Non-solid Al - electrolytic capacitors
Radial Low Profile, 7 mm

RLP 7-097

FEATURES

- Polarized aluminium electrolytic capacitors, non-solid
- Radial leads, cylindrical aluminium case, insulated with a blue vinyl sleeve
- Charge and discharge proof
- Low profile, 7 mm height
- Miniaturized, high CV-product per unit volume.

APPLICATIONS

- General purpose; industrial, automotive and audio-video
- Low surface demand on printed-circuit board
- Coupling, decoupling, smoothing, filtering and timing
- Portable and mobile equipment (small size, low mass), low profile equipment.

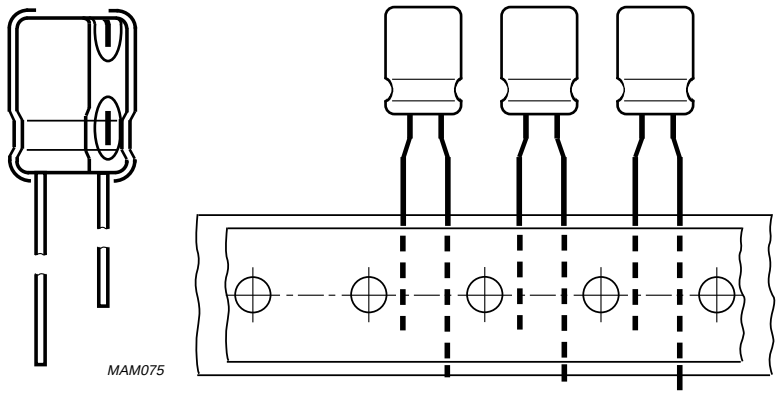
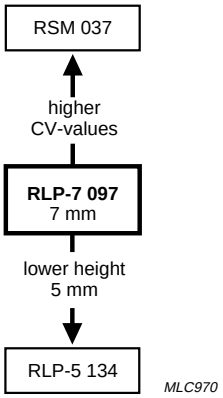


Fig.1 Component outlines.



QUICK REFERENCE DATA

DESCRIPTION	VALUE
Case sizes ($\varnothing D_{nom} \times L_{nom}$ in mm)	4×7 to 7×7
Rated capacitance range, C_R	0.1 to 220 µF
Tolerance on C_R	±20%
Rated voltage, U_R	6.3 to 63 V
Category temperature range	–40 to +85 °C
Endurance test at 85 °C	1000 hours
Useful life at 85 °C	1500 hours
Useful life at 40 °C, $1.4 \times I_R$ applied	40000 hours
Shelf life at 0 V, 85 °C	500 hours
Based on sectional specification	IEC 384-4/CECC 30300, GP grade
Climatic category IEC 68 (DIN 40040)	40/085/56 (GPF)

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Selection chart for C_R, U_R and relevant nominal case sizes (∅D × L in mm)

Preferred types in **bold**.

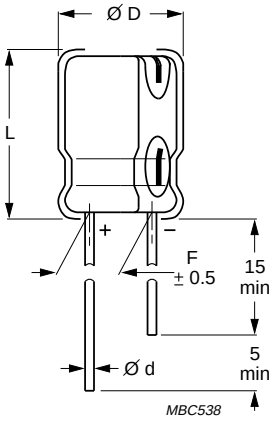
C_R (μF)	U_R (V)						
	6.3	**10**	**16**	**25**	**35**	**50**	**63**
0.10	–	–	–	–	–	–	4 × 7
0.22	–	–	–	–	–	–	4 × 7
0.47	–	–	–	–	–	–	4 × 7
1.0	–	–	–	–	–	–	**4 × 7**
2.2	–	–	–	–	–	–	**4 × 7**
3.3	–	–	–	–	–	**4 × 7**	5 × 7
4.7	–	–	–	–	**4 × 7**	**5 × 7**	**6.3 × 7**
10	–	–	**4 × 7**	–	**5 × 7**	6.3 × 7	**7 × 7**
22	4 × 7	–	**5 × 7**	–	**6.3 × 7**	7 × 7	–
33	–	5 × 7	–	**6.3 × 7**	7 × 7	–	–
47	5 × 7	–	**6.3 × 7**	**7 × 7**	–	–	–
100	–	**6.3 × 7**	**7 × 7**	–	–	–	–
220	7 × 7	–	–	–	–	–	–

MARKING

The capacitors are marked (where possible) with the following information:

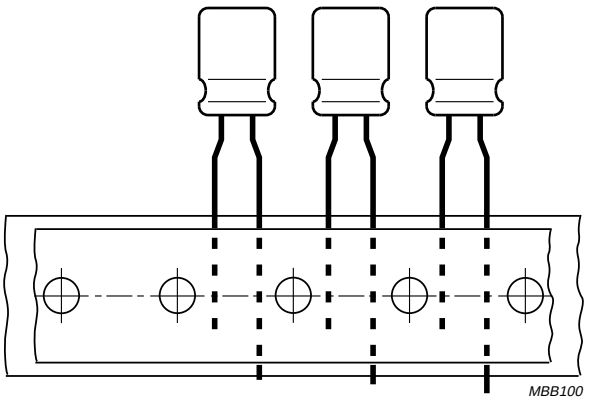
- Rated capacitance (in μF)
- Rated voltage (in V)
- Negative terminal identification
- Group number (097)
- Code indicating factory of origin
- Name of manufacturer (PHILIPS)
- Date code, in accordance with *"IEC 62"*.

MECHANICAL DATA, AVAILABLE FORMS AND PACKAGING QUANTITIES



Dimensions in mm.
For dimensions see Table 1.

Fig.2 **Form CA**: Long leads.



Form TFA: **Preferred**.
Pitch F = 5 mm.
Tape dimensions are specified in this handbook, section *"Packaging".*

Fig.3 Taped in box (ammopack), formed.

Table 1 Physical dimensions and packaging quantities; see Fig.2

NOMINAL CASE SIZE ∅D × L (mm)	CASE CODE	∅d (mm)	$\varnothing D_{max}$ (mm)	L_{max} (mm)	F (mm)	PACKAGING QUANTITIES	
						FORM CA	FORM TFA
4 × 7	71	0.45	4.5	8	1.5 ±0.5	2000	2000
5 × 7	72	0.45	5.5	8	2.0 ±0.5	1000	2000
6.3 × 7	73	0.45	6.8	8	2.5 ±0.5	1000	2000
7 × 7	74	0.45	7.5	8	2.5 ±0.5	1000	1000

ELECTRICAL DATA AND ORDERING INFORMATION

Unless otherwise specified, all electrical values in Table 2 apply at T_{amb} = 20 °C, P = 86 to 106 kPa, RH = 45 to 75%.

SYMBOL	DESCRIPTION
C_R	rated capacitance at 120 Hz, tolerance ±20%
I_R	rated RMS ripple current at 120 Hz, 85 °C
I_{L2}	max. leakage current after 2 minutes at U_R
Tan δ	max. dissipation factor at 120 Hz
ESR	equivalent series resistance at 120 Hz (calculated from tan δ_{max} and C_R)
Z	max. impedance at 10 kHz and 100 kHz

Ordering example

Electrolytic capacitor RLP 7 - 097

100 µF/16 V; ±20%

Nominal case size: ∅7 × 7; Form TFA

Catalogue number: 2222 097 35101

Table 2 Electrical data and ordering information; preferred types in **bold**

U_R (V)	C_R 120 Hz (µF)	NOMINAL CASE SIZE ∅D × L (mm)	CASE CODE	I_R 120 Hz 85 °C (mA)	I_{L2} 2 min (µA)	Tan δ 120 Hz	ESR 120 Hz (Ω)	Z 10 kHz (Ω)	Z 100 kHz (Ω)	CATALOGUE NUMBER 2222			
										BULK LONG LEADS		TAPED AMMOPACK	
										FORM CA	F (mm)	FORM TFA	F (mm)
6.3	22	4 × 7	71	31	3	0.24	14	9.6	8.4	097 53229	1.5	097 33229	5.0
	47	5 × 7	72	47	3	0.24	6.8	5	4.6	097 53479	2.0	097 33479	5.0
	220	7 × 7	74	95	14	0.24	1.4	2	1.8	097 53221	2.5	097 33221	5.0
10	33	5 × 7	72	43	4	0.20	8.0	4	3.7	097 54339	2.0	097 34339	5.0
	100	**6.3 × 7**	**73**	80	10	0.20	2.7	2.3	2.2	**097 54101**	2.5	**097 34101**	5.0
16	**10**	**4 × 7**	**71**	25	3	0.16	21	11	10	**097 55109**	1.5	**097 35109**	5.0
	22	**5 × 7**	**72**	39	4	0.16	9.6	6	5	**097 55229**	2.0	**097 35229**	5.0
	47	**6.3 × 7**	**73**	59	8	0.16	4.5	4	3.5	**097 55479**	2.5	**097 35479**	5.0
	100	**7 × 7**	**74**	97	16	0.16	2.1	3	2.5	**097 55101**	2.5	**097 35101**	5.0
25	**33**	**6.3 × 7**	**73**	53	9	0.14	5.6	3.3	2.6	**097 56339**	2.5	**097 36339**	5.0
	47	**7 × 7**	**74**	71	12	0.14	4.0	2.5	1.9	**097 56479**	2.5	**097 36479**	5.0

U_R (V)	C_R 120 Hz (μF)	NOMINAL CASE SIZE ∅D × L (mm)	CASE CODE	I_R 120 Hz 85 °C (mA)	I_{L2} 2 min (μA)	Tan δ 120 Hz	ESR 120 Hz (Ω)	Z 10 kHz (Ω)	Z 100 kHz (Ω)	CATALOGUE NUMBER 2222			
										BULK LONG LEADS		TAPED AMMOPACK	
										FORM CA	F (mm)	FORM TFA	F (mm)
35	**4.7**	**4 × 7**	**71**	20	3	0.12	34	12	10	**097 50478**	1.5	**097 30478**	5.0
	10	**5 × 7**	**72**	30	4	0.12	16	6.5	5.6	**097 50109**	2.0	**097 30109**	5.0
	22	**6.3 × 7**	**73**	47	8	0.12	7.2	3.3	3	**097 50229**	2.5	**097 30229**	5.0
	33	7 × 7	74	64	12	0.12	4.8	2.9	2.6	097 50339	2.5	097 30339	5.0
50	**3.3**	**4 × 7**	**71**	18	3	0.10	40	16	14	**097 51338**	1.5	**097 31338**	5.0
	4.7	**5 × 7**	**72**	23	3	0.10	28	12	10	**097 51478**	2.0	**097 31478**	5.0
	10	6.3 × 7	73	34	5	0.10	13	6.2	5.5	097 51109	2.5	097 31109	5.0
	22	7 × 7	74	57	11	0.10	6.0	3.2	2.9	097 51229	2.5	097 31229	5.0
63	0.10	4 × 7	71	1.3	3	0.08	1100	238	170	097 58107	1.5	097 38107	5.0
	0.22	4 × 7	71	2.9	3	0.08	480	138	110	097 58227	1.5	097 38227	5.0
	0.47	4 × 7	71	7.9	3	0.08	230	88	66	097 58477	1.5	097 38477	5.0
	1	**4 × 7**	**71**	11	3	0.08	110	42	36	**097 58108**	1.5	**097 38108**	5.0
	2.2	**4 × 7**	**71**	17	3	0.08	48	22	19	**097 58228**	1.5	**097 38228**	5.0
	3.3	5 × 7	72	21	3	0.08	32	16	14	097 58338	2.0	097 38338	5.0
	4.7	**6.3 × 7**	**73**	26	3	0.08	23	12	10	**097 58478**	2.5	**097 38478**	5.0
	10	**7 × 7**	**74**	43	7	0.08	11	6.2	5.5	**097 58109**	2.5	**097 38109**	5.0

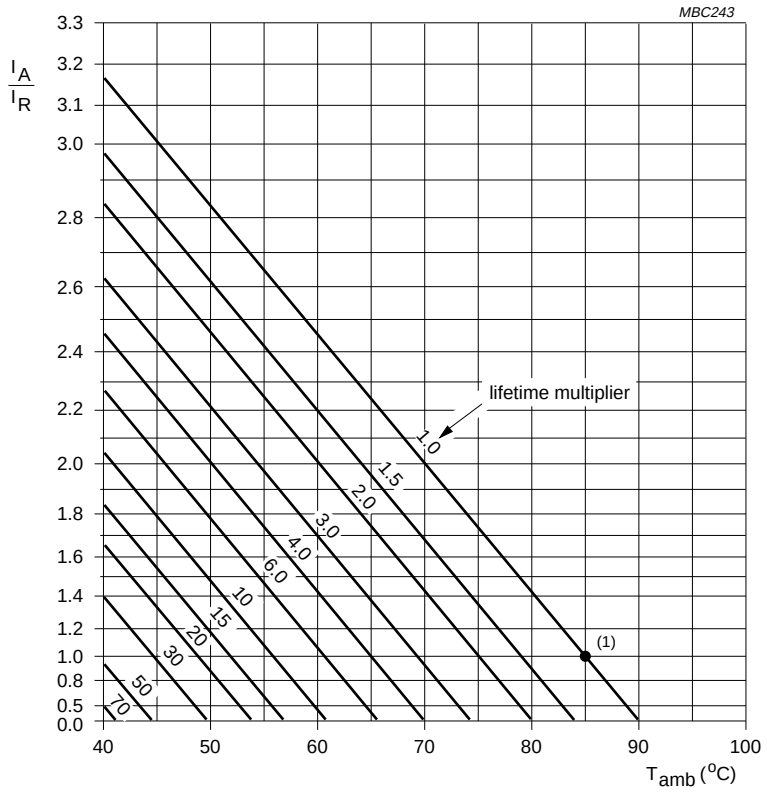
Additional electrical data

DESCRIPTION	CONDITIONS	VALUE
Voltage		
Surge voltage for short periods		$U_s \leq 1.15 \times U_R$
Reverse voltage		$U_{rev} \leq 1$ V
Current		
Leakage current	after 2 minutes at U_R	$I_{L2} \leq 0.01 C_R \times U_R$ or 3 μA (whichever is greater)

RIPPLE CURRENT AND USEFUL LIFE

Table 3 Multiplier of ripple current (I_R) as a function of frequency

FREQUENCY (Hz)	I_R MULTIPLIER
50	0.6
120	1.0
400	1.2
800	1.3
≥2000	1.4



I_A = actual ripple current at 120 Hz.

I_R = rated ripple current at 120 Hz, 85 °C.

(1) Useful life at 85 °C and I_R applied: 1500 hours.

Fig.4 Multiplier of useful life as a function of ambient temperature and ripple current load.

SPECIFIC TESTS AND REQUIREMENTS

General tests and requirements are specified in in this handbook, section *"Tests and Requirements"*.

Table 4 Test procedures and requirements

TEST		PROCEDURE (quick reference)	REQUIREMENTS
NAME OF TEST	**REFERENCE**		
Endurance	IEC 384-4/ CECC 30300, subclause 4.13	T_{amb} = 85 °C, U_R applied; 1000 hours	$\Delta C/C$: ±20% tan $\delta \leq 2 \times$ spec. limit $I_{L2} \leq$ spec. limit
Useful life	CECC 30301, subclause 1.8.1	T_{amb} = 85 °C, U_R and I_R applied; 1500 hours	$\Delta C/C$: ±50% tan $\delta \leq 3 \times$ spec. limit $Z \leq 3 \times$ spec. limit $I_{L2} \leq$ spec. limit no short or open circuit total failure percentage: ≤3%
Shelf life (storage at high temperature)	IEC 384-4/ CECC 30300, subclause 4.17	T_{amb} = 85 °C; no voltage applied; 500 hours; after test: U_R to be applied for 30 minutes, 24 to 48 hours before measurement	$\Delta C/C$, tan δ, Z: for requirements see 'Endurance' test above $I_{L2} \leq$ spec. limit