

DATA SHEET

O56/O57 PSM-SI
Aluminum electrolytic capacitors
Power Standard Miniature Snap-in

Product specification
Supersedes data of 18th January 2000
File under BCcomponents, BC01

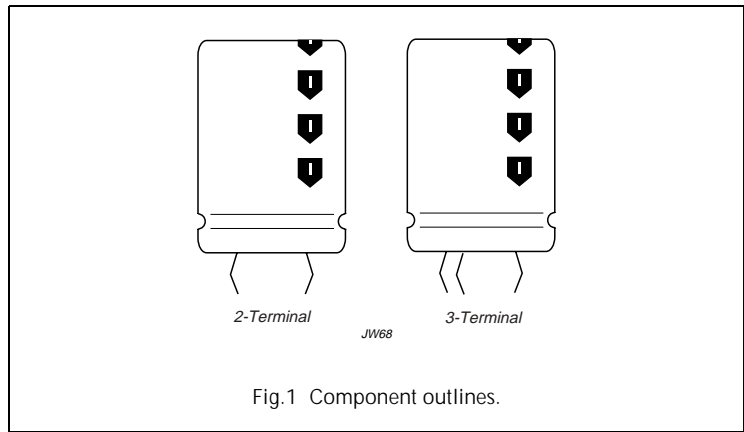
2001 Dec 10

Aluminum electrolytic capacitors Power Standard Miniature Snap-in

056/057 PSM-SI

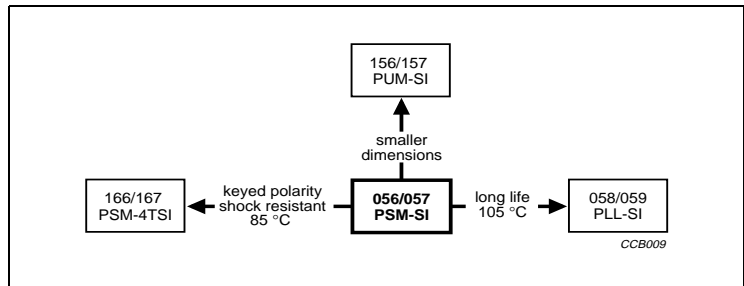
FEATURES

- Polarized aluminum electrolytic capacitors, non-solid electrolyte
- Large types, minimized dimensions, cylindrical aluminum case, insulated with a blue sleeve
- Pressure relief on the top of the aluminum case
- Charge and discharge proof
- Long useful life: 12000 hours at 85 °C
- High ripple current capability
- Keyed polarity version available.



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	
	056	057
Case size ($\varnothing D_{nom} \times L_{nom}$ in mm)	22 × 25 to 35 × 50	
Rated capacitance range (E6 series), C_R	470 to 68000 μF	47 to 1500 μF
Tolerance on C_R	±20%	
Rated voltage range, U_R ; note 1	10 to 100 V	200 to 450 V
Category temperature range	-40 to +85 °C	
Endurance test at 85 °C	5000 hours (450 V: 2000 hours)	
Useful life at 85 °C	12000 hours (450 V: 5000 hours)	
Useful life at 40 °C and $1.4 \times I_R$ applied	210000 hours (450 V: 90000 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	

Note

1. A 420 V range is available on request.

Aluminum electrolytic capacitors

Power Standard Miniature Snap-in

056/057 PSM-SI

Selection chart for C_R , U_R and relevant nominal case sizes ($\varnothing D \times L$ in mm) for 056 series

Preferred types (2-terminals) in **bold**.

C_R (μF)	U_R (V)						
	10	16	25	40	50	63	100
470	–	–	–	–	–	–	22 × 25
680	–	–	–	–	–	–	22 × 30
1000	–	–	–	–	–	22 × 25	25 × 30
	–	–	–	–	–	–	22 × 40
1500	–	–	–	–	22 × 25	22 × 30	30 × 30
	–	–	–	–	–	–	25 × 40
2200	–	–	–	22 × 25	22 × 30	25 × 30	30 × 40
	–	–	–	–	–	22 × 40	25 × 50
3300	–	–	22 × 25	22 × 30	25 × 30	30 × 30	35 × 40
	–	–	–	–	22 × 40	25 × 40	30 × 50
4700	–	22 × 25	22 × 30	25 × 30	30 × 30	30 × 40	35 × 50
	–	–	–	22 × 40	25 × 40	25 × 50	–
6800	22 × 25	22 × 30	25 × 30	30 × 30	30 × 40	35 × 40	–
	–	–	22 × 40	25 × 40	25 × 50	30 × 50	–
10000	22 × 30	25 × 30	30 × 30	30 × 40	35 × 40	35 × 50	–
	–	22 × 40	25 × 40	25 × 50	30 × 50	–	–
15000	25 × 30	30 × 30	30 × 40	35 × 40	35 × 50	–	–
	22 × 40	25 × 40	25 × 50	30 × 50	–	–	–
22000	30 × 30	30 × 40	35 × 40	35 × 50	–	–	–
	25 × 40	25 × 50	30 × 50	–	–	–	–
33000	30 × 40	35 × 40	35 × 50	–	–	–	–
	25 × 50	30 × 50	–	–	–	–	–
47000	35 × 40	35 × 50	–	–	–	–	–
	30 × 50	–	–	–	–	–	–
68000	35 × 50	–	–	–	–	–	–

Aluminum electrolytic capacitors

Power Standard Miniature Snap-in

056/057 PSM-SI

Selection chart for C_R , U_R and relevant nominal case sizes ($\varnothing D \times L$ in mm) for 057 series

Preferred types (2-terminals) in **bold**.

C_R (μF)	U_R (V)				
	200	250	385	400	450
47	–	–	22 × 25	22 × 25	22 × 30
68	–	–	22 × 30	22 × 30	22 × 30
100	–	22 × 25	25 × 30	25 × 30	30 × 30
	–	–	22 × 40	22 × 35	25 × 35
	–	–	22 × 35	–	–
150	22 × 25	22 × 30	30 × 30	30 × 30	25 × 50
	–	–	25 × 40	25 × 50 ⁽¹⁾	30 × 35
	–	–	–	25 × 40	–
220	22 × 30	25 × 30	30 × 45 ⁽¹⁾	30 × 35	35 × 40
	–	22 × 40	30 × 40	25 × 50	30 × 45
	–	–	30 × 35	–	–
	–	–	25 × 50	–	–
330	25 × 30	30 × 30	35 × 35	35 × 40	35 × 50
	22 × 40	25 × 40	30 × 45	30 × 50	35 × 45
470	30 × 30	30 × 40	35 × 50	35 × 50	–
	25 × 40	25 × 50	35 × 45	–	–
680	30 × 40	35 × 40	–	–	–
	25 × 50	30 × 50	–	–	–
1000	35 × 40	35 × 50	–	–	–
	30 × 50	–	–	–	–
1500	35 × 50	–	–	–	–

Note

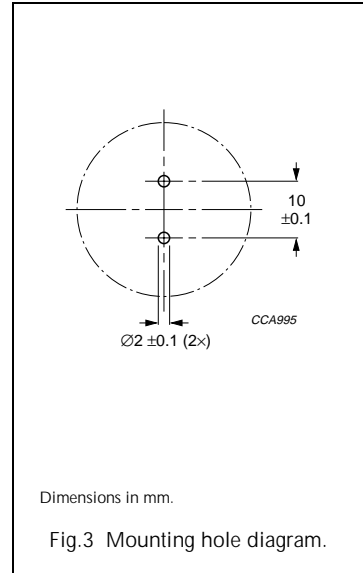
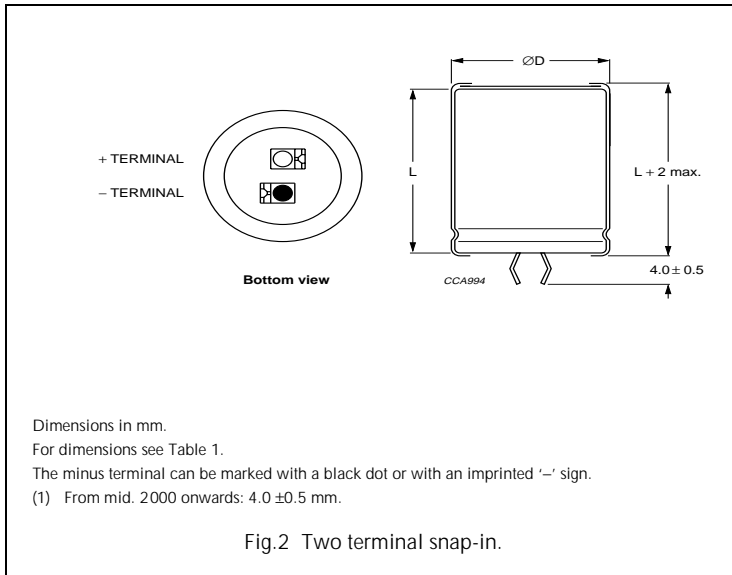
1. Ripple current optimized types.

Aluminum electrolytic capacitors Power Standard Miniature Snap-in

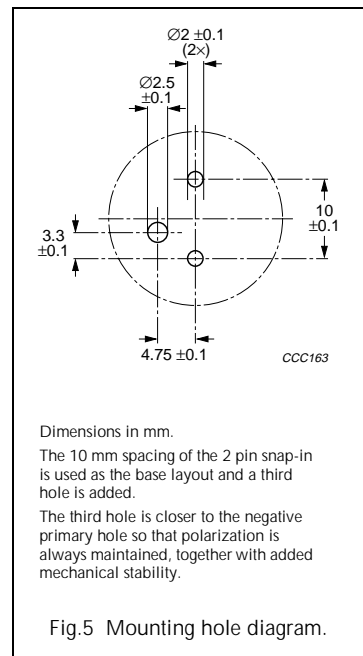
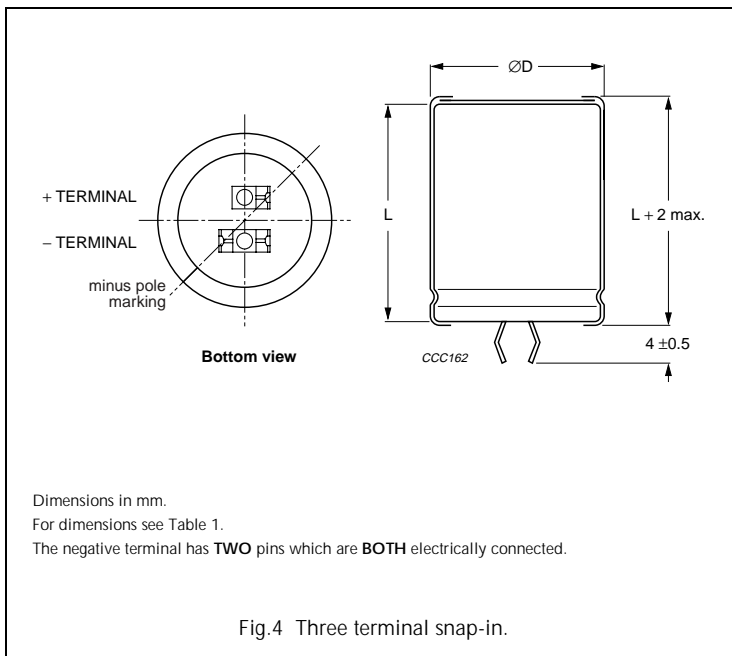
O56/O57 PSM-SI

MECHANICAL DATA AND PACKAGING QUANTITIES

Two terminal snap-in



Three terminal snap-in



Aluminum electrolytic capacitors

Power Standard Miniature Snap-in

O56/O57 PSM-SI

Table 1 Physical dimensions, mass and packaging information; see Figs 2 and 4

NOMINAL CASE SIZE ØD × L (mm)	ØD _{max} (mm)	L _{max} (mm)	MASS (g)	PACKAGING QUANTITIES (units per box)	CARDBOARD BOX DIMENSIONS l × w × h (mm)
22 × 25	23	27	≈12	100	260 × 250 × 39
22 × 30	23	32	≈16	100	260 × 250 × 44
22 × 35	23	37	≈20	100	260 × 250 × 49
22 × 40	23	42	≈23	100	260 × 250 × 54
25 × 30	26	32	≈22	100	290 × 280 × 44
25 × 35	26	37	≈24	100	290 × 280 × 49
25 × 40	26	42	≈27	100	290 × 280 × 54
25 × 50	26	52	≈38	100	290 × 280 × 64
30 × 30	31	32	≈30	100	340 × 330 × 44
30 × 35	31	37	≈35	100	340 × 330 × 49
30 × 40	31	42	≈40	100	340 × 330 × 54
30 × 45	31	47	≈45	100	340 × 330 × 59
30 × 50	31	52	≈50	100	340 × 330 × 64
35 × 35	36	37	≈48	50	390 × 198 × 49
35 × 40	36	42	≈55	50	390 × 198 × 54
35 × 45	36	47	≈63	50	390 × 198 × 59
35 × 50	36	52	≈72	50	390 × 198 × 64

MARKING

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

- Rated capacitance (in µF)
- Tolerance code on rated capacitance (M for ±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".

Aluminum electrolytic capacitors

Power Standard Miniature Snap-in

056/057 PSM-SI

ELECTRICAL DATA AND ORDERING INFORMATION

Unless otherwise specified, all electrical values in Tables 2 and 3 apply at $T_{amb} = 20\text{ °C}$, $P = 86$ to 106 kPa , $RH = 45$ to 75% .

SYMBOL	DESCRIPTION
C_R	rated capacitance at 100 Hz
I_R	rated RMS ripple current at 100 Hz or $\geq 10\text{ kHz}$ 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 056 series

10000 $\mu\text{F}/25\text{ V}$; $\pm 20\%$
Nominal case size: $\varnothing 25 \times 40\text{ mm}$

2-TERMINAL SNAP-IN:

Catalogue number: 2222 056 46103.

3-TERMINAL SNAP-IN:

Catalogue number: 2222 056 26103.

Table 2 Electrical data and ordering information for **056** series; preferred types in **bold**

U_R (V)	C_R 100 Hz (μF)	NOMINAL CASE SIZE $\varnothing D \times L$ (mm)	I_R 100 Hz 85 °C (A)	I_R $\geq 10\text{ kHz}$ 85 °C (A)	I_{L1} 1 min (μA)	I_{L5} 5 min (μA)	ESR 100 Hz ($\text{m}\Omega$)	Z 10 kHz ($\text{m}\Omega$)	CATALOGUE NUMBER 2222 056	
									2-TERM.	3-TERM.
10	6800	22 × 25	2.04	2.40	412	140	76	62	54682	74682
	10000	22 × 30	2.56	3.02	608	205	56	45	54103	74103
	15000	25 × 30	3.12	3.68	904	304	44	39	54153	74153
	15000	22 × 40	3.39	4.00	904	304	41	34	44153	24153
	22000	30 × 30	3.47	4.09	1324	444	44	37	54223	74223
	22000	25 × 40	4.12	4.86	1324	444	34	28	44223	24223
	33000	30 × 40	4.58	5.40	1984	664	32	28	54333	74333
	33000	25 × 50	4.70	5.55	1984	664	30	27	44333	24333
	47000	35 × 40	5.10	6.02	2824	944	31	26	54473	74473
	47000	30 × 50	5.39	6.36	2824	944	28	24	44473	24473
	68000	35 × 50	5.88	6.94	4084	1364	28	23	54683	74683
16	4700	22 × 25	2.01	2.37	455	154	79	62	55472	75472
	6800	22 × 30	2.54	3.00	657	222	57	45	55682	75682
	10000	25 × 30	3.02	3.56	964	324	47	39	55103	75103
	10000	22 × 40	3.28	3.87	964	324	44	34	45103	25103
	15000	30 × 30	3.36	3.96	1444	484	47	37	55153	75153
	15000	25 × 40	4.00	4.72	1444	484	34	28	45153	25153
	22000	30 × 40	4.51	5.32	2116	708	33	28	55223	75223
	22000	25 × 50	3.97	4.68	2116	708	42	41	45223	25223
	33000	35 × 40	5.02	5.92	3172	1060	32	28	55333	75333
	33000	30 × 50	4.75	5.61	3172	1060	36	34	45333	25333
	47000	35 × 50	5.34	6.30	4516	1508	34	32	55473	75473

Aluminum electrolytic capacitors

Power Standard Miniature Snap-in

056/057 PSM-SI

U _R (V)	C _R 100 Hz (μF)	NOMINAL CASE SIZE ØD × L (mm)	I _R 100 Hz 85 °C (A)	I _R ≥10 kHz 85 °C (A)	I _{L1} 1 min (μA)	I _{L5} 5 min (μA)	ESR 100 Hz (mΩ)	Z 10 kHz (mΩ)	CATALOGUE NUMBER 2222 056	
									2-TERM.	3-TERM.
25	3300	22 × 25	1.88	2.22	499	169	89	61	56332	76332
	4700	22 × 30	2.37	2.80	709	239	65	45	56472	76472
	6800	25 × 30	2.81	3.32	1024	344	54	41	56682	76682
	6800	22 × 40	3.16	3.73	1024	344	47	38	46682	26682
	10000	30 × 30	3.25	3.84	1504	504	50	38	56103	76103
	10000	25 × 40	3.73	4.40	1504	504	39	30	46103	26103
	15000	30 × 40	4.73	5.58	2254	754	30	28	56153	76153
	15000	25 × 50	3.92	4.63	2254	754	43	39	46153	26153
	22000	35 × 40	4.48	5.29	3304	1104	40	28	56223	76223
	22000	30 × 50	4.96	5.85	3304	1104	36	23	46223	26223
	33000	35 × 50	4.98	5.88	4954	1654	39	33	56333	76333
40	2200	22 × 25	1.85	2.26	532	180	92	61	57222	77222
	3300	22 × 30	2.09	2.55	796	260	67	45	57332	77332
	4700	25 × 30	2.28	2.78	1132	380	82	70	57472	77472
	4700	22 × 40	3.10	3.78	1132	380	49	38	47472	27472
	6800	30 × 30	3.16	3.85	1636	548	53	38	57682	77682
	6800	25 × 40	3.06	3.73	1636	548	58	50	47682	27682
	10000	30 × 40	4.20	5.12	2404	804	38	28	57103	77103
	10000	25 × 50	3.88	4.73	2404	804	44	39	47103	27103
	15000	35 × 40	4.05	4.94	3604	1204	49	41	57153	77153
	15000	30 × 50	4.45	5.43	3604	1204	41	34	47153	27153
	22000	35 × 50	4.86	5.93	5284	1764	40	33	57223	77223
50	1500	22 × 25	1.36	1.66	454	154	170	130	51152	71152
	2200	22 × 30	1.75	2.14	664	224	120	91	51222	71222
	3300	25 × 30	2.17	2.65	994	334	90	72	51332	71332
	3300	22 × 40	2.42	2.95	994	334	80	63	41332	21332
	4700	30 × 30	2.65	3.23	1414	474	75	63	51472	71472
	4700	25 × 40	2.89	3.53	1414	474	65	52	41472	21472
	6800	30 × 40	3.56	4.34	2044	684	53	45	51682	71682
	6800	25 × 50	3.75	4.58	2044	684	50	43	41682	21682
	10000	35 × 40	4.05	4.94	3004	1004	49	42	51103	71103
	10000	30 × 50	4.50	5.49	3004	1004	40	35	41103	21103
	15000	35 × 50	4.98	6.08	4504	1504	39	33	51153	71153

Aluminum electrolytic capacitors

Power Standard Miniature Snap-in

056/057 PSM-SI

U _R (V)	C _R 100 Hz (μF)	NOMINAL CASE SIZE ∅D × L (mm)	I _R 100 Hz 85 °C (A)	I _R ≥10 kHz 85 °C (A)	I _{L1} 1 min (μA)	I _{L5} 5 min (μA)	ESR 100 Hz (mΩ)	Z 10 kHz (mΩ)	CATALOGUE NUMBER 2222 056		
									2-TERM.	3-TERM.	
63	1000	22 × 25	1.46	1.78	382	130	148	104	58102	78102	
	1500	22 × 30	1.87	2.28	571	193	105	72	58152	78152	
	2200	25 × 30	2.32	2.83	836	281	79	59	58222	78222	
	2200	22 × 40	2.54	3.10	836	281	73	53	48222	28222	
	3300	30 × 30	2.87	3.50	1251	420	64	50	58332	78332	
	3300	25 × 40	3.14	3.83	1251	420	55	44	48332	28332	
	4700	30 × 40	3.67	4.48	1780	596	50	38	58472	78472	
	4700	25 × 50	3.71	4.53	1780	596	48	38	48472	28472	
	6800	35 × 40	4.33	5.28	2574	861	43	38	58682	78682	
	6800	30 × 50	4.75	5.80	2574	861	42	37	48682	28682	
	10000	35 × 50	5.26	6.42	3784	1264	35	30	58103	78103	
100	470	22 × 25	0.77	0.94	286	98	535	470	59471	79471	
	680	22 × 30	0.99	1.21	412	160	375	328	59681	79681	
	1000	25 × 30	1.27	1.55	604	204	265	235	59102	79102	
	1000	22 × 40	1.35	1.65	604	204	260	225	49102	29102	
	1500	30 × 30	1.67	2.04	904	304	190	170	59152	79152	
	1500	25 × 40	1.75	2.14	904	304	180	160	49152	29152	
	2200	30 × 40	2.27	2.77	1324	444	130	120	59222	79222	
	2200	25 × 50	2.30	2.80	1324	444	125	110	49222	29222	
	3300	35 × 40	2.84	3.46	1984	664	100	95	59332	79332	
	3300	30 × 50	2.97	3.62	1984	664	92	85	49332	29332	
		4700	35 × 50	3.59	4.38	2824	677	75	70	59472	79472

Aluminum electrolytic capacitors

Power Standard Miniature Snap-in

056/057 PSM-SI

Table 3 Electrical data and ordering information for **057** series; preferred types in **bold**

U _R (V)	C _R 100 Hz (μF)	NOMINAL CASE SIZE ØD × L (mm)	I _R 100 Hz 85 °C (A)	I _{L1} 1 min (μA)	I _{L5} 5 min (μA)	ESR 100 Hz (mΩ)	Z 10 kHz (mΩ)	CATALOGUE NUMBER 2222 057		
								2-TERM.	3-TERM.	
200	150	22 × 25	0.77	184	64	950	620	52151	72151	
	220	22 × 30	1.00	268	92	650	435	52221	72221	
	330	25 × 30	1.36	400	136	430	310	52331	72331	
	330	22 × 40	1.36	400	136	430	310	42331	22331	
	470	30 × 30	1.80	568	192	310	230	52471	72471	
	470	25 × 40	1.80	568	192	310	230	42471	22471	
	680	30 × 40	2.39	820	276	210	180	52681	72681	
	680	25 × 50	2.39	820	276	210	180	42681	22681	
	1000	35 × 40	2.85	1204	404	160	135	52102	72102	
	1000	30 × 50	2.85	1204	404	160	135	42102	22102	
	1500	35 × 50	3.66	1804	604	120	105	52152	72152	
250	100	22 × 25	0.63	154	54	1440	770	53101	73101	
	150	22 × 30	0.83	229	79	960	520	53151	73151	
	220	25 × 30	1.10	334	114	660	365	53221	73221	
	220	22 × 40	1.10	334	114	660	365	43221	23221	
	330	30 × 30	1.49	499	169	440	265	53331	73331	
	330	25 × 40	1.49	499	169	440	265	43331	23331	
	470	30 × 40	1.98	709	239	310	185	53471	73471	
	470	25 × 50	1.98	709	239	310	185	43471	23471	
	680	35 × 40	2.60	1024	344	240	145	53681	73681	
	680	30 × 50	2.60	1024	344	240	145	43681	23681	
		1000	35 × 50	3.12	1504	504	160	105	53102	73102
	385	47	22 × 25	0.50	112	40	3000	1400	58479	78479
68		22 × 30	0.63	161	56	2100	1000	58689	68689	
100		25 × 30	0.86	235	81	1400	780	58101	78101	
100		22 × 40	0.86	235	81	1400	780	48101	68101	
100		22 × 35	0.84	235	81	1400	780	38101	88101	
150		30 × 30	1.16	350	119	950	520	58151	78151	
150		25 × 40	1.16	350	119	950	520	48151	68151	
220		30 × 45	1.63	512	173	700	460	18221 ⁽¹⁾	88221 ⁽¹⁾	
220		30 × 40	1.57	512	173	650	400	58221	78221	
220		30 × 35	1.50	512	173	650	400	38221	90051	
220		25 × 50	1.57	512	173	650	400	48221	68221	
330		35 × 35	1.73	766	258	480	280	68331	88331	
330		30 × 45	1.75	766	258	480	280	38331	78331	
470		35 × 50	2.40	1089	366	340	220	58471	78471	
470		35 × 45	2.29	1089	366	340	220	48471	28471	

Aluminum electrolytic capacitors

Power Standard Miniature Snap-in

056/057 PSM-SI

U _R (V)	C _R 100 Hz (μF)	NOMINAL CASE SIZE ØD × L (mm)	I _R 100 Hz 85 °C (A)	I _{L1} 1 min (μA)	I _{L5} 5 min (μA)	ESR 100 Hz (mΩ)	Z 10 kHz (mΩ)	CATALOGUE NUMBER 2222 057	
								2-TERM.	3-TERM.
400	47	22 × 25	0.50	117	42	3000	1400	56479	76479
	68	22 × 30	0.63	167	58	2100	1000	56689	76689
	100	25 × 30	0.86	244	84	1400	780	56101	76101
	100	22 × 35	0.84	240	84	1400	780	36101	66101
	150	30 × 30	1.16	364	124	950	520	56151	90054
	150	25 × 50	1.50	364	124	1000	520	16151 ⁽¹⁾	36151 ⁽¹⁾
	150	25 × 40	1.16	364	124	950	520	46151	86151
	220	30 × 35	1.50	532	180	650	400	36221	90055
	220	25 × 50	1.57	532	180	650	400	46221	86221
	330	35 × 40	1.85	796	268	480	280	56331	76331
	330	30 × 50	1.85	796	268	480	280	46331	26331
470	35 × 50	2.40	1132	380	340	220	56471	76471	
450	47	22 × 30	0.26	131	45	5600	4400	67479	87479
	68	22 × 30	0.33	188	65	3900	3100	57689	77689
	100	30 × 30	0.48	274	94	2600	2100	57101	77101
	100	25 × 35	0.46	274	94	2600	2100	37101	17101
	150	30 × 35	0.66	409	140	1600	1300	37151	17151
	150	25 × 50	0.70	409	140	1600	1300	47151	27151
	220	35 × 40	0.92	598	202	1100	900	57221	77221
	220	30 × 45	0.73	598	202	1100	900	37221	17221
	330	35 × 50	1.26	895	301	700	600	57331	77331
	330	35 × 45	1.20	895	301	700	600	47331	27331

Note

1. Ripple current optimized types.

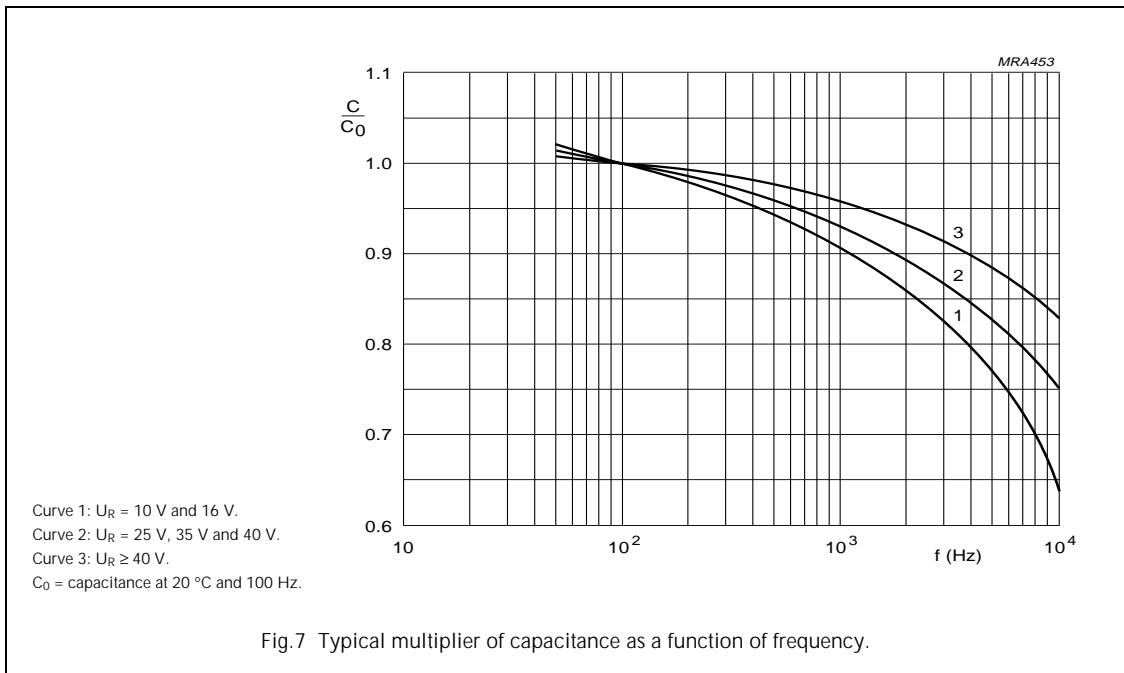
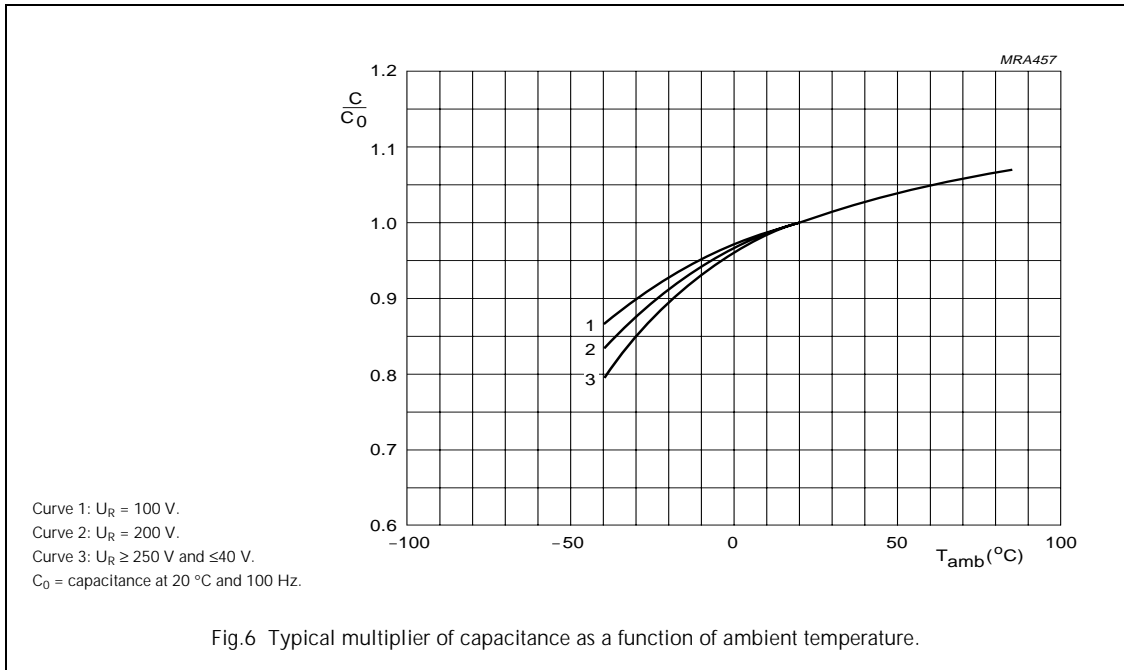
Additional electrical data

PARAMETER	CONDITIONS	VALUE
Voltage		
Surge voltage	≤250 V versions	$U_s = 1.15 \times U_R$
	≥385 V versions	$U_s = 1.1 \times U_R$
Reverse voltage		$U_{rev} \leq 1 \text{ V}$
Current		
Leakage current	after 1 minute at U _R	$I_{L1} \leq 0.006C_R \times U_R + 4 \mu\text{A}$
	after 5 minutes at U _R	$I_{L5} \leq 0.002C_R \times U_R + 4 \mu\text{A}$
Inductance		
Equivalent series inductance (ESL)	all case sizes	typ. 19 nH
		max. 25 nH

Aluminum electrolytic capacitors Power Standard Miniature Snap-in

056/057 PSM-SI

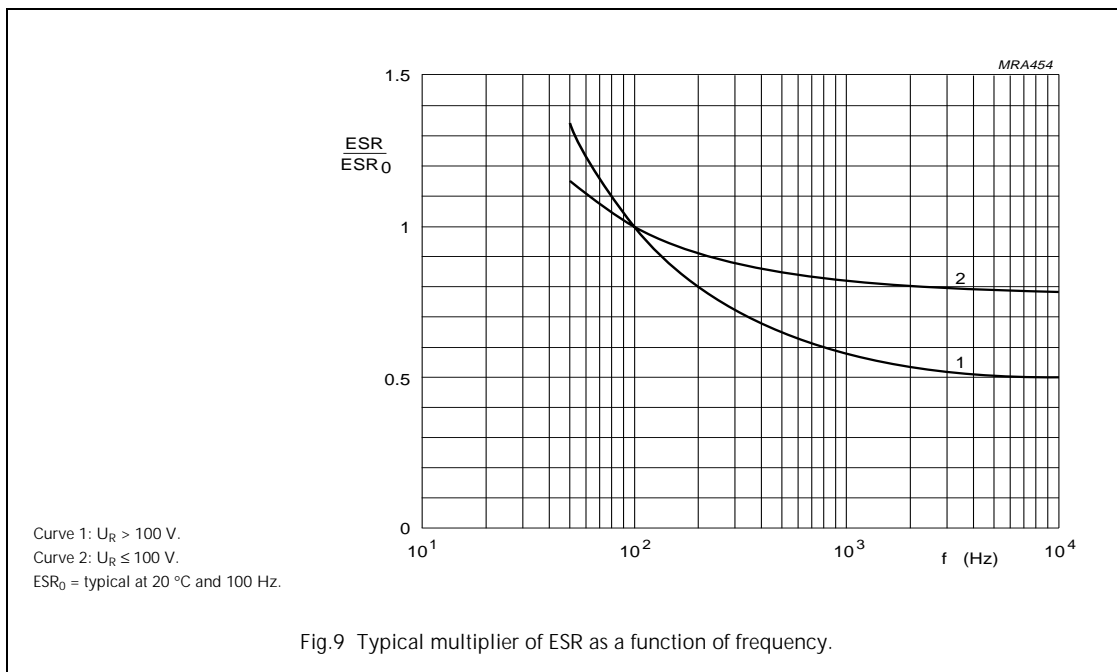
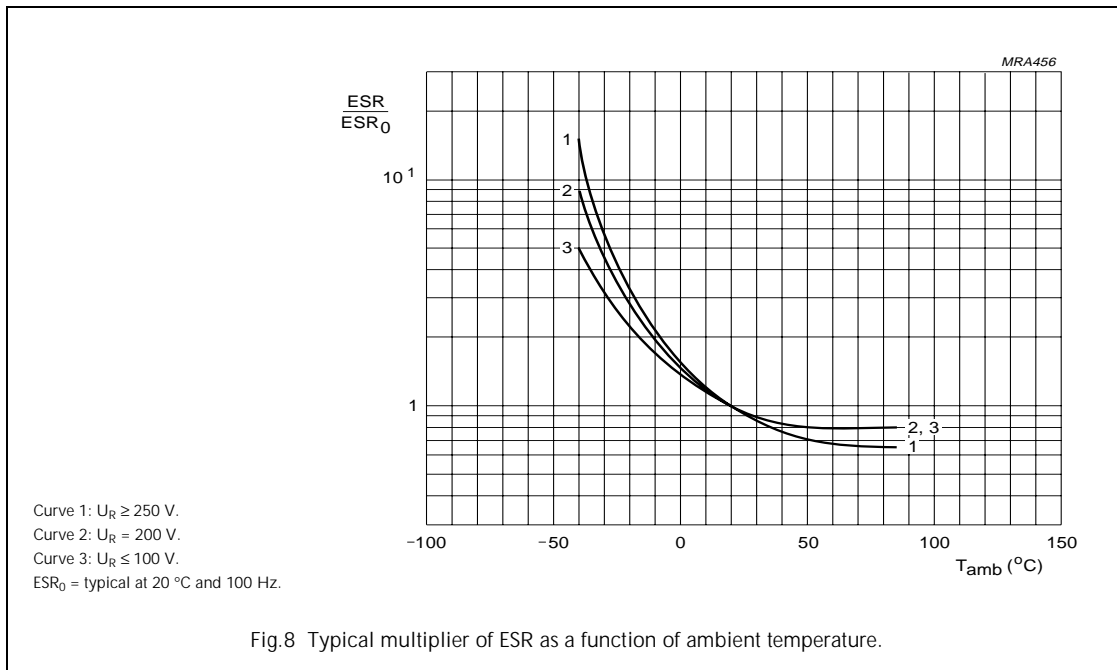
Capacitance (C)



Aluminum electrolytic capacitors Power Standard Miniature Snap-in

056/057 PSM-SI

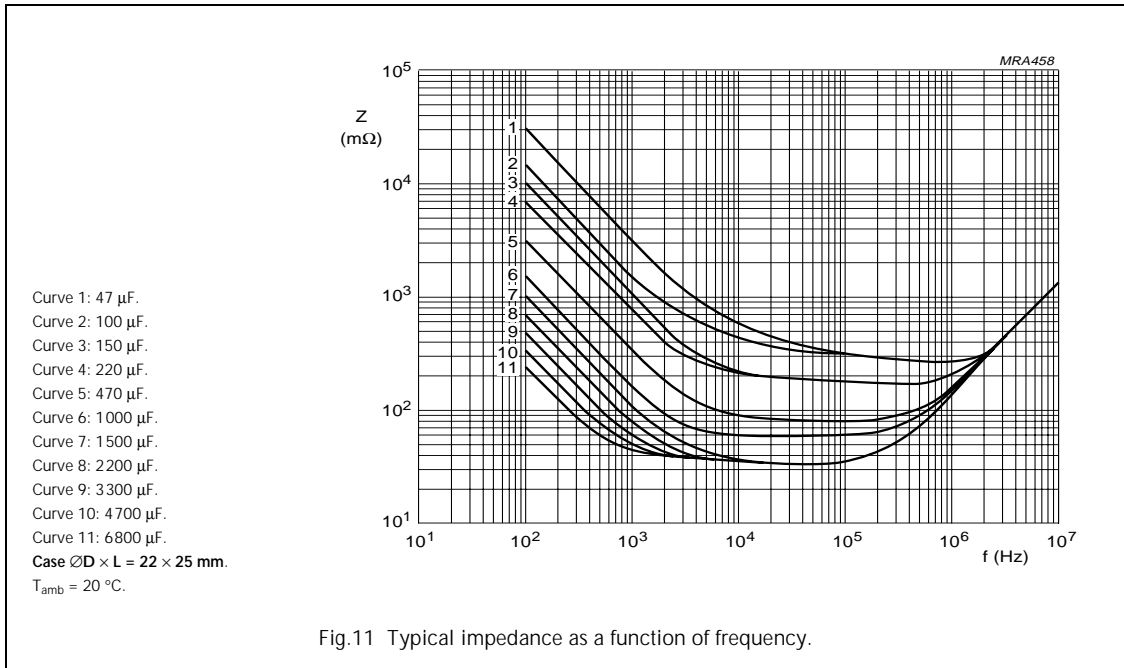
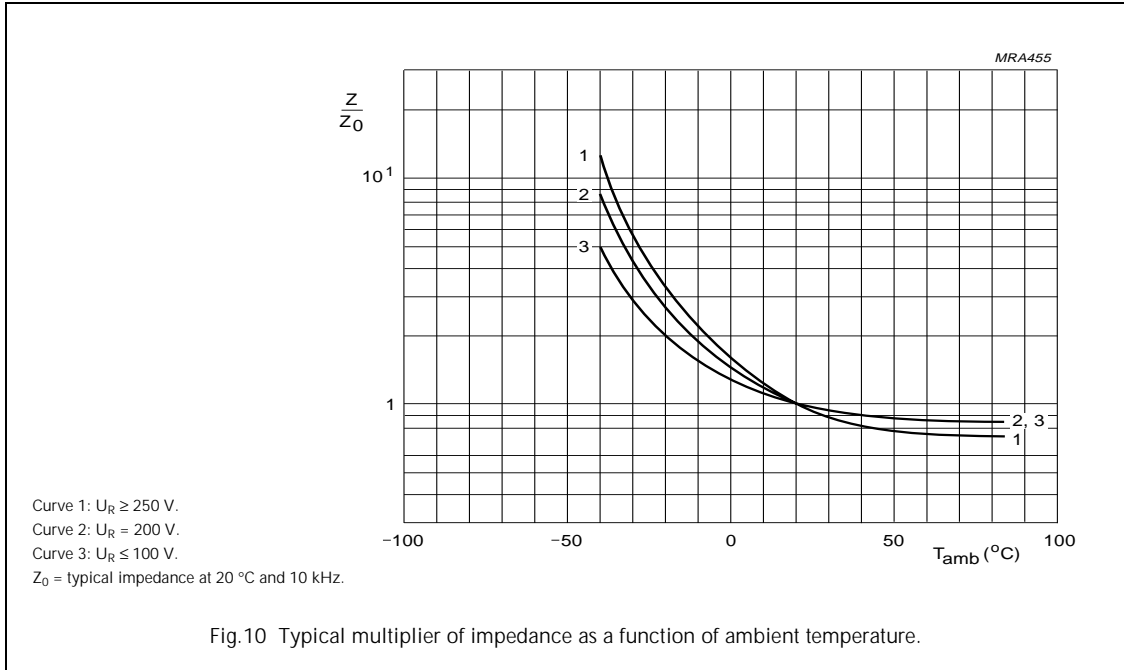
Equivalent series resistance (ESR)



Aluminum electrolytic capacitors Power Standard Miniature Snap-in

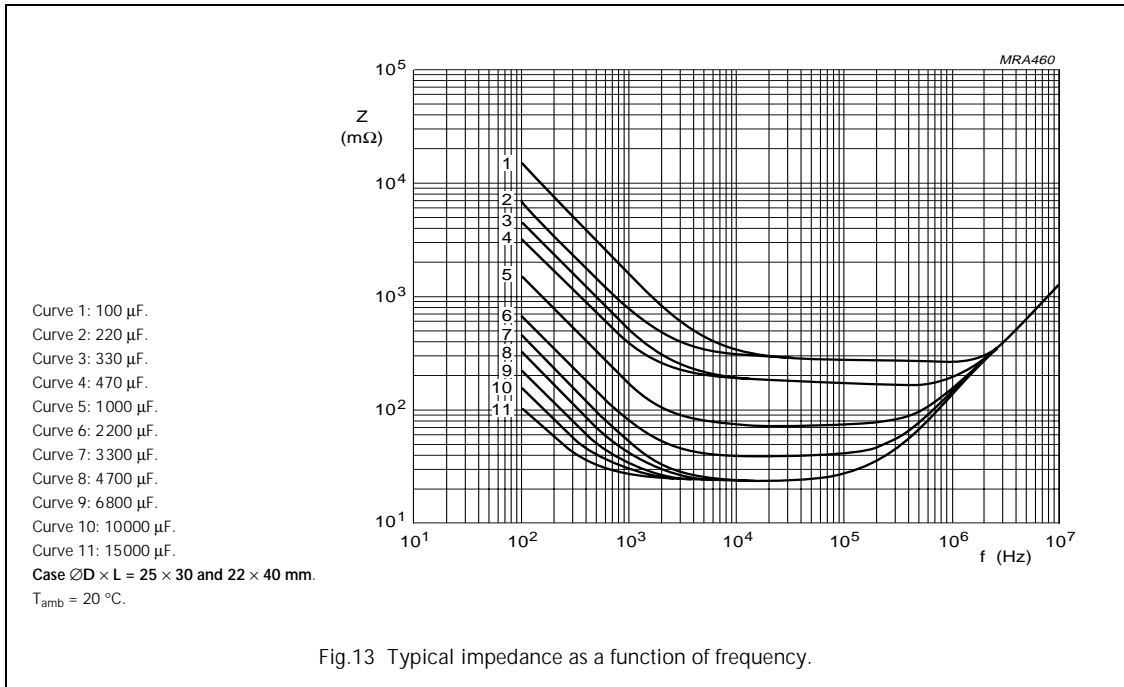
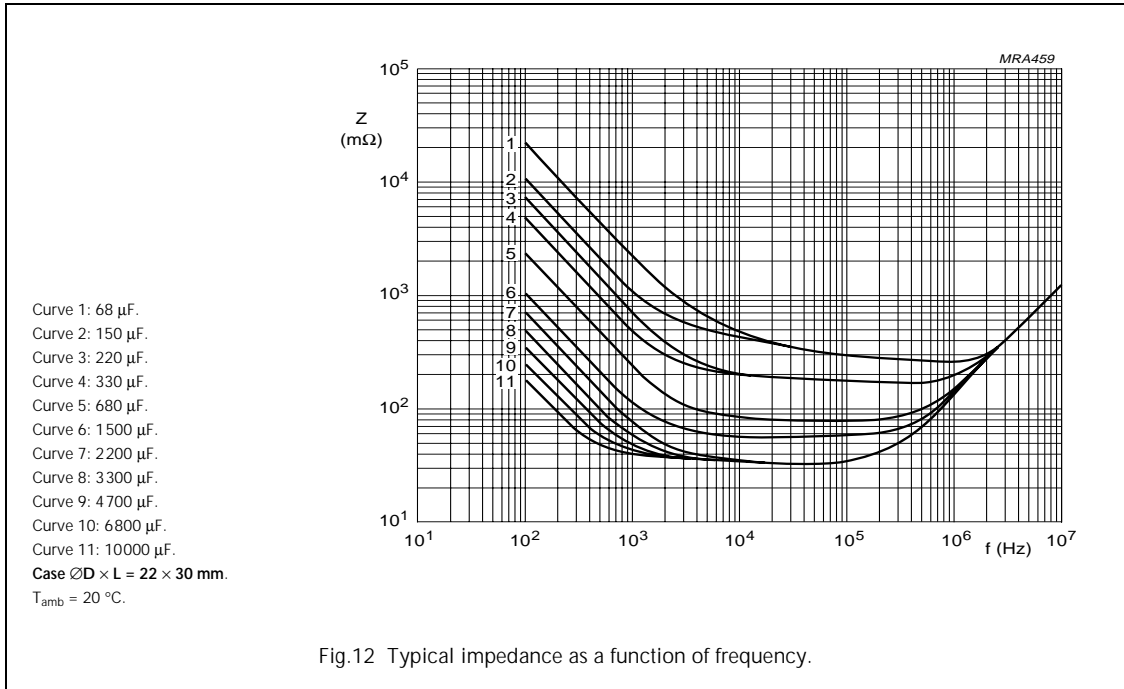
056/057 PSM-SI

Impedance (Z)



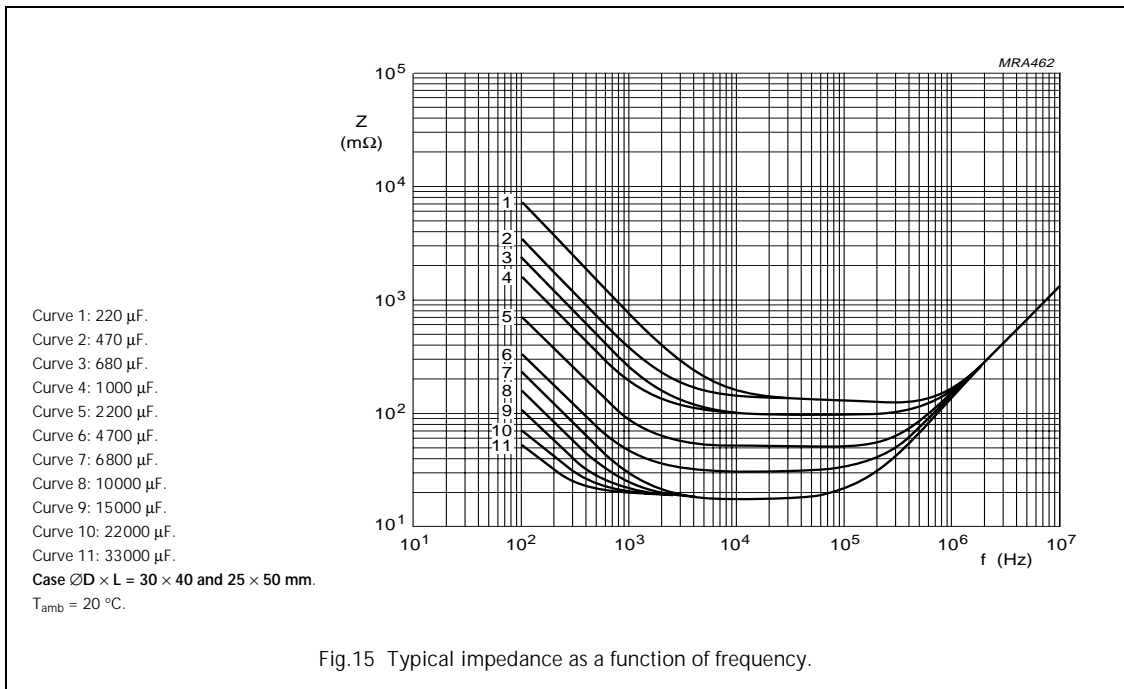
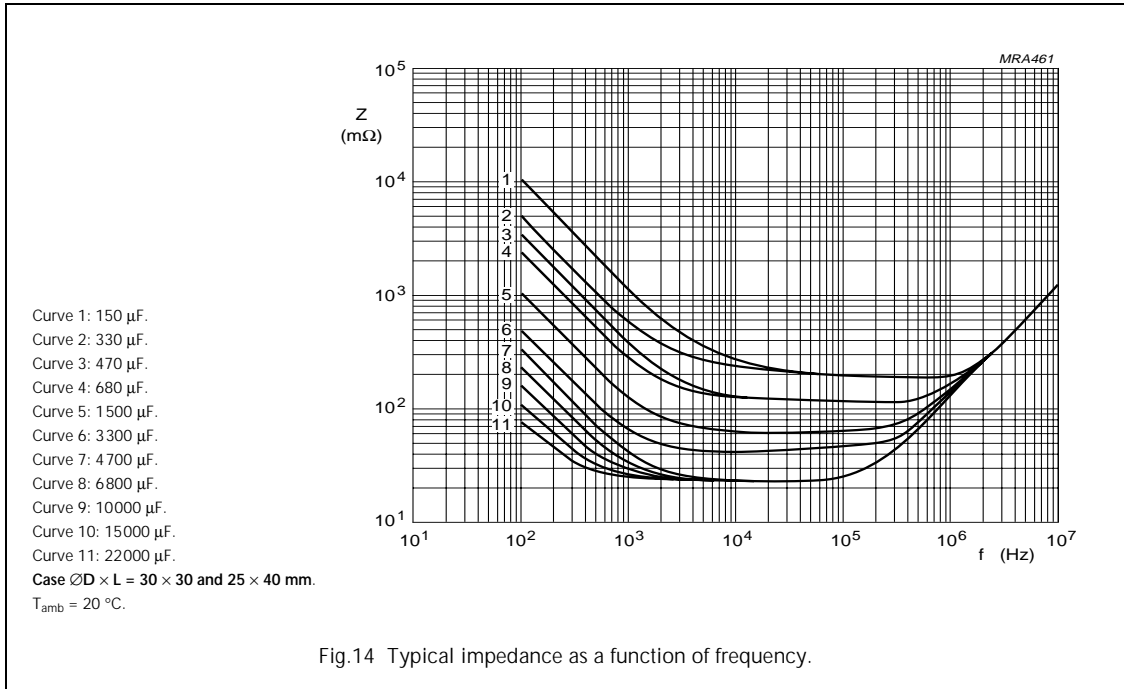
Aluminum electrolytic capacitors Power Standard Miniature Snap-in

056/057 PSM-SI



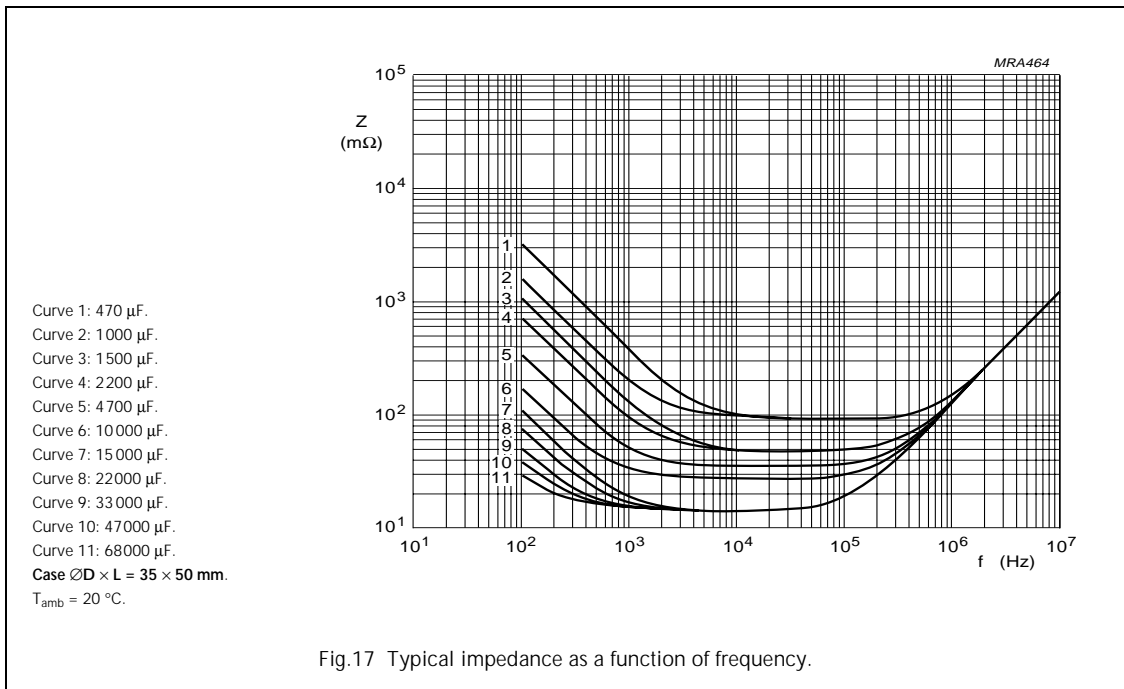
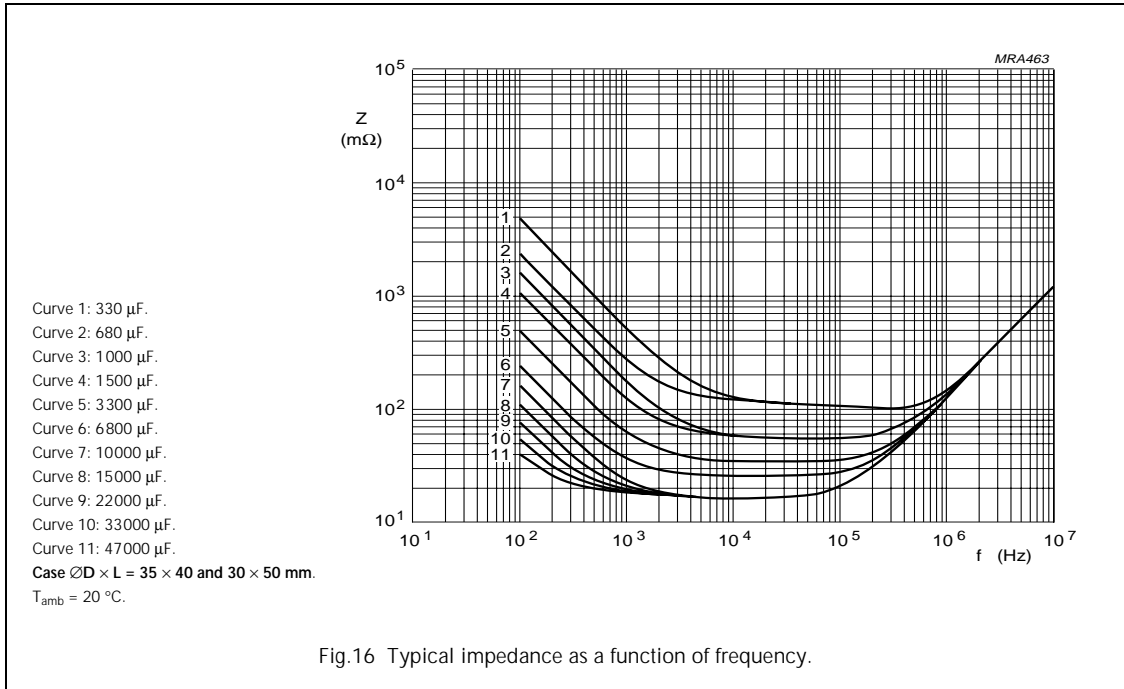
Aluminum electrolytic capacitors Power Standard Miniature Snap-in

056/057 PSM-SI



Aluminum electrolytic capacitors Power Standard Miniature Snap-in

056/057 PSM-SI



Aluminum electrolytic capacitors

Power Standard Miniature Snap-in

056/057 PSM-SI

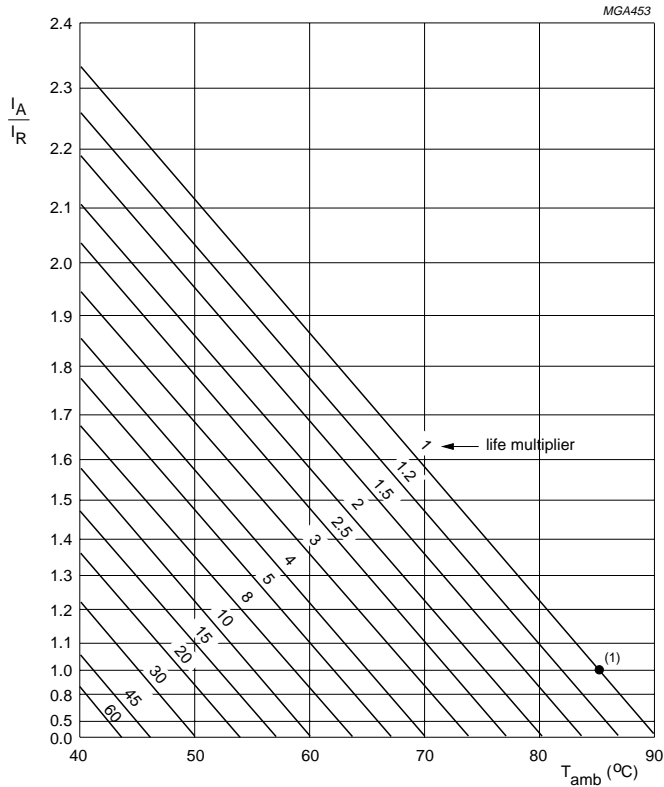
RIPPLE CURRENT AND USEFUL LIFE

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

FREQUENCY (Hz)	I_R MULTIPLIER		
	$U_R = 10 \text{ to } 25 \text{ V}$	$U_R = 40 \text{ to } 100 \text{ V}$	$U_R > 100 \text{ V}$
50	0.93	0.91	0.86
100	1.00	1.00	1.00
200	1.04	1.05	1.13
400	1.07	1.09	1.21
1000	1.11	1.13	1.29
2000	1.13	1.15	1.32
4000	1.15	1.18	1.35
≥ 10000	1.18	1.22	1.40

Aluminum electrolytic capacitors Power Standard Miniature Snap-in

056/057 PSM-SI



I_A = actual ripple current at 100 Hz and 85 °C.
 I_R = rated ripple current at 100 Hz and 85 °C.
 (1) Useful life at 85 °C and I_R applied: 12000 hours (450 V types: 5000 hours).

Fig.18 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 this handbook, section "Tests and Requirements".

Aluminum electrolytic capacitors

Power Standard Miniature Snap-in

056/057 PSM-SI

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; 5000 hours (450 V types: 2000 hours)	$U_R \leq 100\text{ V}$; $\Delta C/C: \pm 15\%$ $U_R > 100\text{ V}$; $\Delta C/C: \pm 10\%$ $ESR \leq 1.3 \times \text{spec. limit}$ $Z \leq 2 \times \text{spec. limit}$ $I_{L5} \leq \text{spec. limit}$
Useful life	CECC 30301 subclause 1.8.1	$T_{amb} = 85\text{ °C}$; U_R and I_R applied; 12000 hours (450 V types: 5000 hours)	$U_R \leq 100\text{ V}$; $\Delta C/C: \pm 45\%$ $U_R > 100\text{ V}$; $\Delta C/C: \pm 30\%$ $ESR \leq 3 \times \text{spec. limit}$ $Z \leq 3 \times \text{spec. limit}$ $I_{L5} \leq \text{spec. limit}$ no short or open circuit, no visible damage total failure percentage: $U_R \leq 100\text{ V}$: $\leq 1\%$; $U_R > 100\text{ V}$: $\leq 3\%$
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	$\Delta C/C: \pm 10\%$ $ESR \leq 1.2 \times \text{spec. limit}$ $I_{L5} \leq 2 \times \text{spec. limit}$