ERSY

Low ESR / Z
Endurance 3.000h at 105°C
Rated voltage range: 10V to 63V
Rated capacitance range: 4,7µF to 1.000µF
Size range: 8,9 x 12,0mm and 10,2 x 12,0mm
Designed as G-Kap (C_R measured at DC-Load) or bipolar Chip capacitor available
RoHS compliant
Special types on request

Specifications

	Characteristics								
Temperature range	-55°C to +105°C								
Rated voltage range	10V to 63V								
Capacitance tolerance	±20%, other on request								(at 20°C, 100Hz)
Leakage current I_{ra}	I_{ra}=0,002·C_R·V_R + 3µA or 5µA, whichever is greater (I_{ra} [µA], C_R: Rated capacitance [µF], V_R: Rated voltage [V])								(at 20°C, after 5 minutes)
Dissipation factor tan δ (D.F.)	Rated voltage (V_R)	10V	16V	25V	35V	40V	50V	63V	
	tan δ_{max}	0,17	0,14	0,12	0,10	0,09	0,08	0,07	(at 20°C, 100Hz)
Low temperature characteristics Z_{max}-factor	Rated voltage (V_R)	10V	16V	25V	35V	40V	50V	63V	
	Z(-40°C)/(20°C)	2	2	2	2	2	2	2	(100Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 3.000 hours at 105°C.								
	Capacitance change	ΔC/C0 ≤ ±25%							
	D.F. (tan δ)	Δtan δ ≤ +200% of the initial specification value							
	Leakage current (I_{ra})	I_{ra} ≤ the initial specified value							
Shelf life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1.000 hours at 105°C without voltage applied.								
	Capacitance change	ΔC/C0 ≤ ±25%							
	D.F. (tan δ)	Δtan δ ≤ +200% of the initial specification value							
	Leakage current (I_{ra})	I_{ra} ≤ +200% of the initial specification value							
Surge voltage test	The capacitors shall be subjected to 1.000 cycles each consisting of charging with the specified surge voltage for 30±5 seconds through a protective resistor (R=0,1/C_R) and open-circuiting for 330 seconds at 105°C. The following specifications shall be satisfied when the capacitors are restored to 20°C.								
	Rated voltage (V_R)	10V	16V	25V	35V	40V	50V	63V	
	Surge voltage (V_S)	11,5V	18,4V	28,8V	40,3V	46V	57,5V	72,5V	
	Appearance	No significant damage							
	Capacitance change	ΔC/C0 ≤ ±10%							
	D.F. (tan δ)	tan δ ≤ the initial specified value							
	Leakage current (I_{ra})	I_{ra} ≤ the initial specified value							

FROLYT
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ISO 9001

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FROLYT

Aluminum-electrolytic capacitors SMD (Chip) for surface mounting with low ESR / Z in the general industrial electronics and special electronics for example automobile industry

Endurance at least 3.000h at +105°C

ERSY

Generic specification:
DIN EN 60384-1

Sectional specification:
DIN EN 60384-18
Without quality assessment

Operating temperature range:
-55 to +105°C

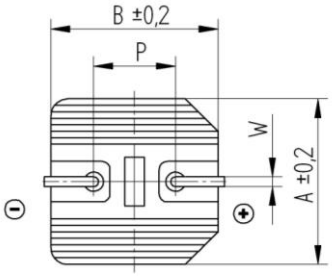
Climatic category:
55/105/56

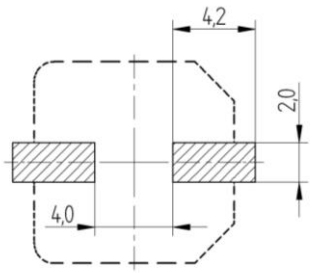
Capacitance range:
±20% (other on request)

Surge voltage V_S:
$V_S = 1{,}15 \cdot V_R$

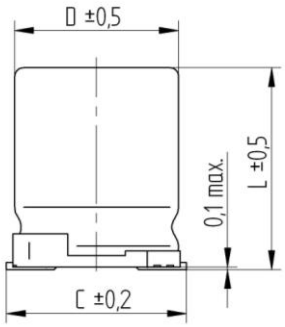
Leakage current I_{ra}:
measured at V_R at +20°C
$I_{ra} \leq 0{,}002 \cdot C_R \cdot V_R + 3\mu A$ or $5\mu A$
(after 5 minutes, whichever is greater)
C_R: Rated capacitance (µF)
V_R: Rated voltage (V)

Reverse voltage:
at +20°C to +25°C = 2V (briefly)
at -55°C to +105°C = 1V (briefly)





*) Soldering on PC board



The marking is done by printing on case surface (Ink-Jet)

*) Recommended Soldering area on PC board

Dimensions [mm]		
	Terminal length x Height	
	8,9 x 12,0	10,2 x 12,0
A	8,9	10,2
B	8,9	10,2
C	9,7	11,0
D	8,7	10.0
L	12,0	12,0
W	0,8-1,1	0,8-1,1
P	4,5	4,5

Endurance at least (after soldering)	
Ambient temperature	
≤ +40°C	300.000h
+85°C	12.000h
+105°C	3.000h

Dimensions Overview: Terminal length x Height [mm]

Rated cap. C_R [µF]	Rated voltage V_R [V]						
	10	16	25	35	40	50	63
4 ,7							8,9 x 12,0
6 ,8						8,9 x 12,0	8,9 x 12,0
10					8,9 x 12,0	8,9 x 12,0	8,9 x 12,0
15				8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0
22			8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0
33		8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0
47	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0
68	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0
100	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	10,2 x 12,0
150	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	10,2 x 12,0	10,2 x 12,0	10,2 x 12,0
220	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	10,2 x 12,0	10,2 x 12,0	10,2 x 12,0	
330	8,9 x 12,0	10,2 x 12,0	10,2 x 12,0	10,2 x 12,0			
470	8,9 x 12,0	10,2 x 12,0	10,2 x 12,0				
680	8,9 x 12,0	10,2 x 12,0					
1 000	10,2 x 12,0						

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Technical specifications

Rated capacitance C_R [µF]	Rated voltage V_R [V]	Size [mm] Terminal length x Height	tan δ 100Hz +20°C (max)	ESR [Ω] 100Hz +20°C (max)	ESR [Ω] 100kHz +20°C (typical)	Z [Ω] 10kHz +20°C (max)	Z [Ω] 100kHz +20°C (typical)	Z [Ω] 10kHz -40°C (max)	Z [Ω] 100kHz -40°C (typical)	I~ [mA]* 100Hz +105°C (max)	I~ [mA]* 100kHz +105°C (max)	Ordering information for FROLYT SMD/Chip electrolytic capacitors
47	10	8,9 x 12,0	0,17	5,76	0,12	0,26	0,13	2,90	1,70	127	375	• Series • Rated capacitance/ Rated voltage • Capacitance tolerance • Dimensions (Terminal length x Height) • Additional requirements Ordering example: ERSY 470µF 16V ±20%, 10,2 x 12,0mm, Carrier Tape on reel
68	10	8,9 x 12,0	0,17	3,98	0,12	0,26	0,13	2,90	1,70	152	401	
100	10	8,9 x 12,0	0,17	2,71	0,12	0,26	0,13	2,90	1,70	185	442	
150	10	8,9 x 12,0	0,17	1,80	0,12	0,26	0,13	2,90	1,70	226	506	
220	10	8,9 x 12,0	0,17	1,23	0,12	0,26	0,13	2,90	1,70	274	573	
330	10	8,9 x 12,0	0,17	0,82	0,12	0,26	0,13	2,90	1,70	335	606	
470	10	8,9 x 12,0	0,17	0,58	0,12	0,26	0,13	2,90	1,70	400	688	
680	10	8,9 x 12,0	0,17	0,40	0,12	0,26	0,13	2,90	1,70	482	786	
1 000	10	10,2 x 12,0	0,17	0,27	0,10	0,21	0,11	2,30	1,40	621	932	
33	16	8,9 x 12,0	0,14	6,75	0,12	0,26	0,13	2,90	1,70	117	374	
47	16	8,9 x 12,0	0,14	4,74	0,12	0,26	0,13	2,90	1,70	140	413	
68	16	8,9 x 12,0	0,14	3,28	0,12	0,26	0,13	2,90	1,70	168	444	
100	16	8,9 x 12,0	0,14	2,23	0,12	0,26	0,13	2,90	1,70	204	488	
150	16	8,9 x 12,0	0,14	1,49	0,12	0,26	0,13	2,90	1,70	249	558	
220	16	8,9 x 12,0	0,14	1,01	0,12	0,26	0,13	2,90	1,70	302	631	
330	16	10,2 x 12,0	0,14	0,68	0,10	0,21	0,11	2,30	1,40	393	711	
470	16	10,2 x 12,0	0,14	0,47	0,10	0,21	0,11	2,30	1,40	469	807	
680	16	10,2 x 12,0	0,14	0,33	0,10	0,21	0,11	2,30	1,40	565	921	
22	25	8,9 x 12,0	0,12	8,68	0,12	0,26	0,13	2,90	1,70	103	353	
33	25	8,9 x 12,0	0,12	5,79	0,12	0,26	0,13	2,90	1,70	126	403	
47	25	8,9 x 12,0	0,12	4,06	0,12	0,26	0,13	2,90	1,70	151	445	
68	25	8,9 x 12,0	0,12	2,81	0,12	0,26	0,13	2,90	1,70	181	478	
100	25	8,9 x 12,0	0,12	1,91	0,12	0,26	0,13	2,90	1,70	220	526	
150	25	8,9 x 12,0	0,12	1,27	0,12	0,26	0,13	2,90	1,70	269	603	
220	25	8,9 x 12,0	0,12	0,87	0,12	0,26	0,13	2,90	1,70	326	681	
330	25	10,2 x 12,0	0,12	0,58	0,10	0,21	0,11	2,30	1,40	425	769	
470	25	10,2 x 12,0	0,12	0,41	0,10	0,21	0,11	2,30	1,40	507	872	

* I~ (Rated ripple current) refers to an increase in temperature of 3K
special requirements or special types on request

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Technical specifications

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Rated capacitance C_R [µF]	Rated voltage V_R [V]	Size [mm] Terminal length x Height	tan δ 100Hz +20°C (max)	ESR [Ω] 100Hz +20°C (max)	ESR [Ω] 100kHz +20°C (typical)	Z [Ω] 10kHz +20°C (max)	Z [Ω] 100kHz +20°C (typical)	Z [Ω] 10kHz -40°C (max)	Z [Ω] 100kHz -40°C (typical)	I~ [mA]* 100Hz +105°C (max)	I~ [mA]* 100kHz +105°C (max)	Ordering information for FROLYT SMD/Chip electrolytic capacitors
15	35	8,9 x 12,0	0,10	10,61	0,12	0,26	0,13	2,90	1,70	93	336	
22	35	8,9 x 12,0	0,10	7,23	0,12	0,26	0,13	2,90	1,70	113	388	
33	35	8,9 x 12,0	0,10	4,82	0,12	0,26	0,13	2,90	1,70	138	442	
47	35	8,9 x 12,0	0,10	3,39	0,12	0,26	0,13	2,90	1,70	165	487	
68	35	8,9 x 12,0	0,10	2,34	0,12	0,26	0,13	2,90	1,70	199	525	
100	35	8,9 x 12,0	0,10	1,59	0,12	0,26	0,13	2,90	1,70	241	576	
150	35	8,9 x 12,0	0,10	1,06	0,12	0,26	0,13	2,90	1,70	295	661	
220	35	10,2 x 12,0	0,10	0,72	0,10	0,21	0,11	2,30	1,40	380	794	
330	35	10,2 x 12,0	0,10	0,48	0,10	0,21	0,11	2,30	1,40	465	842	
10	40	8,9 x 12,0	0,09	14,32	0,29	0,45	0,30	5,60	3,30	80	289	
15	40	8,9 x 12,0	0,09	9,55	0,29	0,45	0,30	5,60	3,30	98	336	
22	40	8,9 x 12,0	0,09	6,51	0,29	0,45	0,30	5,60	3,30	119	381	
33	40	8,9 x 12,0	0,09	4,34	0,29	0,45	0,30	5,60	3,30	146	431	
47	40	8,9 x 12,0	0,09	3,05	0,29	0,45	0,30	5,60	3,30	174	459	
68	40	8,9 x 12,0	0,09	2,11	0,29	0,45	0,30	5,60	3,30	209	500	
100	40	8,9 x 12,0	0,09	1,43	0,29	0,45	0,30	5,60	3,30	254	569	
150	40	10,2 x 12,0	0,09	0,95	0,26	0,30	0,20	3,30	2,60	331	692	
220	40	10,2 x 12,0	0,09	0,65	0,26	0,30	0,20	3,30	2,60	401	726	
6 ,8	50	8,9 x 12,0	0,08	18,72	0,29	0,45	0,30	5,60	3,30	70	270	
10	50	8,9 x 12,0	0,08	12,73	0,29	0,45	0,30	5,60	3,30	85	307	
15	50	8,9 x 12,0	0,08	8,49	0,29	0,45	0,30	5,60	3,30	104	357	
22	50	8,9 x 12,0	0,08	5,79	0,29	0,45	0,30	5,60	3,30	126	403	
33	50	8,9 x 12,0	0,08	3,86	0,29	0,45	0,30	5,60	3,30	155	457	
47	50	8,9 x 12,0	0,08	2,71	0,29	0,45	0,30	5,60	3,30	185	488	
68	50	8,9 x 12,0	0,08	1,87	0,29	0,45	0,30	5,60	3,30	222	531	
100	50	8,9 x 12,0	0,08	1,27	0,29	0,45	0,30	5,60	3,30	269	603	
150	50	10,2 x 12,0	0,08	0,85	0,26	0,30	0,20	3,30	2,60	351	734	
220	50	10,2 x 12,0	0,08	0,58	0,26	0,30	0,20	3,30	2,60	425	769	
4 ,7	63	8,9 x 12,0	0,07	23,70	0,29	0,45	0,30	5,60	3,30	62	249	
6 ,8	63	8,9 x 12,0	0,07	16,38	0,29	0,45	0,30	5,60	3,30	75	290	
10	63	8,9 x 12,0	0,07	11,14	0,29	0,45	0,30	5,60	3,30	91	329	
15	63	8,9 x 12,0	0,07	7,43	0,29	0,45	0,30	5,60	3,30	111	381	
22	63	8,9 x 12,0	0,07	5,06	0,29	0,45	0,30	5,60	3,30	135	432	
33	63	8,9 x 12,0	0,07	3,38	0,29	0,45	0,30	5,60	3,30	165	487	
47	63	8,9 x 12,0	0,07	2,37	0,29	0,45	0,30	5,60	3,30	197	521	
68	63	8,9 x 12,0	0,07	1,64	0,29	0,45	0,30	5,60	3,30	237	566	
100	63	10,2 x 12,0	0,07	1,11	0,26	0,30	0,20	3,30	2,60	306	685	
150	63	10,2 x 12,0	0,07	0,74	0,26	0,30	0,20	3,30	2,60	375	784	

Ordering example: ERSY 470µF 16V ±20%, 10,2 x 12,0mm, Carrier Tape on reel

- Series
- Rated capacitance/ Rated voltage
- Capacitance tolerance
- Dimensions (Terminal length x Height)
- Additional requirements

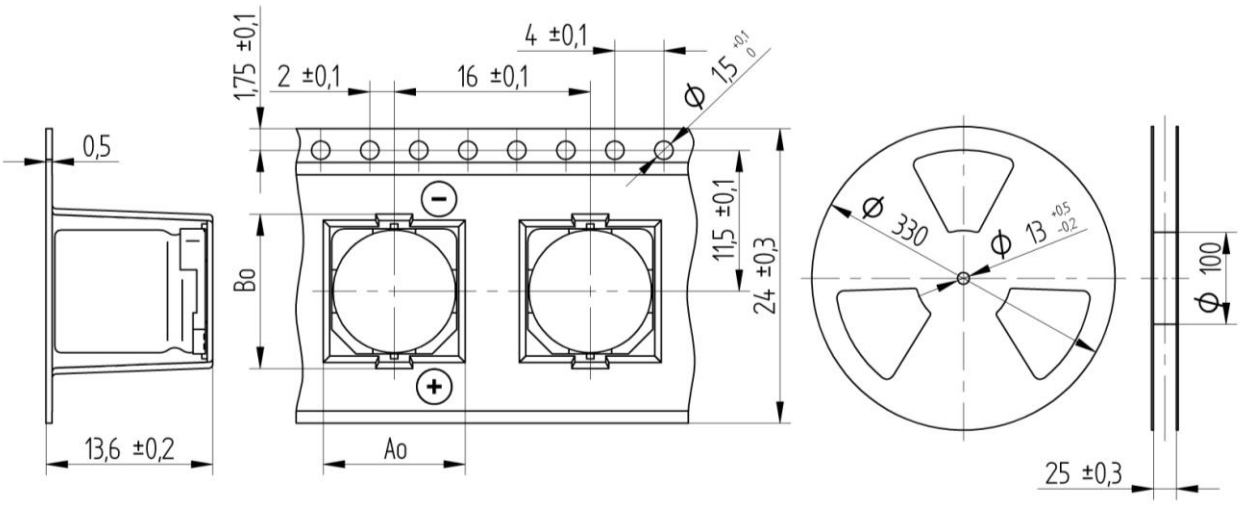
* I~ (Rated ripple current) refers to an increase in temperature of 3K

special requirements or special types on request

Rated ripple current: Frequency multipliers

Rated voltage V_R [V]	Rated capacitance C_R [µF]	Frequency		
		100kHz	10kHz	1kHz
10	47 – 220	1,00	0,93	0,75
	330 – 1000	1,00	0,97	0,81
16	33 – 220	1,00	0,93	0,75
	330 – 680	1,00	0,97	0,81
25	22 – 220	1,00	0,93	0,75
	330 – 470	1,00	0,97	0,81
35	15 – 150	1,00	0,93	0,75
	220 – 330	1,00	0,97	0,81
40	10 – 68	1,00	0,89	0,72
	100 – 220	1,00	0,93	0,75
50	6,8 – 68	1,00	0,89	0,72
	100 – 220	1,00	0,93	0,75
63	4,7 – 47	1,00	0,89	0,72
	68 – 150	1,00	0,93	0,75

Packaging:
- Blister tapes on reel
- 300 components / reel (one packaging unit)
- 2700 Chips = 9 reels (minimum order quantity)

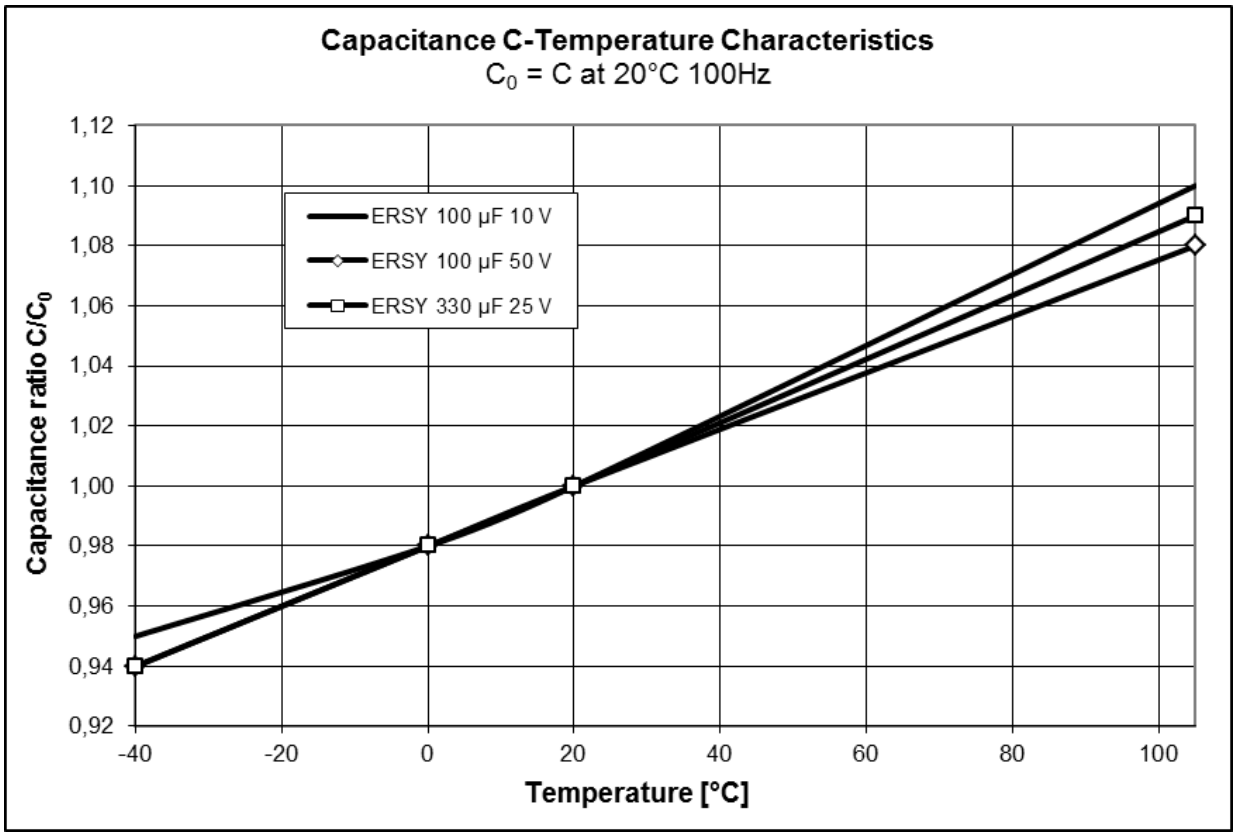


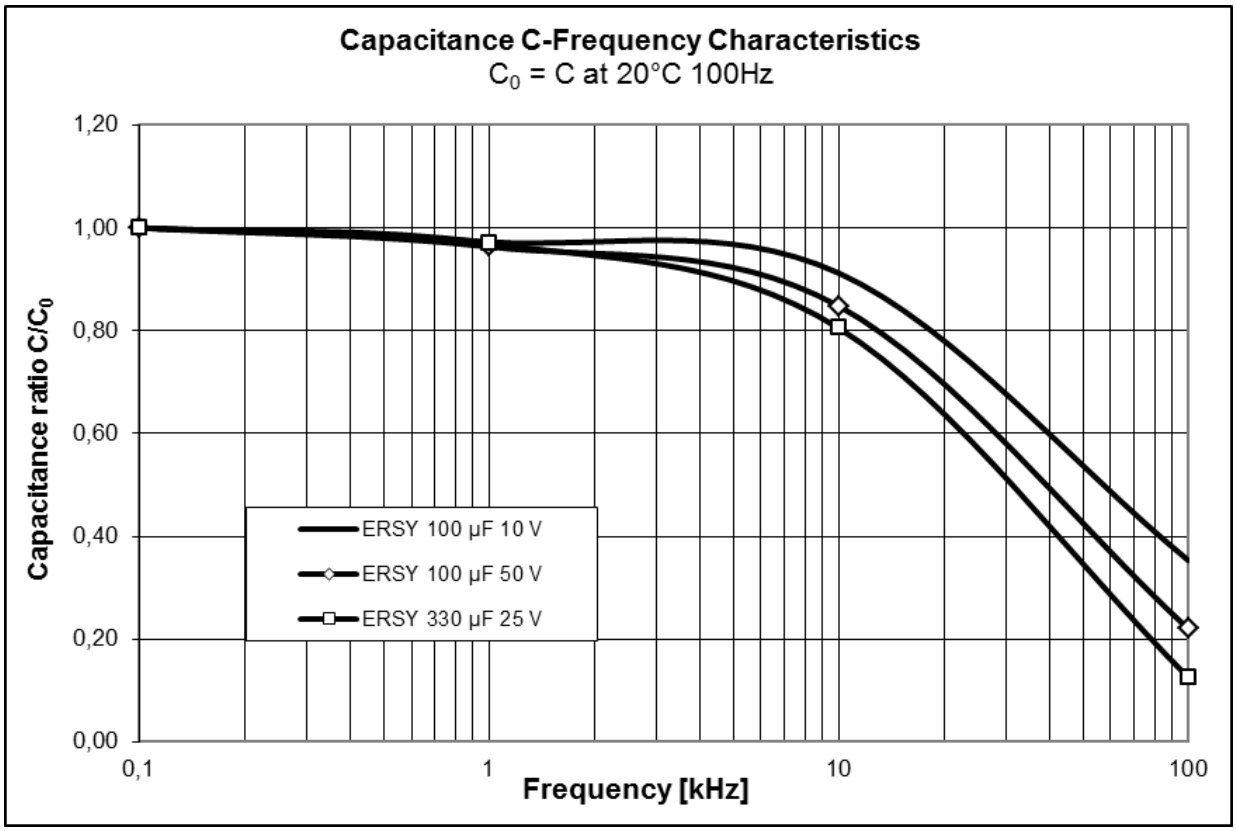
Terminal length x Height	Dimensions [mm]	
	A_0	B_0
8,9 x 12.0	10,4±0,2	11,1±0,2
10,2 x 12,0	11,7±0,2	12,1±0,2

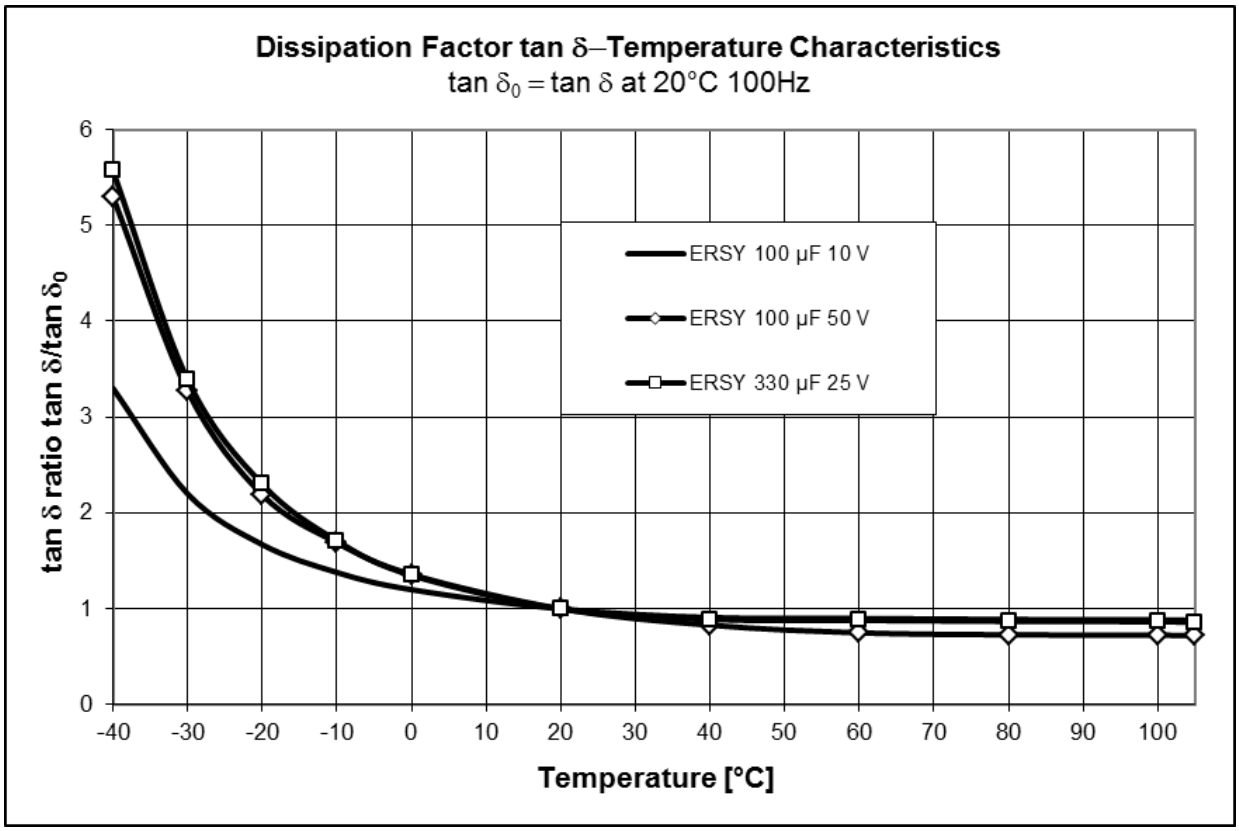
Soldering:
Recommended soldering conditions: https://www.frolyt.de/wp-content/uploads/Soldering_profils.pdf

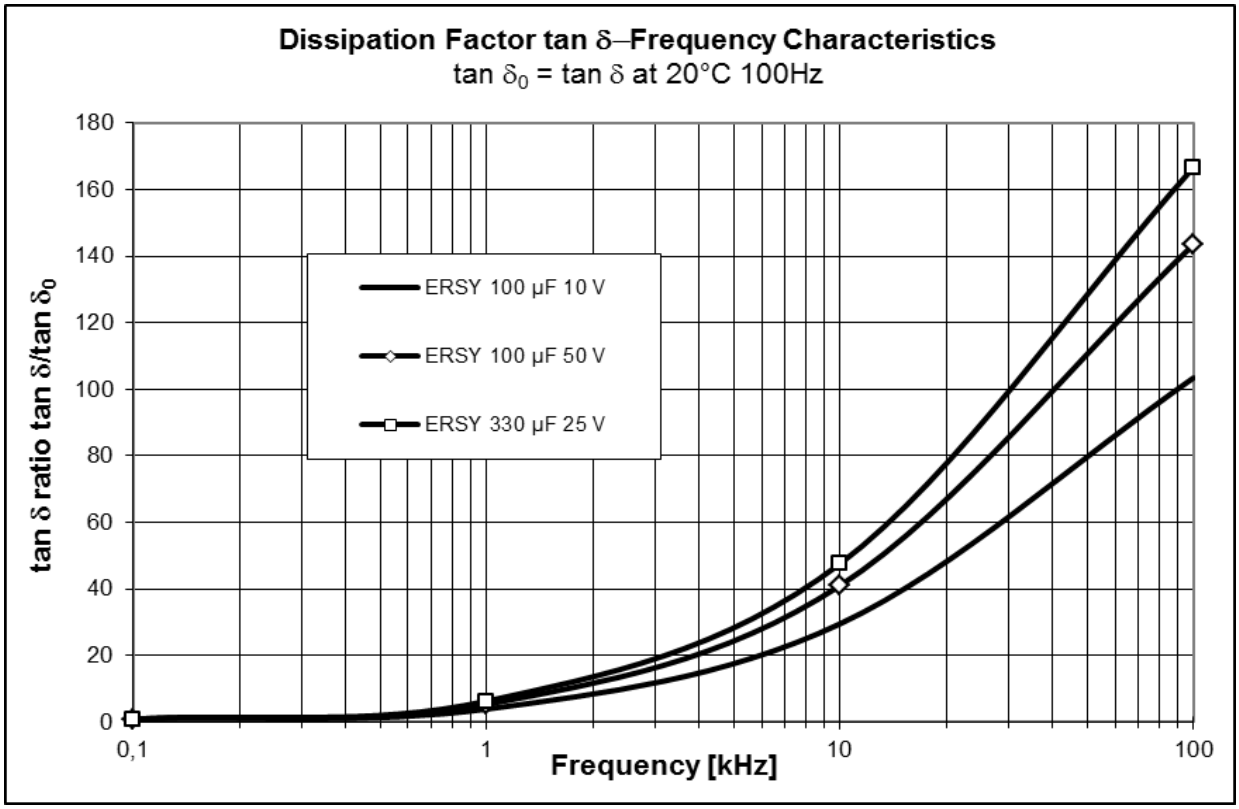
FROLYT-SMD-capacitors with the size 10,2 x 12,0 are also suitable for vapor phase soldering.

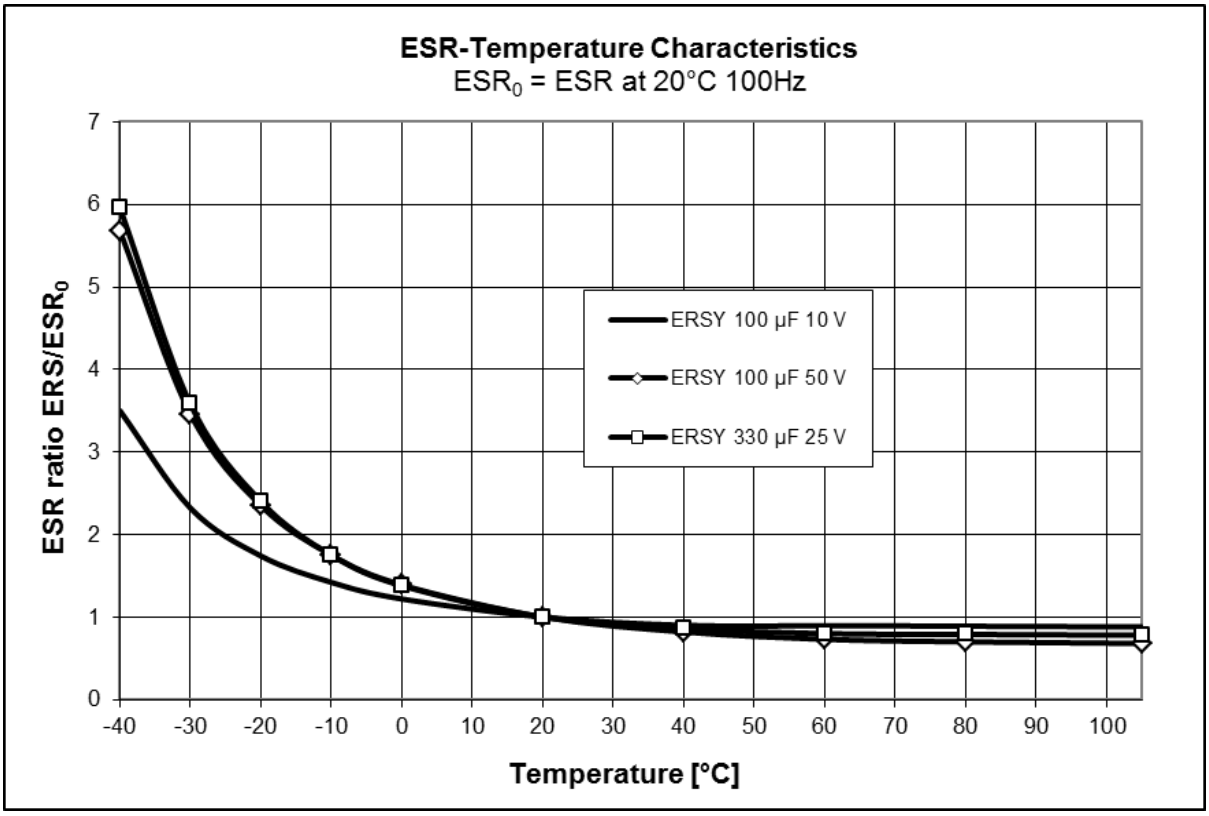
Characteristics

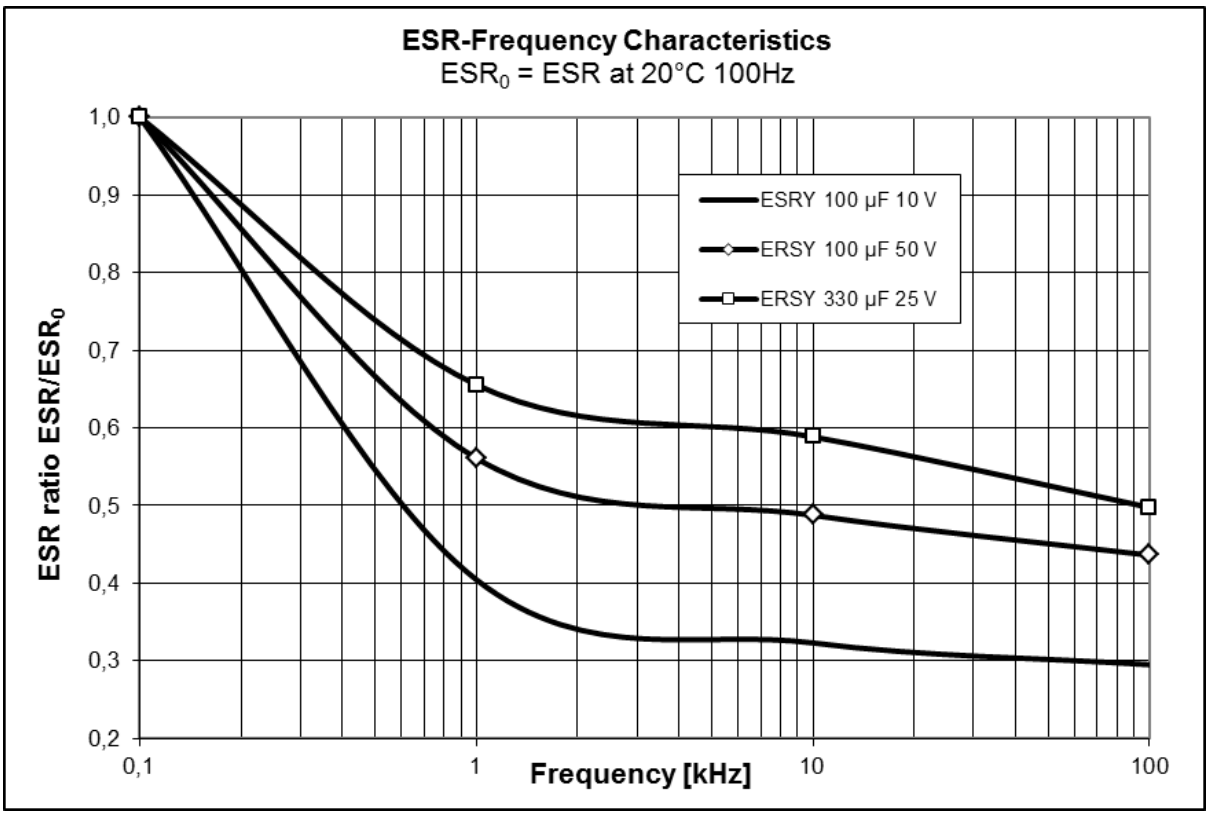


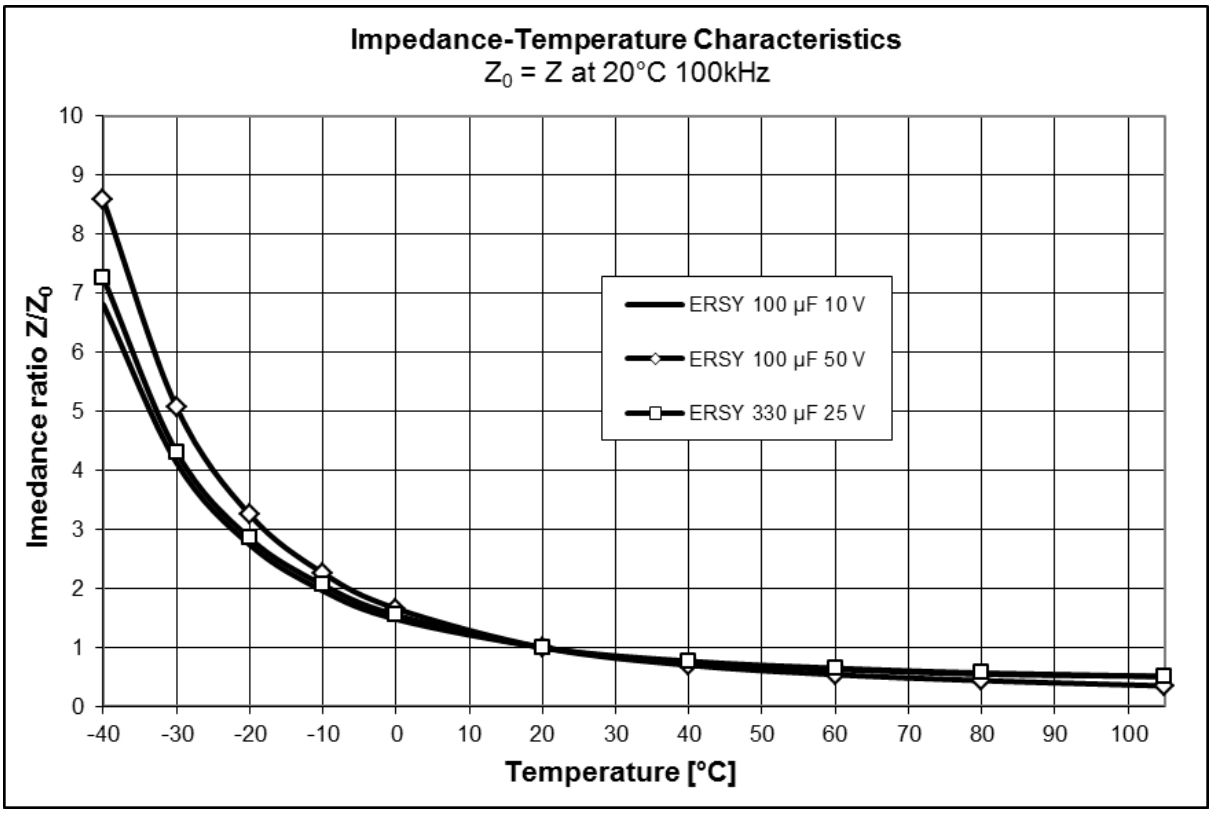


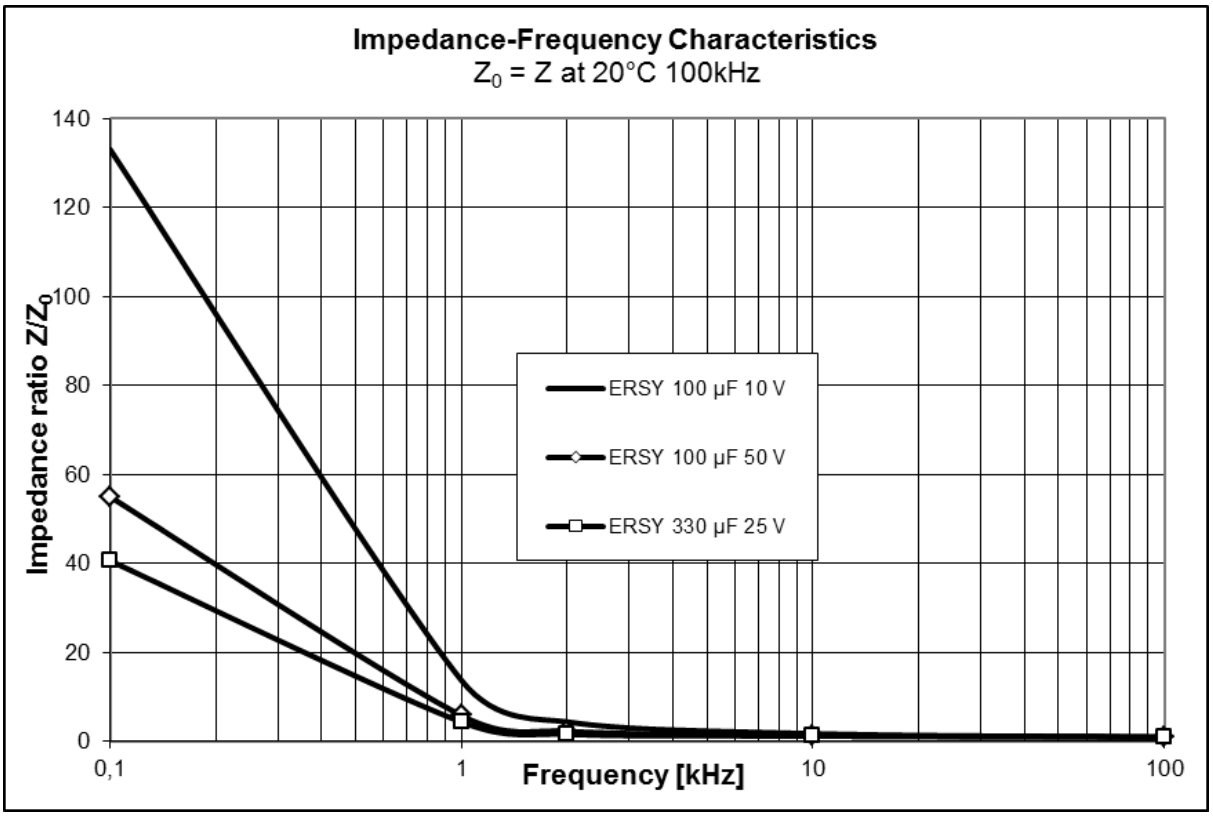

Dissipation Factor tan δ–Temperature Characteristics
tan δ0 = tan δ at 20°C 100Hz
tan δ ratio tan δ/tan δ0
Temperature [°C]
ERSY 100 µF 10 V
ERSY 100 µF 50 V
ERSY 330 µF 25 V
0
1
2
3
4
5
6
-40
-30
-20
-10
0
10
20
30
40
50
60
70
80
90
100


Dissipation Factor tan δ–Frequency Characteristics
tan δ0 = tan δ at 20°C 100Hz
tan δ ratio tan δ/tan δ0
Frequency [kHz]
ERSY 100 µF 10 V
ERSY 100 µF 50 V
ERSY 330 µF 25 V
0
20
40
60
80
100
120
140
160
180
0,1
1
10
100


ESR-Temperature Characteristics
ESR0 = ESR at 20°C 100Hz
ESR ratio ERS/ESR0
Temperature [°C]
ERSY 100 µF 10 V
ERSY 100 µF 50 V
ERSY 330 µF 25 V
0
1
2
3
4
5
6
7
-40
-30
-20
-10
0
10
20
30
40
50
60
70
80
90
100


ESR-Frequency Characteristics
ESR0 = ESR at 20°C 100Hz
ESR ratio ESR/ESR0
Frequency [kHz]
ESRY 100 µF 10 V
ERSY 100 µF 50 V
ERSY 330 µF 25 V
0,2
0,3
0,4
0,5
0,6
0,7
0,8
0,9
1,0
0,1
1
10
100


Impedance-Temperature Characteristics
Z_0 = Z at 20°C 100kHz
Imedance ratio Z/Z_0
10
9
8
7
6
5
4
3
2
1
0
-40
-30
-20
-10
0
10
20
30
40
50
60
70
80
90
100
Temperature [°C]
ERSY 100 µF 10 V
ERSY 100 µF 50 V
ERSY 330 µF 25 V


Impedance-Frequency Characteristics
Z_0 = Z at 20°C 100kHz
Impedance ratio Z/Z_0
140
120
100
80
60
40
20
0
0,1
1
10
100
Frequency [kHz]
ERSY 100 µF 10 V
ERSY 100 µF 50 V
ERSY 330 µF 25 V