C4C, Axial Round, 850 – 3,000 VDC/450 – 750 VAC

KEMET a YAGEO company

Overview

The C4C capacitor is a polypropylene metallized film and polyester double-metallized foil capacitor with a polyester tape wrapping filled with resin, and uses tinned copper wires.

Applications

Typical applications include snubber, clamping, resonance, coupling/decoupling, pulse, and blocking.

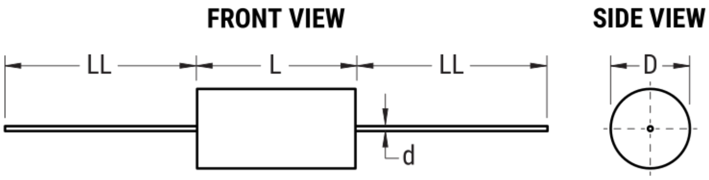
Benefits

- Self-healing
- Low loss
- High ripple current
- High contact reliability
- Suitable for high frequency applications
- PP metallized and PET double-sided metallized foil

Part Number System

C4	C	A	M	U	B	3100	AA	0	J
Series	Type	Fire Protection	Rated Voltage (VDC)	Insulation	Lead Diameter (mm)	Capacitance Code (pF)	Packaging	Capacitor Length (mm)	Tolerance
C4 = MKP Capacitors	C = Round body, snubber application	A = No fire retardant S = Fire retardant (on request)	M = 850 P = 1,200 W = 2,000 Y = 3,000	U = Polyester tape and resin protection 0 = Uninsulated (on request)	B = 0.8 C = 1.0 D = 1.2	Digits two – four indicate the first three digits of the capacitance value. First digit indicates the number of zeros to be added.	AA = Bulk (Bag) – straight leads see "Dimensions Table"	0 = 33 1 = 44 3 = 58	J = 5% K = 10%

Dimensions – Millimeters



D	L	d	LL
Maximum	Maximum	Nominal	±5
10 – 14	33	0.8	40
14.5 – 21.5	33	1	40
19 – 23	44	1	40
23.5 – 33.5	44	1.2	40
28.5 – 32	58	1.2	40

Qualification

Reference Standards	VDE 0560, IEC 61071, EN 61071
Application Class (DIN 40040)	GPE/LS
Vibration Strength	DIN 40040, Table 6, Class V

Performance Characteristics

Temperature Range	–40°C to +85°C
Maximum Permissible Ambient Temperature	+70°C
IEC Climatic Category	40/85/56 according to IEC 68–1
Peak Non-Repetitive Maximum Current	I_{PKR} x 1.5
Test Voltage Terminal to Terminal (VTT)	2 V_n for 10 seconds
Test Voltage Terminal to Case (VTC)	3 k VDC 50 Hz for 60 seconds
Insulation Resistance Test Conditions	Temperature: +25°C ±5% Voltage charge time: 1 minute Test voltage: 100 VDC Typical value (Ris x C): 3,000 seconds
Dissipation Factor (DF)	≤ 5 x 10^{-4} at 1 kHz and 20°C
Capacitance Deviation in Operating Temperature Range of -40°C to +85°C	±1.5% maximum on capacitance value measured at +20°C
Life Expectancy	≥ 30,000 hours at V_{RMS}, ≥ 100,000 hours at V_n
Failure Quota	300/10^9 components per hour
Change of Capacitance vs. Operating Time	–3% after 30,000 hours at V_{RMS} or after 100,000 hours at V_n
Protection	Polyester wrapping with epoxy resin fill
Flame Retardant (IEC 384–1)	Standard execution: non-flame retardant On request: flame retardant execution Category C
Leads	Tinned copper (lead content = 5%)
Installation	Any position
Damp Heat Test	Test Conditions
	Relative humidity: 93% ±2%
	Temperature: +40°C
	Test duration: 56 days
	Capacitance change: ≤ ±5%
	DF change: ≤ 50% of nominal value at 1 kHz
	Insulation resistance: ≥ 50% of limit value

Table 1 – Ratings & Part Number Reference

Cap Value (μF)	VDC	VAC	Peak VDC	Maximum Dimensions (mm)		Ripple Current	Peak Current	ESR (Max)	dV/dt (V/μs)	Packaging Quantity	Part Number
				D	L	100 kHz 70°C (A)	(A)	100 kHz (mΩ)			
0.1	850	450	1,200	10.5	33	5	45	16.6	450	300	C4C(1)M(2)B3100AA0(3)
0.15	850	450	1,200	12.5	33	7	68	11.5	450	300	C4C(1)M(2)B3150AA0(3)
0.22	850	450	1,200	15.5	33	9	99	8.1	450	200	C4C(1)M(2)C3220AA0(3)
0.33	850	450	1,200	18.5	33	9	149	5.8	450	150	C4C(1)M(2)C3330AA0(3)
0.47	850	450	1,200	21.5	33	9	212	4.6	450	100	C4C(1)M(2)C3470AA0(3)
0.68	850	450	1,200	21	44	9	204	5.1	300	100	C4C(1)M(2)C3680AA1(3)
1	850	450	1,200	25	44	12	300	3.8	300	50	C4C(1)M(2)D4100AA1(3)
1.5	850	450	1,200	30.5	44	12	450	3.1	300	50	C4C(1)M(2)D4150AA1(3)
2	850	450	1,200	28.5	58	12	400	3.8	200	30	C4C(1)M(2)D4200AA3(3)
2.2	850	450	1,200	29.5	58	12	440	3.7	200	30	C4C(1)M(2)D4220AA3(3)
2.5	850	450	1,200	31.5	58	12	500	3.5	200	30	C4C(1)M(2)D4250AA3(3)
0.047	1,200	500	1,600	10	33	4	33	27.1	700	400	C4C(1)P(2)B2470AA0(3)
0.068	1,200	500	1,600	12	33	5	48	19.1	700	300	C4C(1)P(2)B2680AA0(3)
0.1	1,200	500	1,600	14	33	7	70	13.4	700	250	C4C(1)P(2)B3100AA0(3)
0.15	1,200	500	1,600	17.5	33	9	105	9.2	700	150	C4C(1)P(2)C3150AA0(3)
0.22	1,200	500	1,600	20.5	33	9	154	6.8	700	100	C4C(1)P(2)C3220AA0(3)
0.33	1,200	500	1,600	20	44	9	149	7.2	450	100	C4C(1)P(2)C3330AA1(3)
0.47	1,200	500	1,600	23	44	9	212	5.6	450	70	C4C(1)P(2)C3470AA1(3)
0.68	1,200	500	1,600	27.5	44	12	306	4.2	450	50	C4C(1)P(2)D3680AA1(3)
1	1,200	500	1,600	33	44	12	450	3.5	450	50	C4C(1)P(2)D4100AA1(3)
1.2	1,200	500	1,600	29	58	12	330	4.5	275	30	C4C(1)P(2)D4120AA3(3)
1.5	1,200	500	1,600	32	58	12	413	4	275	30	C4C(1)P(2)D4150AA3(3)
0.022	2,000	630	2,400	10.5	33	3	25	48.2	1,150	400	C4C(1)W(2)B2220AA0(3)
0.033	2,000	630	2,400	12.5	33	4	38	32.5	1,150	300	C4C(1)W(2)B2330AA0(3)
0.047	2,000	630	2,400	15	33	6	54	23	1,150	200	C4C(1)W(2)C2470AA0(3)
0.068	2,000	630	2,400	17.5	33	7	78	16.3	1,150	150	C4C(1)W(2)C2680AA0(3)
0.1	2,000	630	2,400	20.5	33	9	115	11.6	1,150	100	C4C(1)W(2)C3100AA0(3)
0.15	2,000	630	2,400	19.5	44	9	105	11.3	700	100	C4C(1)W(2)C3150AA1(3)
0.22	2,000	630	2,400	23.5	44	12	154	8	700	70	C4C(1)W(2)D3220AA1(3)
0.33	2,000	630	2,400	28.5	44	12	231	5.9	700	50	C4C(1)W(2)D3330AA1(3)
0.47	2,000	630	2,400	33.5	44	12	329	4.8	700	50	C4C(1)W(2)D3470AA1(3)
0.56	2,000	630	2,400	29	58	12	224	6.1	400	30	C4C(1)W(2)D3560AA3(3)
0.68	2,000	630	2,400	32	58	12	272	5.4	400	30	C4C(1)W(2)D3680AA3(3)
0.0068	3,000	750	3,500	10	33	2	14.5	132	2,100	400	C4C(1)Y(2)B1680AA0(3)
0.01	3,000	750	3,500	12	33	3	21	90.3	2,100	300	C4C(1)Y(2)B2100AA0(3)
0.015	3,000	750	3,500	14.5	33	4	32	60.5	2,100	200	C4C(1)Y(2)C2150AA0(3)
0.022	3,000	750	3,500	17	33	5	46	41.6	2,100	150	C4C(1)Y(2)C2220AA0(3)
0.033	3,000	750	3,500	20.5	33	6	69	28.3	2,100	100	C4C(1)Y(2)C2330AA0(3)
0.047	3,000	750	3,500	19	44	7	59	25.7	1,250	100	C4C(1)Y(2)C2470AA1(3)
0.068	3,000	750	3,500	22.5	44	9	85	18.3	1,250	70	C4C(1)Y(2)C2680AA1(3)
0.1	3,000	750	3,500	27	44	12	125	12.8	1,250	50	C4C(1)Y(2)D3100AA1(3)
0.15	3,000	750	3,500	32	44	12	188	9.2	1,250	50	C4C(1)Y(2)D3150AA1(3)
0.22	3,000	750	3,500	31	58	12	165	9.5	750	30	C4C(1)Y(2)D3220AA3(3)
Capacitance Value (μF)	VDC	VAC	Peak VDC	D (mm)	L (mm)	Ripple Current	Peak Current	ESR	dV/dt (V/μs)	Packaging Quantity	Part Number

(1) A = No fire retardant; S = fire retardant (on request)
(2) U = Tape and resin protection; 0 = unprotected (on request)
(3) K = ±10%, J = ±5%

Environmental Compliance

As a leading global supplier of electronic components and an environmentally conscious company, KEMET continually aspires to improve the environmental effects of our manufacturing processes and our finished electronic components.

In Europe (RoHS Directive) and in some other geographical areas such as China (China RoHS), legislation has been enacted to prevent or otherwise limit the use of certain hazardous materials, including lead (Pb), in electronic equipment. KEMET monitors legislation globally to ensure compliance and endeavors to adjust our manufacturing processes and/or electronic components as may be required by applicable law.

For military, medical, automotive, and some commercial applications, the use of lead (Pb) in the termination is necessary and/or required by design. KEMET is committed to communicating RoHS compliance to our customers. Information related to RoHS compliance will be provided in data sheets and using specific identifiers on the packaging labels.

All KEMET power film capacitors are RoHS compliant.

Materials & Environment

The selection of raw materials that KEMET uses for the production of its electronic components is the result of extensive experience. KEMET directs specific attention toward environmental protection. KEMET selects its suppliers according to ISO 9001 standards and performs statistical analyses on raw materials before acceptance for use in manufacturing our electronic components. All materials are, to the best of KEMET's knowledge, non-toxic and free from cadmium; mercury; chrome and compounds; polychlorine triphenyl (PCB); bromide and chlorinedioxins bromurate clorurate; CFC and HCFC; and asbestos.

Dissipation Factor

Dissipation factor is a complex function involved with capacitor inefficiency. The tgδ may vary up and down with increased temperature. For more information, refer to Performance Characteristics.

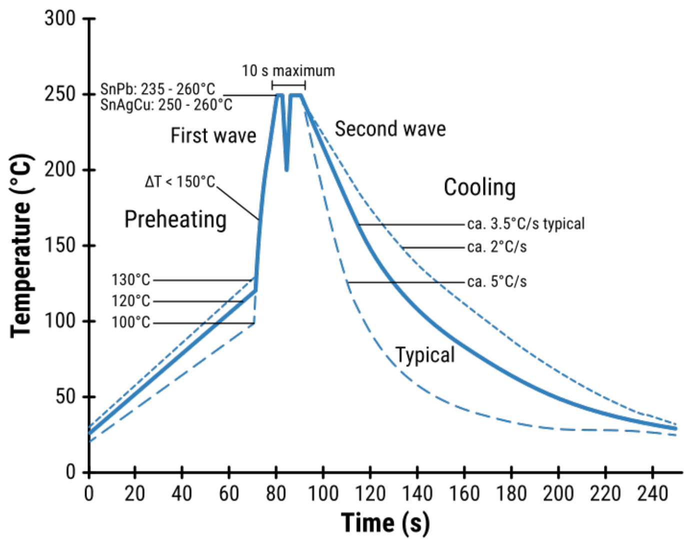
Sealing

Hermetically Sealed Capacitors
As the temperature increases, the pressure inside the capacitor increases. If the internal pressure is high enough, it can cause a breach in the capacitor. Such a breach can result in leakage, impregnation, filling fluid, or moisture susceptibility.

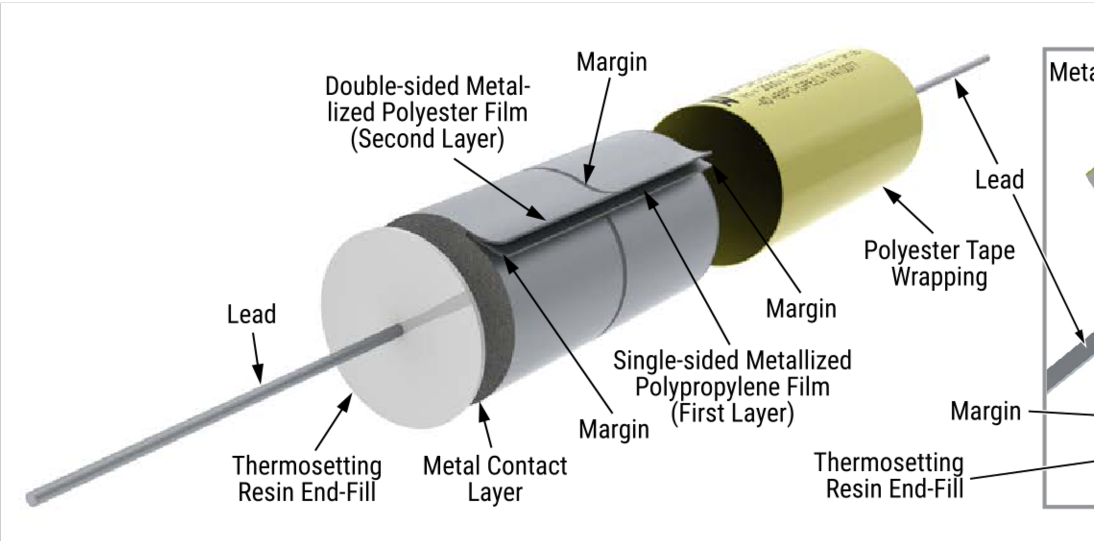
Barometric Pressure
The altitude at which hermetically sealed capacitors are operated controls the capacitor's voltage rating. As the barometric pressure decreases, the susceptibility to terminal arc-over increases. Non-hermetic capacitors can be affected by internal stresses due to pressure changes. These effects can be in the form of capacitance changes, dielectric arc-over, and/or low insulation resistance. Altitude can also affect heat transfer. Heat that is generated in an operation cannot be dissipated properly, and high RI^2 losses and eventual failure can result.

Soldering Process

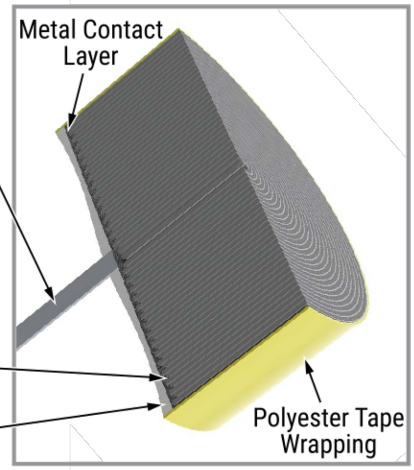
The implementation of the RoHS Directive has required the selection SnAgCu (SAC) alloys or SnCu alloys as primary solder. This has increased the liquidus temperature from that of 183°C for SnPb eutectic alloy to 217 – 221°C for the new alloys. As a result, the heat stress to components, even in wave soldering, has increased considerably due to higher pre-heat and wave temperatures. Polypropylene capacitors are especially sensitive to heat (melting point of polypropylene is 160 – 170°C). Wave soldering can be destructive especially for mechanically small polypropylene capacitors (lead spacings 5 – 10 mm) and great care must be taken during soldering. The solder profiles from KEMET are highly recommended. You may also refer to the wave soldering curve from IEC Publication 61760–1 Edition 2. Please consult KEMET with any questions.



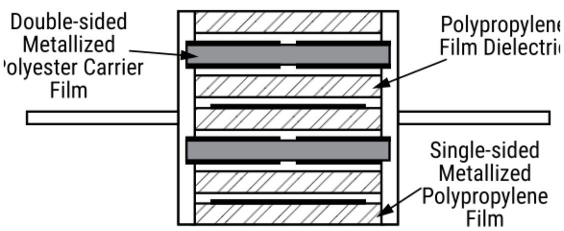
Construction



Detailed Cross Section

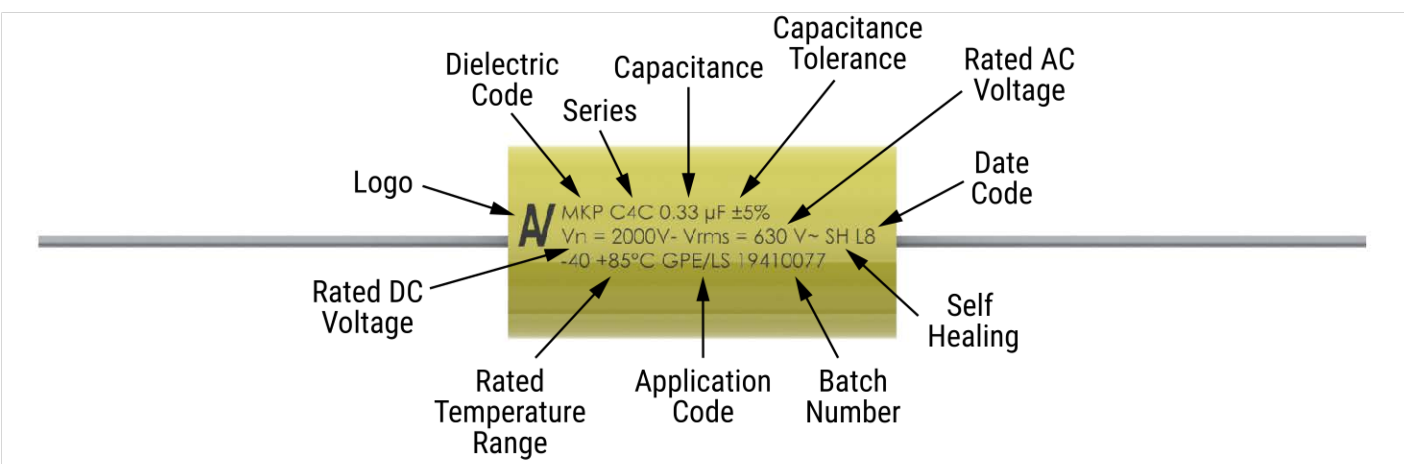


Winding Scheme



2 Sections

Marking



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