规格書

SPECIFICATION

Customer：_____

Part Name: E-CAP

SPEC : RE Series

Part NO. : ALL

Date : 2017-11-22

CUSTOMER SIGN		

TOPAZCON	
DRAWING	RATIFY
黃峰	陳慶

TOPAZCON 黄宝石
专注耐高温型长寿命电解电容

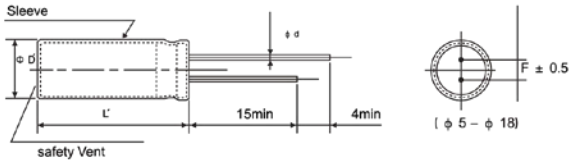
RE Series

- Standard series for general purpose
- Wide temperature range from –40 ℃ ~ +105 ℃
- Endurance: +105 ℃ 2,000hours
- RoHS Compliant

SPECIFICATIONS

Items	Characteristics												
Category Temperature Range	–40 to + 105 ℃ (6.3 to 100Vdc) –25 to +105 ℃ (160 to 500Vdc)												
Rated Voltage Range	6.3 to 500Vdc												
Capacitance Tolerance	± 20%(M) (at 20 ℃ ,120Hz)												
Leakage Current	6.3 to 100Vdc: 1 ≤ 0.03CVor 4 μ A (at 1 minute); 1 ≤ 0.01CVor 3 μ A (at 2 minutes) Whichever is greater 160 to 500Vdc: CV; After 1 minute; After 5 minutes CV ≤ 1.000: 1 ≤ 0.1CV+40 μ A; 1 ≤ 0.03CV+15 μ A CV > 1.000: 1 ≤ 0.04CV+100 μ A; 1 ≤ 0.02CV+25 μ A Where, I: Max.leakage current(μ A), C: Nominal capacitance(μ F) V: Rated voltage(V) (at 20 ℃)												
Dissipation Factor (tan §)	Rated voltage(Vdc)	6.3	10	16	25	35	50	63	100	160–250	350–400	450	500
	tan § (Max)	0.26	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.20	0.24	0.24	0.24
	When nominal capacitance exceeds 1,000 μ F, add 0.02 to the value above for each 1,000 μ F increase. (at 20 ℃ , 120Hz)												
Low Temperature Characteristics (Max.Impedance Ratio)	Rated voltage(Vdc)	6.3	10	16	25	35	50	63	100	160–250	350–400	450	(at 120Hz)
	Z(–25 ℃)/Z(+20 ℃)	5	4	3	2					3	6	6	
	Z(–40 ℃)/Z(+20 ℃)	12	10	8	5	4	3			–	–	–	
Endurance	The following specification shall be satisfied when the capacitors are restored to 20 ℃ after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 105 ℃												
	Capacitance change: ≤ ± 20% of the initial value												
	D.F. (tan §): ≤ 200% of the initial specified value												
	Leakage current: ≤ The initial specified value												
Shelf Life	The following specification shall be satisfied when the capacitors are restored to 20 ℃ after exposing them for 1,000 hours at 105 ℃ ,without voltage applied												
	Capacitance change: ≤ ± 20% of the initial value												
	D.F.(tan §): ≤ 200% of the initial specified value												
	Leakage current: ≤ 200% The initial specified value												

DIMENSIONS[MM]



ΦD	5	6.3	8		10	12.5	16	18
Φd	0.5	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5		5.0	5.0	7.5	7.5
Φ D'	Φ D+0.5max							
L'	L+2max							

RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq(Hz) / Cap(μF)	50	120	300	1k	10k	100k
Cap < 10	0.65	1.00	1.35	1.75	2.30	2.50
10 ≤ Cap < 100	0.75	1.00	1.25	1.50	1.75	1.80
100 ≤ Cap ≤ 1000	0.80	1.00	1.15	1.30	1.40	1.50
Cap > 1000	0.85	1.00	1.03	1.05	1.08	1.08

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

RE Series

STANDARD RATINGS

WV (Vdc)	Cap (μ F)	Case size Φ D × L(mm)	tan §	Ripple current (mArms/105 ℃ ,120Hz)
6.3(0J)	33	5 × 11	0.26	54
	47	5 × 11	0.26	64
	100	5 × 11	0.26	94
	220	5 × 11	0.26	140
	330	6.3 × 11	0.26	190
	470	6.3 × 11	0.26	230
	1000	8 × 11.5	0.26	380
	2200	10 × 20	0.28	710
	3300	10 × 20	0.30	840
	4700	12.5 × 20	0.32	1090
	6800	12.5 × 25	0.36	1350
	10000	16 × 25	0.44	1650
	15000	16 × 35	0.54	2010
	22000	18 × 40	0.68	2350
10(1A)	22	5 × 11	0.19	46
	33	5 × 11	0.19	57
	47	5 × 11	0.19	68
	100	5 × 11	0.19	100
	220	6.3 × 11	0.19	170
	330	6.3 × 11	0.19	200
	470	8 × 11.5	0.19	250
	1000	10 × 12	0.19	460
	2200	10 × 20	0.21	760
	3300	12.5 × 20	0.23	1000
	4700	12.5 × 25	0.25	1260
	6800	16 × 25	0.29	1570
	10000	16 × 35	0.37	1890
	15000	18 × 35	0.47	2180
16(1C)	10	5 × 11	0.16	34
	22	5 × 11	0.16	51
	33	5 × 11	0.16	63
	47	5 × 11	0.16	75
	100	5 × 11	0.16	110
	220	6.3 × 11	0.16	182
	330	8 × 11.5	0.16	260
	470	8 × 11.5	0.16	310
	1000	10 × 16	0.16	560
	2200	12.5 × 20	0.18	920
	3300	12.5 × 25	0.20	1170
	4700	16 × 25	0.22	1480
	6800	16 × 30	0.26	1780
	10000	18 × 35	0.34	2060
25(1E)	4.7	5 × 11	0.14	25
	10	5 × 11	0.14	36
	22	5 × 11	0.14	54
	33	5 × 11	0.14	67
	47	5 × 11	0.14	80
	100	6.3 × 11	0.14	130
	220	8 × 11.5	0.14	230
	330	8 × 11.5	0.14	310
	470	10 × 12	0.14	380
	1000	10 × 20	0.14	680
	2200	12.5 × 25	0.16	1090
	3300	16 × 25	0.18	1400
	4700	16 × 30	0.20	1710
	6800	18 × 35	0.24	2040

WV (Vdc)	Cap (μ F)	Case size Φ D × L(mm)	tan §	Ripple current (mArms/105 ℃ ,120Hz)
35(1V)	4.7	5 × 11	0.12	28
	10	5 × 11	0.12	41
	22	5 × 11	0.12	61
	33	5 × 11	0.12	75
	47	5 × 11	0.12	90
	100	6.3 × 11	0.12	150
	220	8 × 11.5	0.12	270
	330	10 × 12	0.12	350
	470	10 × 16	0.12	460
	1000	12.5 × 20	0.12	810
	2200	16 × 25	0.14	1260
	3300	16 × 35	0.16	1610
	4700	18 × 35	0.18	1910
50(1H)	0.10	5 × 11	0.10	1.3
	0.22	5 × 11	0.10	2.9
	0.33	5 × 11	0.10	4.3
	0.47	5 × 11	0.10	6.2
	1.0	5 × 11	0.10	13
	2.2	5 × 11	0.10	20
	3.3	5 × 11	0.10	25
	4.7	5 × 11	0.10	30
	10	5 × 11	0.10	40
	22	5 × 11	0.10	65
	33	6.3 × 11	0.10	90
	47	6.3 × 11	0.10	110
	100	8 × 11.5	0.10	180
	220	10 × 12	0.10	300
	330	10 × 16	0.10	410
	470	10 × 20	0.10	530
	1000	12.5 × 25	0.10	950
	2200	16 × 35	0.12	1470
	3300	18 × 35	0.14	1770
63(1J)	10	5 × 11	0.09	46
	22	5 × 11	0.09	71
	33	6.3 × 11	0.09	100
	47	6.3 × 11	0.09	120
	100	10 × 12	0.09	215
	220	10 × 16	0.09	335
	330	10 × 20	0.09	510
	470	12.5 × 20	0.09	640
	1000	16 × 25	0.09	930
100(2A)	0.10	5 × 11	0.08	1.5
	0.22	5 × 11	0.08	3.4
	0.33	5 × 11	0.08	5.0
	0.47	5 × 11	0.08	7.1
	1.0	5 × 11	0.08	15
	2.2	5 × 11	0.08	21
	3.3	5 × 11	0.08	29
	4.7	5 × 11	0.08	32
	10	6.3 × 11	0.08	54
	22	8 × 11.5	0.08	93
	33	8 × 11.5	0.08	130
	47	10 × 12	0.08	165
	100	10 × 20	0.08	265
	220	12.5 × 25	0.08	440

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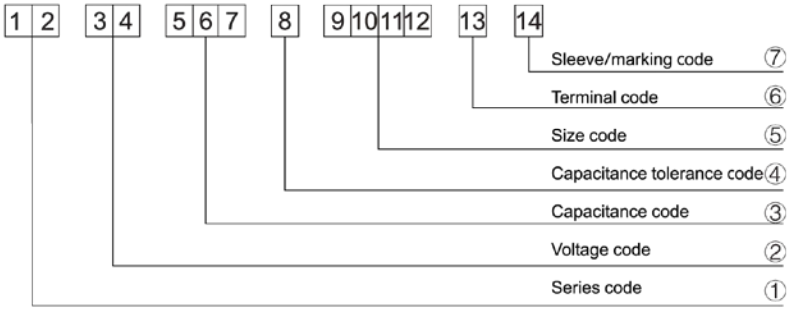
WV (Vdc)	Cap (μ F)	Case size Φ D × L(mm)	tan §	Ripple current (mArms/105 ℃ ,120Hz)
100(2A)	330	16 × 25	0.08	540
	470	16 × 30	0.08	715
	1000	18 × 40	0.08	985
160(2C)	3.3	6.3 × 11	0.20	32
	4.7	6.3 × 11	0.20	38
	10	8 × 12	0.20	65
	10	10 × 12	0.20	76
	22	10 × 12	0.20	98
	22	10 × 16	0.20	108
	22	10 × 20	0.20	120
	33	10 × 16	0.20	158
	33	10 × 20	0.20	165
	47	10 × 20	0.20	182
	47	12.5 × 20	0.20	205
	68	12.5 × 20	0.20	265
	100	12.5 × 25	0.20	318
	100	16 × 25	0.20	335
	220	16 × 30	0.20	568
	330	18 × 35	0.20	710
	470	18 × 40	0.20	870
200(2D)	1	6.3 × 11	0.20	16
	2.2	6.3 × 11	0.20	22
	3.3	6.3 × 11	0.20	32
	4.7	8 × 12	0.20	48
	10	8 × 12	0.20	78
	10	10 × 12	0.20	82
	10	10 × 16	0.20	86
	22	10 × 16	0.20	128
	22	10 × 20	0.20	132
	33	10 × 20	0.20	185
	33	12.5 × 20	0.20	194
	47	12.5 × 20	0.20	225
	68	12.5 × 25	0.20	308
	82	12.5 × 25	0.20	318
	100	16 × 25	0.20	345
	150	16 × 25	0.20	446
	180	16 × 30	0.20	560
	220	16 × 35	0.20	678
	220	18 × 30	0.20	695
	330	18 × 35	0.20	755
	470	18 × 45	0.20	938
250(2E)	2.2	6.3 × 11	0.20	22
	3.3	6.3 × 11	0.20	32
	3.3	8 × 12	0.20	34
	4.7	6.3 × 11	0.20	38
	4.7	8 × 12	0.20	48
	10	10 × 12	0.20	75
	10	10 × 16	0.20	84
	22	10 × 20	0.20	128
	22	12.5 × 20	0.20	145
	33	10 × 20	0.20	150
	33	12.5 × 20	0.20	185
	47	12.5 × 20	0.20	232
	47	12.5 × 25	0.20	245
	100	16 × 25	0.20	370
	100	16 × 30	0.20	400
	150	16 × 35	0.20	468
	220	18 × 35	0.20	660
	220	18 × 40	0.20	702
	330	18 × 40	0.20	730

WV (Vdc)	Cap (μ F)	Case size Φ D × L(mm)	tan §	Ripple current (mArms/105 ℃ ,120Hz)
350(2V)	0.47	6.3 × 11	0.24	11
	1	6.3 × 11	0.24	16
	2.2	8 × 12	0.24	26
	3.3	8 × 12	0.24	34
	3.3	10 × 12	0.24	38
	4.7	8 × 12	0.24	48
	4.7	10 × 12	0.24	52
	10	10 × 12	0.24	68
	10	10 × 16	0.24	82
	10	10 × 20	0.24	88
	22	12.5 × 20	0.24	154
	33	12.5 × 20	0.24	184
	33	16 × 20	0.24	198
	47	16 × 25	0.24	250
	68	16 × 25	0.24	335
	100	18 × 30	0.24	398
400(2G)	1	6.3 × 11	0.24	16
	2.2	6.3 × 11	0.24	30
	2.2	8 × 12	0.24	34
	3.3	8 × 12	0.24	35
	3.3	10 × 12	0.24	38
	4.7	8 × 12	0.24	48
	4.7	10 × 12	0.24	52
	10	10 × 16	0.24	98
	10	10 × 20	0.24	115
	22	12.5 × 25	0.24	192
	33	16 × 20	0.24	258
	47	16 × 25	0.24	305
	68	16 × 30	0.24	465
	68	18 × 25	0.24	445
	82	18 × 25	0.24	474
	100	16 × 40	0.24	544
	100	18 × 30	0.24	532
	120	18 × 35	0.24	588
	150	18 × 40	0.24	668
450(2W)	0.47	8 × 12	0.24	11
	1	8 × 12	0.24	18
	2.2	8 × 12	0.24	25
	2.2	10 × 12	0.24	32
	3.3	10 × 12	0.24	36
	3.3	10 × 16	0.24	40
	4.7	10 × 20	0.24	55
	10	10 × 20	0.24	90
	10	12.5 × 20	0.24	100
	22	12.5 × 25	0.24	168
	22	16 × 20	0.24	185
	33	16 × 25	0.24	215
	47	16 × 30	0.24	344
	68	18 × 30	0.24	455
	82	18 × 30	0.24	472
	100	18 × 35	0.24	530
	120	18 × 40	0.24	582
	150	18 × 50	0.24	700
500(2H)	6.8	10×16	0.24	62
	10	10×16	0.24	65
	15	12.5×16	0.24	70
	22	12.5×20	0.24	100
	33	16×20	0.24	128
	47	16×25	0.24	160

Part Number System



① Series code

Series name	Code	
	1	2
SM	S	M
SS	S	S
SH	S	H
SP	S	P
NP	N	P
LL	L	L
RD	R	D
RE	R	E
RT	R	T
RF	R	F
RG	R	G
RJ	R	J
RR	R	R
LF	L	F
LJ	L	J
LR	L	R
LG	L	G

② Voltage code

WV (Vdc)	Code	
	3	4
4	0	G
6.3	0	J
10	1	A
16	1	C
25	1	E
35	1	V
50	1	H
63	1	J
80	1	K
100	2	A
160	2	C
200	2	D
250	2	E
350	2	V
400	2	G
450	2	W
500	2	H

③ Capacitance code

Cap (uF)	Code		
	5	6	7
0.1	R	1	0
0.22	R	2	2
0.33	R	3	3
0.47	R	4	7
1	1	R	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
100	1	0	1
220	2	2	1
330	3	3	1
470	4	7	1
560	5	6	1
1000	1	0	2
1500	1	5	2
2200	2	2	2
3300	3	3	2
4700	4	7	2
6800	6	8	2
10000	1	0	3
15000	1	5	3

④ Capacitance tolerance code

Tol. (%)	Code
	8
−5 ~ +5	J
−10 ~ +10	K
−20 ~ +20	M

⑤ Size code

ΦD × L (mm)	Code			
	9	10	11	12
3 × 5	0	3	0	5
4 × 5	0	4	0	5
5 × 5	0	5	0	5
6.3 × 5	0	6	0	5
4 × 7	0	4	0	7
5 × 7	0	5	0	7
6.3 × 7	0	6	0	7
8 × 7	0	8	0	7
5 × 11	0	5	1	1
6.3 × 11	0	6	1	1
8 × 12	0	8	1	2
8 × 16	0	8	1	6
10 × 12	1	0	1	2
10 × 16	1	0	1	6
8 × 20	0	8	2	0
10 × 20	1	0	2	0
13 × 20	1	3	2	0
13 × 25	1	3	2	5
16 × 25	1	6	2	5
16 × 32	1	6	3	2
16 × 36	1	6	3	6
18 × 32	1	8	3	2
18 × 36	1	8	3	6
18 × 40	1	8	4	0

⑦ Sleeve/Marking code

Sleeve/Marking	Code
	14
PET	T
Black	B
Yellow	Y
Ink Green	I
Pea Green	P
Orange	O

⑥ Terminal code

Specification	Code
	13
Bulk packing	0
Φ4–8Taping	T1
	T2
	T2
Φ10–18Taping	T3
Lesd Cut	F
	C
	R
	L
	M
	S
	B
	K

Lead Forming

Taping Specifications

Fig.1 Code:T1

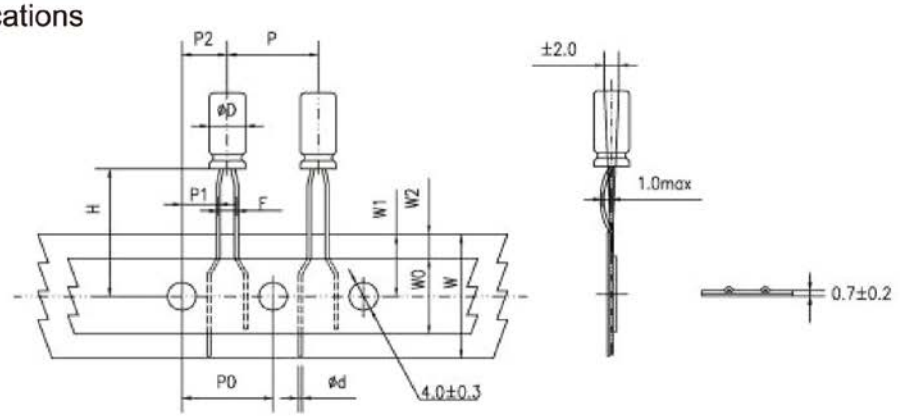


Fig.2Code:T2

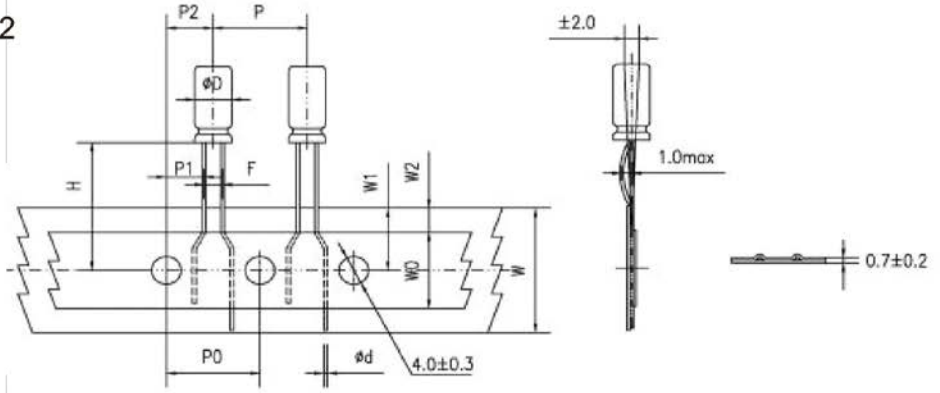


Fig.3 Code:T2

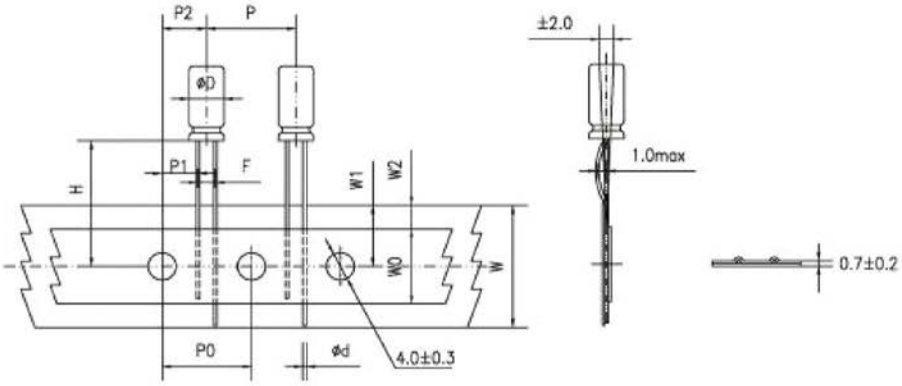
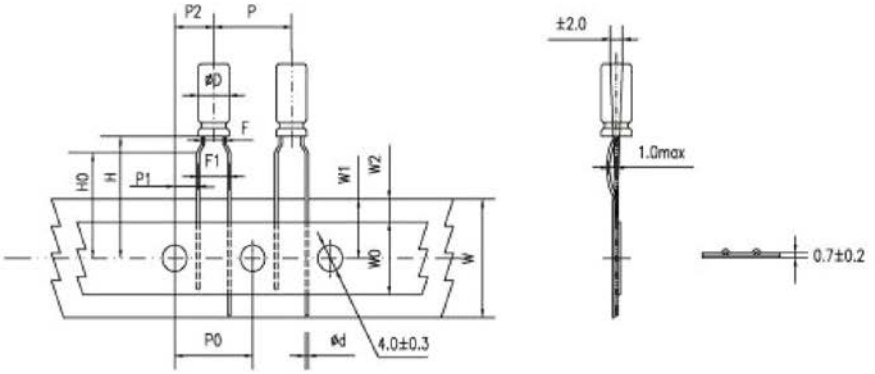


Fig.4 Code:T3



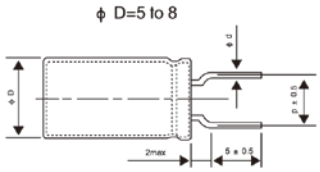
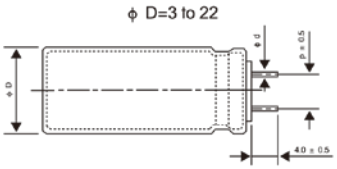
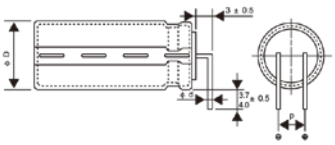
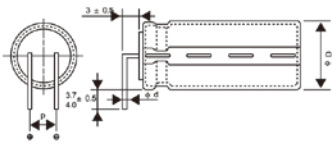
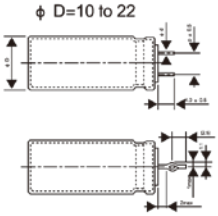
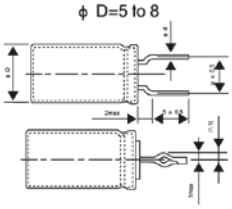
Specification Fig.1 & Fig.2 & Fig.3

Iterms	Symbol	CASE SIZE										Tolerance
		4 × 5 4 × 7		5 × 5 5 × 7		5x11	6.3x5	6.3x7 6.3x9	6.3x11 6.3x12	8x5/7 8x9/11 8x11.5 8x12	8x16 8x20	10x9/12 10x12.5 10x13/16 10x20/25	
Pin Code		T1	T2	T1	T2	T1	T2	T2	T2	T2	T2	T2	
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	PO	12.7		12.7		12.7	12.7	12.7	12.7	12.7	12.7	12.7	± 0.2
Hole center to lead distance	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
Feed hole center to body center distance	P2	6.35		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	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	18.0	± 0.5
Adhesive tape width	WO	11.0		11.0		11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	min
Hole positron	W1	9.0		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	3.0	max

Specification Fig.4

Iterms	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		T3	T3	T3	T3	T3	T3	T3	T3	T3	
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	PO	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	± 0.2
Hole center to lead distance	P1	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	± 0.7
Feed hole center to body center distance	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	HO	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	WO	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	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

Lead Forming & Cut:

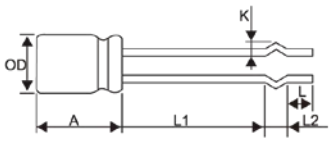
Lead comfiguration:F	Lead comfiguration:C
ϕ D=5 to 8 	ϕ D=3 to 22 
Lead comfiguration:R	**Lead comfiguration:L**
ϕ D=10 to 22 	ϕ D=10 to 22 
Lead comfiguration:M	**Lead comfiguration:S**
ϕ D=10 to 22 	ϕ D=5 to 8 

LEAD SPACING&RECOMMENDED PCB DIMENSIONS

(mm)

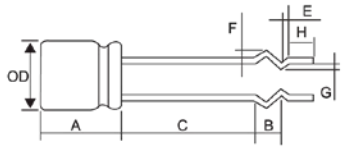
ϕD / Dimensionc	ϕd	p	PC Board		Lead Configuration
			Hole diame ter	Thickness	
5	0.5	5.0	0.8	1.6	F C S
6.3	0.5	5.0	0.8		
8	0.5/0.6	5.0	1.0		
10	0.6	5.0	1.0	1.6	C M R L
12.5	0.6	5.0	1.0		
16	0.8	7.5	1.2		
18	0.8	7.5	1.2		
20	0.8	7.5	1.2		
22	0.8	10.0	1.2		

Lead comfiguration:B



⌀D	L1	L2	K	A	L
5	17.5–19.5	2.6	1.9	10.0–15.0	3.0–5.0
6.3	17.5–19.5	2.6	1.9	10.0–16.0	
8	12.0–14.0	2.5	1.3	10.0–20.0	
8	13.5–15.5	2.5	1.5		
8	13.0–15.0	3.0	1.5		
8	19.5–21.5	3.0	1.5		
8	21.0–23.0	3.0	1.5		
10	7.5–9.5	2.5	1.7	10.0–25.0	
10	17.0–19.0	2.5	1.7		
10	10.5–12.5	2.5	1.5		
10	10.0–12.0	3.0	1.5		
10	13.0–15.0	3.0	1.5		
10	18.0–20.0	3.0	1.5		
10	21.0–23.0	3.0	1.5		
	± 1.0	± 0.5	0.3	± 1.0	± 1.0

Lead comfiguration:K



⌀D	C	B	E	F	G	A	H
8	13.5–15.5	3	1.2	1.8	0.8	10–20	3.0–5.0
10	18.5–20.5	3	1.2	1.8	1	10–25	
10	19.0–21.0	3	1.5	1.4	0.5		
	± 1.0	± 0.5	± 0.3	± 0.3	± 0.3	± 1.0	± 1.0