, 28	39	11.8	13.6
63	06, 14, 22, 30	39	8.5	21.2
63	05, 13, 21, 29	47	12.5	20.4
63	06, 14, 22, 30	47	10.3	21.2
63	05, 13, 21, 29	56	12.5	20.4
63	06, 14, 22, 30	56	12.2	21.2
63	07, 15, 23, 31	68	15	37.3
63	07, 15, 23, 31	82	15	37.3
63	07, 15, 23, 31	100	15	37.3
63	07, 15, 23, 31	120	15	37.3
63	08, 16, 24, 32	150	15	54.2
63	08, 16, 24, 32	180	15	54.2
100	01, 09, 17, 25	4.7	2.5	4.9
100	01, 09, 17, 25	5.6	3.2	4.9
100	01, 09, 17, 25	6.8	4.3	4.9
100	01, 09, 17, 25	8.2	5.2	4.9
100	02, 10, 18, 26	10	6.4	6
100	03, 11, 19, 27	12	6.4	9.5
100	03, 11, 19, 27	15	8	9.5
100	03, 11, 19, 27	18	8	9.5

DC Rated Voltage $U_R$ (V) (Note 1)	Available Case Size Variants (Note 1)	Capacitance Value $C$ ( $\mu$ F) (Note 2)	AC Current $I_{RA}$ (Arms) Max	Weight (g) Max
100	03, 11, 19, 27	22	8	9.5
100	04, 12, 20, 28	27	10	13.6
100	04, 12, 20, 28	33	10	13.6
100	06, 14, 22, 30	33	9.1	21.2
100	05, 13, 21, 29	39	12.5	20.4
100	06, 14, 22, 30	39	10.7	21.2
100	05, 13, 21, 29	47	12.5	20.4
100	06, 14, 22, 30	47	13	21.2
100	07, 15, 23, 31	56	15	37.3
100	07, 15, 23, 31	68	15	37.3
100	07, 15, 23, 31	82	15	37.3
100	07, 15, 23, 31	100	15	37.3
100	08, 16, 24, 32	120	15	54.2
100	08, 16, 24, 32	150	15	54.2
170	01, 09, 17, 25	3.3	2	4.9
170	01, 09, 17, 25	3.9	2.5	4.9
170	01, 09, 17, 25	4.7	3.1	4.9
170	02, 10, 18, 26	5.6	4	6
170	02, 10, 18, 26	6.8	5	6
170	03, 11, 19, 27	8.2	6	9.5
170	03, 11, 19, 27	10	7.3	9.5
170	04, 12, 20, 28	12	8	13.6
170	04, 12, 20, 28	15	10	13.6
170	04, 12, 20, 28	18	10	13.6
170	05, 13, 21, 29	22	10	20.4
170	06, 14, 22, 30	22	7.7	21.2
170	05, 13, 21, 29	27	12.5	20.4
170	06, 14, 22, 30	27	9.5	21.2
170	05, 13, 21, 29	33	12.5	20.4
170	06, 14, 22, 30	33	11.4	21.2
170	07, 15, 23, 31	39	15	37.3
170	07, 15, 23, 31	47	15	37.3
170	07, 15, 23, 31	56	15	37.3
170	08, 16, 24, 32	68	15	54.2
170	08, 16, 24, 32	82	15	54.2
170	08, 16, 24, 32	100	15	54.2
200	01, 09, 17, 25	2.2	2	4.9
200	01, 09, 17, 25	2.7	2.4	4.9
200	01, 09, 17, 25	3.3	2.8	4.9



DC Rated Voltage $U_R$ (V) (Note 1)	Available Case Size Variants (Note 1)	Capacitance Value $C$ ( $\mu$ F) (Note 2)	AC Current $I_{RA}$ (Arms) Max	Weight (g) Max
200	02, 10, 18, 26	3.9	3.5	6
200	02, 10, 18, 26	4.7	4	6
200	03, 11, 19, 27	5.6	5	9.5
200	03, 11, 19, 27	6.8	6	9.5
200	03, 11, 19, 27	8.2	7	9.5
200	04, 12, 20, 28	10	7.5	13.6
200	04, 12, 20, 28	12	9.5	13.6
200	05, 13, 21, 29	15	10	20.4
200	06, 14, 22, 30	15	7.1	21.2
200	05, 13, 21, 29	18	12.5	20.4
200	06, 14, 22, 30	18	8.9	21.2
200	05, 13, 21, 29	22	12.5	20.4
200	06, 14, 22, 30	22	10.1	21.2
200	07, 15, 23, 31	27	15	37.3
200	07, 15, 23, 31	33	15	37.3
200	07, 15, 23, 31	39	15	37.3
200	08, 16, 24, 32	47	15	54.2
200	08, 16, 24, 32	56	15	54.2
200	08, 16, 24, 32	68	15	54.2
250	01, 09, 17, 25	1.5	1.5	4.9
250	01, 09, 17, 25	2.2	2.2	4.9
250	01, 09, 17, 25	2.7	2.4	4.9
250	02, 10, 18, 26	3.3	2.6	6
250	03, 11, 19, 27	3.9	3.1	9.5
250	03, 11, 19, 27	4.7	3.7	9.5
250	03, 11, 19, 27	5.6	4.4	9.5
250	04, 12, 20, 28	6.8	5.4	13.6
250	04, 12, 20, 28	8.2	6.5	13.6
250	04, 12, 20, 28	10	7.9	13.6
250	05, 13, 21, 29	12	9.5	20.4
250	06, 14, 22, 30	12	5.4	21.2
250	05, 13, 21, 29	15	11.9	20.4
250	06, 14, 22, 30	15	6.7	21.2
250	05, 13, 21, 29	18	12.5	20.4
250	06, 14, 22, 30	18	8.1	21.2
250	07, 15, 23, 31	22	9.9	37.3
250	07, 15, 23, 31	27	12.1	37.3
250	07, 15, 23, 31	33	14.9	37.3
250	08, 16, 24, 32	39	15	54.2

DC Rated Voltage $U_R$ (V) (Note 1)	Available Case Size Variants (Note 1)	Capacitance Value $C$ ( $\mu$ F) (Note 2)	AC Current $I_{RA}$ (Arms) Max	Weight (g) Max
250	08, 16, 24, 32	47	15	54.2
250	08, 16, 24, 32	56	15	54.2
400	01, 09, 17, 25	0.82	2.5	4.9
400	01, 09, 17, 25	1	3.1	4.9
400	02, 10, 18, 26	1.2	3.2	6
400	02, 10, 18, 26	1.5	4	6
400	03, 11, 19, 27	1.8	4	9.5
400	03, 11, 19, 27	2.2	4.5	9.5
400	03, 11, 19, 27	2.7	5	9.5
400	04, 12, 20, 28	3.3	5	13.6
400	04, 12, 20, 28	3.9	5.9	13.6
400	04, 12, 20, 28	4.7	7.1	13.6
400	05, 13, 21, 29	5.6	7.9	20.4
400	06, 14, 22, 30	5.6	6.3	21.2
400	05, 13, 21, 29	6.8	9.6	20.4
400	06, 14, 22, 30	6.8	7.6	21.2
400	05, 13, 21, 29	8.2	11.5	20.4
400	06, 14, 22, 30	8.2	9.2	21.2
400	07, 15, 23, 31	10	11.2	37.3
400	07, 15, 23, 31	12	13.4	37.3
400	07, 15, 23, 31	15	15	37.3
400	08, 16, 24, 32	18	15	54.2
400	08, 16, 24, 32	22	15	54.2
500	01, 09, 17, 25	0.39	1.1	4.9
500	01, 09, 17, 25	0.47	1.3	4.9
500	01, 09, 17, 25	0.56	1.5	4.9
500	01, 09, 17, 25	0.68	1.9	4.9
500	02, 10, 18, 26	0.82	2.3	6
500	02, 10, 18, 26	1	2.8	6
500	03, 11, 19, 27	1.2	3.3	9.5
500	03, 11, 19, 27	1.5	4.2	9.5
500	04, 12, 20, 28	1.8	5	13.6
500	04, 12, 20, 28	2.2	6.3	13.6
500	04, 12, 20, 28	2.7	6.3	13.6
500	05, 13, 21, 29	3.3	6.3	20.4
500	06, 14, 22, 30	3.3	4.5	21.2
500	05, 13, 21, 29	3.9	8	20.4
500	06, 14, 22, 30	3.9	5.3	21.2
500	05, 13, 21, 29	4.7	8	20.4

DC Rated Voltage $U_R$ (V) (Note 1)	Available Case Size Variants (Note 1)	Capacitance Value $C$ ( $\mu$ F) (Note 2)	AC Current $I_{RA}$ (Arms) Max	Weight (g) Max
500	06, 14, 22, 30	4.7	6.4	21.2
500	07, 15, 23, 31	5.6	7.9	37.3
500	07, 15, 23, 31	6.8	9.6	37.3
500	07, 15, 23, 31	8.2	11.5	37.3
500	07, 15, 23, 31	10	14	37.3
500	08, 16, 24, 32	12	15	54.2
500	08, 16, 24, 32	15	15	54.2
630	01, 09, 17, 25	0.22	0.8	4.9
630	01, 09, 17, 25	0.27	0.9	4.9
630	01, 09, 17, 25	0.33	1.1	4.9
630	01, 09, 17, 25	0.39	1.3	4.9
630	02, 10, 18, 26	0.47	1.6	6
630	02, 10, 18, 26	0.56	2	6
630	03, 11, 19, 27	0.68	2.5	9.5
630	03, 11, 19, 27	0.82	3	9.5
630	03, 11, 19, 27	1	3.2	9.5
630	04, 12, 20, 28	1.2	3.9	13.6
630	04, 12, 20, 28	1.5	5	13.6
630	04, 12, 20, 28	1.8	5.8	13.6
630	05, 13, 21, 29	2.2	7.2	20.4
630	06, 14, 22, 30	2.2	3.9	21.2
630	05, 13, 21, 29	2.7	8.8	20.4
630	06, 14, 22, 30	2.7	4.8	21.2
630	05, 13, 21, 29	3.3	10.8	20.4
630	06, 14, 22, 30	3.3	5.9	21.2
630	07, 15, 23, 31	3.9	7	37.3
630	07, 15, 23, 31	4.7	8.5	37.3
630	07, 15, 23, 31	5.6	10.1	37.3
630	08, 16, 24, 32	6.8	12.3	54.2
630	08, 16, 24, 32	8.2	14.7	54.2
630	08, 16, 24, 32	10	15	54.2
800	01, 09, 17, 25	0.22	0.9	4.9
800	02, 10, 18, 26	0.27	1.1	6
800	02, 10, 18, 26	0.33	1.4	6
800	03, 11, 19, 27	0.39	1.6	9.5
800	03, 11, 19, 27	0.47	1.9	9.5
800	03, 11, 19, 27	0.56	2.3	9.5
800	03, 11, 19, 27	0.68	2.8	9.5
800	04, 12, 20, 28	0.82	3.4	13.6

DC Rated Voltage $U_R$ (V) (Note 1)	Available Case Size Variants (Note 1)	Capacitance Value $C$ ( $\mu$ F) (Note 2)	AC Current $I_{RA}$ (Arms) Max	Weight (g) Max
800	04, 12, 20, 28	1	4.1	13.6
800	06, 14, 22, 30	1	2.2	21.2
800	05, 13, 21, 29	1.2	5	20.4
800	06, 14, 22, 30	1.2	2.6	21.2
800	05, 13, 21, 29	1.5	6.2	20.4
800	06, 14, 22, 30	1.5	3.3	21.2
800	07, 15, 23, 31	1.8	4.3	37.3
800	07, 15, 23, 31	2.2	5.2	37.3
800	07, 15, 23, 31	2.7	6.4	37.3
800	07, 15, 23, 31	3.3	7.8	37.3
800	08, 16, 24, 32	3.9	9.2	54.2
800	08, 16, 24, 32	4.7	11	54.2
800	08, 16, 24, 32	5.6	12.5	54.2
1000	02, 10, 18, 26	0.15	0.8	6
1000	02, 10, 18, 26	0.22	1.1	6
1000	03, 11, 19, 27	0.27	1.4	9.5
1000	03, 11, 19, 27	0.33	1.7	9.5
1000	03, 11, 19, 27	0.39	3	9.5
1000	04, 12, 20, 28	0.47	2.5	13.6
1000	04, 12, 20, 28	0.56	2.9	13.6
1000	04, 12, 20, 28	0.68	3.4	13.6
1000	06, 14, 22, 30	0.68	1.9	21.2
1000	05, 13, 21, 29	0.82	4.3	20.4
1000	06, 14, 22, 30	0.82	2.3	21.2
1000	05, 13, 21, 29	1	5.2	20.4
1000	06, 14, 22, 30	1	2.9	21.2
1000	07, 15, 23, 31	1.2	3.4	37.3
1000	07, 15, 23, 31	1.5	4.3	37.3
1000	07, 15, 23, 31	1.8	5.1	37.3
1000	07, 15, 23, 31	2.2	6.2	37.3
1000	08, 16, 24, 32	2.7	7.7	54.2
1000	08, 16, 24, 32	3.3	9.4	54.2
1000	08, 16, 24, 32	3.9	11	54.2
1250	02, 10, 18, 26	0.082	0.5	6
1250	02, 10, 18, 26	0.1	0.7	6
1250	03, 11, 19, 27	0.12	0.8	9.5
1250	03, 11, 19, 27	0.15	1	9.5
1250	03, 11, 19, 27	0.18	1.2	9.5
1250	03, 11, 19, 27	0.22	1.5	9.5

DC Rated Voltage $U_R$ (V) (Note 1)	Available Case Size Variants (Note 1)	Capacitance Value C ( $\mu$ F) (Note 2)	AC Current $I_{RA}$ (Arms) Max	Weight (g) Max
1250	04, 12, 20, 28	0.27	1.8	13.6
1250	04, 12, 20, 28	0.33	2.2	13.6
1250	04, 12, 20, 28	0.39	2.6	13.6
1250	06, 14, 22, 30	0.39	1.4	21.2
1250	05, 13, 21, 29	0.47	3.1	20.4
1250	06, 14, 22, 30	0.47	1.7	21.2
1250	05, 13, 21, 29	0.56	3.7	20.4
1250	06, 14, 22, 30	0.56	2	21.2
1250	07, 15, 23, 31	0.68	2.4	37.3
1250	07, 15, 23, 31	0.82	3	37.3
1250	07, 15, 23, 31	1	3.6	37.3
1250	07, 15, 23, 31	1.2	4.3	37.3
1250	08, 16, 24, 32	1.5	5.4	37.3
1250	08, 16, 24, 32	1.8	6.5	54.2
1250	07, 15, 23, 31	2.2	7.9	54.2

**NOTES**

- The Case Size Variants are shown in Figures 2(a), 2(b), 2(c) and 2(d). The allowable voltage variation for each combination of Case Size Variant and DC Rated Voltage is shown below.

**ALLOWABLE VOLTAGE VARIATION  $dV/dt$  (V/ $\mu$ s)**

Case Size Variants	DC Rated Voltage $U_R$											
	50V	63V	100V	170V	200V	250V	400V	500V	630V	800V	1000V	1250V
01 to 05 09 to 13 17 to 21 25 to 29	15	20	30	35	40	45	65	85	105	150	200	250
06, 07, 08 14, 15, 16 22, 23, 24 30, 31, 32	N/A	10	15	20	25	25	40	45	55	80	100	120

- Tolerance of E6 Series Capacitance Values =  $\pm 20\%$ . Tolerance of E12 Series Capacitance Values =  $\pm 10\%$ .

**TABLE 1(b) – MAXIMUM RATINGS**

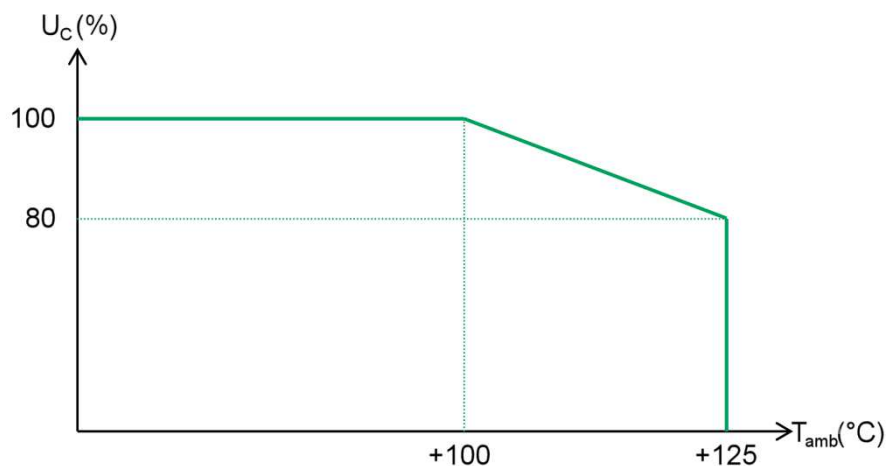
No.	Characteristics	Symbol	Maximum Ratings		Unit	Remarks
			Min	Max		
1	DC Rated Voltage	$U_R$	-	See Table 1(a)	V	$-55^{\circ}\text{C} < T_{op} \leq +100^{\circ}\text{C}$
2	DC Category Voltage	$U_C$	-	See Note 1	V	Over $T_{op}$
3	AC Current	$I_{RA}$	-	See Table 1(a)	Arms	Note 2
4	Operating Temperature Range	$T_{op}$	-55	+125	$^{\circ}\text{C}$	$T_{amb}$
5	Storage Temperature Range	$T_{stg}$	-55	+125	$^{\circ}\text{C}$	
6	Soldering Temperature	$T_{sol}$	-	+260	$^{\circ}\text{C}$	Soldering time $\leq 5\text{s}$ at 1.5mm from the body Soldering time $< 5\text{s}$
	Case Size Variants 01 to 08 and 25 to 32		-	+260		
7	Soldering Distance (Note 3)	-	1	-	mm	Distance of immersion from the body Note 4
	Case Size Variants 01 to 08 and 25 to 32		Not applicable			

**NOTES**

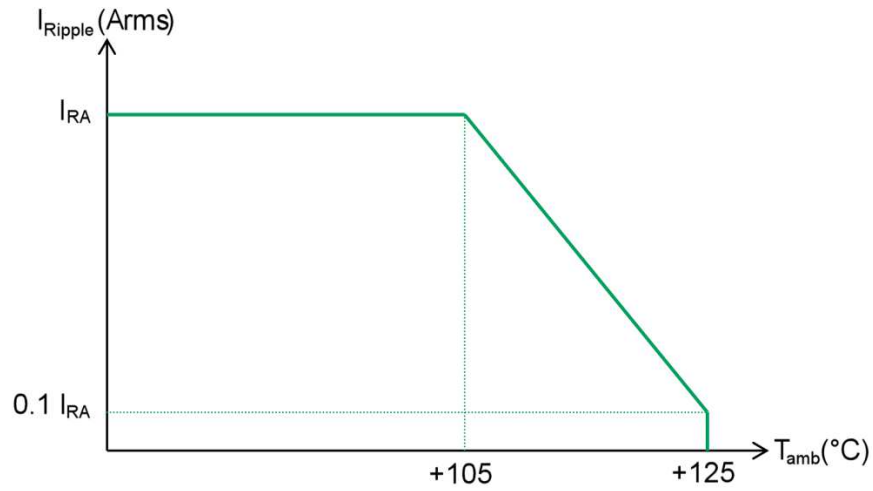
1. When  $T_{op}$  is between  $-55^{\circ}\text{C}$  ( $T_{amb}$ ) and  $+100^{\circ}\text{C}$  ( $T_{amb}$ ), the DC Category Voltage is also the DC Rated Voltage. The DC Category Voltage when  $T_{op} > +100^{\circ}\text{C}$  ( $T_{amb}$ ) but  $\leq +125^{\circ}\text{C}$  ( $T_{amb}$ ) is shown in Figure 1(a).
2. The AC Ripple Current ( $f = 300\text{kHz}$ ) derating is shown in Figure 1(b).
3. Distances are applicable to Paras. 9.10 and 9.11 of ESCC Generic Specification No. 3006.
4. Only the part of the termination which is designed to be soldered shall be tested.

**FIGURE 1 - PARAMETER DERATING INFORMATION**

**FIGURE 1(a) – CATEGORY VOLTAGE VERSUS AMBIENT TEMPERATURE**



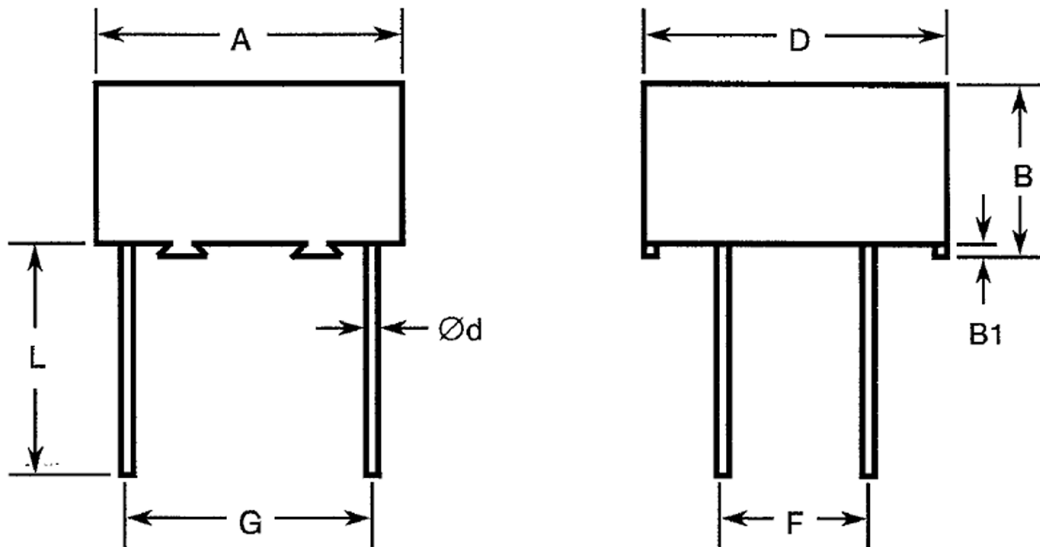
**FIGURE 1(b) – AC RIPPLE CURRENT VERSUS AMBIENT TEMPERATURE**



**FIGURE 2 – PHYSICAL DIMENSIONS**

**FIGURE 2(a) – CASE SIZE VARIANTS 01 TO 08 (TYPE PM907S)**

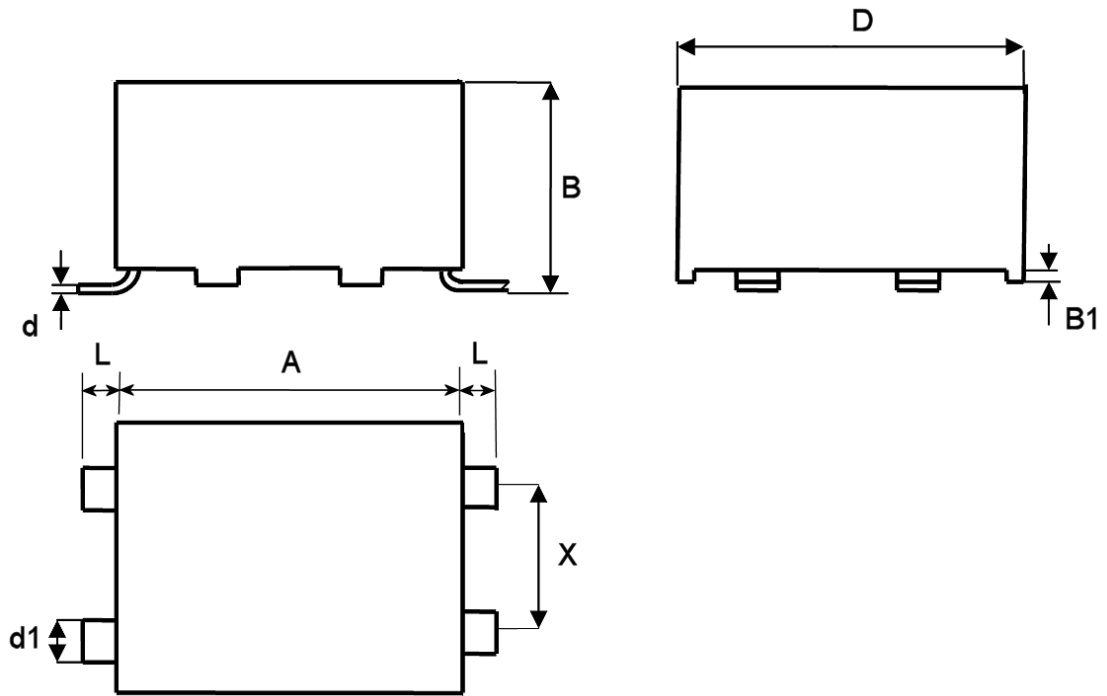
(All dimensions are in millimetres)



Case Size Variant	A		B (Max.)	B1 (Min.)	D		$\varnothing d$		F		G		L (Min.)
	Min.	Max.			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
01	19.5	20.5	6.5	0.25	19.5	20.5	0.95	1.1	9.66	10.66	17.3	18.3	20
02	19.5	20.5	8	0.25	19.5	20.5	0.95	1.1	9.66	10.66	17.3	18.3	20
03	19.5	20.5	12.5	0.25	19.5	20.5	0.95	1.1	9.66	10.66	17.3	18.3	20
04	19.5	20.5	20	0.25	19.5	20.5	0.95	1.1	9.66	10.66	17.3	18.3	20
05	19.5	20.5	30	0.25	19.5	20.5	0.95	1.1	9.66	10.66	17.3	18.3	20
06	30.5	31.5	12.5	0.4	31.5	32.5	0.95	1.1	14.74	15.74	27.44	28.44	20
07	30.5	31.5	22	0.4	31.5	32.5	0.95	1.1	14.74	15.74	27.44	28.44	20
08	30.5	31.5	32	0.4	31.5	32.5	0.95	1.1	14.74	15.74	27.44	28.44	20

FIGURE 2(b) – CASE SIZE VARIANTS 09 TO 16 (TYPE PM907SR1)

(All dimensions are in millimetres)

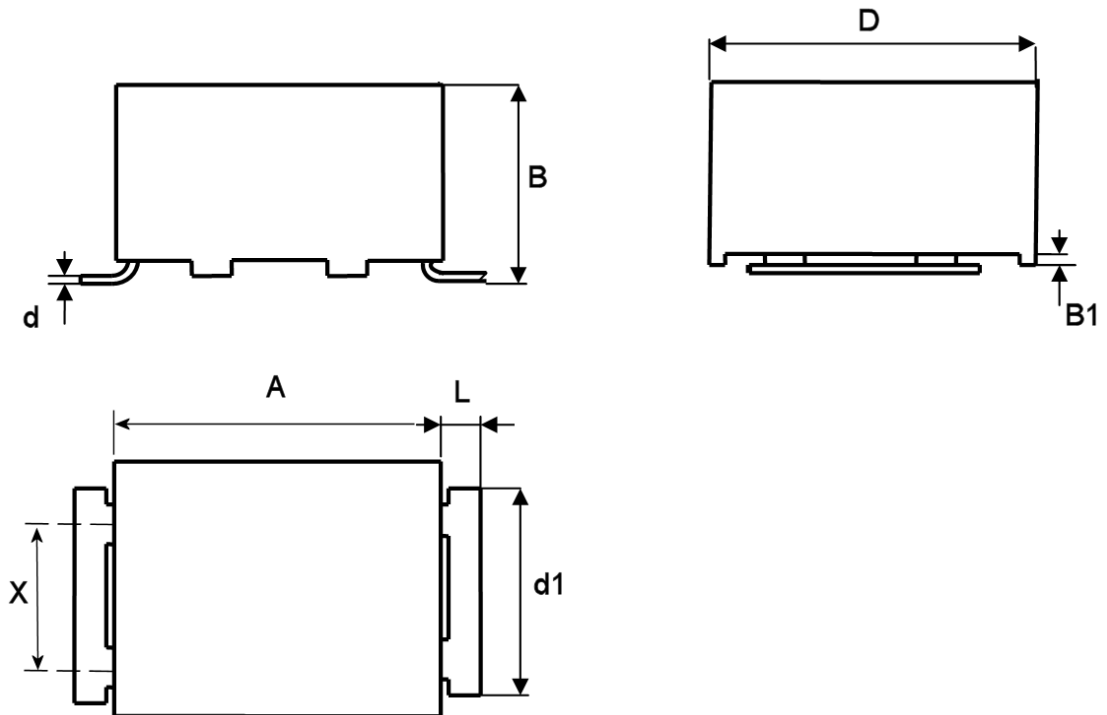


Case Size Variant	A		B		B1 (Min.)	D		d (Max.)	d1		X		L	
	Min.	Max.	Min.	Max.		Min.	Max.		Min.	Max.	Min.	Max.	Min.	Max.
09	19.5	20.5	6.5	7.5	0.25	19.5	20.5	0.3	2.45	2.75	9.5	10.5	2.75	3.25
10	19.5	20.5	8	9	0.25	19.5	20.5	0.3	2.45	2.75	9.5	10.5	2.75	3.25
11	19.5	20.5	12.5	13.5	0.25	19.5	20.5	0.3	2.45	2.75	9.5	10.5	2.75	3.25
12	19.5	20.5	20	21	0.25	19.5	20.5	0.3	2.45	2.75	9.5	10.5	2.75	3.25
13	19.5	20.5	30	31	0.25	19.5	20.5	0.3	2.45	2.75	9.5	10.5	2.75	3.25
14	30.5	31.5	12.5	13.5	0.4	31.5	32.5	0.3	3.95	4.4	14.5	15.5	2.75	3.25
15	30.5	31.5	22	23	0.4	31.5	32.5	0.3	3.95	4.4	14.5	15.5	2.75	3.25
16	30.5	31.5	32	33	0.4	31.5	32.5	0.3	3.95	4.4	14.5	15.5	2.75	3.25



FIGURE 2(c) – CASE SIZE VARIANTS 17 TO 24 (TYPE PM907SR2)

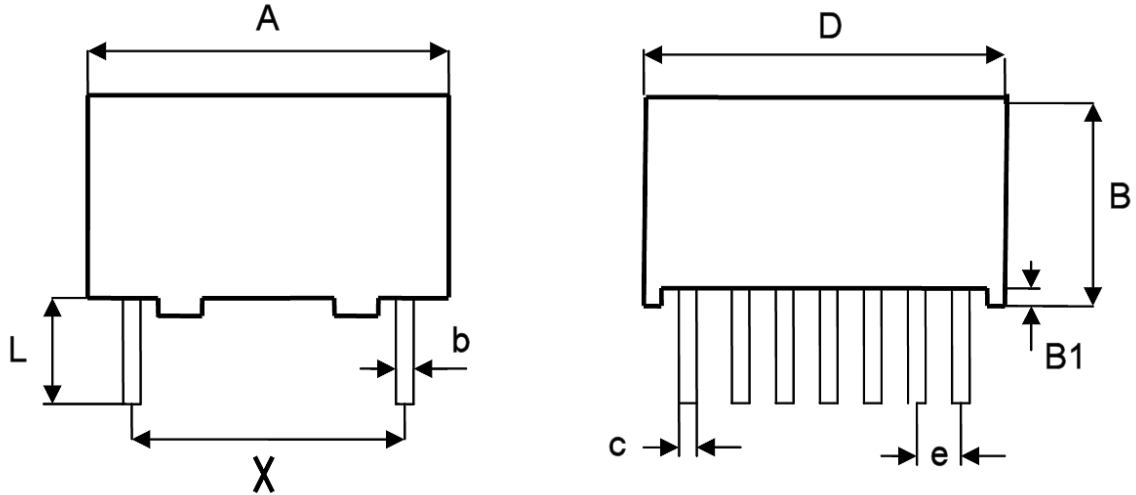
(All dimensions are in millimetres)



Case Size Variant	A		B		B1 (Min.)	D		d (Max.)	d1		X		L	
	Min.	Max.	Min.	Max.		Min.	Max.		Min.	Max.	Min.	Max.	Min.	Max.
17	19.5	20.5	6.5	7.5	0.25	19.5	20.5	0.3	14.5	15.5	9.5	10.5	2.75	3.25
18	19.5	20.5	8	9	0.25	19.5	20.5	0.3	14.5	15.5	9.5	10.5	2.75	3.25
19	19.5	20.5	12.5	13.5	0.25	19.5	20.5	0.3	14.5	15.5	9.5	10.5	2.75	3.25
20	19.5	20.5	20	21	0.25	19.5	20.5	0.3	14.5	15.5	9.5	10.5	2.75	3.25
21	19.5	20.5	30	31	0.25	19.5	20.5	0.3	14.5	15.5	9.5	10.5	2.75	3.25
22	30.5	31.5	12.5	13.5	0.4	31.5	32.5	0.3	23.5	24.5	14.5	15.5	2.75	3.25
23	30.5	31.5	22	23	0.4	31.5	32.5	0.3	23.5	24.5	14.5	15.5	2.75	3.25
24	30.5	31.5	32	33	0.4	31.5	32.5	0.3	23.5	24.5	14.5	15.5	2.75	3.25

FIGURE 2(d) – CASE SIZE VARIANTS 25 TO 32 (TYPE PM907NS)

(All dimensions are in millimetres. A Case Size Variant with 14 terminals is shown for illustrative purposes)

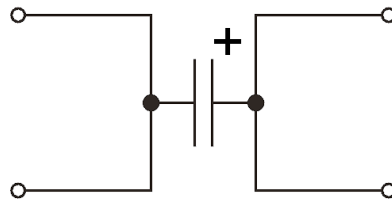


Case Size Variant	A		D		B (Max.)	B1 (Min.)	X	
	Min	Max	Min	Max			Min	Max
25	19.5	20.5	19.5	20.5	6.5	0.25	17.3	18.3
26	19.5	20.5	19.5	20.5	8	0.25	17.3	18.3
27	19.5	20.5	19.5	20.5	12.5	0.25	17.3	18.3
28	19.5	20.5	19.5	20.5	20	0.25	17.3	18.3
29	19.5	20.5	19.5	20.5	30	0.25	17.3	18.3
30	30.5	31.5	31.5	32.5	12.5	0.4	27.89	27.99
31	30.5	31.5	31.5	32.5	22	0.4	27.89	27.99
32	30.5	31.5	31.5	32.5	32	0.4	27.89	27.99

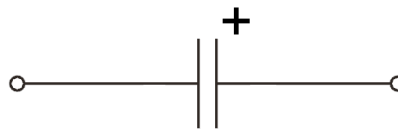
Case Size Variant	b		c		e		L (Min.)	No. of terminals
	Min	Max	Min	Max	Min	Max		
25	0.15	0.35	0.4	0.6	2.34	2.74	5	7 × 2
26	0.15	0.35	0.4	0.6	2.34	2.74	5	7 × 2
27	0.15	0.35	0.4	0.6	2.34	2.74	5	7 × 2
28	0.15	0.35	0.4	0.6	2.34	2.74	5	7 × 2
29	0.15	0.35	0.4	0.6	2.34	2.74	5	7 × 2
30	0.15	0.35	0.4	0.6	2.34	2.74	5	11 × 2
31	0.15	0.35	0.4	0.6	2.34	2.74	5	11 × 2
32	0.15	0.35	0.4	0.6	2.34	2.74	5	11 × 2

**FIGURE 3 - FUNCTIONAL DIAGRAM**

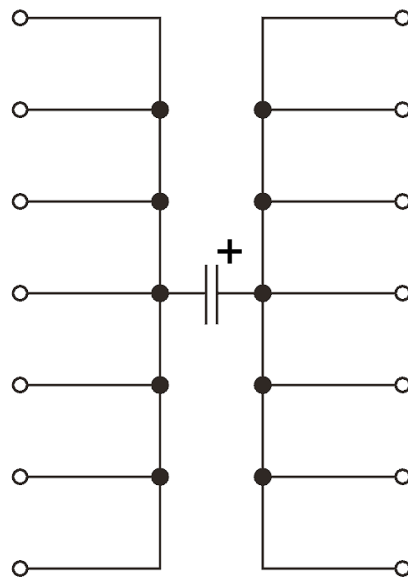
CASE SIZE VARIANTS 01 TO 16



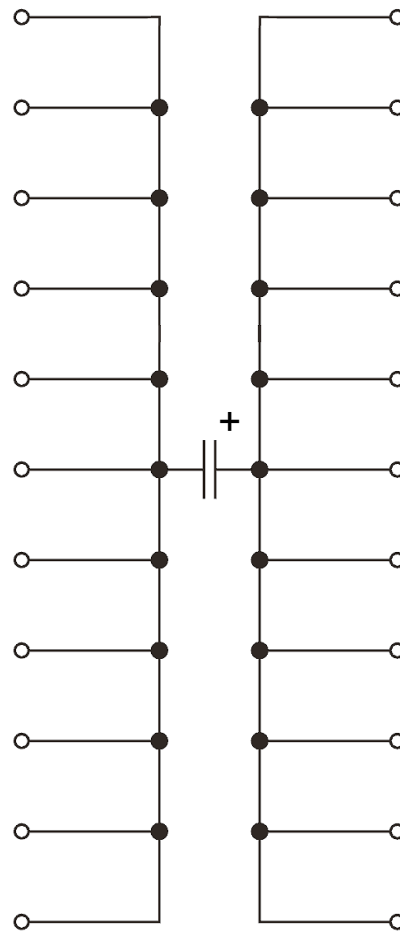
CASE SIZE VARIANTS 17 TO 24



CASE SIZE VARIANTS 25 TO 29



CASE SIZE VARIANTS 30 TO 32



**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. 3006 for Capacitors, Fixed, Film Dielectric. 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) Para. 9.2, Seal Test: Not applicable

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

- (a) Para. 9.2, Seal Test: Not applicable  
(b) Para. 9.19, Sleeving: Not applicable

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

- (a) Para. 9.2, Seal Test: Not applicable.  
(b) Para. 9.8, Corrosion: Not applicable.  
(c) Para. 9.9, Robustness of Terminations: for the purpose of this test the terminations are described as rigid, only the test  $U_a$  is applicable.

- For Case Size Variants 09 to 24:

Add to Paragraph 9.9.1:

Frame termination surface mount capacitors 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 terminations.

A force, as specified in Para. 4.3.3 of this Specification, shall be applied normal to the line joining the terminals and in a plane parallel to the substrate, for a duration of 10 seconds.

Add to paragraph 9.9.2:

For surface mount capacitors, there shall be no evidence of damage or loosening of the components from the substrate.

- For Case Size Variants 01 to 08 and 25 to 32, the requirements are specified in section 9 of the ESCC Generic Specification No. 3006. The test conditions shall be as follows:

Test Condition:  $U_{a1}$  – tensile

Applied force: 20N (Case Size Variants 01 to 08); 10N (Case Size Variants 25 to 32)

Duration: 5 to 10 seconds

- (d) Para. 9.16, Operating Life: For Para. 9.16(c), the applied voltage shall be  $1.25 \times U_C$ .

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

- (a) Para. 9.2, Seal Test: As per Para. 4.2.4(a).  
(b) Para. 9.9, Robustness of Terminations: As per Para. 4.2.4(c).  
(c) Para. 9.16, Operating Life: As per Para. 4.2.4(d).

### 4.3 MECHANICAL REQUIREMENTS

#### 4.3.1 Dimension Check

The dimensions of the capacitors specified herein shall be checked. They shall conform to those shown in Figure 2 and Table 1(a).

#### 4.3.2 Weight

The maximum weight of the capacitors specified herein shall be as specified in Table 1(a).

#### 4.3.3 Robustness of Terminations

Test Condition: 10 Newtons or 20 Newtons, depending on the Case Size Variant. Deviations from the Generic Specification apply and are given in Para. 4.2.4(c) herein.

#### 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 Case

Thermo-plastic with epoxy resin filler.

##### 4.4.2 Lead Material and Finish

For Case Size Variants 01 to 08, the lead material shall be type 'A' in accordance with the requirements of ESCC Basic Specification No. 23500. The finish shall be tin-lead plating with a maximum tin content of 97%.

For Case Size Variants 09 to 32, the terminal material shall be brass with Type '3' or Type '4' finish in accordance with the requirements of ESCC Basic Specification No. 23500.

#### 4.5 MARKING

##### 4.5.1 General

The marking of all 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) Polarity
- (b) The ESCC qualified components symbol (for ESCC qualified components only)
- (c) The ESCC Component Number
- (d) Traceability Information

##### 4.5.2 The ESCC Component Number

The ESCC Component Number shall be constituted as follows:

Example: 300602501B155KH

- Detail Specification Reference: 3006025
- Case Size Variant Number (see Table 1(a) and Figure 2): 01 (as applicable)
- Testing level: B (B or C, as required)
- Characteristic code: Capacitance Value (1.5 $\mu$ F): 155 (as required)
- Characteristic code: Tolerance ( $\pm$ 10%): K (as applicable)
- Rating code: Rated Voltage (250V): H (as required)

4.5.2.1 *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 for marking shall be picofarads (pF).

Capacitance Value (pF)	Code
XX10 <sup>4</sup>	XX4
XX10 <sup>5</sup>	XX5
XX10 <sup>6</sup>	XX6
XX10 <sup>7</sup>	XX7

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

Tolerance (± %)	Code Letter
10	K
20	M

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

Rated Voltage (V)	Code Letter
50	C
63	D
100	E
170	F
200	G
250	H
400	K
500	L
630	Z
800	P
1000	Q
1250	R

4.5.3 Traceability Information

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

#### 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  $T_{amb} = +22 \pm 3^{\circ}\text{C}$ .

##### 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.

#### 4.7 BURN-IN TESTS

##### 4.7.1 Parameter Drift Values

The parameter drift values applicable to burn-in are specified in Table 4 of this specification. Unless otherwise stated, measurements shall be performed at  $T_{amb} = +22 \pm 3^{\circ}\text{C}$ . The parameter drift values ( $\Delta$ ) applicable to the parameters scheduled shall not be exceeded. In addition to these drift value requirements for a given parameter, the appropriate limit value specified in Table 2 shall not be exceeded.

##### 4.7.2 Conditions for Burn-in

The requirements for burn-in are specified in Section 7 of ESCC Generic Specification No. 3006. The conditions for burn-in shall be as specified in Table 5 of this specification. On completion of burn-in there shall be a recovery period of  $24 \pm 2$  hours before the performance of the end-measurements.

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

No.	Characteristics	Symbol	ESCC 3006 Test Method	Test Conditions	Limits		Unit
					Min	Max	
1	Capacitance	C	Para. 9.6.1.2	Test Frequency: 1kHz	See Table 1(a)		$\mu\text{F}$
2	Tangent of Loss Angle	$Tg\delta$	Para. 9.6.1.3	Test Frequency: 1kHz	-	100	$10^{-4}$
3	Insulation Resistance	Ri	Para. 9.6.1.4	$C \leq 0.33\mu\text{F}$	7500	-	$\text{M}\Omega$
				$C > 0.33\mu\text{F}$	2500	-	sec
4	Voltage Proof Terminal to Terminal	VP	Para. 9.6.1.1	Para. 9.6.1.1	$1.6 \times U_R$	-	V

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

No.	Characteristics	Symbol	ESCC 3006 Test Method	Test Conditions (Note 1)	Limits		Unit
					Min	Max	
1(a)	Capacitance Change	$\Delta C/C$	Para. 9.6.1.2	$T_{amb} = -55 (+3 -0)^{\circ}\text{C}$ Test Frequency: 1kHz	-	-10 (2)	%
1(b)	Capacitance Change	$\Delta C/C$	Para. 9.6.1.2	$T_{amb} = +125 (+0 -3)^{\circ}\text{C}$ Test Frequency: 1kHz	-	+18 (2)	%

#### **NOTES**

- These measurements shall be performed on a sample of 6 components. If any samples fail then a 100% test shall be performed. The maximum permissible number of failures in the case of 100% testing is 1% (rounded upwards to the nearest whole number).
- Related to value recorded at  $T_{amb} = +22^{\circ}\text{C}$ .



**TABLE 4 – PARAMETER DRIFT VALUES**

No.	Characteristics	Symbol	Spec. and/or Test Method	Test Conditions	Change Limits ( $\Delta$ )	Unit
1	Capacitance Change	$\Delta C/C$	As per Table 2	As per Table 2	$\pm 5$	%

**TABLE 5 – CONDITIONS FOR BURN-IN AND OPERATING LIFE TESTS**

No.	Characteristic	Symbol	Condition	Unit
1	Ambient Temperature	$T_{amb}$	+125 (+0 -5)	$^{\circ}C$
2	Test Voltage	$V_T$	$1.25 \times U_C$ (Note 1)	V

**NOTES:**

1. See Figure 1(a) for the applicable value of  $U_C$ .

4.8 ENVIRONMENTAL AND ENDURANCE TESTS (CHART IV AND V OF ESCC GENERIC SPECIFICATION NO. 3006)

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

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

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 tests are scheduled in Table 6. Unless otherwise stated, the measurements shall be performed at  $T_{amb} = +22 \pm 3^{\circ}C$ .

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. 3006. The conditions for operating life testing shall be as specified in Table 5 for the burn-in test.

**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. 3006		Measurements and Inspections		Symbol	Limits		Unit
	Environmental and Endurance Tests (1)	Test Method and Conditions	Identification	Conditions		Min	Max	
01	Seal Test	Para. 9.2 and Paras. 4.2.4 and 4.2.5 of this spec.	Not applicable					
02	Rapid Change of Temperature	Para. 9.3	<b>Initial Measurements</b> Capacitance <b>Final Measurements</b> Visual Examination Capacitance Change Tangent of Loss Angle	Table 2 Item 1 After recovery of 24 ±2 hours No damage Table 2 Item 1 Table 2 Item 2	C - ΔC/C Tgδ	Record Values - -3 -	- +3 Table 2	%
03	Corrosion	Para. 9.8 and Para. 4.2.4 of this spec.	Not applicable					
04	Robustness of Terminations	Para. 9.9 and Paras. 4.2.4, 4.2.5 and 4.3.3 of this spec.	<b>Final Measurements</b> Visual Examination	No damage	-	-	-	
05	Resistance to Soldering Heat	Para. 9.10	<b>Initial Measurements</b> Capacitance Tangent of Loss Angle <b>Final Measurements</b> Insulation Resistance Capacitance Change Tangent of Loss Angle Change	Table 2 Item 1 Table 2 Item 2 After recovery of 1 to 2 hours Table 2 Item 3 Table 2 Item 1 Table 2 Item 2	C Tgδ Ri ΔC/C ΔTgδ	Record Values - Table 2 -3 -	Table 2 - +3 +50	% 10 <sup>-4</sup>
06	Solderability	Para. 9.11 Method 1	<b>Final Measurements</b> Visual Examination	Solder Bath Method IEC No. 60068-2-20 Para. 4.6.4, 4.7.4 or 4.9.3	-	-	-	
07	Vibration	Para. 9.12	<b>Final Measurements</b> Visual Examination	No evidence of damage	-	-	-	
08	Shock or Bump	Para. 9.13	<b>Final Measurements</b> Capacitance Change Visual Examination	Para. 9.6.1.2 No evidence of damage, breakdown, arcing or fractures	ΔC/C -	-5 -	+5 -	%

No.	ESCC Generic Spec. No. 3006		Measurements and Inspections		Symbol	Limits		Unit
	Environmental and Endurance Tests (1)	Test Method and Conditions	Identification	Conditions		Min	Max	
09	Climatic Sequence	Para. 9.14	<b>Initial Measurements</b> Capacitance Tangent of Loss Angle <b>Final Measurements</b> Visual Examination Voltage Proof Insulation Resistance Capacitance Change Tangent of Loss Angle Change	Table 2 Item 1 Table 2 Item 2 After Recovery of 24 hrs max No evidence of corrosion Table 2 Item 4 Table 2 Item 3 Table 2 Item 1 Table 2 Item 2	C Tgδ - VP Ri ΔC/C ΔTgδ	Record values - - Table 2 (3) -3 -	Table 2 - - - +3 +50	% 10 <sup>-4</sup>
10	Temperature Coefficient	Para. 9.15	<b>Final Measurements</b> Capacitance Change	ESCC No. 3006 Para. 9.15 Table 3 Item 1(a) Table 3 Item 1(b)	ΔC/C ΔC/C	- -	-10 +18	% %
11	Operating Life	Paras. 9.16, Paras. 4.2.4 and 4.2.5 of this spec.	<b>Initial Measurements</b> Capacitance Tangent of Loss Angle <b>During Tests</b> <b>Intermediate Measurements</b> Capacitance Change <b>Final Measurements</b> Capacitance Change Tangent of Loss Angle Change Insulation Resistance Visual Examination	Table 2 Item 1 Table 2 Item 2 125% U <sub>C</sub> (2) After recovery of 24 ±2 hours Table 2 Item 1 After 24 hours recovery Table 2 Item 1 Table 2 Item 2 Table 2 Item 3 No evidence of damage or corrosion	C Tgδ ΔC/C ΔC/C ΔTgδ Ri -	Record Values - -5 -5 - (3) -	Table 2 +5 +5 +50 - -	% % 10 <sup>-4</sup>
12	Permanence of Marking	Para. 9.17	As applicable	No corrosion or obliteration of any marking				

**NOTES**

1. The tests in this Table refer to either Chart IV or V and shall be used as applicable.
2. For U<sub>C</sub>, see Figure 1(a).
3. Greater than 50% of the value given in Table 2.