

Radial Leaded Aluminum Electrolytic Capacitors

RES Series



FEATURES

- Small size
- Long life and high ripple current
- Endurance: 5000 - 7000 hours at 105°C
- RoHS Compliance and Halogen-free

APPLICATIONS

- Communications equipment
- Industrial equipment



HOW TO ORDER

Product Type Aluminum

Series Type See Table Below

Case Size See Table Below

Capacitance Code µF code: 1st two digits represent significant figures, 3rd digit represents multiplier (number of zeros to follow)

Tolerance M = ±20%

Lead Type
 " " empty = Standard long lead
 "C" = Lead cut only
 "F" = Lead cut and form
 "L" = Lead cut and bend (Left)
 "R" = Lead cut and bend (Right)

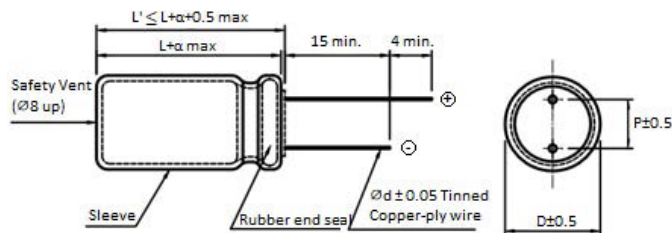
Packaging
 K = Ammo Pack
 B = Bulk Pack

Rated DC Voltage
 016 = 16Vdc
 025 = 25Vdc
 035 = 35Vdc
 050 = 50Vdc
 100 = 100Vdc

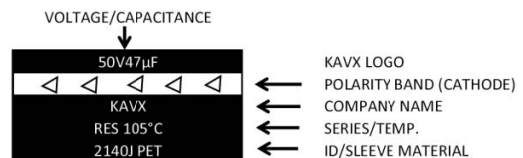
Ordering Example: R ES 0511 220 M 050 K -

CASE DIMENSIONS millimeters (inches)

Code	D±0.50(0.020)	L±0.50(0.020)	d±0.05(0.002)	P±0.50(0.020)	α	Typical Weight (g)
0511	5.00 (0.020)	11.00 (0.433)	0.50 (0.020)	2.00 (0.079)	2.00 (0.079)	0.41
0611	6.30 (0.248)	11.00 (0.433)	0.50 (0.020)	2.50 (0.098)	2.00 (0.079)	0.68
0612	6.30 (0.248)	12.00 (0.472)	0.50 (0.020)	2.50 (0.098)	2.00 (0.079)	0.71
0812	8.00 (0.315)	12.00 (0.472)	0.50 (0.020)	3.50 (0.138)	2.00 (0.079)	1.00
0816	8.00 (0.315)	16.00 (0.629)	0.50 (0.020)	3.50 (0.138)	2.00 (0.079)	1.33
0820	8.00 (0.315)	20.00 (0.787)	0.50 (0.020)	3.50 (0.138)	2.00 (0.079)	1.81



MARKING



TECHNICAL SPECIFICATIONS

Category Temperature Range:	-40°C to +105°C	
Capacitance Range	at 25°C, 120Hz	1.0µF - 1,000µF
Capacitance Tolerance:	at 25°C, 120Hz	±20%
Dissipation Factor (%)	Measurement Frequency: 120Hz at 25°C	Please see the Ratings and Part Number Reference Table below
Leakage Current:	After 2 minutes at rated working voltage at 25°C	I ≤ 0.01CV (µA) or 3µA, whichever is greater

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CAPACITANCE AND RATED VOLTAGE RANGE (FIGURES DENOTES CASE SIZE)

Capacitance		Rated Voltage DC (V _R)				
μF	Code	16V	25V	35V	50V	100V
1.0	1R0				0511	
2.2	2R2				0511	
4.7	4R7				0511	
10	100				0511	
15	150					0612
22	220				0511	
47	470		0511		0611	
56	560			0611		
100	101		0611	0612	0812	
220	221	0611	0812	0816		
330	331		0816			
470	471	0812, 0816	0820			
1000	102	0820				

Released ratings

RATINGS & PART NUMBER REFERENCE

Part No.	Case Size	Capacitance (μF)	Rated Voltage (V)	DCL Max. (μA)	DF Max. (%)	Impedance @100kHz/20°C (Ω _{max})	100kHz RMS Current (mA)/105°C
16V							
RES0611221M016*	0611	220	16	35.2	16	0.140	450
RES0812471M016*	0812	470	16	75.2	16	0.130	950
RES0816471M016*	0816	470	16	75.2	16	0.087	850
RES0820102M016*	0820	1000	16	160.0	16	0.045	1250
25V							
RES0511470M025*	0511	47	25	11.8	14	0.570	210
RES0611101M025*	0611	100	25	25.0	14	0.210	350
RES0812221M025*	0812	220	25	55.0	14	0.130	660
RES0816331M025*	0816	330	25	82.5	14	0.086	850
RES0820471M025*	0820	470	25	117.5	14	0.069	1050
35V							
RES0611560M035*	0611	56	35	19.6	12	0.210	350
RES0612101M035*	0612	100	35	35.0	12	0.250	400
RES0816221M035*	0816	220	35	77.0	12	0.086	850
50V							
RES05111R0M050*	0511	1	50	3	10	4.000	38
RES05112R2M050*	0511	2.2	50	3	10	2.500	57
RES05114R7M050*	0511	4.7	50	3	10	1.900	90
RES0511100M050*	0511	10	50	5.0	10	1.500	120
RES0511220M050*	0511	22	50	11.0	10	0.680	180
RES0611470M050*	0611	47	50	23.5	10	0.300	295
RES0812101M050*	0812	100	50	50.0	10	0.170	560
100V							
RES0612150M100*	0612	15	100	15	8	1.000	126

* Used to denote packing type: "K" for Ammo Pack or "B" for Bulk Pack.
All technical data relates to an ambient temperature of +25°C

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Rated Voltage (V _{dc})	Frequency (Hz)			
	120	1K	10K	100K
Cap. < 220	0.40	0.75	0.90	1.00
220 ≤ Cap. < 470	0.50	0.85	0.94	1.00
470 ≤ Cap. < 1000	0.60	0.87	0.95	1.00

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QUALIFICATION TABLE

Test	RES Series (Temperature range -40°C to +105°C)			
	Condition		Characteristics	
Temperature Stability (Max. Impedance Ratio)	120Hz		Rated Voltage (V)	16 - 100
			Z(-25°C) / Z(20°C)	2
Load Life	Application of the rated voltage and the rated ripple current. Test temperature: 105 ± 2°C		ΔC/C	Within ±20% of initial limit
	Diameter	Life Time (h)	DF	≤ 200% of Initial specified limit
	φD≤6.3	5000	DCL	Not more than the specified limit
	φD=8	7000		
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1000 hours 105°C without voltage applied.		ΔC/C	Within ±20% of initial limit
			DF	≤ 200% of Initial specified limit
			DCL	≤ 200% of Initial specified limit

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use the rms ripple current has to be reduced.

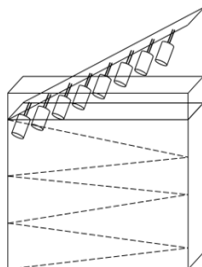
STORAGE

- It is recommended to keep capacitors between the ambient temperatures of 5°C to 35°C and a relative humidity of 75% or below.
- Confirm that the environment does not have any of the following conditions:
 - Damp conditions such as water, saltwater spray, or oil spray or fumes. High humidity or humidity condensation situations.
 - In an atmosphere filled with toxic gasses (such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, ammonia, etc.).
 - Being exposed to direct sunlight, ozone, ultraviolet ray, or radiation.
 - Exposed to acidic or alkaline solutions.
 - Under severe conditions where vibration and / or mechanical shock exceed the applicable ranges of the specification.
- Storage life: 2yrs

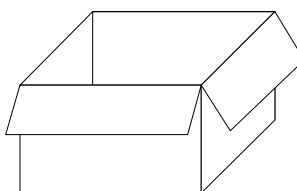
PACKING

Size Code	Bulk Pack					Ammo Pack				
	Bags	Inner Box		Carton		Inner Box		Carton		
		(LxWxH) 290*216*158		(LxWxH) 455*310*350		Quantity	Inner Box Size	Inner Box Quantity	Carton Size	Whole Pieces
		Quantity	Bags Number	Quantity / pcs	Inner Box Number		Quantity / pcs		(LxWxH)	
0511	1000	12	12,000	4	48,000	2000	320x230x50	10	485x345x275	20,000
0611	1000	8	8000	4	32,000	2000	340x290x48	10	600x354x265	20,000
0612	500	10	5000	4	20,000	2000	340x290x48	10	600x354x265	20,000
0812	500	10	5000	4	20,000	950	320x230x50	6	485x345x275	5700
0816	300	10	3000	4	12,000	950	320x230x55	6	485x345x300	5700
0820	300	10	3000	4	12,000	950	320x230x55	6	485x345x300	5700

AMMO PACKING



BULK PACKING

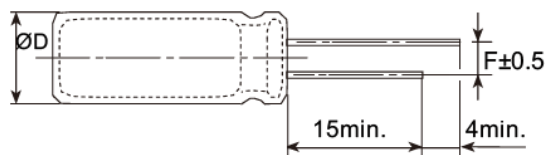


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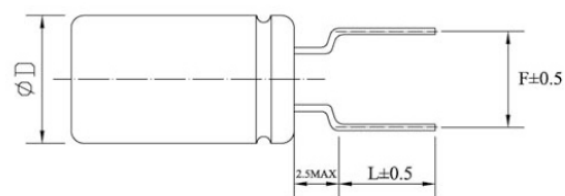
RES Series

TERMINATION TYPE

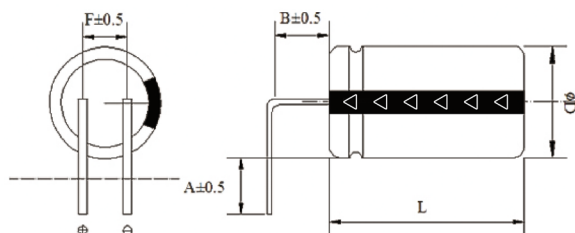
Letter " ": Empty = Standard Long lead.



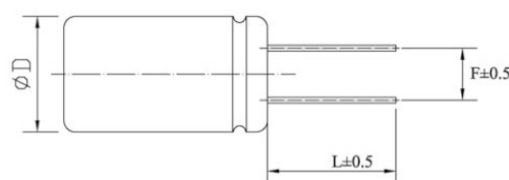
Letter "F": Lead cut and form.



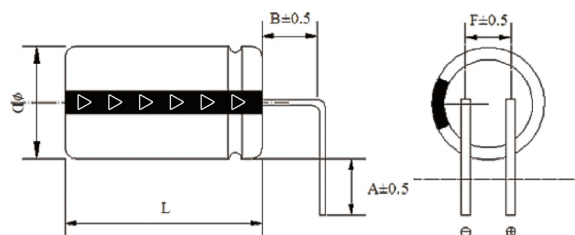
Letter "L": Lead cut and bend (Left).



Letter "C": Lead cut only.



Letter "R": Lead cut and bend (Right).



Letter	Termination Type	Dø	4ø	5ø	6.3ø	8ø	10ø	12.5ø	13ø	16ø	18ø
	Standard long lead	F	1.50	2.00	2.50	3.50	5.00	5.00	5.00	7.50	7.50
C	Lead cut only	F	1.50	2.00	2.50	3.50	5.00	5.00	5.00	7.50	7.50
		L	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
F	Lead cut and form	F	5.00	5.00	5.00	5.00					
		L	3.50	3.50	3.50	3.50					
R / L	Lead cut and bend	F					5.00	5.00	5.00	7.50	7.50
		A					3.50	3.50	3.50	3.50	3.50
		B					2.50	2.50	2.50	2.50	2.50

*All dimensions in mm.

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