

## Overview

The C44U Series is a polypropylene segmented metallized film with cylindrical aluminium can type filled with resin, screw terminals and plastic deck.

## Applications

Typical applications include DC filtering and energy storage.

## Benefits

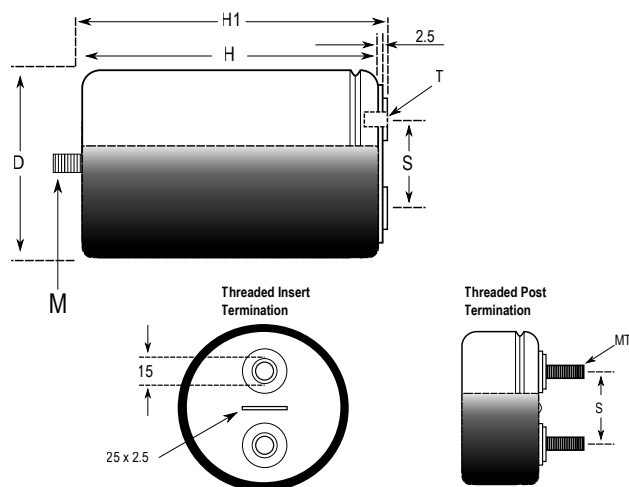
- Controlled self-healing
- Low losses
- High ripple current
- High capacitance density
- Long lifetime



## Part Number System

C4	4	U	Q	G	T	6	5	0	0	F	8	S	K
Series			DC Voltage	Case & Fixing	Terminals Code	Capacitance Code (pF)				Variants	Case Diameter	Film Type	Tolerance
MKP Capacitors for Power Applications	Cylindrical types	DC-Link	J = 700 V O = 900 V Q = 1100 V U = 1300 V	G = Cylindrical case with threaded bolt M12	T = M6 female terminals Q = M8 male terminals Y = M8 female terminals	Digits 9, 10, & 11 indicate the first 3 digits of capacitance value. Digit 8 indicates the number of zeroes that must be added in order to obtain rated capacitance in pF.				A = 85°C Hot Spot temperature series F = 70°C Hot Spot temperature series	7 = 76 mm 8 = 85 mm	T = Standard film S = Segmented film	J = 5% K = 10%
			E = Cylindrical case without threaded bolt										

## Dimensions – Millimeters



D	H	H1	S	Threaded Insert Terminations (T)	Threaded Post Terminations (MT)	Mounting Stud (M)
+1/-0	+0.5/-0	±1	±0.2			
76	55	61	31.7	M6 x 12	M8 x 22.5	M12 x 16
76	70	76	31.7	M6 x 12	M8 x 22.5	M12 x 16
76	95	101	31.7	M6 x 12	M8 x 22.5	M12 x 16
76	120	126	31.7	M6 x 12	M8 x 22.5	M12 x 16
76	140	146	31.7	M6 x 12	M8 x 22.5	M12 x 16
85	55	61	31.7	M6 x 12	M8 x 22.5	M12 x 16
85	70	76	31.7	M6 x 12	M8 x 22.5	M12 x 16
85	95	101	31.7	M6 x 12	M8 x 22.5	M12 x 16
85	120	126	31.7	M6 x 12	M8 x 22.5	M12 x 16
85	140	146	31.7	M6 x 12	M8 x 22.5	M12 x 16
85	174	180	31.7	M6 x 12	M8 x 22.5	M12 x 16
85	264	270	31.7	M6 x 12	M8 x 22.5	M12 x 16

## Qualifications

Reference Standards	IEC 61071
IEC Climatic Category	40/85/21 according to IEC 60068-1

## General Technical Data

Dielectric	Polypropylene Metallized Film – non inductive self-healing
Application	DC Filtering/DC Link
Climatic Category	40/85/21 IEC 60068–1
Maximum Operating Temperature	+90°C
Upper Temperature $T_{MAX}$ Group A	+85°C IEC 61071 – Endurance Test Temperature
Upper Temperature $T_{MAX}$ Group B	+70°C IEC 61071 – Endurance Test Temperature
Lower Temperature $T_{min}$	-40°C
Standard	IEC 61071
Protection	Aluminium case with or without, threaded bolt M12
	Plastic deck flame retardant execution UL 94 V–0
	Thermosetting resin sealing UL 94 V–0 compliant
Installation	Any position
Leads	High current M6 or M8 terminals
Packaging	Packed in cardboard boxes with protection for the terminals
RoHS Compliant	Compliant with the restricted substance requirements of Directive 2002/95/EC

## Electrical Characteristics

Capacitance Tolerance	$\pm 10\%$ at +25°C
Dissipation Factor (DF)	$\leq 0.0002$ at 10 kHz with $T = 25^\circ\text{C} \pm 5^\circ\text{C}$
Surge Voltage	$1.5 \times V_{NDC}$ for maximum 10 times in lifetime at +25°C
Over-Voltage (IEC 61071)	$1.15 \times V_{NDC}$ for maximum 30 minimum, once per day
	$1.3 \times V_{NDC}$ for maximum 1 minimum, once per day
Peak Non-Repetitive Current	$1.5 \times I_{pkr}$ maximum 1,000 times in lifetime
Insulation Resistance	$IR \times C \geq 30,000$ seconds at 100 VDC 1 minute at +25°C
Capacitance Deviation in Operation	$\pm 1.5\%$ maximum on capacitance value measured at +25°C
Permissible Relative Humidity	Annual average $\leq 70\%$ ; 85% on 30 days/year randomly distributed throughout the year. Dewing not admissible.

## Life Expectancy

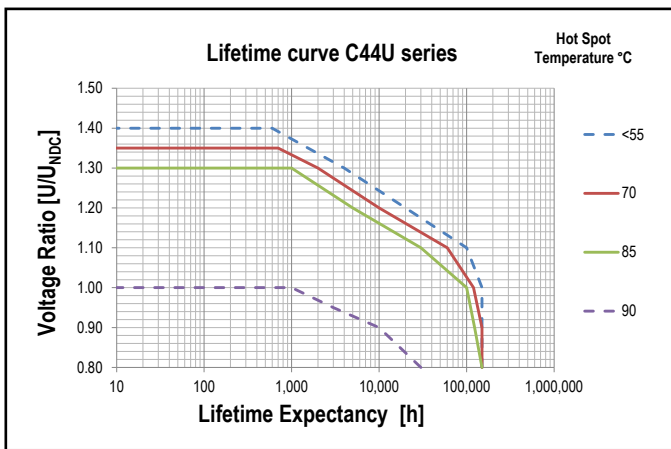
Life Expectancy – Group A	100,000 hours at $V_{NDC}$ @ Hot-Spot temperature $T_{HS} = 85^\circ\text{C}$
Life Expectancy – Group B	100,000 hours at $V_{NDC}$ @ Hot-Spot temperature $T_{HS} = 70^\circ\text{C}$
Capacitance drop at end of life	-10% (typical)
Failure Rate IEC 61709	50 FIT at $V_{NDC}$ @ reference $T_{HS}$ (see FIT curves)

## Test Method

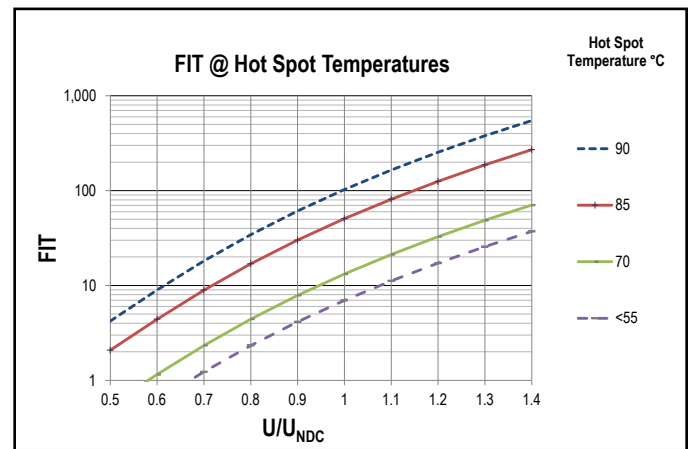
Test voltage between terminals	$1.5 \times V_{NDC}$ for 10 seconds or $1.65 V_{NDC}$ for 2 seconds at 25°C
Test voltage between terminals and case	3.2 kVAC 50 Hz for 2 seconds
Damp Heat	IEC 60068-2-78
Change of temperature	IEC 60068-2-14

## Lifetime Expectancy/Failure Quota Graphs

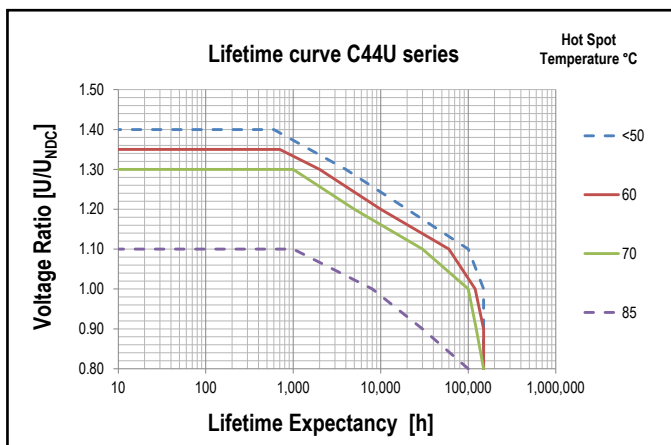
Lifetime Curve Group A – Heavy Duty



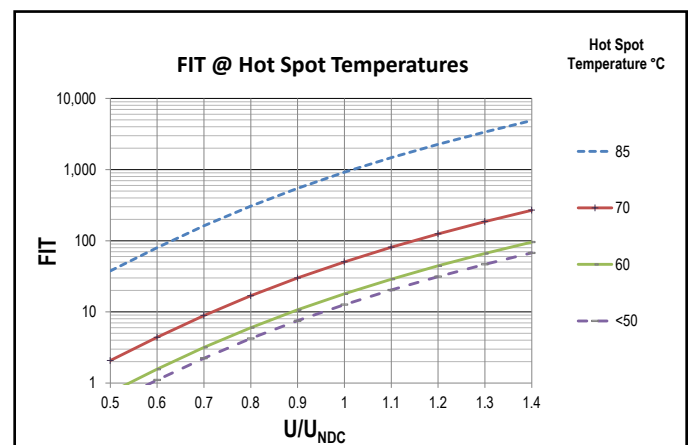
FIT Group A – Heavy Duty



Lifetime Curve Group B – Standard Duty



FIT Group B – Standard Duty



Notes:

$$T_{HS} = T_{AMB} + \Delta T$$

$$\Delta T = ESR * I_{rms}^2 * R_{th}$$

$I_{rms}$  should be limited to values granting  $\Delta T \leq 45^\circ\text{C}$

**Table 1A – Ratings & Part Number Reference**

Cap Value (μF)	VDC	Maximum Dimensions (mm)			Ripple Current	Peak Current	ESR	ESL	Thermal Res	dV/dt (V/μs)	Pkg Qty	Weight (grams)	Part Number Group A Heavy Duty
		D	H	H1	10 kHz 40°C (A) <sup>1</sup>	(A)	10 kHz (mΩ)	(nH)	(°C/W)				
120	700	76	55	61	63	2520	1.1	36	9.9	21	18	280	C44UJGT6120A7TK
160	700	85	55	61	73	3360	0.9	36	8.6	21	10	354	C44UJGT6160A8TK
175	700	76	70	76	62	2450	1.4	40	8.2	14	18	348	C44UJGT6175A7TK
225	700	85	70	76	70	3150	1.2	40	7.2	14	10	414	C44UJGT6225A8TK
350	700	76	120	126	55	2450	2.8	50	5.3	7	9	569	C44UJGT6350A7SK
425	700	76	140	146	55	2550	3.2	60	4.6	6	9	656	C44UJGT6425A7SK
450	700	85	120	126	65	3150	2.3	50	4.6	7	5	723	C44UJGT6450A8SK
550	700	85	140	146	65	3300	2.6	60	4.1	6	5	831	C44UJGT6550A8SK
75	900	76	55	61	57	1950	1.4	36	9.9	26	18	283	C44UOGT5750A7TK
100	900	85	55	61	65	2600	1.2	36	8.6	26	10	355	C44UOGT6100A8TK
110	900	76	70	76	57	1870	1.6	40	8.2	17	18	324	C44UOGT6110A7TK
150	900	85	70	76	65	2550	1.4	40	7.2	17	10	437	C44UOGT6150A8TK
220	900	76	120	126	50	1980	3.3	50	5.3	9	9	574	C44UOGT6220A7SK
275	900	76	140	146	50	1925	3.8	60	4.6	7	9	654	C44UOGT6275A7SK
300	900	85	120	126	60	2700	2.7	50	4.6	9	5	711	C44UOGT6300A8SK
350	900	85	140	146	60	2450	3.0	60	4.1	7	5	833	C44UOGT6350A8SK
50	1100	76	55	61	52	1550	1.6	36	9.9	31	18	265	C44UQGT5500A7TK
70	1100	85	55	61	62	2170	1.3	36	8.6	31	10	356	C44UQGT5700A8TK
75	1100	76	70	76	58	1575	1.6	40	8.2	21	18	352	C44UQGT5750A7TK
100	1100	85	70	76	60	2100	1.7	40	7.2	21	10	414	C44UQGT6100A8TK
150	1100	76	120	126	45	1650	4.1	50	5.3	11	9	577	C44UQGT6150A7SK
190	1100	76	140	146	47	1710	4.3	60	4.6	9	9	654	C44UQGT6190A7SK
200	1100	85	120	126	55	2200	3.2	50	4.6	11	5	723	C44UQGT6200A8SK
250	1100	85	140	146	55	2250	3.6	60	4.1	9	5	824	C44UQGT6250A8SK
Cap Value	VDC	D	H	H1	Ripple Current	Peak Current	ESR	ESL	Thermal Res	dV/dt (V/μs)	Pkg Qty	Weight	Part Number

<sup>1</sup> Current values that lead to a  $\Delta T$  of ~85°C in the Hot Spot  $T_{HS} = T_{AMB} + \Delta T = 85^\circ\text{C}$

For Packaging quantities not listed, please contact KEMET.

**Table 1B – Ratings & Part Number Reference**

Cap Value (μF)	VDC	Maximum Dimensions (mm)			Ripple Current 10 kHz 40°C (A) <sup>1</sup>	Peak Current (A)	ESR 10 kHz (mΩ)	ESL (nH)	Thermal Res (°C/W)	dV/dt (V/μs)	Pkg Qty	Weight (grams)	Part Number Group B Standard Duty
		D	H	H1									
200	900	76	95	101	45	2000	2.3	36	6.4	10	9	645	C44UOGQ6200F7SK
270	900	76	95	101	50	2700	1.8	36	6.4	10	9	610	C44UOGQ6270F7SK
370	900	85	95	101	60	3700	1.4	40	5.6	10	5	715	C44UOGQ6370F8SK
510	900	85	120	126	60	3570	1.8	40	4.6	7	5	840	C44UOGQ6510F8SK
600	900	85	140	146	58	4200	2.2	40	4.1	7	5	950	C44UOGQ6600F8SK
130	1100	76	95	101	40	1560	2.8	36	6.4	12	9	580	C44UQGQ6130F7SK
175	1100	76	95	101	46	2100	2.2	36	6.4	12	9	610	C44UQGQ6175F7SK
240	1100	85	95	101	56	2880	1.7	40	5.6	12	5	710	C44UQGQ6240F8SK
280	1100	76	140	146	43	1960	3.4	40	4.6	7	9	805	C44UQGQ6280F7SK
330	1100	85	140	146	50	2310	2.9	40	4.1	7	5	990	C44UQGQ6330F8SK
500	1100	85	174	180	90	6000	1.1	80	3.4	12	5	1120	C44UQGQ6500F8SK
90	1300	76	95	101	37	1350	3.3	36	6.4	15	9	580	C44UUGQ5900F7SK
120	1300	76	95	101	43	1800	2.5	36	6.4	15	9	610	C44UUGQ6120F7SK
165	1300	85	95	101	52	2475	2.0	40	5.6	15	5	716	C44UUGQ6165F8SK
195	1300	76	140	146	40	1755	4.0	50	4.6	9	9	797	C44UUGQ6195F7SK
250	1300	85	140	146	47	2250	3.3	50	4.1	9	5	957	C44UUGQ6250F8SK
320	1300	85	174	180	82	4800	1.3	80	3.4	15	5	1130	C44UUGQ6320F8SK
550	1300	85	264	270	82	4950	1.9	100	2.3	9	5	1600	C44UUGQ6550F8SK
Cap Value	VDC	D	H	H1	Ripple Current	Peak Current	ESR	ESL	Thermal Res	dV/dt (V/μs)	Pkg Qty	Weight	Part Number

<sup>1</sup> Current values that lead to a  $\Delta T$  of  $\sim 70^\circ\text{C}$  in the Hot Spot à  $T_{HS} = T_{AMB} + \Delta T = 70^\circ\text{C}$

For Packaging quantities not listed, please contact KEMET.

## Marking

MKP C44U	→ Dielectric Type. Series
500μF ±10%	→ Capacitance. Tolerance
Un = 1100V~	→ Rated Voltage
-40 +85°C	→ Climatic Category Temperatures - Min./Max.
NO PCB SH	→ Self-Healing Dielectric.
CE B7 11257039	→ CE Logo. Production Date. Batch Number

## 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, like Lead (Pb), in electronic equipment. All products in this catalog are produced to help our customers' obligations to guarantee their products to 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 like 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 like LF = Lead Free or LFW = Lead Free Wires on the label.

All KEMET power film products are RoHS Compliant.



RoHS Compliant

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## Materials & Environment

The selection of materials used by KEMET for the production of capacitors is the result of extensive experience and constant attention to environmental protection. KEMET selects its suppliers according to ISO 9001 standards and carries out statistical analysis on the materials purchased before acceptance. All materials are, to the company's present knowledge, non-toxic and free from Cadmium, Mercury, Chrome and compounds, PCB (Polychlorine Triphenyl), Bromide and Chlorine Dioxins Bromurate Chlorurate, CFC and HCFC and Asbestos.

## Green Products

All KEMET power film products are ROHS Compliant.

## Insulation Resistance

When the capacitor temperature increases, the insulation resistance decreases. This is due to increased electron activity. Low insulation resistance can also be the result of moisture trapped in the windings, caused by a prolonged exposure to excessive humidity.

## Dissipation Factor

Dissipation factor is a complex function involved with the inefficiency of the capacitor. The  $\tan \delta$  may change up and down with increased temperature. For more information, please refer to Performance Characteristics.

## Sealing

### Hermetically Sealed Capacitors

When the temperature increases, the pressure inside the capacitor increases. If the internal pressure is high enough, it can cause a breach in the capacitor which can result in leakage, impregnation, filling fluid or moisture susceptibility.

### Resin Encased/Wrap & Fill Capacitors

The resin seals on resin encased and wrap and fill capacitors will withstand short-term exposure to high humidity environments without degradation. Resins and plastic tapes will form a pseudo-impervious barrier to humidity and chemicals. These case materials are somewhat porous and through osmosis can cause contaminants to enter the capacitor. The second area of contaminated absorption is the lead-wire/resin interface. Since resins cannot bond 100% to tinned wires, there can be a path formed up to the lead wire into the capacitor section. Aqueous cleaning of circuit boards can aggravate this condition.

### Barometric Pressure

The altitude at which hermetically sealed capacitors are operated controls the voltage rating of the capacitor. 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. This can be in the form of capacitance changes or dielectric arc-over as well as low insulation resistance. Heat transfer can also be affected by altitude operation. Heat generated in operation cannot be dissipated properly and can result in high R12 losses and eventual failure.

### Radiation

Radiation capabilities of capacitors must be taken into consideration. Electrical degradation in the form of dielectric embitterment can take place causing shorts or opens.



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- (4) The Customer assumes the risk of any and all uses that the Customer makes of the prototype samples.*

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