

Part Numbering System



① Category code

Type	Code	
	2	3
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
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		
	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: $\Phi 4\sim\Phi 18$



Code:F
RANGE: $\Phi 4\sim\Phi 8$



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: $\Phi 10\sim\Phi 18$



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

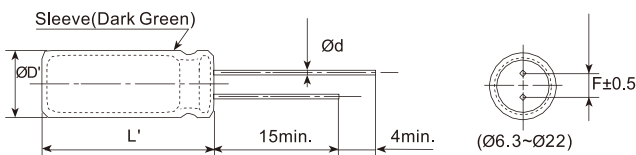
- Endurance +130°C 1,000~2,000 hours +105°C 8,000~12,000 hours
- Withstand high temperature, miniaturized, long life
- Suitable for output circuit and input circuit of LED driving power.
- RoHS Compliant



SPECIFICATIONS

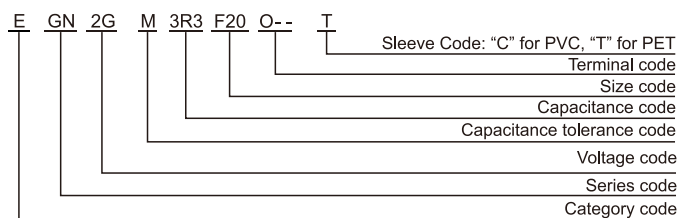
Items	Characteristics								
Category Temperature Range	-40~+130°C(160~450 V _{dc})				-40~+105°C(500 V _{dc})				
Rated Voltage Range	160~500 V _{dc}								
Capacitance Tolerance	±20%(M) (at 20°C, 120Hz)								
Leakage Current	160~400 V _{dc}	450~500 V _{dc}		Where, I: Max.leakage current (μA), C:Nominal capacitance (μF), V: Rated voltage (V)					
	I ≤ 0.02CV + 10μA	I ≤ 0.03CV + 10μA		(at 20°C after 2 minutes)					
Dissipation Factor (tanδ)	Rated Voltage(V _{dc})	160	200	250	350	400	450	500	
	tanδ (max.)	0.15	0.15	0.15	0.20	0.20	0.20	0.24	
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(V _{dc})	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	
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				Case Dia.	130°C Load life (hours)	105°C Load life (hours)	
	D.F. (tanδ)	≤200% of the initial specified value					160~450WV	160~450WV	500WV
	Leakage Current	≤The initial specified value				∅D=6.3	1,000	8,000	-
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]



∅D	6.3	8		10	12.5	16	18	22
∅d	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
∅D'	∅D+0.5max.							
L'	L+2max.							

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Cap.(μF)	Freq.(Hz)	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 (V _{dc})	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
		6.3*12	0.15	81	53
	4.7	8*9	0.15	82	54
		8*12	0.15	86	56
		8*9	0.15	88	58
	5.6	8*12	0.15	98	64
		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
		10*12	0.15	420	273
22	10*16	0.15	475	309	
	10*16	0.15	520	340	
	10*20	0.15	570	372	
33	10*20	0.15	595	387	
	12.5*25	0.15	660	429	
	12.5*20	0.15	750	490	
68	12.5*25	0.15	800	520	
	12.5*20	0.15	1100	715	
	16*25	0.15	1120	728	
100	16*25	0.15	1210	785	
	16*30	0.15	1280	832	
	6.3*7	0.15	46	31	
1	6.3*9	0.15	52	40	
	6.3*12	0.15	56	42	
	6.3*7	0.15	52	40	
1.5	6.3*9	0.15	56	42	
	6.3*12	0.15	60	45	
	6.3*7	0.15	56	40	
1.8	6.3*9	0.15	60	45	
	6.3*12	0.15	68	50	
	6.3*9	0.15	68	50	
2.2	6.3*12	0.15	74	55	
	6.3*9	0.15	74	55	
	6.3*12	0.15	80	60	
2.8	6.3*9	0.15	86	65	
	6.3*12	0.15	96	72	
	6.3*12	0.15	128	102	
3.3	8*9	0.15	135	107	
	8*12	0.15	154	122	
	8*9	0.15	150	120	
4.7	8*12	0.15	165	132	
	8*16	0.15	220	176	
	8*9	0.15	158	125	
5.6	8*12	0.15	175	140	
	8*16	0.15	228	182	

WV (V _{dc})	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
		8*12	0.15	240	167
	10	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
		8*20	0.15	382	248
	22	10*16	0.15	446	290
		10*20	0.15	492	320
		10*20	0.15	570	370
	33	12.5*16	0.15	570	370
		12.5*20	0.15	600	390
		12.5*16	0.15	600	390
	47	12.5*20	0.15	628	408
		12.5*25	0.15	660	430
		12.5*16	0.15	600	390
	68	16*25	0.15	860	560
		12.5*30	0.15	882	574
		16*25	0.15	1060	690
100	16*25	0.15	1120	728	
	16*35	0.15	1290	840	
	6.3*7	0.15	46	31	
1	6.3*9	0.15	52	40	
	6.3*12	0.15	56	42	
	6.3*7	0.15	52	40	
1.5	6.3*9	0.15	56	42	
	6.3*12	0.15	60	45	
	6.3*7	0.15	56	40	
1.8	6.3*9	0.15	60	45	
	6.3*12	0.15	68	50	
	6.3*9	0.15	68	50	
2.2	6.3*12	0.15	74	55	
	6.3*9	0.15	74	55	
	6.3*12	0.15	84	62	
2.8	6.3*9	0.15	86	65	
	6.3*12	0.15	100	74	
	8*9	0.15	120	95	
3.3	8*12	0.15	154	122	
	8*9	0.15	150	120	
	8*12	0.15	165	132	
4.7	8*9	0.15	158	125	
	8*16	0.15	228	182	
	8*12	0.15	245	172	
8.2	8*16	0.15	274	192	
	10*9	0.15	235	165	
	8*12	0.15	265	185	
10	8*16	0.15	294	205	
	8*20	0.15	378	245	
	10*16	0.15	462	300	
15	12.5*16	0.15	550	358	
	12.5*20	0.15	610	398	
	12.5*16	0.15	610	398	
22	12.5*20	0.15	648	420	
	12.5*30	0.15	874	568	
	16*25	0.15	874	568	
33	12.5*35	0.15	966	628	
	16*25	0.15	1030	668	
	16*30	0.15	1140	740	
47	12.5*50	0.15	1288	838	
	18*25	0.15	1330	865	
	16*35	0.15	1400	910	

Radial Type

CD11GN series

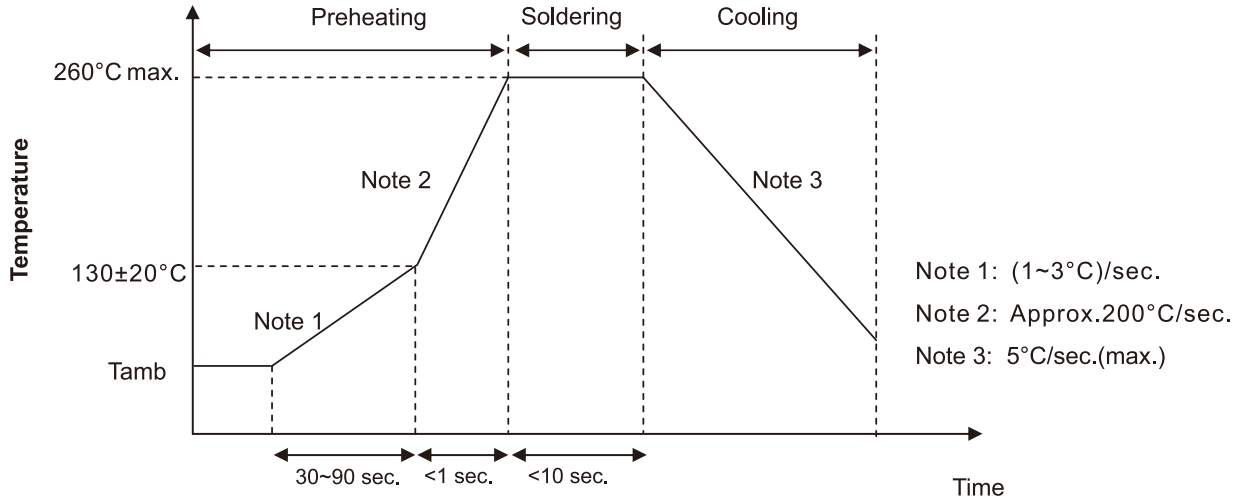
■ STANDARD RATINGS

WV (V _{dc})	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mA _{rms} /105°C, 100kHz)	Rated ripple current (mA _{rms} /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
	1.2	8*12	0.20	72	66
		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
	2.2	8*16	0.20	104	88
		6.3*12	0.20	87	72
		8*12	0.20	92	80
	2.8	8*16	0.20	110	94
		8*12	0.20	108	85
		8*16	0.20	120	96
	3.3	8*20	0.20	148	118
		8*12	0.20	120	96
		8*14	0.20	125	98
	4.7	8*16	0.20	128	102
		8*20	0.20	152	122
		8*12	0.20	148	110
	5.6	8*20	0.20	168	125
		8*20	0.20	175	133
		10*12	0.20	162	122
	6.8	10*16	0.20	180	135
		10*20	0.20	200	140
		8*20	0.20	202	142
	8.2	10*16	0.20	210	148
		10*20	0.20	220	154
	10*16	0.20	252	164	

WV (V _{dc})	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mA _{rms} /105°C, 100kHz)	Rated ripple current (mA _{rms} /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
	22	12.5*20	0.20	400	260
		8*50	0.20	476	310
	33	12.5*20	0.20	490	318
		12.5*25	0.20	532	346
	47	10*45	0.20	627	408
		16*20	0.20	560	364
		16*25	0.20	608	395
	68	12.5*40	0.20	660	429
		16*25	0.20	700	455
		18*25	0.20	792	515
	100	12.5*55	0.20	870	566
		18*25	0.20	835	543
	1	18*30	0.20	900	585
		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
	5.6	10*12	0.20	150	110
		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	
	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	/
		18*30	0.24	792	/
	68	22*35	0.24	1100	/
		22*35	0.24	1480	/

Solering Recommendation

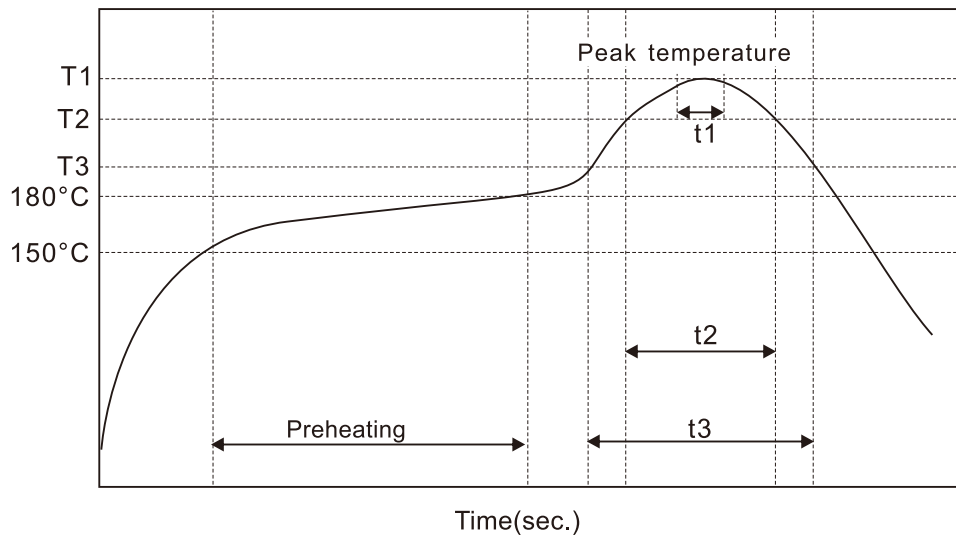
■ Flow Soldering(Radial Lead Type)



■ Reflow Soldering

- (For Polymer SMD Type)

Recommended Reflow Profile

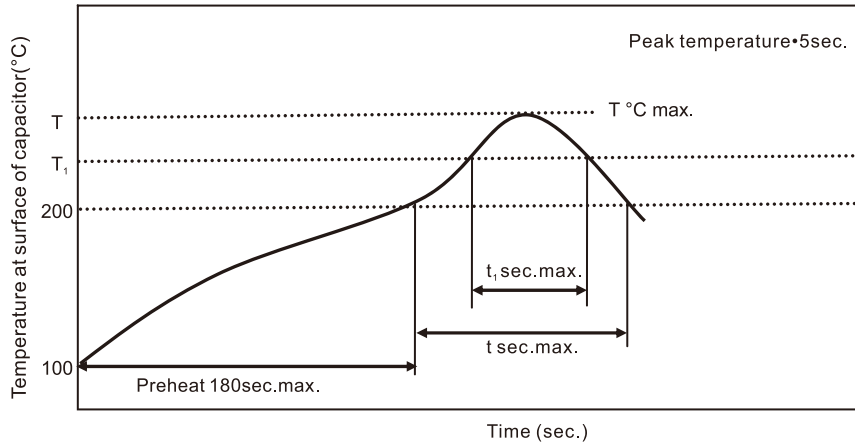


Item	Preheating	T1(°C)	T2(°C)	T3(°C)	t1(sec.)	t2(sec.)	t3(sec.)	Reflow cycle
Condition 1	150°C to 180°C Within 90sec.	≤260	230	200	≤10	≤40	≤60	1
Condition 2		≤250	230	200	≤10	≤40	≤60	2

● (For Liquid SMD Type)

Case size: $\Phi 6.3$ – $\Phi 10$ mm:

- Temperature at surface of capacitor shall not exceed $T^{\circ}\text{C}$.
- The duration for over 200°C temperature and $T_1^{\circ}\text{C}$ 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.

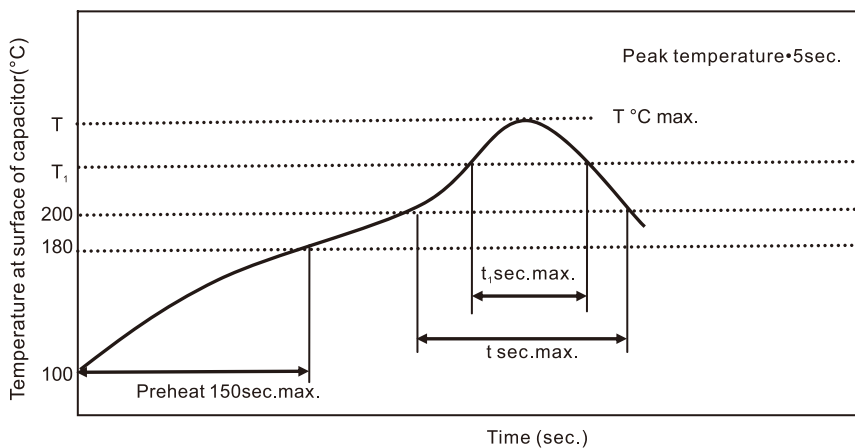


Case size (mm)	$T(^{\circ}\text{C})$ ①	$T_1(^{\circ}\text{C})$	$t(\text{sec.})$ ②	$t_1(\text{sec.})$ ③	Reflow cycle
$\Phi 6.3$	250	230	90	40	1
$\Phi 8$	240	230	90	30	1
$\Phi 10$	235	230	60	30	1

- ① Peak temperature
- ② The duration over 200°C (max.)
- ③ The duration over $T_1^{\circ}\text{C}$
- Please contact us if capacitors are subject to the conditions other than the allowable range of reflow.

Case size: $\Phi 12.5$ – $\Phi 18$ mm:

- Temperature at surface of capacitor shall not exceed $T^{\circ}\text{C}$.
- The duration for over 200°C temperature and $T_1^{\circ}\text{C}$ 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)	$T(^{\circ}\text{C})$ ①	$T_1(^{\circ}\text{C})$	$t(\text{sec.})$ ②	$t_1(\text{sec.})$ ③	Reflow cycle
$\Phi 12.5$ – $\Phi 18$	240	230	60	30	1

- ① Peak temperature
- ② The duration over 200°C (max.)
- ③ The duration over $T_1^{\circ}\text{C}$
- Please contact us if capacitors are subject to the conditions other than the allowable range of reflow.