

SMD Aluminum Conductive Polymer Electrolytic Capacitors

APZ Series



FEATURES

- Endurance: 2000 hours at 105°C
- Standard Substance
- RoHS compliant

APPLICATIONS

- Displace Card and System Board

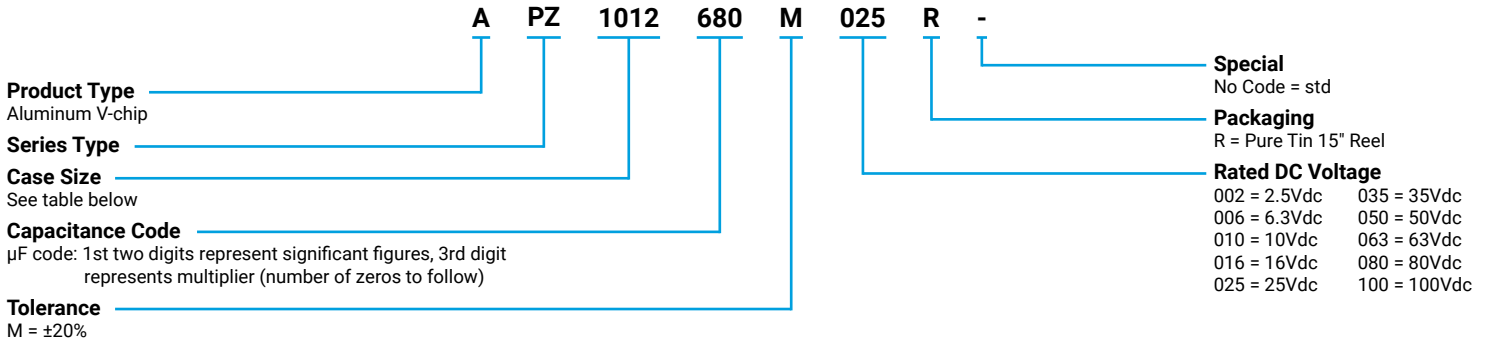


LEAD-FREE
LEAD-FREE COMPATIBLE
COMPONENT



RoHS
COMPLIANT

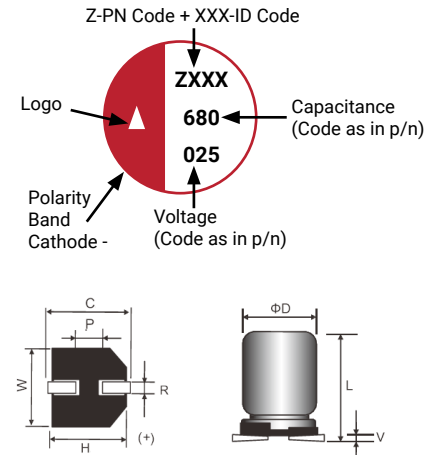
HOW TO ORDER



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)
0604	6.30 (0.248)	4.50 (0.177)	6.60 (0.260)	6.60 (0.260)	7.30 (0.287)	0.50-0.80 (0.020-0.031)	2.00 (0.080)	0.30 (0.012)	0.23
0606	6.30 (0.248)	6.00 (0.236)	6.60 (0.260)	6.60 (0.260)	7.30 (0.287)	0.50-0.80 (0.020-0.031)	2.00 (0.080)	0.30 (0.012)	0.28
0609	6.30 (0.248)	9.30 (0.366)	6.60 (0.260)	6.60 (0.260)	7.30 (0.287)	0.50-0.80 (0.020-0.031)	2.00 (0.080)	0.30 (0.012)	0.40
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)	0.68
0811	8.00 (0.315)	11.50 (0.453)	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)	0.80
1012	10.00 (0.394)	12.50 (0.492)	10.30 (0.406)	10.30 (0.406)	11.00 (0.433)	0.70-1.30 (0.028-0.051)	4.50 (0.177)	0.30 (0.012)	1.28

MARKING



TECHNICAL SPECIFICATIONS

Category Temperature Range:	-55°C to + 105°C	
Capacitance Range	At 25°C, 120Hz	15µF to 2200µF
Capacitance Tolerance:	At 25°C, 120Hz	±20%
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 500µA, 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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TDS-ALUM-0012 | Rev 3

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CAPACITANCE AND RATED VOLTAGE RANGE (FIGURES DENOTES CASE SIZE)

Capacitance		Rated Voltage DC (V _R)									
μF	Code	2.5V	6.3V	10V	16V	25V	35V	50V	63V	80V	100V
22	220					0604, 0606	0606	0606	0606		0811
27	270					0606	0606			0811	
33	330					0604	0606	0606	0609		
47	470				0604, 0606	0604, 0606, 0609	0606, 0609	0609	0809	1012	1012
56	560					0604, 0606			0811		
68	680				0606	0604, 0606	0606, 0609	0811		1012	
82	820							0811, 1012			
100	101			0604	0604, 0606	0604, 0606, 0609	0609, 0809, 0811	0811, 1012	1012		
120	121			0606	0604			0811			
150	151				0606, 0609	0609	0811	1012			
180	181				0606, 0609						
220	221	0604	0604, 0606	0606, 0609	0609	0609, 0811	0811	1012			
270	271		0606		0609, 0809		0811, 1012				
330	331	0604, 0606	0606	0609	0609, 0811, 1012	0811, 1012	1012				
390	391	0606									
470	471	0606	0609	0609, 0809		0811, 1012	1012				
560	561	0606	0609	0811, 1012	0811	1012					
680	681	0609			1012	1012					
1000	102		0811	0811, 1012	1012						
1500	152		0811	1012							
2200	222		1012								

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
2.5 Volt							
APZ0604221M002R	0604	220	2.5	500	8	20	2700
APZ0604331M002R	0604	330	2.5	500	8	20	2700
APZ0606331M002R	0606	330	2.5	500	8	20	2700
APZ0606391M002R	0606	390	2.5	500	8	20	2800
APZ0606471M002R	0606	470	2.5	500	8	20	2900
APZ0606561M002R	0606	560	2.5	500	8	20	3000
APZ0609681M002R	0609	680	2.5	500	8	15	4300
6.3 Volt							
APZ0604221M006R	0604	220	6.3	500	8	20	2700
APZ0606221M006R	0606	220	6.3	500	8	20	2800
APZ0606271M006R	0606	270	6.3	500	8	20	3000
APZ0606331M006R	0606	330	6.3	500	8	20	2100
APZ0609471M006R	0609	470	6.3	592	8	15	3500
APZ0609561M006R	0609	560	6.3	706	8	15	3700
APZ0811102M006R	0811	1000	6.3	1260	8	15	4300
APZ0811152M006R	0811	1500	6.3	1890	8	15	4400
APZ1012222M006R	1012	2200	6.3	2772	8	15	5600
10 Volt							
APZ0604101M010R	0604	100	10	500	12	50	2500
APZ0606121M010R	0606	120	10	500	12	30	2700
APZ0606221M010R	0606	220	10	500	12	30	2700
APZ0609221M010R	0609	220	10	500	12	20	3000
APZ0609331M010R	0609	330	10	660	12	20	3100
APZ0609471M010R	0609	470	10	940	12	30	3400
APZ0809471M010R	0809	470	10	940	12	22	3400
APZ0811561M010R	0811	560	10	1120	12	20	3600

All technical data relates to an ambient temperature of +25°C. 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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APZ Series



Part No.	Case Size	Capacitance (μF)	Rated Voltage (V)	DCL Max. (μA)	DF Max. (%)	ESR Max. @100kHz (mΩ)	100kHz RMS Current (mA)/105°C
APZ1012561M010R	1012	560	10	1120	12	20	5000
APZ0811102M010R	0811	1000	10	2000	12	15	4200
APZ1012102M010R	1012	1000	10	2000	12	15	4400
APZ1012152M010R	1012	1500	10	3000	12	15	4400
16 Volt							
APZ0604470M016R	0604	47	16	500	12	50	2000
APZ0606470M016R	0606	47	16	500	12	40	1700
APZ0606680M016R	0606	68	16	500	12	40	2000
APZ0604101M016R	0604	100	16	500	12	50	2000
APZ0606101M016R	0606	100	16	500	12	30	2400
APZ0604121M016R	0604	120	16	500	12	50	2000
APZ0606151M016R	0606	150	16	500	12	30	2400
APZ0609151M016R	0609	150	16	500	12	25	2600
APZ0606181M016R	0606	180	16	576	12	60	2500
APZ0609181M016R	0609	180	16	576	12	25	2700
APZ0609221M016R	0609	220	16	704	12	25	2500
APZ0609271M016R	0609	270	16	864	12	25	2600
APZ0809271M016R	0809	270	16	864	12	25	2800
APZ0609331M016R	0609	330	16	1056	12	25	2600
APZ0811331M016R	0811	330	16	1056	12	20	4000
APZ1012331M016R	1012	330	16	1056	12	20	5000
APZ0811561M016R	0811	560	16	1792	12	20	3500
APZ1012681M016R	1012	680	16	2176	12	20	4000
APZ1012102M016R	1012	1000	16	3200	12	20	4100
25 Volt							
APZ0604220M025R	0604	22	25	500	12	100	400
APZ0606220M025R	0606	22	25	500	12	80	1600
APZ0606270M025R	0606	27	25	500	12	50	1100
APZ0604330M025R	0604	33	25	500	12	100	400
APZ0604470M025R	0604	47	25	500	12	100	400
APZ0606470M025R	0606	47	25	500	12	50	1800
APZ0609470M025R	0609	47	25	500	12	35	2000
APZ0604560M025R	0604	56	25	500	12	60	1000
APZ0606560M025R	0606	56	25	500	12	50	1800
APZ0604680M025R	0604	68	25	500	12	60	900
APZ0606680M025R	0606	68	25	500	12	50	1800
APZ0604101M025R	0604	100	25	500	12	60	1000
APZ0606101M025R	0606	100	25	500	12	50	2100
APZ0609101M025R	0609	100	25	500	12	30	2400
APZ0609151M025R	0609	150	25	750	12	30	2500
APZ0609221M025R	0609	220	25	1100	12	30	2500
APZ0811221M025R	0811	220	25	1100	12	30	2600
APZ0811331M025R	0811	330	25	1650	12	30	2700
APZ1012331M025R	1012	330	25	1650	12	22	2800
APZ0811471M025R	0811	470	25	2350	12	30	2800
APZ1012471M025R	1012	470	25	2350	12	22	3100
APZ1012561M025R	1012	560	25	2800	12	22	3300
APZ1012681M025R	1012	680	25	3400	12	22	3300
35 Volt							
APZ0606220M035R	0606	22	35	500	12	60	1100
APZ0606270M035R	0606	27	35	500	12	60	1100
APZ0606330M035R	0606	33	35	500	12	60	1100
APZ0606470M035R	0606	47	35	500	12	45	1100
APZ0609470M035R	0609	47	35	500	12	50	1500
APZ0606680M035R	0606	68	35	500	12	45	1100
APZ0609680M035R	0609	68	35	500	12	40	1800
APZ0609101M035R	0609	100	35	700	12	40	2100
APZ0809101M035R	0809	100	35	700	12	40	2800
APZ0811101M035R	0811	100	35	700	12	30	3000
APZ0811151M035R	0811	150	35	1050	12	30	3000
APZ0811221M035R	0811	220	35	1540	12	30	2400
APZ0811271M035R	0811	270	35	1890	12	30	2500

All technical data relates to an ambient temperature of +25°C. 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
APZ1012271M035R	1012	270	35	1890	12	30	2700
APZ1012331M035R	1012	330	35	2310	12	30	2700
APZ1012471M035R	1012	470	35	3290	12	30	3000
50 Volt							
APZ0606220M050R	0606	22	50	500	12	80	800
APZ0606330M050R	0606	33	50	500	12	80	850
APZ0609470M050R	0609	47	50	500	12	60	1400
APZ0811680M050R	0811	68	50	680	12	30	2000
APZ0811820M050R	0811	82	50	820	12	30	2000
APZ1012820M050R	1012	82	50	820	12	30	2000
APZ0811101M050R	0811	100	50	1000	12	30	2000
APZ1012101M050R	1012	100	50	1000	12	30	2100
APZ0811121M050R	0811	120	50	1200	12	30	2000
APZ1012151M050R	1012	150	50	1500	12	30	2100
APZ1012221M050R	1012	220	50	2200	12	30	2300
63 Volt							
APZ0606220M063R	0606	22	63	500	12	80	450
APZ0609330M063R	0609	33	63	500	12	60	500
APZ0809470M063R	0809	47	63	592	12	60	1000
APZ0811560M063R	0811	56	63	706	12	40	1400
APZ1012101M063R	1012	100	63	1260	12	40	1600
80 Volt							
APZ0811270M080R	0811	27	80	500	12	50	600
APZ1012470M080R	1012	47	80	752	12	50	900
APZ1012680M080R	1012	68	80	1088	12	50	900
100 Volt							
APZ0811220M100R	0811	22	100	500	15	50	600
APZ1012470M100R	1012	47	100	940	15	50	900

All technical data relates to an ambient temperature of +25°C. 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) < 1kHz	1kHz ≤ F(Hz) < 10kHz	10kHz ≤ F(Hz) < 100kHz	100kHz ≤ F(Hz) < 500kHz
Coefficient	0.05	0.30	0.70	1.00

QUALIFICATION TABLE

Test	APZ 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 2000 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
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 2000 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
Surge Voltage	The capacitors shall be subjected to 1000 cycles each consisting of charge with the surge voltages specified at normal temperature 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

REFLOW

Peak Temperature	260°C, 10 sec. max.
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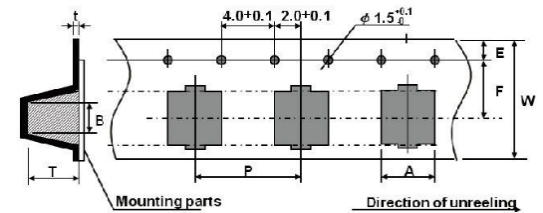
Preheat Temperature	150°C to 180°C, 90 sec. max.
Duration at 200°C or higher	60 sec. max.
Duration at 230°C or higher	40 sec. max.
Reflow Number	Twice or less

STORAGE

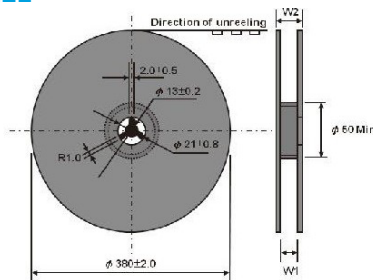
- It is recommended to keep capacitors between the ambient temperatures of 5°C to 35°C (If between 35 to 85°C, it should be less than three months), and the relative humidity of 75% or below.
- Confirm that the environment does not have any of the following conditions:
 - Damp conditions such as water, saltwater spray, or oil spray or fumes. High humidity or humidity condensation situations.
 - In an atmosphere filled with toxic gases (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.
- Storage Time
 - Before unseal: within 1 year after delivery
 - After seal: within 1 month from opening

PACKAGE TAPE DIMENSIONS units (mm)

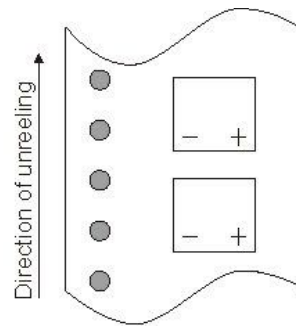
Size Code	A±0.20	B±0.20	W±0.30	F±0.10	E±0.10	P±0.10	t±0.10	T±0.20
0604	7.0	7.0	16.0	7.5	1.75	12.0	0.4	8.0
0606	7.0	7.0	16.0	7.5	1.75	12.0	0.4	8.0
0609	7.0	7.0	16.0	7.5	1.75	12.0	0.4	10.0
0809	8.7	8.7	24.0	11.5	1.75	16.0	0.4	10.5
0811	8.7	8.7	24.0	11.5	1.75	16.0	0.4	12.0
1012	10.7	10.7	24.0	11.5	1.75	16.0	0.4	13.0-13.5



REEL



POLARITY

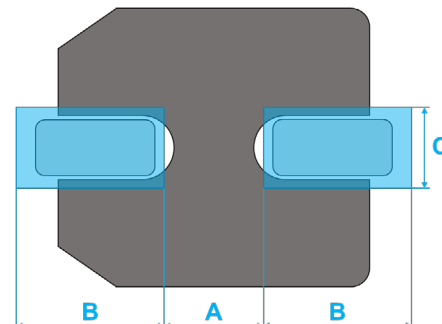


DIMENSIONS units (mm)

Size Code	W1±1.00	W2±1.00	Qty./Reel
0604	18.0	22.0	1200
0606	18.0	22.0	1000
0609	18.0	22.0	800
0809	26.0	30.0	600
0811	26.0	31.0	500
1012	26.0	31.0	500

RECOMMENDED LAND PATTERN DIMENSION OF PCB

Size Code	A (mm)	B (mm)	C (mm)
0604	1.9	3.5	1.6
0606	1.9	3.5	1.6
0609	1.9	3.5	1.6
0809	3.1	4.2	2.2
0811	3.1	4.2	2.2
1012	4.5	4.4	2.2



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