SMD Aluminum Conductive Polymer Electrolytic Capacitors

APC Series



FEATURES

- Super Low ESR
- Long life
- 105°C, 15,000 hours
- RoHS compliant and Halogen-free

LEAD-FREE
LEAD-FREE COMPATIBLE COMPONENT

RoHS COMPLIANT

APPLICATIONS

- DC/DC Converter, Voltage Regulators, Decouping
- Applications for Computer Motherboards, etc.

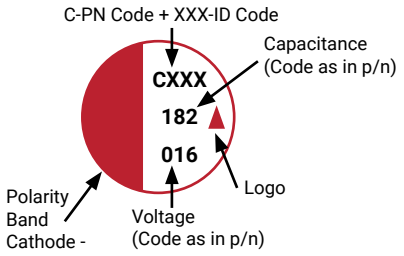
HOW TO ORDER

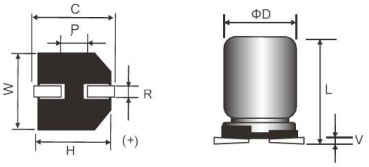
A	PC	1016	182	M	016	R	-
Product Type Aluminum	**Series Type**	**Case Size** See table below	**Capacitance Code** µF code: 1st two digits represent significant figures, 3rd digit represents multiplier (number of zeros to follow)	**Tolerance** M = ±20%	**Rated DC Voltage** 006 = 6.3Vdc 010 = 10Vdc 016 = 16Vdc 020 = 20Vdc 025 = 25Vdc 035 = 35Vdc 063 = 63Vdc 080 = 80Vdc 100 = 100Vdc	**Packaging** R = 15" Reel (Material details available upon request)	**Special** No Code = std

CASE DIMENSIONS millimeters (inches)

Code	D±0.50 (0.020)	L±0.50 (0.020)	W±0.20 (0.008)	H±0.20 (0.008)	C±0.20 (0.008)	R	P±0.30 (0.012)	V max	Typical Weight (g)
0506	5.00 (0.197)	6.00 (0.236)	5.30 (0.209)	5.30 (0.209)	6.00 (0.236)	0.50 - 0.80 (0.020 - 0.031)	1.40 (0.055)	0.30 (0.012)	0.20
0507	5.00 (0.197)	7.00 (0.276)	5.30 (0.209)	5.30 (0.209)	6.00 (0.236)	0.50 - 0.80 (0.020 - 0.031)	1.40 (0.055)	0.30 (0.012)	0.25
0606	6.30 (0.248)	6.00 (0.236)	6.60 (0.260)	6.60 (0.260)	7.30 (0.287)	0.50 - 0.90 (0.020 - 0.035)	2.00 (0.080)	0.30 (0.012)	0.32
0607	6.30 (0.248)	7.00 (0.276)	6.60 (0.260)	6.60 (0.260)	7.30 (0.287)	0.50 - 0.90 (0.020 - 0.035)	2.00 (0.080)	0.30 (0.012)	0.41
0608	6.30 (0.248)	7.70 (0.303)	6.60 (0.260)	6.60 (0.260)	7.30 (0.287)	0.50 - 0.90 (0.020 - 0.035)	2.00 (0.080)	0.30 (0.012)	0.41
0609	6.30 (0.248)	9.50 (0.374)	6.60 (0.260)	6.60 (0.260)	7.30 (0.287)	0.50 - 0.90 (0.020 - 0.035)	2.00 (0.080)	0.30 (0.012)	0.42
0807	8.00 (0.315)	7.00 (0.276)	8.30 (0.327)	8.30 (0.327)	9.00 (0.354)	0.70 - 1.10 (0.028 - 0.043)	3.20 (0.126)	0.30 (0.012)	0.53
0809	8.00 (0.315)	9.50 (0.374)	8.30 (0.327)	8.30 (0.327)	9.00 (0.354)	0.70 - 1.10 (0.028 - 0.043)	3.20 (0.126)	0.30 (0.012)	0.64
0812	8.00 (0.315)	12.00 (0.472)	8.30 (0.327)	8.30 (0.327)	9.00 (0.354)	0.70 - 1.10 (0.028 - 0.043)	3.20 (0.126)	0.30 (0.012)	0.84
1010	10.00 (0.394)	10.50 (0.413)	10.30 (0.406)	10.30 (0.406)	11.00 (0.433)	0.70 - 1.10 (0.028 - 0.043)	4.50 (0.177)	0.30 (0.012)	1.17
1012	10.00 (0.394)	12.50 (0.492)	10.30 (0.406)	10.30 (0.406)	11.00 (0.433)	0.70 - 1.10 (0.028 - 0.043)	4.50 (0.177)	0.30 (0.012)	1.46
1016	10.00 (0.394)	16.50 (0.650)	10.30 (0.406)	10.30 (0.406)	11.00 (0.433)	0.70 - 1.10 (0.028 - 0.043)	4.50 (0.177)	0.30 (0.012)	2.04

MARKING





TECHNICAL SPECIFICATIONS

Category Temperature Range:	-55°C to +105°C	
Capacitance Range	At 25°C,120Hz	10µF to 1800µF
Capacitance Tolerance:		±20%
Surge Voltage:	At 105°C	Rated voltage x 1.15
Dissipation Factor (%)	Measurement Frequency: 120Hz at 25°C	Please see the ratings and part number reference table below
Leakage Current:	After 2 minutes at rated working voltage at 25°C*	I ≦ 0.2CV or 300µA, whichever is greater

* Note: In the case of an anomalous reading, re-measure the leakage current after following voltage treatment:
Voltage treatment: DC rated voltage to be applied to the capacitors for 120 minutes at 105°C.

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CAPACITANCE AND RATED VOLTAGE RANGE (FIGURES DENOTES CASE SIZE)

Capacitance		Rated Voltage DC (V_R)								
µF	Code	6.3V	10V	16V	20V	25V	35V	63V	80V	100V
10	100					0606				
22	220								0812	0812
39	390			0606						
47	470				0506	0606			1012	1012
56	560					0606				
68	680						0609			
100	101			0606				1012		
120	121	0606	0507							
150	151		0608					1012		
180	181			0607						
220	221	0507	0609	0609, 0807, 0809	0809	0812, 1010				
330	331			0809	0809	1010				
390	391				0809					
470	471	0609	0809	0809		1012				
560	561	0809		0809, 0812	1010					
820	821			1010						
1000	102	0809		1010, 1012						
1800	182			1016						

Released ratings

RATINGS & PART NUMBER REFERENCE

Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	DCL Max. (µA)	DF Max. (%)	ESR Max. @100kHz (mΩ)	100kHz RMS Current (mA)/105°C
6.3 Volt							
APC0606121M006R	0606	120	6.3	300	12	27	2400
APC0507221M006R	0507	220	6.3	300	12	20	1600
APC0609471M006R	0609	470	6.3	592	12	20	3200
APC0809561M006R	0809	560	6.3	705	12	15	4400
APC0809102M006R	0809	1000	6.3	1260	12	15	4520
10 Volt							
APC0507121M010R	0507	120	10	300	12	25	2400
APC0608151M010R	0608	150	10	300	12	24	2450
APC0609221M010R	0609	220	10	440	12	20	3200
APC0809471M010R	0809	470	10	940	12	18	4100
16 Volt							
APC0606390M016R	0606	39	16	300	12	24	2100
APC0606101M016R	0606	100	16	320	12	24	2400
APC0607181M016R	0607	180	16	576	12	24	2800
APC0609221M016R	0609	220	16	704	12	15	3200
APC0807221M016R	0807	220	16	704	12	22	3100
APC0809221M016R	0809	220	16	704	12	20	4200
APC0809331M016R	0809	330	16	1056	12	20	4400
APC0809471M016R	0809	470	16	1504	12	25	4400
APC0809561M016R	0809	560	16	1792	12	25	4400
APC0812561M016R	0812	560	16	1792	12	16	4820
APC1010821M016R	1010	820	16	2624	12	18	5200
APC1010102M016R	1010	1000	16	3200	12	18	5200
APC1012102M016R	1012	1000	16	3200	12	16	5400
APC1016182M016R	1016	1800	16	5760	12	8	6400
20 Volt							
APC0506470M020R	0506	47	20	300	12	60	1300
APC0809221M020R	0809	220	20	880	12	30	1800
APC0809331M020R	0809	330	20	1320	12	30	1890
APC0809391M020R	0809	390	20	1560	12	28	2200
APC1010561M020R	1010	560	20	2240	12	28	3320
25 Volt							
APC0606100M025R	0606	10	25	300	12	60	1200
APC0606470M025R	0606	47	25	300	12	40	1200
APC0606560M025R	0606	56	25	300	12	40	1450
APC0812221M025R	0812	220	25	1100	12	32	3500
APC1010221M025R	1010	220	25	1100	12	35	3800
APC1010331M025R	1010	330	25	1650	12	35	3800
APC1012471M025R	1012	470	25	2350	12	32	4000
35 Volt							

All technical data relates to an ambient temperature of +25C. Capacitance and DF are measured at 120Hz, 0.5RMS with DC bias of 2.2 volts.
DCL is measured at rated voltage after 5 minutes.

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Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	DCL Max. (µA)	DF Max. (%)	ESR Max. @100kHz (mΩ)	100kHz RMS Current (mA)/105°C
APC0609680M035R	0609	68	35	476	12	50	2300
63 Volt							
APC1012101M063R	1012	100	63	1260	12	28	2550
APC1012151M063R	1012	150	63	1890	12	28	2550
80 Volt							
APC0812220M080R	0812	22	80	352	12	40	2100
APC1012470M080R	1012	47	80	752	12	30	2500
100 Volt							
APC0812220M100R	0812	22	100	440	12	45	2000
APC1012470M100R	1012	47	100	940	12	35	2300

All technical data relates to an ambient temperature of +25C. Capacitance and DF are measured at 120Hz, 0.5RMS with DC bias of 2.2 volts.
DCL is measured at rated voltage after 5 minutes.

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency	120Hz ≦ F(Hz) < 1K	1K ≦ F(Hz) < 10K	10K ≦ F(Hz) < 100K	100K(Hz) ≦ F < 500K
Coefficient	0.05	0.30	0.70	1.00

QUALIFICATION TABLE

Test	APC Series (Temperature range -55°C to +105°C)		
	Condition	Characteristics	
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 15,000 hours at 105°C.	**Visual examination**	no visible damage
		ΔC/C	≦ ±20% of the initial limit
		DF	≦ 150% of the initial specified limit
		ESR	≦ 150% of the initial specified limit
		DCL	≦ Initial specified limit or less
Damp Heat (Steady State)	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjection them to store at 60°C, 90 to 95% RH for 1000 hours, without DC applied.	**Visual examination**	no visible damage
		ΔC/C	≦ ±20% of the initial limit
		DF	≦ 150% of the initial specified limit
		ESR	≦ 150% of the initial specified limit
		DCL	≦ Initial specified limit or less
Surge Voltage	The capacitors shall be subjected to 1000 cycles each consisting of charge with the surge voltages specified at 105°C for 30 seconds. Through a protective resistor (R = 1kΩ) and discharge for 5 minutes 30 seconds.	**Visual examination**	no visible damage
		ΔC/C	≦ ±20% of the initial limit
		DF	≦ 150% of the initial specified limit
		ESR	≦ 150% of the initial specified limit
		DCL	≦ Initial specified limit or less

REFLOW

Peak Temperature	260°C, 10+1 sec.	250°C, 10+1 sec.
Preheat Temperature	150°C to 180°C, 90 ±3 sec.	
Duration at 200°C or higher	60 sec. max.	60 sec. max.
Duration at 220°C or higher	50 sec. max.	50 sec. max.
Duration at 230°C or higher	40 sec. max.	40 sec. max.
Reflow Number	Once	Twice or less

STORAGE

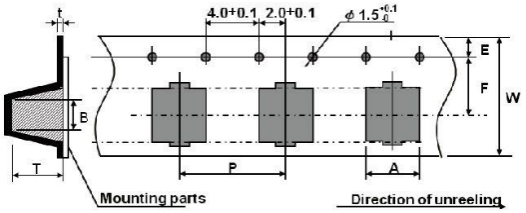
1. It is recommended to keep capacitors between the ambient temperatures of 5°C to 35°C (if between 35°C to 85°C, it should be less than three months) and the relative humidity of 75% or below.
2. Confirm that the environment does not have any of the following conditions:
   - Damp conditions such as water, saltwater spray, oil spray or fumes. High humidity or humidity condensation situations.
   - In an atmosphere filled with toxic gasses (such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, ammonia, etc.).
   - Being exposed to direct sunlight, ozone, ultraviolet ray, or radiation.
   - Being exposed to acidic or alkaline solutions.
   - Under severe conditions where vibration and / or mechanical shock exceed the applicable ranges of the specification.
3. Shelf life

Years		
0-1	**1-2**	**>2**
Ok	Ok	Performance check

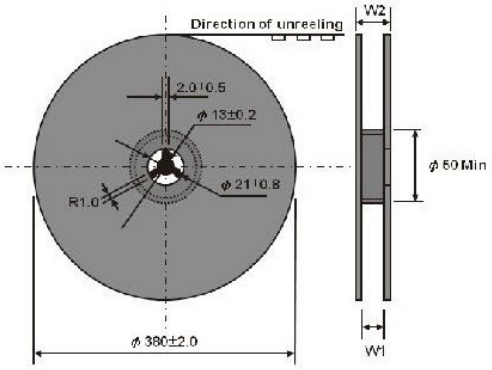
- Years from manufacturing date code.
- KYOCERA AVX does not guarantee or assume responsibility for product behavior after 3 years of storage.
- Ageing procedure should be performed as follows:
  - Connect the capacitor in series to a 1kΩ resistor, and apply half rated voltage for 2 hours.
  - After half rated voltage for 2 hours applied, increase and apply rated voltage for another 2 hours.

PACKAGE TAPE DIMENSIONS units (mm)

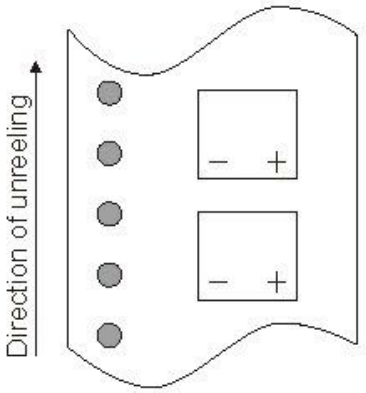
Size Code	A±0.20	B±0.20	W±0.30	F±0.10	E±0.10	P±0.10	t±0.10	T±0.20
0506	5.7	5.7	12.0	5.5	1.75	12.0	0.4	7.5
0507	5.7	5.7	12.0	5.5	1.75	12.0	0.4	7.5
0606	7.0	7.0	16.0	7.5	1.75	12.0	0.4	6.5
0607	7.0	7.0	16.0	7.5	1.75	12.0	0.4	8.2
0608	7.0	7.0	16.0	7.5	1.75	12.0	0.4	8.2
0609	7.0	7.0	16.0	7.5	1.75	12.0	0.4	10.0
0807	8.7	8.7	24.0	11.5	1.75	16.0	0.4	8.8
0809	8.7	8.7	24.0	11.5	1.75	16.0	0.4	11.0
0812	8.7	8.7	24.0	11.5	1.75	16.0	0.4	13.0
1010	10.7	10.7	24.0	11.5	1.75	16.0	0.4	11.0
1012	10.7	10.7	24.0	11.5	1.75	16.0	0.4	13.0-13.5
1016	10.7	10.7	24.0	11.5	1.75	16.0	0.4	17.5



REEL



POLARITY

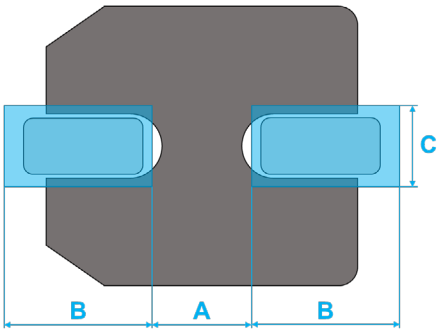


DIMENSIONS UNITS (MM)

Size Code	W1±1.00	W2±1.00	Qty./Reel
0506	14.0	18.0	1000
0507	14.0	18.0	1000
0606-0607	18.0	22.0	1000
0608	18.0	22.0	1000
0609	18.0	22.0	800
0807-0809	26.0	30.0	500
1010	26.0	30.0	500
0812-1012	26.0	30.0	400
1016	26.0	30.0	300

RECOMMENDED LAND PATTERN DIMENSION OF PCB

Size Code	A (mm)	B (mm)	C (mm)
0506	1.4	3.0	1.6
0507	1.4	3.0	1.6
0606	1.9	3.5	1.6
0607	1.9	3.5	1.6
0608	1.9	3.5	1.6
0609	1.9	3.5	1.6
0807	3.1	4.2	2.2
0809	3.1	4.2	2.2
0812	3.1	4.2	2.2
1010	4.5	4.4	2.2
1012	4.5	4.4	2.2
1016	4.5	4.4	2.2



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