Miniature Aluminum Electrolytic Capacitors

Classification	Series	Configuration	Applications	Category Temperature Range (°C)	Features: Standard type	Features: Smaller-sized & low profile	Features: Low impedance	Features: Long life	Features: Anti-cleaning solvent	Rated Voltage Range (V.D.C)	Rated Capacitance Range (μF)	Tolerance on Rated Capacitance (%)	Page
Ultra-Miniature type	MA	04	5mmL, Standard, For General Purposes	−40 to +85	●				●	4 to 50	0.1 to 470	±20	109
	MP	04	5mmL, Bi-Polarized	−40 to +85	●				●	6.3 to 50	0.1 to 47	±20	110
	MT	04	5mmL, Wide Temperature Range	−55 to +105	●				●	4 to 50	0.1 to 100	±20	111
	MF	04	5mmL, Low Impedance	−55 to +105			●		●	6.3 to 35	1 to 100	±20	112
	MV	04	5mmL, Long Life Assurance	−40 to +105				●		4 to 50	0.1 to 100	±20	113
	SA	04	7mmL, For General Purposes	−40 to +85	●				●	6.3 to 50	0.1 to 220	±20	114
	SR	04	7mmL, High C / V	−40 to +85		●			●	4 to 50	0.1 to 470	±20	114
	SP	04	7mmL, Bi-Polarized	−40 to +85	●				●	6.3 to 50	0.1 to 220	±20	115
	ST	04	7mmL, Wide Temperature Range	−55 to +105	●				●	6.3 to 50	0.1 to 220	±20	116
	SV	04	7mmL, Long Life Assurance	−40 to +105				●		6.3 to 50	0.1 to 220	±20	117
	SF	04	7mmL, Low Impedance	−55 to +105			●		●	6.3 to 35	6.8 to 220	±20	118
Standard type	VK	04	Miniature Sized, Standard	−40 (−25) to +85		●			▲	6.3 to 450	0.1 to 68000	±20	120
	VR	04	Standard	−40 (−25) to +85	●				▲	6.3 to 450	0.1 to 33000	±20	122
	VX	02	Standard, For General Purposes	−40 (−25) to +85	●				▲	6.3 to 450	0.47 to 10000	±20	124
	VY	04	Miniature Sized, Wide Temperature Range	−55 (−40, −25) to +105		●			▲	6.3 to 450	0.1 to 68000	±20	126
	VZ	04	Wide Temperature Range	−55 (−40, −25) to +105	●				▲	6.3 to 450	0.1 to 33000	±20	128
	RS	04	Compact & Standard For General Purposes	−40 to +85		●			▲	6.3 to 400	0.1 to 10000	±20	130
	RZ	04	Low-Profile Sized, Wide Temperature Range	−55 (−40) to +105		●			▲	6.3 to 400	0.1 to 10000	±20	132
	RU	04	12.5mmL	−40 (−25) to +85		●			▲	6.3 to 450	6.8 to 6800	±20	134
	RY	04	12.5mmL Wide Temperature Range	−55 (−40, −25) to +105		●			▲	6.3 to 450	6.8 to 4700	±20	136
	VP	04	Bi-Polarized	−40 to +85	●				●	6.3 to 100	0.47 to 6800	±20	138
	EP	04	Bi-Polarized, Wide Temperature Range	−55 to +105	●				●	6.3 to 100	0.47 to 6800	±20	119
High Reliability type	PM	04	Extremely Low Impedance, High Reliability	−55 (−40, −25) to +105			●	●	▲	6.3 to 450	0.47 to 15000	±20	140
	PW	04	Miniature Sized, Low Impedance, High Reliability	−55 (−40, −25) to +105		●	●	●	▲	6.3 to 450	0.47 to 15000	±20	147
	TT	04	Miniature Sized, Low Impedance, High Reliability	−40 to +105		●	●	●	●	6.3 to 50	1 to 470	±20	152
	PA	04	Miniature Sized, Low Impedance, High Reliability	−55 to +105		●	●	●	●	6.3 to 35	180 to 10000	±20	154
	HV	04	Extremely Low Impedance, High Reliability	−40 to +105		●	●	●	●	6.3 to 35	47 to 8200	±20	156
	HD	04	Extremely Low Impedance, High Reliability	−40 to +105		●	●		●	6.3 to 50	22 to 6800	±20	160
	HC	04	Extremely Low Impedance, High Reliability	−40 to +105		●	●		●	6.3 to 35	4.7 to 1000	±20	158
	HE	04	Extremely Low Impedance, High Reliability	−40 to +105		●	●	●	●	6.3 to 100	0.47 to 18000	±20	163
	HM	04	Extremely Low Impedance, High Reliability, For PC motherboard	−40 to +105		●	●		●	6.3 to 16	330 to 12000	±20	168
	HN	04	Extremely Low Impedance, High Reliability, For PC motherboard	−25 to +105		●	●		●	6.3 to 16	330 to 8200	±20	169
	HZ	04	Extremely Low Impedance, For PC motherboard	−25 to +105		●	●		●	6.3 to 16	470 to 3300	±20	170
	PJ	04	Low Impedance, For Switching Power Supplies	−55 (−40, −25) to +105	●		●	●	▲	6.3 to 450	0.47 to 15000	±20	171
	PS	04	Miniature Sized, Low Impedance, For Switching Power Supplies	−55 (−40, −25) to +105		●	●		▲	6.3 to 450	0.47 to 15000	±20	178
	TS	04	Miniature Sized, For Switching Power Supplies	−40 to +105		●		●	●	6.3 to 50	0.1 to 470	±20	180
	PV	04	Miniature Sized, Low Impedance, High Reliability	−55 to +105			●	●	●	6.3 to 50	0.47 to 390	±20	182
	PT	04	Miniature Sized, High Ripple Current, Long Life	−25 to +105		●		●		200 to 450	15 to 820	±20	184
	PZ	04	High voltage, Smaller-Sized	−25 to +105		●				200 to 450	18 to 470	±20	186
	PB	04	Miniature Sized, High Ripple Current, High Reliability	−40 (−25) to +105		●		●	▲	10 to 450	0.47 to 3300	±20	188
	CA	04	Miniature Sized, High Ripple Current, Long Life	−25 to +105		●		●		160 to 450	6.8 to 220	±20	190
	CS	04	Miniature Sized, High Ripple Current, High Reliability	−40 (−25) to +105		●		●		160 to 450	6.8 to 330	±20	192
	CY	04	Miniature Sized, High Ripple Current, High Reliability	−40 to +105		●		●		160 to 400	6.8 to 560	±20	194
	PX	04	Long Life Assurance, High Reliability	−55 to +105			●	●	●	10 to 35	1 to 4700	±20	196
	BT	04	High Temperature Range, For Industrial equipment (125°C)	−40 (−25) to +125				●	▲	10 to 450	1 to 4700	±20	198
	BW	04	High Temperature Range, For Industrial equipment (135°C)	−55 to +135				●	●	10 to 100	1 to 4700	±20	200
	BX	04	High Temperature Range, For Automobile equipment (150°C)	−55 (−40, −25) to +150				●	●	10 to 400	1 to 4700	±20	202

Above description is a feature against AK-225AES.
▲ : Applicable up to 100V ratings or less.

Miniature Aluminum Electrolytic Capacitors

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Special equipment	KL	04	Low Leakage Current	−40 to +85	●				●	6.3 to 100	0.1 to 10000	±20, ±10	204
	TM	04	Timer Circuit Use	−40 to +85	●				●	10 to 50	1 to 470	±20, ±10	206
	JB	04	Memory Back-Up Use	−25 to +85	●				●	5.5	2.2mF to 47mF	−10 to +50	207
	AQ	04	For Permissible Abnormal Voltage	−40 to +105						200 · 400	10 to 220	±20	208
	AS	04	Miniature Type,For Permissible Abnormal Voltage	−40 to +105		●				200	33 to 330	±20	209
For audio equipment	KZ	04	Premium Grade Type, For Audio Equipment	−40 to +85					●	25 to 100	10 to 1000	±20	210
	FG	04	High Grade Type, For Audio Equipment	−40 to +85	●				●	6.3 to 100	0.1 to 10000	±20	212
	KW	04	Standard, For Audio Equipment	−40 to +85	●				●	6.3 to 100	0.1 to 33000	±20	211
	FW	04	Standard, For Audio Equipment	−40 to +85		●			●	6.3 to 100	0.1 to 33000	±20	214
	SW	04	7mmL, For Audio Equipment	−40 to +85	●				●	6.3 to 50	0.1 to 220	±20	216
	MW	04	5mmL, For General Audio Equipment	−40 to +85	●				●	4 to 50	0.1 to 470	±20	217
	UQ	32	105°C Chip Type, For Audio Equipment	−40 to +105					●	6.3 to 50	0.1 to 1000	±20	218
	ES	04	Bi-Polarized, For Audio Equipment	−40 to +85	●				●	6.3 to 50	0.47 to 1000	±20	220
	DB, GB	04	Bi-Polarized, For Speaker Network	−40 to +85	●				●	50	1 to 68	±20, ±10	221
	Upgrade KT	04	105°C Standard, For Audio Equipment	−55 to +105	●				●	6.3 to 50	0.1 to 33000	±20	222

Above description is a feature against AK-225AES.
▲ : Applicable up to 100V ratings or less.Please refer to page 19 for details of cleaning.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

FG

High Grade Standard Type, For Audio Equipment

series

For Audio Use

Anti-Solvent Feature

- "Fine Gold" MUSE acoustic series suited for high grade audio equipment, using state of the art etching techniques.
- Rich sound in the bass register and clearer high end, most suited for AV equipment like DVD, MD.
- Compliant to the RoHS directive (2002/95/EC).

KZ ← High Grade | FG | High Grade → FW

■Specifications

Item	Performance Characteristics
Category Temperature Range	−40 to +85°C
Rated Voltage Range	6.3 to 100V
Rated Capacitance Range	0.1 to 10000μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 1 minute's application of rated voltage, leakage current is not more than 0.01CV or 3 (μA) , whichever is greater.
Tangent of loss angle (tan δ)	Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	6.3	10	16	25	35	50	63	80	100
tan δ (MAX.)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.09	0.08

For capacitance of more than 1000μF add 0.02 for every increase of 1000μF.

Stability at Low Temperature — Measurement frequency : 120Hz

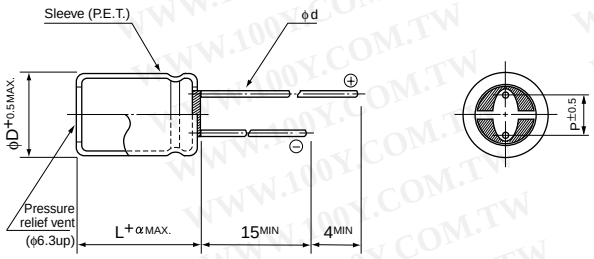
Rated voltage (V)		6.3	10	16	25	35	50	63	80	100
Impedance ratio ZT / Z20 (MAX.)	Z−25°C / Z+20°C	4	3	2	2	2	2	2	2	2
	Z−40°C / Z+20°C	8	6	4	4	3	3	3	3	3

Endurance — The specifications listed at right shall be met when the capacitors are restored to 20°C after the rated voltage is applied for 1000 hours at 85°C.

Capacitance change	Within ±20% of the initial measurement for units of not more than 16V or φ6.3 Within ±15% of the initial measurement for units of not less than 25V or above φ6.3
tan δ	150% or less than the initial specified value
Leakage current	Less than or equal to the initial specified value

Shelf Life	After storimg the capacitors under no load at 85°C for 1000 hours and then performing voltage treatment based on JIS C 5101-4 clause 4.1 at 20°C, they shall meet the specified values for the endurance characteristics listed above.
Marking	Printed with black color letter on gold sleeve.

■Radial Lead Type



(mm)

φD	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
φd	0.6	0.6	0.6	0.6	0.8	0.8	0.8

α	(L < 20) 1.5
	(L ≧ 20) 2.0

• Please refer to page 20 about the end seal configulation.

Type numbering system (Example : 10V 47μF)

1	2	3	4	5	6	7	8	9	10	11
U	F	G	1	A	4	7	0	M	D	M

Configuration

Capacitance tolerance (±20%)

Rated capacitance (47μF)

Rated voltage (10V)

Series name

Type

φD	Code
5	DM
6.3	EM
8 · 10	PM
12.5 to 18	HM

Please refer to page 20, 21, 22 about the formed or taped product spec.
Please refer to page 4 for the minimum order quantity.

● Dimension table in next page.

FG series

■Dimensions

Cap.(μF) \ V	Code	6.3		10		16		25		35		50	
		0J		1A		1C		1E		1V		1H	
0.1	0R1											5×11	1.1
0.22	R22											5×11	2.4
0.33	R33											5×11	3.6
0.47	R47											5×11	5.0
1	010											5×11	9.0
2.2	2R2											5×11	18
3.3	3R3											5×11	22
4.7	4R7											5×11	27
10	100											5×11	39
22	220							5×11	50	6.3×11	60	6.3×11	65
33	330					5×11	57	6.3×11	70	6.3×11	75	8×11.5	93
47	470			5×11	60	6.3×11	74	6.3×11	85	8×11.5	101	8×11.5	111
100	101			6.3×11	99	8×11.5	128	8×11.5	140	10×12.5	176	10×16	215
220	221			8×11.5	170	10×12.5	226	10×16	260	10×20	320	12.5×20	390
330	331			10×12.5	247	10×16	309	10×20	351	12.5×20	446	12.5×20	488
470	471	10×12.5	270	10×16	330	10×20	406	12.5×20	476	12.5×25	590	16×25	650
1000	102	10×20	485	12.5×20	601	12.5×25	723	16×25	854	16×25	1060	16×31.5	1143
2200	222	12.5×25	867	16×25	1047	16×25	1290	16×35.5	1570	18×35.5	1840		
3300	332	16×25	1135	16×31.5	1520	16×35.5	1720	18×40	1794				
4700	472	16×31.5	1431	16×35.5	1840	18×35.5	2140						
6800	682	18×35.5	1810	18×40	2049								
10000	103	18×40	2100										

Cap.(μF) \ V	Code	63		80		100	
		1J		1K		2A	
0.1	0R1					5×11	2.3
0.22	R22					5×11	5.5
0.33	R33					5×11	8.0
0.47	R47					5×11	10
1	010					5×11	15
2.2	2R2					5×11	22
3.3	3R3					5×11	27
4.7	4R7					5×11	36
10	100	6.3×11	50	6.3×11	55	8×11.5	65
22	220	8×11.5	85	8×11.5	100	10×12.5	110
33	330	8×11.5	105	10×12.5	130	10×16	150
47	470	10×12.5	140	10×16	170	10×20	190
100	101	10×20	255	12.5×20	270	12.5×20	300
220	221	12.5×20	420	12.5×25	490	16×25	549
330	331	12.5×25	541	16×31.5	650	16×31.5	734
470	471	16×25	840	16×35.5	920	18×35.5	980
1000	102	18×35.5	1400			Case size φD×L (mm)	Rated ripple

Rated ripple current (mArms) at 85°C 120Hz

● Frequency coefficient of rated ripple current

Cap.(μF) \ Frequency	50Hz	120Hz	300Hz	1kHz	10kHz or more
Less than 47	0.75	1.00	1.35	1.57	2.00
100 to 470	0.80	1.00	1.23	1.34	1.50
1000 to 10000	0.85	1.00	1.10	1.13	1.15