

# DATA SHEET

Datasheet.World

2251 064 MP-SI

**Aluminum electrolytic capacitors**  
**Multi-Pin Snap-in**

Product specification

2002 Jan 11

New

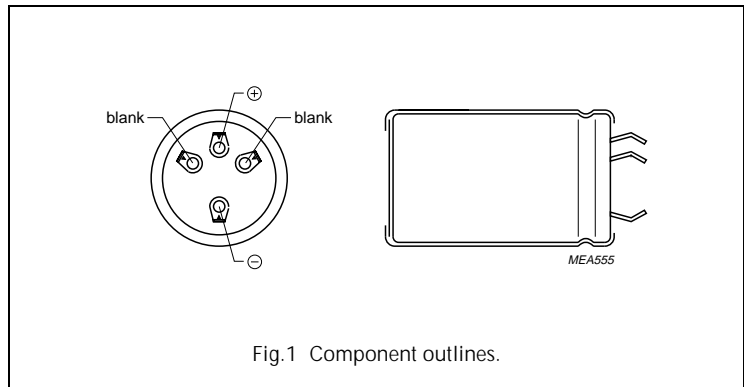
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# Aluminum electrolytic capacitors Multi-Pin Snap-in

2251 064 MP-SI

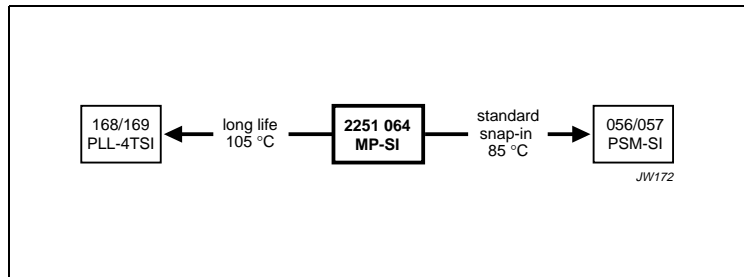
## FEATURES

- Keyed polarity obtained by 4 snap-in terminals
- Polarized aluminum electrolytic capacitors, non-solid electrolyte
- Large types, minimized dimensions, cylindrical aluminum case, insulated with a blue sleeve
- Pressure relief in the side of the aluminum case
- Charge and discharge proof
- Long useful life: 5000 hours at 85 °C
- Very high ripple current capability.



## APPLICATIONS

- General purpose, industrial and audio/video systems
- Smoothing and filtering
- Standard and switched mode power supplies
- Energy storage in pulse systems.



## QUICK REFERENCE DATA

DESCRIPTION	VALUE
Case size ( $\varnothing D_{nom} \times L_{nom}$ in mm)	35 × 50 to 50 × 105
Rated capacitance range (E6/E12 series), $C_R$	330 to 16000 $\mu$ F
Tolerance on $C_R$	±20%
Rated voltage range, $U_R$	100 to 450 V
Category temperature range	-40 to +85 °C
Endurance test at 85 °C	2000 hours
Useful life at 85 °C	5000 hours
Useful life at 40 °C and $1.4 \times I_R$ applied	75000 hours
Shelf life at 0 V, 85 °C	500 hours
Based on sectional specification	IEC 60384-4/EN130300
Climatic category IEC 60068	40/085/56

# Aluminum electrolytic capacitors

## Multi-Pin Snap-in

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Selection chart for  $C_R$ ,  $U_R$  and relevant nominal case sizes ( $\varnothing D \times L$  in mm)

$C_R$ ( $\mu\text{F}$ )	$U_R$ (V)				
	100	250	350	400	450
330	–	–	–	–	35 × 50
390	–	–	–	–	40 × 50
470	–	–	–	35 × 50	35 × 63/45 × 50
560	–	–	35 × 50	40 × 50	35 × 80/50 × 50 40 × 63
680	–	–	40 × 50	35 × 63/45 × 50	35 × 105/40 × 80 45 × 63
820	–	–	35 × 63/45 × 50	35 × 80/50 × 50 40 × 63	40 × 105/50 × 63 45 × 80
1000	–	–	35 × 80/50 × 50 40 × 63	35 × 105/45 × 63 40 × 80	45 × 105/50 × 80
1200	–	35 × 50	35 × 105/45 × 63 40 × 80	35 × 105/45 × 63 40 × 80	50 × 105
1400	–	40 × 50	40 × 105/50 × 63 45 × 80	45 × 105/50 × 80	–
1600	–	45 × 50	45 × 105/50 × 80	50 × 105	–
1800	–	35 × 63	–	–	–
1900	–	50 × 50	50 × 105	–	–
2100	–	40 × 63	–	–	–
2200	–	35 × 80	–	–	–
2500	–	45 × 63	–	–	–
2600	–	40 × 80	–	–	–
2700	–	35 × 105	–	–	–
3000	–	50 × 63	–	–	–
3100	–	45 × 80	–	–	–
3300	–	40 × 105	–	–	–
3700	–	50 × 80	–	–	–
3900	–	45 × 105	–	–	–
4700	35 × 50	50 × 105	–	–	–
5600	40 × 50	–	–	–	–
6800	35 × 63/45 × 50	–	–	–	–
8200	35 × 80/50 × 50 40 × 63	–	–	–	–
10000	35 × 105/45 × 63 40 × 80	–	–	–	–
11000	45 × 80/50 × 63	–	–	–	–
12000	40 × 105	–	–	–	–
13000	50 × 80	–	–	–	–
14000	50 × 80	–	–	–	–
16000	50 × 105	–	–	–	–

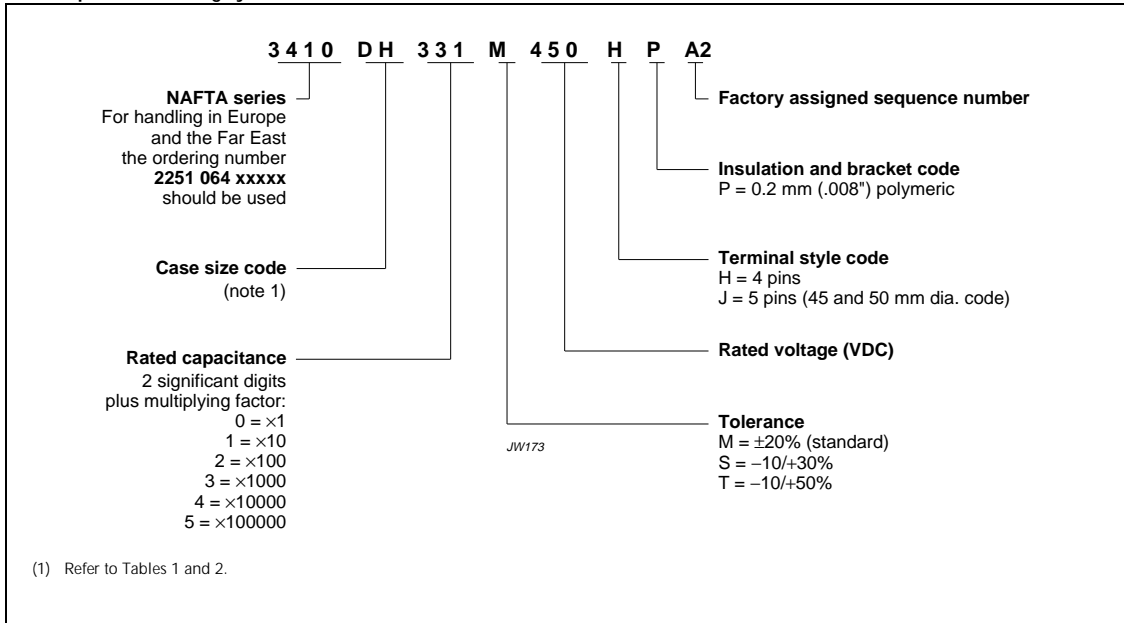
# Aluminum electrolytic capacitors

## Multi-Pin Snap-in

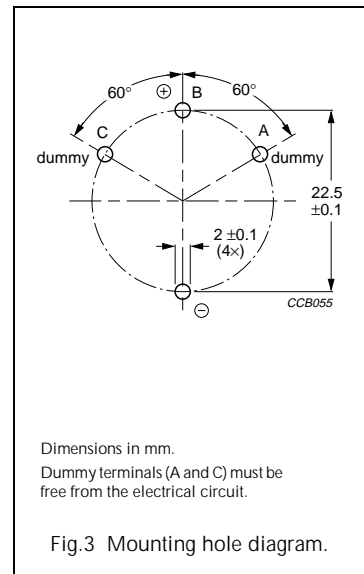
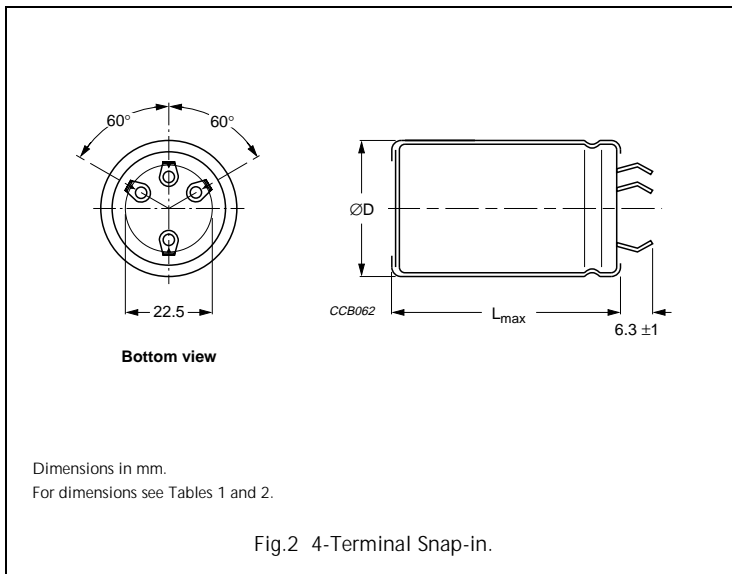
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### ORDERING INFORMATION

#### NAFTA part numbering system



### MECHANICAL DATA AND PACKAGING QUANTITIES



# Aluminum electrolytic capacitors

## Multi-Pin Snap-in

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**Table 1** Physical dimensions in millimetres, mass and packaging information; see Fig.2

CASE CODE	NOMINAL CASE SIZE $\varnothing D \times L$ (mm)	$\varnothing D_{\max}$ (mm)	$L_{\max}$ (mm)	MASS (g)	PACKAGING QUANTITIES (units per box)	CARDBOARD BOX DIMENSIONS $l \times w \times h$ (mm)
DF	35 × 50	36	51	≈72	100	402 × 402 × 251
DG	35 × 63	36	64	≈73	150	402 × 200 × 302
DH	35 × 80	36	81	≈74	100	402 × 402 × 251
DJ	35 × 105	36	106	≈75	100	402 × 200 × 302
EF	40 × 50	41	51	≈76	180	403 × 225 × 300
EG	40 × 63	41	64	≈77	135	403 × 225 × 300
EH	40 × 80	41	81	≈78	90	403 × 225 × 240
EJ	40 × 105	41	106	≈79	90	403 × 225 × 240
FF	45 × 50	46	51	≈80	96	324 × 216 × 289
FG	45 × 63	46	64	≈81	96	324 × 216 × 289
FH	45 × 80	46	81	≈82	72	332 × 221 × 278
FJ	45 × 105	46	106	≈83	48	332 × 221 × 318
GF	50 × 50	51	51	≈84	96	324 × 216 × 289
GG	50 × 63	51	64	≈85	96	324 × 216 × 289
GH	50 × 80	51	81	≈86	72	332 × 221 × 278
GJ	50 × 105	51	106	≈87	48	332 × 221 × 318

**Table 2** Physical dimensions in inches, mass and packaging information; see Fig.2

CASE CODE	NOMINAL CASE SIZE $\varnothing D \times L$ (inches)	$\varnothing D_{\max}$ (inches)	$L_{\max}$ (inches)	MASS (g)	PACKAGING QUANTITIES (units per box)	CARDBOARD BOX DIMENSIONS $l \times w \times h$ (inches)
DF	1.378 × 1.969	1.42	2.01	≈72	100	15.813 × 15.813 × 9.875
DG	1.378 × 2.480	1.42	2.52	≈73	150	15.813 × 7.875 × 11.875
DH	1.378 × 3.150	1.42	3.19	≈74	100	15.813 × 15.813 × 9.875
DJ	1.378 × 4.134	1.42	4.17	≈75	100	15.813 × 7.875 × 11.875
EF	1.575 × 1.969	1.61	2.01	≈76	180	15.875 × 8.875 × 11.813
EG	1.575 × 2.480	1.61	2.52	≈77	135	15.875 × 8.875 × 11.813
EH	1.575 × 3.150	1.61	3.19	≈78	90	15.875 × 8.875 × 9.438
EJ	1.575 × 4.134	1.61	4.17	≈79	90	15.875 × 8.875 × 9.438
FF	1.772 × 1.969	1.81	2.01	≈80	96	12.75 × 8.5 × 11.375
FG	1.772 × 2.480	1.81	2.52	≈81	96	12.75 × 8.5 × 11.375
FH	1.772 × 3.150	1.81	3.19	≈82	72	13.063 × 8.688 × 10.938
FJ	1.772 × 4.134	1.81	4.17	≈83	48	13.063 × 8.688 × 12.375
GF	1.969 × 1.969	2.01	2.01	≈84	96	12.75 × 8.5 × 11.375
GG	1.969 × 2.480	2.01	2.52	≈85	96	12.75 × 8.5 × 11.375
GH	1.969 × 3.150	2.01	3.19	≈86	72	13.063 × 8.688 × 10.938
GJ	1.969 × 4.134	2.01	4.17	≈87	48	13.063 × 8.688 × 12.375

# Aluminum electrolytic capacitors

## Multi-Pin Snap-in

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#### ELECTRICAL DATA AND ORDERING INFORMATION

Unless otherwise specified, all electrical values in Table 3 apply at  $T_{amb} = 20\text{ °C}$ ,  
 $P = 86$  to  $106\text{ kPa}$ ,  $RH = 45$  to  $75\%$ .

SYMBOL	DESCRIPTION
$C_R$	rated capacitance at 100 Hz
$I_R$	rated RMS ripple current at 100 Hz and 85 °C
$I_{L1}$	max. leakage current after 1 minute at $U_R$
$I_{L5}$	max. leakage current after 5 minutes at $U_R$
ESR	max. equivalent series resistance at 100 Hz
Z	max. impedance at 10 kHz

#### Ordering example

Electrolytic capacitor 2251 064 series  
 10000  $\mu\text{F}/100\text{ V}$ ;  $\pm 20\%$

Nominal case size:  $\varnothing 45 \times 63\text{ mm}$

Catalogue number: 2251 064 39103.

**Table 3** Electrical data and ordering information for 2251 064 series

$U_R$ (V)	$C_R$ 100 Hz ( $\mu\text{F}$ )	NOMINAL CASE SIZE $\varnothing D \times L$ (mm)	CASE CODE	$I_R$ 100 Hz 85 °C (A)	$I_{L1}$ 1 min ( $\mu\text{A}$ )	$I_{L5}$ 5 min ( $\mu\text{A}$ )	ESR MAX. 100 Hz (m $\Omega$ )	Tan $\delta$ MAX. 100 Hz	CATALOGUE NUMBER 2251 ... ..
100	4700	35 × 50	DF	7.7	2690	944	37	0.12	064 59472
	5600	40 × 50	EF	8.1	3203	1124	38	0.14	064 59562
	6800	35 × 63	DG	9.1	3887	1364	31	0.15	064 59682
	6800	45 × 50	FF	8.9	3887	1364	37	0.18	064 49682
	8200	35 × 80	DH	10.9	4685	1644	26	0.15	064 59822
	8200	40 × 63	EG	10.4	4685	1644	27	0.16	064 49822
	8200	50 × 50	GF	9.1	4685	1644	40	0.23	064 39822
	10000	35 × 105	DJ	13.5	5711	2004	21	0.14	064 59103
	10000	40 × 80	EH	12.2	5711	2004	23	0.16	064 49103
	10000	45 × 63	FG	10.8	5711	2004	29	0.20	064 39103
	11000	45 × 80	FH	12.5	6281	2204	25	0.19	064 59113
	11000	50 × 63	GG	10.8	6281	2204	31	0.24	064 49113
	12000	40 × 105	EJ	14.6	6851	2404	21	0.16	064 59123
	13000	50 × 80	GH	12.7	7421	2604	26	0.24	064 59133
	14000	45 × 105	FJ	15	7991	2804	20	0.19	064 59143
	16000	50 × 105	GJ	15	9131	3204	22	0.24	064 59163

# Aluminum electrolytic capacitors

## Multi-Pin Snap-in

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$U_R$ (V)	$C_R$ 100 Hz ( $\mu$ F)	NOMINAL CASE SIZE $\varnothing D \times L$ (mm)	CASE CODE	$I_R$ 100 Hz 85 °C (A)	$I_{L1}$ 1 min ( $\mu$ A)	$I_{L5}$ 5 min ( $\mu$ A)	ESR MAX. 100 Hz (m $\Omega$ )	Tan $\delta$ MAX. 100 Hz	CATALOGUE NUMBER 2251 ... ..
250	1200	35 × 50	DF	5.2	1721	604	85	0.07	064 53122
	1400	40 × 50	EF	5.9	2006	704	75	0.07	064 53142
	1600	45 × 50	FF	6.3	2291	804	71	0.08	064 53162
	1800	35 × 63	DG	7.1	2576	904	55	0.07	064 53182
	1900	50 × 50	GF	7.1	2719	954	65	0.09	064 53192
	2100	40 × 63	EG	7.5	3004	1054	54	0.08	064 53212
	2200	35 × 80	DH	7.9	3146	1104	48	0.08	064 53222
	2500	45 × 63	FG	8.1	3574	1254	51	0.09	064 53252
	2600	40 × 80	EH	8.8	3716	1304	43	0.08	064 53262
	2700	35 × 105	DJ	9.4	3859	1354	40	0.08	064 53272
	3000	50 × 63	GG	9.0	4286	1504	46	0.10	064 53302
	3100	45 × 80	FH	9.6	4429	1554	41	0.09	064 53312
	3300	40 × 105	EJ	10.7	4714	1654	35	0.08	064 53332
	3700	50 × 80	GH	10.5	5284	1854	37	0.10	064 53372
	3900	45 × 105	FJ	11.5	5569	1954	34	0.09	064 53392
	4700	50 × 105	GJ	12.5	6709	2354	31	0.10	064 53472
350	560	35 × 50	DF	3.4	1129	396	89	0.07	064 55561
	680	40 × 50	EF	4.0	1368	480	159	0.07	064 55681
	820	35 × 63	DG	4.5	1647	578	132	0.07	064 55821
	820	45 × 50	FF	4.5	1647	578	145	0.08	064 45821
	1000	35 × 80	DH	5.3	2006	704	103	0.07	064 55102
	1000	40 × 63	EG	5.2	2006	704	112	0.08	064 45102
	1000	50 × 50	GF	5.2	2006	704	121	0.08	064 35102
	1200	35 × 105	DJ	6.3	2405	844	91	0.08	064 55122
	1200	40 × 80	EH	6.1	2405	844	93	0.08	064 45122
	1200	45 × 63	FG	5.8	2405	844	102	0.08	064 35122
	1400	40 × 105	EJ	7.1	2804	984	79	0.08	064 55142
	1400	45 × 80	FH	6.6	2804	984	87	0.08	064 45142
	1400	50 × 63	EJ	6.4	2804	984	91	0.09	064 35142
	1600	45 × 105	FJ	7.7	3203	1124	75	0.08	064 55162
	1600	50 × 80	GH	7.3	3203	1124	78	0.09	064 45162
	1900	50 × 105	GJ	8.6	3802	1334	66	0.09	064 55192

# Aluminum electrolytic capacitors

## Multi-Pin Snap-in

### 2251 064 MP-SI

$U_R$ (V)	$C_R$ 100 Hz ( $\mu$ F)	NOMINAL CASE SIZE $\varnothing D \times L$ (mm)	CASE CODE	$I_R$ 100 Hz 85 °C (A)	$I_{L1}$ 1 min ( $\mu$ A)	$I_{L5}$ 5 min ( $\mu$ A)	ESR MAX. 100 Hz (m $\Omega$ )	Tan $\delta$ MAX. 100 Hz	CATALOGUE NUMBER 2251 ... ..
400	470	35 × 50	DF	3.3	1083	380	209	0.07	064 56471
	560	40 × 50	EF	3.8	1288	452	178	0.07	064 56561
	680	35 × 63	DG	4.2	1562	548	146	0.07	064 56681
	680	45 × 50	FF	4.3	1562	548	161	0.08	064 46681
	820	35 × 80	DH	5.0	1881	660	122	0.07	064 56821
	820	40 × 63	EG	4.9	1881	660	125	0.07	064 46821
	820	50 × 50	GF	4.9	1881	660	137	0.08	064 36821
	1000	35 × 105	DJ	6.0	2291	804	101	0.07	064 56102
	1000	40 × 80	EH	5.8	2291	804	102	0.07	064 46102
	1000	45 × 63	FG	5.5	2291	804	112	0.08	064 36102
	1200	40 × 105	EJ	6.9	2747	964	89	0.07	064 56122
	1200	45 × 80	FH	6.4	2747	964	94	0.08	064 46122
	1200	50 × 63	EJ	6.2	2747	964	97	0.08	064 36122
	1400	45 × 105	FJ	7.5	3203	1124	81	0.08	064 56142
	1400	50 × 80	GH	7.2	3203	1124	84	0.08	064 46142
	1600	50 × 105	GJ	8.2	3659	1284	73	0.08	064 56162
450	330	35 × 50	DF	2.8	858	301	291	0.07	064 57331
	390	40 × 50	EF	3.2	1012	355	246	0.07	064 57391
	470	35 × 63	DG	3.6	1217	427	205	0.07	064 57471
	470	45 × 50	FF	3.7	1217	427	220	0.07	064 47471
	560	35 × 80	DH	4.2	1448	508	172	0.07	064 57561
	560	40 × 63	EG	4.1	1448	508	174	0.07	064 47561
	560	50 × 50	GF	4.2	1448	508	188	0.07	064 37561
	680	35 × 105	DJ	5.0	1756	616	144	0.07	064 57681
	680	40 × 80	EH	4.9	1756	616	146	0.07	064 47681
	680	45 × 63	FG	4.7	1756	616	155	0.07	064 37681
	820	40 × 105	EJ	5.9	2115	742	122	0.07	064 57821
	820	45 × 80	FH	5.5	2115	742	129	0.07	064 47821
	820	50 × 63	EJ	5.3	2115	742	133	0.07	064 37821
	1000	45 × 105	FJ	6.5	2576	904	107	0.07	064 57102
	1000	50 × 80	GH	6.3	2576	904	107	0.07	064 47102
	1200	50 × 105	GJ	7.3	3089	1084	92	0.07	064 57122



# Aluminum electrolytic capacitors

## Multi-Pin Snap-in

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### Additional electrical data

PARAMETER	CONDITIONS	VALUE
<b>Voltage</b>		
Surge voltage	≤350 V versions	$U_s = 1.15 \times U_R$
	≥350 V versions	$U_s = 1.1 \times U_R$
Reverse voltage		$U_{rev} \leq 1 \text{ V}$
<b>Current</b>		
Leakage current	after 5 minutes at $U_R$	$I_{L5} \leq 0.002C_R \times U_R + 4 \mu\text{A}$
<b>Inductance</b>		
Equivalent series inductance (ESL)	all case sizes	typ. 19 nH
		max. 25 nH

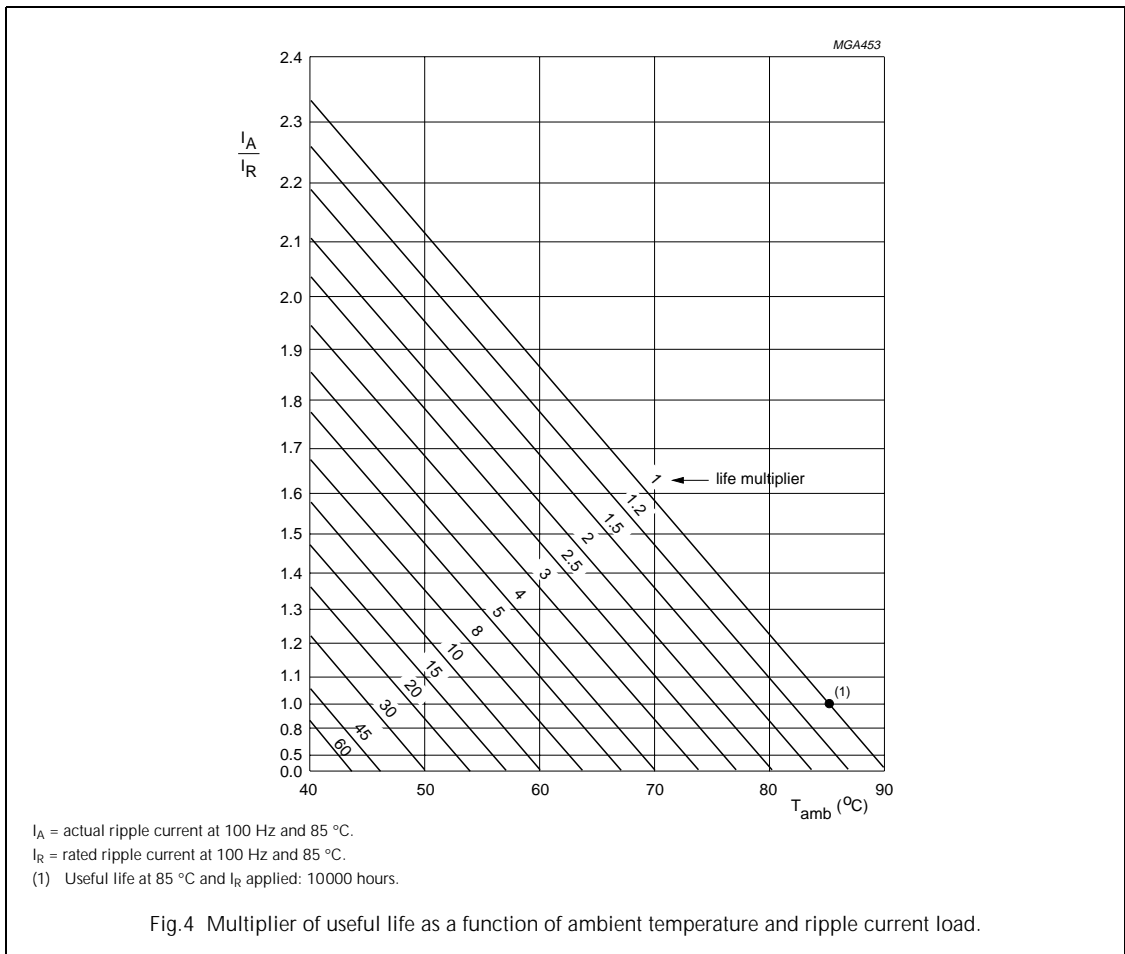
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## RIPPLE CURRENT AND USEFUL LIFE

**Table 4** Multiplier of ripple current ( $I_R$ ) as a function of frequency

FREQUENCY (Hz)	$I_R$ MULTIPLIER	
	$U_R = \leq 100 \text{ V}$	$U_R = > 100 \text{ V}$
50	0.86	0.86
100	1.00	1.00
300	1.15	1.25
1000	1.35	1.40
$\geq 10000$	1.45	1.50



# Aluminum electrolytic capacitors

## Multi-Pin Snap-in

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### SPECIFIC TESTS AND REQUIREMENTS

General tests and requirements are specified in data handbook BC01, section "Tests and Requirements".

**Table 5** Test procedures and requirements

TEST		PROCEDURE (quick reference)	REQUIREMENTS
NAME OF TEST	REFERENCE		
Endurance	IEC 60384-4/ EN130300 subclause 4.13	$T_{amb} = 85\text{ °C}$ ; $U_R$ applied; 2000 hours	$U_R \leq 100\text{ V}$ ; $\Delta C/C$ : $\pm 15\%$ $U_R > 100\text{ V}$ ; $\Delta C/C$ : $\pm 15\%$ $ESR \leq 2 \times \text{spec. limit}$ $Z \leq 2 \times \text{spec. limit}$ $I_{L5} \leq \text{spec. limit}$
Useful life	CECC 30301 subclause 1.8.1	$T_{amb} = 85\text{ °C}$ ; $U_R$ and $I_R$ applied; 5000 hours	$U_R \leq 100\text{ V}$ ; $\Delta C/C$ : $\pm 35\%$ $U_R > 100\text{ V}$ ; $\Delta C/C$ : $\pm 30\%$ $ESR \leq 3 \times \text{spec. limit}$ $Z \leq 3 \times \text{spec. limit}$ $I_{L5} \leq \text{spec. limit}$ no short or open circuit, no visible damage total failure percentage: $\leq 4\%$
Shelf life (storage at high temperature)	IEC 60384-4/ EN130300 subclause 4.17	$T_{amb} = 85\text{ °C}$ no voltage applied; 500 hours  after test: $U_R$ to be applied for 30 minutes, 24 to 48 hours before measurement	$\Delta C/C$ : $\pm 10\%$ $ESR \leq 1.2 \times \text{spec. limit}$ $I_{L5} \leq 2 \times \text{spec. limit}$

### MARKING

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

- Rated capacitance (in  $\mu\text{F}$ )
- Tolerance code on rated capacitance (M for  $\pm 20\%$ )
- Rated voltage (in V)
- Climatic category in accordance with "IEC 60068"
- Date code (year and week) in accordance with "IEC 60062"
- Code for factory of origin
- Name of manufacturer
- '–' sign to indicate the negative terminal, visible from the top and side of the capacitor
- Code number (last 8 digits)
- Code for basic specification in accordance with "IEC 60384-4-1" and "CECC 30301".