ESW Series, 105ºC

Overview

KEMET's ESW Series of aluminum electrolytic radial capacitors are designed for long life (3,000 – 5,000 hours) and high reliability applications.

Applications

Typical applications include high frequency switch mode circuits.

Benefits

- Suited for long life, high reliability applications
- Operating temperature of up to 105°C
- 3,000 – 6,000 hour operating life
- Case with Ø D ≥ 6.3 mm
- Safety vent on the capacitor base

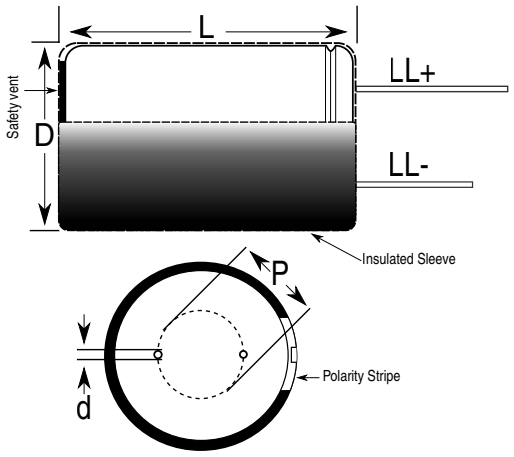
Part Number System

ESW	226	M	6R3	A	C3	AA
Series	Capacitance Code (pF)	Tolerance	Rated Voltage (VDC)	Electrical Parameters	Size Code	Packaging
Radial Leaded Aluminum Electrolytic	Digits 4 – 5 represent the first two digits of the capacitance value. The final digit indicates the number of zeros to be added.	M = ±20%	6R3 = 6.3 010 = 10 016 = 16 025 = 25 035 = 35 050 = 50 063 = 63 100 = 100	A = Standard	See Dimension Table	See Ordering Options Table

Ordering Options Table

Diameter	Packaging Type	Lead Type	Lead Length (mm)	Lead and Packaging Code
Standard Bulk Packaging Options				
4 – 22	Bulk (bag)	Straight	20/15 Minimum	AA
Standard Auto-Insertion Packaging Options				
4 – 5	Tape & Reel	Formed to 2.5 mm	H_0 = 16.5 ±0.75	LA
6.3	Tape & Reel	2.5 mm Lead Spacing	H_0 = 18.5 ±0.75	KA
8	Tape & Reel	Formed to 5 mm	H_0 = 16.5 ±0.75	JA
10 – 13	Ammo	5 mm Lead Spacing	H_0 = 18.5 ±0.75	EA
16	Ammo	7.5 mm Lead Spacing	H_0 = 18.5 ±0.75	EA
Other Packaging Options				
4 – 8	Ammo	Formed to 5 mm	H_0 = 16.5 ±0.75	DA
10	Ammo	5 mm Lead Spacing	H_0 = 16.5 ±0.75	DA
4 – 8	Ammo	Straight	H_0 = 18.5 ±0.75	EA
4 – 5	Ammo	Formed to 2.5 mm	H_0 = 16.5 ±0.75	FA
4 – 6.3	Tape & Reel	Formed to 5 mm	H_0 = 16.5 ±0.75	JA
4 – 5, 8 – 16	Tape & Reel	Straight	H_0 = 18.5 ±0.75	KA
Contact KEMET for other Lead and Packaging options				

Dimensions – Millimeters



Size Code	D		L		p		d		LL+/LL-	
	Nominal	Tolerance	Nominal	Tolerance	Nominal	Tolerance	Nominal	Tolerance	Nominal	Tolerance
C3	5	±0.5	11	+1.5/-0	2	±0.5	0.5	Nominal	20/15	Minimum
E3	6.3	±0.5	11	+1.5/-0	2.5	±0.5	0.5	Nominal	20/15	Minimum
E4	6.3	±0.5	15	+2.0/-0	2.5	±0.5	0.5	Nominal	20/15	Minimum
G3	8	±0.5	11	+1.5/-0	3.5	±0.5	0.6	Nominal	20/15	Minimum
G4	8	±0.5	15	+2.0/-0	3.5	±0.5	0.6	Nominal	20/15	Minimum
G6	8	±0.5	20	+2.0/-0	3.5	±0.5	0.6	Nominal	20/15	Minimum
H1	10	±0.5	12	+1.5/-0	5	±0.5	0.6	Nominal	20/15	Minimum
H2	10	±0.5	16	+2.0/-0	5	±0.5	0.6	Nominal	20/15	Minimum
H4	10	±0.5	20	+2.0/-0	5	±0.5	0.6	Nominal	20/15	Minimum
H5	10	±0.5	25	+2.0/-0	5	±0.5	0.6	Nominal	20/15	Minimum
H6	10	±0.5	30	+2.0/-0	5	±0.5	0.6	Nominal	20/15	Minimum
L2	13	±0.5	16	+2.0/-0	5	±0.5	0.6	Nominal	20/15	Minimum
L3	13	±0.5	20	+2.0/-0	5	±0.5	0.6	Nominal	20/15	Minimum
L4	13	±0.5	25	+2.0/-0	5	±0.5	0.6	Nominal	20/15	Minimum
L8	13	±0.5	30	+2.0/-0	5	±0.5	0.6	Nominal	20/15	Minimum
L6	13	±0.5	36	+2.0/-0	5	±0.5	0.6	Nominal	20/15	Minimum
M6	16	±0.5	15	+2.0/-0	7.5	±0.5	0.8	Nominal	20/15	Minimum
M5	16	±0.5	20	+2.0/-0	7.5	±0.5	0.8	Nominal	20/15	Minimum
M7	16	±0.5	25	+2.0/-0	7.5	±0.5	0.8	Nominal	20/15	Minimum
M2	16	±0.5	32	+2.0/-0	7.5	±0.5	0.8	Nominal	20/15	Minimum
M3	16	±0.5	36	+2.0/-0	7.5	±0.5	0.8	Nominal	20/15	Minimum
N6	18	±0.5	16	+2.0/-0	7.5	±0.5	0.8	Nominal	20/15	Minimum
N4	18	±0.5	20	+2.0/-0	7.5	±0.5	0.8	Nominal	20/15	Minimum
N5	18	±0.5	25	+2.0/-0	7.5	±0.5	0.8	Nominal	20/15	Minimum
N1	18	±0.5	32	+2.0/-0	7.5	±0.5	0.8	Nominal	20/15	Minimum
N2	18	±0.5	36	+2.0/-0	7.5	±0.5	0.8	Nominal	20/15	Minimum
N3	18	±0.5	40	+2.0/-0	7.5	±0.5	0.8	Nominal	20/15	Minimum

Performance Characteristics

Item	Performance Characteristics
Capacitance Range	0.47 – 15,000 µF
Capacitance Tolerance	±20% at 120 Hz / 20°C
Rated Voltage	6.3 – 100 VDC
Life Test	3,000 – 6,000 hours (see conditions in Test Method & Performance)
Operating Temperature	-40°C to +105°C
Leakage Current	I = 0.01 CV (mA) or 3 mA
	C = rated capacitance (µF), V = rated voltage (VDC). Voltage applied for 2 minutes at 20°C.

Impedance Z Characteristics at 120 Hz

Rated Voltage (VDC)	6.3	10	16	25	35	50	63	100
Z (-40°C) / Z (20°C)	3	3	3	3	3	3	3	3

Compensation Factor of Ripple Current (RC) vs. Frequency

Capacitance Range (µF)	120 Hz	1 kHz	10 kHz	100 kHz
0.47 – 33	0.42	0.70	0.90	1.00
39 – 270	0.50	0.73	0.92	1.00
330 – 680	0.55	0.77	0.94	1.00
820 – 1,800	0.60	0.80	0.96	1.00
2,200 – 15,000	0.70	0.85	0.98	1.00

Test Method & Performance

Conditions	Load Life Test		Shelf Life Test
Temperature	105°C		105°C
Test Duration	Can Ø ≤ 6.3 mm	3,000 hours	1,000 hours
	Can Ø = 8.0 mm	4,000 hours	
	Can Ø = 10.0 mm	5,000 hours	
	Can Ø ≥ 13.0 mm	6,000 hours	
Ripple Current	Maximum ripple current specified at 100 kHz 105°C		No ripple current applied
Voltage	The sum of DC voltage and the peak AC voltage must not exceed the rated voltage of the capacitor		No voltage applied
Performance	**The following specifications will be satisfied when the capacitor is restored to 20°C:**		
Capacitance Change	Within ±25% of the initial value		
Dissipation Factor	Does not exceed 200% of the specified value		
Leakage Current	Does not exceed specified value		

Environmental Compliance

As an environmentally conscious company, KEMET is working continuously with improvements concerning the environmental effects of both our capacitors and their production. In Europe (RoHS Directive) and in some other geographical areas like China, legislation has been put in place to prevent the use of some hazardous materials, such as lead (Pb), in electronic equipment. All products in this catalog are produced to help our customers' obligations to guarantee their products and fulfill these legislative requirements. The only material of concern in our products has been lead (Pb), which has been removed from all designs to fulfill the requirement of containing less than 0.1% of lead in any homogeneous material. KEMET will closely follow any changes in legislation world wide and makes any necessary changes in its products, whenever needed.

Some customer segments such as medical, military and automotive electronics may still require the use of lead in electrode coatings. To clarify the situation and distinguish products from each other, a special symbol is used on the packaging labels for RoHS compatible capacitors.

Because of customer requirements, there may appear additional markings such as LF = Lead Free or LFW = Lead Free Wires on the label.

RoHS Compliant

Table 1 – Ratings & Part Number Reference

VDC	VDC Surge Voltage	Rated Capacitance 120 Hz 20°C (µF)	Case Size D x L (mm)	DF 120 Hz 25°C (tan δ %)*	Z 100 kHZ 25°C (Ω)	RC 100 kHz 105°C (mA)	LC 20ºC 2 Minutes (µA)	Part Number
6.3	8	22	5 x 11	22	0.600	180	3	ESW226M6R3AC3(1)
6.3	8	33	5 x 11	22	0.600	180	3	ESW336M6R3AC3(1)
6.3	8	47	5 x 11	22	0.600	180	3	ESW476M6R3AC3(1)
6.3	8	100	5 x 11	22	0.600	180	6	ESW107M6R3AC3(1)
6.3	8	150	6 x 11	22	0.250	290	9	ESW157M6R3AE3(1)
6.3	8	220	6 x 11	22	0.250	290	14	ESW227M6R3AE3(1)
6.3	8	330	6 x 11	22	0.250	290	21	ESW337M6R3AE3(1)
6.3	8	330	6 x 15	22	0.230	430	21	ESW337M6R3AE4(1)
6.3	8	470	8 x 11	22	0.117	555	30	ESW477M6R3AG3(1)
6.3	8	560	8 x 11	22	0.117	555	35	ESW567M6R3AG3(1)
6.3	8	680	10 x 12	22	0.090	755	43	ESW687M6R3AH1(1)
6.3	8	820	8 x 15	22	0.085	730	52	ESW827M6R3AG4(1)
6.3	8	820	10 x 12	22	0.090	755	52	ESW827M6R3AH1(1)
6.3	8	1000	10 x 12	22	0.090	755	63	ESW108M6R3AH1(1)
6.3	8	1200	8 x 20	22	0.065	955	76	ESW128M6R3AG6(1)
6.3	8	1200	10 x 16	22	0.068	1050	76	ESW128M6R3AH2(1)
6.3	8	1500	10 x 20	22	0.052	1220	94	ESW158M6R3AH4(1)
6.3	8	2200	10 x 25	22	0.045	1440	139	ESW228M6R3AH5(1)
6.3	8	2200	13 x 20	22	0.038	1815	139	ESW228M6R3AL3(1)
6.3	8	2700	10 x 30	22	0.035	1815	170	ESW278M6R3AH6(1)
6.3	8	3300	13 x 20	22	0.038	1655	208	ESW338M6R3AL3(1)
6.3	8	3900	13 x 25	22	0.030	1945	246	ESW398M6R3AL4(1)
6.3	8	4700	16 x 25	22	0.022	2555	296	ESW478M6R3AM7(1)
6.3	8	4700	13 x 30	22	0.025	2310	296	ESW478M6R3AL8(1)
6.3	8	5600	13 x 36	22	0.022	2510	353	ESW568M6R3AL6(1)
6.3	8	5600	16 x 20	22	0.029	2205	353	ESW568M6R3AM5(1)
6.3	8	6800	16 x 25	22	0.022	2555	428	ESW688M6R3AM7(1)
6.3	8	6800	18 x 20	22	0.028	2490	428	ESW688M6R3AN4(1)
6.3	8	8200	16 x 32	22	0.018	3010	517	ESW828M6R3AM2(1)
6.3	8	10000	16 x 32	22	0.016	3150	630	ESW109M6R3AM2(1)
6.3	8	10000	18 x 25	22	0.020	2740	630	ESW109M6R3AN5(1)
6.3	8	12000	18 x 32	22	0.016	3635	756	ESW129M6R3AN1(1)
6.3	8	15000	18 x 36	22	0.015	3680	945	ESW159M6R3AN2(1)
10	13	22	5 x 11	19	0.600	180	3	ESW226M010AC3(1)
10	13	33	5 x 11	19	0.600	180	3	ESW336M010AC3(1)
10	13	47	5 x 11	19	0.600	180	5	ESW476M010AC3(1)
10	13	82	5 x 11	19	0.600	180	8	ESW826M010AC3(1)
10	13	100	5 x 11	19	0.600	180	10	ESW107M010AC3(1)
10	13	150	6 x 11	19	0.250	290	15	ESW157M010AE3(1)
10	13	180	6 x 11	19	0.250	290	18	ESW187M010AE3(1)
10	13	220	6 x 11	19	0.250	290	22	ESW227M010AE3(1)
10	13	220	6 x 15	19	0.230	430	22	ESW227M010AE4(1)
10	13	330	8 x 11	19	0.117	555	33	ESW337M010AG3(1)
10	13	470	8 x 11	19	0.117	555	47	ESW477M010AG3(1)
10	13	680	8 x 15	19	0.085	730	68	ESW687M010AG4(1)
10	13	680	10 x 12	19	0.090	755	68	ESW687M010AH1(1)
10	13	1000	8 x 20	19	0.065	995	100	ESW108M010AG6(1)
10	13	1000	10 x 16	19	0.068	1050	100	ESW108M010AH2(1)
10	13	1200	10 x 20	19	0.052	1220	120	ESW128M010AH4(1)
10	13	1500	10 x 20	19	0.052	1220	150	ESW158M010AH4(1)
10	13	1500	10 x 25	19	0.045	1440	150	ESW158M010AH5(1)
10	13	2200	10 x 30	19	0.035	1815	220	ESW228M010AH6(1)
10	13	2200	13 x 20	19	0.038	1655	220	ESW228M010AL3(1)
10	13	2700	13 x 25	19	0.030	1945	270	ESW278M010AL4(1)
10	13	3300	13 x 25	19	0.030	1945	330	ESW338M010AL4(1)
10	13	3300	13 x 30	19	0.025	2310	330	ESW338M010AL8(1)
10	13	3900	13 x 36	19	0.022	2510	390	ESW398M010AL6(1)
VDC	**VDC Surge**	**Rated Capacitance**	**Case Size**	**DF**	**Z**	**RC**	**LC**	**Part Number**

(1) Insert packaging code. See Ordering Options Table for available options.

** When capacitance exceeds 1,000 µF, the DF value (%) is increased by 2% for every additional 1,000 µF.*

Table 1 – Ratings & Part Number Reference cont'd

VDC	VDC Surge Voltage	Rated Capacitance 120 Hz 20°C (µF)	Case Size D x L (mm)	DF 120 Hz 25°C (tan δ %)*	Z 100 kHZ 25°C (Ω)	RC 100 kHz 105°C (mA)	LC 20ºC 2 Minutes (µA)	Part Number
10	13	3900	16 x 20	19	0.029	2205	390	ESW398M010AM5(1)
10	13	4700	16 x 25	19	0.022	2555	470	ESW478M010AM7(1)
10	13	5600	16 x 25	19	0.022	2555	560	ESW568M010AM7(1)
10	13	5600	18 x 20	19	0.028	2490	560	ESW568M010AN4(1)
10	13	6800	16 x 32	19	0.018	3010	680	ESW688M010AM2(1)
10	13	6800	18 x 25	19	0.020	2740	680	ESW688M010AN5(1)
10	13	8200	16 x 36	19	0.016	3150	820	ESW828M010AM3(1)
10	13	8200	18 x 32	19	0.016	3635	820	ESW828M010AN1(1)
10	13	10000	18 x 36	19	0.015	3680	1000	ESW109M010AN2(1)
10	13	15000	18 x 40	19	0.014	3800	1500	ESW159M010AN3(1)
16	20	10	5 x 11	16	0.600	180	3	ESW106M016AC3(1)
16	20	22	5 x 11	16	0.600	180	4	ESW226M016AC3(1)
16	20	33	5 x 11	16	0.600	180	5	ESW336M016AC3(1)
16	20	47	5 x 11	16	0.600	180	8	ESW476M016AC3(1)
16	20	56	5 x 11	16	0.600	180	9	ESW566M016AC3(1)
16	20	100	6 x 11	16	0.250	290	16	ESW107M016AE3(1)
16	20	120	6 x 11	16	0.250	290	19	ESW127M016AE3(1)
16	20	150	6 x 11	16	0.250	290	24	ESW157M016AE3(1)
16	20	180	6 x 15	16	0.230	430	29	ESW187M016AE4(1)
16	20	220	8 x 11	16	0.117	555	35	ESW227M016AG3(1)
16	20	330	8 x 11	16	0.117	555	53	ESW337M016AG3(1)
16	20	470	8 x 15	16	0.085	730	75	ESW477M016AG4(1)
16	20	470	10 x 12	16	0.090	755	75	ESW477M016AH1(1)
16	20	680	8 x 20	16	0.065	995	109	ESW687M016AG6(1)
16	20	680	10 x 16	16	0.068	1050	109	ESW687M016AH2(1)
16	20	820	10 x 20	16	0.052	1220	131	ESW827M016AH4(1)
16	20	1000	10 x 20	16	0.052	1220	160	ESW108M016AH4(1)
16	20	1200	10 x 25	16	0.045	1440	192	ESW128M016AH5(1)
16	20	1500	10 x 30	16	0.035	1815	240	ESW158M016AH6(1)
16	20	1500	13 x 20	16	0.038	1655	240	ESW158M016AL3(1)
16	20	2200	13 x 25	16	0.030	1945	352	ESW228M016AL4(1)
16	20	2700	13 x 30	16	0.025	2310	432	ESW278M016AL8(1)
16	20	2700	16 x 20	16	0.029	2205	432	ESW278M016AM5(1)
16	20	3300	13 x 36	16	0.022	2510	528	ESW338M016AL6(1)
16	20	3300	16 x 25	16	0.022	2555	528	ESW338M016AM7(1)
16	20	3900	16 x 25	16	0.022	2555	624	ESW398M016AM7(1)
16	20	3900	18 x 20	16	0.028	2490	624	ESW398M016AN4(1)
16	20	4700	16 x 32	16	0.018	3010	752	ESW478M016AM2(1)
16	20	4700	18 x 25	16	0.020	2740	752	ESW478M016AN5(1)
16	20	5600	18 x 32	16	0.016	3150	896	ESW568M016AN1(1)
16	20	5600	18 x 36	16	0.016	3635	896	ESW568M016AN2(1)
16	20	6800	18 x 36	16	0.015	3680	1088	ESW688M016AN2(1)
16	20	8200	18 x 36	16	0.015	3680	1312	ESW828M016AN2(1)
16	20	10000	18 x 40	16	0.014	3800	1600	ESW109M016AN3(1)
25	32	4.7	5 x 11	14	0.600	180	3	ESW475M025AC3(1)
25	32	10	5 x 11	14	0.600	180	3	ESW106M025AC3(1)
25	32	22	5 x 11	14	0.600	180	5	ESW226M025AC3(1)
25	32	33	5 x 11	14	0.600	180	8	ESW336M025AC3(1)
25	32	39	5 x 11	14	0.600	180	10	ESW396M025AC3(1)
25	32	47	5 x 11	14	0.600	180	12	ESW476M025AC3(1)
25	32	82	6 x 11	14	0.250	290	20	ESW826M025AE3(1)
25	32	100	6 x 11	14	0.250	290	25	ESW107M025AE3(1)
25	32	120	6 x 15	14	0.230	430	30	ESW127M025AE4(1)
25	32	150	8 x 11	14	0.117	555	37	ESW157M025AG3(1)
25	32	220	8 x 11	14	0.117	555	55	ESW227M025AG3(1)
25	32	330	8 x 15	14	0.085	730	82	ESW337M025AG4(1)
25	32	330	10 x 12	14	0.090	755	82	ESW337M025AH1(1)
VDC	VDC Surge	Rated Capacitance	Case Size	DF	Z	RC	LC	Part Number

(1) Insert packaging code. See Ordering Options Table for available options.

** When capacitance exceeds 1,000 µF, the DF value (%) is increased by 2% for every additional 1,000 µF.*

Table 1 – Ratings & Part Number Reference cont'd

VDC	VDC Surge Voltage	Rated Capacitance 120 Hz 20°C (µF)	Case Size D x L (mm)	DF 120 Hz 25°C (tan δ %)*	Z 100 kHZ 25°C (Ω)	RC 100 kHz 105°C (mA)	LC 20ºC 2 Minutes (µA)	Part Number
25	32	470	8 x 20	14	0.065	995	117	ESW477M025AG6(1)
25	32	470	10 x 16	14	0.068	1050	117	ESW477M025AH2(1)
25	32	560	10 x 20	14	0.052	1220	140	ESW567M025AH4(1)
25	32	680	10 x 20	14	0.052	1220	170	ESW687M025AH4(1)
25	32	820	10 x 25	14	0.045	1440	205	ESW827M025AH5(1)
25	32	1000	10 x 30	14	0.035	1815	250	ESW108M025AH6(1)
25	32	1000	13 x 20	14	0.038	1655	250	ESW108M025AL3(1)
25	32	1500	13 x 25	14	0.030	1945	375	ESW158M025AL4(1)
25	32	1500	16 x 25	14	0.022	2555	375	ESW158M025AM7(1)
25	32	1800	13 x 30	14	0.025	2310	450	ESW188M025AL8(1)
25	32	1800	16 x 20	14	0.029	2205	450	ESW188M025AM5(1)
25	32	2200	13 x 36	14	0.022	2510	550	ESW228M025AL6(1)
25	32	2200	16 x 25	14	0.022	2555	550	ESW228M025AM7(1)
25	32	2200	18 x 20	14	0.028	2490	550	ESW228M025AN4(1)
25	32	2700	16 x 25	14	0.022	2555	675	ESW278M025AM7(1)
25	32	3300	16 x 32	14	0.018	3010	825	ESW338M025AM2(1)
25	32	3300	18 x 25	14	0.020	2740	825	ESW338M025AN5(1)
25	32	3900	16 x 36	14	0.016	3150	975	ESW398M025AM3(1)
25	32	3900	18 x 32	14	0.016	3635	975	ESW398M025AN1(1)
25	32	4700	18 x 36	14	0.015	3680	1175	ESW478M025AN2(1)
25	32	6800	18 x 40	14	0.014	3800	1700	ESW688M025AN3(1)
35	44	4.7	5 x 11	12	0.600	180	3	ESW475M035AC3(1)
35	44	10	5 x 11	12	0.600	180	3	ESW106M035AC3(1)
35	44	22	5 x 11	12	0.600	180	8	ESW226M035AC3(1)
35	44	27	5 x 11	12	0.600	180	9	ESW276M035AC3(1)
35	44	33	5 x 11	12	0.600	180	12	ESW336M035AC3(1)
35	44	47	6 x 11	12	0.250	290	16	ESW476M035AE3(1)
35	44	56	6 x 11	12	0.250	290	20	ESW566M035AE3(1)
35	44	82	6 x 15	12	0.230	430	29	ESW826M035AE4(1)
35	44	100	8 x 11	12	0.117	555	35	ESW107M035AG3(1)
35	44	150	8 x 11	12	0.117	555	52	ESW157M035AG3(1)
35	44	220	8 x 15	12	0.085	730	77	ESW227M035AG4(1)
35	44	220	10 x 12	12	0.090	755	77	ESW227M035AH1(1)
35	44	330	8 x 20	12	0.065	995	115	ESW337M035AG6(1)
35	44	330	10 x 16	12	0.068	1050	115	ESW337M035AH2(1)
35	44	390	10 x 20	12	0.052	1220	136	ESW397M035AH4(1)
35	44	470	10 x 20	12	0.052	1220	164	ESW477M035AH4(1)
35	44	560	10 x 25	12	0.045	1440	196	ESW567M035AH5(1)
35	44	680	10 x 30	12	0.035	1815	238	ESW687M035AH6(1)
35	44	680	13 x 20	12	0.038	1655	238	ESW687M035AL3(1)
35	44	1000	13 x 25	12	0.030	1945	350	ESW108M035AL4(1)
35	44	1200	13 x 30	12	0.025	2310	420	ESW128M035AL8(1)
35	44	1200	16 x 20	12	0.029	2205	420	ESW128M035AM5(1)
35	44	1500	13 x 36	12	0.022	2510	525	ESW158M035AL6(1)
35	44	1500	16 x 25	12	0.022	2555	525	ESW158M035AM7(1)
35	44	1800	16 x 25	12	0.022	2555	630	ESW188M035AM7(1)
35	44	1800	18 x 20	12	0.028	2490	630	ESW188M035AN4(1)
35	44	2200	16 x 32	12	0.018	3010	770	ESW228M035AM2(1)
35	44	2200	18 x 25	12	0.020	2740	770	ESW228M035AN5(1)
35	44	2700	16 x 36	12	0.016	3150	945	ESW278M035AM3(1)
35	44	2700	18 x 32	12	0.016	3635	945	ESW278M035AN1(1)
35	44	3300	18 x 36	12	0.015	3680	1155	ESW338M035AN2(1)
35	44	4700	18 x 40	12	0.014	3800	1645	ESW478M035AN3(1)
50	63	4.7	5 x 11	10	2.300	90	3	ESW475M050AC3(1)
50	63	10	5 x 11	10	1.400	120	5	ESW106M050AC3(1)
50	63	18	5 x 11	10	1.300	155	9	ESW186M050AC3(1)
50	63	22	5 x 11	10	1.200	170	11	ESW226M050AC3(1)
VDC	VDC Surge	Rated Capacitance	Case Size	DF	Z	RC	LC	Part Number

(1) Insert packaging code. See Ordering Options Table for available options.

** When capacitance exceeds 1,000 µF, the DF value (%) is increased by 2% for every additional 1,000 µF.*

Table 1 – Ratings & Part Number Reference cont'd

VDC	VDC Surge Voltage	Rated Capacitance 120 Hz 20°C (µF)	Case Size D x L (mm)	DF 120 Hz 25°C (tan δ %)*	Z 100 kHZ 25°C (Ω)	RC 100 kHz 105°C (mA)	LC 20ºC 2 Minutes (µA)	Part Number
50	63	33	6 x 11	10	0.430	300	16	ESW336M050AE3(1)
50	63	47	6 x 11	10	0.430	300	23	ESW476M050AE3(1)
50	63	56	6 x 15	10	0.400	360	28	ESW566M050AE4(1)
50	63	82	8 x 11	10	0.234	485	41	ESW826M050AG3(1)
50	63	100	8 x 11	10	0.234	485	50	ESW107M050AG3(1)
50	63	120	8 x 15	10	0.155	635	60	ESW127M050AG4(1)
50	63	120	10 x 12	10	0.162	615	60	ESW127M050AH1(1)
50	63	150	10 x 12	10	0.162	615	75	ESW157M050AH1(1)
50	63	180	8 x 20	10	0.120	860	90	ESW187M050AG6(1)
50	63	180	10 x 16	10	0.119	850	90	ESW187M050AH2(1)
50	63	220	10 x 16	10	0.119	850	110	ESW227M050AH2(1)
50	63	220	10 x 20	10	0.090	1030	110	ESW227M050AH4(1)
50	63	270	10 x 25	10	0.082	1200	135	ESW277M050AH5(1)
50	63	330	10 x 20	10	0.090	1030	165	ESW337M050AH4(1)
50	63	330	10 x 30	10	0.060	1610	165	ESW337M050AH6(1)
50	63	390	13 x 20	10	0.063	1480	195	ESW397M050AL3(1)
50	63	470	13 x 20	10	0.060	1500	235	ESW477M050AL3(1)
50	63	560	13 x 25	10	0.050	1832	280	ESW567M050AL4(1)
50	63	680	13 x 25	10	0.050	1832	340	ESW687M050AL4(1)
50	63	680	16 x 20	10	0.048	1835	340	ESW687M050AM5(1)
50	63	820	13 x 36	10	0.034	2285	410	ESW827M050AL6(1)
50	63	820	18 x 20	10	0.042	2420	410	ESW827M050AN4(1)
50	63	1000	16 x 25	10	0.034	2235	500	ESW108M050AM7(1)
50	63	1200	16 x 32	10	0.028	2700	600	ESW128M050AM2(1)
50	63	1200	18 x 25	10	0.029	2610	600	ESW128M050AN5(1)
50	63	1500	16 x 32	10	0.028	2700	750	ESW158M050AM2(1)
50	63	1500	16 x 36	10	0.025	2790	750	ESW158M050AM3(1)
50	63	1800	18 x 32	10	0.025	3000	900	ESW188M050AN1(1)
50	63	2200	18 x 36	10	0.023	3100	1100	ESW228M050AN2(1)
63	79	4.7	5 x 11	9	4.700	68	3	ESW475M063AC3(1)
63	79	6.8	5 x 11	9	2.500	95	4	ESW685M063AC3(1)
63	79	10	5 x 11	9	2.100	110	6	ESW106M063AC3(1)
63	79	12	5 x 11	9	2.000	145	8	ESW126M063AC3(1)
63	79	15	6 x 11	9	1.200	160	9	ESW156M063AE3(1)
63	79	22	6 x 11	9	0.710	250	14	ESW226M063AE3(1)
63	79	33	6 x 11	9	0.710	250	21	ESW336M063AE3(1)
63	79	39	6 x 15	9	0.700	330	25	ESW396M063AE4(1)
63	79	47	8 x 11	9	0.342	405	30	ESW476M063AG3(1)
63	79	68	8 x 11	9	0.342	405	43	ESW686M063AG3(1)
63	79	100	8 x 15	9	0.230	535	63	ESW107M063AG4(1)
63	79	100	10 x 12	9	0.256	535	63	ESW107M063AH1(1)
63	79	120	10 x 16	9	0.194	600	76	ESW127M063AH2(1)
63	79	150	10 x 16	9	0.194	660	94	ESW157M063AH2(1)
63	79	180	10 x 20	9	0.147	885	113	ESW187M063AH4(1)
63	79	180	13 x 16	9	0.150	1020	113	ESW187M063AL2(1)
63	79	220	10 x 20	9	0.147	885	139	ESW227M063AH4(1)
63	79	220	10 x 25	9	0.130	1050	139	ESW227M063AH5(1)
63	79	270	16 x 15	9	0.090	1410	170	ESW277M063AM6(1)
63	79	330	13 x 20	9	0.085	1285	208	ESW337M063AL3(1)
63	79	390	13 x 25	9	0.070	1720	246	ESW397M063AL4(1)
63	79	390	18 x 16	9	0.086	1690	246	ESW397M063AN6(1)
63	79	470	13 x 25	9	0.070	1720	296	ESW477M063AL4(1)
63	79	470	13 x 30	9	0.055	2090	296	ESW477M063AL8(1)
63	79	470	16 x 20	9	0.059	1765	296	ESW477M063AM5(1)
63	79	560	16 x 25	9	0.050	2160	353	ESW567M063AM7(1)
63	79	680	13 x 36	9	0.047	2265	428	ESW687M063AL6(1)
63	79	680	18 x 20	9	0.055	2290	428	ESW687M063AN4(1)
VDC	**VDC Surge**	**Rated Capacitance**	**Case Size**	**DF**	**Z**	**RC**	**LC**	**Part Number**

(1) Insert packaging code. See Ordering Options Table for available options.

** When capacitance exceeds 1,000 µF, the DF value (%) is increased by 2% for every additional 1,000 µF.*

Table 1 – Ratings & Part Number Reference cont'd

VDC	VDC Surge Voltage	Rated Capacitance 120 Hz 20°C (µF)	Case Size D x L (mm)	DF 120 Hz 25°C (tan δ %)*	Z 100 kHZ 25°C (Ω)	RC 100 kHz 105°C (mA)	LC 20ºC 2 Minutes (µA)	Part Number
63	79	820	16 x 32	9	0.043	2670	517	ESW827M063AM2(1)
63	79	820	18 x 25	9	0.043	2585	517	ESW827M063AN5(1)
63	79	1000	16 x 32	9	0.043	2670	630	ESW108M063AM2(1)
63	79	1000	16 x 36	9	0.036	2770	630	ESW108M063AM3(1)
63	79	1200	18 x 32	9	0.032	2950	756	ESW128M063AN1(1)
63	79	1500	18 x 36	9	0.030	3095	945	ESW158M063AN2(1)
63	79	2200	18 x 40	9	0.028	3200	1386	ESW228M063AN3(1)
100	125	0.47	5 x 11	8	43.000	20	3	ESW474M100AC3(1)
100	125	1.0	5 x 11	8	20.000	30	3	ESW105M100AC3(1)
100	125	2.2	5 x 11	8	9.800	44	3	ESW225M100AC3(1)
100	125	3.3	5 x 11	8	6.600	58	3	ESW335M100AC3(1)
100	125	4.7	5 x 11	8	4.600	74	5	ESW475M100AC3(1)
100	125	6.8	5 x 11	8	3.500	95	7	ESW685M100AC3(1)
100	125	10	6 x 11	8	1.800	130	10	ESW106M100AE3(1)
100	125	15	8 x 11	8	0.830	180	15	ESW156M100AG3(1)
100	125	18	6 x 15	8	0.800	200	18	ESW186M100AE4(1)
100	125	22	8 x 11	8	0.680	230	22	ESW226M100AG3(1)
100	125	33	8 x 15	8	0.450	360	33	ESW336M100AG4(1)
100	125	33	10 x 12	8	0.460	320	33	ESW336M100AH1(1)
100	125	47	8 x 20	8	0.370	420	47	ESW476M100AG6(1)
100	125	47	10 x 16	8	0.370	420	47	ESW476M100AH2(1)
100	125	68	10 x 20	8	0.300	490	68	ESW686M100AH4(1)
100	125	82	10 x 25	8	0.250	540	82	ESW826M100AH5(1)
100	125	100	13 x 20	8	0.180	580	100	ESW107M100AL3(1)
100	125	150	13 x 25	8	0.130	710	150	ESW157M100AL4(1)
100	125	180	13 x 30	8	0.120	790	180	ESW187M100AL8(1)
100	125	180	16 x 20	8	0.130	750	180	ESW187M100AM5(1)
100	125	220	16 x 25	8	0.100	890	220	ESW227M100AM7(1)
100	125	220	18 x 20	8	0.110	850	220	ESW227M100AN4(1)
100	125	330	16 x 25	8	0.090	1080	330	ESW337M100AM7(1)
100	125	390	18 x 25	8	0.083	1260	390	ESW397M100AN5(1)
100	125	470	16 x 32	8	0.076	1310	470	ESW477M100AM2(1)
100	125	560	18 x 32	8	0.068	1370	560	ESW567M100AN1(1)
100	125	560	18 x 36	8	0.064	1410	560	ESW567M100AN2(1)
100	125	820	18 x 40	8	0.047	1520	820	ESW827M100AN3(1)
VDC	**VDC Surge**	**Rated Capacitance**	**Case Size**	**DF**	**Z**	**RC**	**LC**	**Part Number**

(1) Insert packaging code. See Ordering Options Table for available options.

** When capacitance exceeds 1,000 µF, the DF value (%) is increased by 2% for every additional 1,000 µF.*

Mounting Positions (Safety Vent)

In operation, electrolytic capacitors will always conduct a leakage current which causes electrolysis. The oxygen produced by electrolysis will regenerate the dielectric layer but, at the same time, the hydrogen released may cause the internal pressure of the capacitor to increase. The overpressure vent (safety vent) ensures that the gas can escape when the pressure reaches a certain value. All mounting positions must allow the safety vent to work properly.

Installing

- A general principle is that lower-use temperatures result in a longer, useful life of the capacitor. For this reason, it should be ensured that electrolytic capacitors are placed away from heat-emitting components. Adequate space should be allowed between components for cooling air to circulate, particularly when high ripple current loads are applied. In any case, the maximum category temperature must not be exceeded.
- Do not deform the case of capacitors or use capacitors with a deformed case.
- Verify that the connections of the capacitors are able to insert on the board without excessive mechanical force.
- If the capacitors require mounting through additional means, the recommended mounting accessories shall be used.
- Verify the correct polarization of the capacitor on the board.
- Verify that the space around the pressure relief device is according to the following guideline:

Case Diameter	Space Around Safety Vent
≤ 16 mm	> 2 mm
> 16 mm to ≤ 40 mm	> 3 mm
> 40 mm	> 5 mm

It is recommended that capacitors always be mounted with the safety device uppermost or in the upper part of the capacitor.

- If the capacitors are stored for a long time, the leakage current must be verified. If the leakage current is superior to the value listed in this catalog, the capacitors must be reformed. In this case, they can be reformed by application of the rated voltage through a series resistor approximately 1 kΩ for capacitors with V_R ≤ 160 V (5 W resistor) and 10 kΩ for the other rated voltages.
- In the case of capacitors connected in series, a suitable voltage sharing must be used.
  In the case of balancing resistors, the approximate resistance value can be calculated as: R = 60/C

KEMET recommends, nevertheless, to ensure that the voltage across each capacitor does not exceed its rated voltage.

Application and Operation Guidelines

Electrical Ratings:
Capacitance (ESC)

Capacitance is measured by applying an alternate voltage of ≤ 0.5 V at a frequency of 120 or 100 Hz and 20°C.

Temperature Dependence of the Capacitance

Capacitance of an electrolytic capacitor depends upon temperature: with decreasing temperature the viscosity of the electrolyte increases, thereby reducing its conductivity.

Capacitance will decrease if temperature decreases. Furthermore, temperature drifts cause armature dilatation and, therefore, capacitance changes (up to 20% depending on the series considered, from 0 to 80°C). This phenomenon is more evident for electrolytic capacitors than for other types.

Frequency Dependence of the Capacitance

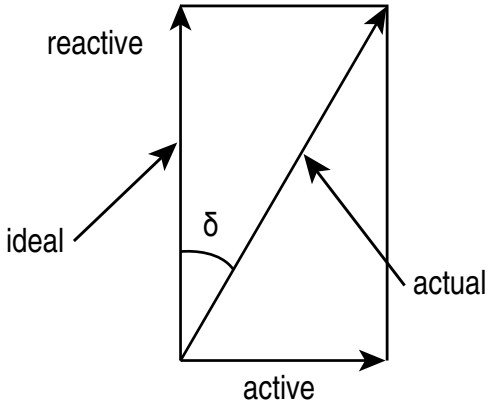
Effective capacitance value is derived from the impedance curve, as long as impedance is still in the range where the capacitance component is dominant.

$$C = \frac{1}{2\pi fZ}$$

C = Capacitance (F)
f = Frequency (Hz)
Z = Impedance (Ω)

Dissipation Factor tan δ (DF)

Dissipation Factor tan δ is the ratio between the active and reactive power for a sinusoidal waveform voltage. It can be thought of as a measurement of the gap between an actual and ideal capacitor.

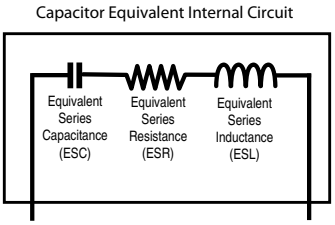


Tan δ is measured with the same set-up used for the series capacitance ESC.
tan δ = ω x ESC x ESR where:

ESC = Equivalent Series Capacitance
ESR = Equivalent Series Resistance

Equivalent Series Inductance (ESL)

Self inductance or Equivalent Series Inductance results from the terminal configuration and internal design of the capacitor.



Equivalent Series Resistance (ESR)

Equivalent Series Resistance is the resistive component of the equivalent series circuit. ESR value depends on frequency and temperature and is related to the tan δ by the following equation:

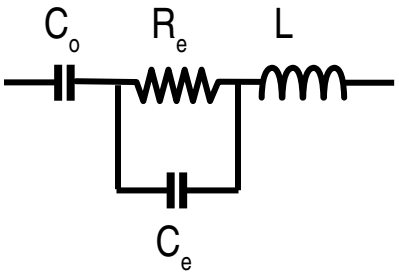
$$ESR = \frac{\tan \delta}{2\pi f\, ESC}$$

ESR = Equivalent Series Resistance (Ω)
tan δ = Dissipation Factor
ESC = Equivalent Series Capacitance (F)
f = Frequency (Hz)

Tolerance limits of the rated capacitance must be taken into account when calculating this value.

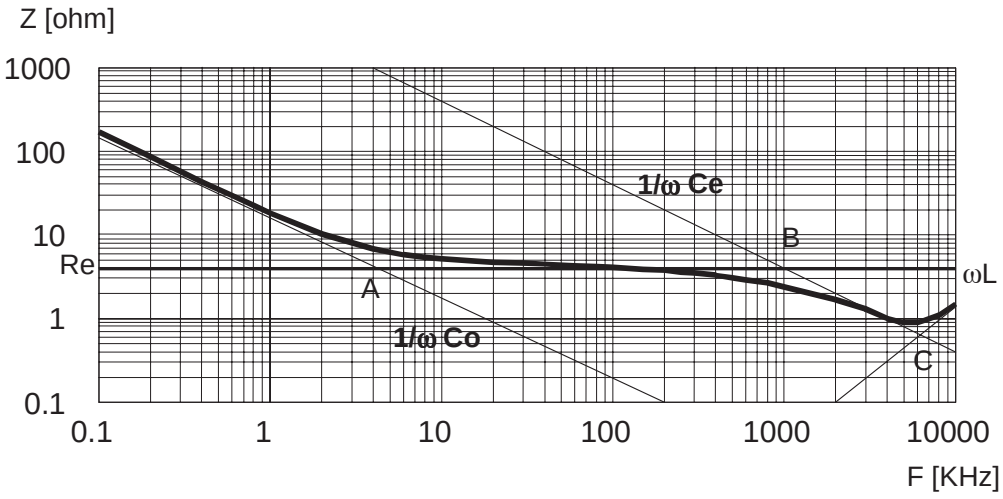
Impedance (Z)

Impedance of an electrolytic capacitor results from a circuit formed by the following individual equivalent series components:



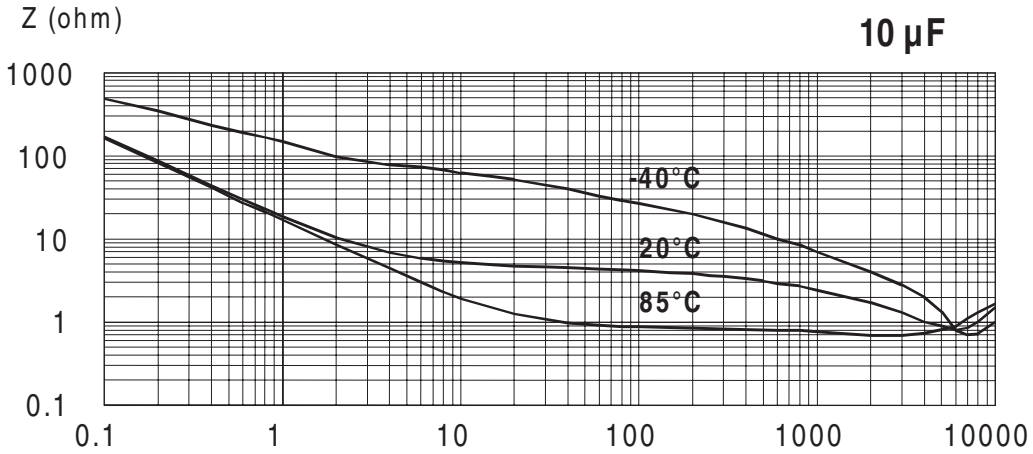
C_o = Aluminum oxide capacitance (surface and thickness of the dielectric)
R_e = Resistance of electrolyte and paper mixture (other resistances not depending on the frequency are not considered: tabs, plates, etc.)
C_e = Electrolyte soaked paper capacitance
L = Inductive reactance of the capacitor winding and terminals
Impedance of an electrolytic capacitor is not a constant quantity that retains its value under all conditions; it changes depending on frequency and temperature.

Impedance as a function of frequency (sinusoidal waveform) for a certain temperature can be represented as follows:



- Capacitive reactance predominates at low frequencies
- With increasing frequency, capacitive reactance Xc = $1/\omega C_o$ decreases until it reaches the order of magnitude of electrolyte resistance R_e(A)
- At even higher frequencies, resistance of the electrolyte predominates: $Z = R_e$ (A - B)
- When the capacitor's resonance frequency is reached (ω_0), capacitive and inductive reactance mutually cancel each other $1/\omega C_e = \omega L$, $\omega_0 = C\sqrt{1/LCe}$
- Above this frequency, inductive reactance of the winding and its terminals (XL = Z = ωL) becomes effective and leads to an increase in impedance

Generally speaking, it can be estimated that $C_e \approx 0.01\ C_o$.
Impedance as a function of frequency (sinusoidal waveform) for different temperature values can be represented as follows (typical values):



R_e is the most temperature-dependent component of an electrolytic capacitor equivalent circuit. Electrolyte resistivity will decrease if temperature rises.

In order to obtain a low impedance value throughout the temperature range, R_e must be as little as possible. However, R_e values that are too low indicate a very aggressive electrolyte, resulting in a shorter life of the electrolytic capacitor at high temperatures. A compromise must be reached.

Leakage Current (LC)

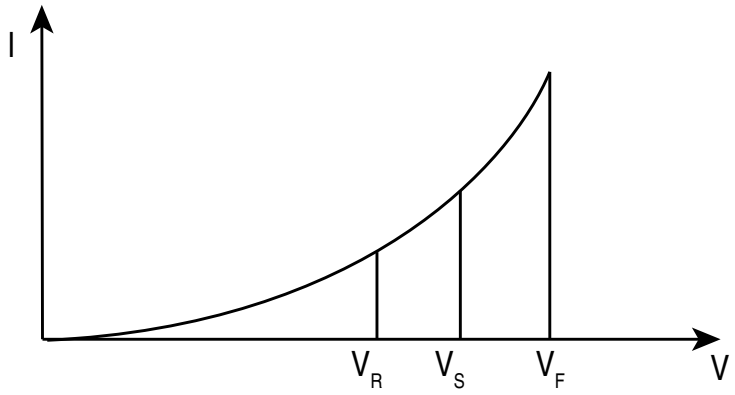
Due to the aluminum oxide layer that serves as a dielectric, a small current will continue to flow even after a DC voltage has been applied for long periods. This current is called leakage current.

A high leakage current flows after applying voltage to the capacitor then decreases in a few minutes, e.g., after prolonged storage without any applied voltage. In the course of continuous operation, the leakage current will decrease and reach an almost constant value.

After a voltage-free storage the oxide layer may deteriorate, especially at high temperature. Since there are no leakage currents to transport oxygen ions to the anode, the oxide layer is not regenerated. The result is that a higher than normal leakage current will flow when voltage is applied after prolonged storage.

As the oxide layer is regenerated in use, the leakage current will gradually decrease to its normal level.

The relationship between the leakage current and voltage applied at constant temperature can be shown schematically as follows:



Where:
V_F = **Forming voltage**
If this level is exceeded, a large quantity of heat and gas will be generated and the capacitor could be damaged.
V_R = **Rated voltage**
This level represents the top of the linear part of the curve.
V_S = **Surge voltage**
This lies between V_R and V_F. The capacitor can be subjected to V_S for short periods only.

Electrolytic capacitors are subjected to a reforming process before acceptance testing. The purpose of this preconditioning is to ensure that the same initial conditions are maintained when comparing different products.

Ripple Current (RC)

The maximum ripple current value depends on:
- Ambient temperature
- Surface area of the capacitor (heat dissipation area)

tan δ or ESR
- Frequency

The capacitor's life depends on the thermal stress.

Frequency Dependence of the Ripple Current

ESR and, thus, the tan δ depend on the frequency of the applied voltage. This indicates that the allowed ripple current is also a function of the frequency.

Temperature Dependence of the Ripple Current

The data sheet specifies maximum ripple current at the upper category temperature for each capacitor.

Expected Life Calculation

Expected life depends on operating temperature according to the following formula: $L = Lo \times 2^{(To-T)/10}$

Where:

L: Expected life

Lo: Load life at maximum permissible operating temperature

T: Actual operating temperature

To: Maximum permissible operating temperature

This formula is applicable between 40°C and To.

Packaging Quantities

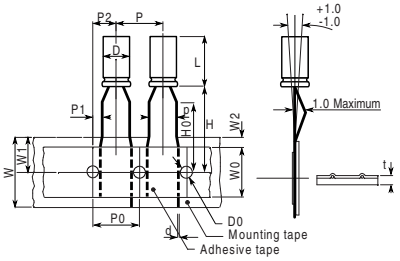
Size Code	Diameter (mm)	Length (mm)	Bulk Standard Leads	Auto-insertion		
				Cut Leads	Ammo	Tape & Reel
C3	5	11	10000	15000	2000	1300
E3	6.3	11	10000	15000	2000	1100
E4	6.3	15	10000	15000	2000	1100
G3	8	11	6000	8000	1000	750
G4	8	15	5000	5000	1000	750
G6	8	20	4000	4000	1000	750
H1	10	12	4000	4000	700	600
H2	10	16	3000	4000	700	600
H4	10	20	2400	3000	700	600
H5	10	25	2400	2400	500	
H6	10	30	2000	2000	500	
L2	13	16	2400	2400	500	
L3	13	20	2000	2000	500	
L4	13	25	1600	1600	500	
L8	13	30	1200	2400		
L6	13	36	1000	1200	400	
M6	16	15	1000	1000	300	
M5	16	20	1000	500	300	
M7	16	25	1000	500	300	
M2	16	32	800	500		
M3	16	36	600	500		
N6	18	16	800	1000	300	
N4	18	20	800	1000		
N5	18	25	800	500		
N1	18	32	500	500		
N2	18	36	500	500		
N3	18	40	500	500		

Standard Marking for Surface Mount Types

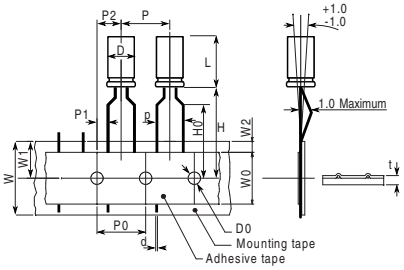
- KEMET logo
- Series
- Operating temperature (°C)
- Rated capacitance (µF)
- Rated voltage (VDC)
- Negative polarity: white line
- Date code

Taping for Automatic Insertion Machines

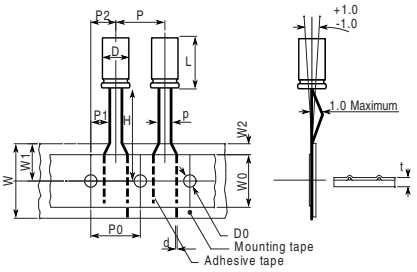
Formed to 2.5 mm
(Lead and packaging code LA and FA)



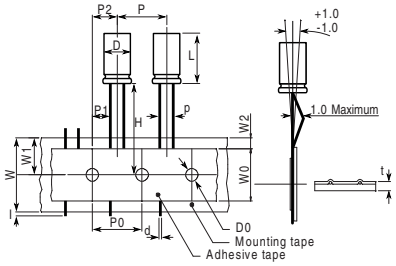
Formed to 5 mm
(Lead and packaging code JA and DA)



Straight Leads (Diameter: 4 – 8 mm)
Lead and packaging code EA and KA



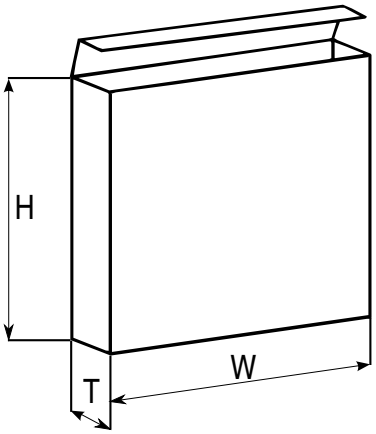
Straight Leads (Diameter > 8)
Lead and packaging code EA and KA



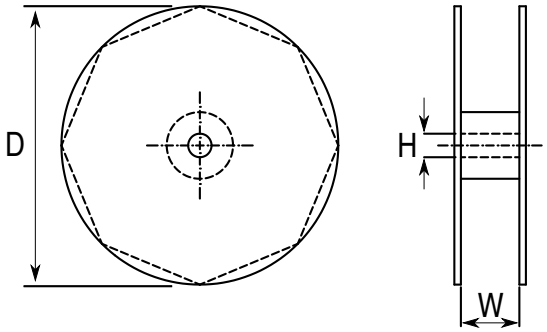
Dimensions (mm)	D	L	p	d	P	P0	P1	P2	W	W0	W1	W2	H0	H1	I	D0	t
Tolerance	+0.5		+0.8/-0.2	±0.05	±1 .0	±0 .3	±0 .7	±1 .3	+1/-0.5	±0.5	Maximum	Maximum	±0.75	±0.5	Maximum	±0.2	±0.2
Formed to 2.5 mm	4	5-7	2.5	0.45	12.7	12.7	5.1	6.35	18	12	11	3	16	18.5		4	0.7
	5	≤7	2.5	0.45	12.7	12.7	5.1	6.35	18	12	11	3	16	18.5		4	0.7
		>7	2.5	0.5	12.7	12.7	5.1	6.35	18	12	11	3	16	18.5		4	0.7
Formed to 5 mm	4	5-7	5	0.45	12.7	12.7	3.85	6.35	18	12	11	3	16	18.5		4	0.7
	5	≤7	5	0.45	12.7	12.7	3.85	6.35	18	12	11	3	16	18.5		4	0.7
		>7	5	0.5	12.7	12.7	3.85	6.35	18	12	11	3	16	18.5		4	0.7
	6	≤7	5	0.5	12.7	12.7	3.85	6.35	18	12	11	3	16	18.5		4	0.7
		>7	5	0.5	12.7	12.7	3.85	6.35	18	12	11	3	16	18.5		4	0.7
	8	≤7	5	0.5	12.7	12.7	3.85	6.35	18	12	11	3	16	18.5		4	0.7
		>7	5	0.5	12.7	12.7	3.85	6.35	18	12	11	3	16	18.5		4	0.7
Straight leads	4	5-7	1.5	0.45	12.7	12.7	5.6	6.35	18	12	11	3	18.5			4	0.7
	5	≤7	2	0.45	12.7	12.7	5.35	6.35	18	12	11	3	18.5			4	0.7
		>7	2	0.5	12.7	12.7	5.35	6.35	18	12	11	3	18.5			4	0.7
	6	≤7	2.5	0.5	12.7	12.7	5.1	6.35	18	12	11	3	18.5			4	0.7
		>7	2.5	0.5	12.7	12.7	5.1	6.35	18	12	11	3	18.5			4	0.7
	8	≤7	3.5	0.5	12.7	12.7	4.6	6.35	18	12	11	3	18.5			4	0.7
		>7	3.5	0.5	12.7	12.7	4.6	6.35	18	12	11	3	18.5			4	0.7
	10	12-25	5	0.6	12.7	12.7	3.85	6.35	18	12	11	3	18.5		1	4	1
	12	15-25	5	0.6	15	15	3.85	7.5	18	12	11	3	18.5		1	4	1
	13		5	0.6	15	15	3.85	7.5	18	12	11	3	18.5		1	4	1
			5	0.6	15	15	3.85	7.5	18	12	11	3	18.5		1	4	1
	16		7.5	0.8	30	30	3.75	7.5	18	12	11	3	18.5		1	4	1
	18		7.5	0.8	30	30	3.75	7.5	18	12	11	3	18.5		1	4	1

Lead Taping & Packaging

Ammo Box



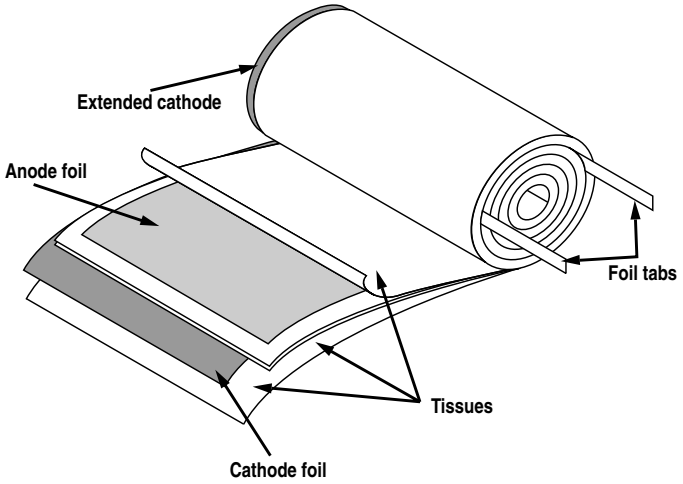
Reel



Case Size (mm)	Ammo			Reel		
	H	W	T	D	H	W
		Maximum	Maximum	±2	±0.5	+1/-0.1
4	230	340	42	350	30	50
5 x 5 – 7	230	340	42			
6 x 5 – 7	275	340	42			
8 x 5 – 9	235	340	45			
5 x 11	230	340	48			
6 x 11	270	340	48			
8 x 11	235	340	48			
8 x 14 – 20	240	340	57			
10 x 12	250	340	52			
10 x 15 – 19	256	340	57			
10 x 22 – 25	250	340	60			
12	270	340	57			
13	285	340	62			
16	265	340	62			

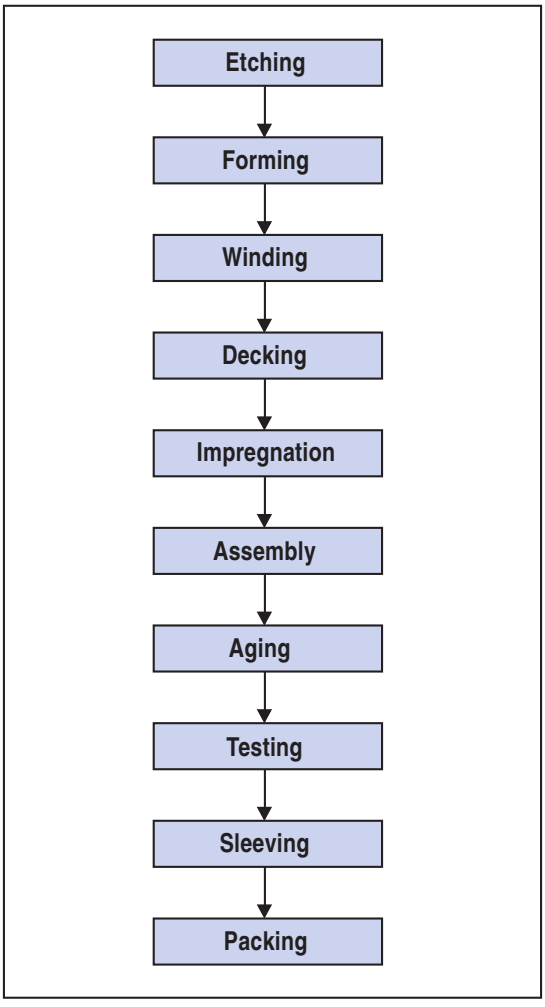
Construction

The manufacturing process begins with the anode foil being electrochemically etched to increase the surface area and then "formed" to produce the aluminum oxide layer. Both the anode and cathode foils are then interleaved with absorbent paper and wound into a cylinder. During the winding process, aluminum tabs are attached to each foil to provide the electrical contact.



The deck, complete with terminals, is attached to the tabs and then folded down to rest on top of the winding. The complete winding is impregnated with electrolyte before being housed in a suitable container, usually an aluminum can, and sealed. Throughout the process, all materials inside the housing must be maintained at the highest purity and be compatible with the electrolyte.

Each capacitor is aged and tested before being sleeved and packed. The purpose of aging is to repair any damage in the oxide layer and thus reduce the leakage current to a very low level. Aging is normally carried out at the rated temperature of the capacitor and is accomplished by applying voltage to the device while carefully controlling the supply current. The process may take several hours to complete.



Damage to the oxide layer can occur due to variety of reasons:

- Slitting of the anode foil after forming
- Attaching the tabs to the anode foil
- Minor mechanical damage caused during winding

A sample from each batch is taken by the quality department after completion of the production process.

The following tests are applied and may be varied at the request of the customer. In this case the batch, or special procedure, will determine the course of action.

Electrical:

- Leakage current
- Capacitance
- ESR
- Impedance
- Tan Delta

Mechanical/Visual:

- Overall dimensions
- Torque test of mounting stud
- Print detail
- Box labels
- Packaging, including packed quantity

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Singapore
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Tel: 91-806-53-76817

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Other KEMET Resources

Tools	
Resource	Location
Configure A Part: CapEdge	http://capacitoredge.kemet.com
SPICE & FIT Software	http://www.kemet.com/spice
Search Our FAQs: KnowledgeEdge	http://www.kemet.com/keask

Product Information	
Resource	Location
Products	http://www.kemet.com/products
Technical Resources (Including Soldering Techniques)	http://www.kemet.com/technicalpapers
RoHS Statement	http://www.kemet.com/rohs
Quality Documents	http://www.kemet.com/qualitydocuments

Product Request	
Resource	Location
Sample Request	http://www.kemet.com/sample
Engineering Kit Request	http://www.kemet.com/kits

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Although we design and manufacture our products to the most stringent quality and safety standards, given the current state of the art, isolated component failures may still occur. Accordingly, customer applications which require a high degree of reliability or safety should employ suitable designs or other safeguards (such as installation of protective circuitry or redundancies) in order to ensure that the failure of an electrical component does not result in a risk of personal injury or property damage.

Although all product-related warnings, cautions and notes must be observed, the customer should not assume that all safety measures are indicated or that other measures may not be required.

Digitally signed by Jeannette Calvo
DN: c=US, st=FL, l=Fort Lauderdale, o=KEMET Corp., ou=Marketing Communications, cn=Jeannette Calvo, email=jeannettecalvo@kemet.com
Date: 2012.10.10 16:19:22 -04'00'