

FEATURES 特征

- Can be used in a wide range of frequency to suppress EMI.
可在宽频率范围内用于抑制电磁干扰 (EMI)
- Excellent solderability and high heat resistance.
良好的可焊性和耐焊性
- Monolithic structure for excellent reliability.
整体式结构, 可靠性优异.
- Operating Temp : -55°C~+125°C(Including self heating)
工作温度范围:-55~+125°C(包括自身温度上升)



APPLICATIONS 用途

- Noise suppression in power lines or signal lines of electrical equipment such as communication equipment, computers and LCD TVs.
适用于通信设备、计算机、液晶电视等电气设备的电源线或信号线中的噪声抑制.

PART NUMBERING 产品型号

APBD	1608	-	601	W	T	D12
①	②		③	④	⑤	⑥

① Series Name	
APBD	Multilayer Chip Ferrite Beads

③ Impedance	
Code (example)	Impedance [Ω]
900	90
221	220
102	1000

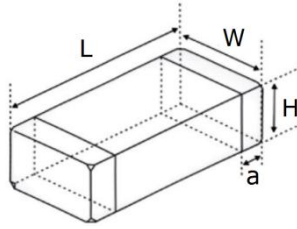
④ Characteristics Code	
Standard	W

② External Dimensions [inch]	(L×W) (mm)
0603 [0201]	0.6×0.3
1005 [0402]	1.0×0.5
1608 [0603]	1.6×0.8
2012 [0805]	2.0×1.2
3216 [1206]	3.2×1.6

⑤ Packaging	
T	Tape & Reel

⑥ Special Material Code	
	D12

■ DIMENSIONS 尺寸



Unit: mm [inch]

Dimensions				
Series	L	W	H	a
APBD0603 [0201]	0.6±0.03 [0.020±0.003]	0.3±0.03 [0.010±0.003]	0.3±0.03 [0.010±0.003]	0.15±0.05 [0.010±0.002]
APBD1005 [0402]	1.0± 0.15 [0.040± 0.006]	0.5± 0.15 [0.020± 0.006]	0.5± 0.15 [0.020± 0.006]	0.25± 0.1 [0.010± 0.004]
APBD1608 [0603]	1.6± 0.20 [0.063± 0.008]	0.8± 0.20 [0.031± 0.008]	0.8± 0.20 [0.031± 0.008]	0.3± 0.2 [0.01± 0.008]
APBD2012 [0805]	2.0± 0.20 [0.079± 0.008]	1.2± 0.20 [0.047± 0.008]	0.9± 0.20 [0.035± 0.008]	0.5± 0.3 [0.020± 0.012]
APBD3216 [1206]	3.2± 0.20 [0.126±0.008]	1.6± 0.20 [0.063± 0.008]	0.9± 0.20 [0.035± 0.008]	0.5± 0.3 [0.020± 0.012]

■ ELECTRICAL CHARACTERISTICS 特性规格表

● APBD0603 Series

Part No.	Impedance (Ω)	Tolerance	Test Frequency (MHz)	Max. DC Resistance (Ω)	Max. Rated Current(mA)
APBD0603-100WTD12	10	±5Ω	100	0.10	550
APBD0603-220WTD12	22	±25%	100	0.25	320
APBD0603-250WTD12	25	±25%	100	0.26	470
APBD0603-330WTD12	33	±25%	100	0.30	320
APBD0603-600WTD12	60	±25%	100	0.40	220
APBD0603-700WTD12	70	±25%	100	0.40	220
APBD0603-800WTD12	80	±25%	100	0.40	220
APBD0603-121WTD12	120	±25%	100	0.50	220
APBD0603-241WTD12	240	±25%	100	0.80	220
APBD0603-601WTD12	600	±25%	100	1.50	110
APBD0603-102WTD12	1000	±25%	100	2.50	110

ELECTRICAL CHARACTERISTICS 特性规格表

● APBD1005 Series

Part No.	Impedance (Ω)	Tolerance	Test Frequency (MHz)	Max. DC Resistance (Ω)	Max. Rated Current(mA)
APBD1005-000WTD12	0	0~15Ω	100	0.05	550
APBD1005-050WTD12	5	0~15Ω	100	0.05	550
APBD1005-070WTD12	7	0~11Ω	100	0.05	550
APBD1005-090WTD12	9	5~13Ω	100	0.05	550
APBD1005-100WTD12	10	7~15Ω	100	0.05	550
APBD1005-110WTD12	11	7~15Ω	100	0.05	550
APBD1005-150WTD12	15	9~21Ω	100	0.05	550
APBD1005-190WTD12	19	12~25Ω	100	0.10	320
APBD1005-220WTD12	22	±25%	100	0.13	320
APBD1005-260WTD12	26	±25%	100	0.13	320
APBD1005-300WTD12	30	±25%	100	0.20	320
APBD1005-310WTD12	31	±25%	100	0.20	320
APBD1005-330WTD12	33	±25%	100	0.20	320
APBD1005-360WTD12	36	±25%	100	0.20	320
APBD1005-600WTD12	60	±25%	100	0.30	220
APBD1005-700WTD12	70	±25%	100	0.35	220
APBD1005-750WTD12	75	±25%	100	0.35	220
APBD1005-800WTD12	80	±25%	100	0.35	220
APBD1005-101WTD12	100	±25%	100	0.35	220
APBD1005-121WTD12	120	±25%	100	0.40	220
APBD1005-151WTD12	150	±25%	100	0.47	220
APBD1005-181WTD12	180	±25%	100	0.52	160
APBD1005-201WTD12	200	±25%	100	0.52	160
APBD1005-221WTD12	220	±25%	100	0.52	160
APBD1005-301WTD12	300	±25%	100	0.65	110
APBD1005-331WTD12	330	±25%	100	0.90	110
APBD1005-471WTD12	470	±25%	100	0.90	110
APBD1005-501WTD12	500	±25%	100	0.90	110
APBD1005-601WTD12	600	±25%	100	1.00	110
APBD1005-801WTD12	800	±25%	100	1.30	110
APBD1005-102WTD12	1000	±25%	100	1.40	110
APBD1005-122WTD12	1200	±25%	100	1.80	35

● APBD1608 Series

Part No.	Impedance (Ω)	Tolerance	Test Frequency (MHz)	Max. DC Resistance (Ω)	Max. Rated Current(mA)
APBD1608-000WTD12	0	0~15Ω	100	0.05	2100
APBD1608-050WTD12	5	0~15Ω	100	0.05	2100
APBD1608-070WTD12	7	0~11 Ω	100	0.05	2100
APBD1608-090WTD12	9	5~13 Ω	100	0.05	2100

ELECTRICAL CHARACTERISTICS 特性规格表

● APBD1608 Series

Part No.	Impedance (Ω)	Tolerance	Test Frequency (MHz)	Max. DC Resistance (Ω)	Max. Rated Current(mA)
APBD1608-100WTD12	10	7~15Ω	100	0.05	2100
APBD1608-110WTD12	11	7~15Ω	100	0.05	2100
APBD1608-150WTD12	15	9~21 Ω	100	0.05	2100
APBD1608-190WTD12	19	12~25Ω	100	0.05	2100
APBD1608-220WTD12	22	±25%	100	0.05	2100
APBD1608-300WTD12	30	±25%	100	0.05	1100
APBD1608-310WTD12	31	±25%	100	0.05	1100
APBD1608-330WTD12	33	±25%	100	0.05	1100
APBD1608-600WTD12	60	±25%	100	0.15	420
APBD1608-700WTD12	70	±25%	100	0.15	420
APBD1608-750WTD12	75	±25%	100	0.15	420
APBD1608-800WTD12	80	±25%	100	0.15	420
APBD1608-900WTD12	90	±25%	100	0.20	320
APBD1608-101WTD12	100	±25%	100	0.20	320
APBD1608-121WTD12	120	±25%	100	0.20	320
APBD1608-151WTD12	150	±25%	100	0.20	320
APBD1608-181WTD12	180	±25%	100	0.30	320
APBD1608-201WTD12	200	±25%	100	0.30	320
APBD1608-221WTD12	220	±25%	100	0.30	320
APBD1608-301WTD12	300	±25%	100	0.35	220
APBD1608-331WTD12	330	±25%	100	0.45	220
APBD1608-471WTD12	470	±25%	100	0.45	220
APBD1608-501WTD12	500	±25%	100	0.45	220
APBD1608-601WTD12	600	±25%	100	0.45	220
APBD1608-801WTD12	800	±25%	100	0.60	220
APBD1608-102WTD12	1000	±25%	100	0.60	220
APBD1608-122WTD12	1200	±25%	100	0.70	220
APBD1608-152WTD12	1500	±25%	100	0.70	220
APBD1608-182WTD12	1800	±25%	100	0.90	160
APBD1608-202WTD12	2000	±25%	100	1.10	160
APBD1608-222WTD12	2200	±25%	100	1.20	110
APBD1608-252WTD12	2500	±25%	100	1.30	60

● APBD2012 Series

Part No.	Impedance (Ω)	Tolerance	Test Frequency (MHz)	Max. DC Resistance (Ω)	Max. Rated Current(mA)
APBD2012-000WTD12	0	0~15Ω	100	0.04	2300
APBD2012-050WTD12	5	0~15Ω	100	0.04	2300
APBD2012-070WTD12	7	0~11 Ω	100	0.04	2300
APBD2012-090WTD12	9	5~13 Ω	100	0.04	2300
APBD2012-100WTD12	10	7~15Ω	100	0.04	2300

ELECTRICAL CHARACTERISTICS 特性规格表

● APBD2012 Series

Part No.	Impedance (Ω)	Tolerance	Test Frequency (MHz)	Max. DC Resistance (Ω)	Max. Rated Current (mA)
APBD2012-110WTD12	11	7~15 Ω	100	0.04	2300
APBD2012-150WTD12	15	9~21 Ω	100	0.04	2300
APBD2012-190WTD12	19	12~25 Ω	100	0.04	2300
APBD2012-220WTD12	22	$\pm 25\%$	100	0.05	1600
APBD2012-260WTD12	26	$\pm 25\%$	100	0.05	1600
APBD2012-300WTD12	30	$\pm 25\%$	100	0.05	1600
APBD2012-310WTD12	31	$\pm 25\%$	100	0.05	1600
APBD2012-330WTD12	33	$\pm 25\%$	100	0.05	1600
APBD2012-400WTD12	40	$\pm 25\%$	100	0.10	1100
APBD2012-500WTD12	50	$\pm 25\%$	100	0.10	1100
APBD2012-600WTD12	60	$\pm 25\%$	100	0.10	1100
APBD2012-700WTD12	70	$\pm 25\%$	100	0.10	1100
APBD2012-800WTD12	80	$\pm 25\%$	100	0.10	1100
APBD2012-900WTD12	90	$\pm 25\%$	100	0.15	850
APBD2012-101WTD12	100	$\pm 25\%$	100	0.15	850
APBD2012-121WTD12	120	$\pm 25\%$	100	0.15	850
APBD2012-151WTD12	150	$\pm 25\%$	100	0.18	750
APBD2012-181WTD12	180	$\pm 25\%$	100	0.18	750
APBD2012-221WTD12	220	$\pm 25\%$	100	0.20	650
APBD2012-301WTD12	300	$\pm 25\%$	100	0.20	650
APBD2012-331WTD12	330	$\pm 25\%$	100	0.30	600
APBD2012-391WTD12	390	$\pm 25\%$	100	0.30	600
APBD2012-471WTD12	470	$\pm 25\%$	100	0.30	600
APBD2012-501WTD12	500	$\pm 25\%$	100	0.30	600
APBD2012-601WTD12	600	$\pm 25\%$	100	0.30	600
APBD2012-801WTD12	800	$\pm 25\%$	100	0.35	550
APBD2012-102WTD12	1000	$\pm 25\%$	100	0.35	550
APBD2012-122WTD12	1200	$\pm 25\%$	100	0.40	550
APBD2012-152WTD12	1500	$\pm 25\%$	100	0.40	550
APBD2012-202WTD12	2000	$\pm 25\%$	100	0.45	550
APBD2012-222WTD12	2200	$\pm 25\%$	100	0.45	550
APBD2012-252WTD12	2500	$\pm 25\%$	50	0.50	420
APBD2012-272WTD12	2700	$\pm 25\%$	50	0.60	220
APBD2012-302WTD12	3000	$\pm 25\%$	50	0.60	220

● APBD3216 Series

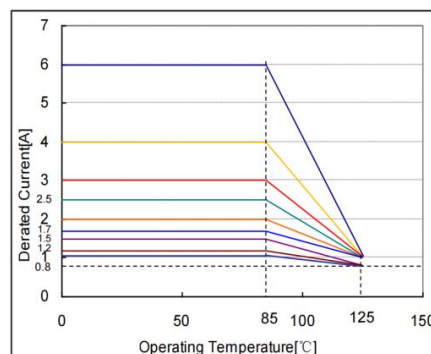
Part No.	Impedance (Ω)	Tolerance	Test Frequency (MHz)	Max. DC Resistance (Ω)	Max. Rated Current (mA)
APBD3216-000WTD12	0	0~15 Ω	100	0.05	2300
APBD3216-050WTD12	5	0~15 Ω	100	0.05	2300
APBD3216-070WTD12	7	0~11 Ω	100	0.05	2300

ELECTRICAL CHARACTERISTICS 特性规格表

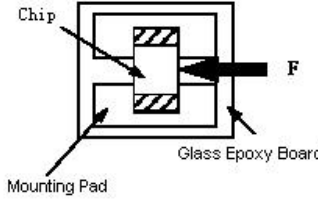
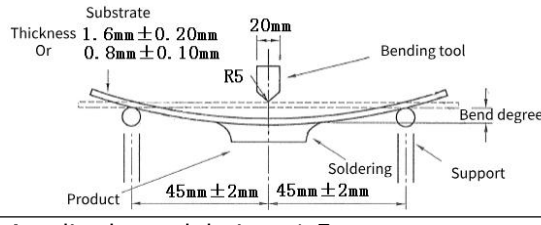
● APBD3216 Series

Part No.	Impedance (Ω)	Tolerance	Test Frequency(MHz)	Max. DC Resistance(Ω)	Max. Rated Current(mA)
APBD3216-090WTD12	9	5~13 Ω	100	0.05	2100
APBD3216-100WTD12	10	7~15 Ω	100	0.05	2100
APBD3216-110WTD12	11	7~15 Ω	100	0.05	2100
APBD3216-150WTD12	15	9~21 Ω	100	0.05	2100
APBD3216-190WTD12	19	12~25 Ω	100	0.05	2100
APBD3216-220WTD12	22	$\pm 25\%$	100	0.05	2100
APBD3216-300WTD12	30	$\pm 25\%$	100	0.05	2100
APBD3216-310WTD12	31	$\pm 25\%$	100	0.05	2100
APBD3216-500WTD12	50	$\pm 25\%$	100	0.10	1100
APBD3216-600WTD12	60	$\pm 25\%$	100	0.10	1100
APBD3216-700WTD12	70	$\pm 25\%$	100	0.10	1100
APBD3216-750WTD12	75	$\pm 25\%$	100	0.10	1100
APBD3216-800WTD12	80	$\pm 25\%$	100	0.10	1100
APBD3216-900WTD12	90	$\pm 25\%$	100	0.10	1100
APBD3216-101WTD12	100	$\pm 25\%$	100	0.10	1100
APBD3216-121WTD12	120	$\pm 25\%$	100	0.10	1100
APBD3216-151WTD12	150	$\pm 25\%$	100	0.15	1100
APBD3216-181WTD12	180	$\pm 25\%$	100	0.15	1100
APBD3216-221WTD12	220	$\pm 25\%$	100	0.20	850
APBD3216-301WTD12	300	$\pm 25\%$	100	0.20	850
APBD3216-331WTD12	330	$\pm 25\%$	100	0.30	650
APBD3216-471WTD12	470	$\pm 25\%$	100	0.30	650
APBD3216-501WTD12	500	$\pm 25\%$	100	0.30	650
APBD3216-601WTD12	600	$\pm 25\%$	100	0.30	650
APBD3216-801WTD12	800	$\pm 25\%$	100	0.35	650
APBD3216-102WTD12	1000	$\pm 25\%$	100	0.35	650
APBD3216-122WTD12	1200	$\pm 25\%$	100	0.60	320
APBD3216-152WTD12	1500	$\pm 25\%$	50	0.60	320
APBD3216-182WTD12	1800	$\pm 25\%$	50	0.80	110
APBD3216-202WTD12	2000	$\pm 25\%$	50	1.00	110
APBD3216-252WTD12	2500	$\pm 25\%$	50	1.20	60
APBD3216-302WTD12	3000	$\pm 25\%$	50	1.50	60

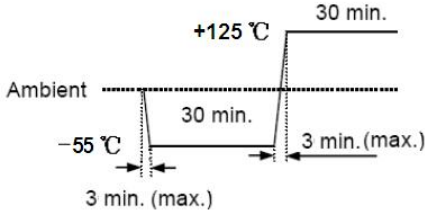
- Impedance testing conditions: E4982A or equivalent, test voltage 50mV $\pm$ 5mV, Temperature 15 $^{\circ}$ C~35 $^{\circ}$ C, Humidity 25%~75%.
- Max. DC Resistance Testing conditions: RM3542A or equivalent, Temperature 15 $^{\circ}$ C~35 $^{\circ}$ C, Humidity 25%~75%.
- Rated current: Apply the rated current, and the surface temperature rise of the product shall not exceed 40 $^{\circ}$ C .
When operating temperatures exceed +85 $^{\circ}$ C, derating of current is necessary for chip ferrite beads for which rated current is 1000mA and over. Please apply the derating curve shown in chart according to the operating temperature.



RELIABILITY TEST 可靠性测试

Items	Requirements	Test Methods and Remarks
Operating Temperature Range	-55℃~+ 125℃	Includes product surface temperature rise
1. Solder ability	No mechanical damage. 95% (75% for 0603 series) or more of electrode area shall be coated by new solder.	Preheating temperature: 120℃ to 150℃ Preheating time: 60s Solder 96.5%Sn/3.0%Ag/0.5%Cu of the Sn solder. Solder temperature: 245±3℃ Immersion tin depth: 10mm Duration: 3±0.3s Dip performance to a flux of about: 3 ~ 5 s
2. Resistance to Soldering Heat	No mechanical damage. Inductance : Impedance change: within ±30%	Preheating temperature: 120℃ to 150℃ Preheating time: 60s Solder 96.5%Sn/3.0%Ag/0.5%Cu of the Sn solder. Solder temperature: 260℃±5℃ Immersion tin depth: 10mm Duration: 10±1s Dip performance to a flux of about: 3~5 s
3. Adhesion of electrode	The termination and body should be no damage.	Applied force: 2N force for 0603 series ; 5N force for 1005 series ; 7N force for 1608 series ; 10N force for 2012 、 3216 series. 15N force for 3225 、 4532 series. Keep time : 10±1S 
4. Low temperature resistance	No mechanical damage. Impedance change: within ±30%	Temperature: -55±2℃ Testing time: 1000 h (+24h)
5. Bending strength	No mechanical damage.	Testing board: glass epoxy-resin substrate For (1±0.5) mm/s compression speed, curvature: 2mm, hold time 20s±1s. 
6. Vibration	No mechanical damage. Impedance change: within ±30%	Amplitude modulation: 1.5mm Test time: A period of 2h in each of 3 mutually perpendicular directions. Frequency range: 10Hz to 55Hz to 10Hz for 1min.

RELIABILITY TEST 可靠性测试

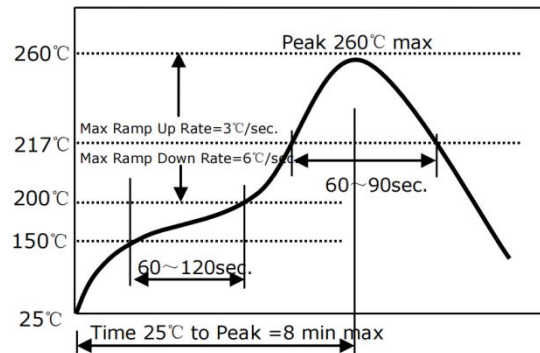
Items	Requirements	Test Methods and Remarks
7. High temperature resistance	No mechanical damage. Impedance change: within $\pm 30\%$	Testing time: 1000 h (+24h) Temperature: $125 \pm 2^\circ\text{C}$
8. Static Humidity	No mechanical damage. Impedance change: within $\pm 30\%$	Humidity: 90% to 95% RH Temperature: $60 \pm 2^\circ\text{C}$ Testing time: 1000 h (+24h)
9. High temperature load	No mechanical damage. Impedance change: within $\pm 30\%$	impose current: at room Testing time: 1000 h (+24h) Temperature: $85 \pm 2^\circ\text{C}$
10. Temperature Shock	No mechanical damage. Impedance change: within $\pm 30\%$	Temperature: -55°C for $30 \pm 3\text{min}$ + 125°C for $30 \pm 3\text{min}$ Number of cycles: 100 

Recommended Soldering Technologies 回流焊建议

Reflowing Profile

- ◆ Preheat condition: $150 \sim 200^\circ\text{C} / 60 \sim 120\text{sec.}$
- ◆ Allowed time above 217°C : $60 \sim 90\text{sec.}$
- ◆ Max temp: 260°C
- ◆ Max time at max temp: 10sec.
- ◆ Solder paste: Sn/3.0Ag/0.5Cu
- ◆ Allowed Reflow time: 2x max

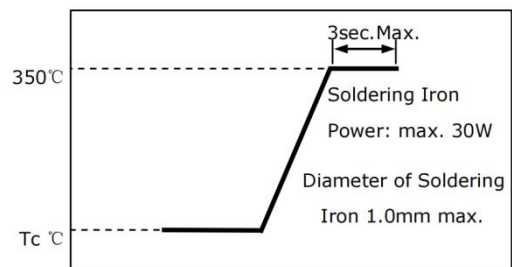
Note: The reflow profile in the above table is only for qualification and is not meant to specify board assembly profiles. Actual board assembly profiles must be based on the customer's specific board design, solder paste and process, and should not exceed the parameters as the Reflow profile shows.



Iron Soldering Profile

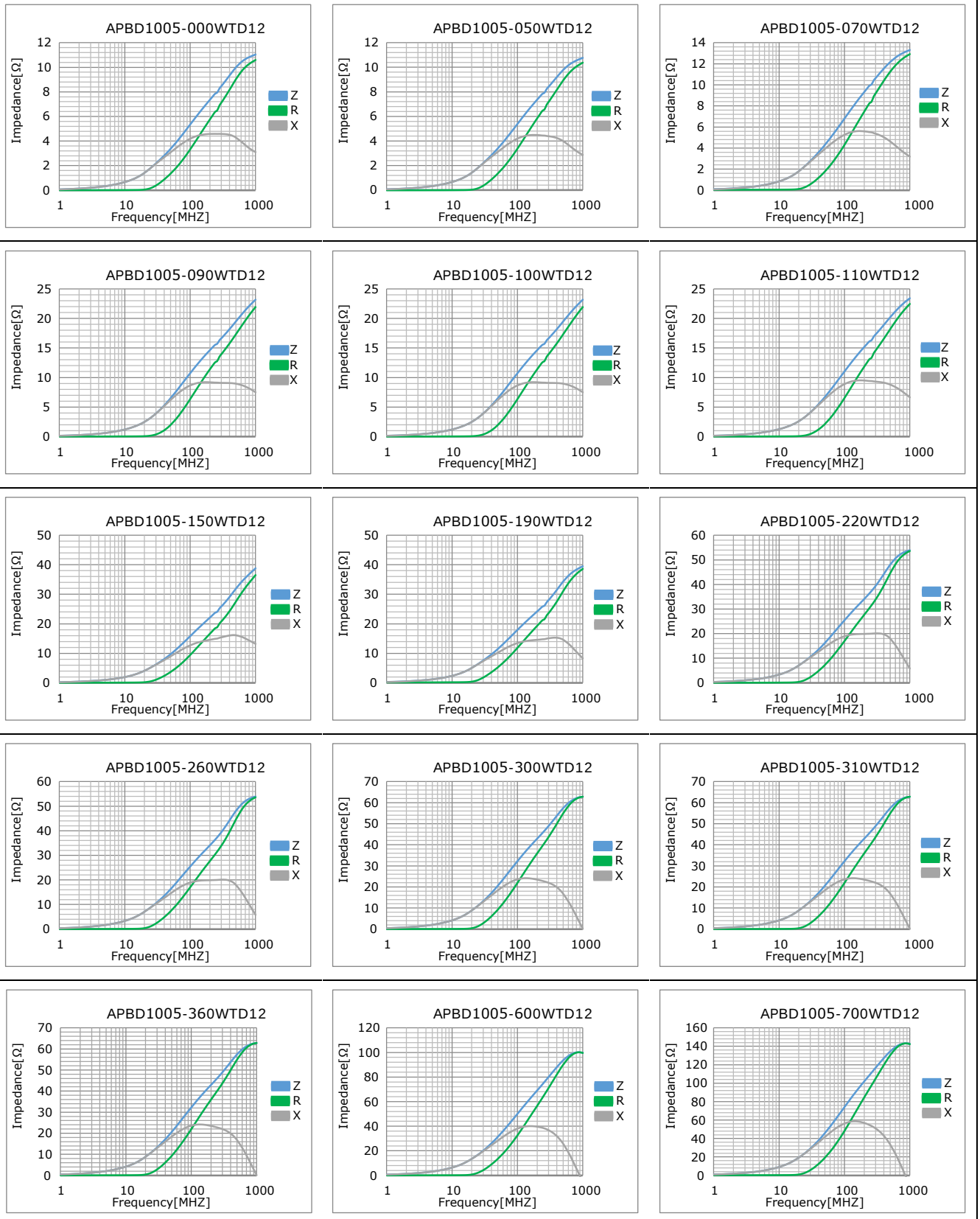
- ◆ Iron soldering power: Max.30W
- ◆ Pre-heating: $150^\circ\text{C} / 60\text{sec.}$
- ◆ Soldering Tip temperature: 350°C Max.
- ◆ Soldering time: 3sec Max.
- ◆ Solder paste: Sn/3.0Ag/0.5Cu
- ◆ Max.1 times for iron soldering

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

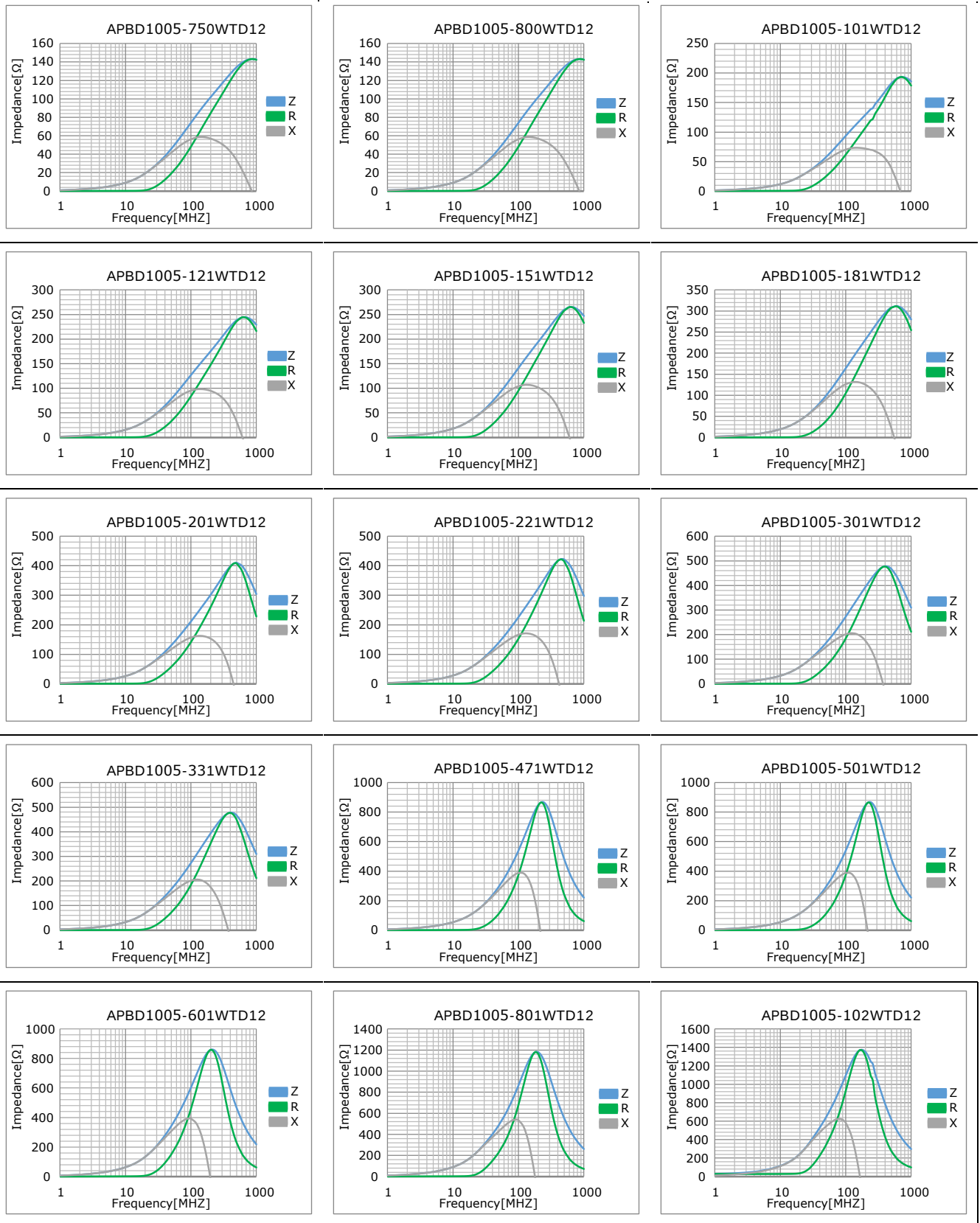


PRODUCT CHARACTERISTIC CURVE 电气特性

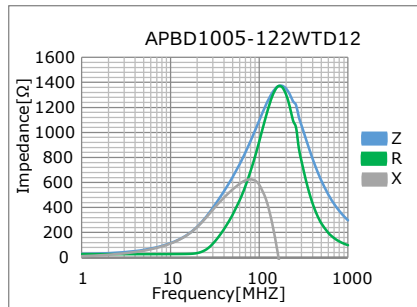
APBD1005 Series



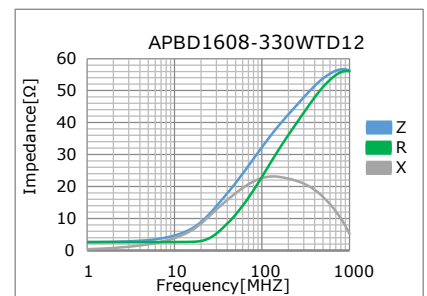
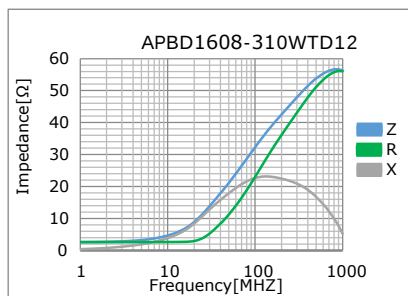
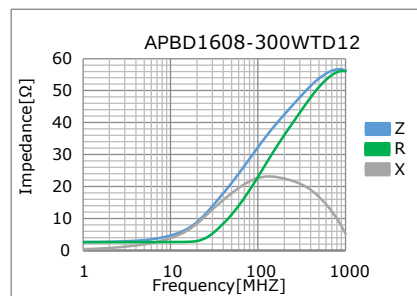
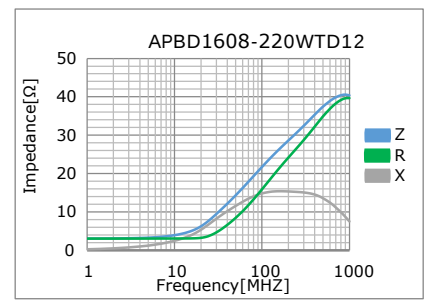
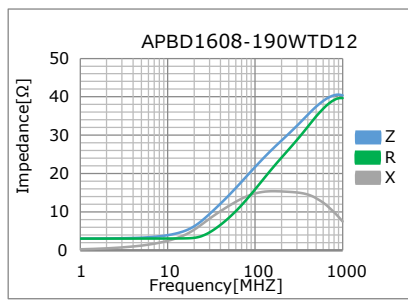
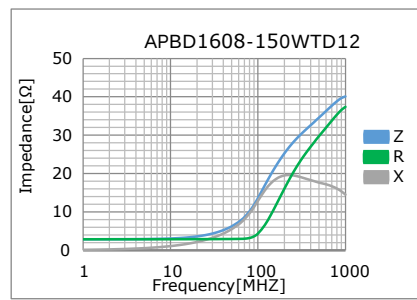
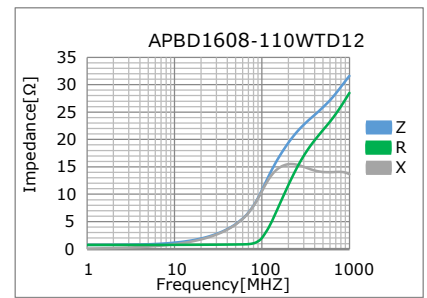
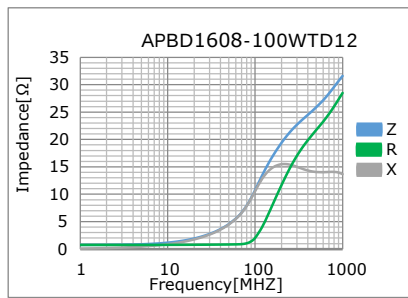
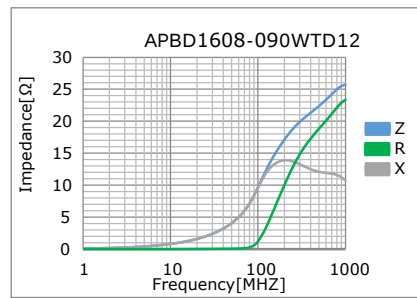
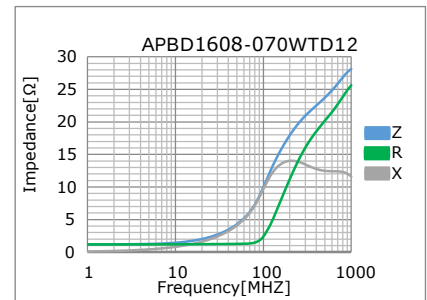
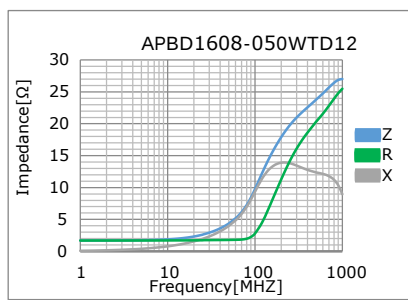
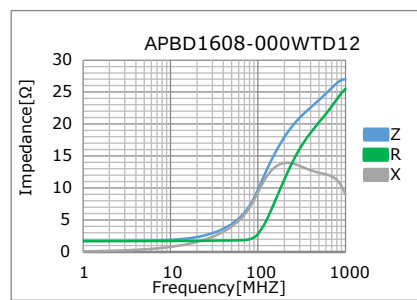
APBD1005 Series

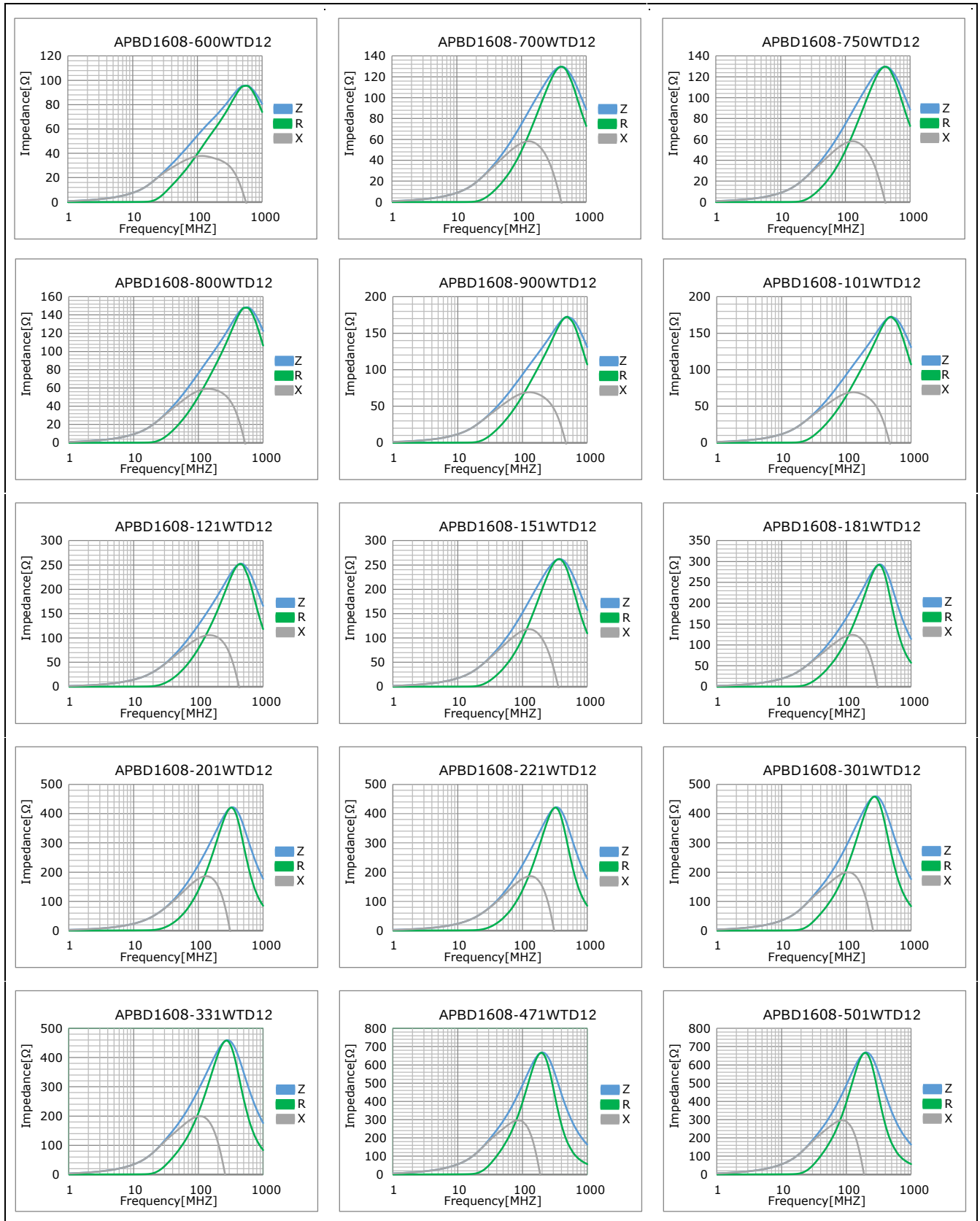


APBD1005 Series

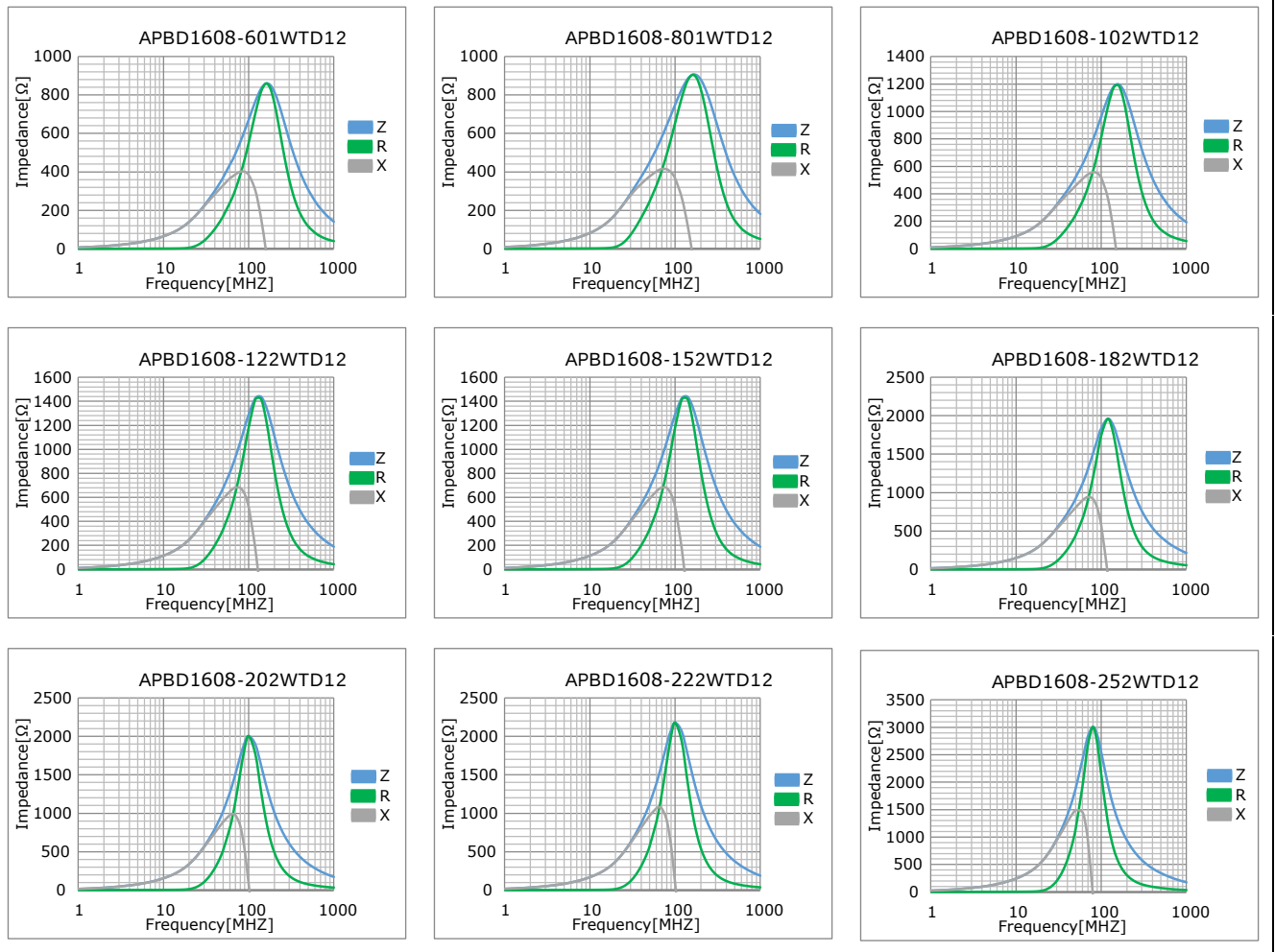


APBD1608 Series

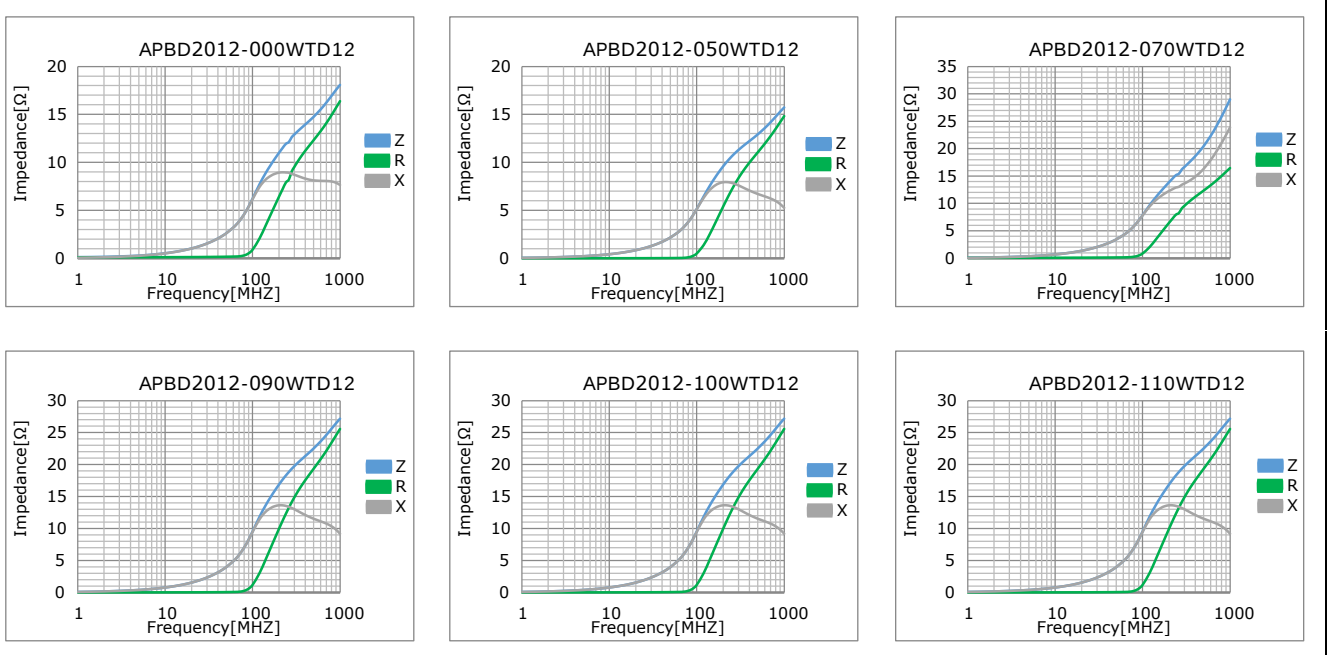




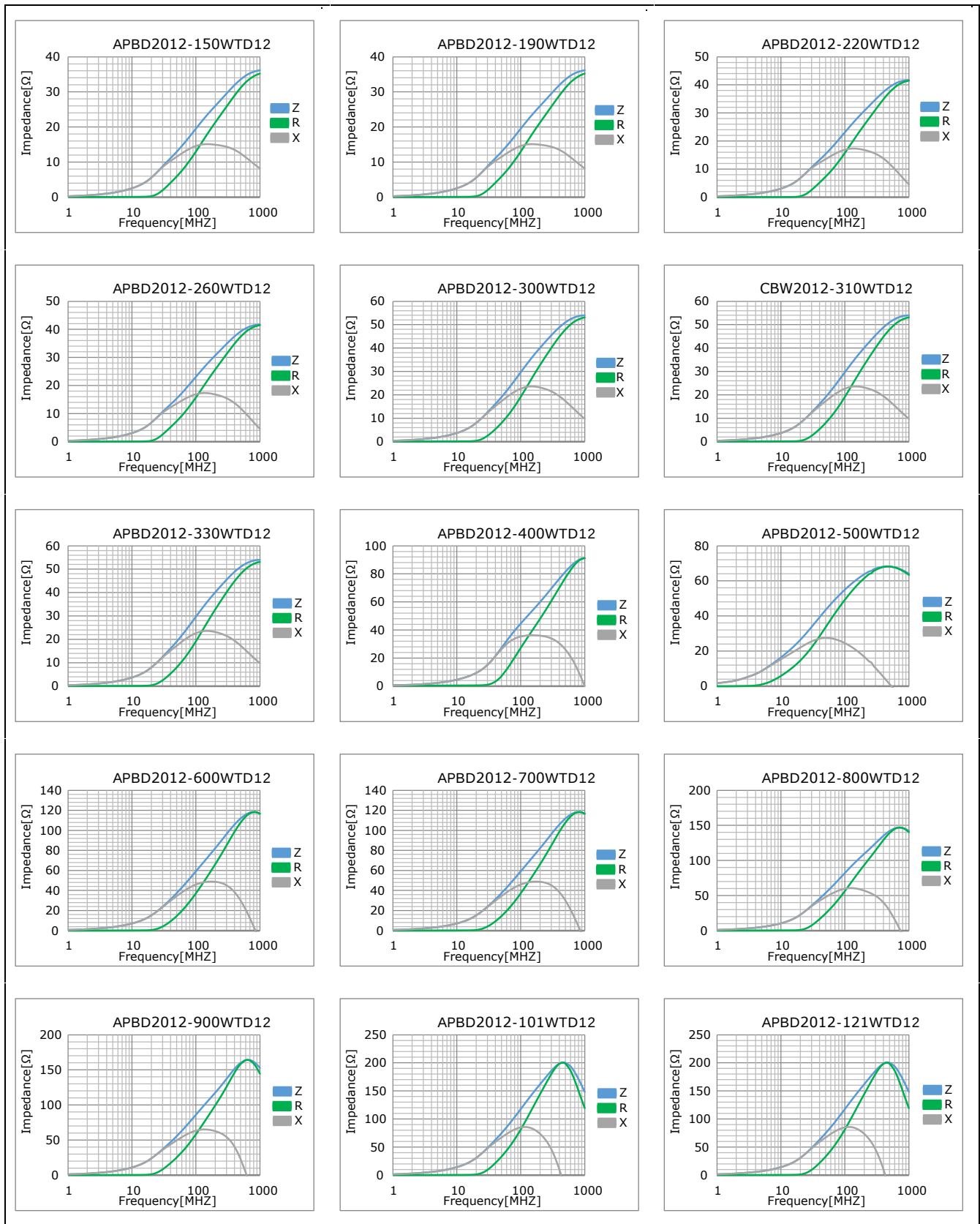
APBD1608 Series

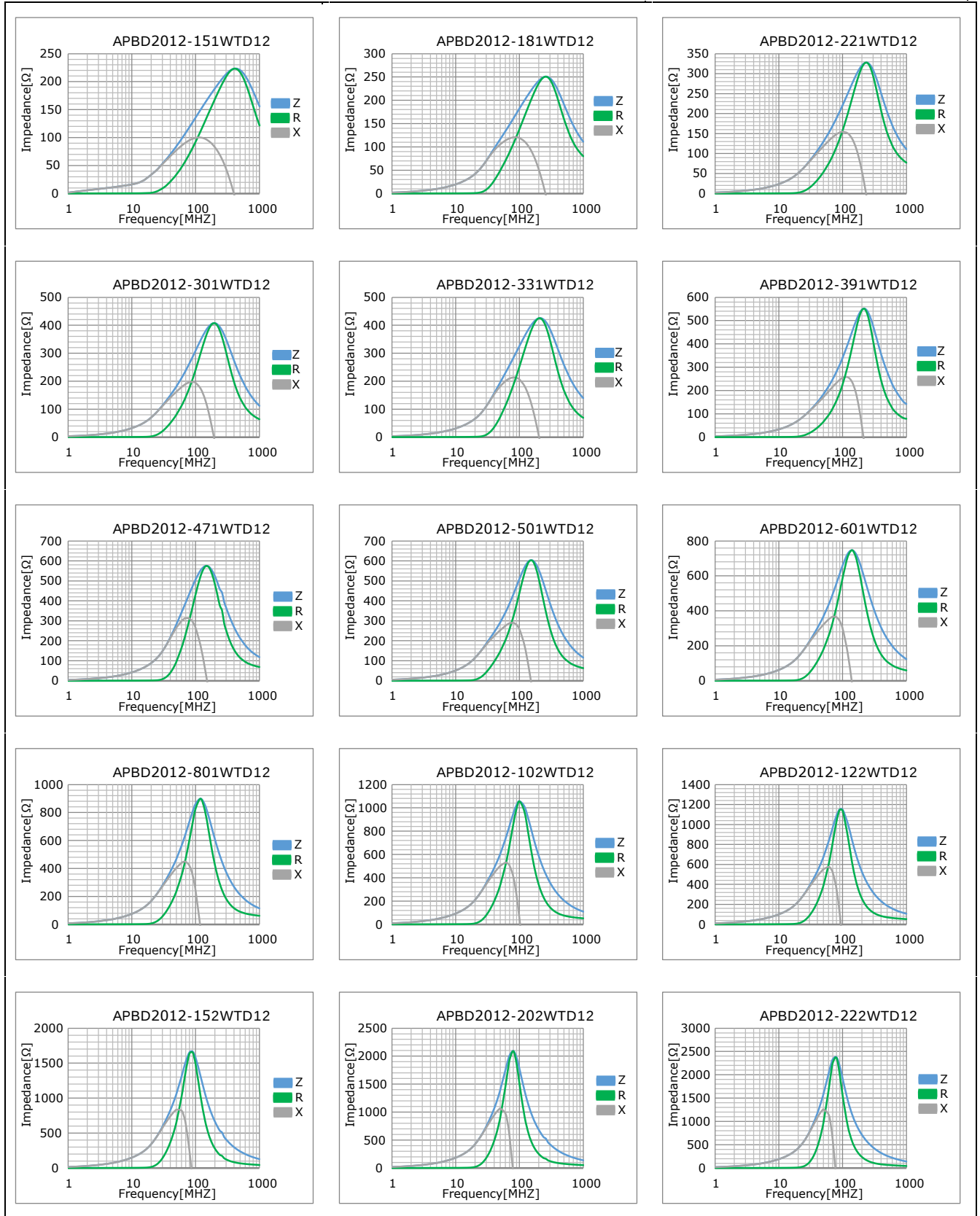


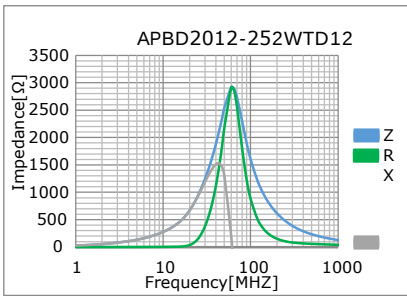
APBD2012 Series



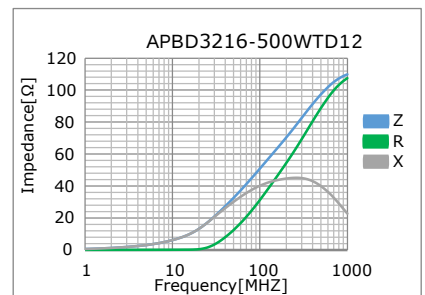
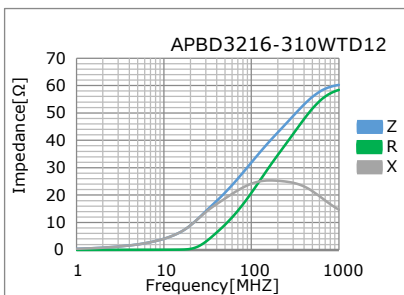
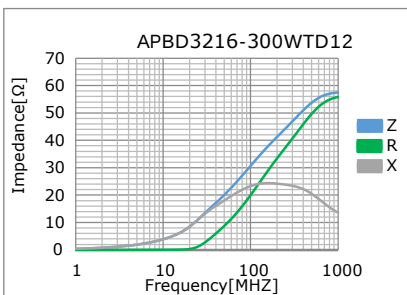
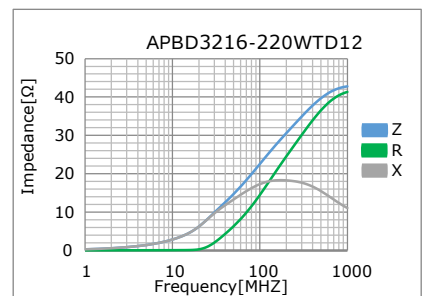
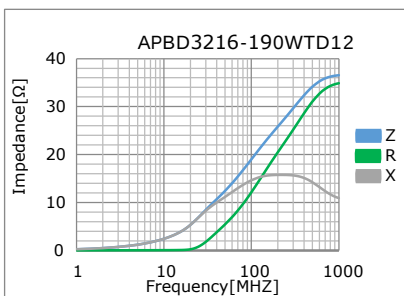
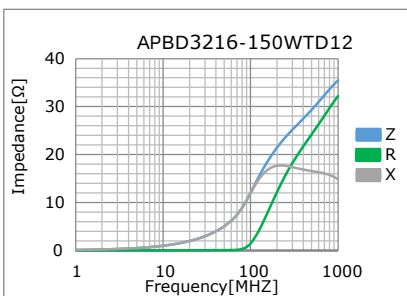
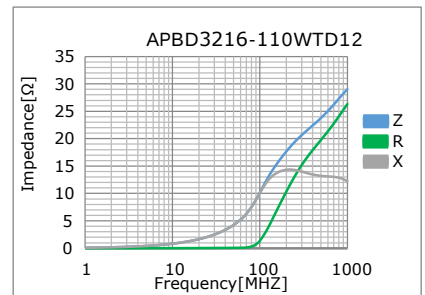
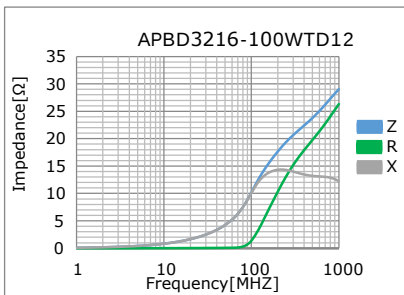
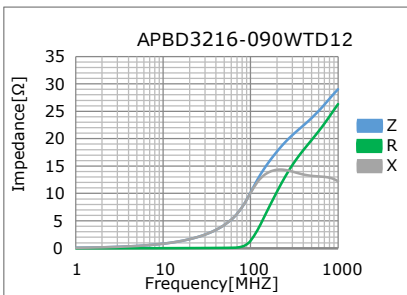
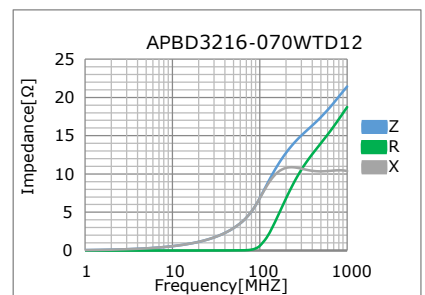
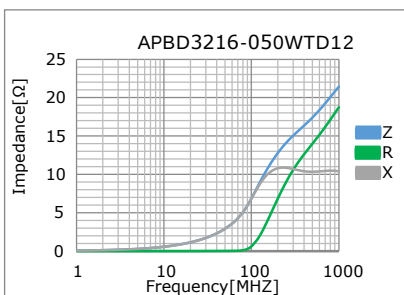
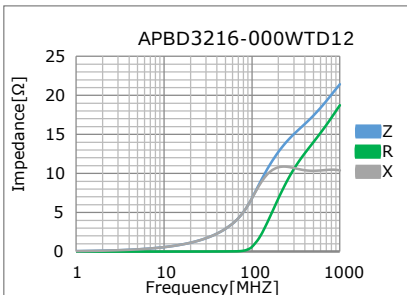
Specifications subject to change without notice. Please check our website for latest information.

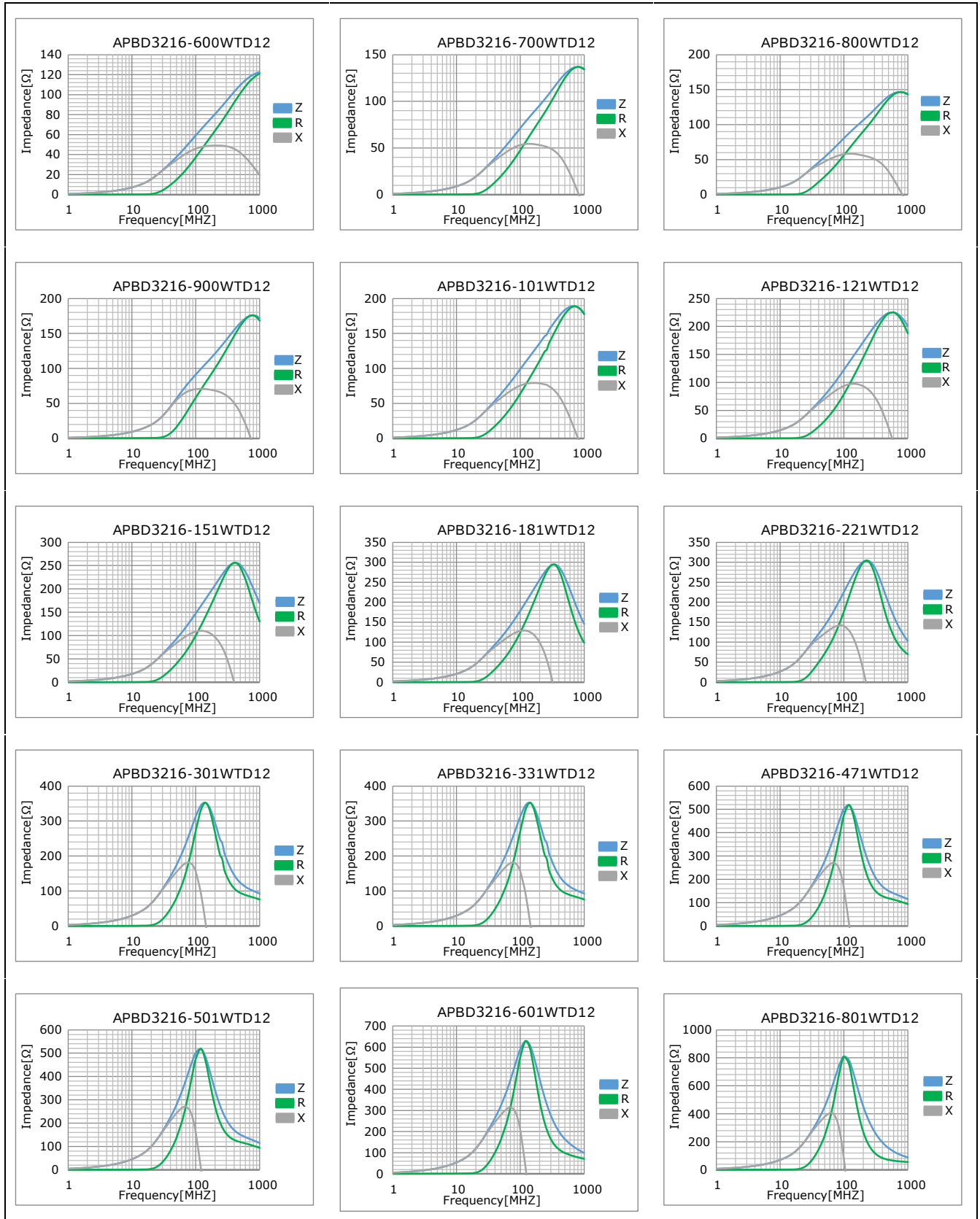


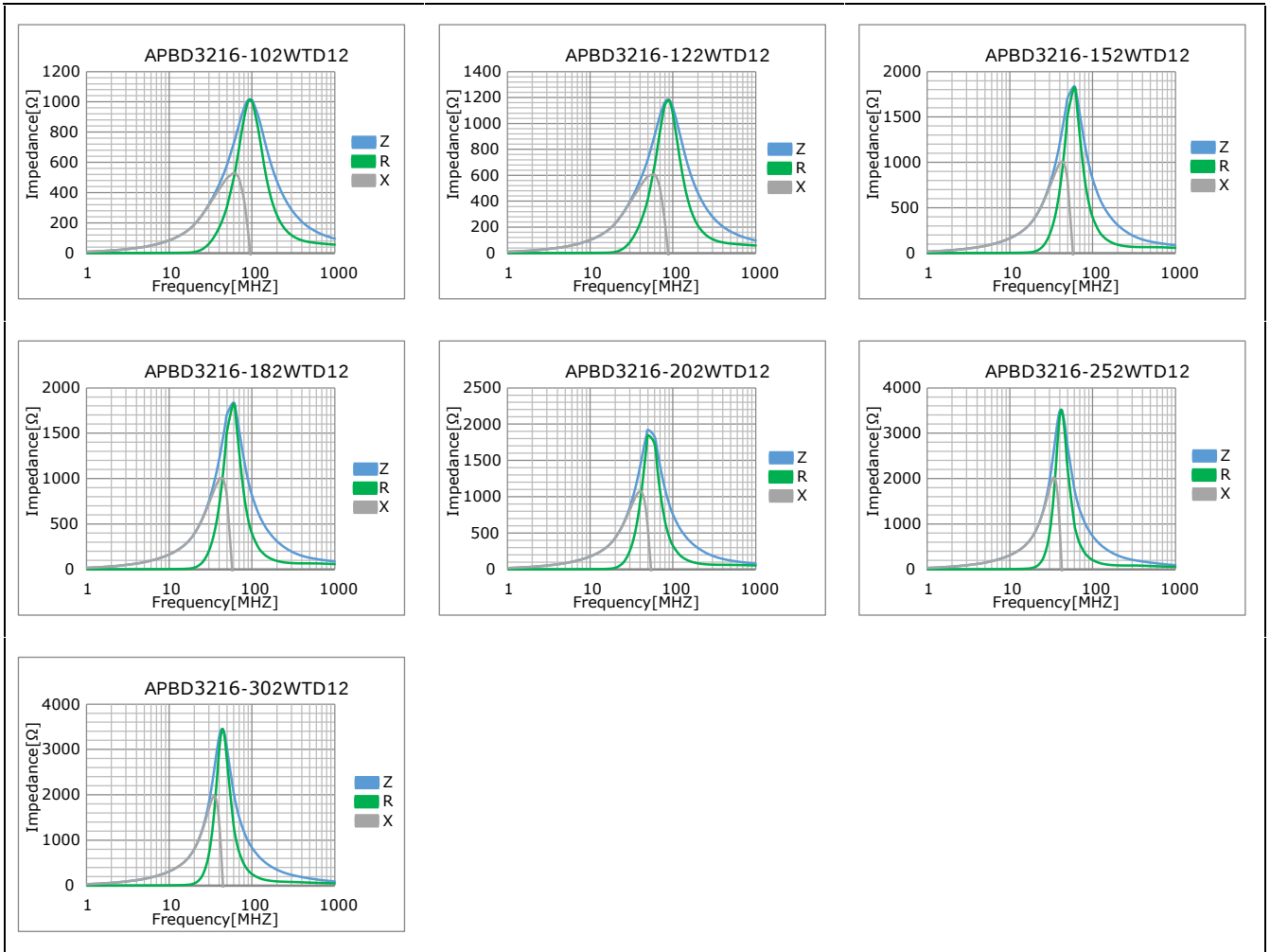




APBD3216 Series







 Safety Reminders 注意事项

SAFETY REMINDERS

- The storage period is within 12 months. Be sure to follow the storage conditions (temperature: 15 to 35°C, humidity: 75% RH or less). If the storage period elapses, the soldering of the terminal electrodes may deteriorate.
- Do not use or store in locations where there are conditions such as gas corrosion (salt, acid, alkali, etc.).
- Soldering corrections after mounting should be within the range of the conditions determined in the specifications. If overheated, a short circuit, performance deterioration, or lifespan shortening may occur.
- When embedding a printed circuit board where a chip is mounted to a set, be sure that residual stress is not given to the chip due to the overall distortion of the printed circuit board and partial distortion such as at screw tightening portions.
- Self heating (temperature increase) occurs when the power is turned ON, so the tolerance should be sufficient for the set thermal design.
- This product is not designed for production processes involving ultrasonic welding, as high-frequency vibration may cause application issues such as product detachment and breakage.
- Carefully layout the coil for the circuit board design of the non-magnetic shield type. A malfunction may occur due to magnetic interference.
- Use a wrist band to discharge static electricity in your body through the grounding wire.
- Do not expose the products to magnets or magnetic fields.
- Do not use for a purpose outside of the contents regulated in the delivery specifications.
- The products listed on this catalog are intended for use in general electronic equipment, under a normal operation and use condition.

The Company shall not guarantee the suitability, performance, or quality for the following applications that require a high level of safety and reliability, or where equipment failure, malfunction, or abnormal operation may cause damage to human life, physical well-being, or property, and may have significant social impacts (hereinafter referred to as "specific applications"). If you intend to use this product in the application scenarios listed below, or if you have special requirements exceeding the scope or conditions specified in each product catalog, please contact us.

- (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.