

# SMD Chip Aluminum Electrolytic Capacitor

## How To Order:

Series: GV, CB, CZ      Part No.

Series    476

M

100

S

### Capacitance

10PF=100

100PF=101

1000PF=102

1NF=1000pf=102

1UF=1000000=105

### Tolerance

B=0.1PF

C=0.25PF

D=0.5PF

G=2%

J=5%

K=10%

Z=+80%~-20%

M=20%

### Voltage

50V=500

500V=501

1000V=102

2KV=2000V=202

### Life:

S=1000 hours

L=2000 hours

GV = 85C

CZ I= low ESR

CB= 105C = HV

Description: CHIP ALUMINUM Capacitor 47uf 20% 10V 1000Hrs

size: 4X5.5mm

### Note:

The normal packing of Chip Alum. Cap. is Taped/Reel.

The quantity of dia 4 is 2000pcs/Reel,

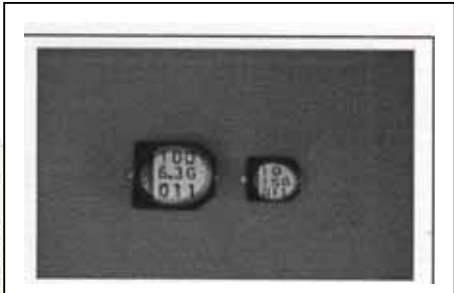
The quantity of dia 6.3 is 1000pcs/Reel,

The quantity of dia 8x6.2 is 1000pcs/Reel

The quantity of 8x10.2 is 500pcs/Reel

# SMD Chip Aluminum Electrolytic Capacitor

<b>Features</b> <b>Applications</b> . Lifetime:85 , 2000hrs . Low profile vertical chip	<b>Recommended</b> . AV (TV, Video, Audio) . Monitor/Computer
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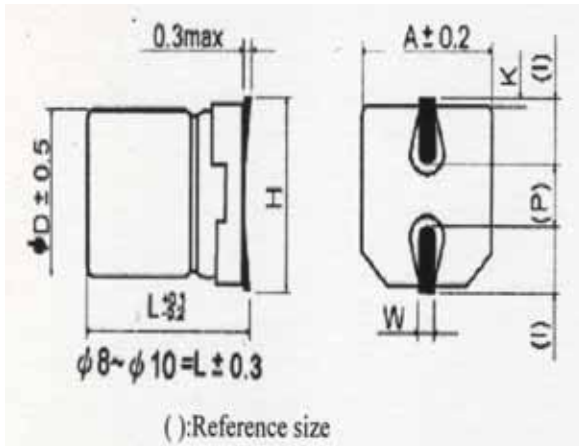
## GV Series

## Specifications

Items	Characteristics									
Capacitance Tolerance	±20% (M) (120Hz,20 )									
Rated Voltage Range (WV)	4~100 VDC									
Operating Temperature Range	-40~+85									
Surge Voltage (V) (20 )	WV	4	6.3	10	16	25	35	50		
	SV	5	8	13	20	32	44	63		
Leakage Current (Max) (20 )	0.01CV or 3 μ A whichever is greater (After rated voltage applied for 2 minutes)									
	=Leakage Current ( μ A) C=Nominal Capacitance ( μ F) V=Rated Voltage (V)									
Dissipation Factor (Max) (tan ) (120Hz, 20 )	Shown in the table of standard rating									
Low Temperature Stability Impedance Ratio (Max)	WV Z(120Hz)	4	6.3	10	16	25	35	50		
	Z(-25 )/Z(20 )	7	4	3	2	2	2	2		
	Z(-40 )/Z(20 )	15	8	6	4	4	3	3		
Load Life	After applying rated voltage for 2000 hours at 85 , the capacitor shall meet the following requirement.									
	Capacitance Change	Within±20% of the initial value								
	Dissipation Factor	Not move than 200% of the specified value								
	Leakage Current	Not more than the specified value								
Shelf Life	After placed at 85 without voltage applied for 1000 hours, the capacitor shall meet the same requirement as load life.									
Applicable standards	Refer to JIS C-5101									

# SMD Chip Aluminum Electrolytic Capacitor

## Dimensions (mm)



D	L	A	H	I	W	P	K
4.0	5.4	4.3	5.5 Max	1.8	0.65±0.1	1.0±0.2	+0.15 -0.20
5.0	5.4	5.3	6.5 Max	2.2	0.65±0.1	1.5±0.2	+0.15 -0.20
6.3	5.4	6.6	7.8 Max	2.6	0.65±0.1	1.8±0.2	+0.15 -0.20
8.0	6.2	8.3	9.5 Max	3.4	0.65±0.1	2.2±0.2	+0.15 -0.20
8.0	10.2	8.3	10.0 Max	3.4	0.90±0.2	3.1±0.2	0.70±0.2
10.0	10.2	10.3	12.0 Max	3.5	0.90±0.2	4.6±0.2	0.70±0.2

## Multiplier for Ripple Current

### Frequency coefficient

Frequency (Hz)	60	120	1K	10K
Coefficient	0.80	1.00	1.15	1.25

### Temperature coefficient

Ambient Temperature ( )	50	70	85
Coefficient	1.36	1.25	1.00

## Case Size / tan / Max Ripple Current / ESR

**CASE SIZE ( D×L (mm) ) & MAX DISSIPATION FACTOR (tan / 120Hz, 20 ) & MAX PERMISSIBLE RIPPLE CURRENT (RC (m Arms) / 120Hz, 85 ) & MAX EQUIVALENT SERIES RESISTANCE (ESR( )/120Hz,20 )**

WV	4				6.3				10				16			
SPEC	D×L	tan	RC	ESR	D×L	tan	RC	ESR	D×L	tan	RC	ESR	D×L	tan	RC	ESR
4.7													4×5.4	0.16	20	45.1
10													4×5.4	0.16	28	21.1
22	4×5.4	0.35	19	21.1	4×5.4	0.26	20	15.6	4×5.4	0.30	28	18.0	4×5.4	0.26	27	15.6
													5×5.4	0.16	39	
33	4×5.4	0.35	26	14.0	5×5.4	0.26	22	10.4	4×5.4	0.30	29	8.03	5×5.4	0.26	45	10.4
									5×5.4	0.20	43		6.3×5.4	0.16	66	
47	4×5.4	0.35	34	9.87	5×5.4	0.26	46	7.33	5×5.4	0.30	43	8.46	6.3×5.4	0.16	70	4.51
100	5×5.4	0.35	61	4.64	6.3×5.4	0.26	71	3.44	6.3×5.4	0.26	70	3.44	6.3×5.4	0.20	70	2.65
220	6.3×5.4	0.35	82	2.11	8×6.2	0.35	250	2.11	8×6.2	0.26	250	1.56	8×10.2	0.20	280	1.20
330					8×6.2	0.35	300	1.40	8×10.2	0.26	330	1.04	10×10.2	0.20	380	0.803
470					8×10.2	0.35	380	0.987	10×10.2	0.26	400	0.733	10×10.2	0.20	420	0.564
1000					10×10.2	0.35	700	0.464	10×10.2	0.26	580	0.344				

## SMD Chip Aluminum Electrolytic Capacitor

WV	25				35				50			
SPEC $\mu F$	DxL	tan	RC	ESR	DxL	tan	RC	ESR	DxL	tan	RC	ESR
0.1									4x5.4	0.12	1	1593
0.22									4x5.4	0.12	2	723
0.33									4x5.4	0.12	3	482
0.47									4x5.4	0.12	5	338
1									4x5.4	0.12	10	159
2.2					4x5.4	0.12	8	72.3	4x5.4	0.12	16	72.3
3.3					4x5.4	0.12	10	48.2	4x5.4	0.12	16	48.2
4.7	4x5.4	0.14	22	39.5	4x5.4	0.12	22	33.8	5x5.4	0.12	23	33.8
10	5x5.4	0.14	28	18.5	5x5.4	0.12	30	15.9	6.3x5.4	0.12	35	15.9
22	6.3x5.4	0.14	55	8.44	6.3x5.4	0.12	60	7.23	8x6.2	0.12	110	7.23
33	6.3x5.4	0.14	65	5.62	8x6.2	0.14	130	5.62	8x10.2	0.12	120	4.82
47	6.3x5.4	0.20	70	6.20	8x6.2	0.14	165	3.95	10x10.2	0.12	130	3.38
	8x6.2	0.16	96									
100	8x10.2	0.16	180	2.12	10x10.2	0.14	210	1.85	10x10.2	0.12	190	1.59
220	10x10.2	0.16	310	0.964	10x10.2	0.14	310	0.844				

# SMD Chip Aluminum Electrolytic Capacitor

## CB Series

### Features

- Long life of 2000 hrs at 105 .
- Reflow soldering is available.
- Available for high density mounting
- For detail specifications, please refer to Engineering Bulletin No. E131



### Specifications

Item	Performance Characteristics								
Operating Temperature Range	-40~+105								
Rated Voltage Range	6.3~50VDC								
Capacitance Range	0.1 to 1000 $\mu$ F								
Capacitance Tolerance	$\pm 20\%$ (120Hz, +20 )								
Leakage Current (+20 ,max.)	1 0.01CV or 3 ( $\mu$ A) After 2 minutes, whichever is greater measured with rated working voltage applied								
Dissipation Factor (tan ) (+20 , at 120Hz)	Rated voltage (VDC)	4	6.3	10	16	25	35	50	
	D.F. (%)max	0.42	0.3	0.24	0.2	0.16	0.14	0.14	
Low Temperature Characteristics (120Hz)	Impedance ratio max	Rated voltage (VDC)	6.3	10	16	25	35	50	
		Z-25 /Z+20	6	4	4	3	2	2	
		Z-40 /Z+20	12	10	8	6	4	4	
Load Life	Test conditions								
	Duration time	:2000 Hrs							
	Ambient temperature	:+85							
	Applied voltage	:Rate DC working voltage							
	After test requirements at +20 :								
	Capacitance change	:Within $\pm 30\%$ of the initial value							
Dissipation factor	:Not more than 300% of specified value								
Leakage current	: Not more than the specified value								
Shelf Life	Test conditions								
	Duration time	:1000Hrs							
	Ambient temperature	:+105							
	Applied voltage	:None							
	After test requirements at +20 :	:Same limits as Load life.							
	Pre-treatment for measurements shall be conducted after application of DC working voltage for 30 minutes.								

# SMD Chip Aluminum Electrolytic Capacitor

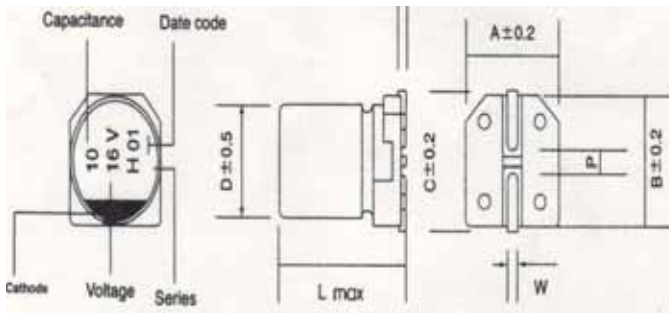
## Multiplier for Ripple Currents vs. Frequency

Frequency(Hz)		60(50)	120	500	1K	10K $\leq$
Multiplier	0.1~47 $\mu$ F	0.8	1.0	1.20	1.30	1.50
	100~1000 $\mu$ F	0.8	1.0	1.10	1.15	1.20

## Multiplier for Ripple Currents vs. Temperature

Temperature $^{\circ}$ C	65	85	105
Multiplier	2.1	1.7	1.0

## Diagram of Dimensions: (mm)



$\Phi$ D	L	A	B	C	W	P
4	5.5	4.3	4.3	5.1	0.5~0.8	1.0
5	5.5	5.3	5.3	5.9	0.5~0.8	1.4
6.3	5.5	6.6	6.6	7.2	0.5~0.8	1.9
8	6.5	8.3	8.3	9.0	0.5~0.8	2.3
8	10.5	8.3	8.3	9.0	0.7~1.1	3.1
10	10.5	10.3	10.3	11.0	0.7~1.1	4.5

## Case Size

uF \ WV (SV)		$\Phi$ DxL(mm)											
		6.3 (8)		10 (13)		16 (20)		25 (32)		35 (44)		50 (63)	
		Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple
0.1												4x5.5	1.0
0.22												4x5.5	2.0
0.33												4x5.5	3.0
0.47												4x5.5	4.0
1												4x5.5	8.4
2.2												4x5.5	11
3.3												4x5.5	13
4.7								4x5.5	12	4x5.5	14	4x5.5	18
10						4x5.5	20	4x5.5	12	4x5.5	24	6.3x5.5	28
22		4x5.5	23	4x5.5	25	4x5.5	31	6.3x5.5	38	6.3x5.5	46	8x6.5	55
33		4x5.5	28	4x5.5	34	5x5.5	40	6.3x5.5	48	8x6.5	50	8x10.5	135
						6.3x5.5	40						
47		4x5.5	37	6.3x5.5	40	6.3x5.5	56	8x6.5	60	8x6.5	65	8x10.5	155
100		6.3x5.5	57	8x6.5	60	8x6.5	62	8x10.5	180	8x10.5	180	10x10.5	315
220		8x6.5	65	8x6.5	70	8x6.5	185	10x10.5	190	10x10.5	360		
						8x10.5	185						
330		8x10.5	70	8x10.5	195	10x10.5	195						
470		8x10.5	210	10x10.5	440								
1000		10x10.5	480										

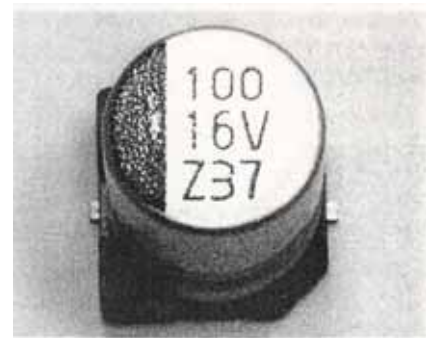
Ripple Current (mA, rms) at 105 $^{\circ}$ C 120Hz

# SMD Chip Aluminum Electrolytic Capacitor

## CZ Series

### Features

- Low impedance 100KHz
- Reflow soldering is available
- Available for high density mounting
- Load life 1000 HR at 105
- For detail specifications, please refer to Engineering Bulletin No. E135



### Specifications

Item	Performance Characteristics						
Operating Temperature Range	-55~+105						
Rated Voltage Range	6.3~35VDC						
Capacitance Range	1 to 220 $\mu$ F						
Capacitance Tolerance	$\pm$ 20% (120Hz, 20 )						
Leakage Current	After 2 minutes, leakage current is not more than 0.01CV or 3( $\mu$ A), whichever is greater.						
Dissipation Factor (tan )	(+20 , at 120Hz)	Working voltage (VDC)	6.3	10	16	25	35
		D.F. (%)max	0.22	0.19	0.16	0.14	0.14
Low Temperature Characteristics (120Hz)	Impedance ratio max	Working voltage (VDC)	10	16	35	35	50
		Z-25 /Z+20	3	2	2	2	2
		Z-40 /Z+20	6	4	4	3	3
Load Life	Test conditions						
	Duration time	:1000 Hrs					
	Ambient temperature	:+105					
	Applied voltage	:Rate DC working voltage					
After test requirements at +105 :							
Capacitance change : $\pm$ 25% of the initial measured value							
Dissipation factor : $\pm$ 200% of the initial specified value							
Leakage current : The initial specified value							
Shelf Life	Test conditions						
	Duration time	:1000 Hrs					
	Ambient temperature	:+105					
	Applied voltage	:None					
After test requirements at +105 :Same limits as Load life.							

# SMD Chip Aluminum Electrolytic Capacitor

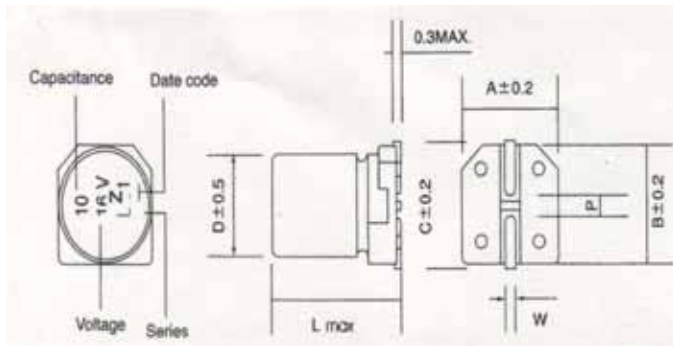
Multiplier for Ripple Currents vs. Frequency

CAP (μF)\Hz		60(50)	120	400	1K	10K	50K-100K
Multiplier	CAP ≤ 10	0.47	0.59	0.76	0.85	0.97	1.0
	10 < CAP ≤ 100	0.52	0.65	0.80	0.89	0.97	1.0

Multiplier for Ripple Currents vs. Temperature

Temperature°C	65	85	105
Multiplier	2.1	1.7	1

Diagram of Dimensions: (unit: mm)



ΦD	L	A	B	C	W	P
4	5.5	4.3	4.3	4.9	0.5~0.8	1.0
5	5.5	5.3	5.3	5.9	0.5~0.8	1.4
6.3	5.5	6.6	6.6	7.2	0.5~0.8	1.9
8	6.5	8.3	8.3	9.0	0.5~0.8	2.3
8	10.5	8.3	8.3	9.0	0.7~1.1	3.1
10	10.5	10.3	10.3	11.0	0.7~1.1	4.5

Case Size

uF	wV(sv)	6.3 (8)			10 (13)			16 (20)			25 (32)			35 (44)		
		Size	Ripple	Impedance	Size	Ripple	Impedance	Size	Ripple	Impedance	Size	Ripple	Impedance	Size	Ripple	Impedance
1													4×5.5	50	5	
1.5													4×5.5	50	5	
2.2													4×5.5	50	5	
3.3													4×5.5	50	5	
4.7											4×5.5	50	5	4×5.5	50	5
6.8											4×5.5	80	5	6.3×5.5	80	2.6
10								4×5.5	50	5	6.3×5.5	80	2.6	6.3×5.5	80	2.6
15								4×5.5	80	2.6	6.3×5.5	115	1.3	6.3×5.5	115	1.3
22		4×5.5	50	5	4×5.5	80	2.6	6.3×5.5	80	2.6	6.3×5.5	115	1.3	6.3×5.5	115	1.3
33		4×5.5	80	2.6	6.3×5.5	80	2.6	6.3×5.5	115	1.3	6.3×5.5	115	1.3	8×6.5	150	0.8
47		6.3×5.5	80	2.6	6.3×5.5	115	1.3	6.3×5.5	115	1.3	8×6.5	150	0.8	8×6.5	150	0.8
68		6.3×5.5	115	1.3	6.3×5.5	115	1.3	8×6.5	150	0.8	8×6.5	150	0.8			
100		6.3×5.5	115	1.3	8×6.5	150	0.8	8×6.5	150	0.8						
150		8×6.5	150	0.8	8×6.5	150	0.8									
220		8×6.5	150	0.8												

Ripple Current (mA, rms) at 105°C 100Hz  
Max impedance(Ω) at 20°C 100KHz

# SMD Chip Aluminum Electrolytic Capacitor

## FKV Series

### Features

- 85 Low leakage case diameter 4~ 8
- Reflow soldering is available
- Available for high density mounting
- For detail specifications, please refer to Engineering Bulletin No. E134



### Specifications

Item	Performance Characteristics								
Operating Temperature Range	-40~+85								
Rated Voltage Range	6.3~50VDC								
Capacitance Range	0.1 to 330 $\mu$ F								
Capacitance Tolerance	$\pm 20\%$ (120Hz, 20 )								
Leakage Current (+20 )	1 0.02CV or 0.4 ( $\mu$ A) After 2 minutes, whichever is greater measured with rated working voltage applied								
Dissipation Factor (tan )	(+20 , at 120Hz)	Working voltage (VDC)		6.3	10	16	25	35	50
		D.F. (%)max		26	22	18	16	14	12
Low Temperature Characteristics (120Hz)	Impedance ratio max	Working voltage (VDC)		4	6.3	10	16	35	50
		Z-25 /Z+20		7	4	3	2	2	2
		Z-40 /Z+20		15	8	6	4	4	3
Load Life	<b>Test conditions</b> Duration time :1000 Hrs Ambient temperature :+85 Applied voltage :Rate DC working voltage								
	After test requirements at +20 : Capacitance change :Within $\pm 25\%$ of the initial value Dissipation factor :Not more than 200% of specified value Leakage current : Not more than the specified value								
Shelf Life	<b>Test conditions</b> Duration time :1000Hrs Ambient temperature :+85 Applied voltage :None								
	After test requirements at +20 :Same limits as Load life. Pre-treatment for measurements shall be conducted after application of DC working voltage for 30 minutes.								

# SMD Chip Aluminum Electrolytic Capacitor

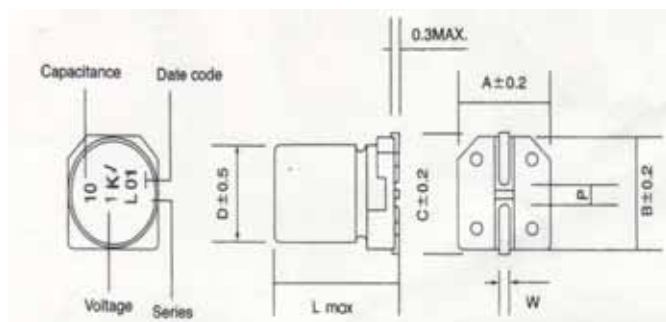
Multiplier for Ripple Currents vs. Frequency

CAP (μF)\Hz		60(50)	120	400	1K	10K	50K-100K
Multiplier	CAP ≤ 10	0.47	0.59	0.76	0.85	0.97	1.0
	10 < CAP ≤ 100	0.52	0.65	0.80	0.89	0.97	1.0

Multiplier for Ripple Currents vs. Temperature

Temperature°C	65	85	105
Multiplier	2.1	1.7	1

Diagram of Dimensions: (unit: mm)



φD	L	A	B	C	W	P
4	5.5	4.3	4.3	5.1	0.5~0.8	1.0
5	5.5	5.3	5.3	5.9	0.5~0.8	1.4
6.3	5.5	6.6	6.6	7.2	0.5~0.8	1.9
8	6.5	8.3	8.3	9	0.5~0.8	2.3
8	10.5	8.3	8.3	9	0.7~1.1	3.1

Case Size

φ D×L(mm)

WV(SV)	6.3 (8)		10 (13)		16 (20)		25 (32)		35 (44)		50 (63)	
	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple
0.1											4×5.5	1
0.22											4×5.5	2
0.33											4×5.5	2.8
0.47											4×5.5	4
1											4×5.5	8.4
2.2									4×5.5	8.4	4×5.5	13
3.3							4×5.5	10	4×5.5	15	4×5.5	17
4.7					4×5.5	10	4×5.5	16	4×5.5	18	6.3×5.5	20
10	4×5.5	15	4×5.5	23	4×5.5	23	6.3×5.5	27	6.3×5.5	29	6.3×5.5	33
22	4×5.5	28	4×5.5	33	6.3×5.5	37	6.3×5.5	42	6.3×5.5	46	8×6.5	52
33	6.3×5.5	37	6.3×5.5	41	6.3×5.5	49	6.3×5.5	52	8×6.5	62	8×6.5	71
47	6.3×5.5	45	6.3×5.5	52	6.3×5.5	58	8×6.5	70	8×6.5	80		
100	6.3×5.5	70	8×6.5	80	8×6.5	92	8×6.5	110				
220	8×6.5	110	8×6.5	135								
330	8×6.5	170										

Ripple Current (mA, rms) at 85°C 120Hz

# SMD Chip Aluminum Electrolytic Capacitor

## FNV Series

### Features

85 Non-polarized, 5.5 mm max height

Reflow soldering is available

Available for high density mounting

For detail specifications, please refer to Engineering Bulletin No. E132



### Specifications

Item	Performance Characteristics						
Operating Temperature Range	-40~+85						
Rated Voltage Range	6.3~50VDC						
Capacitance Range	0.1 to 47 $\mu$ F						
Capacitance Tolerance	$\pm 20\%$ (120Hz, 20 $^{\circ}$ C)						
Leakage Current (+20 $^{\circ}$ C, max.)	0.05CV or 10 ( $\mu$ A) After 2 minutes, whichever is greater measured with rated working voltage applied						
Dissipation Factor (tan $\delta$ )	(+20 $^{\circ}$ C, at 120Hz)	Rated voltage (VDC)	6.3	10	16	35	50
		D.F. (%)max	0.3	0.24	0.2	0.14	0.14
Low Temperature Characteristics (120Hz)	Impedance ratio max	Rated voltage (VDC)	6.3	10	16	35	50
		Z-25 /Z+20	4	3	2	2	2
		Z-40 /Z+20	8	6	4	3	3
Load Life	Test conditions Duration time :2000 Hrs Ambient temperature :+85 Applied voltage :Rate DC working voltage After test requirements at +20 $^{\circ}$ C : Capacitance change : Within $\pm 25\%$ of the initial value Dissipation factor :Not more than 200% of specified value Leakage current :Not more than the specified value						
Shelf Life	Test conditions Duration time :1000 Hrs Ambient temperature :+85 Applied voltage :None After test requirements at +20 $^{\circ}$ C :Same limits as Load life. Pre-treatment for measurements shall be conducted after application of DC working voltage for 30 minutes.						

# SMD Chip Aluminum Electrolytic Capacitor

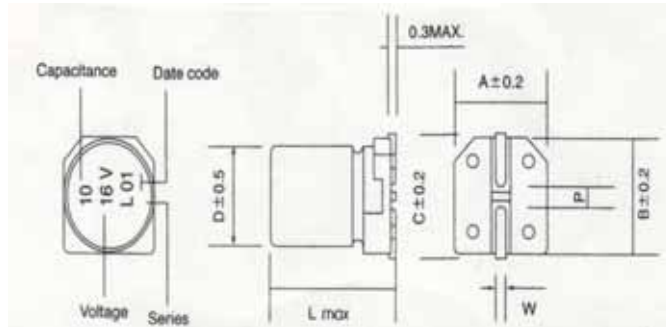
## Multiplier Ripple Currents vs. Frequency

Frequency(Hz)	60(50)	120	500	1K	10K≤
Multiplier	0.8	1.0	1.2	1.30	1.50

## Multiplier for Ripple Currents vs. Temperature

Temperature°C	50	70	85
Multiplier	2.0	1.6	1.0

## Diagram of Dimensions: (unit: mm)



$\Phi D$	L	A	B	C	W	P
4	5.5	4.3	4.3	5.1	0.5~0.8	1
5	5.5	5.3	5.3	5.9	0.5~0.8	1.4
6.3	5.5	6.6	6.6	7.2	0.5~0.8	1.9

## Case Size

WV(SV)	$\Phi D \times L$ (mm)											
	6.3 (8)		10 (13)		16 (20)		25 (32)		35 (44)		50 (63)	
$\mu F$	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple
0.1											4×5.5	1.0
0.22											4×5.5	2.0
0.33											4×5.5	2.8
0.47											4×5.5	4.0
1											4×5.5	8.4
2.2									4×5.5	8.4	4×5.5	13
											5×5.5	13
3.3					4×5.5	12	4×5.5	12	4×5.5	16	4×5.5	17
							5×5.5	12	5×5.5	16	5×5.5	17
4.7					4×5.5	12	4×5.5	16	4×5.5	18	6.3×5.5	20
							5×5.5	16	5×5.5	18		
10	4×5.5	15	4×5.5	17	4×5.5	23	6.3×5.5	27	6.3×5.5	29		
					5×5.5	23						
22	4×5.5	28	6.3×5.5	33	6.3×5.5	37						
	5×5.5	28										
33	6.3×5.5	37	6.3×5.5	41	6.3×5.5	49						
47	6.3×5.5	45										

Ripple Current (mA, rms) at 85°C 120Hz