

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

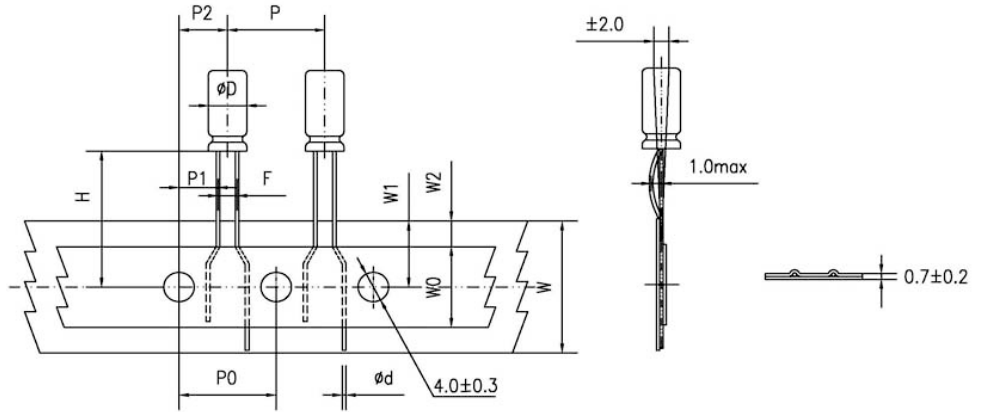


Fig.3 code: B

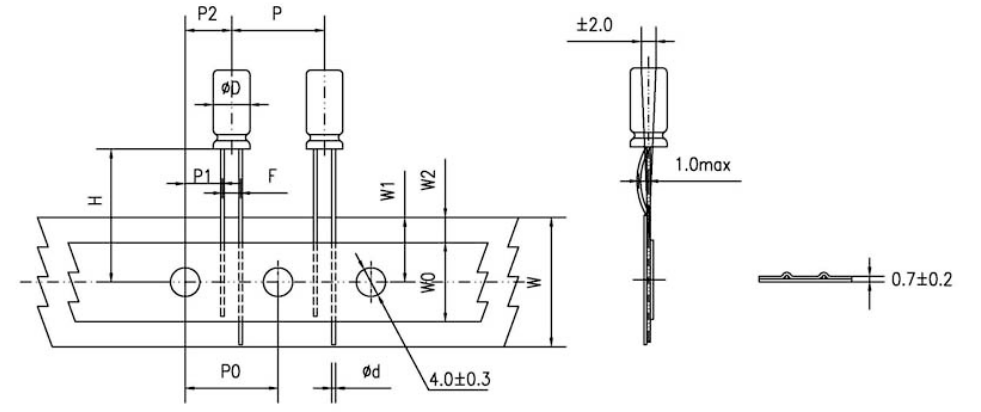
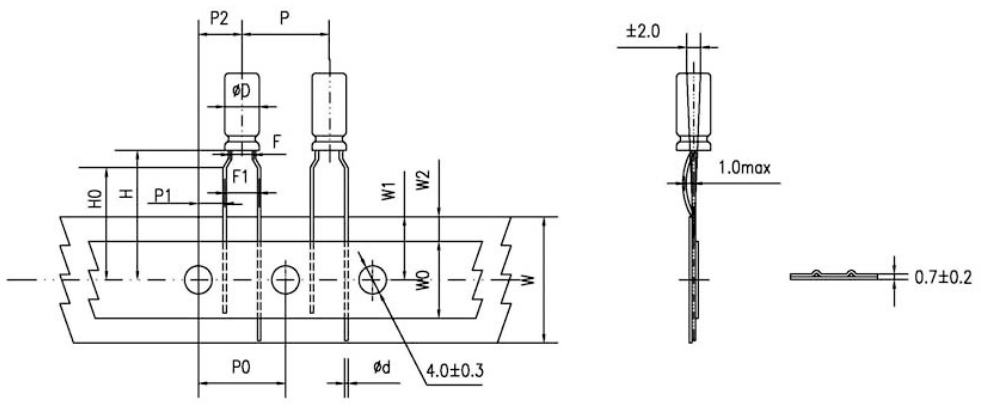


Fig.4 code: P



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.

PT series

- Endurance: +125°C 2,000 hours
- Long Life, High Temperature Resistance
- Recommended Applications: Lamps Power, LED Power, Service Equipment
- RoHS Compliant and lead-free



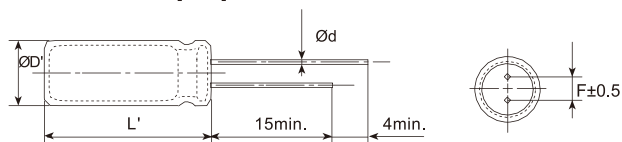
SPECIFICATIONS

Items	Characteristics								
Category Temperature Range	-55~+125°C								
Rated Working Voltage Range	6.3~25 V _{dc}								
Nominal Capacitance Range	22~5600μF								
Capacitance Tolerance	±20%(M) (at 20°C, 120Hz)								
DC Leakage Current	I ≤ 0.2CV or 500μA, 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})	6.3	6.8	7.5	10	16	25	(at 20°C, 120Hz)	
	tanδ (max.)	0.08			0.12				
ESR(100k~300kHz, 20°C)	Value in characteristics table								
Temperature Characteristic (Impedance Ratio at 100kHz)	Z(+125°C)/Z(+20°C) ≤ 1.25 Z(-55°C)/Z(+20°C) ≤ 1.25								
Endurance	After applying rated voltage for 2,000 hours at 125°C, the capacitors shall meet the following requirements.								
	Appearance	No significant damage							
	Capacitance Change	≤ ±20% of the initial value							
	D.F. (tanδ)	≤ 200% of the initial specified value							
	ESR	≤ 200% of the initial specified value							
Humidity Test	After subjecting to 90~95% RH for 2,000 hours at 60°C without voltage applied, the capacitors shall meet the requirement as surge test.								
	Surge Test	After subjecting to 1,000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds, the capacitors shall meet the following requirements.							
		Appearance	No significant damage						
		Capacitance Change	≤ ±20% of the initial value						
		D.F. (tanδ)	≤ 150% of the initial specified value						
ESR		≤ 150% of the initial specified value							
Surge Test	Leakage Current	≤ The initial specified value							

Conductive Polymer Radial Type

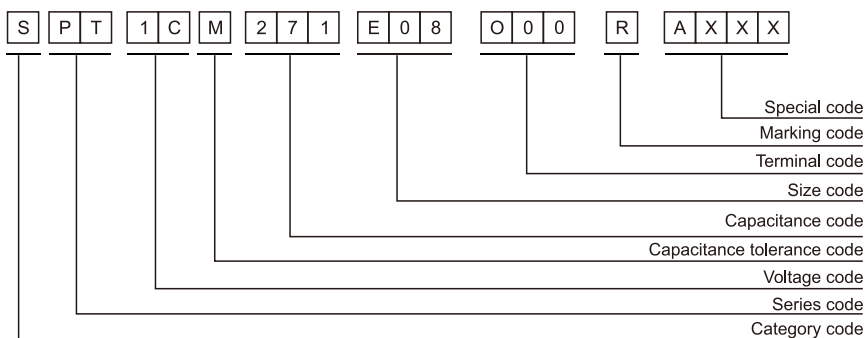
*Note: If any doubt arises, measure the leakage current after the following voltage treatment.
Voltage treatment: DC rated voltage is applied to the capacitors for 120 minutes at 105°C.

DIMENSIONS [mm]



ØD	5	5.5	6.3	6.8	8	10	13
Ød	0.5	0.5	0.5	0.5	0.6	0.6	0.6
F	2.0	2.5	2.5	2.5	3.5	5.0	5.0
ØD'	ØD+0.5max.						
L'	L+1.0max.				L-0.5~+1		L-0.5~+2

PART NUMBERING SYSTEM



PT series

■ STANDARD RATINGS

VDC (SV)	Cap (μF)	Size ΦDxL(mm)	ESR (mΩ,20°C,100kHz)(max.)	Rated ripple current (mA _{rms} /125°C,100kHz)	Leakage Current (μA)(max.)
6.3 (7.2)	100	4*7	42	900	500
	150	4*7	42	1260	500
	180	5*7	42	1560	500
	220	5*7	28	2100	500
		6.3*7	28	2130	500
		6.3*8	21	2160	500
	270	5*7	28	2280	500
	330	5*8	28	2400	500
		6.3*5	35	1896	500
		6.3*8	21	2400	500
	390	5*9	28	2460	500
	470	5*10	28	2580	592
		5.5*9	28	2460	592
		6.3*7	28	2340	592
		6.3*8	21	2640	592
		6.3*7	28	2520	706
	560	6.3*8	28	2880	706
		5.5*9	28	2580	706
		6.3*9	28	3048	857
	680	5.5*9	28	2880	857
		8*9	28	2760	857
		6.3*9	28	3000	1033
	820	6.3*10	18	3100	1033
		8*9	21	2820	1033
		6.3*10	14	3090	1260
	1000	8*9	17	2880	1260
8*11		12	3120	1260	
6.3*11		14	3120	1512	
1200	8*11	14	3180	1512	
	8*11	14	3240	1890	
1500	10*12	14	3300	1890	
1800	10*10	14	3336	2268	
2200	8*14	14	3420	2772	
6.8 (7.8)	10*12	14	3480	2772	
	3300	10*14	14	3540	4158
	4700	10*17	14	3660	5000
	5600	10*18	14	3780	5000
	220	5*7	28	1980	500
7 (8)	270	5*7	28	2160	500
	330	5*8	28	2280	500
	470	6.3*5	35	1860	500
		5*9	28	2460	639
	560	6.3*7	28	2220	639
	680	6.3*8	28	2700	762
	820	6.3*9	28	2880	925
	1000	6.3*9	28	2940	1115
		6.3*11	17	3060	1360
	8*11	14	3090	1360	
150	5*6	42	900	500	
7.5 (8.6)	220	5*7	28	1920	500
	270	5*8	28	2040	500
	330	5*9	28	2160	500
	470	6.3*8	28	2280	658
		5.5*9	28	2160	658
	560	6.3*8	28	2400	784
	680	6.3*9	17	2520	952
	820	6.3*10	17	2700	1148
		8*9	17	2760	1148
	220	5*7	28	1860	500
10 (11.5)	270	5*8	28	1980	500
	330	5*9	28	2100	500
	390	5*9	28	2100	585
	470	6.3*7	35	1920	705
		5.5*9	28	2130	705
	500	5.5*9	28	2160	750
	560	6.3*8	28	2340	840
	680	6.3*9	17	2460	1020
		6.8*8	28	2400	1020
	820	6.3*10	17	2640	1230
		8*9	17	2730	1230
	1200	8*11	17	2880	1800
	47	5*7	49	1320	500
	56	5*7	49	1350	500
68	5*7	49	1380	500	
82	5*7	49	1410	500	
100	5*7	49	1440	500	

PT series

■ STANDARD RATINGS

VDC (SV)	Cap (μF)	Size ΦDxL(mm)	ESR (mΩ,20°C,100kHz)(max.)	Rated ripple current (mArms/125°C,100kHz)	Leakage Current (μA)(max.)
10 (11.5)	120	5*7	28	1470	500
	150	5*7	28	1500	500
	180	5*8	28	1620	500
	220	5*9	28	1692	500
		6.3*8	21	1896	500
	270	6.3*8	28	1860	540
	330	6.3*8	28	1980	660
		8*9	21	2040	660
	390	6.3*10	17	2100	660
		6.3*8	28	2040	780
	470	5.5*9	28	2040	940
		6.3*8	28	2100	940
		8*9	21	2130	940
	560	8*11	17	3390	940
		6.3*10	18	2160	1120
		8*9	21	2160	1120
	680	6.3*11	21	2280	1360
		8*11	17	2340	1360
	820	8*11	17	2400	1640
		8*11	17	2520	2000
1000	10*12	14	3180	2000	
1200	8*12	14	2700	2400	
	10*12	14	3270	2400	
1500	10*12	14	3300	3000	
1800	10*13	14	3480	3600	
2200	10*15	14	3660	4400	
3300	10*18	14	3720	5000	
12 (13.8)	220	4*10	21	1260	528
	330	5.5*9	28	1860	792
	470	5.5*9	28	1920	1128
		6.3*9	28	2070	1128
	560	6.3*10	21	2040	1344
		6.3*11	21	2160	1632
	680	8*10	21	2220	1632
		8*11	17	2280	1968
	1000	8*12	17	2400	2400
	1200	8*14	17	2640	2880
1500	8*16	17	2880	3600	
16 (18.4)	47	5*7	28	1230	500
	56	5*7	28	1260	500
	68	5*7	28	1290	500
	82	5*7	28	1320	500
		5*7	28	1350	500
	100	6.3*5	35	1260	500
		6.3*8	28	1680	500
	120	5*8	28	1410	500
	150	5*8	28	1440	500
		5*8	28	1470	576
	180	6.3*7	22	1500	576
		5*10	28	1560	704
		6.3*8	28	1620	704
	220	6.3*10	21	1740	704
		5.5*9	28	1650	864
		6.3*8	28	1680	864
	270	8*9	28	1740	864
		5.5*9	28	1740	1056
		6.3*9	28	1740	1056
	330	6.3*10	21	1860	1056
		5.5*10	28	1800	1504
		6.3*11	21	1860	1504
	470	8*11	15	2760	1504
		8*9	18	2460	1504
		8*11	15	1920	1792
	560	8*13	15	1980	1792
		10*12	15	2100	1792
		8*11	15	2040	2176
	680	10*12	15	2160	2176
		8*13	15	2100	2624
820	10*12	15	3060	2624	
	10*13	15	2400	3200	
1000	8*14	15	2160	3200	
1200	10*15	15	2580	3840	
1500	10*14	15	2880	4800	
	10*18	15	3300	4800	
1800	10*15	15	3240	5000	
2200	10*18	15	3480	5000	
3300	13*18	15	3660	5000	

Conductive Polymer Radial Type

PT series

■ STANDARD RATINGS

VDC (SV)	Cap (μF)	Size ΦDxL(mm)	ESR (mΩ,20°C,100kHz)(max.)	Rated ripple current (mA _{rms} /125°C,100kHz)	Leakage Current (μA)(max.)
20 (23)	33	5*8	56	1140	500
	39	5*8	56	1170	500
	47	5*8	56	1320	500
	56	5*9	56	1260	500
	68	6.3*8	42	1260	500
	82	6.3*8	42	1290	500
	100	6.3*8	42	1320	500
	120	6.3*8	42	1380	500
	150	6.3*10	28	1410	600
	180	8*9	42	1470	720
	220	8*11	28	1530	880
	270	8*11	28	1620	1080
	330	8*11	28	1680	1320
		6.3*11	28	1300	1320
	470	10*12	28	1740	1880
		8*11	28	1400	1880
	560	10*13	28	1860	2240
680	10*15	28	1980	2720	
	8*15	28	1600	2720	
820	10*18	28	2040	3280	
1000	10*18	28	2340	4000	
25 (29)	22	5*9	56	1100	500
	33	5*9	56	1110	500
	39	5*8	56	1140	500
	47	5*9	56	1170	500
	56	5*9	56	1230	500
	68	6.3*7	42	1260	500
	82	6.3*8	42	1290	500
		6.3*8	42	1320	500
	100	6.3*10	28	1380	500
		8*11	28	1470	500
	120	6.3*8	42	1380	600
	150	6.3*10	28	1410	750
	180	6.3*10	28	1450	900
		8*9	42	1470	900
	220	8*11	28	1530	1100
		10*12	28	1740	1100
	270	8*11	28	1620	1350
		8*11	28	1680	1650
	330	10*12	28	1860	1650
		10*10	28	1600	1650
	470	10*12	28	1680	2350
		8*16	28	1620	2350
	560	10*13	28	1800	2800
680	10*15	28	1920	3400	
	10*12	30	1700	3400	
820	10*18	28	1980	4100	
1000	10*18	28	2280	5000	

※ Specifications subject to change without notice.

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