Wire Wound Chip Common Mode Choke

APCW Series

FEATURES 特征

- Winding type realizes small size and low frofile..
  绕线结构，小尺寸
- Prevention of common mode noise at high frequency.
  对高频共模噪声有良好的抑制作用
- 22~2800Ω are optional for different noise level and signal frequency.
  对不同的噪声水平和信号频率，有 22Ω~2800Ω 可供选择
- Operating Temp：-40℃~+125℃(Including self heating).
  工作温度范围:-40℃~+125℃(包括自身温度上升)

RoHS Reach SVHC-Free Halogen Free



APPLICATIONS 用途

- USB2.0 of PC, peripheral equipments, small digital AV equipments, etc.
  PC机及周边设备、数字 AV 等其他设备的 USB2.0接口
- LVDS lines of Note PC, LCD.
  笔记本电脑、LCD的LVDS线
- Audio lines.
  音频线路

PART NUMBERING 产品型号

APCW	2012	-	900	P	2	T
①	②		③	④	⑤	⑥

① Series Name	
APCW	Wire Wound Chip Common Mode Choke

② External Dimensions
1608[0603]
2012[0805]
2520[1008]
3216[1206]
3225[1210]
4532[1812]

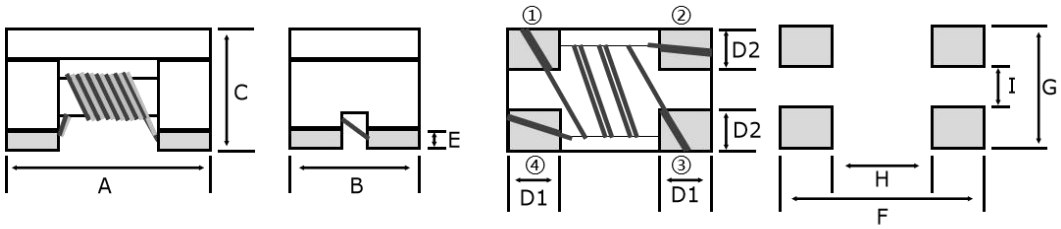
③ Nominal Impedance	
Code (example)	Nominal Impedance［Ω］
900	90
121	120
102	1000

④ Impedance Tolerance	
Code (example)	Impedance Tolerance
P	±25%
N	±30%

⑤ Number of Lines
2

⑥ Packaging	
T	Tape & Reel

DIMENSIONS & RECOMMENDED LAND PATTERN 尺寸及推荐焊盘

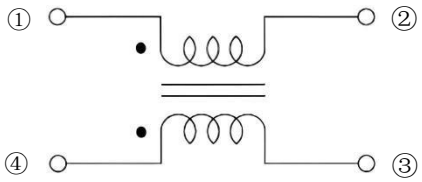


Recommended Land Pattern

Unit: mm

Dimensions							Recommended Land Pattern			
Series	A	B	C	E	D1	D2	F	G	I	H
					Typ.		Typ.			
APCW1608	1.60±0.1	0.80±0.1	1.10±0.1	0.1 Max.	0.25	0.33	1.89	0.85	0.25	0.73
APCW2012	2.00±0.2	1.20±0.2	1.20±0.2	0.2 ±0.1	0.46	0.55	2.60	1.25	0.40	0.80
APCW2520	2.50±0.2	2.00±0.2	1.20±0.2	0.2 Typ.	0.60	0.45	3.20	2.20	0.60	1.20
APCW3216	3.20±0.2	1.60±0.2	1.90±0.2	0.2 Typ.	0.60	0.70	3.50	1.90	0.40	1.70
APCW3225	3.20±0.2	2.50±0.2	2.15±0.2	0.2 Typ.	0.90	0.80	4.00	2.80	0.60	1.60
APCW4532	4.50±0.2	3.20±0.2	2.80±0.2	0.2 Typ.	1.20	1.00	4.80	3.80	0.70	2.40

EQUIVALET CIRCUIT 等效电路



ELECTRICAL CHARACTERISTICS 特性规格表

● APCW1608 Series

Part Number	Impedance @100MHz, 1V	Heat Rating Current	DC Resistance	Rated Voltage	Insulation Resistance
		Max.	Max.		Min.
Unit	Ω	mA	Ω	Volts	MΩ
Symbol	Z	Irms	DCR	VDC	IR
APCW1608-220P2T	22	500	0.11	20	10
APCW1608-250P2T	25	500	0.1	20	10
APCW1608-600P2T	60	350	0.2	20	10
APCW1608-900P2T	90	300	0.25	20	10
APCW1608-121P2T	120	300	0.25	20	10
APCW1608-141P2T	140	300	0.25	20	10
APCW1608-201P2T	200	300	0.25	20	10
APCW1608-221P2T	220	300	0.25	20	10
APCW1608-251P2T	250	280	0.28	20	10

ELECTRICAL CHARACTERISTICS 特性规格表

APCW2012 Series

Part Number	Impedance @100MHz, 1V	Heat Rating Current	DC Resistance	Insulation Resistance	Rated Voltage
		Max.	Max.	Min.	
Unit	Ω	mA	Ω	MΩ	Volts
Symbol	Z	Irms	DCR	IR	VDC
APCW2012-300P2T	30	400	0.15	10	50
APCW2012-500P2T	50	400	0.25	10	50
APCW2012-670P2T	67	400	0.25	10	50
APCW2012-900P2T	90	400	0.3	10	50
APCW2012-121P2T	120	370	0.3	10	50
APCW2012-181P2T	180	330	0.35	10	50
APCW2012-221P2T	220	300	0.4	10	50
APCW2012-261P2T	260	300	0.4	10	50
APCW2012-361P2T	360	280	0.45	10	50
APCW2012-601P2T	600	220	0.6	10	50
APCW2012-801P2T	800	300	0.88	10	50
APCW2012-901P2T	900	150	0.9	10	50
APCW2012-102P2T	1000	150	1.3	10	50

APCW2520 Series

Part Number	Impedance @100MHz, 1V	Heat Rating Current	DC Resistance	Insulation Resistance	Rated Voltage
		Max.	Max.	Min.	
Unit	Ω	mA	Ω	MΩ	Volts
Symbol	Z	Irms	DCR	IR	VDC
APCW2520-301P2T	300	400	0.2	10	50
APCW2520-451P2T	450	350	0.3	10	50
APCW2520-601P2T	600	330	0.38	10	50
APCW2520-102P2T	1000	240	0.5	10	50

APCW3216 Series

Part Number	Impedance @100MHz, 1V	Heat Rating Current	DC Resistance	Insulation Resistance	Rated Voltage
		Max.	Max.	Min.	
Unit	Ω	mA	Ω	MΩ	Volts
Symbol	Z	Irms	DCR	IR	VDC
APCW3216-900P2T	90	370	0.3	10	50
APCW3216-121P2T	120	350	0.3	10	50
APCW3216-161P2T	160	340	0.4	10	50
APCW3216-221P2T	220	300	0.45	10	50
APCW3216-261P2T	260	310	0.5	10	50
APCW3216-361P2T	360	300	0.6	10	50
APCW3216-601P2T	600	260	0.8	10	50

ELECTRICAL CHARACTERISTICS 特性规格表

- APCW3216 Series

Part Number	Impedance @100MHz, 1V	Heat Rating Current	DC Resistance	Insulation Resistance	Rated Voltage
		Max.	Max.	Min.	
Unit	Ω	mA	Ω	MΩ	Volts
Symbol	Z	Irms	DCR	IR	VDC
APCW3216-801P2T	800	240	0.9	10	50
APCW3216-102P2T	1000	230	1	10	50
APCW3216-142P2T	1400	220	1	10	50
APCW3216-202P2T	2000	200	1.2	10	50
APCW3216-222P2T	2200	200	1.2	10	50

- APCW3225 Series

Part Number	Impedance @100MHz, 1V	Heat Rating Current	DC Resistance	Insulation Resistance	Rated Voltage
		Max.	Max.	Min.	
Unit	Ω	mA	Ω	MΩ	Volts
Symbol	Z	Irms	DCR	IR	VDC
APCW3225-800P2T	80	640	0.12	10	50
APCW3225-900P2T	90	1000	0.12	10	50
APCW3225-161P2T	160	480	0.15	10	50
APCW3225-271P2T	270	450	0.25	10	50
APCW3225-501P2T	500	1000	0.3	10	50
APCW3225-601P2T	600	1000	0.2	10	50
APCW3225-801P2T	800	350	0.35	10	50
APCW3225-102P2T	1000	480	0.35	10	50

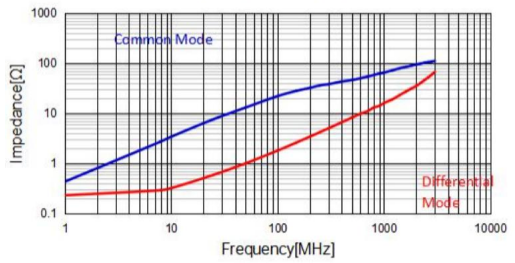
- APCW4532 Series

Part Number	Impedance @100MHz, 1V	Heat Rating Current	DC Resistance	Insulation Resistance	Rated Voltage
		Max.	Max.	Min.	
Unit	Ω	mA	Ω	MΩ	Volts
Symbol	Z	Irms	DCR	IR	VDC
APCW4532-800P2T	80	2300	0.05	10	50
APCW4532-900P2T	90	2000	0.085	10	50
APCW4532-121P2T	120	1400	0.1	10	50
APCW4532-201P2T	200	1500	0.1	10	50
APCW4532-221P2T	220	1300	0.1	10	50
APCW4532-331P2T	330	1100	0.11	10	50
APCW4532-601P2T	600	1400	0.12	10	50
APCW4532-701P2T	700	1500	0.12	10	50
APCW4532-801P2T	800	1000	0.16	10	50
APCW4532-901P2T	900	1000	0.17	10	50
APCW4532-102P2T	1000	1000	0.18	10	50
APCW4532-142P2T	1400	700	0.2	10	50
APCW4532-282P2T	2800	900	0.35	10	50

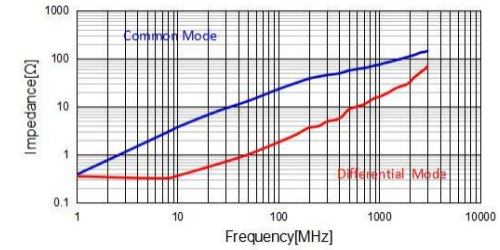
- Rating DC current: Temperature rise(△T) is 40℃ approximately at Irms.
- Storage temp.: -10℃ ~ +40℃ , R.H.: 60% Max.
- Moisture sensitivity level (MSL)： 1 .

CHARACTERISTICS(REFERENCE) 特征曲线

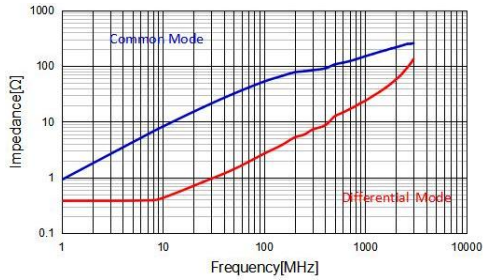
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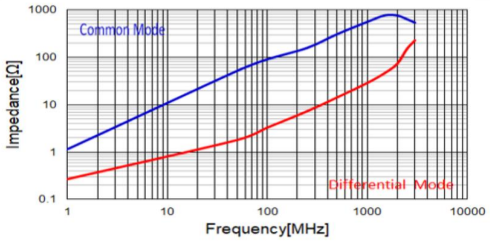
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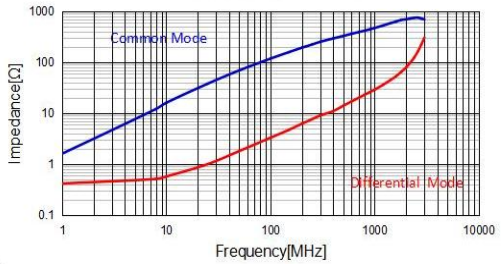
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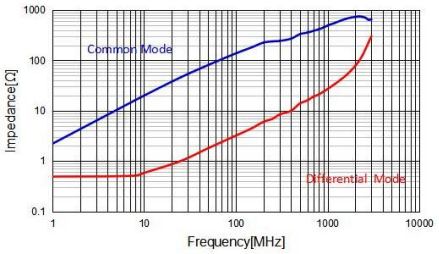
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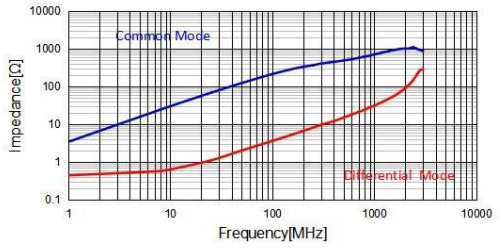
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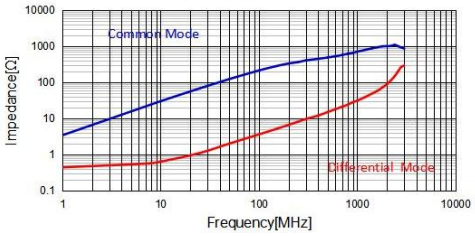
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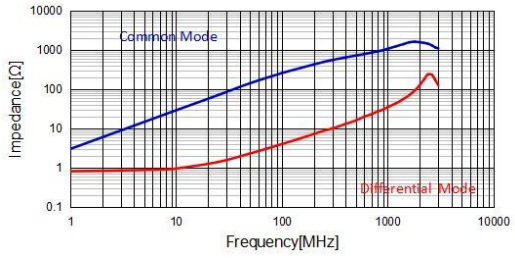
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APCW1608-221P2T

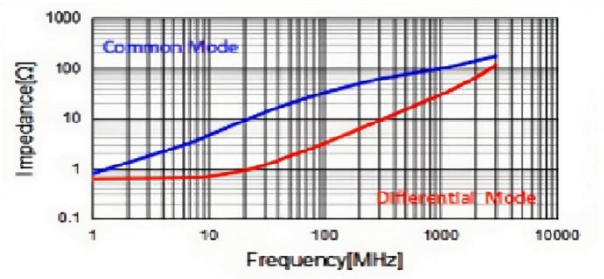


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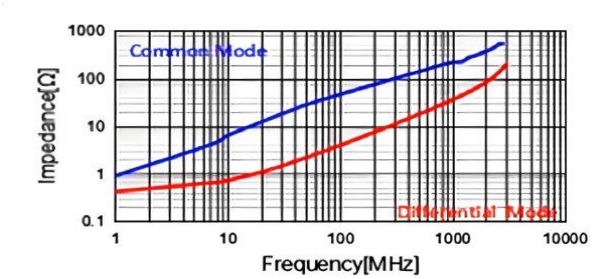


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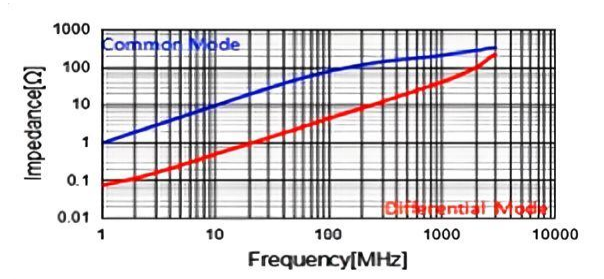
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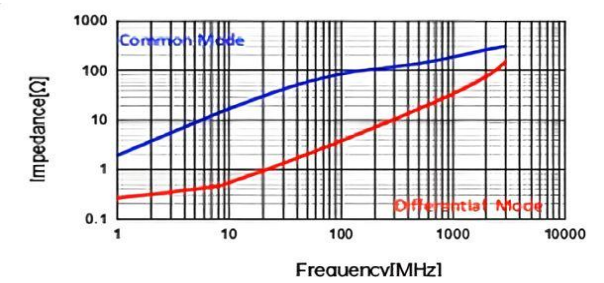
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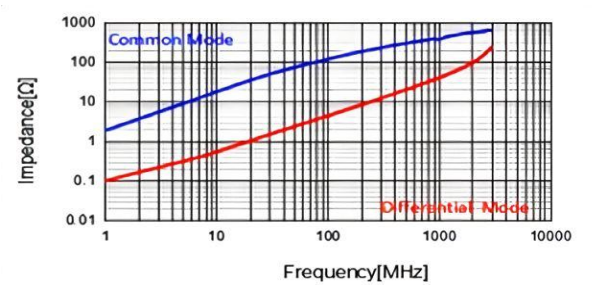
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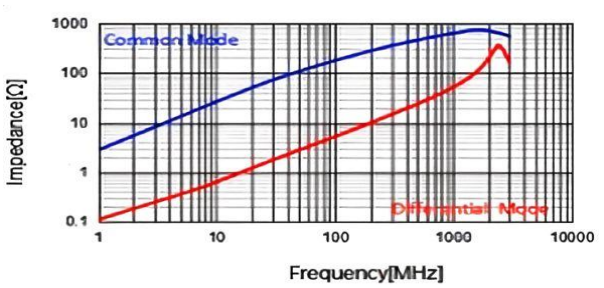
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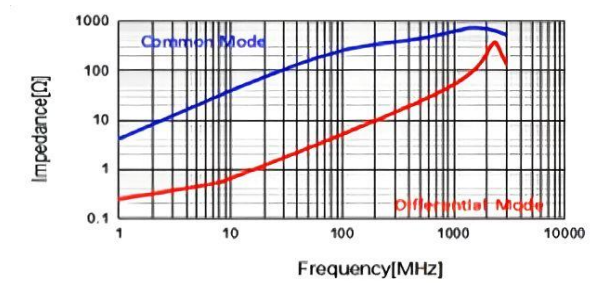
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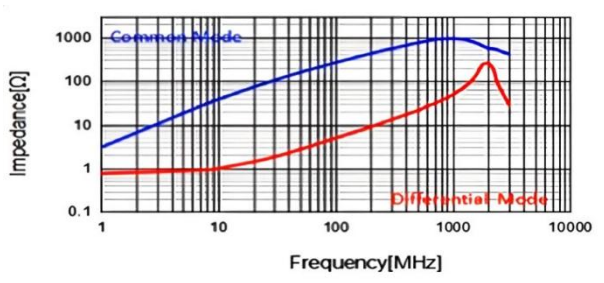
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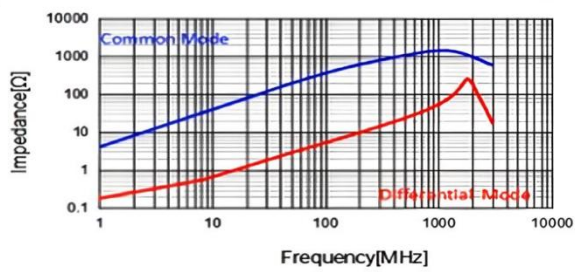


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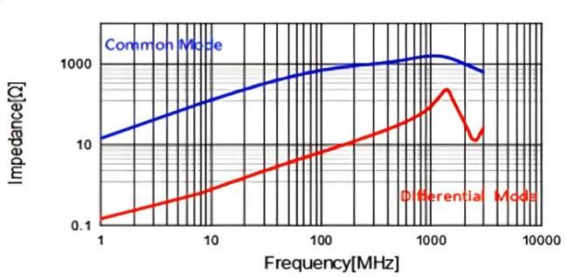


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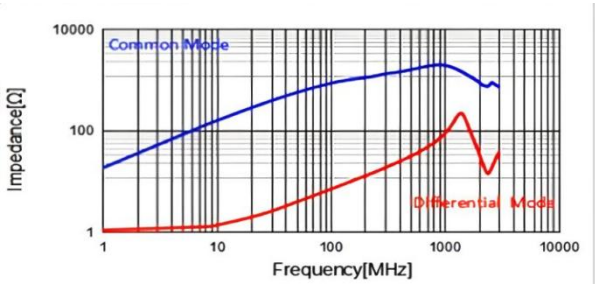
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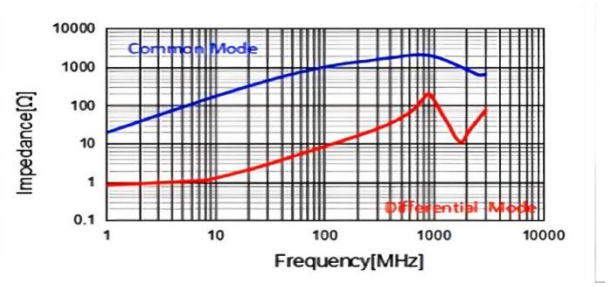
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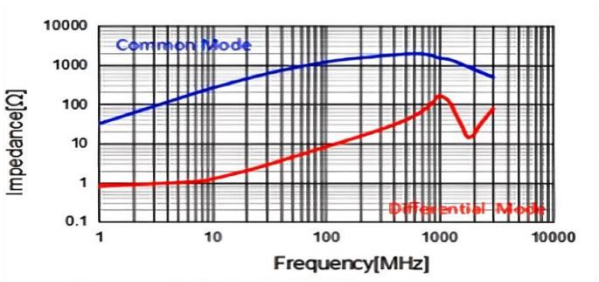
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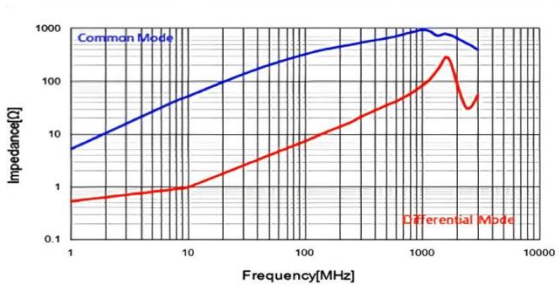
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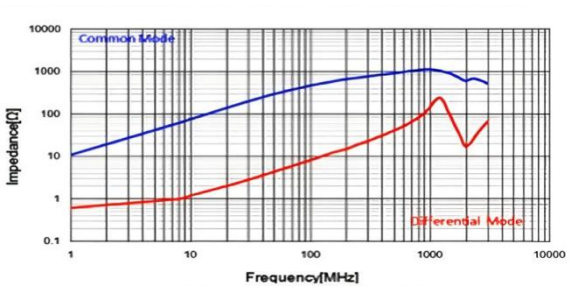
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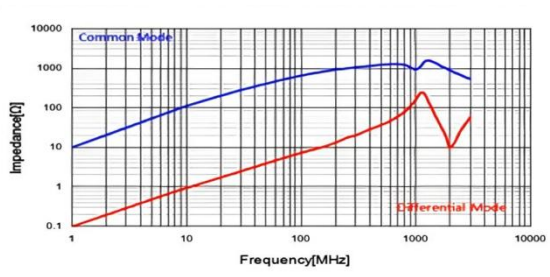
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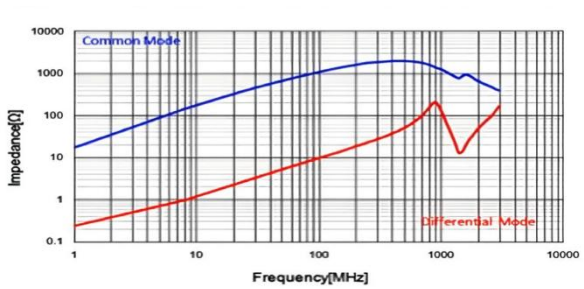
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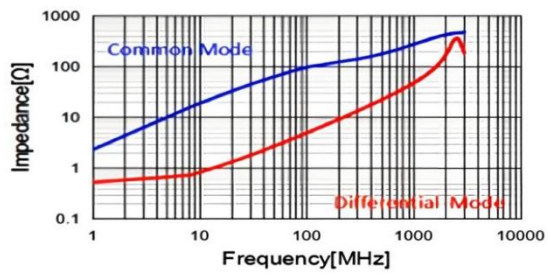
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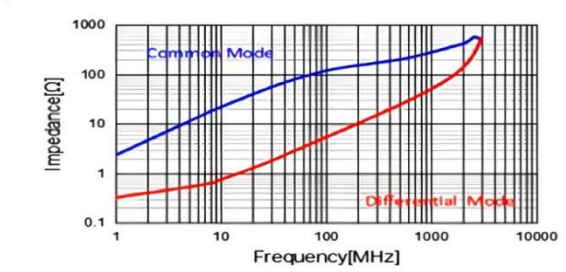


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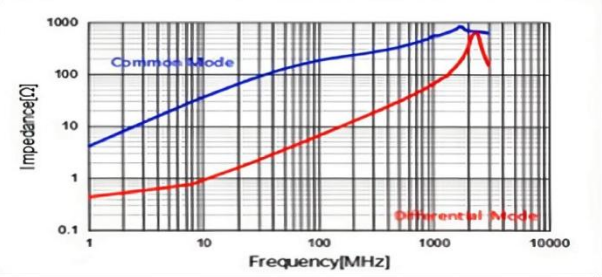


CHARACTERISTICS(REFERENCE) 特征曲线

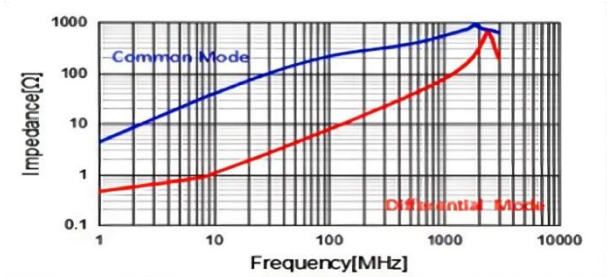
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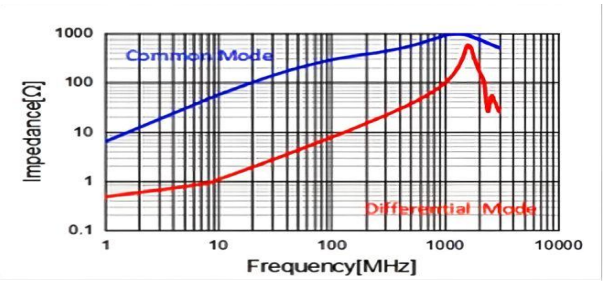
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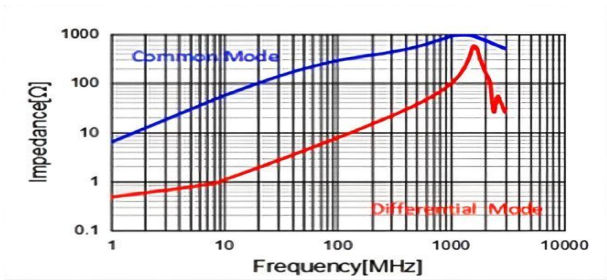
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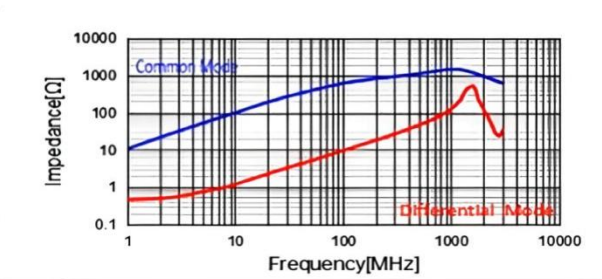
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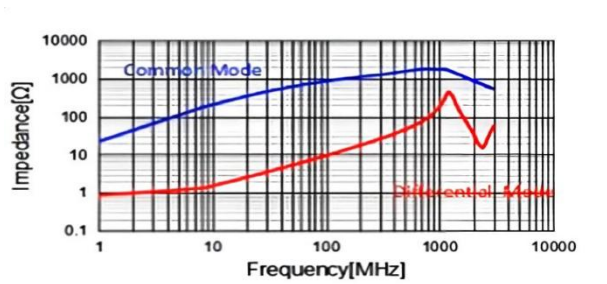
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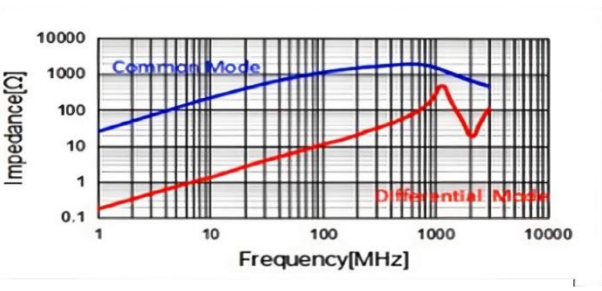
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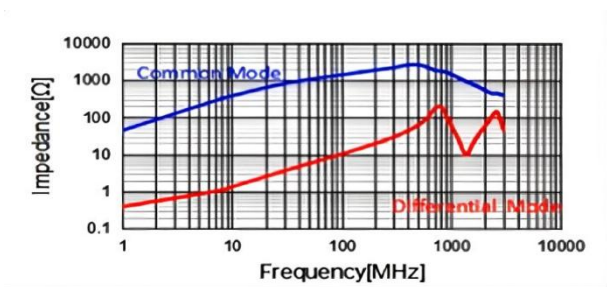
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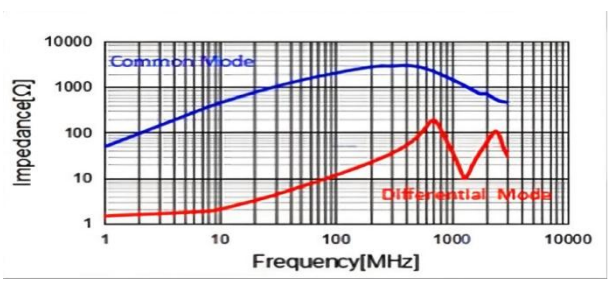
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APCW3216-142P2T

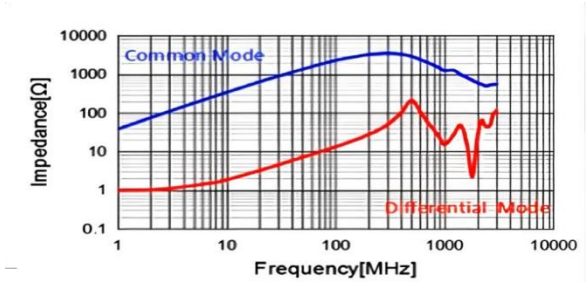


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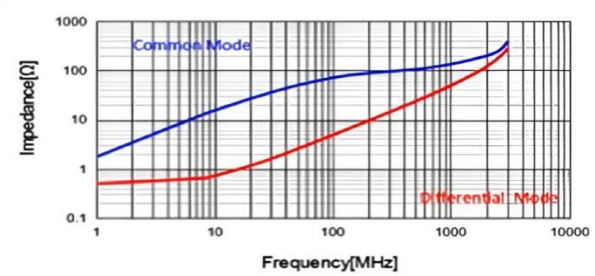


CHARACTERISTICS(REFERENCE) 特征曲线

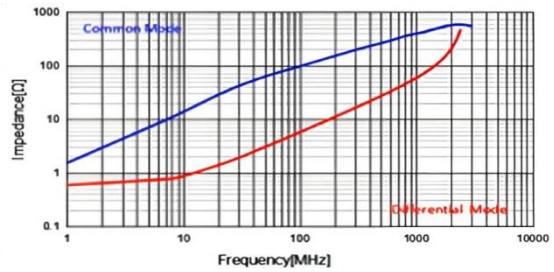
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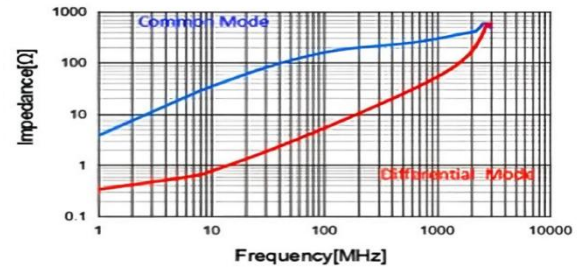
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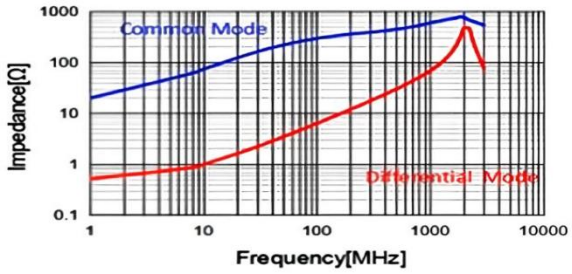
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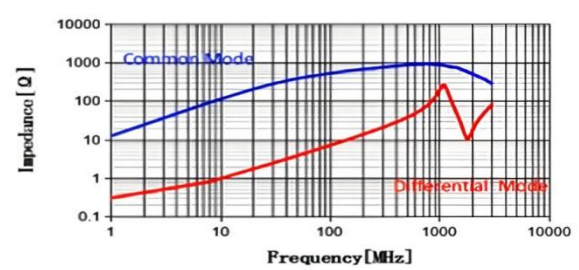
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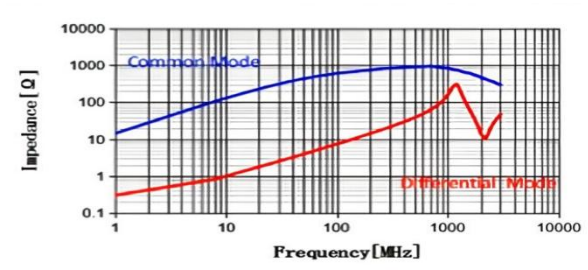
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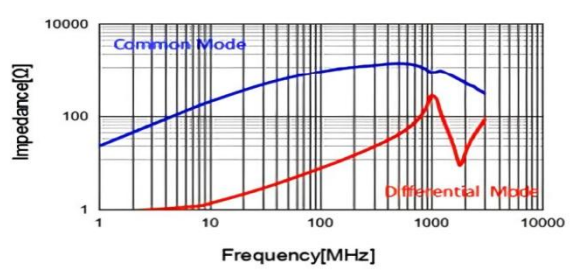
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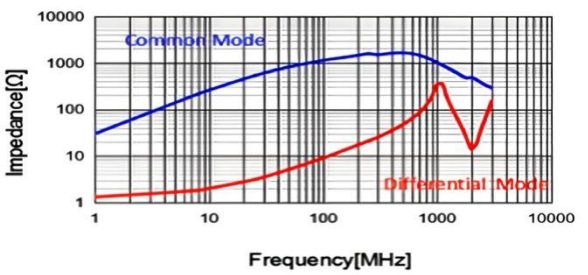
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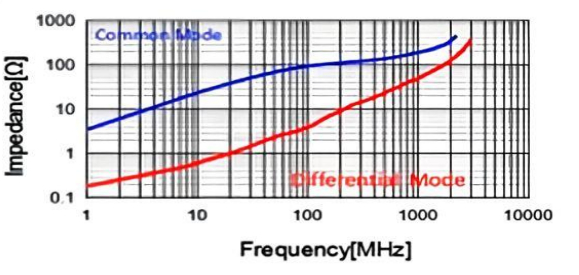
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APCW3225-102P2T

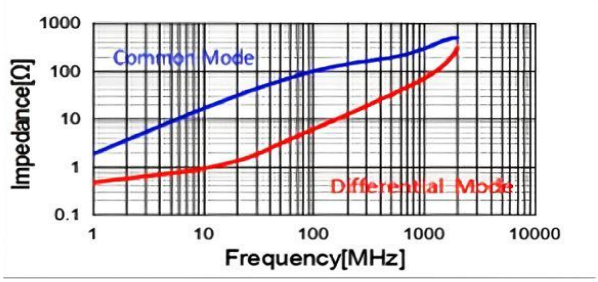


APCW4532-800P2T

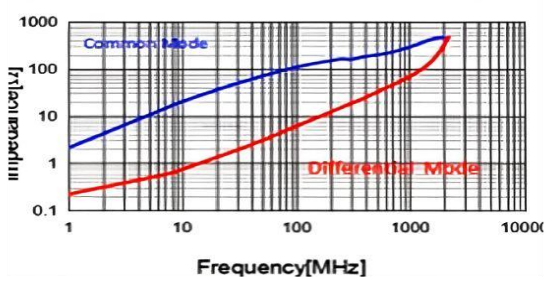


CHARACTERISTICS(REFERENCE) 特征曲线

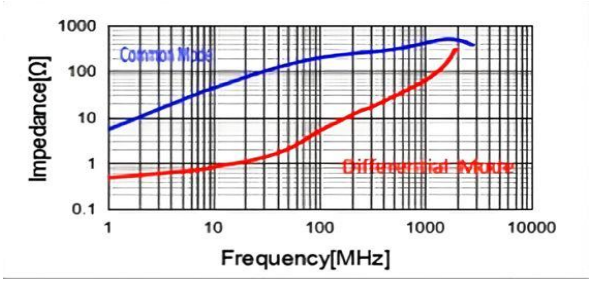
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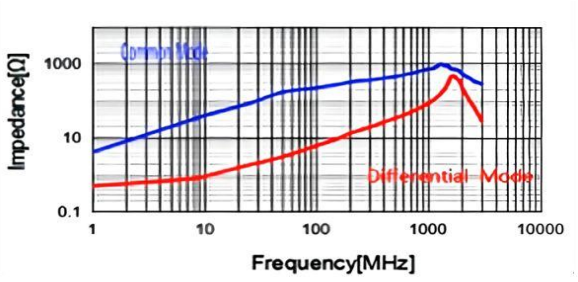
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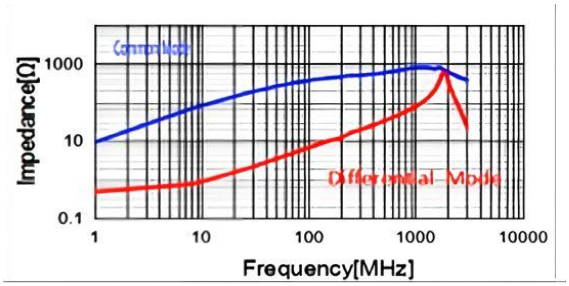
APCW4532-201P2T



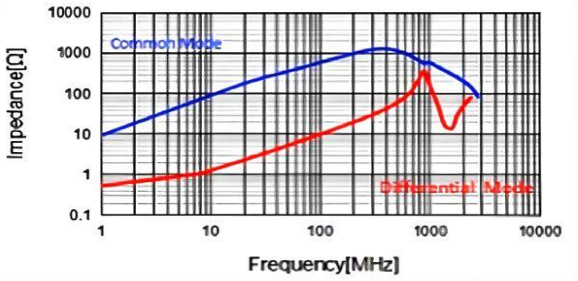
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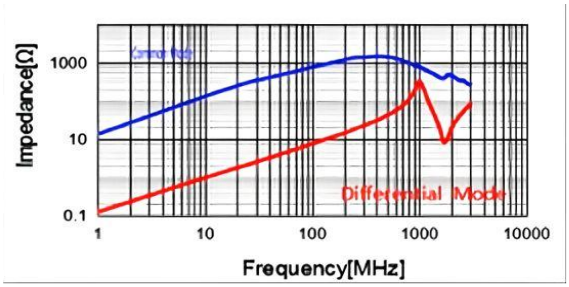
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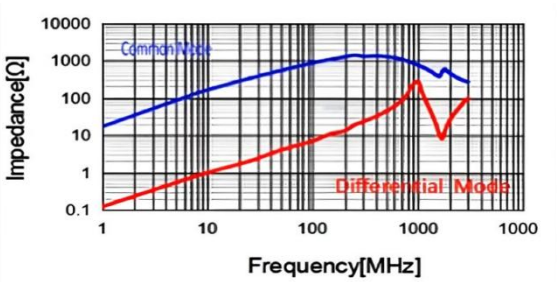
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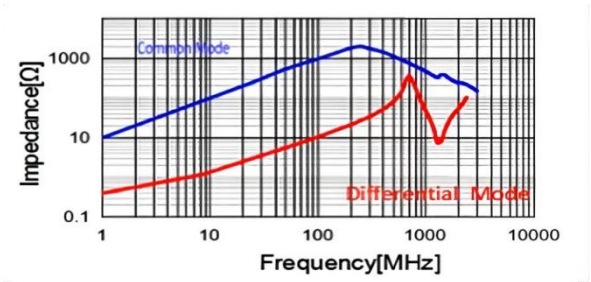
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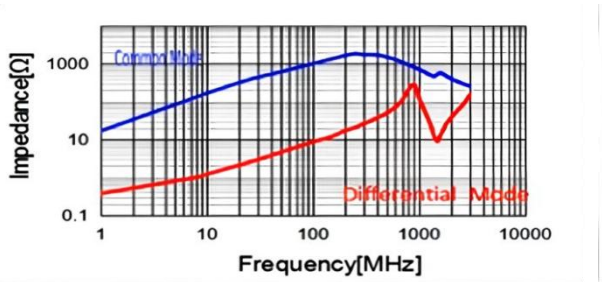
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APCW4532-901P2T

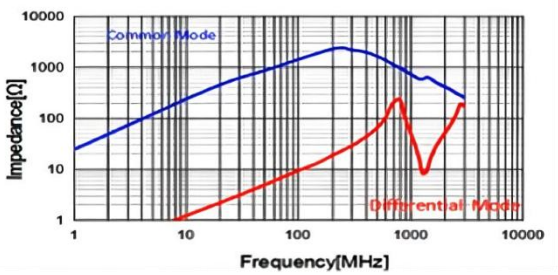


APCW4532-102P2T



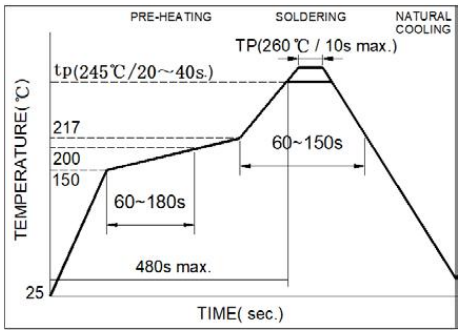
CHARACTERISTICS(REFERENCE) 特征曲线

APCW4532-142P2T



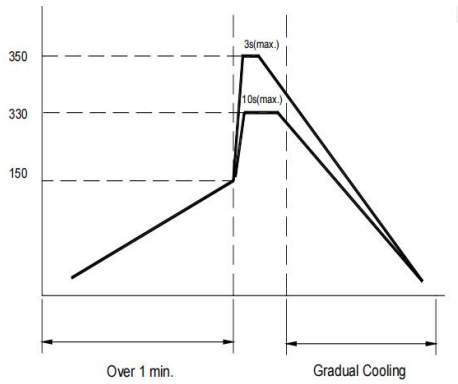
RECOMMENDED SOLDERING TECHNOLGIES 回流焊建议

- Re-flow Soldering (Lead Free)
- ☆ Preheat circuit and products to 150℃
- ☆ 260℃ tip temperature (max)
- ☆ Reflow times: no more than 2 times
- ☆ Solder paste thickness: the best 0.08mm is ,but max is 0.1mm



- Note: The reflow profile in the above table is only for qualification and is not meant to specify board assembly profiles. Actual board assembly profiles must be based on the customer's specific board design, solder paste and process, and should not exceed the parameters as the Reflow profile shows.

- Hand Soldering
- ☆ Use a 20 watt soldering iron with tip diameter of 1.0mm
- ☆ Limit soldering time to 3 sec



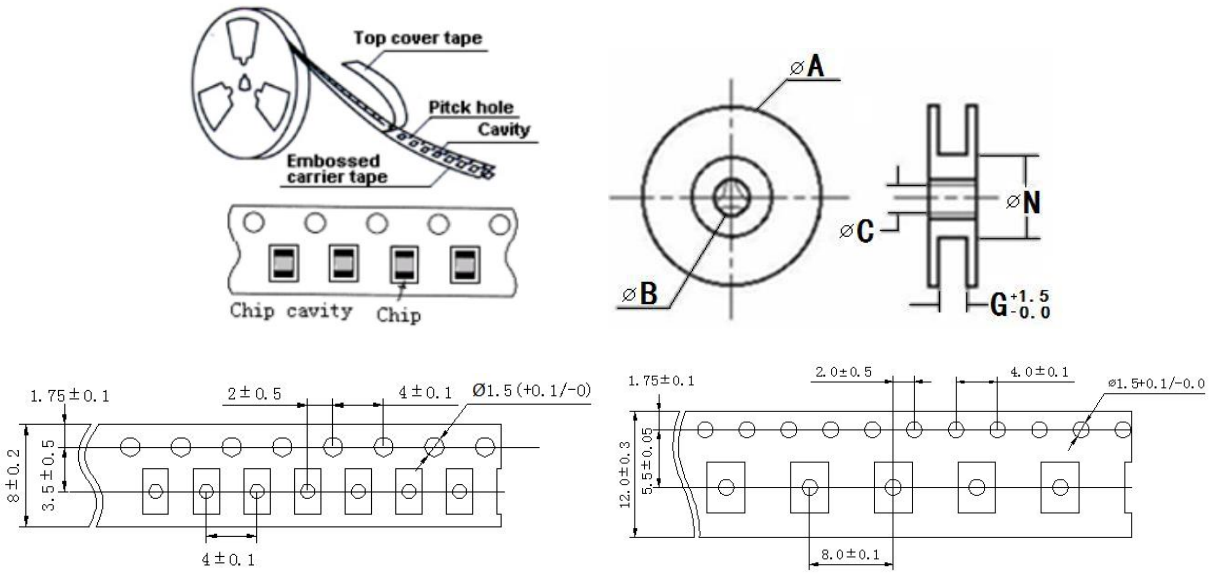
- Note: Take care not to apply the tip of the soldering iron to the terminal electrodes.

RELIABILITY TEST 可靠性试验

Test Item	Test Requirements	Test Conditions
High Temperature	1. No visible mechanical damage 2. ΔZ/Z ≤ 20% 3. ΔR/R ≤ 10%	Test temp: 85±3℃, Duration: 96h. Stabilize 24±4h at ambient before measurement
Low Temperature	1. No visible mechanical damage 2. ΔZ/Z ≤ 20% 3. ΔR/R ≤ 10%	Test temp: -40±3℃, Duration: 96h. Stabilize 24±4h at ambient before measurement
Damp Heat, Steady State	1. No visible mechanical damage 2. ΔZ/Z ≤ 20% 3. ΔR/R ≤ 10%	Test temp: 85±3 ℃ , Humidity: 85 ±3%RH, Duration: 96h. Stabilize 24±4h at ambient before measurement
Thermal Shock	1. No visible mechanical damage 2. ΔZ/Z ≤ 20% 3. ΔR/R ≤ 10%	Test temp: -40±3℃/30min ⇔ 85±3℃/30min, 100 cycles. Samples shall be stabilized 24±4h at ambient before measurement
Endurance (Operational Life)	1. No visible mechanical damage 2. ΔZ/Z ≤ 20% 3. ΔR/R ≤ 10%	Test temp: 85±3℃, Duration: 96±2h, rated current applied. Samples shall be stabilized at ambient24±4h at ambient before measurement
Vibration	1. No visible mechanical damage 2. ΔZ/Z ≤ 20% 3. ΔR/R ≤ 10%	Frequency: (10~55~10)Hz, 1G peak-to-peak amplitude: 1.5mm. Duration: 2h per X/Y/Z axis (6h total). Stabilize at ambient stabilized 1~2h before measurement
Resistance to Soldering Heat	1. No visible mechanical damage 2. ΔZ/Z ≤ 20% 3. ΔR/R ≤ 10%	Test temp: 260℃, Duration: T:7.0min, 1x reflow preconditioning. Solder: Sn/3.0Ag/0.5Cu. Stabilize 1~2h at ambient before measurement.
Solderability	No visible mechanical damage	1. Solder temp: 245±5℃, Immersion: 3±0.5s. 2. Solder coverage ≥95% on terminations (excluding seating plane)
Board Flex	No visible mechanical damage	Precondition: 1x reflow. Samples with tinned terminals soldered on PCB. Static load applied gradually,T: 60±5s, board deflection ≤2.0mm
Terminal Strength	No visible mechanical damage	Apply specified static load vertically to terminals,hold for 30±1s. Verify no terminal detachment.

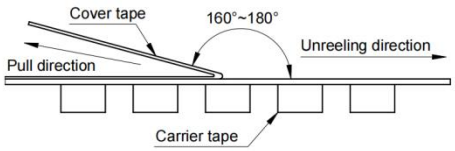
PACKAGING 包装

- Packaging type: Strapping packaging.
- 1608~4532 Series



Type	A	B	C	N	G
APCW1608	178±2.0	22±2.0	13±1.0	60±1.0	8
APCW2012	178±2.0	22±2.0	13±1.0	60±1.0	8
APCW2520	178±2.0	22±2.0	13±1.0	60±1.0	12
APCW3216	178±2.0	22±2.0	13±1.0	60±1.0	8
APCW3225	178±2.0	22±2.0	13±1.0	60±1.0	12
APCW4532	178±2.0	22±2.0	13±1.0	60±1.0	12

- Peeling off force:0.05 to 0.7N in the direction show below.



- Packing Quantity.

Series	Quantity/Reel
APCW1608	3000Pcs
APCW2012	2000Pcs
APCW2520	2000Pcs
APCW3216	2000Pcs
APCW3225	1000Pcs
APCW4532	500Pcs

PRECAUTIONS ON USE 使用注意事项

- Precautions on Use.

1. Always wear static control bands to protect against ESD.
2. Any devices used with the products (soldering irons, measuring instruments) should be properly grounded.
3. Keep bare hands and metal conductors (i.e., metal desk) away from electrodes or conductive areas that lead to electrodes.
4. Preheat when soldering.
5. Don't apply current in excess of the rated current value. It may reduce the impedance or inductance, or cause damage to components due to over-current.
6. For magnetic products, keep clear of anything that may generate magnetic fields such as speakers and coils. Use non-magnetic tweezers when handing the chips.
7. When soldering, the electrical characteristics may be varied due to hot energy and mechanical stress.
8. When coating products with resin, the relatively high resin curing stress may change the electrical characteristics. For exterior coating, select resin carefully so that electrical and mechanical performance of the product is not affected. Before using, please evaluate reliability with the product mounted in your application set.
9. When mount chips with adhesive in preliminary assembly, do appropriate check before the soldering stage, i.e., the size of land pattern, type of adhesive, amount applied, hardening of the adhesive on proper usage and amounts of adhesive to use.
10. Mounting density: Add special attention to radiating heat of products when mounting other components nearby. The excessive heat by other products may cause deterioration at joint of this product with substrate.
11. Since some products are constructed like an open magnetic circuit, narrow spacing between components may cause magnetic coupling.
12. Please do not give the product any excessive mechanical shocks in transportation.
13. Please do not touch wires by sharp terminals such as tweezers to avoid causing any damage to wires.
14. Please do not add any shock and power to the soldered product to avoid causing any damage to chip body.
15. Please do not touch the electrodes by naked hand as the solderability of the external electrodes may deteriorate by grease or oil on the skin.
16. Magnetic materials shall be far away from parts to avoid impacts on their electrical characteristics;
17. Parts could be damaged by external mechanical pressure or stacked heavy objects, as well as strong shaking & dropping;
18. Please do not store parts in bulk to prevent coils and parts being damaged;
19. Oversized external force to parts on PCB may lead to parts being damaged or slipped off;
20. Please do not use parts on edge or top of PCB board in your design to avoid parts being damaged during PCB is moved.
21. Please use flux contained with resin since the highly acidic (Chlorine content more than 0.2 wt%) or water-soluble one could damage the insulation film of wires, then causing short circuit of parts.
22. Please do not use the brush to clean product or its surroundings. If you use the brush to clean product or its surroundings on PCB,copper wire may be broke, causing the product open.
23. Avoid ultrasonic processing, which may cause component falling off and poor pad contact.
24. When using APV products, customers should record the production batch number for traceability.



SAFETY REMINDERS 注意事项

SAFETY REMINDERS

● All products listed in this specification are developed, designed and intended for use in general electronics equipment. The products are not designed or Warranted to meet the requirements of the applications listed below, whose performance and/or quality require especially high reliability, or whose failure, malfunction or trouble might directly cause damage to society, person, or property. Please understand that we are not responsible for any damage or liability caused by use of the products in any of the applications below. Please contact us for more details if you intend to use our products in the following applications.

☆ 1.Aerospace/aviation equipment

☆ 2.Transportation equipment (cars, electric trains, ships, etc.)

☆ 3.Medical equipment

☆ 4.Power-generation control equipment

☆ 5.Atomic energy-related equipment

☆ 6.Seabed equipment

☆ 7.Transportation control equipment

☆ 8.Public information-processing equipment

☆ 9.Military equipment

☆ 10.Electric heating apparatus, burning equipment

☆ 11.Disaster prevention/crime prevention equipment

☆ 12.Safety equipment

☆ 13.Other applications that are not considered general-purpose applications

● When designing your equipment even for general-purpose applications, you are kindly requested to take into consideration securing protection circuit/device or providing backup circuits in your equipment.