

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
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: $\Phi 4\sim\Phi 18$



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

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.

RJ series

- Miniaturized
- Low impedance, high ripple current, long life
- Endurance: +105°C 8,000 ~12,000 hours
- RoHS Compliant

Upgrade



SPECIFICATIONS

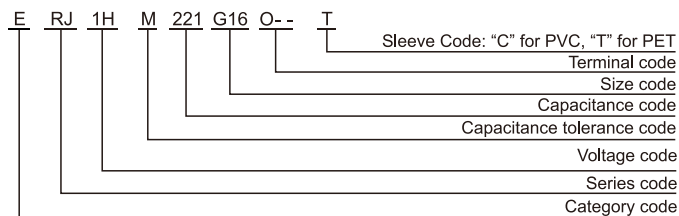
Items	Characteristics	
Category Temperature Range	-40~+105°C	
Rated Voltage Range	10~120 V _{dc}	
Capacitance Tolerance	±20%(M) (at 20°C, 120Hz)	
Leakage Current	I ≤ 0.01CV or 3μA, whichever is greater. Where, I: Max. leakage current (μA), C: Nominal capacitance (μF), V: Rated voltage (V) (at 20°C after 2 minutes)	
Dissipation Factor (tanδ)	Rated Voltage(V _{dc})	10 16 25 35 50 63 80 100 120
	tanδ (max.)	0.19 ; 0.16 ; 0.14 ; 0.12 ; 0.10 ; 0.09 ; 0.09 ; 0.08 ; 0.12
	When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20°C, 120Hz)	
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(V _{dc})	10 16 25 35 50 63 80 100 120
	Z(-25°C)/Z(+20°C)	2 2 3
	Z(-40°C)/Z(+20°C)	4 3 6
	(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 105 °C, the peak voltage shall not exceed the rated voltage.	
	Capacitance Change	≤±25% of the initial value (10V: ≤±30%)
	D. F. (tanδ)	≤200% 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 leaving them under no load at 105°C for 1,000 hours.	
	Capacitance Change	≤±25% of the initial value (10V: ≤±30%)
	D. F. (tanδ)	≤200% of the initial specified value
	Leakage Current	≤200% of the initial specified value

DIMENSIONS[mm]



ØD	5	6.3	8	10	12.5	16	18
Ød	0.5	0.5	0.5	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
ØD'	ØD+0.5max.						
L'	L+2max.						

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz)	120	1k	10k	100k≤
Cap.<47	0.42	0.70	0.90	1.00
47≤Cap.<330	0.50	0.73	0.92	1.00
330≤Cap.<820	0.55	0.77	0.94	1.00
820≤Cap.<2200	0.60	0.80	0.96	1.00
Cap.≥2200	0.70	0.85	0.98	1.00

RJ series

■ STANDARD RATINGS

WV (V _{dc})	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ω _{max} /20°C, 100kHz)	Rated ripple current (mA _{rms} /105°C, 100kHz)
10(1A)	150	5*11	0.19	0.4	450
		6.3*9	0.19	0.52	380
		6.3*11	0.19	0.17	700
	330	8*9	0.19	0.22	590
		8*12	0.19	0.075	1200
	560	10*9	0.19	0.097	1020
		8*16	0.19	0.059	1600
	820	10*12.5	0.19	0.053	1700
	1000	8*20	0.19	0.041	1960
	1200	10*16	0.19	0.038	2000
	1800	10*20	0.19	0.028	2500
	2200	10*25	0.21	0.024	2900
	2700	12.5*20	0.21	0.025	2600
	3300	12.5*25	0.23	0.019	3200
	4700	12.5*30	0.25	0.018	3660
16*20		0.25	0.021	3330	
12.5*35		0.27	0.016	4120	
5600	16*25	0.27	0.017	3810	
16(1C)	120	5*11	0.16	0.4	450
		6.3*9	0.16	0.52	380
		6.3*11	0.16	0.17	700
	270	8*9	0.16	0.22	590
		8*12	0.16	0.075	1200
	470	10*9	0.16	0.097	1020
		8*16	0.16	0.059	1600
	560	10*12.5	0.16	0.053	1700
	820	8*20	0.16	0.041	1960
	1000	10*16	0.16	0.038	2000
	1500	10*20	0.16	0.028	2500
	1800	10*25	0.16	0.024	2900
	2200	12.5*20	0.18	0.025	2600
	2700	12.5*25	0.18	0.019	3200
	3300	12.5*30	0.20	0.018	3660
16*20		0.20	0.021	3330	
12.5*35		0.20	0.016	4120	
4700	16*25	0.22	0.017	3810	
25(1E)	68	5*11	0.14	0.4	450
		6.3*9	0.14	0.52	380
		6.3*11	0.14	0.17	700
	150	8*9	0.14	0.22	590
		8*12	0.14	0.075	1200
	330	10*9	0.14	0.097	1020
		8*16	0.14	0.059	1600
	390	10*12.5	0.14	0.053	1700
	470	8*20	0.14	0.041	1960
	560	10*16	0.14	0.038	2000
	1000	10*20	0.14	0.028	2500
	1200	10*25	0.14	0.024	2900
	1500	12.5*20	0.14	0.025	2600
	1800	12.5*25	0.14	0.019	3200
	2200	12.5*30	0.16	0.018	3660
16*20		0.16	0.021	3330	
12.5*35		0.16	0.016	4120	
3300	16*25	0.18	0.017	3810	

WV (V _{dc})	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ω _{max} /20°C, 100kHz)	Rated ripple current (mA _{rms} /105°C, 100kHz)
35(1V)	47	5*11	0.12	0.4	450
		6.3*9	0.12	0.52	380
		6.3*11	0.12	0.17	700
	100	8*9	0.12	0.22	590
		8*12	0.12	0.075	1200
	180	10*9	0.12	0.097	1020
		8*16	0.12	0.059	1600
	220	10*12.5	0.12	0.053	1700
	270	8*20	0.12	0.041	1960
	330	10*16	0.12	0.038	2000
	390	10*20	0.12	0.028	2500
	560	10*25	0.12	0.024	2900
	680	12.5*20	0.12	0.025	2600
	820	12.5*25	0.12	0.019	3200
	1500	12.5*30	0.12	0.018	3660
16*20		0.12	0.021	3330	
12.5*35		0.12	0.016	4120	
1800	16*25	0.12	0.017	3810	
50(1H)	27	5*11	0.10	0.48	310
		6.3*9	0.10	0.63	260
		6.3*11	0.10	0.22	500
	56	8*9	0.10	0.29	425
		8*12	0.10	0.12	950
	100	10*9	0.10	0.16	800
		8*16	0.10	0.082	1230
	120	10*12.5	0.10	0.073	1280
	150	8*20	0.10	0.058	1580
	180	10*16	0.10	0.053	1650
	220	10*20	0.10	0.038	2060
	330	10*25	0.10	0.032	2420
	390	12.5*20	0.10	0.032	2300
	470	12.5*25	0.10	0.025	2800
	820	12.5*30	0.10	0.023	3370
16*20		0.10	0.026	3070	
12.5*35		0.10	0.021	3810	
1000	16*25	0.10	0.022	3510	
63(1J)	18	5*11	0.09	0.71	240
		6.3*9	0.09	0.92	200
		6.3*11	0.09	0.28	420
	47	8*9	0.09	0.36	350
		8*12	0.09	0.18	720
	82	10*9	0.09	0.24	610
		8*16	0.09	0.13	990
	100	10*12.5	0.09	0.11	990
	120	8*20	0.09	0.096	1200
	150	10*16	0.09	0.076	1200
	180	10*20	0.09	0.056	1570
	270	12.5*16	0.09	0.072	1570
	330	10*25	0.09	0.046	1990
	390	12.5*20	0.09	0.041	1990
	470	12.5*25	0.09	0.031	2460
12.5*30		0.09	0.028	2760	
16*20		0.09	0.032	2380	
560	12.5*35	0.09	0.024	3040	
680	16*25	0.09	0.025	2890	
820					

Radial Type

RJ series

■ STANDARD RATINGS

WV (V _{dc})	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ω _{max} /20°C, 100kHz)	Rated ripple current (mA _{RMS} /105°C, 100kHz)
80(1B)	12	5*11	0.09	1.2	220
		6.3*9	0.09	1.6	180
	27	6.3*11	0.09	0.46	370
		8*9	0.09	0.6	310
	47	8*12	0.09	0.29	620
		10*9	0.09	0.38	520
	56	8*16	0.09	0.2	780
	68	10*12.5	0.09	0.17	780
	82	8*20	0.09	0.16	1040
	100	10*16	0.09	0.11	1040
	150	10*20	0.09	0.084	1430
		12.5*16	0.09	0.11	1430
	180	10*25	0.09	0.069	1620
	220	12.5*20	0.09	0.062	1750
	270	12.5*25	0.09	0.047	2210
	330	12.5*30	0.09	0.042	2400
	390	16*20	0.09	0.048	1950
		12.5*35	0.09	0.036	2600
	470	12.5*40	0.09	0.032	2860
		16*25	0.09	0.038	2430
560	18*20	0.09	0.045	2270	
	16*30	0.09	0.032	2640	
680	16*35	0.09	0.029	2860	
	18*25	0.09	0.036	2500	
820	16*40	0.09	0.027	3510	
	18*30	0.09	0.03	2860	
1000	18*35	0.09	0.027	3510	
1200	18*40	0.09	0.026	3860	
100(1K)	8.2	5*11	0.08	1.2	220
		6.3*9	0.08	1.6	180
	18	6.3*11	0.08	0.46	370
		8*9	0.08	0.6	310
	33	8*12	0.08	0.29	620
		10*9	0.08	0.38	520
	47	8*16	0.08	0.2	780
	56	10*12.5	0.08	0.17	780
	68	8*20	0.08	0.16	1040
	82	10*16	0.08	0.11	1040
	100	10*20	0.08	0.084	1430
		12.5*16	0.08	0.11	1430
	120	10*25	0.08	0.069	1620
	150	12.5*20	0.08	0.062	1750
	220	12.5*25	0.08	0.047	2210
	270	12.5*30	0.08	0.042	2400
		16*20	0.08	0.048	1950
	330	12.5*35	0.08	0.036	2600
		12.5*40	0.08	0.032	2860
	390	16*25	0.08	0.038	2430
18*20		0.08	0.045	2270	
470	16*30	0.08	0.032	2640	
	18*25	0.08	0.036	2500	
560	16*35	0.08	0.029	2860	
	18*30	0.08	0.03	2860	
680	16*40	0.08	0.027	3510	
	18*35	0.08	0.027	3510	
820	18*40	0.08	0.026	3860	

WV (V _{dc})	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ω _{max} /20°C, 100kHz)	Rated ripple current (mA _{RMS} /105°C, 100kHz)
120(2B)	10	6.3*11	0.12	4.6	110
	15	6.3*12	0.12	3.8	145
	18	8*9	0.12	3.5	165
	22	8*12	0.12	3.0	180
	33	8*16	0.12	2.5	320
		10*12.5	0.12	2.5	320
	47	8*20	0.12	2.2	385
		10*16	0.12	2.0	400
	56	10*16	0.12	1.9	410
	68	10*16	0.12	1.8	420
	82	10*20	0.12	1.6	435
	100	10*25	0.12	1.3	540
	120	12.5*20	0.12	1.1	750
	150	12.5*25	0.12	0.85	810
	220	13*30	0.12	0.65	990
		16*20	0.12	0.65	990
	270	16*25	0.12	0.47	1125
		18*20	0.12	0.47	1125
	330	16*30	0.12	0.36	1215
		18*25	0.12	0.36	1215
470	16*40	0.12	0.26	1350	
	18*30	0.12	0.26	1350	

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