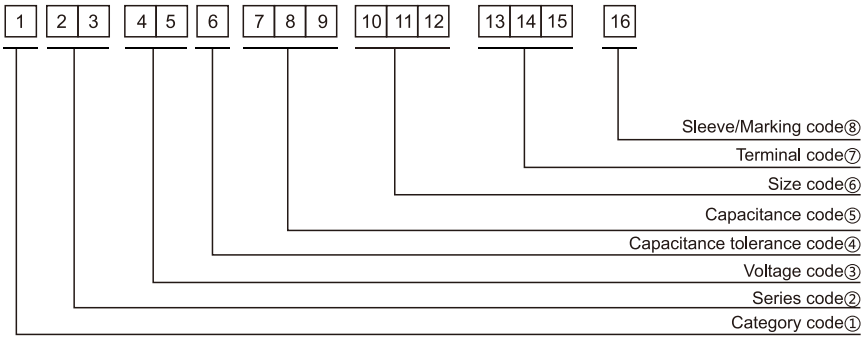
Part Numbering System



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

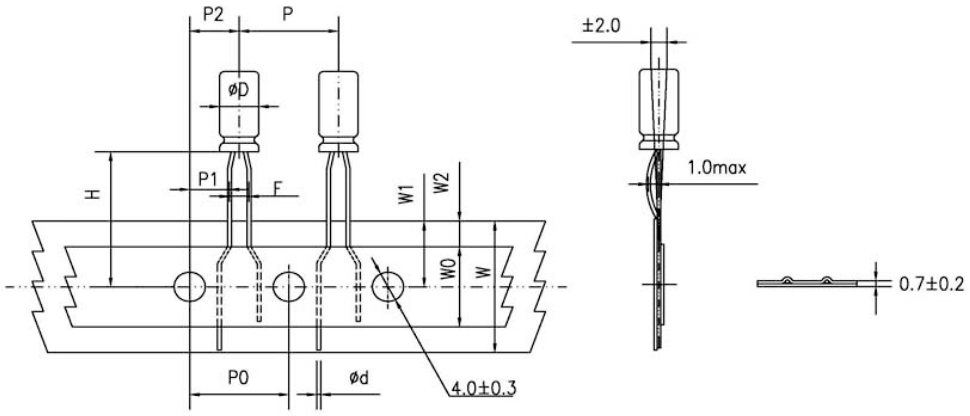


Fig.2 code: B

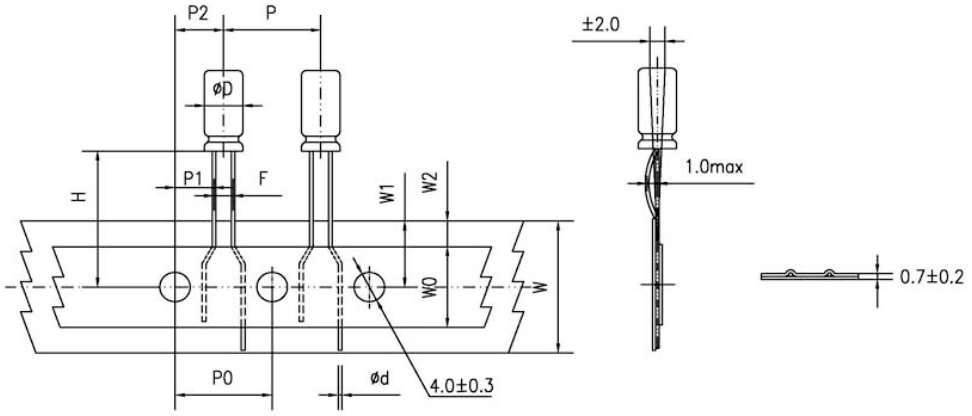


Fig.3 code: B

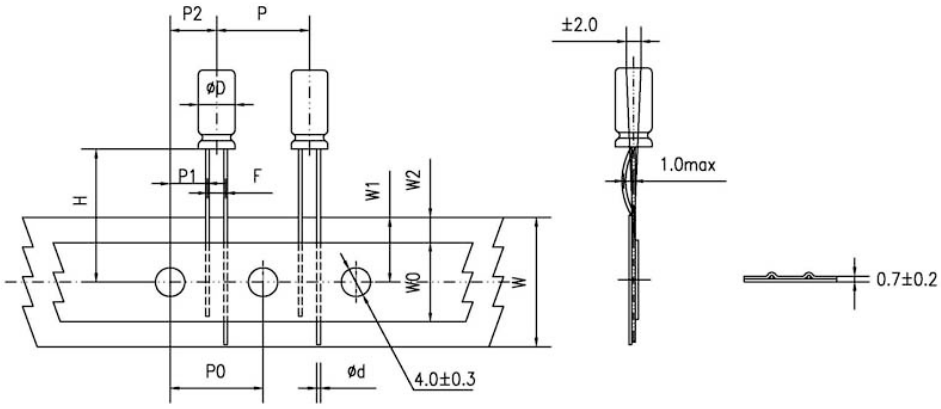
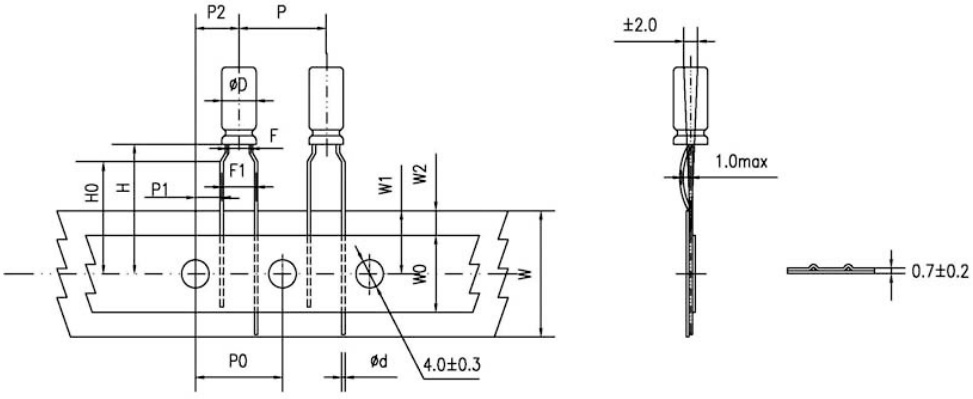


Fig.4 code: P



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

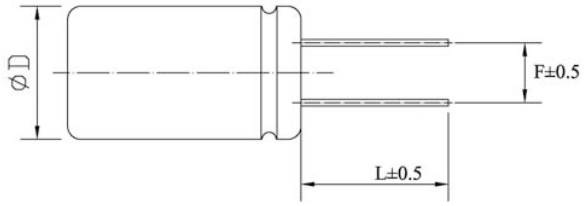
Specification Fig.4

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

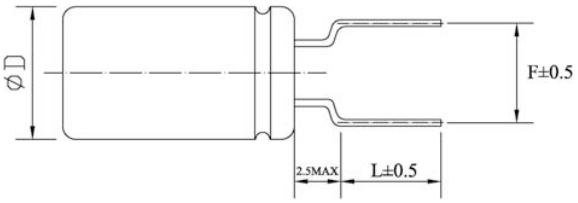
Lead Forming

Lead Forming & Cut

Code:C
RANGE: Φ4~Φ18

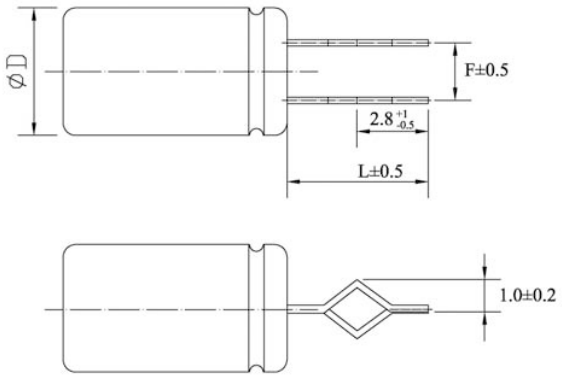


Code:F
RANGE: Φ4~Φ8



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	-	-	-

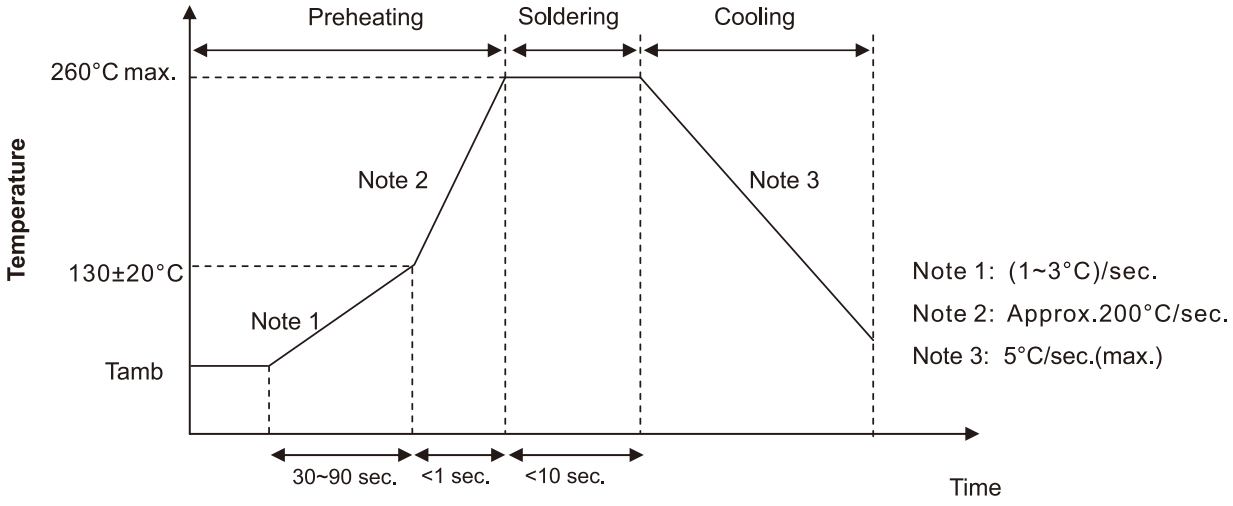
Code:J
RANGE: Φ10~Φ18



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

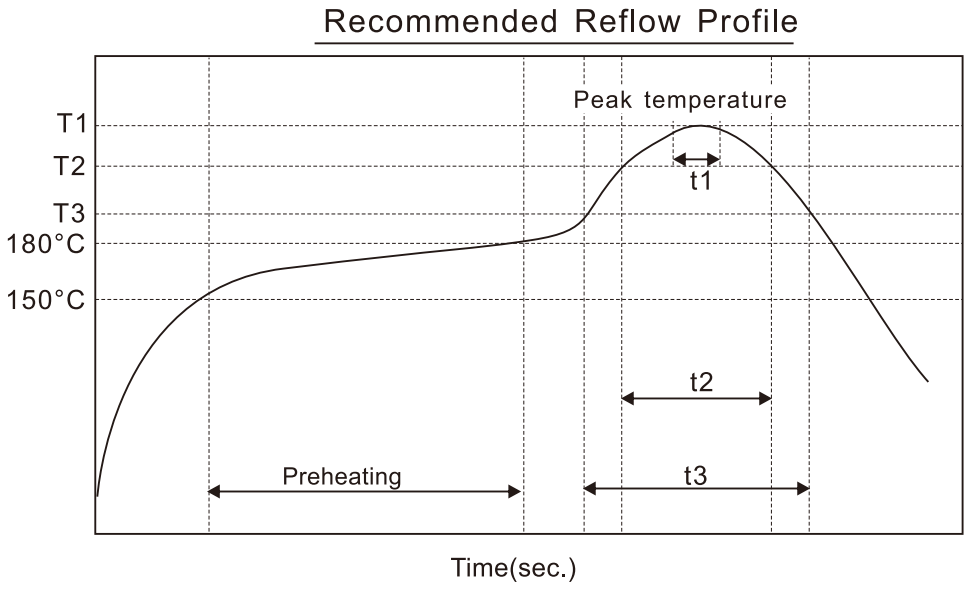
Solering Recommendation

■ Flow Soldering(Radial Lead Type)



■ Reflow Soldering

• (For Polymer SMD Type)

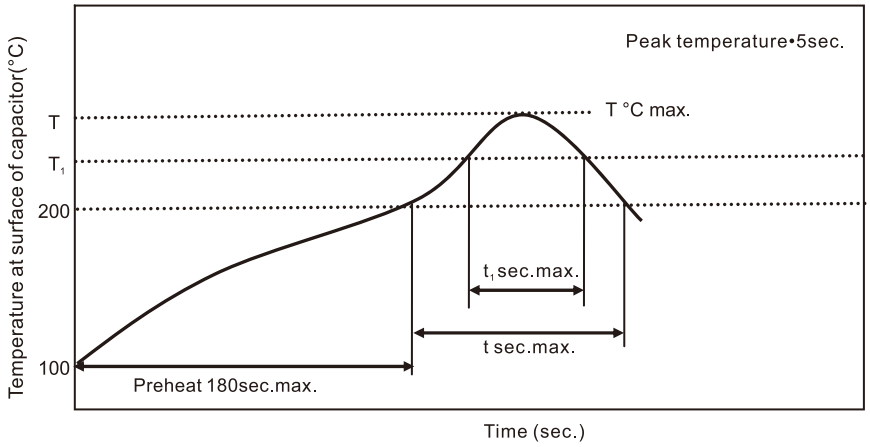


Item	Preheating	T1(°C)	T2(°C)	T3(°C)	t1(sec.)	t2(sec.)	t3(sec.)	Reflow cycle
Condition 1	150°C to 180°C Within 90sec.	≤260	230	200	≤10	≤40	≤60	1
Condition 2		≤250	230	200	≤10	≤40	≤60	2

• (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.

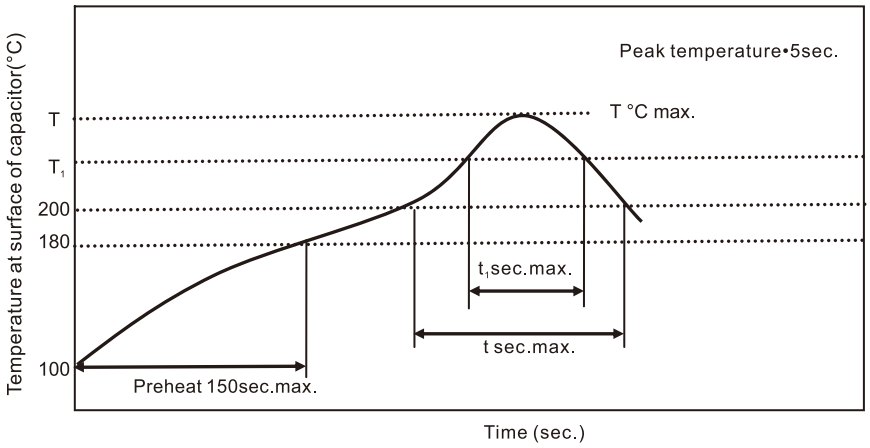


Case size (mm)	T(°C) ①	T_1(°C)	t(sec.) ②	t_1(sec.) ③	Reflow cycle
Φ6.3	250	230	90	40	1
Φ8	240	230	90	30	1
Φ10	235	230	60	30	1

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.

LT series

- Downsize and long life series
- Endurance: 5,000 hours at 105°C
- **RoHS Compliant**

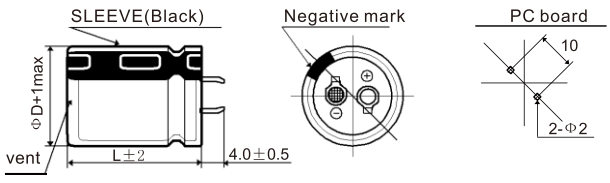
Upgrade

SPECIFICATIONS

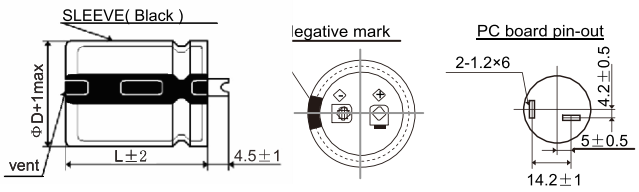
Items	Characteristics			
Category Temperature Range	-25~+105°C			
Rated Voltage Range	160~550V.DC			
Capacitance Tolerance	±20%(M)			(at 20°C,120Hz)
Leakage Current	$I \le 3\sqrt{CV}$ Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)			(at 20°C after 5 minutes)
Dissipation Factor (tanδ)	Rated Voltage(V_{dc})	160~400	420~550	(at 20°C,120Hz)
	tanδ (max.)	0.15	0.20	
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(V_{dc})	160~250	315~550	(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 5,000 hours at 105 °C.			
	Capacitance Change	≤±20% of the initial value		
	D.F. (tanδ)	≤200% of the initial specified value (500V_{dc}:≤250%;550V_{dc}:≤300%)		
	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]

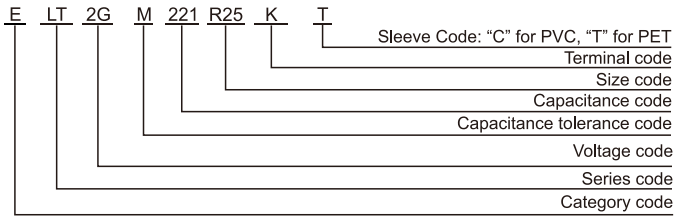
- Terminal Code : K (Φ22 to Φ35) : Standard



- Terminal Code : L (Φ35)



PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current (Hz)

W.V	120	1k	10k	100k
160~250	1.00	1.32	1.45	1.50
315~550	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.

LT series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
160(2C)	390	22*25	0.15	1.32
	560	22*30	0.15	1.66
		25*25	0.15	1.68
	680	22*35	0.15	1.87
		25*30	0.15	1.88
		30*25	0.15	1.96
	820	22*40	0.15	2.09
	1000	22*50	0.15	2.41
		25*35	0.15	2.38
		30*30	0.15	2.40
		35*25	0.15	2.55
	1200	25*45	0.15	2.71
		30*40	0.15	2.77
		35*30	0.15	2.86
	1500	25*50	0.15	3.08
		30*45	0.15	3.17
		35*35	0.15	3.22
	1800	30*50	0.15	3.53
		35*40	0.15	3.66
	2200	35*45	0.15	4.14
	2700	35*50	0.15	4.68
180(2L)	330	22*25	0.15	1.21
	470	22*30	0.15	1.52
		25*25	0.15	1.52
	560	22*35	0.15	1.70
		25*30	0.15	1.78
	680	22*40	0.15	1.91
		25*30	0.15	1.88
	820	22*45	0.15	1.99
		25*35	0.15	2.16
		30*30	0.15	2.17
		35*25	0.15	2.31
	1000	22*50	0.15	2.25
		25*45	0.15	2.47
		30*35	0.15	2.46
	1200	25*50	0.15	2.75
		30*40	0.15	2.77
		35*30	0.15	2.86
	1500	30*50	0.15	3.22
		35*35	0.15	3.22
	1800	35*45	0.15	3.74
	2200	35*50	0.15	4.22

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
200(2D)	270	22*25	0.15	1.10
	390	22*30	0.15	1.38
		25*25	0.15	1.39
	470	22*35	0.15	1.55
	560	22*40	0.15	1.73
		25*30	0.15	1.71
		30*25	0.15	1.78
	680	22*45	0.15	1.81
		25*35	0.15	1.87
		30*30	0.15	1.98
		35*25	0.15	2.10
	820	22*50	0.15	2.18
		25*40	0.15	2.09
		30*35	0.15	2.22
	1000	25*50	0.15	2.39
		30*40	0.15	2.53
		35*30	0.15	2.61
	1200	30*50	0.15	2.88
		35*35	0.15	2.88
	1500	35*40	0.15	3.34
	1800	35*50	0.15	3.82
220(2N)	270	22*25	0.15	1.10
	330	22*30	0.15	1.19
	390	25*25	0.15	1.39
	470	22*35	0.15	1.55
		25*30	0.15	1.56
		30*25	0.15	1.63
	560	22*40	0.15	1.73
		30*30	0.15	1.79
	680	22*50	0.15	1.99
		25*35	0.15	1.96
		30*35	0.15	2.02
		35*25	0.15	2.10
	820	25*45	0.15	2.24
		30*40	0.15	2.29
		35*30	0.15	2.36
	1000	25*50	0.15	2.51
		30*45	0.15	2.59
		35*35	0.15	2.63
	1200	30*50	0.15	2.88
		35*40	0.15	2.98
	1500	35*45	0.15	3.41
	1800	35*50	0.15	3.82

LT series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
250(2E)	220	22*25	0.15	1.01
	270	22*30	0.15	1.20
	330	25*25	0.15	1.32
	390	22*35	0.15	1.44
		25*30	0.15	1.43
		30*25	0.15	1.51
	470	22*40	0.15	1.62
	560	22*50	0.15	1.84
		25*35	0.15	1.78
		30*30	0.15	1.83
		35*25	0.15	1.91
	680	25*45	0.15	2.04
		30*35	0.15	2.06
		35*30	0.15	2.15
	820	25*50	0.15	2.28
		30*45	0.15	2.39
		35*35	0.15	2.38
	1000	30*50	0.15	2.68
		35*40	0.15	2.72
	1200	35*45	0.15	3.05
	1500	35*50	0.15	3.49
315(2F)	150	22*25	0.15	0.80
	180	22*30	0.15	0.92
		25*25	0.15	0.94
	220	22*35	0.15	1.04
		30*25	0.15	1.17
	270	22*40	0.15	1.18
		25*30	0.15	1.19
	330	22*45	0.15	1.33
		25*35	0.15	1.37
		30*30	0.15	1.40
		35*25	0.15	1.49
	390	22*50	0.15	1.48
		25*40	0.15	1.52
	470	25*45	0.15	1.70
		30*35	0.15	1.71
		35*30	0.15	1.82
	560	25*50	0.15	1.88
		30*45	0.15	1.97
		35*35	0.15	2.00
	680	30*50	0.15	2.21
		35*40	0.15	2.29
	820	35*45	0.15	2.57
	1000	35*50	0.15	2.89

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
350(2V)	120	22*25	0.15	0.72
	150	22*30	0.15	0.84
	180	25*25	0.15	0.94
	220	22*40	0.15	1.06
		25*30	0.15	1.07
		30*25	0.15	1.13
	270	22*45	0.15	1.20
		25*35	0.15	1.24
		30*30	0.15	1.27
		35*25	0.15	1.35
	330	22*50	0.15	1.36
		25*40	0.15	1.39
		30*35	0.15	1.43
	390	25*45	0.15	1.55
		30*40	0.15	1.60
		35*30	0.15	1.66
	470	25*50	0.15	1.72
		30*45	0.15	1.81
		35*35	0.15	1.83
	560	30*50	0.15	2.00
		35*40	0.15	2.07
	680	35*45	0.15	2.34
	820	35*50	0.15	2.62
400(2G)	100	22*25	0.15	0.66
	120	22*30	0.15	0.75
	150	22*35	0.15	0.86
		25*25	0.15	0.86
	180	22*40	0.15	0.96
		25*30	0.15	0.97
		30*25	0.15	1.02
	220	22*45	0.15	1.09
		25*35	0.15	1.12
		30*25	0.15	1.22
	270	22*50	0.15	1.23
		25*45	0.15	1.29
		30*30	0.15	1.27
	330	25*50	0.15	1.44
		30*35	0.15	1.43
		35*30	0.15	1.52
	390	30*40	0.15	1.60
		35*35	0.15	1.67
	470	30*50	0.15	1.84
		35*40	0.15	1.90
	560	35*45	0.15	2.12
	680	35*50	0.15	2.39

LT series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
420(2T)	100	22*25	0.20	0.66
	120	22*30	0.20	0.75
		25*25	0.20	0.77
	150	22*35	0.20	0.86
	180	22*45	0.20	0.98
		25*35	0.20	1.01
		30*25	0.20	1.02
	220	22*50	0.20	1.11
		25*40	0.20	1.14
		30*30	0.20	1.14
		35*25	0.20	1.22
	270	25*45	0.20	1.29
		30*35	0.20	1.30
		35*30	0.20	1.38
	330	25*50	0.20	1.44
		30*40	0.20	1.48
		35*35	0.20	1.54
	390	30*45	0.20	1.64
		35*40	0.20	1.73
	470	30*50	0.20	1.84
		35*45	0.20	1.94
	560	35*50	0.20	2.17
450(2W)	82	22*25	0.20	0.59
	100	22*30	0.20	0.69
		25*25	0.20	0.70
	120	22*35	0.20	0.77
	150	22*45	0.20	0.90
		25*35	0.20	0.92
		30*25	0.20	0.93
	180	22*50	0.20	1.01
		25*40	0.20	1.03
		30*30	0.20	1.03
		35*25	0.20	1.10

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
450(2W)	220	25*45	0.20	1.16
		30*35	0.20	1.17
		35*30	0.20	1.24
	270	25*50	0.20	1.31
		30*40	0.20	1.33
		35*35	0.20	1.39
	330	30*45	0.20	1.51
	390	30*50	0.20	1.67
		35*45	0.20	1.77
	470	35*50	0.20	1.98
500(2H)	100	30*25	0.20	0.82
	120	30*30	0.20	0.91
		35*25	0.20	0.88
	150	30*35	0.20	1.04
	180	30*40	0.20	1.17
		35*30	0.20	1.10
	220	30*45	0.20	1.33
		35*35	0.20	1.23
	270	30*50	0.20	1.50
		35*40	0.20	1.42
	330	35*45	0.20	1.60
	390	35*50	0.20	1.78
	470	35*60	0.20	2.03
550(2J)	120	30*30	0.20	0.91
	150	30*35	0.20	1.04
	180	30*40	0.20	1.17
		35*30	0.20	1.10
	220	30*50	0.20	1.35
		35*40	0.20	1.28
	270	35*45	0.20	1.45
	330	35*50	0.20	1.64
	390	35*60	0.20	1.85

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