

承 認 書

SPECIFICATION FOR APPROVAL

客 戶 :
CUSTOMER

LOMEX

承認圖號 :
APP. NO.

D130100712




系 列 :
SERIES

LC

使用溫度範圍 :
OPERATION TEMP. RANGE

-25/-40~+105°C

本公司料號 VENDOR'S PART NO.	貴公司料號 BUYER'S PART NO.
GLC***M*****0	

貴公司承認印 BUYER'S APPROVAL STAMP	智寶電子(東莞)有限公司 TEAPO ELECTRONICS(Dong Guan) CORPORATION	
		
	APPROVED BY:	TESTED BY:
		

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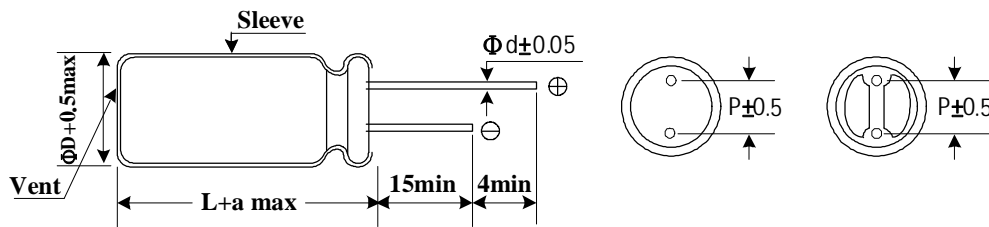
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I . Scope

This standard defines characteristics and dimensions for aluminum electrolytic capacitors named LC Series is High voltage and long life product

II . Construction & Dimensions



*Safety vent only for :Dimension $\geq 6.3 \times 11$

Diameter(φD)	10	13	16	18	22
Lead space(P)	5.0		7.5		10.0
Lead diameter(φd)	0.6		0.8		0.8
a	1.5	2.0	2.0	2.0	2.0

III . Characteristics

Standard test condition

Unless otherwise specified all tests shall be performed at, or referred to, an ambient temperature of 20°C and a relative humidity not greater than 60%.

Operating Temperature Range

160~400VDC -40~+105°C

450 VDC -25~+105°C

1. Electrical characteristics

(1). Rated Voltage and Surge Voltage

WV: Working Voltage (VDC)

SV: Surge Voltage (V)

WV	160	200	250	350	400	450
SV	200	250	300	400	450	500

(2). Leakage Current

The maximum leakage current is specified in the following formula after DC working voltage applied.

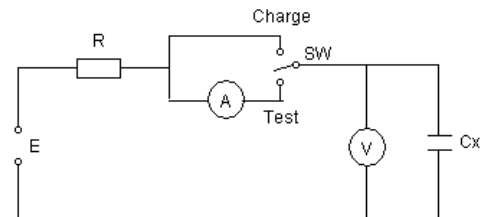
$$160\sim 450V \quad I=0.06CV + 10 (\mu A) \text{ for 2 minutes}$$

where I: Leakage Current (μA)

C: Nominal Capacitance (μF)

V: Rated Voltage (V)

Measurement circuit



(3). Capacitance Tolerance

Capacitance tolerance should be within the range of $\pm 20\%$ which is measured at 120Hz/20°C

(4). Dissipation Factor

Dissipation Factor at 120Hz/ 20°C shall not exceed the values given in the table below.

WV	160	200	250	350	400	450
DF(%)	15	15	15	20	24	24

(5). Low Temperature Characteristics

The ratio of impedance at -25°C/+20°C and -40°C/+20°C of the capacitor shall be less than the following value at 120Hz.

Z(120Hz)	WV					
	160	200	250	350	400	450
Z(-25°C) / Z(+20°C)	3	3	3	5	5	6
Z(-40°C) / Z(+20°C)	6	6	6	6	6	-

(6). Multiplier for Ripple Current

Frequency coefficient

Frequency (Hz)	50,60	120	300	1K	10K~100k
coefficient	0.80	1.00	1.20	1.40	1.60

2. Mechanical Characteristics

Lead Pull Test

Capacitors shall be with stand the pull test shown in the following table.

Lead diameter (mm)	Load (Kg)	Test time (sec)
$d \leq 0.5$	0.5	30 ⁺⁵ ₋₀
$0.5 < d \leq 0.8$	1.0	30 ⁺⁵ ₋₀
$0.8 < d \leq 1.2$	2.5	30 ⁺⁵ ₋₀

2. Endurance characteristics**(1). Ripple Life**

To put capacitors into the oven which is staying at $105\pm 2^{\circ}\text{C}$, then to add rated voltage with max. ripple current in the capacitors. This experiment will be lasted for $5000+12/-0$ hours. We will examine the electric characteristics after getting them cooled down to room temperature. The values must not be over those on following table.

*If dimension is down size, Ripple Life will be $3000+12/-0$ hours

Capacitance Change	Within $\pm 20\%$ of initial value
Dissipation Factor	200% or less of initial specified value
Leakage Current	initial specified value or less

(2). Shelf Life

The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them at $105\pm 2^{\circ}\text{C}$ for $1000+12/-0$ hours without voltage applied.

Capacitance Change	Within $\pm 20\%$ of initial value
Dissipation Factor	200% or less of initial specified value
Leakage Current	initial specified value or less

(3). Solderability Test

The following specifications shall be satisfied when the lead wires are tested in solder bath at $245\pm 5^{\circ}\text{C}$ for 2.5 ± 0.5 seconds, more than 95% of the terminal surface shall be covered with new solder.

(4). Solder Heat Resistance Test

The following specifications shall be satisfied when the lead wires are tested in solder bath at $275+2/-0^{\circ}\text{C}$ for 20 ± 0.5 seconds.

Capacitance Change	$\leq \pm 5\%$ of the initial value
Dissipation factor	\leq Initial specified value
Leakage Current	\leq Initial specified value

IV. Mounting

The paper separators and the electrolytic-conductive electrolytes in a non-solid aluminum electrolytic capacitor is flammable.

Leaking electrolyte on a PC board can gradually erode the copper traces, possibly causing smoke or burning by short-circuiting the copper traces.

Verify the following points when designing a PC board.

- (1) Provide the appropriate hole spacing on the PC board to match the terminal spacing of the capacitor.

- (2) Make the following open space over the vent so that the vent can operate correctly.

<u>Case diameter</u>	<u>Clearance</u>
ϕ 6.3 to ϕ 13 mm	2 mm minimum
ϕ 16 to ϕ 35 mm	3 mm minimum
ϕ 40 mm and up	5 mm minimum

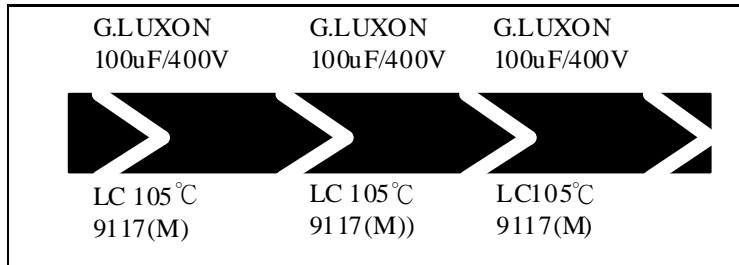
- (3) Do not place any wires or copper traces over the vent of the capacitor.
- (4) Installing a capacitor with the vent facing the PC board needs an appropriate ventilation hole in PC board.
- (5) Do not pass any copper traces beneath the seal side of a capacitor.
The trace must pass 1 or 2 mm to the side of the capacitor.
- (6) Avoid placing any heat-generating objects adjacent to a capacitor or even on the reverse side of the PC board.
- (7) Do not pass any via holes or underneath a capacitor.
- (8) In designing double-sided PC boards, do not locate any copper trace under the seal side of a capacitor.

V. Storage Condition

- (1) Aluminum Electrolytic Capacitors should not be stored in high temperatures or where there is a high level of humidity. The suitable storage condition is 5~35°C and less than 75% in relative humidity.
- (2) Aluminum Electrolytic Capacitors should not be stored in damp conditions such as water, saltwater spray or oil spray.
- (3) Do not store Aluminum Electrolytic Capacitors in an environment full of hazardous gas (hydrogen sulfide, sulfurous acid gas, nitrous acid, chlorine gas, ammonium, etc...).
- (4) Aluminum Electrolytic Capacitors should not be stored under exposure to ozone, ultraviolet rays or radiation.
- (5) If a capacitor has been stored for more than one year under normal temperature (shorter if high temperature) and it shows increased leakage current, then a treatment by voltage application is recommended. The capacitor which hasn't been treated mustn't be used directly.

VI. Marking

Marking on capacitor include:



Ⓟ G-LUXON trademark

Ⓟ Series No.

Ⓟ Nominal capacitance

Ⓟ Max operating temperature

Ⓟ Working voltage

Ⓟ Date code

Ⓟ Polarity

Ⓟ Capacitance tolerance

Remark: Date code numbering system. Date code is indicated manufactured date

Manufactured year

Code	5	6	7	8	9	10	11	12	13
Year	2005	2006	2007	2008	2009	2010	2011	2012	2013

Manufactured month

Month	1	2	3	4	5	6	7	8	9	10	11	12
Code	01	02	03	04	05	06	07	08	09	10	11	12

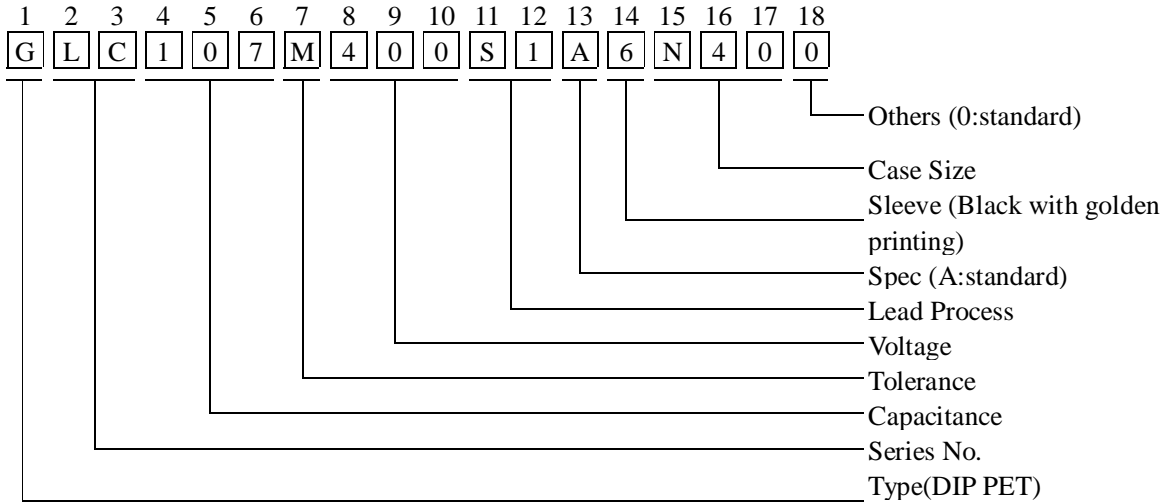
Sleeve Supplier(Made in Dongguan)

Supplier	SO LI	YNG SHINN	CHI YUAN	YUN LIN
Code	2	8	5	7
material	PET	PET	PET	PET

The above code descriptions are just examples, they haven't completely shown all sleeve suppliers.

VII. Catalog numbering

G-LUXON LC TYPE (Part Number)



VIII. Packaging specification

Miniature Aluminum Electrolytic Capacitors

For Bulk: Standard Cutting & Forming

Classification	Standard Bulk				Cutting & Forming				Min. ordering amount
	Case size D*L(mm)	Vinyl bag	inner box 289*168*279 (mm)	outer carton 355*297*290 (mm)	gross weight (kg)	Vinyl bag	inner box 289*168*135 (mm)	outer carton 355*297*290 (mm)	gross weight (kg)
4×5	2,000	24,000	48,000	13	2,000	20,000	80,000	20	25
4×7	2,000	20,000	40,000	11	2,000	16,000	64,000	17	25
5×5	2,000	20,000	40,000	12	2,000	16,000	64,000	18	25
5×7	2,000	16,000	32,000	13	2,000	16,000	64,000	23	25
5×11	1,000	12,000	24,000	13	1,000	10,000	40,000	22	25
6.3×5	2,000	16,000	32,000	11	2,000	10,000	40,000	16	20
6.3×7	2,000	12,000	24,000	10	2,000	10,000	40,000	15	20
6.3×11	1,000	10,000	20,000	14	1,000	7,000	28,000	17	20
8×7	500	10,000	20,000	14	500	6,500	26,000	16	15
8×9,8×11	500	7,500	15,000	17	500	4,000	16,000	18	15
8×14	500	5,000	10,000	12	500	3,000	12,000	14	15
8×16	500	5,000	10,000	16	500	2,000	8,000	13	15
8×20	200	4,000	8,000	14	200	2,000	8,000	14	15
10×12.5	200	4,000	8,000	15	200	2,000	8,000	15	12
10×15	200	3,600	7,200	16	200	2,000	8,000	18	12
10×17	200	3,600	7,200	17	200	1,600	6,400	15	12
10×20	200	3,000	6,000	19	200	1,400	5,600	17	12
10×25	200	2,400	4,800	17	200	1,200	4,800	16	12
13×13,13×15	200	2,400	4,800	15	200	800	3,200	13	10
13×18,13×20	200	1,800	3,600	15	200	600	2,400	10	10
13×25	200	1,200	2,400	14	200	600	2,400	14	10
13×30	100	1,200	2,400	16	100	500	2,000	14	10
13×34,13×36	100	1,000	2,000	14	100	300	1,200	12	10
13×38,13×40	100	800	1,600	15	100	300	1,200	15	10

Classification	Standard Bulk				Cutting & Forming				Min. ordering amount
	Case size D*L(mm)	Vinyl bag	inner box (mm)	outer carton (mm)	gross weight (kg)	Vinyl bag	inner box (mm)	outer carton (mm)	gross weight (kg)
16X15、16X20	200	1000	2000	22	200	1000	2000	22	5
16X25	200	1000	2000	24	-	500	4000	44	5
16X30、16X32、	200	800	1600	20	-	500	3000	37	5
16X36、16X40	200	600	1200	22	-	500	3000	55	5
16X45	100	500	1000	22	-	-	-	-	5
18X15、18X20	200	800	1600	21	-	-	-	-	2.5
18X22、18X25	200	800	1600	23	-	500	2000	28	2.5
18X30	100	600	1200	25	-	-	-	-	2.5
18X32、18X36、18X40	100	500	1000	25	-	500	1000	25	2.5
18X45、18X50	100	300	600	21	-	600	1200	40	2.5
20X25	-	-	-	-	-	400	800	20	1.5
22X32	-	-	-	-	-	320	1920	55	1.5
22X30	-	-	-	-	-	400	800	25	1.5
22X35、22X40	100	300	600	21	-	400	800	27	1.5

For Taping Ammo & Reel

Classification	Ammo Tape					Reel Tape			Min. ordering amount kpcs
	inner box (mm)	quantity (pcs)	outer carton (mm)	quantity (pcs)	gross weight (kg)	inner carton 350*350*110 (mm)	outer carton 370*370*600 (mm)	gross weight (kg)	
4 φ	340×275×50	3,000	355×297×290	15,000	6	3,000	15,000	8	25
5 φ	340×230×50	2,000	355×252×290	10,000	6 ~ 7	2,400	12,000	8	25
6.3 φ	340×275×50	2,000	355×297×290	10,000	8	2,000	10,000	6	20
8 φ ×5-16L	340×230×50	1,000	355×252×290	5,000	7	1,600	8,000	12	15
8 φ ×20L	340×230×58	1,000	355×252×315	5,000	7	1,000	5,000	12	15
10 φ ×10~17L	340×230×50	600	355×252×290	3,000	7	-	-	-	12
10 φ ×20~25L	340×230×58	600	355×252×315	3,000	7	-	-	-	12
10 φ ×30L	340×230×65	600	355×252×290	2,400	7	-	-	-	12
13 φ ×32L below	315×275×65	400	355×297×290	1,600	5	-	-	-	10
13 φ ×36L above	315×275×74	400	355×297×337	1,600	5	-	-	-	10
16 φ ×32L below	315×275×65	300	355×297×290	1,200	5	-	-	-	5
16 φ ×36L above	315×275×74	300	355×297×337	1,200	5	-	-	-	5

Note : For 10 φ Reel Tape :

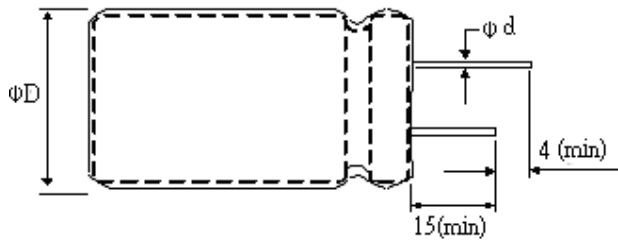
size	inner carton(pcs)	outer carton(pcs)
10 φ ×10~16L	1,200	6,000
10 φ ×17~20L	1,000	5,000

IX. Others

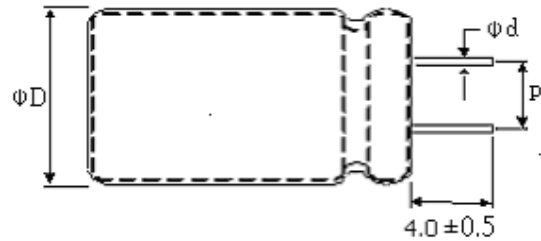
- (1) All Teapo capacitors comply to RoHS(Restriction of Hazardous Substances) requirements where Chromium VI(Cr+6),Cadmium(Cd) , Mercury(Hg), Lead(pb), Polybrominated biphenyls(PBBs)and Polybrominated biphenyl/diphenyl ethers (PBBEs/PBDEs) have not been detected [lower than MDL (Method Detection Limit)] per SGS certification test report..
 - (2)Satisfied characteristic JIS C 5101
 - (3)Aluminum Electrolytic Capacitors may be damaged by corrosion which is caused by any halogenated hydrocarbon solvents.
- Please let us know in advance the solvent name and conditions for your PCB cleaning

X. Lead processing type and Taping

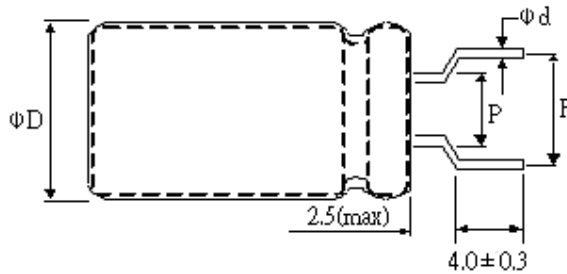
Code S1: Standard Type



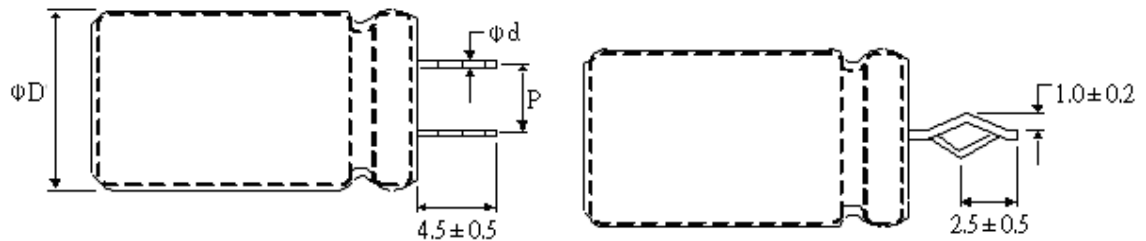
Code C5: Straight Cut



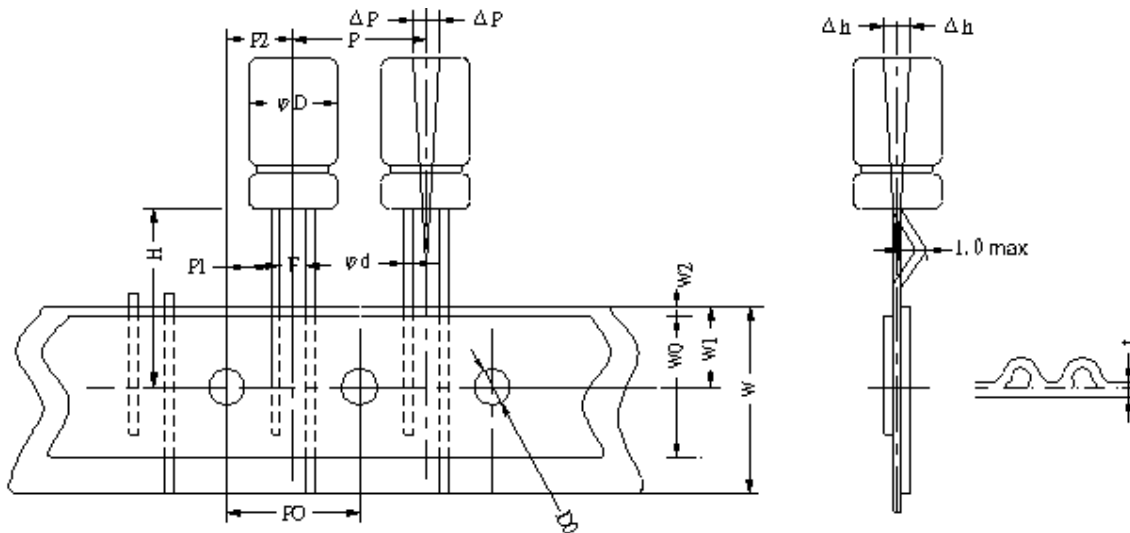
Code F6: Forming Cut(φ 4~ φ 8)



Code K2: Kink cut, & Crimping



Code T1/R1 : Ammo / Reel Tape ($\phi 10$)

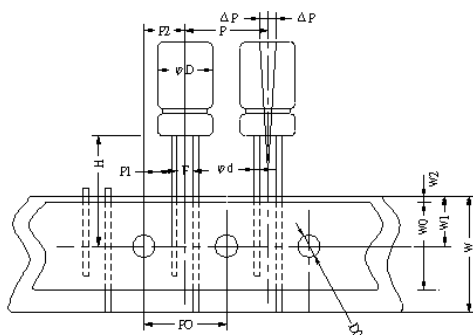


Unit: mm

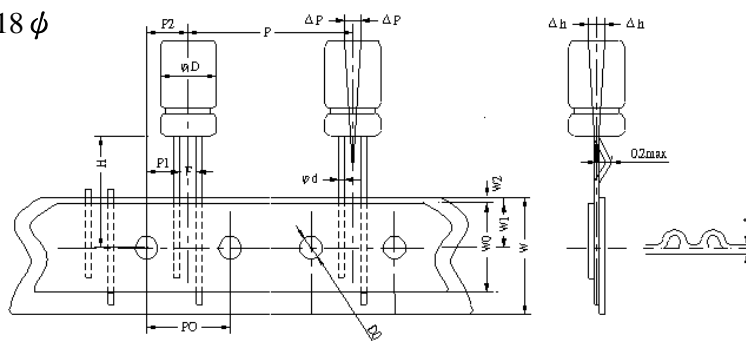
SYMBOL	CASE SIZE	TOLERANCE
	10x10~30	
ϕd	0.6	± 0.05
P	12.7	± 1.0
P0	12.7	± 0.3
P1	3.85	± 0.5
P2	6.35	± 1.0
F	5.0	+0.6 / -0.2
W	18.0	± 0.5
W0	12.0 min	-
W1	9.0	± 0.5
W2	2.0 max	-
H	18.5	± 0.75
D0	4.0	± 0.3
ΔP	0.2 max	-
Δh	0.2 max	-
t	0.7	± 0.2

Code T1 : Ammo ($\phi 13 \sim \phi 18$)

13 ϕ



16-18 ϕ



Unit: mm

SYMBOL	CASE SIZE				TOLERANCE
	12.5x15~25	13x13~40	16x16~40	18x20~32	
ϕd	0.6	0.6~0.8	0.8		± 0.05
P	15.0		30.0		± 1.0
P0	15.0				± 0.3
P1	5.0		3.75		± 0.7
P2	7.5				± 1.3
F	5.0		7.5		+0.6 / -0.2
W	18				± 0.5
W0	12.0 min				-
W1	9.0				± 0.5
W2	2.0 max				-
H	18.5				± 0.75
D0	4.0				± 0.3
ΔP	0.2 max				-
Δh	0.2 max				-
t	0.7				± 0.3

■ Dimensions, Rated Ripple Current

Capacitance (μ F)	Rated (Surge) Voltage					
	160 (200)		200 (250)		250 (300)	
	Size	Ripple	Size	Ripple	Size	Ripple
10			※10x16	80	※10x16 10X20	85 100
15			※10x16	100		
22	10X20	160	10X20	160	※10x25 13x20	145 160
33	10X20	210	※10X20 13x20	160 210	13x20	210
47	13x20	260	13x20	260	13x25 16x20	270 275
68	13x25 16x20	360 430	13x25 16x20	360 430	16x25 18x20	380 375
100	16x25 18x20	475 465	16x25 18x20	475 465	16x32 18x25	520 500
150	16x32 18x25	650 625	18x25	650	18x32	650
220	16x32 18x25	750 725	18x32	780	18x40	820
330	18x32	960				

Capacitance (μ F)	Rated (Surge) Voltage					
	350 (400)		400 (450)		450 (500)	
	Size	Ripple	Size	Ripple	Size	Ripple
3.3					10X20	60
4.7			※10x16	60	13x20	80
6.8			※10x16	72	※10X20	90
10	10X20	100	10X20	100	13x20 13x25	110 110
22	13x20	160	13x25 16x20	170 200	16x25 18x20	190 200
33	13x25 16x20	230 250	16x25 18x20	230 250	16x32 18x25	275 280
47	16x25 18x20	300 315	16x32 18x25	300 325	18x32	340
68	16x32 18x25	400 380	18x36	420	18x32 18x40	395 460
100					<u>18x40</u>	<u>410</u>
	18x32	530	18x40	545	22x40	580
150			22x40	650		

☆ Size : D ϕ x L (mm) ☆ Ripple Current : mA/rms. 105°C, 120Hz

※ Down Size : 3000 Hrs