



**Features:**

- Standard type of V-chip, 2,000 hours, 105°C
- Applicable to SMT process.

**Specifications:**

Items	Characteristics						
Capacitance Tolerance	± 20%(120Hz, 20°C)						
Operating Temperature Range	-55°C to +105°C						
Rated Voltage Range	6.3 to 50V DC						
Capacitance Range	0.1 to 1,000µF						
Leakage Current	I ≤ 0.03CV or 3 (µA), which is greater. (After 2 minutes application of DC rated voltage, at 20°C)						
Dissipation Factor (tan δ)	Measurement Frequency: 120Hz. Temperature: 20°C						
	Rated Voltage(V)	6.3	10	16	25	35	50
	tan δ(Max)	0.32	0.28	0.24	0.18	0.15	0.14
Low Temperature Stability Impedance Ratio(Max)	Measurement Frequency: 120Hz.						
	Rated Voltage(V)	6.3	10	16	25	35	50
	Z(-25°C)/Z(20°C)	4	3	2	2	2	2
	Z(-55°C)/Z(20°C)	8	8	4	4	3	3
Load Life	2000 hours,with application of rated voltage at 105°C						
	Capacitance Change	Within ±20% of Initial Value					
	tan δ	200% or less of Initial Specified Value					
	Leakage Current	Initial Specified Value or less					
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.						
	Capacitance Change	Within ± 20% of Initial Value					
	tan δ	200% or less of Initial Specified Value					
	Leakage Current	Initial Specified Value or less					
Resistance to Soldering Heat	The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature they meet the characteristics requirements listed at right.		Capacitance Change	Within ± 10% of Initial Value			
			tan δ	Initial Specified Value			
			Leakage Current	Initial Specified Value or less			
Marking	Black print on the case top						

## Frequency Coefficient of Permissible Ripple Current

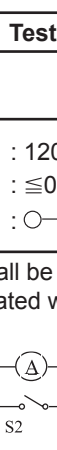
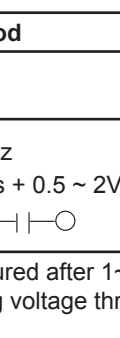
Frequency (Hz)	50	120	300	1K	$\geq 10K$
Coefficient	0.7	1	1.17	1.36	1.50

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

## Scope

This specification applies to aluminium electrolytic capacitor, used in electronic equipment.

## Electrical Characteristics

Item	Test Method	Specification															
Rated Voltage		Voltage range, capacitance range, see specification of this series.															
Capacitance	Measuring frequency : 120 ±12Hz	Voltage range, capacitance range, see specification of this series.															
Dissipation factor	Measuring voltage : $\leq 0.5V_{rms} + 0.5 \sim 2V_{DC}$																
	Measurement circuit : 	Dissipation factor, leakage current, see specification of this series.															
Leakage current	DC leakage current shall be measured after 1~2 minutes application of the DC rated working voltage through the 1000Ω resistor at 20°C  R : 1000 ±100Ω      S1 : Switch A : DC current meter      S2 : Switch for protect of current meter V : DC voltage meter      CX : Testing capacitor	Dissipation factor leakage current, see specification of this series.															
Temperature characteristics	<table border="1"> <thead> <tr> <th>Step</th> <th>Temperature</th> <th>Storage Time</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>20 ±2°C</td> <td>30 minutes</td> </tr> <tr> <td>2</td> <td>-40 ±3°C</td> <td>2 hours</td> </tr> <tr> <td>3</td> <td>20 ±2°C</td> <td>15 minutes</td> </tr> <tr> <td>4</td> <td>105 ±2°C</td> <td>2 hours</td> </tr> </tbody> </table> <p>Step 1. Measure the capacitance and impedance. (<math>Z_r</math>) (<math> Z </math>, 20°C, 120Hz ±10%) Step 2. Measure the impedance at thermal balance after 2 hours. (<math> Z </math>, 20°C, 120Hz ±10%) Step 4. Measure the capacitance and leakage current at thermal balance after 2 hours.</p>	Step	Temperature	Storage Time	1	20 ±2°C	30 minutes	2	-40 ±3°C	2 hours	3	20 ±2°C	15 minutes	4	105 ±2°C	2 hours	<p>Step 2. Impedance ratio (<math>Z_r / Z_{r0}</math>) less than specified value. Step 4. Capacitance change : within ± 20% of the initial measured value. Leakage current : Less than 10 times of initial specified value .</p>
Step	Temperature	Storage Time															
1	20 ±2°C	30 minutes															
2	-40 ±3°C	2 hours															
3	20 ±2°C	15 minutes															
4	105 ±2°C	2 hours															

Item	Test Method	Specification
Surge test	Rated surge voltage shall be applied (switch on) for 30 ±5 seconds and then shall be applied (switch off) with discharge for 5 ±0.5 min at room temperature . This cycle shall be repeated for 1000 cycles. Duration of one cycle is 6 ± 0.5 minutes .	Capacitance change : within ± 20% of the initial specified value. Dissipation factor : 2.7 less than 200% of the initial specified value. Leakage current : within initial specified value.
Applicable Ripple Current	The maximum A.C. current having frequency of 100k Hz which can be applied to the capacitor at 105 ±2°C continuously. Peak voltage not to exceed rated D.C.voltage.	

## Mechanical characteristics

Lead strength	<p>(A) Tensile strength : wire lead terminal :</p> <table border="1"> <tr> <td>d (mm)</td> <td>≤0.45</td> <td>0.5 ~ 0.8</td> <td>0.8&lt;d ≤1.25</td> </tr> <tr> <td>Load (kg)</td> <td>0.51</td> <td>1</td> <td>2</td> </tr> </table> <p>Snap-in terminal</p> <table border="1"> <tr> <td>d (mm)</td> <td>snap-in terminal</td> </tr> <tr> <td>Load (kg)</td> <td>2</td> </tr> </table> <p>The capacitor shall withstand the constant tensile force specified between the body and each lead for 10 seconds without damage either mechanical or electrical.</p> <p>(B) Bending strength : wire lead terminal :</p> <table border="1"> <tr> <td>d (mm)</td> <td>≤0.45</td> <td>0.5 ~ 0.8</td> <td>0.8&lt;d ≤1.25</td> </tr> <tr> <td>Load (kg)</td> <td>0.25</td> <td>0.51</td> <td>1</td> </tr> </table> <p>Snap-in terminal</p> <table border="1"> <tr> <td>Cross section area of terminal</td> <td>Force (kg)</td> </tr> <tr> <td>0.5&lt;S≤1</td> <td>1</td> </tr> <tr> <td>S&gt;1</td> <td>2.5</td> </tr> </table> <p>With the capacitor in a vertical position apply the load specified axially to each lead. The capacitor shall be rotated slowly from the vertical to the horizontal position, back to the vertical position. The 90° in the opposite direction and back the original position. Performance of capacitor shall not have changed and leads shall be undamaged</p>	d (mm)	≤0.45	0.5 ~ 0.8	0.8<d ≤1.25	Load (kg)	0.51	1	2	d (mm)	snap-in terminal	Load (kg)	2	d (mm)	≤0.45	0.5 ~ 0.8	0.8<d ≤1.25	Load (kg)	0.25	0.51	1	Cross section area of terminal	Force (kg)	0.5<S≤1	1	S>1	2.5	<p>When the capacitance is measured, there shall be no intermittent contacts, or open- or short-circuiting.</p> <p>There shall be no such mechanical damage as terminal damage etc.</p>
d (mm)	≤0.45	0.5 ~ 0.8	0.8<d ≤1.25																									
Load (kg)	0.51	1	2																									
d (mm)	snap-in terminal																											
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Cross section area of terminal	Force (kg)																											
0.5<S≤1	1																											
S>1	2.5																											
Vibration resistance	<p>The frequency of the vibration shall vary uniformly within the range 10 to 55 Hz with the amplitude of 1.5mm, completing the cycle in the interval of one minute.</p> <p>The capacitor shall be securely mounted by its leads with hold the body of capacitor. The capacitor shall be vibrated in three mutually perpendicular directions for a period of 2 hours in each direction .</p>	<p>Capacitance : no unsteady. Appearance : no abnormal. Capacitance change : within ± 5% of initial measured value .</p>																										
Solderability	The leads are dipped in the solder bath of Sn at 260 ±5°C for 2 ± 0.5 seconds . The dipping depth should be set at 1.5 ~ 2mm .	The solder alloy shall cover the 95% or more of the dipped lead's area .																										

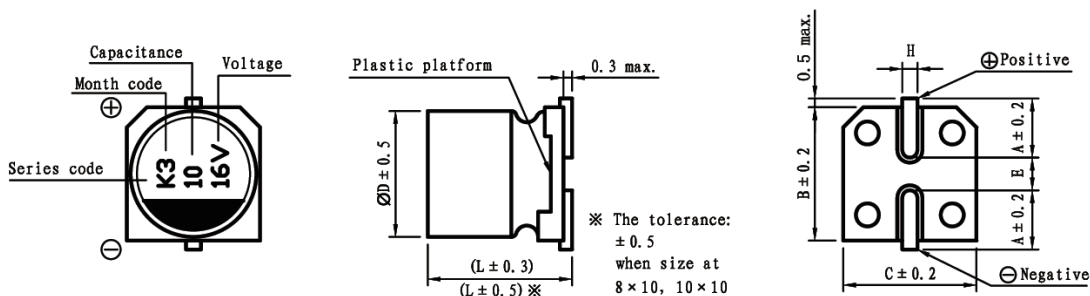
## Reliability

Item	Test Method	Specification
Soldering heat resistance	The leads immerse in the solder bath of Sn at $260 \pm 5^\circ\text{C}$ for $10 \pm 1$ seconds until a distance of 1.5 ~ 2mm from the case.	No damage or leakage of electrolyte. Capacitance change : within $\pm 10\%$ of the initial measured value. Tan $\delta$ : less than specified value. Leakage current : less than specified value.
Damp heat (Steady state)	Subject the capacitors to $40 \pm 2^\circ\text{C}$ and 90% to 95% relative humidity for $240 \pm 8$ hours.	Capacitance change : within $\pm 10\%$ of the initial measured value. Tan $\delta$ : less than specified value. Leakage current : less than specified value.
Load life	After X hours continuous application of DC rated working voltage at $105 \pm 2^\circ\text{C}$ , the measurements shall meet the following limits. Measurements shall be performed after 2 hours exposed at room temperature .	Standard of judgement is according to requirement of this series.
Shelf life	After storage for Y hours at $105 \pm 2^\circ\text{C}$ without voltage application , the measurements shall meet the following limits. Measurements shall be performed after exposed for 1 to 2 hrs at room temperature after application of DC rated voltage to the capacitor for Z minutes .	
Storage at Low Temperature	The capacitor shall be stored at temperature of $-40 \pm 3^\circ\text{C}$ for $240 \pm 8$ hours, during which time no voltage shall be applied. And then the capacitor shall be subjected to standard atmospheric conditions for 16 hours or more, after which measurements shall be made.	Capacitance change : within $\pm 10\%$ of the initial value. Tan $\delta$ : less than specified value. Leakage current : less than specified value Appearance : no abnormal.

## MCVFZ Series

### Dimensions:

#### Chip Type



# SMD Aluminium Electrolytic Capacitors

D × L	4 × 5.4	5 × 5.4	6.3 × 5.4	6.3 × 7.7	8 × 10	10 × 10
A	1.8	2.1	2.4	2.4	2.9	3.2
B	4.3	5.3	6.6	6.6	8.3	10.3
C	4.3	5.3	6.6	6.6	8.3	10.3
E	1.0	1.3	2.2	2.2	3.1	4.5
L	5.4	5.4	5.4	7.7	10	10
H	0.5~0.8	0.5~0.8	0.5~0.8	0.5~0.8	0.8~1.1	0.8~1.1

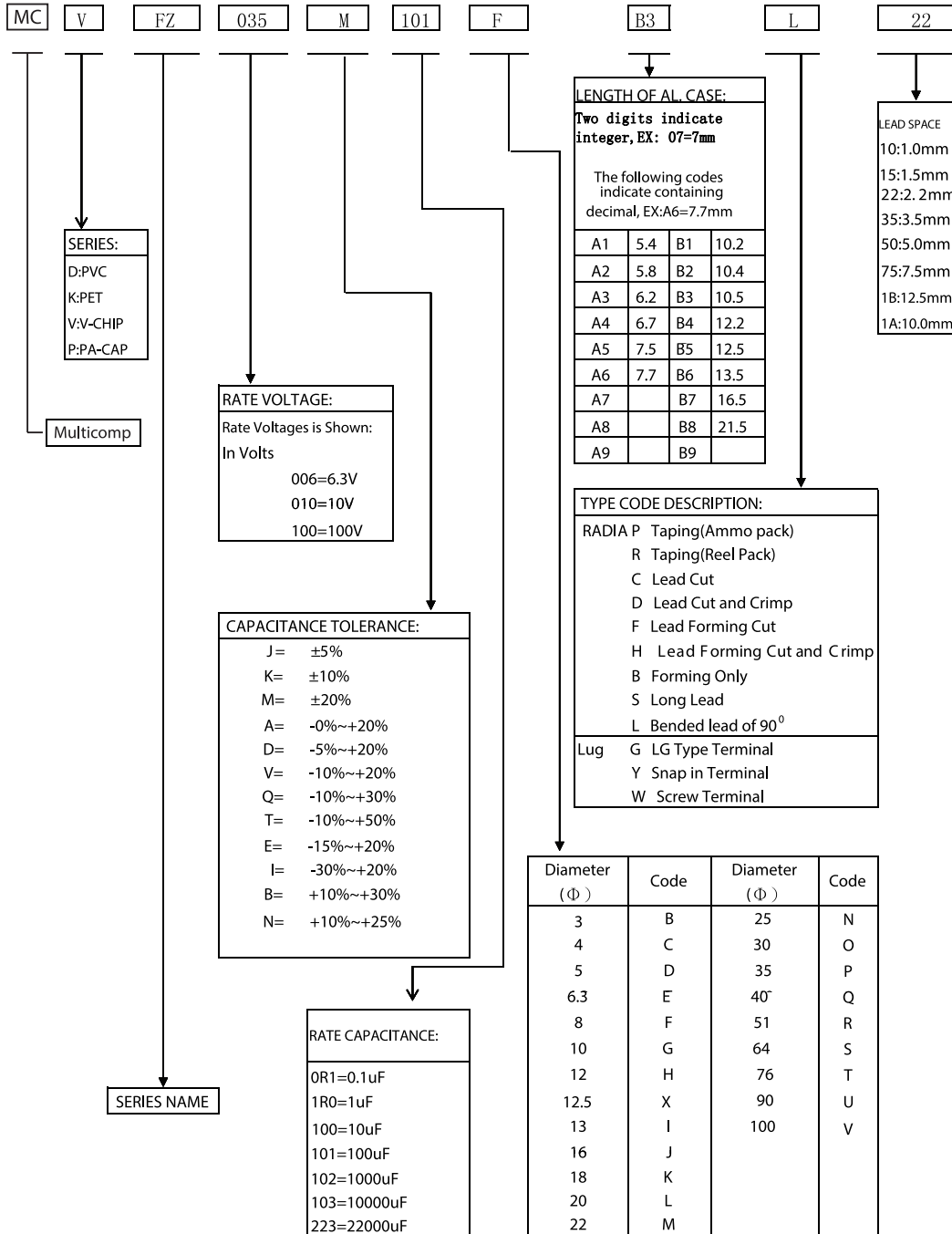
Dimensions : Millimetres

## Standard Ratings:

D × L (mm); R.C.(mA rms) at 105°C 120Hz.

Cap (µF)	V (Code)	6.3 (0J)		10 (1A)		16 (1C)		25 (1E)		35 (1V)		50 (1H)	
	Item	D × L	R.C.	D × L	R.C.	D × L	R.C.	D × L	R.C.	D × L	R.C.	D × L	R.C.
0.1												4×5.4	1
0.22												4×5.4	2.6
0.33												4×5.4	3.2
0.47												4×5.4	3.8
1												4×5.4	8
2.2								4×5.4	6.6	4×5.4	8	4×5.4	11
3.3						4×5.4	7	4×5.4	12	4×5.4	13	4×5.4	16
4.7				4×5.4	7	4×5.4	9	4×5.4	13	4×5.4	15	5×5.4	19
10		4×5.4	10	4×5.4	13	4×5.4	28	5×5.4	25	5×5.4	28	6.3×5.4	35
22		4×5.4	26	5×5.4	35	5×5.4	39	6.3×5.4	45	6.3×5.4	70	6.3×7.7	58
33		4×5.4	29	6.3×5.4	43	6.3×5.4	51	6.3×5.4	65	6.3×5.4	70	8×10	140
47		5×5.4	45	6.3×5.4	62	6.3×5.4	70	6.3×5.4	70	6.3×7.7	80	8×10	170
								6.3×7.7	80				
100		6.3×5.4	71	6.3×5.4	90	6.3×7.7	100	6.3×7.7	100	8×10	305	8×10	315
220		6.3×7.7	100	6.3×7.7	120	6.3×7.7	125	8×10	355	10×10	450	10×10	450
						8×10	215						
330				8×10	215	10×10	440	10×10	450				
470		10×10	310	10×10	440	10×10	460	10×10	490				
1000		10×10	495										

## Explanation of parts numbers



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