NOT RECOMMENDED FOR NEW DESIGNS

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

LEAD-FREE
LEAD-FREE COMPATIBLE COMPONENT

RoHS COMPLIANT

APPLICATIONS

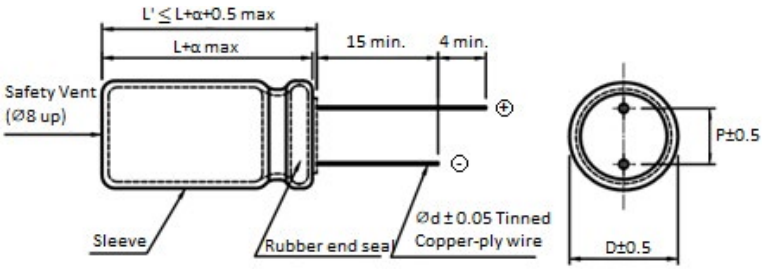
- Communications equipment
- Industrial equipment

HOW TO ORDER

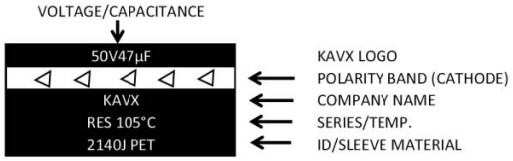
R	ES	0511	220	M	050	K	-
Product Type Aluminum	**Series Type**	**Case Size** See table below	**Capacitance Code** µF code: 1st two digits represent significant figures, 3rd digit represents multiplier (number of zeros to follow)	**Tolerance** M = ±20%	**Rated DC Voltage** 016 = 16Vdc 025 = 25Vdc 035 = 35Vdc 050 = 50Vdc 100 = 100Vdc	**Packaging** K = Ammo Pack B = Bulk Pack	**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)

CASE DIMENSIONS millimeters (inches)

Code	D±0.50(0.020)	L	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)	0.60 (0.024)	3.50 (0.138)	2.00 (0.079)	1.81



MARKING



*If different rubber seal is needed, please contact your sales representative.
*For ammo packing lead shape please refer to "Lead forming taping specification for ammo pack".
*If different lead shape is needed, please refer to "Termination type".

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 (Ωmax)	100kHz RMS Current (mA)/105°C	MSL
16V								
RES0611221M016*	0611	220	16	35.2	16	0.140	450	1
RES0812471M016*	0812	470	16	75.2	16	0.130	950	1
RES0816471M016*	0816	470	16	75.2	16	0.087	850	1
RES0820102M016*	0820	1000	16	160.0	16	0.045	1250	1
25V								
RES0511470M025*	0511	47	25	11.8	14	0.570	210	1
RES0611101M025*	0611	100	25	25.0	14	0.210	350	1
RES0812221M025*	0812	220	25	55.0	14	0.130	660	1
RES0816331M025*	0816	330	25	82.5	14	0.086	850	1
RES0820471M025*	0820	470	25	117.5	14	0.069	1050	1
35V								
RES0611560M035*	0611	56	35	19.6	12	0.210	350	1
RES0612101M035*	0612	100	35	35.0	12	0.250	400	1
RES0816221M035*	0816	220	35	77.0	12	0.086	850	1
50V								
RES05111R0M050*	0511	1	50	3	10	4.000	38	1
RES05112R2M050*	0511	2.2	50	3	10	2.500	57	1
RES05114R7M050*	0511	4.7	50	3	10	1.900	90	1
RES0511100M050*	0511	10	50	5.0	10	1.500	120	1
RES0511220M050*	0511	22	50	11.0	10	0.680	180	1
RES0611470M050*	0611	47	50	23.5	10	0.300	295	1
RES0812101M050*	0812	100	50	50.0	10	0.170	560	1
100V								
RES0612150M100*	0612	15	100	15	8	1.000	126	1

* 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 (Vdc)	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℃		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

1. It is recommended to keep capacitors between the ambient temperatures of 5°C to 35°C (if between 35°C to 85°C, it should be less than three months) and the relative humidity of 75% or below.
2. Confirm that the environment does not have any of the following conditions:
   - Damp conditions such as water, saltwater spray, 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.
   - Being exposed to acidic or alkaline solutions.
   - Under severe conditions where vibration and / or mechanical shock exceed the applicable ranges of the specification.
3. Shelf life

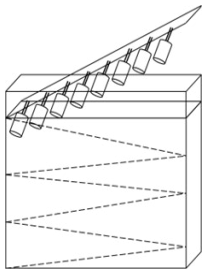
Years		
0-1	1-2	>2
Ok	Ok	Performance check

- Years from manufacturing date code.
- KYOCERA AVX does not guarantee or assume responsibility for product behavior after 3 years of storage.
- Ageing procedure should be performed as follows:
  - Connect the capacitor in series to a 1kΩ resistor, and apply half rated voltage for 2 hours.
  - After half rated voltage for 2 hours applied, increase and apply rated voltage for another 2 hours.

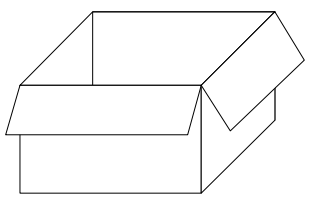
PACKING

Size Code	Bulk Pack					Ammo Pack				
	Bags	Inner Box (LxWxH) 290*216*158		Carton (LxWxH) 455*310*350		Inner Box		Carton		
	Quantity	Bags Number	Quantity / pcs	Inner Box Number	Quantity / pcs	Quantity	Inner Box Size (LxWxH)	Inner Box Quantity	Carton Size (LxWxH)	Whole Pieces
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

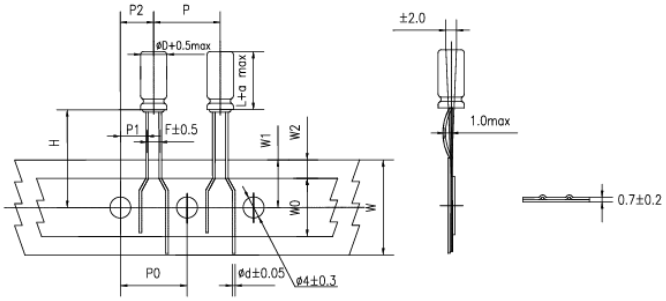


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LEAD FORMING TAPING SPECIFICATIONS FOR AMMO PACK



Items	Symbol	Case Size				Tolerance
		0511	0611 0612	0812	0816 0820	
Lead Wire Diameter	d	0.5	0.5	0.5	0.5/0.6	±0.05
Pitch of Body	P	12.7	12.7	12.7	12.7	±1.0
Feed Hole Pitch	P0	12.7	12.7	12.7	12.7	±0.2
Distance from Hole Center to Lead	P1	5.35	5.1	4.6	4.6	±0.7
Distance from Feed Hole Center to Body Center	P2	6.35	6.35	6.35	6.35	±1.0
Lead-to-lead distance	F	2.0	2.5	3.5	3.5	±0.5
Height of Body from Tape Center	H	18.5	18.5	18.5	18.5	±0.75
Base Tape Width	W	18.0	18.0	18.0	18.0	±0.5
Adhesive Tape Width	W0	6.0	8.0	8.0	8.0	min
Hole Position	W1	9.0	9.0	9.0	9.0	+0.75-0.5
Hole Down Tape Position	W2	1.5	1.5	1.5	1.5	max

*All dimensions in mm

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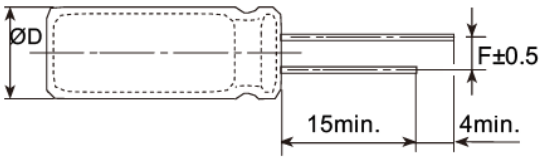
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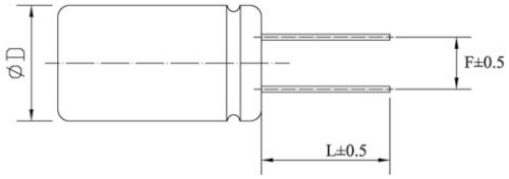
RES Series

TERMINATION TYPE

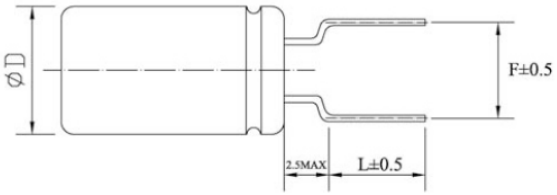
Letter " ": Empty = Standard Long lead.



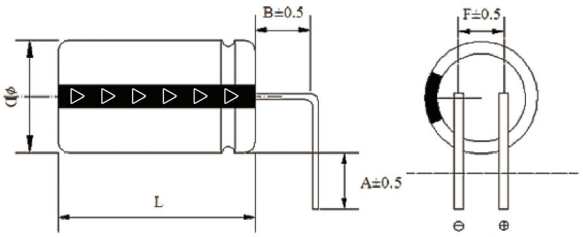
Letter "C": Lead cut only.



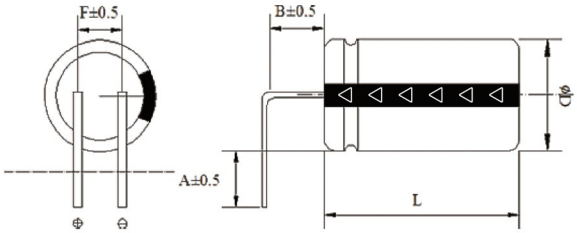
Letter "F": Lead cut and form.



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



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



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	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30
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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