ESC, +105°C



Overview

The KEMET ESC radial aluminum electrolytic capacitors are designed for low impedance and high frequency applications.

Applications

Typical applications include high frequency switch mode circuits.

Benefits

- · Low impedance
- 1,000 3,000 hour operating life
- Operating temperature of up to 105°C
- Case with \emptyset D \geq 5 mm
- · Safety vent on the capacitor base



Part Number System

ESC	157	M	6	6R3		C3	AA				
Series	Capacitance Code (pF)	Tolerance	Rated Voltage (VDC)		-		_		Electrical Parameters	Size Code	Packaging
Radial Aluminum Electrolytic	First two digits represent significant figures for capacitance values. Last digit specifies 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	Length	Packaging Type	Lead Type	Lead Length (mm)	Lead and Packaging Code				
	Standard Bulk Packaging Options								
4 - 22	All	Bulk (bag)	Straight	20/15 Minimum	AA				
	Tape & Reel								
4 - 5	All	Tape & Reel	Formed to 2.5 mm	$H_0 = 16 \pm 0.75$	LA				
4 - 8	All	Tape & Reel	2.5 mm lead spacing	H ₀ = 18.5 ±0.75	KA				
4 - 8	All	Tape & Reel	Formed to 5 mm	$H_0 = 16 \pm 0.75$	JA				
10	≤ 20	Tape & Reel	Straight	H ₀ = 18.5 ±0.75	KA				
		Ar	nmo Pack						
4 - 8	All	Ammo	Formed to 5 mm	H ₀ = 16 ±0.75	DA				
4 - 8	All	Ammo	Straight	H ₀ = 18.5 ±0.75	EA				
4 - 5	All	Ammo	Formed to 2.5 mm	$H_0 = 16 \pm 0.75$	FA				
10 - 13	All	Ammo	5 mm lead spacing	H ₀ = 18.5 ±0.75	EA				
16	All	Ammo	7.5 mm lead spacing	H ₀ = 18.5 ±0.75	EA				
18	18 ≤ 25 Ammo 7.5 mm lead spacing $H_0 = 18.5 \pm 0.75$ EA				EA				
		Contact KEMET for oth	er lead and packaging op	otions					

Environmental Compliance

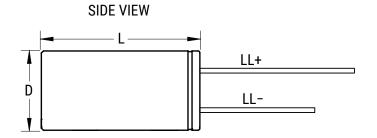
As an environmentally conscious company, KEMET is working continuously with improvements concerning the environmental effects of both our capacitors and their production. In Europe (RoHS Directive) and in some other geographical areas like China, legislation has been put in place to prevent the use of 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 make 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.

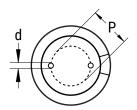
Due to customer requirements, there may appear additional markings such as lead free (LF) or lead-free wires (LFW) on the label.



Dimensions - Millimeters



TERMINAL END VIEW



Ci O-d-		D		_		P		d	LL+/LL-
Size Code	Nominal	Tolerance	Nominal	Tolerance	Nominal	Tolerance	Nominal	Tolerance	Mininimum
C3	5.0	±0.5	11.0	+1.5/-0	2.0	±0.5	0.5	Nominal	20/15
E3	6.3	±0.5	11.0	+1.5/-0	2.5	±0.5	0.5	Nominal	20/15
G3	8.0	±0.5	11.0	+1.5/-0	3.5	±0.5	0.6	Nominal	20/15
G4	8.0	±0.5	15.0	+2.0/-0	3.5	±0.5	0.6	Nominal	20/15
G6	8.0	±0.5	20.0	+2.0/-0	3.5	±0.5	0.6	Nominal	20/15
Н9	10.0	±0.5	12.5	+1.5/-0	5.0	±0.5	0.6	Nominal	20/15
Н8	10.0	±0.5	16.0	+2.0/-0	5.0	±0.5	0.6	Nominal	20/15
H4	10.0	±0.5	20.0	+2.0/-0	5.0	±0.5	0.6	Nominal	20/15
Н5	10.0	±0.5	25.0	+2.0/-0	5.0	±0.5	0.6	Nominal	20/15
H6	10.0	±0.5	30.0	+2.0/-0	5.0	±0.5	0.6	Nominal	20/15
L3	13.0	±0.5	20.0	+2.0/-0	5.0	±0.5	0.6	Nominal	20/15
L4	13.0	±0.5	25.0	+2.0/-0	5.0	±0.5	0.6	Nominal	20/15
L8	13.0	±0.5	30.0	+2.0/-0	5.0	±0.5	0.6	Nominal	20/15
L7	13.0	±0.5	40.0	+2.0/-0	5.0	±0.5	0.6	Nominal	20/15
M7	16.0	±0.5	25.0	+2.0/-0	7.5	±0.5	0.8	Nominal	20/15
M2	16.0	±0.5	32.0	+2.0/-0	7.5	±0.5	0.8	Nominal	20/15
М3	16.0	±0.5	36.0	+2.0/-0	7.5	±0.5	0.8	Nominal	20/15
N2	18.0	±0.5	36.0	+2.0/-0	7.5	±0.5	0.8	Nominal	20/15
N3	18.0	±0.5	40.0	+2.0/-0	7.5	±0.5	0.8	Nominal	20/15



Performance Characteristics

ltem	Performance Characteristics				
Capacitance Range	4.7 – 15,000 μF				
Capacitance Tolerance	±20% at 120 Hz/20°C				
Rated Voltage	6.3 – 100 VDC				
Life Test	2,000 - 3,000 hours (see conditions in Test Method & Performance)				
Operating Temperature	-40°C to +105°C				
Lookogo Current	I ≤ 0.01 CV or 3 μA, whichever is greater				
Leakage Current	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	10	16	25	35	50	63	100
Z (-25°C)/Z (20°C)	4	3	3	3	3	2	2	2
Z (-40°C)/Z (20°C)	8	6	4	4	4	4	4	4

Compensation Factor of Ripple Current (RC) vs. Frequency

Capacitance Range (μF)	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz	100 kHz
4.7	0.30	0.40	0.50	0.70	0.80	1.00
5.6 - 33	0.40	0.50	0.60	0.80	0.90	1.00
34 - 330	0.60	0.70	0.80	0.90	0.95	1.00
331 - 1,000	0.65	0.90	0.90	0.98	1.00	1.00
1,200 - 15,000	0.85	0.90	0.95	0.98	1.00	1.00



Test Method & Performance

Conditions	Load Li	fe Test	Shelf Life Test			
Temperature	105	5°C	105°C			
	Can Ø ≥ 5 x 11, ≤ 10 x 12.5 mm 2,000 hours		1 000 haura			
Test Duration	Can Ø ≥ 10 x 15 mm	3,000 hours	1,000 hours			
	If dimension is down size, endurance will be 1,000 hours less than standard					
Ripple Current	Maximum ripple current s	pecified at 100 KHz 105°C	No ripple current applied			
Voltage	The sum of DC voltage and the p the rated voltage		No voltage applied			
Performance	The following specification	ns will be satisfied when the	capacitor is restored to 20°C:			
Capacitance Change	Within ±20% of the initial value					
Dissipation Factor	Does not exceed 200% of the specified value					
Leakage Current	Does not exceed specified value					

Shelf Life

The capacitance, ESR and impedance of a capacitor will not change significantly after extended storage periods, however, the leakage current will very slowly increase.

KEMET's E aluminum electrolytic capacitors should not be stored in high temperatures or where there is a high level of humidity. The suitable storage condition for KEMET's E aluminum electrolytic capacitors is +5 to +35°C and less than 75% in relative humidity. KEMET's E aluminum electrolytic capacitors should not be stored in damp conditions such as water, saltwater spray or oil spray. KEMET's E aluminum electrolytic capacitors should not be stored in an environment full of hazardous gas (hydrogen sulphide, sulphurous acid gas, nitrous acid, chlorine gas, ammonium, etc.) KEMET's E aluminum electrolytic capacitors should not be stored under exposure to ozone, ultraviolet rays or radiation.

If a capacitor has been stored for more than 18 months under these conditions and it shows increased leakage current, then a treatment by voltage application is recommended.

Re-Age (Reforming) Procedure

Apply the rated voltage to the capacitor at room temperature for a period of one hour, or until the leakage current has fallen to a steady value below the specified limit. During re-aging a maximum charging current of twice the specified leakage current or 5 mA, whichever is greater, is suggested.



Table 1 - Ratings & Part Number Reference

VDC VDC Voltage Capacitance (µF) Capacitance (µF) Capacitance (µF) Capacitance (µF) Capacitance (µF) Capacitance (µF) Capacitance (µF) Capacitance (µF) Capacitance (µF) Part Number 6.3 8 200 6.3 11 22 0.420 200 20 13.9 ESCISTMERSACI) 6.3 8 270 6.3 x11 22 0.220 250 17.0 ESCISTMERSACI) 6.3 8 330 6.3 x11 22 0.230 250 17.0 ESCISTMERSACI) 6.3 8 330 6.3 x11 22 0.180 400 2.6 ESCISTMERSACI) 6.3 8 470 *9.3 11 22 0.180 400 2.6 ESCISTMERSACI) 6.3 8 600 *9.11 22 0.100 700 4.2 ESCISTMERSACIO) 6.3 8 1.000 8 x15 22 0.065 750 51.7 ESCISTMERSACION) 6.3 8 1.000			Rated		DF				
Voltage		VDC		Cooo Sizo		Z	RC	LC 20°C	
Voltage	VDC	Surge				100 kHz	100 kHz	2 Minutes	Part Number
(LET) (CAT O 3) CAT		_		D X L (mm)		20°C (0)	105°C (mA)	(IIA)	
6.3 8 220 6.3 x 11 22 0.320 250 13.9 ESC27MRSAES(I) 6.3 8 330 8.11 22 0.220 250 10.8 ESC37MRSAES(I) 6.3 8 330 8.11 22 0.180 400 20.8 ESC37MRSAES(I) 6.3 8 470 4.5 x 11 22 0.180 400 20.8 ESC37MRSAES(I) 6.3 8 470 8.11 22 0.180 400 20.8 ESC37MRSAES(I) 6.3 8 470 8.11 22 0.180 440 20.6 ESC37MRSAES(I) 6.3 8 470 8.11 22 0.180 440 20.6 ESC37MRSAES(I) 6.3 8 6.60 8.15 22 0.100 500 500 20.6 ESC47MRSAES(I) 6.3 8 6.60 8.15 22 0.100 700 42.8 ESC37MRSAES(I) 6.3 8 6.60 8.15 22 0.100 700 42.8 ESC37MRSAES(I) 6.3 8 6.60 8.15 22 0.100 700 42.8 ESC37MRSAES(I) 6.3 8 8 6.60 8.15 22 0.100 700 42.8 ESC37MRSAES(I) 6.3 8 8 1.000 8 8.15 22 0.159 500 60.0 ESC47MRSAES(I) 6.3 8 8 1.000 8 8.20 22 0.159 500 60.0 ESC47MRSAES(I) 6.3 8 8 1.000 10 x 12.5 22 0.060 60 60.0 ESC37MRSAES(I) 6.3 8 1.000 10 x 16 22 0.059 60 60.0 ESC37MRSAES(I) 6.3 8 1.000 10 x 16 22 0.059 60 60.0 ESC37MRSAES(I) 6.3 8 1.000 10 x 16 22 0.059 60 60.0 ESC37MRSAES(I) 6.3 8 1.000 10 x 16 22 0.059 60 60 60.0 ESC37MRSAES(I) 6.3 8 1.000 10 x 16 22 0.059 60 60 60.0 ESC37MRSAES(I) 6.3 8 1.500 10 x 16 22 0.055 10 x 1		ronage	(µF)		(tan δ %)¹	20 0 (11)	100 0 (11111)	(P71)	
6.3 8 330 6.3 x11 22 0.220 250 17.0 ESC27/MRGALE(I) 6.6 8 330 6.3 x11 22 0.330 250 0.8 ESC37/MRGALE(I) 6.6 8 330 6.3 x11 22 0.180 400 20.8 ESC37/MRGALE(I) 6.6 8 4.70 4.5 x11 22 0.180 400 20.8 ESC37/MRGALE(I) 6.6 8 4.70 8.1 1 22 0.180 400 20.8 ESC37/MRGALE(I) 6.3 8 6.60 4.8 x11 22 0.140 550 29.6 ESC47/MRGALE(I) 6.3 8 6.60 4.8 x11 22 0.140 550 29.6 ESC47/MRGALE(I) 6.3 8 6.60 4.8 x11 22 0.140 550 29.6 ESC47/MRGALE(I) 6.3 8 6.60 4.8 x11 22 0.140 550 29.6 ESC47/MRGALE(I) 6.3 8 6.60 4.8 x11 22 0.100 7.00 42.8 ESC65/MRGALE(I) 6.3 8 1.000 8.8 x15 22 0.005 7.00 42.7 ESC65/MRGALE(I) 6.3 8 1.000 8.8 x15 22 0.005 7.00 63.0 ESC106/MRGALE(I) 6.3 8 1.000 8.2 0.2 2 0.060 600 600 63.0 ESC106/MRGALE(I) 6.3 8 1.000 8.2 0.2 2 0.060 600 600 63.0 ESC106/MRGALE(I) 6.3 8 1.000 10 x12.5 22 0.080 690 63.0 ESC106/MRGALE(I) 6.3 8 1.000 8.2 0.2 2 0.060 600 600 63.0 ESC106/MRGALE(I) 6.3 8 1.500 8.2 0.00 10 x15 22 0.085 900 94.5 ESC106/MRGALE(I) 6.3 8 1.500 8.2 0.00 10 x16 22 0.064 1.000 7.00 7.00 F. ESC106/MRGALE(I) 6.3 8 1.500 8.2 0.00 8.2 0.00 8.2 0.00 8.2 0.00 8.2 0.00 8.2 0.00 8.2 0.00 8.2 0.00 8.2 0.00 8.2 0.00 8.2 0.00 8.2 0.00 8.2 0.00 8.2 0.00 8.2 0.00 9.4 5 ESC106/MRGALE(I) 6.3 8 1.500 8.2 0.00 8.2 0.00 9.4 5 ESC106/MRGALE(I) 6.3 8 1.500 8.2 0.00 8.2 0.00 9.4 5 ESC106/MRGALE(I) 6.3 8 1.500 10 x10 x10 x10 x10 x10 x10 x10 x10 x1									
6.3 8 330 6.3 x11 22 0.280 250 20.8 ESC337M6R3A62[1] 6.3 8 330 8 x11 22 0.180 400 20.8 ESC337M6R3A62[1] 6.3 8 470 8 x11 22 0.180 400 20.6 ESC477M6R3A62[1] 6.3 8 690 8 x15 22 0.120 580 42.8 ESC657M6R3A63[1] 6.3 8 690 8 x15 22 0.120 580 42.8 ESC657M6R3A63[1] 6.3 8 8 70 8 x10 22 0.085 750 51.7 ESC277M6R3A63[1] 6.3 8 8 1,000 8 x11 22 0.159 580 63.0 ESC677M6R3A63[1] 6.4 8 1,000 8 x 10 22 0.085 750 51.7 ESC27M6R3A64[1] 6.5 8 1,000 10 x12 5 22 0.085 760 51.7 ESC27M6R3A64[1] 6.6 8 1,000 10 x12 5 22 0.080 690 650 ESC17M6R3A64[1] 6.6 8 1,000 10 x12 5 22 0.080 690 650 ESC17M6R3A64[1] 6.6 8 1,000 10 x12 5 22 0.080 690 650 ESC17M6R3A64[1] 6.6 8 1,000 10 x12 5 22 0.080 690 690 650 ESC17M6R3A64[1] 6.6 8 1,000 10 x12 5 22 0.084 1,000 75.6 ESC17M6R3A64[1] 6.6 8 1,000 10 x12 5 22 0.084 1,000 75.6 ESC17M6R3A64[1] 6.6 8 1,000 10 x12 5 22 0.085 700 80 650 ESC17M6R3A64[1] 6.6 8 1,000 10 x12 5 22 0.085 700 80 650 ESC17M6R3A64[1] 6.6 8 1,000 10 x12 5 22 0.085 700 80 650 ESC17M6R3A64[1] 6.6 8 1,000 10 x12 5 22 0.085 700 80 650 ESC17M6R3A64[1] 6.6 8 1,000 10 x12 5 22 0.085 1,000 75.6 ESC17M6R3A64[1] 6.6 8 1,000 10 x12 5 22 0.085 1,000 94.5 ESC17M6R3A64[1] 6.6 8 1,000 10 x12 5 22 0.055 1,000 94.5 ESC17M6R3A64[1] 6.6 8 1,000 10 x12 5 22 0.044 1,250 94.5 ESC17M6R3A64[1] 6.6 8 2,000 10 x20 22 0.044 1,250 94.5 ESC17M6R3A64[1] 6.6 8 2,000 10 x20 22 0.044 1,250 94.5 ESC17M6R3A64[1] 6.6 8 3,000 10 x20 22 0.048 1,310 138.6 ESC22M6R3A44[1] 6.6 8 8 3,000 10 x20 22 0.048 1,310 138.6 ESC22M6R3A44[1] 6.6 8 8 3,000 10 x20 22 0.048 1,310 138.6 ESC22M6R3AA4[1] 6.6 8 8 3,000 10 x20 22 0.048 1,310 138.6 ESC22M6R3AA4[1] 6.6 8 8 3,000 10 x20 22 0.048 1,310 138.6 ESC22M6R3AA4[1] 6.7 10 x10 x10 x10 x10 x10 x10 x10 x10 x10									
6.3 8 470 *6.3 x11 22 0.180 400 20.8 ESC33/M6R3ASQ1) 6.3 8 470 *6.3 x11 22 0.180 550 29.6 ESC47/M6R3ASQ1) 6.3 8 470 8 x11 22 0.140 550 29.6 ESC47/M6R3ASQ1) 6.3 8 600 8 x15 22 0.100 700 42.8 ESC687M6R3ASQ1) 6.3 8 820 8 x20 22 0.085 750 51.7 ESC22M6R3A6Q1) 6.3 8 1,000 *8 x11 22 0.150 560 63.0 ESC106M6R3ASQ1) 6.3 8 1,000 8 x15 22 0.085 750 51.7 ESC22M6R3A6Q1) 6.3 8 1,000 8 x15 22 0.085 700 63.0 ESC106M6R3ASQ1) 6.3 8 1,000 10 x12.5 22 0.085 700 63.0 ESC106M6R3AGQ1) 6.3 8 1,000 10 x12.5 22 0.089 800 63.0 ESC106M6R3AGQ1) 6.3 8 1,000 10 x12.5 22 0.089 800 63.0 ESC106M6R3AGQ1) 6.3 8 1,000 10 x12.5 22 0.089 800 63.0 ESC106M6R3AGQ1) 6.3 8 1,000 10 x12.5 22 0.089 800 63.0 ESC106M6R3AGQ1) 6.3 8 1,500 10 x10.5 22 0.089 800 63.0 ESC106M6R3AGQ1) 6.3 8 1,500 10 x10.5 22 0.089 800 63.0 ESC106M6R3AGQ1) 6.3 8 1,500 10 x10.5 22 0.089 800 63.0 ESC106M6R3AGQ1) 6.3 8 1,500 10 x10.5 22 0.089 800 63.0 ESC106M6R3AGQ1) 6.3 8 1,500 10 x10.5 22 0.089 800 63.0 ESC106M6R3AGQ1) 6.3 8 1,500 10 x10.5 22 0.089 800 63.0 ESC106M6R3AGQ1) 6.3 8 1,500 10 x10.5 22 0.089 800 63.0 ESC106M6R3AGQ1) 6.3 8 1,500 10 x10.5 22 0.089 800 63.0 ESC106M6R3AGQ1) 6.3 8 1,500 10 x10.5 22 0.089 800 63.0 ESC106M6R3AGQ1) 6.3 8 1,500 10 x10.5 22 0.089 800 63.0 ESC206M6R3AGQ1 6.3 8 1,500 10 x10.5 22 0.089 800 63.0 ESC206M6R3AGQ1 6.3 8 1,500 10 x10.5 22 0.089 800 63.0 ESC206M6R3AGQ1 6.3 8 1,500 10 x10.5 22 0.089 800 63.0 ESC206M6R3AGQ1 6.3 8 2,200 10 x10.2 22 0.089 800 63.0 ESC206M6R3AGQ1 6.3 8 2,200 10 x10.2 22 0.051 1,200 138.6 ESC222M6R3AGQ1 6.3 8 2,200 113.2 20 22 0.051 1,200 138.6 ESC222M6R3AGQ1 6.3 8 2,200 113.2 20 22 0.051 1,200 138.6 ESC222M6R3AGQ1 6.3 8 3,300 113.2 5 22 0.043 1,450 138.6 ESC222M6R3AGQ1 6.3 8 3,300 113.2 5 22 0.043 1,500 20.9 ESC33M6R3AGQ1 6.3 8 3,300 113.2 5 22 0.043 1,500 20.9 ESC33M6R3AGQ1 6.3 8 8,300 13.2 5 22 0.043 1,500 20.9 ESC33M6R3AGQ1 6.3 8 8,300 10 x10.5 5 10 0.04 1,500 20.9 ESC33M6R3AGQ1 6.3 8 8,300 10 x10.5 5 10 0.04 1,500 20.9 ESC33M6R3AGQ1 6.3 8 8,300 10 x10.5 5 10 0.04 1,500 20.9 ESC32M6R3AGQ1 6.3 8 8 1,500 10 x10.5 5 10 0.04 1,500									. ,
6.3 B 470 **5.3 x 11 22 0.180 440 29.6 ESC477M6R3A2G) 6.3 B 600 **8 x 11 22 0.120 580 42.8 ESC697M6R3A3G) 6.3 B 600 **8 x 11 22 0.120 580 42.8 ESC697M6R3A3G) 6.3 B 600 8 x 15 22 0.000 700 42.8 ESC697M6R3A3G) 6.3 B 820 8 x 20 22 0.085 750 51.7 ESC627M6R3A3G) 6.3 B 1,000 **8 x 11 22 0.050 580 63.0 ESC108M6R3A3G) 6.3 B 1,000 8 x 15 22 0.085 700 63.0 ESC108M6R3A3G) 6.3 B 1,000 8 x 20 22 0.085 700 63.0 ESC108M6R3A3G) 6.3 B 1,000 10 x 12.5 22 0.089 900 63.0 ESC108M6R3A3G) 6.3 B 1,000 10 x 12.5 22 0.080 990 63.0 ESC108M6R3A3G) 6.3 B 1,000 10 x 12.5 22 0.080 990 63.0 ESC108M6R3A3G) 6.3 B 1,000 10 x 12.5 22 0.080 990 63.0 ESC108M6R3A3G) 6.3 B 1,500 **8 x 15 22 0.085 980 94.5 ESC158M6R3A3G) 6.3 B 1,500 **8 x 15 22 0.085 980 94.5 ESC158M6R3A3G) 6.3 B 1,500 **0 x 20 22 0.055 1,070 94.5 ESC158M6R3A3G] 6.3 B 1,500 **10 x 10 22 0.055 1,070 94.5 ESC158M6R3A3G] 6.3 B 1,500 **10 x 10 22 0.055 1,070 94.5 ESC158M6R3A3G] 6.3 B 1,500 **10 x 10 x 20 22 0.054 1,220 138.6 ESC228M6R3AHS] 6.3 B 2,200 **10 x 20 22 0.054 1,220 138.6 ESC228M6R3AHS] 6.3 B 2,200 **10 x 20 22 0.054 1,220 138.6 ESC228M6R3AHS] 6.4 B 2,200 **10 x 20 22 0.055 1,070 94.5 ESC158M6R3A4G] 6.5 B 2,200 **10 x 20 22 0.054 1,220 138.6 ESC228M6R3AHS] 6.6 B 2,200 **10 x 20 22 0.055 1,070 94.5 ESC158M6R3AHS] 6.6 B 2,200 **10 x 20 22 0.055 1,070 94.5 ESC158M6R3AHS] 6.6 B 2,200 **10 x 20 22 0.054 1,400 138.6 ESC228M6R3AHS] 6.6 B 2,200 **10 x 20 22 0.055 1,070 94.5 ESC228M6R3AHS] 6.6 B 2,200 **10 x 20 22 0.054 1,400 138.6 ESC228M6R3AHS] 6.6 B 2,200 **10 x 20 22 0.055 1,000 0.000 138.6 ESC228M6R3AHS] 6.6 B 2,200 **10 x 20 22 0.055 1,000 0.000 138.6 ESC228M6R3AHS] 6.6 B 2,200 **10 x 20 22 0.055 1,000 0.000 138.6 ESC228M6R3AHS] 6.6 B 2,200 **10 x 20 22 0.055 1,000 0.000 138.6 ESC228M6R3AHS] 6.7 B 2,200 **10 x 20 22 0.055 1,000 0.000 138.6 ESC228M6R3AHS] 6.8 B 2,000 **10 x 20 22 0.055 1,000 0.									
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6.3 8 3,300 **10 x 25 22 0.043 1,450 138.6 ESC22BM6R3AL(1) 6.3 8 3,300 13 x 25 22 0.032 1,750 207.9 ESC33BM6R3AL(1) 6.3 8 3,900 13 x 25 22 0.032 1,750 245.7 ESC39BM6R3AL(1) 6.3 8 4,700 **13 x 25 22 0.032 1,550 245.7 ESC39BM6R3AL(1) 6.3 8 4,700 **13 x 30 22 0.033 1,570 296.1 ESC47BM6R3AL(1) 6.3 8 4,700 15 x 25 22 0.033 1,570 296.1 ESC47BM6R3AL(1) 6.3 8 4,700 15 x 25 22 0.033 1,570 296.1 ESC47BM6R3AL(1) 6.3 8 6,800 16 x 32 22 0.028 1,800 296.1 ESC47BM6R3AL(1) 6.3 8 6,800 16 x 32 22 0.028 1,800 296.1 ESC47BM6R3AL(1) 6.3 8 8,200 16 x 32 22 0.019 2,350 516.6 ESC28BM6R3AM(1) 6.3 8 8,200 16 x 36 22 0.019 2,550 630.0 ESC10BM6R3AM(1) 6.3 8 15,000 18 x 36 22 0.019 2,550 630.0 ESC10BM6R3AM(1) 10 13 100 5 x 11 19 0.420 150 10.0 ESC107M010AC(31) 10 13 120 5 x 11 19 0.320 250 15.0 ESC127M010AC(31) 10 13 120 5 x 11 19 0.320 250 15.0 ESC127M010AC(31) 10 13 150 6.3 x 11 19 0.320 250 15.0 ESC127M010AC(31) 10 13 330 8 x 11 19 0.320 250 15.0 ESC127M010AC(31) 10 13 330 8 x 11 19 0.220 300 22.0 ESC227M010AC(31) 10 13 330 8 x 11 19 0.140 550 33.0 ESC37M010AC(31) 10 13 470 8 x 15 19 0.100 750 47.0 ESC477M010AC(31) 10 13 680 *8 x 11 19 0.120 550 47.0 ESC477M010AC(31) 10 13 680 *8 x 11 19 0.065 800 68.0 ESC687M010AH(1) 10 13 680 *8 x 11 19 0.065 800 68.0 ESC687M010AH(1) 10 13 1,000 *10 x 12.5 19 0.085 800 68.0 ESC687M010AH(1) 10 13 1,000 *10 x 12.5 19 0.085 800 68.0 ESC687M010AH(1) 10 13 1,000 *10 x 12.5 19 0.085 800 68.0 ESC687M010AH(1) 10 13 1,000 *10 x 20 19 0.044 1,250 120.0 ESC128M010AH(1) 10 13 1,000 *10 x 20 19 0.044 1,250 120.0 ESC128M010AH(1) 10 13 1,000 *10 x 20 19 0.044 1,250 120.0 ESC228M010AH(1) 10 13 1,000 *10 x 20 19 0.044 1,250 120.0 ESC328M010AH(1) 10 13 1,000 *10 x 20 19 0.044 1,250 120.0 ESC328M010AH(1) 10 13 1,000 *10 x 20 19 0.044 1,250 120.0 ESC328M010AH(1) 10 13 1,000 *10 x 20 19 0.039 1,450 120.0 ESC328M010AH(1) 10 13 1,000 *10 x 20 19 0.039 1,450 120.0 ESC328M010AH(1) 10 13 1,000 *10 x 20 19 0.039 1,450 120.0 ESC328M010AH(1) 10 13 1,000 *10 x 20 19 0.039 1,450 120.0 ESC328M010AH(1) 10 13 4,700 *13 x 25 19 0.028							·		` '
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VDC VDC Surge Rated Capacitance Case Size DF Z RC LC Part Number									
	VDC	VDC Surge	Rated Capacitance	Case Size	DF	Z	RC	LC	Part Number

 $^{(1) \} Insert \ packaging \ code. \ See \ Ordering \ Options \ Table \ for \ available \ options.$

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

^{*} Dimension is down size, Endurance will be less 1,000 hours than standard.



Table 1 - Ratings & Part Number Reference cont.

	VDC	Rated Capacitance	Case Size	DF 120 Hz	Z	RC	LC 20°C	
VDC	Surge Voltage	120 Hz 20°C (μF)	D x L (mm)	20°C (tan δ %) ¹	100 kHz 20°C (Ω)	100 kHz 105°C (mA)	2 Minutes (μA)	Part Number
10	13	8,200	18 x 36	19	0.019	2,800	820.0	ESC828M010AN2(1)
16	20	56	5 x 11	16	0.630	100	9.0	ESC566M016AC3(1)
16	20	68	5 x 11	16	0.420	150	10.9	ESC686M016AC3(1)
16	20	100	5 x 11	16	0.370	200	16.0	ESC107M016AC3(1)
16	20	120	6.3 x 11	16	0.320	250	19.2	ESC127M016AE3(1)
16	20	150	6.3 x 11	16	0.220	300	24.0	ESC157M016AE3(1)
16	20	220	8 x 11	16	0.140	550	35.2	ESC227M016AG3(1)
16 16	20 20	330 330	8 x 11	16 16	0.120	550 750	52.8 52.8	ESC337M016AG3(1)
16	20	330	8 x 15 10 x 12.5	16	0.100 0.080	688	52.8	ESC337M016AG4(1) ESC337M016AH9(1)
16	20	470	8 x 15	16	0.080	730	75.2	ESC477M016AG4(1)
16	20	470	10 x 12.5	16	0.085	800	75.2	ESC477M016AH9(1)
16	20	680	10 x 16	16	0.064	1,050	108.8	ESC687M016AH8(1)
16	20	820	10 x 20	16	0.044	1,100	131.2	ESC827M016AH4(1)
16	20	1,000	*10 x 16	16	0.043	1,140	160.0	ESC108M016AH8(1)
16	20	1,000	10 x 20	16	0.039	1,250	160.0	ESC108M016AH4(1)
16	20	1,200	*10 x 25	16	0.042	1,310	192.0	ESC128M016AH5(1)
16	20	1,200	13 x 20	16	0.038	1,450	192.0	ESC128M016AL3(1)
16	20	1,500	*10 x 20	16	0.045	1,200	240.0	ESC158M016AH4(1)
16 16	20 20	1,500 2,200	13 x 20 *10 x 30	16 16	0.034 0.032	1,600 1,780	240.0 352.0	ESC158M016AL3(1)
16	20	2,200	*13 x 20	16	0.032	1,720	352.0 352.0	ESC228M016AH6(1) ESC228M016AL3(1)
16	20	2,200	13 x 25	16	0.033	2,000	352.0	ESC228M016AL4(1)
16	20	3,300	*13 x 40	16	0.026	2,200	528.0	ESC338M016AL7(1)
16	20	3,300	16 x 25	16	0.024	2,200	528.0	ESC338M016AM7(1)
16	20	4,700	16 x 36	16	0.019	2,550	752.0	ESC478M016AM3(1)
16	20	6,800	18 x 36	16	0.019	2,800	1088.0	ESC688M016AN2(1)
25	32	10	5 x 11	14	0.550	50	3.0	ESC106M025AC3(1)
25	32	47	5 x 11	14	0.450	150	11.8	ESC476M025AC3(1)
25 25	32 32	56	5 x 11	14 14	0.420 0.370	150	14.0	ESC566M025AC3(1)
25 25	32	68 100	6.3 x 11 6.3 x 11	14	0.370	200 250	17.0 25.0	ESC686M025AE3(1) ESC107M025AE3(1)
25	32	120	8 x 11	14	0.200	300	30.0	ESC127M025AG3(1)
25	32	150	8 x 11	14	0.140	550	37.5	ESC157M025AG3(1)
25	32	220	8 x 11	14	0.120	550	55.0	ESC227M025AG3(1)
25	32	220	8 x 15	14	0.100	750	55.0	ESC227M025AG4(1)
25	32	330	*8 x 15	14	0.100	660	82.5	ESC337M025AG4(1)
25	32	330	8 x 20	14	0.069	800	82.5	ESC337M025AG6(1)
25	32	330	10 x 16	14	0.086	900	82.5	ESC337M025AH8(1)
25 25	32 32	470 470	8 x 20 10 x 16	14 14	0.067 0.064	800 1050	117.5 117.5	ESC477M025AG6(1) ESC477M025AH8(1)
25 25	32	470	10 x 16 10 x 12.5	14	0.086	760	117.5	ESC477M025AH8(1) ESC477M025AH9(1)
25	32	680	10 x 12.3	14	0.039	1,100	170.0	ESC687M025AH4(1)
25	32	820	10 x 20	14	0.039	1,250	205.0	ESC827M025AH4(1)
25	32	1,000	*10 x 20	14	0.047	1,160	250.0	ESC108M025AH4(1)
25	32	1,000	*10 x 25	14	0.042	1,310	250.0	ESC108M025AH5(1)
25	32	1,000	13 x 20	14	0.038	1,450	250.0	ESC108M025AL3(1)
25	32	1,200	13 x 25	14	0.035	1,600	300.0	ESC128M025AL4(1)
25	32	1,500	*13 x 30	14	0.032	1,750	375.0	ESC158M025AL8(1)
25 25	32 32	1,500	16 x 25 *13 x 30	14 14	0.028 0.029	2,000 1,810	375.0 550.0	ESC158M025AM7(1) ESC228M025AL8(1)
25	32	2,200 2,200	*16 x 25	14	0.029	1,660	550.0	ESC228M025AL8(1) ESC228M025AM7(1)
25	32	2,200	16 x 32	14	0.032	2,200	550.0	ESC228M025AM7(1)
25	32	3,300	*16 x 36	14	0.019	2,540	825.0	ESC338M025AM3(1)
25	32	3,300	18 x 36	14	0.019	2,550	825.0	ESC338M025AN2(1)
25	32	4,700	18 x 36	14	0.019	2,800	1175.0	ESC478M025AN2(1)
VDC	VDC Surge	Rated Capacitance	Case Size	DF	Z	RC	LC	Part Number

 $^{(1) \} Insert \ packaging \ code. \ See \ Ordering \ Options \ Table \ for \ available \ options.$

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

^{*} Dimension is down size, Endurance will be less 1,000 hours than standard.



Table 1 - Ratings & Part Number Reference cont.

Voltage		VDC	Rated Capacitance	Case Size	DF 120 Hz	Z	RC	LC 20°C	
Color Colo	VDC	Surge				100 kHz	100 kHz	2 Minutes	Part Number
35 44 4 6.8 5 x11 12 1.000 115 3.0 ESC478M035AG31 35 44 10 5 x11 12 0.000 140 3.5 ESC68M035AG31 35 44 15 5 x11 12 0.000 140 3.5 ESC16M035AG31 35 44 22 5 x11 12 0.000 190 77 ESC22M035AG31 35 44 22 5 x11 12 0.000 190 77 ESC22M035AG31 35 44 33 5 x11 12 0.050 190 77 ESC22M035AG31 35 44 47 37 6.3 x11 12 0.050 190 77 ESC22M035AG31 35 44 68 6.3 x11 12 0.039 250 16.5 ESC47M035AG31 35 44 68 6.3 x11 12 0.039 250 16.5 ESC47M035AG31 35 44 100 8 8 11 12 0.039 250 16.5 ESC47M035AG31 35 44 100 8 8 11 12 0.039 30 30 35 ESC66M035AG31 35 44 100 8 8 x15 12 0.140 350 350 35 ESC67M035AG31 35 44 100 8 8 x15 12 0.140 350 350 35 ESC67M035AG31 35 44 150 8 x15 12 0.140 850 350 22 ESC67M035AG31 35 44 120 8 x11 12 0.139 ESC 7 10 10 10 10 10 10 10 10 10 10 10 10 10		voitage	(μF)		(tan δ %) ¹	20 C (Ω)	105 C (IIIA)	(μΑ)	
35 44 10 5 x11 12 0.090 140 3.5 ESOESM035AG21, 35 44 15 5 x11 12 0.090 170 5.3 ESOESM035AG21, 35 44 15 5 x11 12 0.090 170 5.3 ESOESM035AG21, 35 44 125 5 x11 12 0.090 170 7.7 ESOZZM035AG21, 35 44 33 5 x11 12 0.080 200 11.6 ESOZ3M035AG21, 35 44 47 6.3 x11 12 0.080 200 11.6 ESOZ3M035AG21, 35 44 68 63 x11 12 0.039 2:50 16.5 ESOZ3M035AG21, 35 44 100 63 x11 12 0.039 2:50 16.5 ESOZ3M035AG21, 35 44 100 63 x11 12 0.020 300 23.8 ESOESM035AG21, 35 44 100 8 x11 12 0.180 300 35.0 ESOZ3M035AG21, 35 44 100 8 x11 12 0.180 300 35.0 ESOZ3M035AG21, 35 44 120 8 x11 12 0.140 450 35.0 ESOZ3M035AG21, 35 44 120 8 x11 12 0.0100 659 550 42.0 ESOZ3M035AG21, 35 44 120 8 x11 12 0.0100 659 550 42.0 ESOZ3M035AG21, 35 44 120 8 x11 12 0.0100 659 550 42.0 ESOZ3M035AG21, 35 44 220 12 x12.5 12 0.009 600 77.0 ESOZ3M035AG21, 35 44 320 10 x20 12 0.009 600 77.0 ESOZ3M035AG21, 35 44 320 10 x20 12 0.009 600 77.0 ESOZ3M035AG21, 35 44 470 10 x20 12 0.032 1.000 11.5 ESOZ3M035AG21, 35 44 470 10 x20 12 0.032 1.000 11.5 ESOZ3M035AG21, 35 44 820 13 x20 12 0.032 1.000 16.4 ESOZ3M035AG21, 35 44 820 13 x20 12 0.033 1.300 16.4 ESOZ3M035AG21, 35 44 820 13 x20 12 0.038 1.000 290 0.000 77.0 ESOZ3M035AG21, 35 44 820 13 x20 12 0.038 1.000 290 0.000 17.0 ESOZ3M035AG21, 35 44 820 13 x20 12 0.038 1.000 290 0.000 17.0 ESOZ3M035AG21, 35 44 820 13 x20 12 0.038 1.000 290 0.000 17.0 ESOZ3M035AG21, 35 44 1.000 13 x25 12 0.022 1.000 90 0.000 11.5 ESOZ3M035AG21, 35 44 1.000 13 x25 12 0.022 1.000 90 0.000 17.0 ESOZ3M035AG21, 35 44 1.000 13 x25 12 0.022 1.000 90 0.000 11.5 ESOZ3M035AG21, 35 44 1.000 13 x25 12 0.022 1.000 90 0.000 17.0 ESOZ3M035AG21, 35 44 1.000 13 x25 12 0.022 1.000 90 0.000 11.5 ESOZ3M035AG21, 35 44 1.000 13 x25 12 0.022 1.000 90 0.000 11.5 ESOZ3M035AG21, 35 44 1.000 13 x25 12 0.022 1.000 90 0.0000 90 0.000 90 0.000 90 0.000 90 0.000 90 0.000 90 0.000 90 0.000									ESC688M025AN2(1)
35									
35 44 15 5 x11 12 0.990 170 5.3 ESCISMOSSACSI 36 44 32 5 x11 12 0.580 200 11.6 ESC33MOSSACSI 37 44 47 0.3 x11 12 0.580 200 11.6 ESC33MOSSACSI 38 44 47 0.3 x11 12 0.220 300 2.8 ESC63MOSSACSI 38 44 100 6.3 x11 12 0.220 300 2.8 ESC63MOSSACSI 38 44 100 8 x11 12 0.180 300 35.0 ESCIDYMOSSACSI 38 44 100 8 x11 12 0.180 300 35.0 ESCIDYMOSSACSI 38 44 100 8 x11 12 0.180 300 35.0 ESCIDYMOSSACSI 38 44 100 8 x11 12 0.180 300 35.0 ESCIDYMOSSACSI 38 44 100 8 x11 12 0.180 550 42.0 ESCIDYMOSSACSI 38 44 150 8 x15 12 0.100 659 57.7 ESCIDYMOSSACSI 38 34 4 150 8 x15 12 0.100 659 57.7 ESCIDYMOSSACSI 38 44 220 8 x11 12 0.060 659 57.7 ESCIDYMOSSACSI 38 44 220 8 x11 12 0.060 859 52.5 ESCIDYMOSSACSI 38 44 220 8 x12 12 0.060 800 77.0 ESCIDYMOSSACSI 38 44 220 10 x12 3 12 0.060 800 77.0 ESCIDYMOSSACSI 38 44 220 10 x12 3 12 0.060 800 77.0 ESCIDYMOSSACSI 39 44 220 10 x12 3 12 0.060 800 77.0 ESCIDYMOSSACSI 30 44 4 220 10 x12 3 12 0.060 800 77.0 ESCIDYMOSSACSI 30 44 4 20 10 x20 12 0.039 1.300 164 5 ESCIDYMOSSACSI 35 44 6 60 13 x 20 12 0.039 1.300 164 5 ESCIDYMOSSACSI 36 44 6 60 13 x 20 12 0.039 1.300 164 5 ESCIDYMOSSACSI 37 44 6 60 13 x 20 12 0.039 1.300 164 5 ESCIDYMOSSACSI 38 44 1,000 10 x 25 12 0.029 1,700 180 180 180 180 180 180 180 180 180 1									` '
35 44 22 5x11 12 0.000 190 7.7 ESC2ZMOSSACST 35 44 47 6.3x11 12 0.039 250 16.5 ESC2ZMOSSACST 35 44 47 6.3x11 12 0.039 250 16.5 ESC2ZMOSSACST 35 44 100 6.3x11 12 0.039 250 16.5 ESC2ZMOSSACST 35 44 100 8.11 12 0.180 300 3.5 0 ESC1ZMOSSACST 35 44 100 8.11 12 0.180 300 3.5 0 ESC1ZMOSSACST 35 44 100 8.11 12 0.180 300 3.5 0 ESC1ZMOSSACST 35 44 100 8.11 12 0.180 300 3.5 0 ESC1ZMOSSACST 35 44 120 8.11 12 0.130 550 42 0 ESC1ZMOSSACST 35 44 120 8.11 12 0.130 550 42 0 ESC1ZMOSSACST 35 44 120 8.15 12 0.100 650 52.5 ESC1ZMOSSACST 35 44 220 10.12.5 12 0.000 650 77.0 ESC2ZMOSSACST 35 44 220 10.12.5 12 0.009 800 77.0 ESC2ZMOSSACST 35 44 330 10.12.5 12 0.009 800 77.0 ESC2ZMOSSACST 35 44 330 10.2 20 12 0.052 900 115.5 ESC3ZMOSSACT 35 44 330 10.2 20 12 0.039 1.300 16.5 ESC3ZMOSSACT 35 44 470 10.2 20 12 0.039 1.300 16.4 5 ESC3ZMOSSACT 35 44 680 13.2 20 12 0.039 1.300 16.4 5 ESC3ZMOSSACT 35 44 680 13.2 20 12 0.039 1.300 16.4 5 ESC3ZMOSSACT 35 44 680 13.2 20 12 0.039 1.300 16.4 5 ESC3ZMOSSACT 35 44 680 13.2 20 12 0.039 1.300 16.4 5 ESC3ZMOSSACT 35 44 1.000 13.2 20 12 0.039 1.300 16.4 5 ESC3ZMOSSACT 35 44 1.000 13.2 20 12 0.039 1.300 16.4 5 ESC3ZMOSSACT 35 44 1.000 13.2 20 12 0.039 1.300 16.4 5 ESC3ZMOSSACT 35 44 1.000 13.2 20 12 0.039 1.300 16.4 5 ESC3ZMOSSACT 35 44 1.000 13.2 20 12 0.039 1.300 16.4 5 ESC3ZMOSSACT 35 44 1.000 13.2 25 12 0.039 1.300 16.4 5 ESC3ZMOSSACT 35 12 0.039 1.300 16.5 0 ESC3ZMOSSACT 35 12 0.039 1.300 12 0.000 11.0 ESC3ZMOSSACT 35 12 0.039 1.300 12 0.000 11.0 ESC3ZMOSSACT 35 12 0.039 1.300 12 0.000 11.0 ESC3ZMOSSACT 35 12 0.00									` '
35 44 47 6.3 x 11 12 0.5 80 200 11.6 ES033M0SASQ13 35 44 47 6.3 x 11 12 0.220 300 23.8 ESC68M0SASQ13 35 44 100 6.3 x 11 12 0.220 300 23.8 ESC68M0SASQ13 35 44 100 8 x 11 12 0.180 300 35.0 ESC107M0SASQ13 35 44 100 8 x 11 12 0.140 450 35.0 ESC107M0SASQ13 35 44 150 8 x 15 12 0.100 650 77.0 ESC227M0SASQ13 35 44 150 8 x 15 12 0.100 650 77.0 ESC227M0SASQ13 35 44 220 10 x 12.5 12 0.069 800 77.0 ESC227M0SASQ13 35 44 220 10 x 12.5 12 0.059 900 115.5 ESC337M0SASQ13 35 44 330 10 x 20 12 0.052 900 115.5 ESC337M0SASQ13 35 44 330 10 x 20 12 0.044 1.050 115.5 ESC337M0SASQ13 35 44 330 10 x 20 12 0.044 1.050 115.5 ESC337M0SASQ13 35 44 680 13 x 20 12 0.039 1.300 164.5 ESC47M0SASQ13 35 44 680 13 x 20 12 0.039 1.300 164.5 ESC67M0SASQ13 35 44 1.000 13 x 25 12 0.099 1.300 28.0 ESC687M0SASQ13 35 44 1.000 13 x 25 12 0.099 1.700 350.0 ESC18M0SASQ13 35 44 1.000 15 x 25 12 0.099 1.700 350.0 ESC18M0SASQ13 35 44 1.000 16 x 25 12 0.028 1.900 420.0 ESC687M0SSASQ13 35 44 1.000 15 x 25 12 0.029 1.700 350.0 ESC18M0SSASQ13 35 44 1.000 16 x 25 12 0.029 1.700 350.0 ESC18M0SSASQ13 35 44 1.000 16 x 25 12 0.029 1.700 350.0 ESC18M0SSASQ13 35 44 1.000 16 x 25 12 0.029 1.700 550.0 ESC18M0SSASQ13 35 44 1.000 16 x 25 12 0.029 1.700 550.0 ESC18M0SSASQ13 35 44 1.000 16 x 25 12 0.029 1.700 550.0 ESC18M0SSASQ13 35 44 2.000 16 x 36 12 0.019 2.550 770.0 ESC228M0SSASQ13 35 34 4 2.000 16 x 36 12 0.019 2.550 770.0 ESC228M0SSASQ13 35 44 2.000 16 x 36 12 0.019 2.550 770.0 ESC228M0SSASQ13 35 44 2.000 16 x 36 12 0.019 2.550 770.0 ESC228M0SSASQ13 35 44 2.000 16 x 36 12 0.019 2.550 770.0 ESC228M0SSASQ13 35 44 2.000 16 x 36 12 0.019 2.550 770.0 ESC228M0SSASQ13 35 44 2.000 16 x 36 12 0.019 2.550 770.0 ESC228M0SSASQ13 35 44 2.000 16 x 36 12 0.019 2.550 770.0 ESC228M0SSASQ13 35 44 2.000 16 x 36 12 0.019 2.550 770.0 ESC228M0SSASQ13 35 44 2.000 16 x 36 12 0.019 2.550 770.0 ESC228M0SSASQ13 35 44 2.000 16 x 36 12 0.019 2.550 770.0 ESC228M0SSASQ13 35 44 2.000 16 x 36 12 0.019 2.550 770.0 ESC228M0SSASQ13 35 450 450 450 450 450 450 450 450 450 45									ESC226M035AC3(1)
35									ESC336M035AC3(1)
35 44 100 6.3 x 11 12 0.180 300 35.0 ESCIOT/MOSASAS/13 35 44 120 8 x 11 12 0.130 550 42.0 ESCIOT/MOSASAS/13 35 44 120 8 x 15 12 0.100 650 77.0 ESCIOT/MOSASAS/13 35 44 120 1 x 12.5 12 0.100 650 77.0 ESCIOT/MOSASAS/14 35 44 220 1 x 12.5 12 0.100 650 77.0 ESCIOT/MOSASAS/14 35 44 220 1 x 12.5 12 0.069 800 77.0 ESCIOT/MOSASAS/14 35 44 330 10 x 20 12 0.062 900 115.5 ESCIST/MOSASAS/14 35 44 330 10 x 20 12 0.092 900 115.5 ESCIST/MOSASAS/14 35 44 330 10 x 20 12 0.094 1,1550 115.5 ESCIST/MOSASAS/14 35 44 470 10 x 20 12 0.039 1,300 164.5 ESCIST/MOSASAS/14 35 44 820 13 x 20 12 0.039 1,300 164.5 ESCIST/MOSASAS/14 35 44 820 13 x 20 12 0.034 1,550 287.0 ESCIST/MOSASAS/14 35 44 820 13 x 20 12 0.034 1,550 287.0 ESCIST/MOSASAS/14 35 44 1,000 13 x 25 12 0.029 1,700 350.0 ESCIST/MOSASAS/14 35 44 1,000 16 x 25 12 0.029 1,700 350.0 ESCIST/MOSASAS/14 35 44 1,500 16 x 25 12 0.029 1,700 350.0 ESCIST/MOSASAS/14 35 44 1,500 16 x 25 12 0.029 1,700 250.0 ESCIST/MOSASAS/14 35 44 1,500 16 x 25 12 0.029 1,700 250.0 ESCIST/MOSASAS/14 35 44 1,500 16 x 25 12 0.029 1,700 250.0 ESCIST/MOSASAS/14 35 44 2,200 16 x 36 12 0.019 2,550 770.0 ESCIST/MOSASAS/15 35 44 3,300 18 x 36 12 0.019 2,550 770.0 ESCIST/MOSASAS/15 50 63 4.7 5 x 11 10 1,800 120 3.4 ESCIST/MOSASAS/15 50 63 6.8 5 x 11 10 1,800 120 3.4 ESCIST/MOSASAS/15 50 63 6.8 5 x 11 10 1,800 120 3.4 ESCIST/MOSASAS/15 50 63 6.8 5 x 11 10 1,800 120 3.4 ESCIST/MOSASAS/15 50 63 6.8 5 x 11 10 1,800 120 3.4 ESCIST/MOSASAS/15 50 63 15 5 x 11 10 1,200 130 7,5 ESCIST/MOSASAS/15 50 63 15 5 x 11 10 1,800 120 30 25 5 50 50 50 ESCIST/MOSASAS/15 50 63 15 5 x 11 10 1,800 120 130 7,5 ESCIST/MOSASAS/15 50 63 15 5 x 11 10 0,500 250 16.5 ESCIST/MOSASAS/15 50 63 15 5 x 11 10 0,500 250 16.5 ESCIST/MOSASAS/15 50 63 15 5 x 11 10 0,500 250 16.5 ESCIST/MOSASAS/15 50 63 15 5 x 11 10 0,500 250 16.5 ESCIST/MOSASAS/15 50 63 15 10 1 x 12.5 10 0,600 250 16.5 ESCIST/MOSASAS/15 50 63 150 10 x 12.5 10 0,600 250 16.5 ESCIST/MOSASAS/15 50 63 150 10 x 12.5 10 0,600 250 16.5 ESCIST/MOSASAS/15 50 63 100 8 x 15 10 0,600 10 0,000 115 3.0 ES	35	44	47	6.3 x 11		0.039	250		ESC476M035AE3(1)
35									ESC686M035AE3(1)
25									` '
95									
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35 44 330 10 x 20 12 0.044 1,050 115.5 ESC337M035AH8[1 35 44 470 10 x 20 12 0.044 1,050 115.5 ESC337M035AH8[1 35 44 470 10 x 20 12 0.038 1,400 238.0 ESC687M035AL3[1 35 44 820 13 x 20 12 0.038 1,400 238.0 ESC687M035AL3[3 55 44 820 13 x 20 12 0.034 1,550 287.0 ESC827M035AL3[3 55 44 1,000 13 x 25 12 0.029 1,700 350.0 ESC18M035AL3[3 55 44 1,200 16 x 25 12 0.029 1,700 350.0 ESC18M035AL3[3 55 44 1,200 16 x 25 12 0.028 1,900 420.0 ESC18M035AM7[3 35 44 1,500 16 x 25 12 0.024 2,100 525.0 ESC18M035AM7[3 35 44 2,200 16 x 35 12 0.021 2,300 770.0 ESC28M035AM7[3 35 44 2,200 16 x 36 12 0.019 2,550 770.0 ESC28M035AM7[3 35 44 2,200 16 x 36 12 0.019 2,550 770.0 ESC28M035AM3[5 0.6 S 3 47 5 x 11 10 2.000 115 0.6 ESC38M035AM3[5 0.6 S 3 47 5 x 11 10 1.850 120 3.4 ESC68M035AC3[5 0.6 S 3 4.7 5 x 11 10 1.850 120 3.4 ESC68M035AC3[5 0.6 S 3 10 5 x 11 10 1.200 180 7.5 ESC18M035AC3[5 0.6 S 3 15 5 x 11 10 1.200 180 7.5 ESC18M035AC3[5 0.6 S 3 22 5 x 11 10 0.700 200 115 3.0 ESC38M035AC3[5 0.6 S 3 3 3 6.3 x 11 10 0.500 200 115 0.5 ESC38M035AC3[5 0.6 S 3 15 5 x 11 10 0.700 200 110 ESC228M035AC3[5 0.6 S 3 3 3 6.3 x 11 10 0.500 300 225 16.5 ESC38M035AC3[5 0.6 S 3 10 5 x 11 10 0.500 300 225 16.5 ESC38M035AC3[5 0.6 S 3 10 5 x 11 10 0.500 300 225 16.5 ESC38M035AC3[5 0.6 S 3 10 5 x 11 10 0.500 300 225 16.5 ESC38M035AC3[5 0.6 S 3 10 5 x 11 10 0.500 300 225 16.5 ESC38M035AC3[5 0.6 S 3 10 5 x 11 10 0.500 300 225 16.5 ESC38M035AC3[5 0.6 S 3 10 0 8 x 15 10 0.6 S 0.6 S 0.0 ESC107M050AC3[5 0.6 S 0.6 S 0.0 ESC107M050AC3[5 0.6 S 0.6 S 0.0 ESC107M050AC3[5 0.6 S 0.0 ESC107M050AC3[5 0.6 S 0.0 ESC107M050AC3[5 0.0 ESC107M050AC3][5 0.6 S 0.6 S 0.0 ESC107M050AC3[5 0.0 ESC107M050AC3[5 0.0 ESC107M050AC3][5 0.6 S 0.0 ESC107M050AC3[5 0.0 ESC107M050AC3[5 0.0 ESC107M050AC3][5 0.6 S 0.0 ESC107M050AC3[5 0.0 ESC107M050AC3[5 0.0 ESC107M050AC3][5 0.6 S 0.0 ESC107M050AC3[5 0.0 ESC107M050AC3][5 0.0 ESC107M050AC3[5 0.0									` '
35									` ′
35									ESC337M035AH4(1)
35	35	44	470	10 x 20		0.039	1,300	164.5	ESC477M035AH4(1)
35									ESC687M035AL3(1)
35									ESC827M035AL3(1)
35									ESC108M035AL4(1)
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50 63 15 5 x 11 10 1.200 180 7.5 ESC156M050AC2(1) 50 63 22 5 x 11 10 0.700 200 11.0 ESC226M050AC3(1) 50 63 33 6.3 x 11 10 0.600 250 16.5 ESC336M050AE3(1) 50 63 47 6.3 x 11 10 0.520 300 23.5 ESC476M050AE3(1) 50 63 68 8 x 11 10 0.250 300 23.5 ESC476M050AE3(1) 50 63 100 8 x 15 10 0.250 550 50.0 ESC107M050AG(1) 50 63 100 8 x 20 10 0.210 650 60.0 ESC127M050AG(5) 50 63 120 8 x 20 10 0.210 650 60.0 ESC127M050AG(6) 50 63 120 8 x 20 10 0.060 1,050 111.0 ESC227M050AG(6) 50	50		6.8		10		120		ESC685M050AC3(1)
50 63 22 5 x 11 10 0.700 200 11.0 ESC226M050AC3(1) 50 63 33 6.3 x 11 10 0.600 250 16.5 ESC336M050AE3(1) 50 63 47 6.3 x 11 10 0.520 300 23.5 ESC476M050AE3(1) 50 63 68 8 x 11 10 0.350 450 34.0 ESC686M050AG3(1) 50 63 100 8 x 11 10 0.250 550 50.0 ESC107M050AG4(1) 50 63 100 8 x 20 10 0.210 650 60.0 ESC127M050AG6(1) 50 63 120 8 x 20 10 0.210 650 60.0 ESC17M050AG6(1) 50 63 120 10 x 12.5 10 0.160 800 75.0 ESC17M050AG(1) 50 63 220 *10 x 16 10 0.100 1,050 110.0 ESC227M050AH6(1) 50	50	63		5 x 11		1.700			ESC106M050AC3(1)
50 63 33 6.3 x 11 10 0.600 250 16.5 ESC336M050AE3(1) 50 63 47 6.3 x 11 10 0.520 300 23.5 ESC476M050AE3(1) 50 63 68 8 x 11 10 0.350 450 34.0 ESC66M050AG3(1) 50 63 100 8 x 15 10 0.250 550 50.0 ESC107M050AG3(1) 50 63 120 8 x 20 10 0.210 650 60.0 ESC127M050AH5(1) 50 63 120 8 x 20 10 0.210 650 60.0 ESC127M050AH5(1) 50 63 150 10 x 12.5 10 0.160 800 75.0 ESC17M050AH5(1) 50 63 220 *10 x 25 10 0.068 1,050 110.0 ESC227M050AH5(1) 50 63 330 10 x 20 10 0.072 1,300 165.0 ESC337M050AH4(1)									ESC156M050AC3(1)
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63 79 47 6.3 x 11 9 0.900 300 29.6 ESC476M063AE3(1									` '
									ESC476M063AE3(1)
		VDC Surge	Rated Capacitance		DF	Z			

 $^{(1) \} Insert \ packaging \ code. \ See \ Ordering \ Options \ Table \ for \ available \ options.$

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

^{*} Dimension is down size, Endurance will be less 1,000 hours than standard.



Table 1 - Ratings & Part Number Reference cont.

VDC	VDC Surge Voltage	Rated Capacitance 120 Hz 20°C (µF)	Case Size D x L (mm)	DF 120 Hz 20°C (tan δ %) ¹	Z 100 kHz 20°C (Ω)	RC 100 kHz 105°C (mA)	LC 20°C 2 Minutes (µA)	Part Number
63	79	47	8 x 11	9	0.700	450	29.6	ESC476M063AG3(1)
63	79	68	8 x 11	9	0.520	550	42.8	ESC686M063AG3(1)
63	79	100	8 x 20	9	0.350	650	63.0	ESC107M063AG6(1)
63	79	120	10 x 16	9	0.300	800	75.6	ESC127M063AH8(1)
63	79	150	10 x 16	9	0.200	1,050	94.5	ESC157M063AH8(1)
63	79	220	10 x 20	9	0.150	1,300	138.6	ESC227M063AH4(1)
63	79	330	13 x 20	9	0.100	1,400	207.9	ESC337M063AL3(1)
63	79	470	13 x 25	9	0.064	1,550	296.1	ESC477M063AL4(1)
63	79	680	16 x 25	9	0.052	1,700	428.4	ESC687M063AM7(1)
63	79	820	16 x 32	9	0.048	1,900	516.6	ESC827M063AM2(1)
63	79	1,000	16 x 32	9	0.042	2,100	630.0	ESC108M063AM2(1)
63	79	1,200	16 x 36	9	0.036	2,550	756.0	ESC128M063AM3(1)
63	79	1,500	18 x 36	9	0.033	2,800	945.0	ESC158M063AN2(1)
100	125	4.7	5 x 11	8	2.000	120	4.7	ESC475M100AC3(1)
100	125	6.8	5 x 11	8	1.850	140	6.8	ESC685M100AC3(1)
100	125	10	6.3 x 11	8	1.500	200	10.0	ESC106M100AE3(1)
100	125	15	6.3 x 11	8	1.200	250	15.0	ESC156M100AE3(1)
100	125	22	8 x 11	8	0.790	300	22.0	ESC226M100AG3(1)
100	125	33	8 x 15	8	0.590	450	33.0	ESC336M100AG4(1)
100	125	47	10 x 16	8	0.350	550	47.0	ESC476M100AH8(1)
100	125	68	10 x 20	8	0.240	650	68.0	ESC686M100AH4(1)
100	125	100	13 x 20	8	0.180	800	100.0	ESC107M100AL3(1)
100	125	120	13 x 25	8	0.150	1,050	120.0	ESC127M100AL4(1)
100	125	150	13 x 25	8	0.110	1,300	150.0	ESC157M100AL4(1)
100	125	220	16 x 25	8	0.071	1,400	220.0	ESC227M100AM7(1)
100	125	330	16 x 32	8	0.049	1,550	330.0	ESC337M100AM2(1)
100	125	470	18 x 36	8	0.038	1,700	470.0	ESC477M100AN2(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.

 $^{^{1}}$ When capacitance exceeds 1,000 μ F, the DF value (%) is increased by 2% for every additional 1,000 μ F.

^{*} Dimension is down size, Endurance will be less 1,000 hours than standard.



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, or 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

- As a general principle, 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 the 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 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 k Ω for capacitors with $V_R \le 160$ V (5 W resistor) and 10 k Ω for the other rated voltages.
- In the case of capacitors connected in a 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.



Electrical Ratings: Capacitance (ESC)

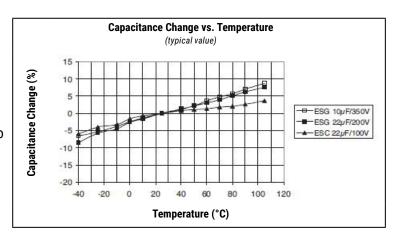


Simplified equivalent circuit diagram of an electrolytic capacitor

The capacitive component of the equivalent series circuit, (equivalent series capacitance - ESC), is determined by applying an alternate voltage of ≤ 0.5 V at a frequency of 120 or 100 Hz and 20°C (IEC 384-1, 384-4).

Temperature Dependence of the Capacitance

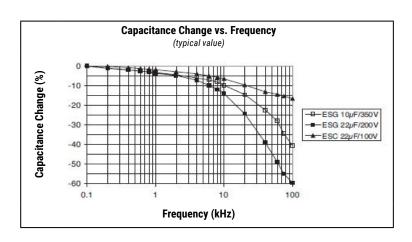
Capacitance of an electrolytic capacitor depends upon temperature: with decreasing temperature the viscosity of the electrolyte increases, thereby reducing its conductivity. Capacitance will decrease if temperature decreases. Furthermore, temperature drifts cause armature dilatation and, therefore, capacitance 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.

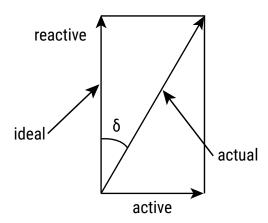
C =
$$\frac{1}{2\pi \text{ fZ}}$$
 C = capacitance (F)
f = frequency (Hz)
Z = impedance (Ω)





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.

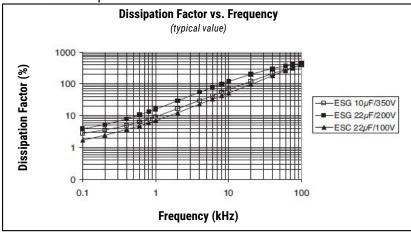


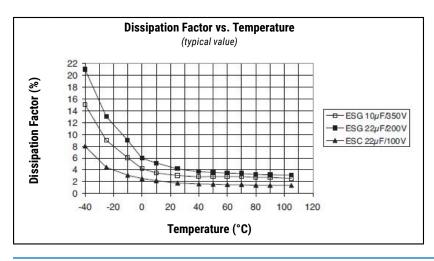
Tan δ is measured with the same set-up used for the series capacitance ESC.

Tan $\delta = \omega \times ESC \times ESR$ where:

ESC = Equivalent series capacitance

ESR = Equivalent series resistance



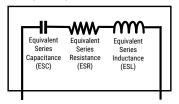




Equivalent Series Inductance (ESL)

Equivalent series inductance or self inductance results from the terminal configuration and internal design of the capacitor.

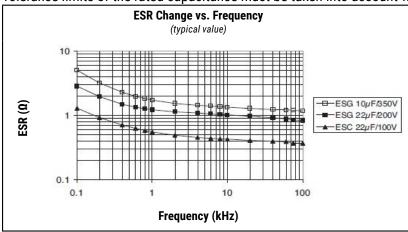
Capacitor Equivalent Internal Circuit

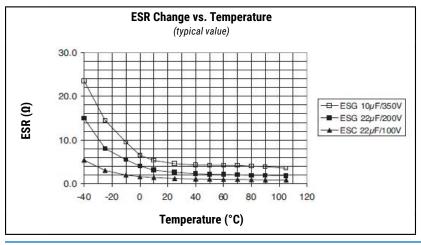


Equivalent Series Resistance (ESR)

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:

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

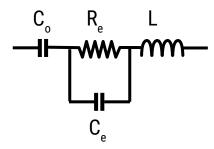






Impedance (Z)

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.)

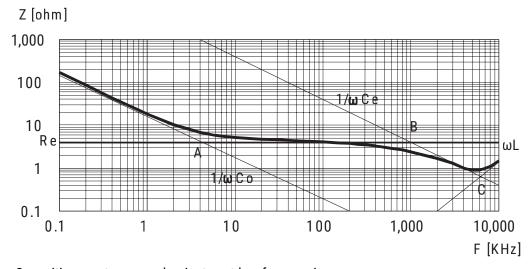
 R_e = Resistance of electrolyte and paper mixture (other resistances not depending on the frequency are not considered: tabs, plates, etc.)

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:



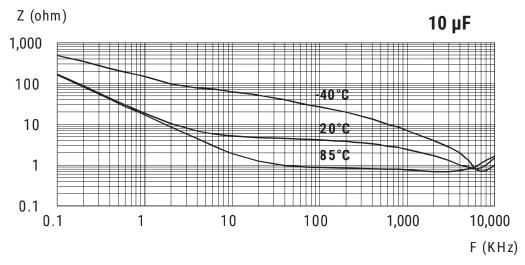
- Capacitive reactance predominates at low frequencies.
- With increasing frequency, capacitive reactance $Xc = 1/\omega C_o$ decreases until it reaches the order of magnitude of electrolyte resistance $R_o(A)$
- At even higher frequencies, resistance of the electrolyte predominates: Z = R₂ (A B)
- When the capacitor's resonance frequency is reached (ω_0), capacitive and inductive reactance mutually cancel each other $1/\omega C_p = \omega L$, $\omega_0 = 1/SQR(LC_p)$
- 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 $C_a \approx 0.01 C_a$.



Impedance (Z) cont.

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



 $R_{\rm e}$ 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, for example, 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 a 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.



Leakage Current (LC) cont.

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:



V_F = Forming voltage

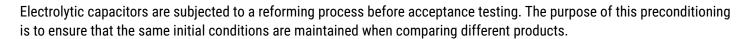
If this level is exceeded, a large quantity of heat and gas will be generated and the capacitor could be damaged.

V_D = 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.





The maximum ripple current value depends on:

- · Ambient temperature
- Surface area of the capacitor (heat dissipation area)

 $tan \delta or ESR$

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 x $2^{(To-T)/10}$

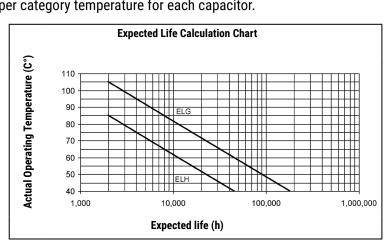
Where:

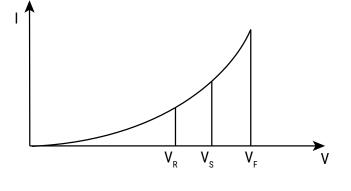
L: Expected life

Lo: Load life at a maximum permissible operating temperature

T: Actual operating temperature

To: Maximum permissible operating temperature This formula is applicable between 40°C and To.





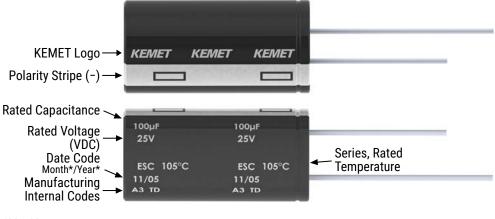


Packaging Quantities

Cina	Diameter	Longth
Size Code	Diameter (mm)	Length (mm)
	, ,	• •
C3	5.0	11.0
E3	6.3	11.0
G3	8.0	11.0
G4	8.0	15.0
G6	8.0	20.0
Н9	10.0	12.5
Н8	10.0	16.0
H4	10.0	20.0
H5	10.0	25.0
Н6	10.0	30.0
L3	13.0	20.0
L4	13.0	25.0
L8	13.0	30.0
L7	13.0	40.0
М7	16.0	25.0
M2	16.0	32.0
М3	16.0	36.0
N2	18.0	36.0
N3	18.0	40.0



Marking



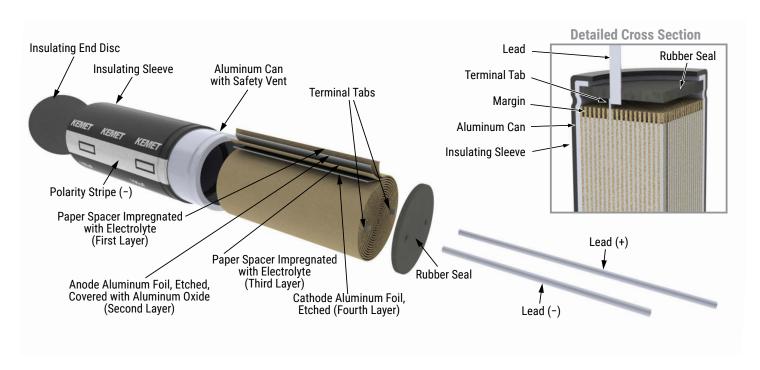
*Y = Year

Code	01	02	03	04	05	06	07	08	09
Year	2011	2012	2013	2014	2015	2016	2017	2018	2019

*M = Month

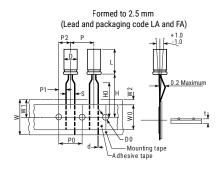
Code	01	02	03	04	05	06	07	08	09	10	11	12
Month	1	2	3	4	5	6	7	8	9	10	11	12

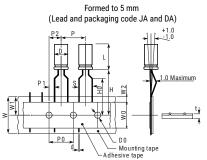
Construction



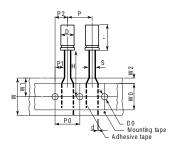


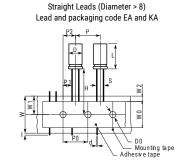
Taping for Automatic Insertion Machines





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



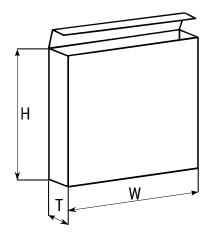


Dimensions (mm)	D	L	S	d	P	P0	P1	P2	W	W0	W 1	W2	НО	H1	I	D0	t
Tolerance	+0.5		+0.8/-0.2	±0.05	±1.0	±0.3	±0.7	±1.3	+1/-0.5	±0.5	Maximum	Maximum	±0.75	±0.5	Maximum	±0.2	±0.2
	4	5 – 7	2.5	0.45	12.7	12.7	5.1	6.35	18	12	11	3	16.0	18.5		4	0.7
Formed to 2.5 mm	5	≤ 7	2.5	0.45	12.7	12.7	5.1	6.35	18	12	11	3	16.0	18.5		4	0.7
2.5 11111	Э	> 7	2.5	0.50	12.7	12.7	5.1	6.35	18	12	11	3	16.0	18.5		4	0.7
	4	5 – 7	5.0	0.45	12.7	12.7	3.85	6.35	18	12	11	3	16.0	18.5		4	0.7
	5	≤ 7	5.0	0.45	12.7	12.7	3.85	6.35	18	12	11	3	16.0	18.5		4	0.7
	J	>7	5.0	0.50	12.7	12.7	3.85	6.35	18	12	11	3	16.0	18.5		4	0.7
Formed to 5 mm	6	≤ 7	5.0	0.50	12.7	12.7	3.85	6.35	18	12	11	3	16.0	18.5		4	0.7
J 111111	0	> 7	5.0	0.50	12.7	12.7	3.85	6.35	18	12	11	3	16.0	18.5		4	0.7
	8	≤ 7	5.0	0.50	12.7	12.7	3.85	6.35	18	12	11	3	16.0	18.5		4	0.7
	0	> 7	5.0	0.50	12.7	12.7	3.85	6.35	18	12	11	3	16.0	18.5		4	0.7
	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	0.45	12.7	12.7	5.35	6.35	18	12	11	3	18.5			4	0.7
	J	> 7	2.0	0.50	12.7	12.7	5.35	6.35	18	12	11	3	18.5			4	0.7
Ctraight loads	_	≤ 7	2.5	0.50	12.7	12.7	5.1	6.35	18	12	11	3	18.5			4	0.7
Straight leads	6	> 7	2.5	0.50	12.7	12.7	5.1	6.35	18	12	11	3	18.5			4	0.7
	8	≤ 7	3.5	0.50	12.7	12.7	4.6	6.35	18	12	11	3	18.5			4	0.7
	Ø	> 7	3.5	0.50	12.7	12.7	4.6	6.35	18	12	11	3	18.5			4	0.7
	10	≤ 20	5.0	0.60	12.7	12.7	3.85	6.35	18	12	11	3	18.5		1	4	1.0

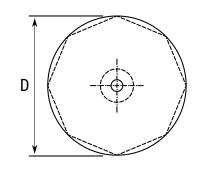


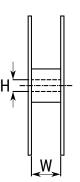
Lead Taping & Packaging











			Ammo		Reel			
Diameter	Length	Н	W	Т	D	Н	W	
		Maximum		Maximum	±2	±0.5	+1/-0.1	
4	All	230	340	42				
5	≤ 7	230	340	42				
5	11	275	340	42		30		
6.3	≤ 7	235	340	45				
6.3	11	230	340	48	250		FO	
8	≤ 7	270	340	48	350		50	
8	11	235	340	48				
8	>11 ≤ 20	240	340	57				
10	≤ 13	250	340	52				
10	>13 ≤ 20	256	340	57				
10	>20	250	340	60				
12	All	270	340	57		NA		
13	All	285	340	62	NA		NA	
16	All	265	340	62				
18	All	288	340	65				



Construction Data

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. This sample size is controlled by the use of recognized sampling tables defined in BS 6001.

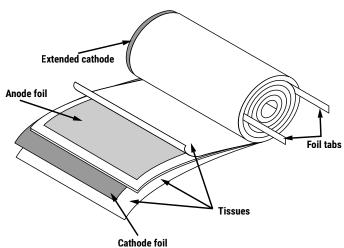
The following tests are applied and may be varied at the request of the customer. In this case the batch, or special procedure, will determine the course of action.

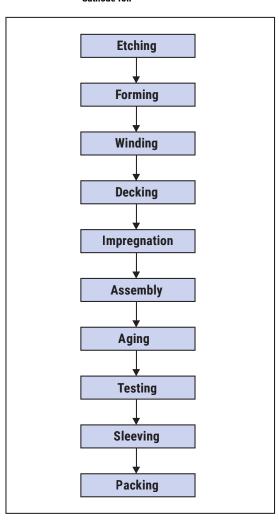
Electrical:

- · 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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