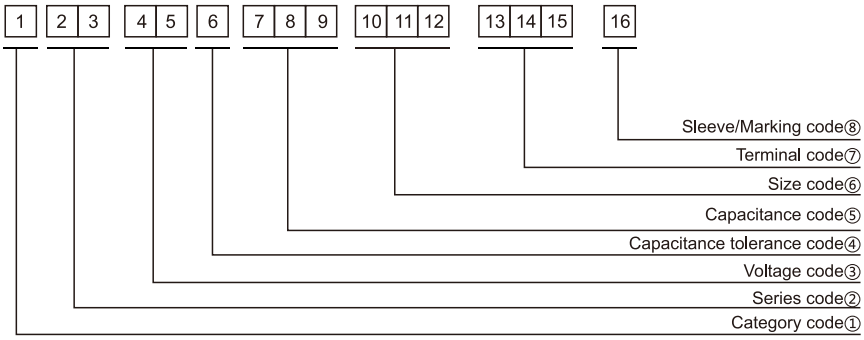
Part Numbering System



① Category code

Type	Code
	1
Electrolytic Capacitor	E
Conductive Polymer	S

② Series code

Series name	Code	
	2	3
WH	W	H
CD11GE	G	E
CD11GES	G	X
CD11GAS	G	W
CD11GHS	G	S
NR	N	R
PZ	P	Z

③ Voltage code

WV (V_{dc})	Code	
	4	5
2.5	0	E
3	0	D
4	0	G
6.3	0	J
6.8	0	C
7	0	Q
7.5	0	A
10	1	A
12	1	T
16	1	C
25	1	E
35	1	V
40	1	G
50	1	H
63	1	J
80	1	B
100	1	K
120	2	B
160	2	C
180	2	L
200	2	D
220	2	N
250	2	E
315	2	F
350	2	V
380	2	P
400	2	G
420	2	T
450	2	W
500	2	H
550	2	J
600	2	K

④ Capacitance tolerance code

Tol. (%)	Code
	6
-10~+10	K
-20~+20	M
-10~+30	Q
-10~+20	V
0~+20	A
-5~+20	C
-10~-20	B
-5~+5	D
0~+10	E
-5~-20	F
-15~+5	N

⑤ Capacitance code

Cap (μF)	Code		
	7	8	9
0.10	R	1	0
0.22	R	2	2
0.33	R	3	3
0.47	R	4	7
0.68	R	6	8
1	0	1	0
2.2	2	R	2
3.3	3	R	3
4.7	4	R	7
6.8	6	R	8
10	1	0	0
22	2	2	0
33	3	3	0
47	4	7	0
68	6	8	0
100	1	0	1
220	2	2	1
330	3	3	1
470	4	7	1
680	6	8	1
1000	1	0	2
2200	2	2	2
3300	3	3	2
4700	4	7	2
6800	6	8	2
10000	1	0	3
22000	2	2	3
33000	3	3	3
68000	6	8	3

⑥ Size code

ΦD (mm)	Code
	10
4	C
5	D
6.3	E
8	F
10	G
11	H
12	J
12.5	W
13	K
14	X
16	L
18	M
19	Z
20	N
22	O
25	P
30	Q
35	R
40	Y
51.6	S
64.3	T
76.9	U
91	V
100	A

L (mm)	Code	
	11	12
5	0	5
7	0	7
11	1	1
12	1	2
16	1	6
20	2	0
25	2	5
30	3	0
35	3	5
40	4	0
46	4	6
50	5	0
60	6	0
80	8	0
100	A	0
115	B	5
120	C	0
130	D	0
140	E	0
160	G	0
200	K	0
220	M	0
236	N	6
250	P	0

⑦ Terminal code

Specification	Code	Size	
	13	14	15
Bulk packing	O	-	-
Taping (SMD Type)	D	0	0
Φ4~8 Taping F=5.0mm	P	5	0
Φ10~12.5 Taping F=5.0mm	B	5	0
Lead Cut L=3.5mm	C	3	5
Lead Cut L=11.0mm	C	B	0
Lead Forming & Cut L=4.5mm	F	-	-
Kink & Cut L=4.5mm	J	-	-
Snap-in type Terminal 4.0mm in length	K	-	-
Three Terminals	T	-	-
Ring clip mounting standard design	A	0	0
Ring clip mounting special design	S	-	-

⑧ Sleeve/Marking code

Sleeve/Marking	Code
	16
PVC	C
PET	T
Dark blue	B
Bright red	R
Sky-blue	S
Light blue	T
Pink	Z
Black	H
Purple-blue	V
Red	O

Lead Forming

Taping Specifications

Fig.1 code: X

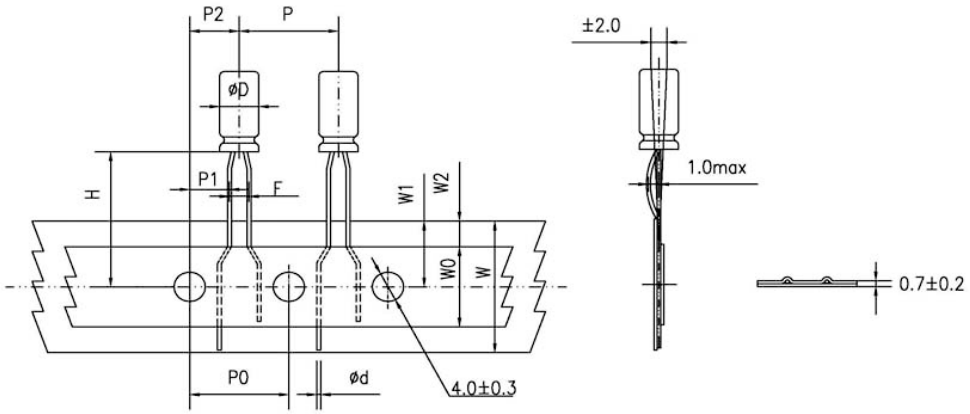


Fig.2 code: B

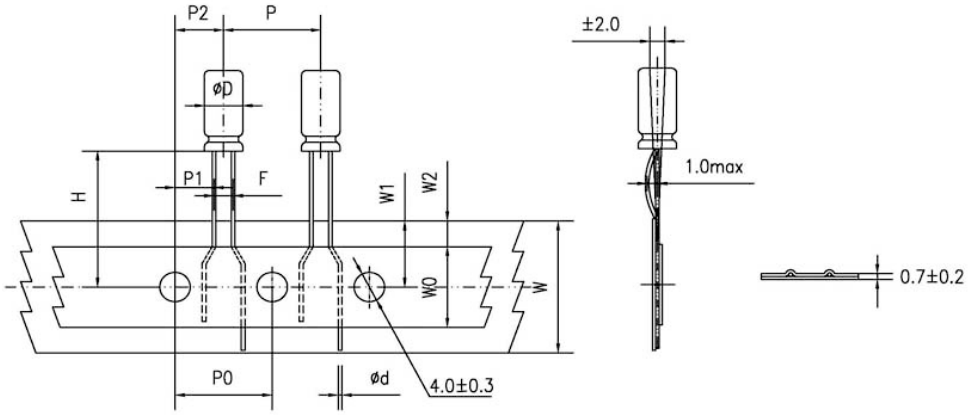


Fig.3 code: B

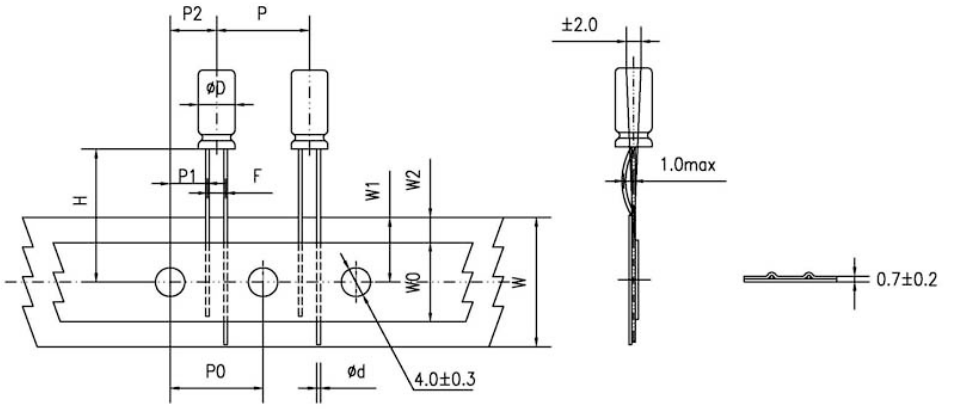
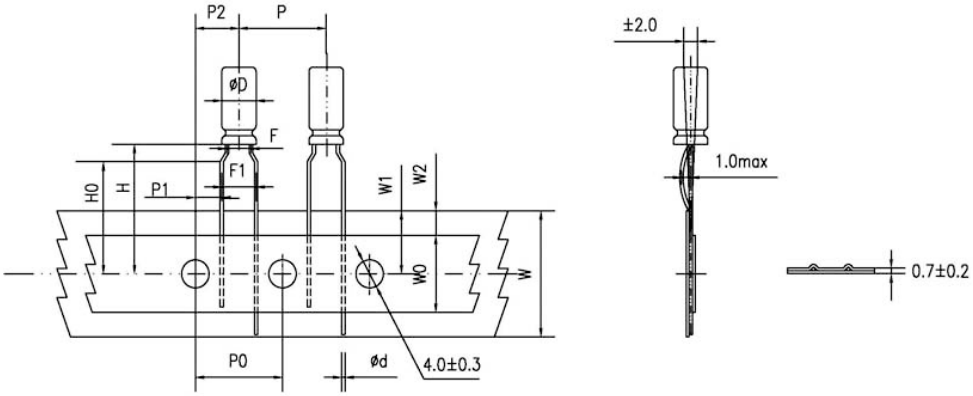


Fig.4 code: P



Lead Forming

Specification Fig.1 & Fig.2 & Fig.3

Items	Symbol	Case size									Tolerance
		4*5 4*7	5*5 5*7	5*11	6.3*5	6.3*7 6.3*9	6.3*11 6.3*12	8*5/7 8*9/11 8*11.5 8*12	8*16 8*20	10*9/12 10*12.5 10*13/16 10*20/25	
Pin Code		X B	X B	X B	B	B	B	B	B	B	
Lead wire diameter	Φd	0.45	0.45	0.5	0.45	0.5	0.5	0.45/0.5	0.6	0.6	±0.05
Pitch of body	P	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	±1.0
Feed hole pitch	P0	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	±0.2
Distance from hole center to lead	P1	5.1 5.6	5.1 5.35	5.1 5.35	5.1	5.1	5.1	4.6	4.6	3.85	±0.7
Distance from feed hole center to body center	P2	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	±1.0
Lead-to-lead distance	F	2.5 1.5	2.5 2.0	2.5 2.0	2.5	2.5	2.5	3.5	3.5	5.0	±0.5
Height of body from tape center	H	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	±0.75
Base tape width	W	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	±0.5
Adhesive tape width	W0	6.0	6.0	6.0	6.0	6.0	8.0	8.0	8.0	11.0	min
Hole position	W1	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	+0.75 -0.5
Hole down tape position	W2	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	max

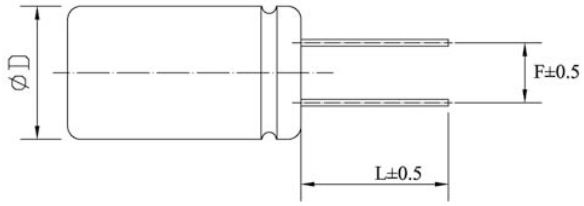
Specification Fig.4

Items	Symbol	Case size									Tolerance
		4*5 4*7	5*5	5*7	5*11	6.3*5	6.3*7 6.3*9	6.3*11 6.3*12	8*5/7 8*9/11 8*11.5/12	8*16 8*20	
Pin Code		P	P	P	P	P	P	P	P	P	
Lead wire diameter	Φd	0.45	0.45	0.45	0.5	0.45	0.5	0.5	0.45/0.5	0.6	±0.05
Pitch of body	P	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	±1.0
Feed hole pitch	P0	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	±0.2
Distance from hole center to lead	P1	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	±0.7
Distance from feed hole center to body center	P2	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	±1.0
Lead-to-lead distance	F	1.5	2.0	2.0	2.0	2.5	2.5	2.5	3.5	3.5	±0.5
Lead to lead distance	F1	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	+0.8 -0.2
Height of body from tape center	H	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	±0.75
Lead wire clinch height	H0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	±0.5
Base tape width	W	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	±0.5
Adhesive tape width	W0	6.0	6.0	6.0	6.0	6.0	6.0	8.0	8.0	8.0	min
Hole position	W1	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	+0.75 -0.5
Hole down tape position	W2	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	max

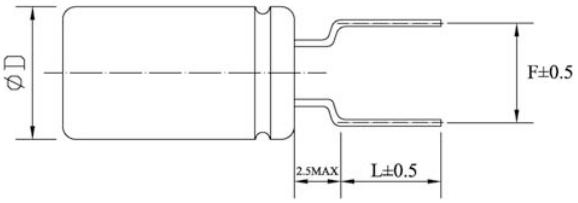
Lead Forming

Lead Forming & Cut

Code:C
RANGE: Φ4~Φ18

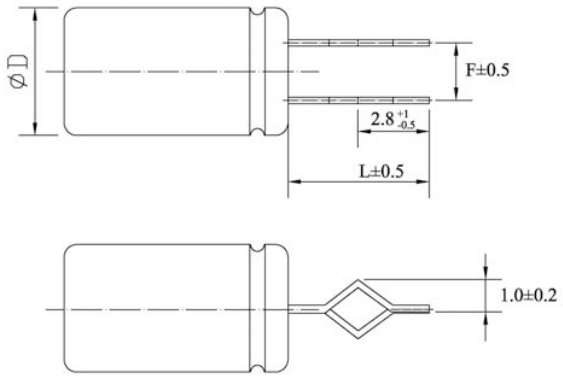


Code:F
RANGE: Φ4~Φ8



ΦD	F	L	ΦD	F	L
4	1.5	3.0~12.0	4	5.0	3.5, 4.5, 5.0, 7.0
5	2.0	3.0~12.0	5	5.0	3.5, 4.5, 5.0, 7.0
6.3	2.5	3.0~12.0	6.3	5.0	3.5, 4.5, 5.0, 7.0
8	3.5	3.0~12.0	8	5.0	3.5, 4.5, 5.0, 7.0
10	5.0	3.0~12.0	-	-	-
12.5	5.0	3.0~12.0	-	-	-
16	7.5	3.0~12.0	-	-	-
18	7.5	3.0~12.0	-	-	-

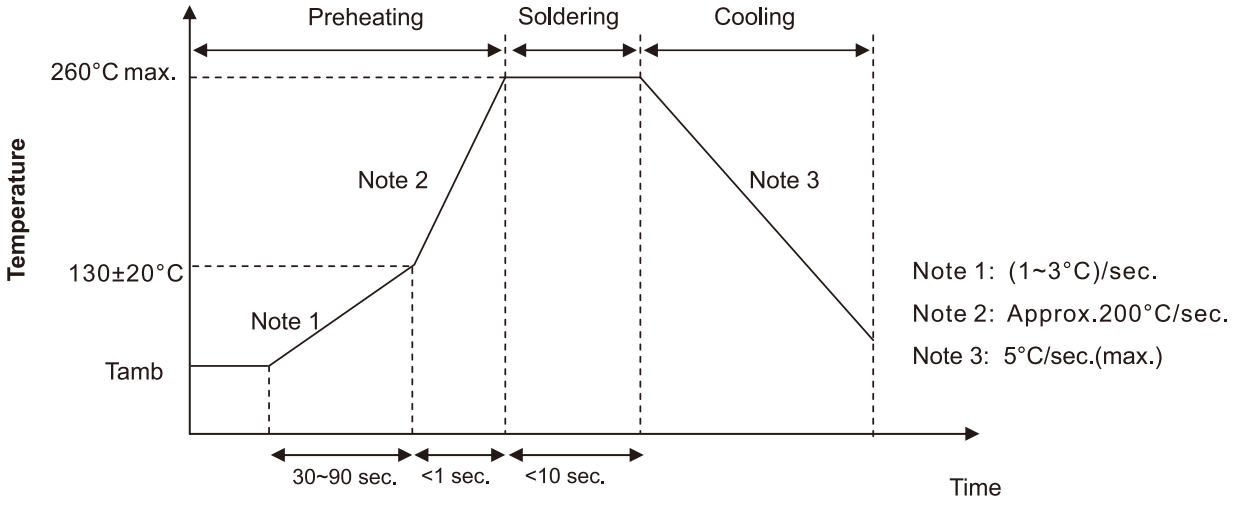
Code:J
RANGE: Φ10~Φ18



ΦD	F	L
10	5.0	4.0, 4.5, 5.0
12.5	5.0	4.0, 4.5, 5.0
16	7.5	4.0, 4.5, 5.0
18	7.5	4.0, 4.5, 5.0

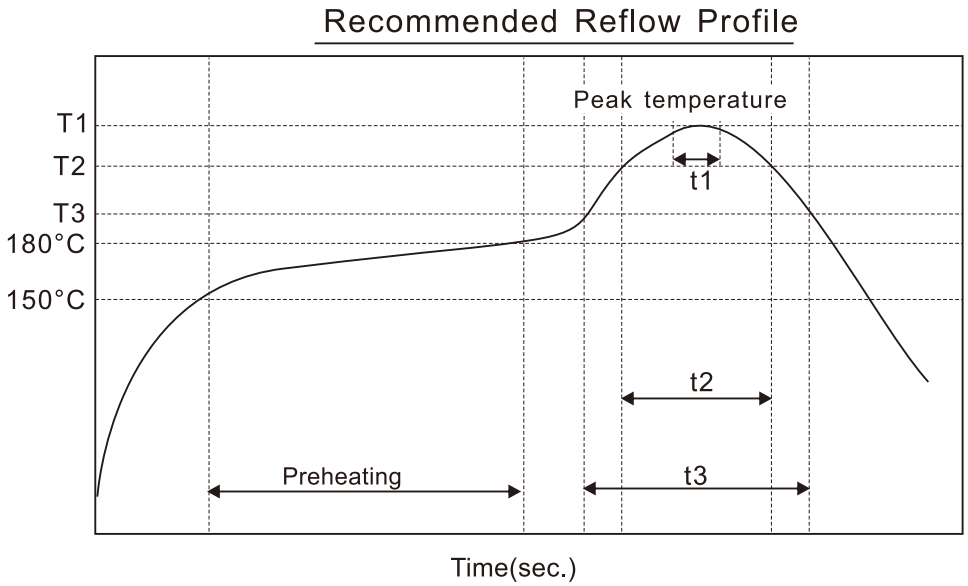
Solering Recommendation

■ Flow Soldering(Radial Lead Type)



■ Reflow Soldering

• (For Polymer SMD Type)

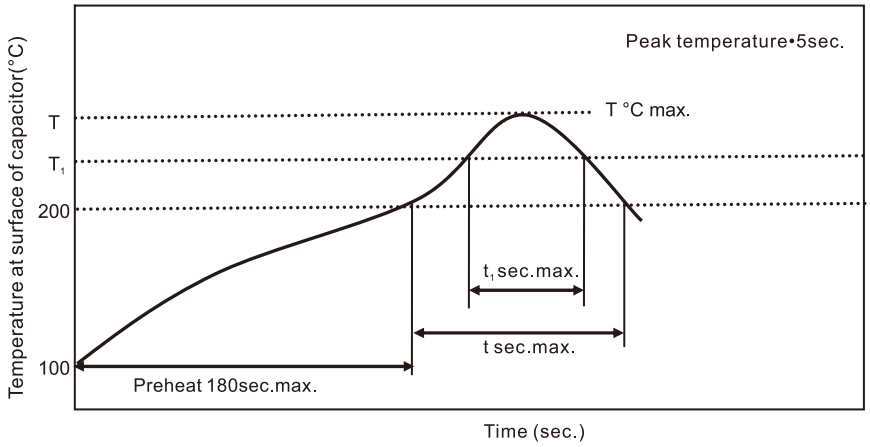


Item	Preheating	T1(°C)	T2(°C)	T3(°C)	t1(sec.)	t2(sec.)	t3(sec.)	Reflow cycle
Condition 1	150°C to 180°C Within 90sec.	≤260	230	200	≤10	≤40	≤60	1
Condition 2		≤250	230	200	≤10	≤40	≤60	2

• (For Liquid SMD Type)

Case size:Φ6.3~Φ10mm:

- Temperature at surface of capacitor shall not exceed T°C.
- The duration for over 200°C temperature and T_1°C at surface of capacitor shall not exceed t and $t_1$seconds,respectively.
- Preheat shall be done at 100°C to 200°C and for Maximum 180 seconds.

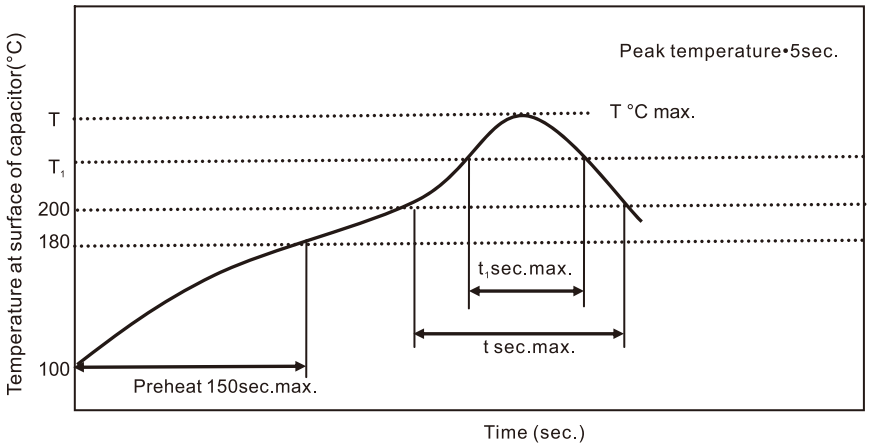


Case size (mm)	T(°C) ①	T_1(°C)	t(sec.) ②	t_1(sec.) ③	Reflow cycle
Φ6.3	250	230	90	40	1
Φ8	240	230	90	30	1
Φ10	235	230	60	30	1

① Peak temperature
② The duration over 200°C (max.)
③ The duration over T_1°C
■ Please contact us if capacitors are subject to the conditions other than the allowable range of reflow.

Case size:Φ12.5~Φ18mm:

- Temperature at surface of capacitor shall not exceed T°C.
- The duration for over 200°C temperature and T_1°C at surface of capacitor shall not exceed t and t_1 seconds,respectively.
- Preheat shall be done at 100°C to 180°C and for Maximum 150 seconds.



Case size (mm)	T(°C) ①	T_1(°C)	t(sec.) ②	t_1(sec.) ③	Reflow cycle
Φ12.5~Φ18	240	230	60	30	1

① Peak temperature
② The duration over 200°C (max.)
③ The duration over T_1°C
■ Please contact us if capacitors are subject to the conditions other than the allowable range of reflow.

LB series

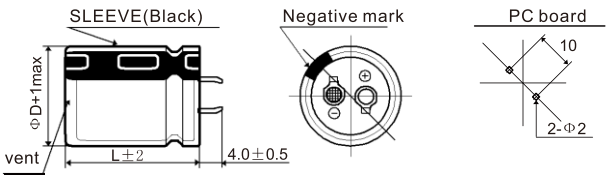
- High reliability. Extremely long life series
- Endurance with ripple current: 10,000 hours at 105°C
- **RoHS Compliant**

SPECIFICATIONS

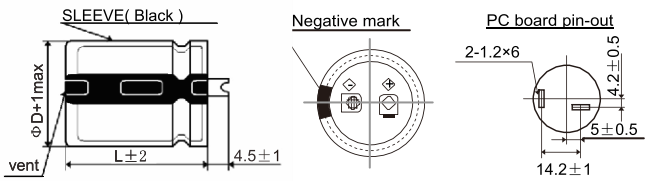
Items	Characteristics			
Category Temperature Range	-25~+105°C			
Rated Voltage Range	200~450V.DC			
Capacitance Tolerance	±20%(M)			(at 20°C,120Hz)
Leakage Current	I≤3$\sqrt{CV}$ Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)			(at 20°C after 5 minutes)
Dissipation Factor (tanδ)	Rated Voltage(V_{dc})	200~400	450	(at 20°C,120Hz)
	tanδ (max.)	0.15	0.20	
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(V_{dc})	200~400	450	(at 120Hz)
	Z(-25°C)/Z(+20°C)	4	8	
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for 10,000 hours at 105 °C.			
	Capacitance Change	≤±20% of the initial value		
	D.F. (tanδ)	≤250% of the initial specified value		
	Leakage Current	≤The initial specified value		
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.			
	Capacitance Change	≤±15% of the initial value		
	D.F. (tanδ)	≤150% of the initial specified value		
	Leakage Current	≤200% of the initial specified value		

DIMENSIONS[mm]

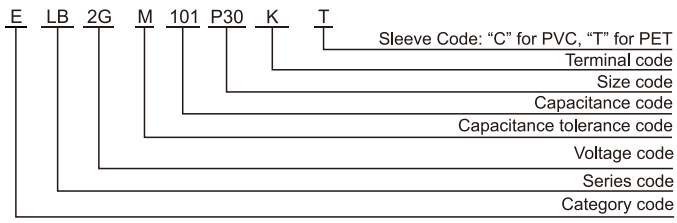
- Terminal Code : K (Φ22 to Φ35) : Standard



- Terminal Code : L (Φ35)



PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current (Hz)

W.V	120	1k	10k	100k
200, 250	1.00	1.32	1.45	1.50
400, 450	1.00	1.30	1.41	1.43

The endurance of capacitors is shortened 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.

LB series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
200(2D)	220	22*25	0.15	1.01
	270	22*30	0.15	1.09
		25*25	0.15	1.12
	330	22*30	0.15	1.21
		25*25	0.15	1.21
	390	22*35	0.15	1.32
		25*30	0.15	1.29
		30*25	0.15	1.31
	470	22*40	0.15	1.41
		25*35	0.15	1.42
		30*30	0.15	1.40
	560	22*45	0.15	1.52
		25*35	0.15	1.51
		30*30	0.15	1.52
	680	25*40	0.15	1.72
		30*35	0.15	1.71
	820	25*50	0.15	2.01
		30*40	0.15	2.02
		35*30	0.15	2.01
	1000	30*45	0.15	2.20
		35*35	0.15	2.21
	1200	30*50	0.15	2.32
		35*40	0.15	2.31
	1500	35*50	0.15	2.51
250(2E)	180	22*30	0.15	0.91
		25*25	0.15	0.90
	220	22*30	0.15	1.01
		25*25	0.15	1.00
	270	22*35	0.15	1.11
		25*30	0.15	1.10
		30*25	0.15	1.12
	330	22*40	0.15	1.20
		25*35	0.15	1.21
		30*25	0.15	1.20
	390	22*45	0.15	1.30
		25*35	0.15	1.32
		30*30	0.15	1.33
	470	25*45	0.15	1.40
		30*35	0.15	1.42
		35*30	0.15	1.40
	560	25*50	0.15	1.51
		30*35	0.15	1.50
		35*30	0.15	1.52
	680	30*45	0.15	1.72
		35*35	0.15	1.71
	820	30*50	0.15	2.01
		35*40	0.15	2.01
	1000	35*45	0.15	2.22
	1200	35*50	0.15	2.32

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
400(2G)	56	22*25	0.15	0.51
	68	22*30	0.15	0.55
		25*25	0.15	0.56
	82	22*35	0.15	0.64
		25*25	0.15	0.65
	100	22*35	0.15	0.70
		25*30	0.15	0.69
	120	22*40	0.15	0.75
		25*35	0.15	0.76
		30*25	0.15	0.75
	150	22*50	0.15	0.82
		25*40	0.15	0.83
		30*30	0.15	0.82
	180	25*45	0.15	0.90
		30*35	0.15	0.91
		35*25	0.15	0.90
	220	25*50	0.15	1.01
		30*40	0.15	1.02
		35*30	0.15	1.00
	270	30*45	0.15	1.10
		35*35	0.15	1.10
	330	30*50	0.15	1.20
		35*40	0.15	1.21
	390	35*45	0.15	1.29
	470	35*50	0.15	1.35
450(2W)	39	22*25	0.20	0.37
	47	22*30	0.20	0.40
	56	22*35	0.20	0.47
		25*25	0.20	0.48
	68	22*40	0.20	0.53
		25*30	0.20	0.53
	82	22*45	0.20	0.56
		25*35	0.20	0.56
		30*25	0.20	0.56
	100	22*50	0.20	0.64
		25*40	0.20	0.64
		30*30	0.20	0.64
	120	25*45	0.20	0.72
		30*30	0.20	0.72
	150	25*50	0.20	0.79
		30*40	0.20	0.79
		35*30	0.20	0.78
	180	30*45	0.20	0.87
		35*35	0.20	0.87
	220	30*50	0.20	1.00
		35*40	0.20	1.01
	270	35*45	0.20	1.19
	330	35*50	0.20	1.38