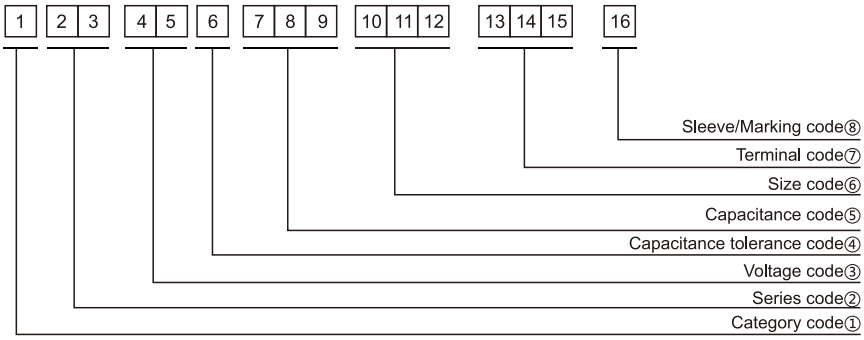
Part Numbering System



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

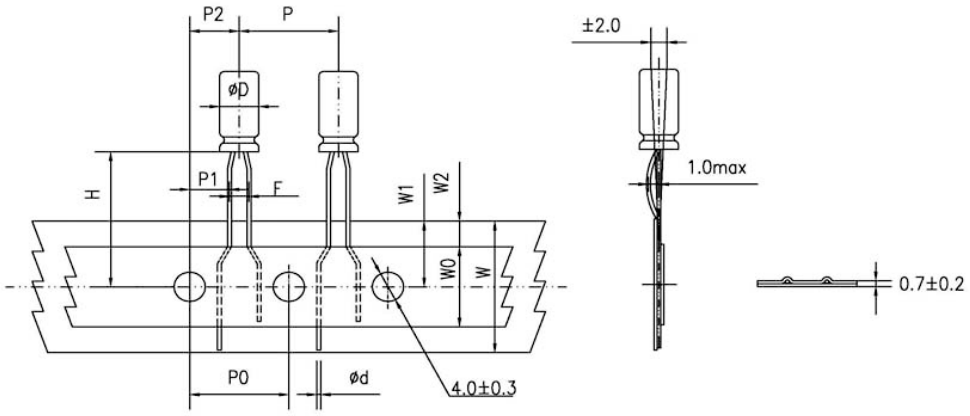


Fig.2 code: B

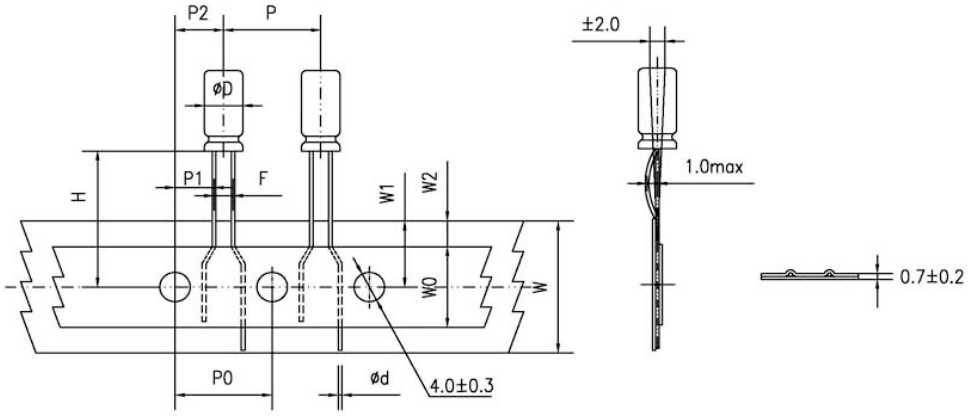


Fig.3 code: B

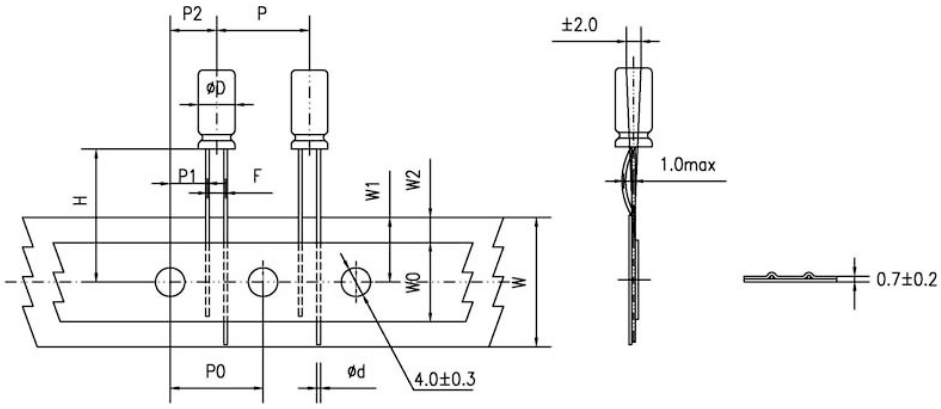
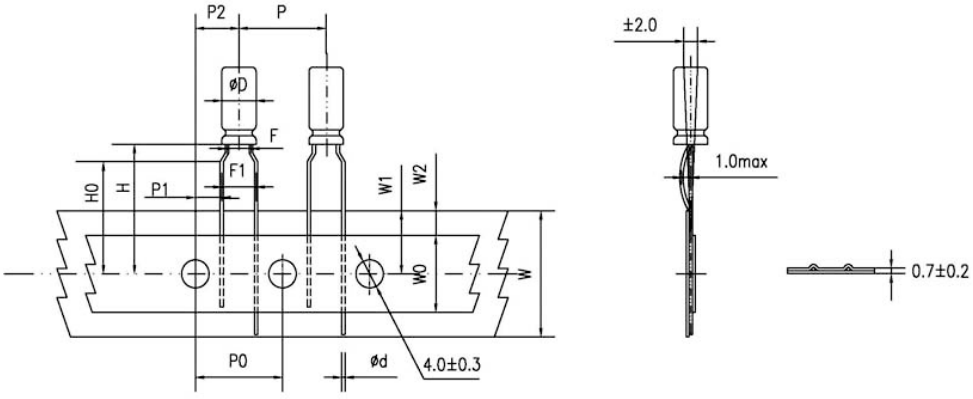


Fig.4 code: P



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

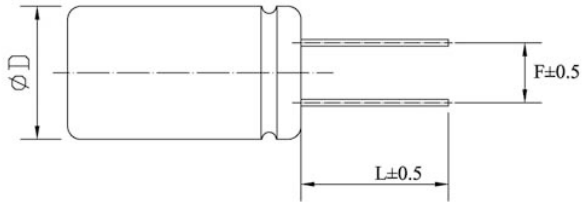
Specification Fig.4

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

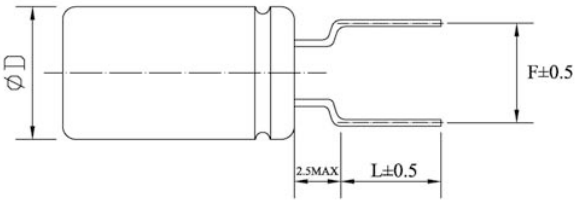
Lead Forming

Lead Forming & Cut

Code:C
RANGE: Φ4~Φ18

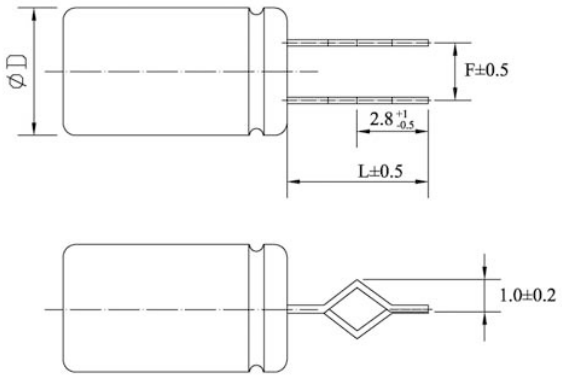


Code:F
RANGE: Φ4~Φ8



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

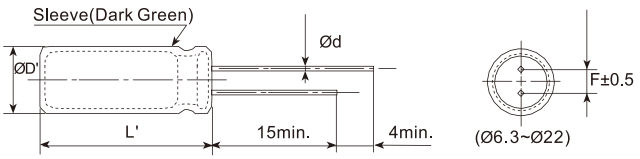
CD11GN series

- Endurance +130°C 1,000~2,000 hours +105°C 8,000~12,000 hours
- Withstand high temperature,miniaturized,long life
- Suitable for output circuit and input circuit of LED driving power.
- **RoHS Compliant**

SPECIFICATIONS

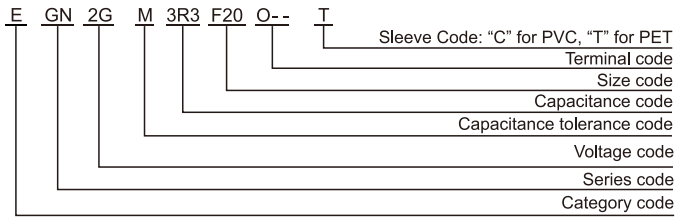
Items	Characteristics								
Category Temperature Range	-40~+130°C(160~ 450 Vdc) -40~+105°C(500 Vdc)								
Rated Voltage Range	160~500 Vdc								
Capacitance Tolerance	±20%(M) (at 20°C,120Hz)								
Leakage Current	160~400 Vdc: I≤0.02CV+10μA; 450~500 Vdc: I≤0.03CV+10μA. Where, I: Max.leakage current (μA),C:Nominal capacitance (μF), V: Rated voltage (V) (at 20°C after 2 minutes)								
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	160	200	250	350	400	450	500	
	tanδ (max.)	0.15	0.15	0.15	0.20	0.20	0.20	0.24	(at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	160	200	250	350	400	450	500	
	Z(-25°C)/Z(+20°C)	3	3	3	5	5	6	6	
	Z(-40°C)/Z(+20°C)	6	6	6	6	6	9	15	(at 120Hz)
Endurance	The specifications listed below shall be met when the capacitors are restored to 20°C after DC voltage plus rated ripple current is applied for a specified period of time at 130°C or 105°C,the peak voltage shall not exceed the rated voltage.								
	Capacitance Change: ≤±20% of the initial value								
	D.F. (tanδ): ≤200% of the initial specified value								
	Leakage Current: ≤The initial specified value								
	Case Dia.	130°C Load life (hours) 160~450WV		105°C Load life (hours) 160~450WV		105°C Load life (hours) 500WV			
	ØD=6.3	1,000		8,000		-			
	ØD≥8	2,000		12,000		10,000			
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 1,000 hours.								
	Capacitance Change: ≤±20% of the initial value								
	D.F. (tanδ): ≤200% of the initial specified value								
	Leakage Current: ≤200% of the initial specified value								

DIMENSIONS[mm]



ØD	6.3	8		10	12.5	16	18	22
Ød	0.5	0.5	0.6	0.6	0.6	0.8	0.8	0.8
F	2.5	3.5		5.0	5.0	7.5	7.5	10
ØD'	ØD+0.5max.							
L'	L+2max.							

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Cap.(μF)	120	1k	10k	100k
Cap.<33	0.40	0.70	0.90	1.00
Cap.≥33	0.50	0.80	0.90	1.00

CD11GN series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C, 100kHz)	Rated ripple current (mArms/130°C, 100kHz)
160(2C)	1	6.3*7	0.15	40	26
		6.3*9	0.15	45	30
		6.3*12	0.15	50	34
	1.5	6.3*7	0.15	46	31
		6.3*9	0.15	50	34
		6.3*12	0.15	55	36
	1.8	6.3*7	0.15	53	35
		6.3*9	0.15	58	38
		6.3*12	0.15	64	42
	2.2	6.3*7	0.15	58	38
		6.3*9	0.15	64	42
		6.3*12	0.15	70	46
	2.8	6.3*7	0.15	61	40
		6.3*9	0.15	68	45
		6.3*12	0.15	75	49
	3.3	6.3*9	0.15	72	47
		6.3*12	0.15	80	52
	4.7	6.3*12	0.15	81	53
		8*9	0.15	82	54
		8*12	0.15	86	56
	5.6	8*9	0.15	88	58
		8*12	0.15	98	64
	6.8	8*9	0.15	100	65
		8*16	0.15	110	72
	10	8*12	0.15	190	124
		8*16	0.15	225	146
		10*9	0.15	200	130
	15	8*12	0.15	255	165
		8*16	0.15	288	188
	22	10*12	0.15	420	273
		10*16	0.15	475	309
	33	10*16	0.15	520	340
		10*20	0.15	570	372
	47	10*20	0.15	595	387
		12.5*25	0.15	660	429
	68	12.5*20	0.15	750	490
		12.5*25	0.15	800	520
	100	12.5*20	0.15	1100	715
		16*25	0.15	1120	728
	150	16*25	0.15	1210	785
		16*30	0.15	1280	832
200(2D)	1	6.3*7	0.15	46	31
		6.3*9	0.15	52	40
		6.3*12	0.15	56	42
	1.5	6.3*7	0.15	52	40
		6.3*9	0.15	56	42
		6.3*12	0.15	60	45
	1.8	6.3*7	0.15	56	40
		6.3*9	0.15	60	45
		6.3*12	0.15	68	50
	2.2	6.3*9	0.15	68	50
		6.3*12	0.15	74	55
	2.8	6.3*9	0.15	74	55
		6.3*12	0.15	80	60
	3.3	6.3*9	0.15	86	65
		6.3*12	0.15	96	72
	4.7	6.3*12	0.15	128	102
		8*9	0.15	135	107
		8*12	0.15	154	122
	5.6	8*9	0.15	150	120
		8*12	0.15	165	132
		8*16	0.15	220	176
	6.8	8*9	0.15	158	125
		8*12	0.15	175	140
		8*16	0.15	228	182

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C, 100kHz)	Rated ripple current (mArms/130°C, 100kHz)
200(2D)	8.2	8*12	0.15	195	146
		10*9	0.15	210	160
	10	8*12	0.15	240	167
		8*16	0.15	290	202
		8*20	0.15	330	230
		10*9	0.15	280	195
	15	8*16	0.15	338	235
		8*20	0.15	350	240
	22	8*20	0.15	382	248
		10*16	0.15	446	290
		10*20	0.15	492	320
	33	10*20	0.15	570	370
		12.5*16	0.15	570	370
		12.5*20	0.15	600	390
	47	12.5*16	0.15	600	390
		12.5*20	0.15	628	408
		12.5*25	0.15	660	430
	68	16*25	0.15	860	560
	100	12.5*30	0.15	882	574
		16*25	0.15	1060	690
	150	12.5*40	0.15	1120	728
		16*35	0.15	1290	840
250(2E)	1	6.3*7	0.15	46	31
		6.3*9	0.15	52	40
		6.3*12	0.15	56	42
	1.5	6.3*7	0.15	52	40
		6.3*9	0.15	56	42
		6.3*12	0.15	60	45
	1.8	6.3*7	0.15	56	40
		6.3*9	0.15	60	45
		6.3*12	0.15	68	50
	2.2	6.3*9	0.15	68	50
		6.3*12	0.15	74	55
	2.8	6.3*9	0.15	74	55
		6.3*12	0.15	84	62
	3.3	6.3*9	0.15	86	65
		6.3*12	0.15	100	74
	4.7	8*9	0.15	120	95
		8*12	0.15	154	122
	5.6	8*9	0.15	150	120
		8*12	0.15	165	132
	6.8	8*9	0.15	158	125
		8*16	0.15	228	182
	8.2	8*12	0.15	245	172
		8*16	0.15	274	192
		10*9	0.15	235	165
	10	8*12	0.15	265	185
		8*16	0.15	294	205
	15	8*20	0.15	378	245
	22	10*16	0.15	462	300
	33	12.5*16	0.15	550	358
		12.5*20	0.15	610	398
	47	12.5*16	0.15	610	398
		12.5*20	0.15	648	420
	68	12.5*30	0.15	874	568
		16*25	0.15	874	568
	100	12.5*35	0.15	966	628
		16*25	0.15	1030	668
		16*30	0.15	1140	740
	150	12.5*50	0.15	1288	838
		18*25	0.15	1330	865
		16*35	0.15	1400	910

CD11GN series

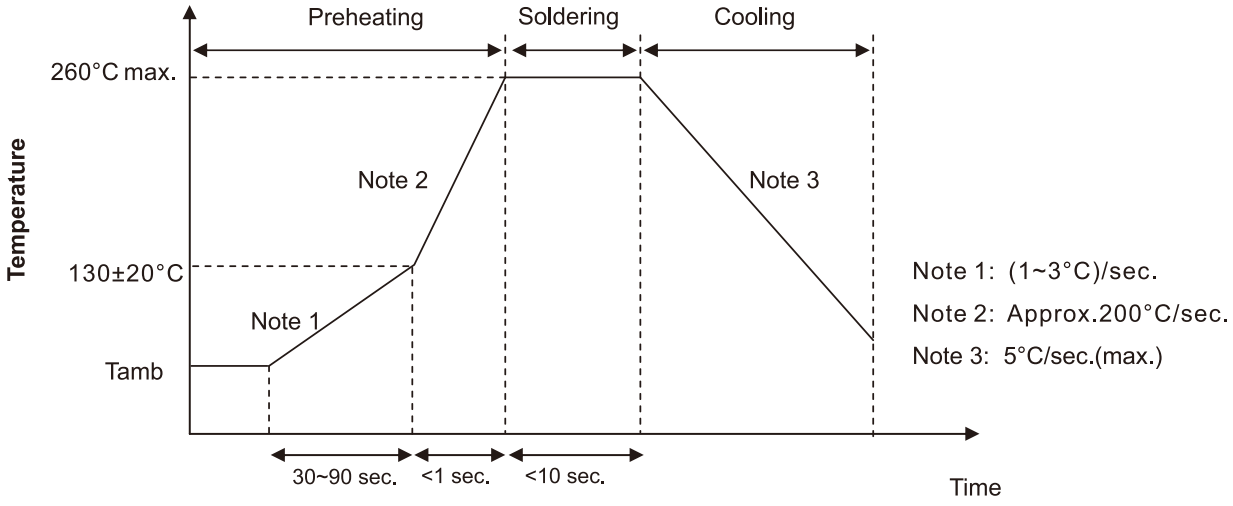
■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C, 100kHz)	Rated ripple current (mArms/130°C, 100kHz)
350(2V)	1	6.3*9	0.20	52	40
		6.3*12	0.20	58	44
	1.5	6.3*12	0.20	65	50
		8*9	0.20	68	52
	1.8	6.3*12	0.20	70	54
		8*9	0.20	74	57
	2.2	6.3*12	0.20	78	60
		8*9	0.20	82	63
	2.8	8*12	0.20	90	68
		10*9	0.20	95	72
	3.3	8*9	0.20	95	71
		8*12	0.20	100	75
		10*9	0.20	105	78
	4.7	8*12	0.20	135	108
	5.6	8*12	0.20	140	109
		8*16	0.20	160	125
	6.8	8*16	0.20	170	123
		8*20	0.20	195	142
	8.2	8*20	0.20	250	164
	10	10*16	0.20	275	178
		10*20	0.20	300	195
	15	10*20	0.20	380	247
	22	12.5*20	0.20	476	309
	33	16*20	0.20	600	390
	47	16*20	0.20	740	480
	68	18*25	0.20	880	572
	100	18*30	0.20	1160	754
400(2G)	1	6.3*9	0.20	62	55
		6.3*12	0.20	66	60
		8*12	0.20	72	66
	1.2	6.3*12	0.20	68	62
	1.5	8*9	0.20	75	68
		8*12	0.20	86	75
		8*16	0.20	92	80
	1.8	8*9	0.20	80	70
		8*12	0.20	90	78
		8*16	0.20	104	88
	2.2	6.3*12	0.20	87	72
		8*12	0.20	92	80
		8*16	0.20	110	94
	2.8	8*12	0.20	108	85
		8*16	0.20	120	96
		8*20	0.20	148	118
	3.3	8*12	0.20	120	96
		8*14	0.20	125	98
		8*16	0.20	128	102
		8*20	0.20	152	122
	4.7	8*12	0.20	148	110
		8*20	0.20	168	125
	5.6	8*20	0.20	175	133
		10*12	0.20	162	122
		10*16	0.20	180	135
		10*20	0.20	200	140
	6.8	8*20	0.20	202	142
		10*16	0.20	210	148
		10*20	0.20	220	154
	8.2	10*16	0.20	252	164

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C, 100kHz)	Rated ripple current (mArms/130°C, 100kHz)
400(2G)	8.2	10*20	0.20	266	174
	10	10*16	0.20	288	187
		10*20	0.20	304	198
	15	8*40	0.20	340	220
		12.5*16	0.20	360	234
		12.5*20	0.20	400	260
	22	8*50	0.20	476	310
		12.5*20	0.20	490	318
		12.5*25	0.20	532	346
	33	10*45	0.20	627	408
		16*20	0.20	560	364
		16*25	0.20	608	395
	47	12.5*40	0.20	660	429
		16*25	0.20	700	455
		18*25	0.20	792	515
	68	12.5*55	0.20	870	566
		18*25	0.20	835	543
		18*30	0.20	900	585
	100	18*35	0.20	1090	708
		18*40	0.20	1180	768
450(2W)	1	8*9	0.20	64	56
		8*12	0.20	68	62
	1.5	8*12	0.20	84	74
		10*9	0.20	90	76
	1.8	8*12	0.20	90	76
		10*9	0.20	95	80
	2.2	8*16	0.20	92	78
	2.8	8*16	0.20	120	96
	3.3	8*16	0.20	125	100
	4.7	8*20	0.20	168	125
		10*12	0.20	150	110
	5.6	10*16	0.20	180	135
	6.8	10*16	0.20	200	132
		10*20	0.20	220	154
	8.2	10*16	0.20	235	153
		10*20	0.20	266	174
	10	10*25	0.20	304	198
		12.5*16	0.20	290	188
	15	8*45	0.20	400	260
		12.5*20	0.20	400	260
	22	10*40	0.20	500	325
		16*20	0.20	500	325
	33	10*50	0.20	615	400
		16*25	0.20	665	432
	47	12.5*45	0.20	720	468
		16*35	0.20	818	532
	68	18*30	0.20	900	585
	100	18*35	0.20	1110	722
		18*40	0.20	1180	768
500(2H)	10	12.5*20	0.24	288	/
		12.5*25	0.24	302	/
	15	12.5*25	0.24	396	/
		16*20	0.24	396	
	22	12.5*35	0.24	504	/
		16*25	0.24	504	/
	33	18*25	0.24	630	/
	47	18*30	0.24	792	/
	68	22*35	0.24	1100	/
	100	22*35	0.24	1480	/

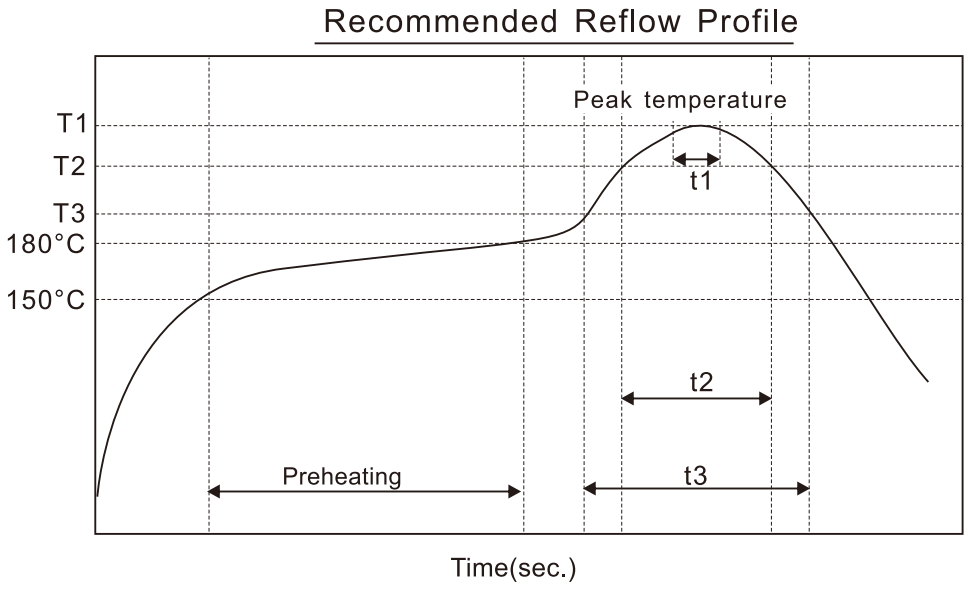
Solering Recommendation

■ Flow Soldering(Radial Lead Type)



■ Reflow Soldering

• (For Polymer SMD Type)

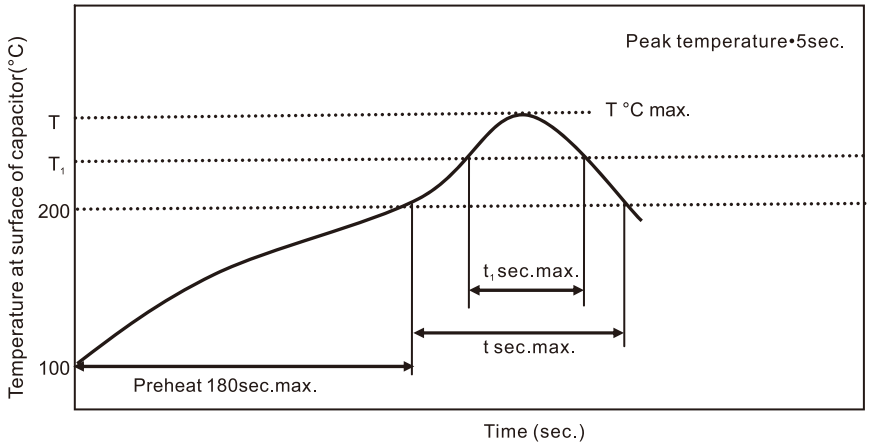


Item	Preheating	T1(°C)	T2(°C)	T3(°C)	t1(sec.)	t2(sec.)	t3(sec.)	Reflow cycle
Condition 1	150°C to 180°C Within 90sec.	≤260	230	200	≤10	≤40	≤60	1
Condition 2		≤250	230	200	≤10	≤40	≤60	2

• (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.

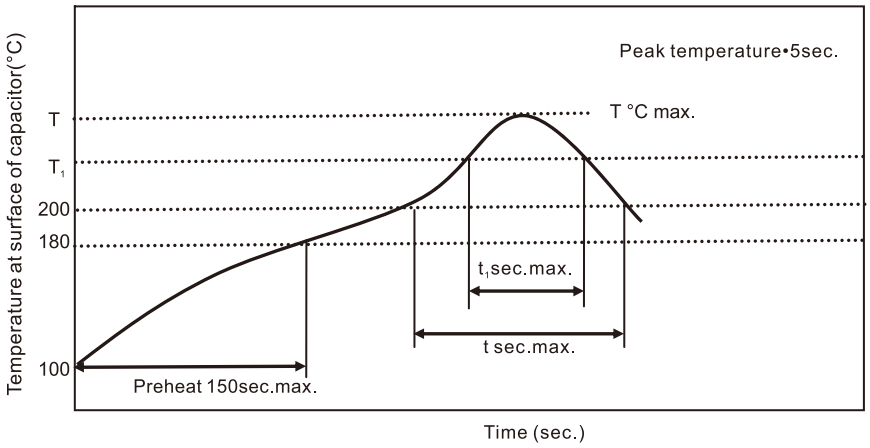


Case size (mm)	T(°C) ①	T_1(°C)	t(sec.) ②	t_1(sec.) ③	Reflow cycle
Φ6.3	250	230	90	40	1
Φ8	240	230	90	30	1
Φ10	235	230	60	30	1

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.

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