

RF Inductor

Automotive Grade

ASCQ Series



Overview

RF inductors are designed to operate at high frequencies, typically in the MHz to GHz range. Unlike power inductors, RF inductors are optimized for signal processing in radio frequency (RF) circuits. They play a vital role in tuning, filtering and impedance matching in communication and signal transmission systems.

Benefits

1. Automotive grade available
2. Excellent high frequency application
3. High Q factor and SRF value
4. Miniaturization

Applications

1. Automotive for infotainment systems, GPS, and radar for ADAS
2. RF matching circuit requiring Q value
3. Bluetooth, WLAN, UWB, digital TV tuners and high-frequency circuit and module

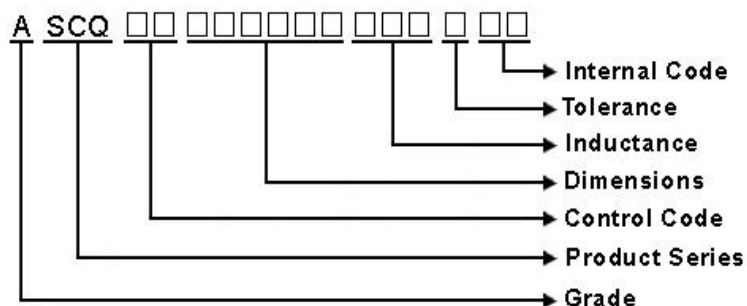
Product Information

Series	Size Code (JIS/EIA)	Inductance (nH)
ASCQ	0603/0201	0.6 ~ 22



1 Scope: This specification applies to Multilayer Chip Inductors for Automotive Electronics based on AEC-Q200 except for Power train and Safety.

2 Part Numbering:



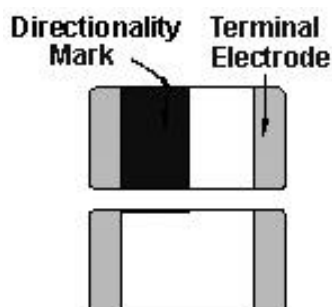
3 Rating:

Operating Temperature: - 5 5 °C ~ 1 2 5 °C

Storage Temperature: - 5 5 °C ~ 1 2 5 °C(after PCB)

- 5 °C~4 0 °C,Humidity 4 0 %~7 0 %(before PCB)

4 Marking:



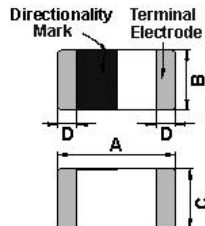
5 Standard Testing Condition

	Unless otherwise specified	In case of doubt
Temperature	Ordinary Temperature(15 to 35°C)	20 to 30°C
Humidity	Ordinary Humidity(25 to 85% RH)	50 to 80 %RH

ASCQ00060303 Series Specification

AEC-Q200

6 Configuration and Dimensions:



Dimensions in mm

TYPE	060303
A	0.60±0.03
B	0.30±0.03
C	0.30±0.03
D	0.15±0.05

Net Weight (grms)

Size Code	Net Weight (grms)
ASCQ00060303	0.000175

7 Electrical Characteristics:

Part No.	Inductance (nH)	L,Q Test Freq.	Q Min.	SRF (MHz)Min.	RDC (Ω)Max.	IDC (mA)Max.	Tolerance
ASCQ000603030N6□00	0.6	500 MHz,500 mV	14	10000	0.06	900	B
ASCQ000603030N7□00	0.7	500 MHz,500 mV	14	10000	0.06	900	B
ASCQ000603030N8□00	0.8	500 MHz,500 mV	14	10000	0.06	900	B
ASCQ000603030N9□00	0.9	500 MHz,500 mV	14	10000	0.06	900	B
ASCQ000603031N0□00	1	500 MHz,500 mV	14	10000	0.07	850	B
ASCQ000603031N1□00	1.1	500 MHz,500 mV	14	10000	0.07	850	B
ASCQ000603031N2□00	1.2	500 MHz,500 mV	14	10000	0.08	800	B
ASCQ000603031N3□00	1.3	500 MHz,500 mV	14	10000	0.09	760	B
ASCQ000603031N4□00	1.4	500 MHz,500 mV	14	10000	0.12	640	B
ASCQ000603031N5□00	1.5	500 MHz,500 mV	14	10000	0.15	600	B
ASCQ000603031N6□00	1.6	500 MHz,500 mV	14	10000	0.19	510	B
ASCQ000603031N7□00	1.7	500 MHz,500 mV	14	10000	0.11	680	B
ASCQ000603031N8□00	1.8	500 MHz,500 mV	14	10000	0.12	640	B
ASCQ000603031N9□00	1.9	500 MHz,500 mV	14	10000	0.13	620	B
ASCQ000603032N0□00	2	500 MHz,500 mV	14	10000	0.15	600	B
ASCQ000603032N1□00	2.1	500 MHz,500 mV	14	10000	0.16	550	B
ASCQ000603032N2□00	2.2	500 MHz,500 mV	14	10000	0.2	500	B
ASCQ000603032N3□00	2.3	500 MHz,500 mV	14	10000	0.24	460	B
ASCQ000603032N4□00	2.4	500 MHz,500 mV	14	10000	0.26	430	B
ASCQ000603032N5□00	2.5	500 MHz,500 mV	14	10000	0.28	415	B
ASCQ000603032N6□00	2.6	500 MHz,500 mV	14	10000	0.3	405	B
ASCQ000603032N7□00	2.7	500 MHz,500 mV	14	10000	0.32	400	B
ASCQ000603032N8□00	2.8	500 MHz,500 mV	14	9500	0.2	500	B
ASCQ000603032N9□00	2.9	500 MHz,500 mV	14	9300	0.22	480	B
ASCQ000603033N0□00	3	500 MHz,500 mV	14	9100	0.24	460	B

NOTE: □-tolerance B=±0.1nH / C=±0.2nH / S=±0.3nH / H=±3% / J=±5%

1.Operating temperature range - 5 5 °C ~ 1 2 5 °C

2.IDC:Applied the current to coils, the inductance shall be less than 10% initial value.

3.Residual impedance of short chip : 0.48nH

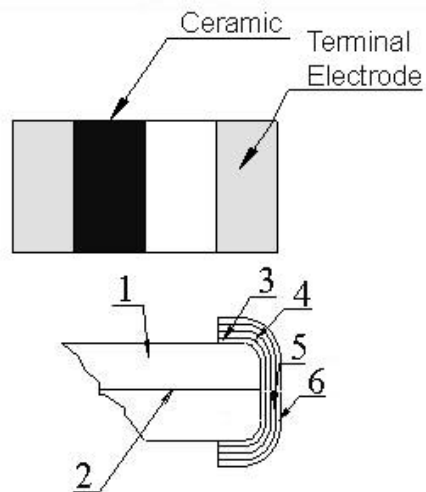
ASCQ00060303 Series Specification

AEC-Q200

Part No.	Inductance (nH)	L,Q Test Freq.	Q Min.	SRF (MHz)Min.	RDC (Ω)Max.	IDC (mA)Max.	Tolerance
ASCQ000603033N1□00	3.1	500 MHz,500 mV	14	8900	0.25	450	B
ASCQ000603033N2□00	3.2	500 MHz,500 mV	14	8700	0.28	415	B
ASCQ000603033N3□00	3.3	500 MHz,500 mV	14	8600	0.28	415	B
ASCQ000603033N4□00	3.4	500 MHz,500 mV	14	8400	0.29	410	B
ASCQ000603033N5□00	3.5	500 MHz,500 mV	14	8200	0.3	405	B
ASCQ000603033N6□00	3.6	500 MHz,500 mV	14	8100	0.32	400	B
ASCQ000603033N7□00	3.7	500 MHz,500 mV	14	8000	0.36	370	B
ASCQ000603033N8□00	3.8	500 MHz,500 mV	14	7800	0.4	355	B
ASCQ000603033N9□00	3.9	500 MHz,500 mV	14	7700	0.41	350	B
ASCQ000603034N3□00	4.3	500 MHz,500 mV	14	6500	0.48	320	C
ASCQ000603034N7□00	4.7	500 MHz,500 mV	14	6400	0.42	350	C
ASCQ000603035N1□00	5.1	500 MHz,500 mV	14	6100	0.45	330	C
ASCQ000603035N6□00	5.6	500 MHz,500 mV	14	5500	0.47	325	C
ASCQ000603036N2□00	6.2	500 MHz,500 mV	14	5100	0.52	305	C
ASCQ000603036N8□00	6.8	500 MHz,500 mV	14	4800	0.55	305	H
ASCQ000603037N5□00	7.5	500 MHz,500 mV	14	4600	0.55	305	H
ASCQ000603038N2□00	8.2	500 MHz,500 mV	14	4300	0.57	290	H
ASCQ000603039N1□00	9.1	500 MHz,500 mV	14	4000	0.65	270	H
ASCQ0006030310N□00	10	500 MHz,500 mV	14	3800	0.85	230	H
ASCQ0006030312N□00	12	500 MHz,500 mV	12	3300	0.85	230	H
ASCQ0006030315N□00	15	500 MHz,500 mV	12	2600	0.89	220	H
ASCQ0006030318N□00	18	500 MHz,500 mV	12	2300	1.05	205	H
ASCQ0006030322N□00	22	500 MHz,500 mV	12	1900	1.29	190	H

8 ASCQ00060303 Series

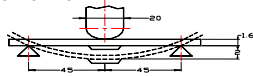
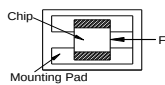
8.1 Construction:



8.2 Material List:

NO	PART	MATERIAL
1	Main Substance	Al ₂ O ₃ -B ₂ O ₃ -SiO ₂
2	Silver electrode	Ag
3	Silver electrode	Ag
4	Cu plating	Cu
5	Ni plating	Ni
6	Sn plating	Sn

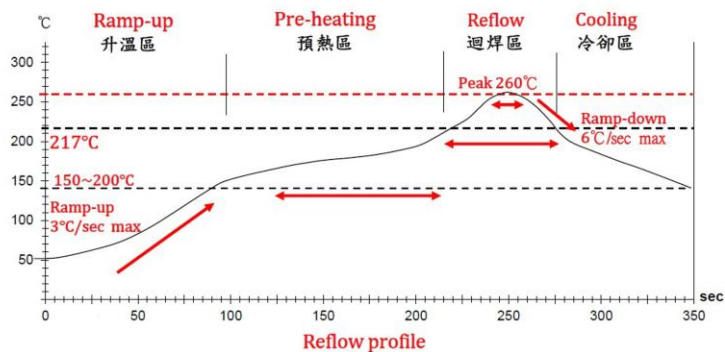
9 Reliability Of Ceramic Multilayer Chip Inductor For High Freq.

No	Item	Specification	Test Method
1-1-1	Board Flex	The forces applied on the right conditions must not damage the terminal electrode and the Ceramic.	Refer to AEC-Q200-005 Test device shall be soldered on the substrate Substrate Dimension: 100x40x1.6mm Deflection: 2.0mm Keeping Time: 60 sec 
1-1-2	Resistance to Soldering Heat	Appearance: No damage Inductance change shall be within $\pm 10\%$. Q change shall be within $\pm 30\%$	Refer to MIL-STD-202 Method 210 Pre-heating: 150-200°C, 60-100 sec Above 217°C, 60-150 secs Peak Temperature: 260 ± 5 °C, 20-40 sec Cycles : 2 times
1-1-3	Solder ability	The electrodes shall be at least 95% covered with new solder coating	Refer to J-STD-002 Pre-heating: 150°C, 1min Solder Composition: Sn/Ag3.0/Cu0.5(Pb-Free) Solder Temperature: 245 ± 5 °C (Pb-Free) Immersion Time: 4 ± 1 sec
1-1-4	Terminal Strength Test	The chip must not damage the terminal electrode and the Ceramic.	Refer to AEC-Q200-006 Test device shall be soldered on the substrate Force 2N for 60 ± 1 seconds for 0603 series Force 5N for 60 ± 1 seconds for 1005 series Force 10N for 60 ± 1 seconds for 1608 series Force 1.8Kg for 60 ± 1 seconds for the other series. 
1-1-5	Vibration Test	Appearance: No damage Inductance change shall be within $\pm 10\%$. Q change shall be within $\pm 30\%$	Refer to MIL-STD-202 Method 204 Vibration waveform: Sine waveform Vibration frequency: 10Hz~2000Hz Vibration acceleration: 5g 10Hz~20KHz and back to 10Hz should be down in 20 minutes Duration of test: 12 cycles each of 3 orientations, 20 minutes for each cycle, 12 hr total Vibration axes: X, Y & Z
1-1-6	Mechanical Shock Test	Appearance: No damage Inductance change shall be within $\pm 10\%$. Q change shall be within $\pm 30\%$	Refer to MIL-STD-202 Method 213 Units are non-operating. Pulse shape : Half-sine waveform Impact acceleration : 100 g Pulse duration : 6 ms Number of shocks : 18 shocks (3 shocks for each face)
1-1-7	Physical Dimension	The chip must not damage the terminal electrode and the Ceramic.	Refer to JESD22 Method JB-100 Verify physical dimensions to the applicable device specification. Note : User(s) and Suppliers spec. Electrical Test not Required.
1-1-8	Resistance to Solvent	There must be no change in appearance or obliteration of marking	Refer to MIL-STD-202 Method 215 Inductors must withstand 6 minutes of alcohol or water.
1-1-9	ESD	Appearance: No damage Inductance change shall be within $\pm 10\%$	Refer to AEC-Q200-002 ESD Rank 1C < 2kV

9 Reliability Of Ceramic Multilayer Chip Inductor For High Freq.

1-2.Environmental Performance

No	Item	Specification	Test Method
1-2-1	Temperature Cycle	Appearance: No damage Inductance change shall be within $\pm 10\%$. Q change shall be within $\pm 30\%$	Refer to JESD Method JA-104 Total cycles: 1000 cycles 30 minutes exposure to -40°C 30 minutes exposure to 125°C 1 min. maximum transition between temperatures Measured after exposure in the room condition for 24hrs
1-2-2	Biased Humidity Resistance		Refer to MIL-STD-202 Method 103 Temperature: $85 \pm 2^{\circ}\text{C}$ Relative Humidity: 85% / Time: 1000hrs Measured after exposure in the room condition for 24hrs
1-2-3	High Temperature Exposure (Storage)		Refer to MIL-STD-202 Method 108 Temperature: $125 \pm 3^{\circ}\text{C}$ / Relative Humidity: 0% Time: 1000hrs Measured after exposure in the room condition for 24hrs
1-2-4	Operational Life	Appearance: No damage Inductance change shall be within $\pm 10\%$.	Temperature: $125 \pm 3^{\circ}\text{C}$ Applied Current: Rated Current/ Time: 1000hrs Measured after exposure in the room condition for 24hrs



Lead-Free(LF)標準溫度分析範圍

Refer to J-STD-020C

管制項目 Item.	升温區 Ramp-up	預熱區 Pre-heating	迴焊區 Reflow	Peak Temp	冷卻區 Cooling
溫度範圍 Temp.scope	R.T ~ 150°C	150°C ~ 200°C	Above 217°C	260±5°C	Peak Temp.~150°C
標準時間 Time spec.	-	60 ~ 180 sec	60 ~ 150 sec	20 ~ 40 sec	-
實際時間 Time result	-	75 ~ 100 sec	90 ~ 120 sec	20 ~ 35 sec	-

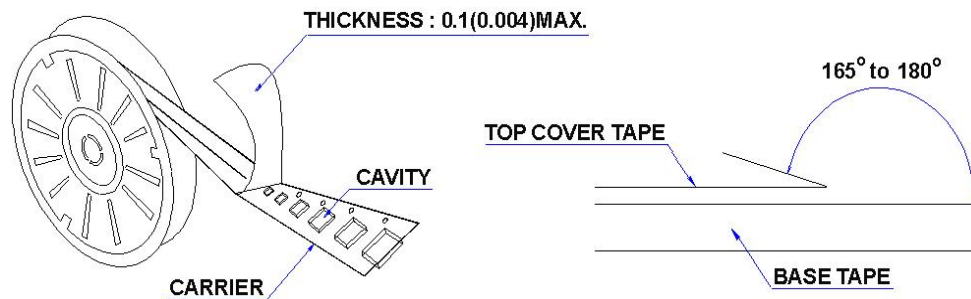
NOTE :

1. Re-flow possible times : within 2 times
2. Nitrogen adopted is recommended while in re-flow
3. Products can only be soldered with reflow

11 Packaging:

11.1 Packaging -Cover Tape

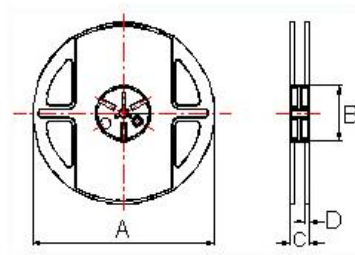
The force for tearing off cover tape is 10 to 100 grams in the arrow direction.



11.2 Packaging Quantity

TYPE	PCS/REEL
060303	15000

11.3 Reel Dimensions

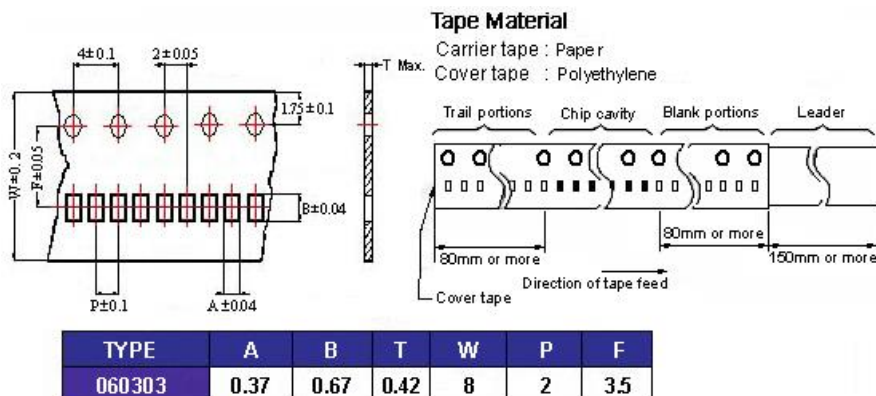


Dimensions in mm

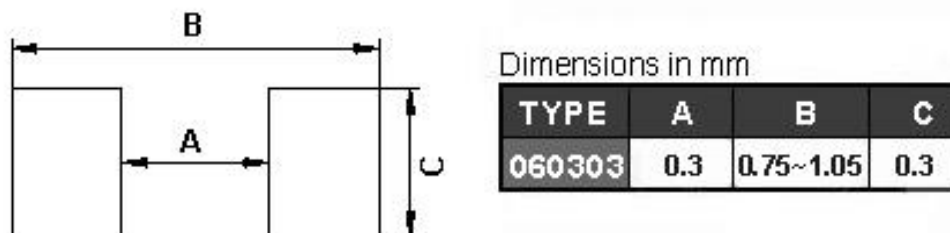
TYPE	A	B	C	D
060303	180	60	13	1.5

11 Packaging:

11.4 Tape Dimensions in mm



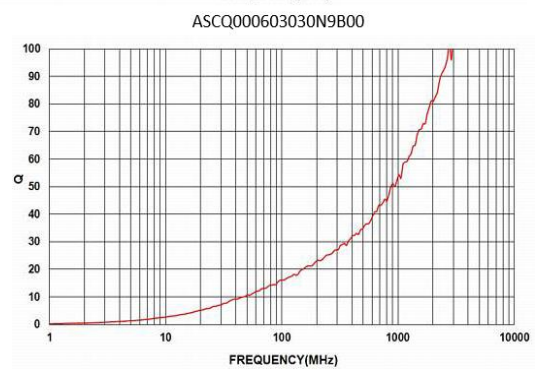
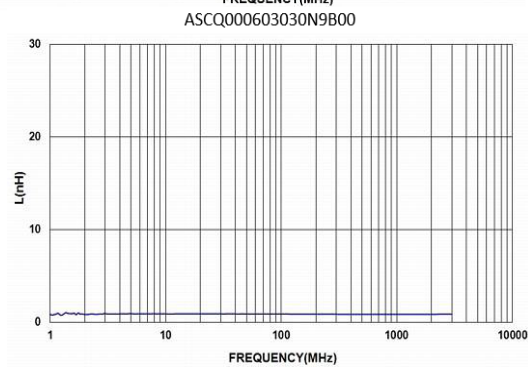
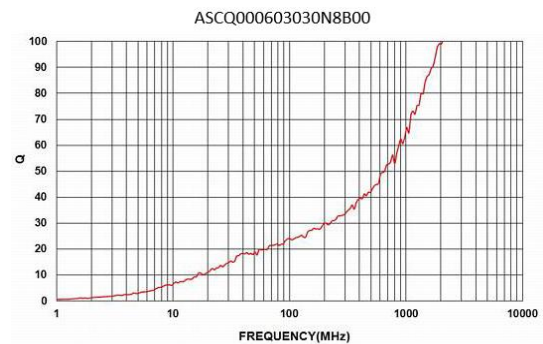
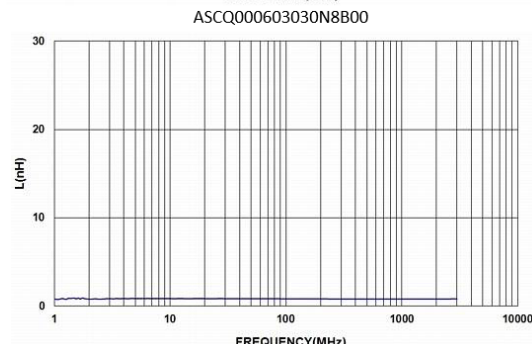
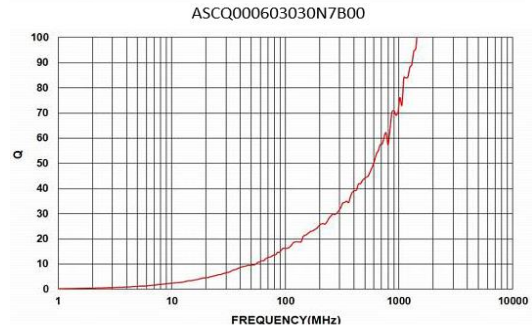
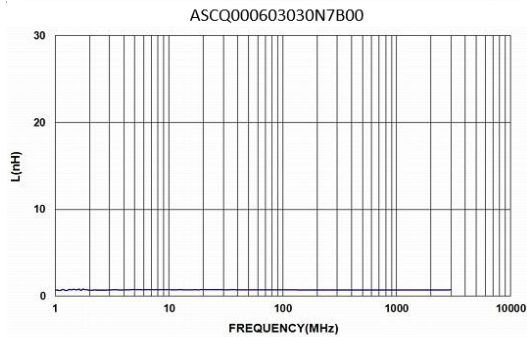
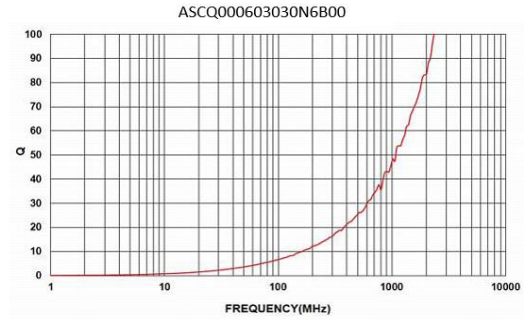
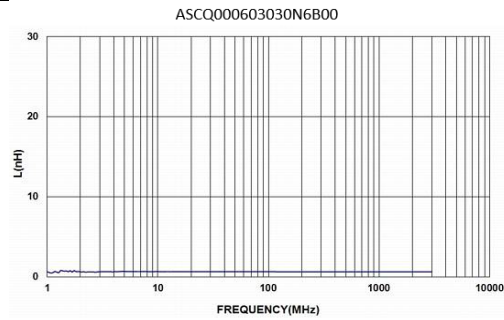
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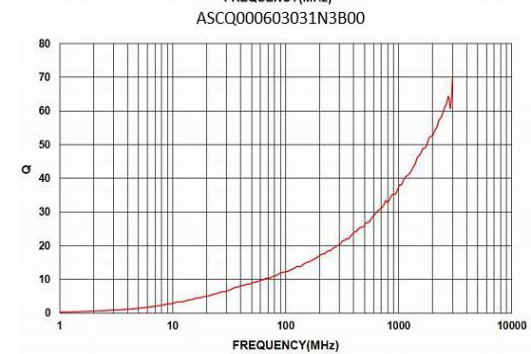
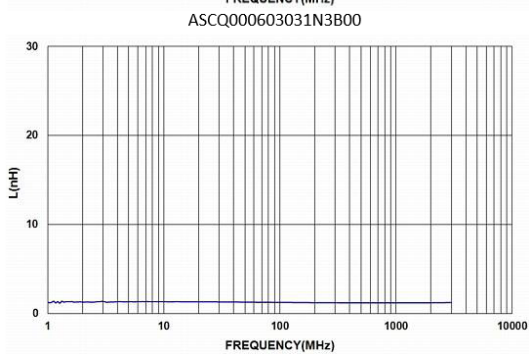
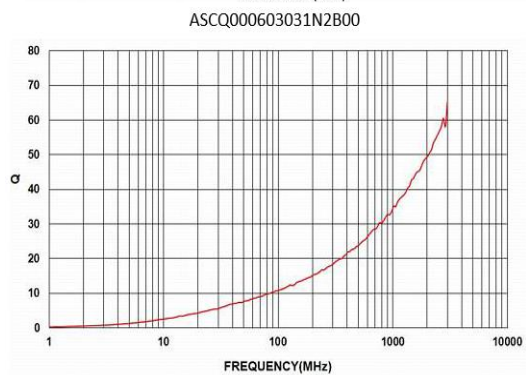
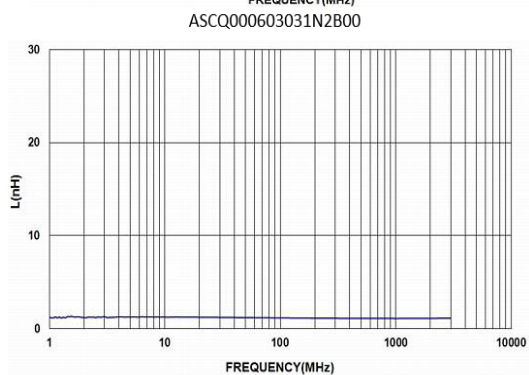
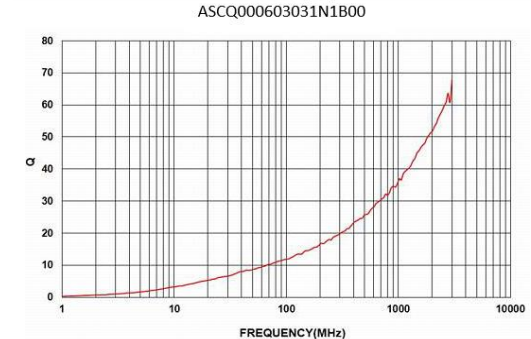
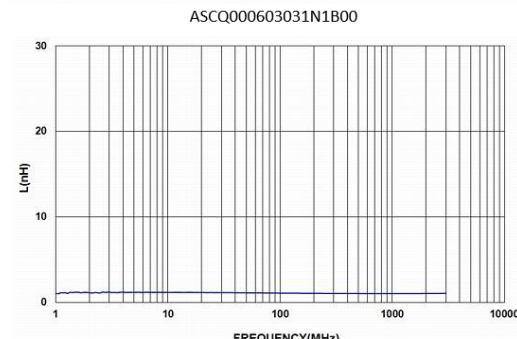
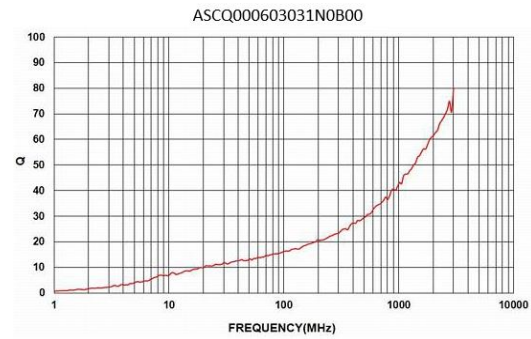
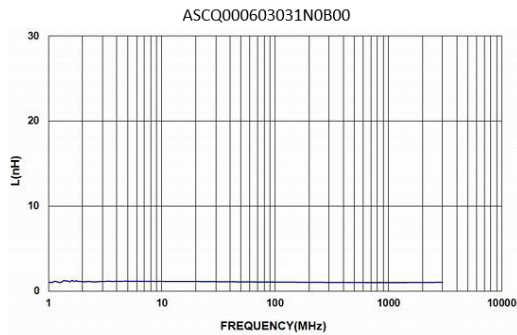
13 Note:

1. Please make sure that your product has been evaluated and confirmed against your specifications when our product is mounted to your product.
2. Do not knock nor drop.
3. All the items and parameters in this product specification have been prescribed on the premise that our product is used for the purpose, under the condition and in the environment agreed upon between you and us. You are requested not to use our product deviating from such agreement.
4. Please keep the distance between transformer/coil and other components (refer to the standard IEC 950)
5. The moisture sensitivity level (MSL) of products is classified as level 1.

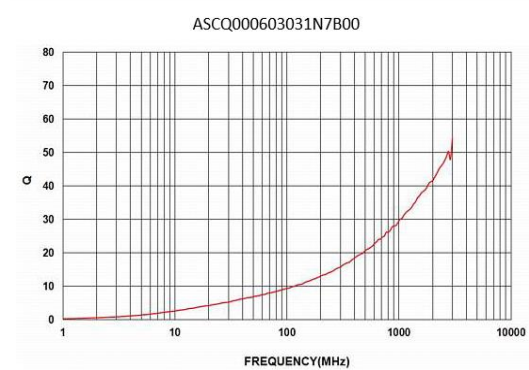
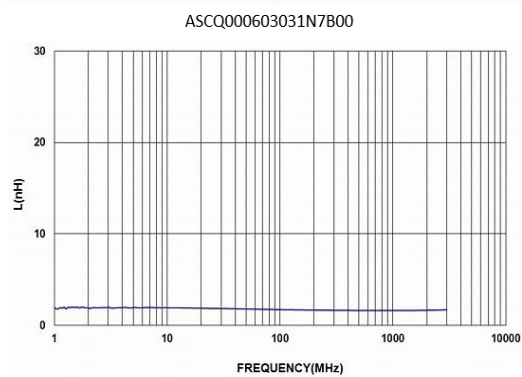
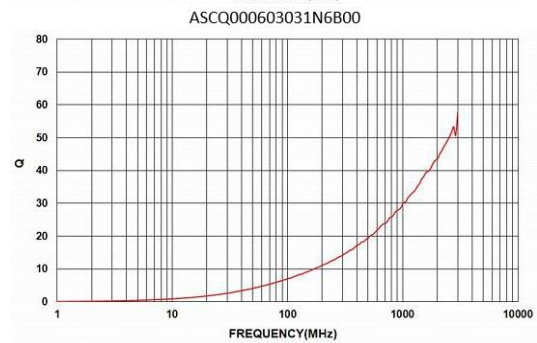
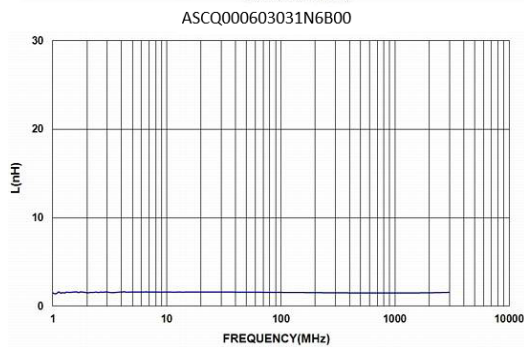
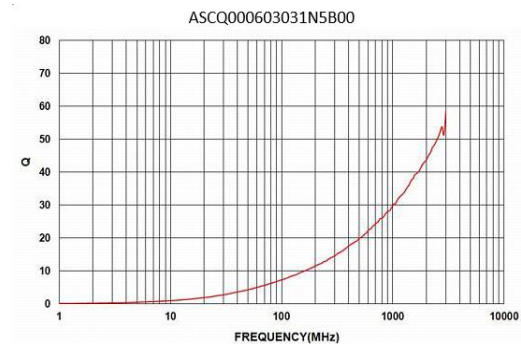
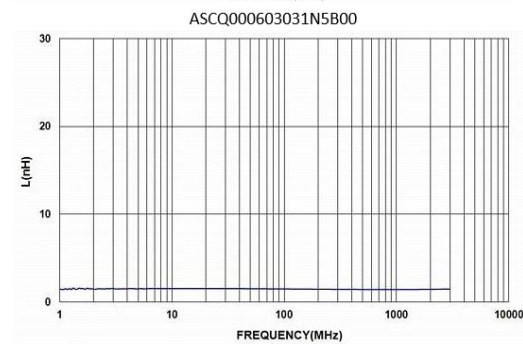
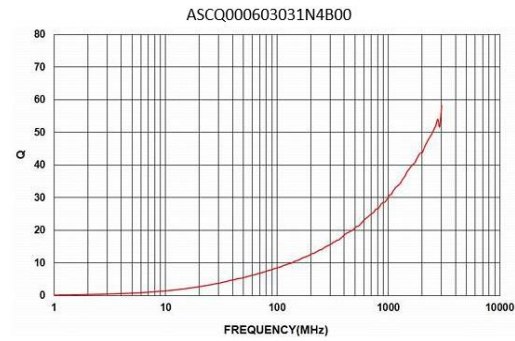
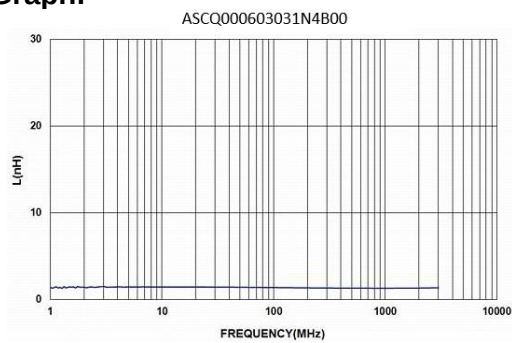
14 Graph:



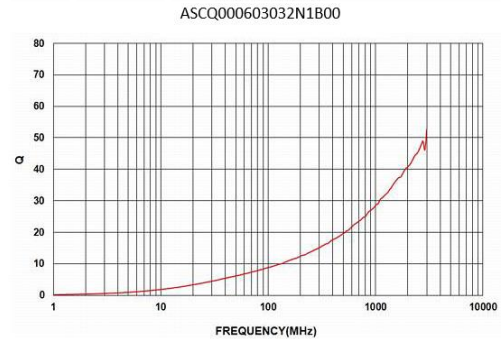
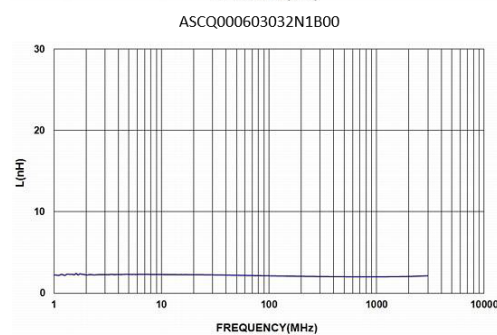
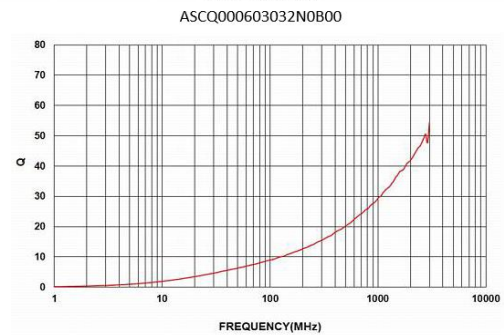
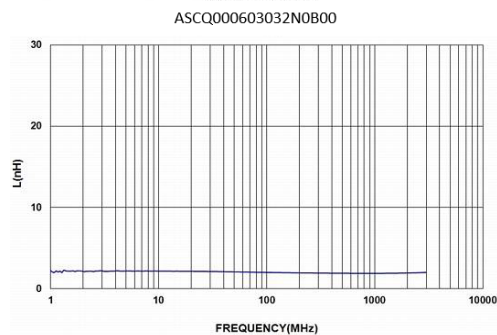
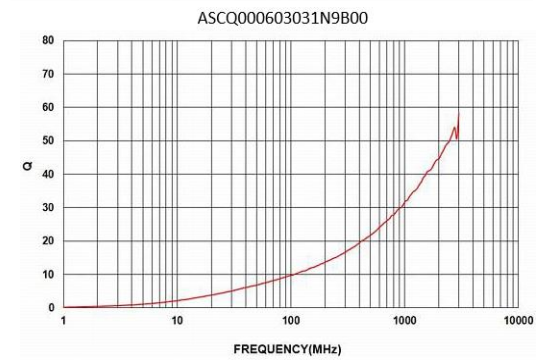
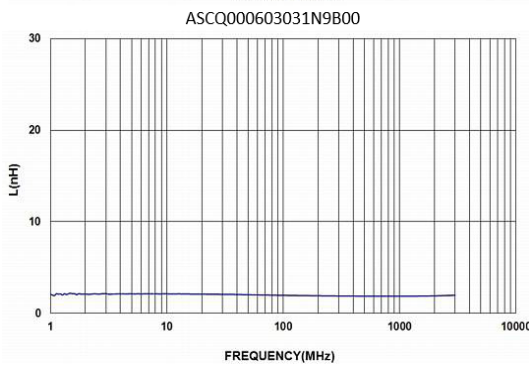
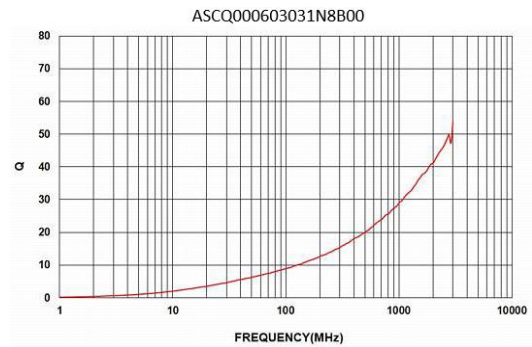
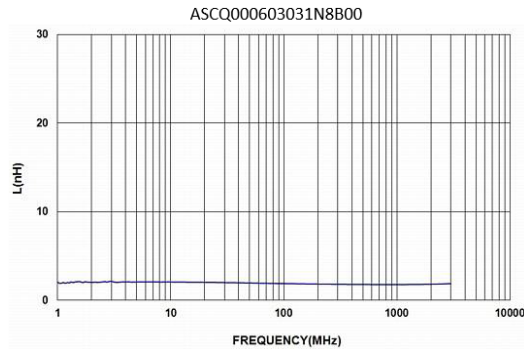
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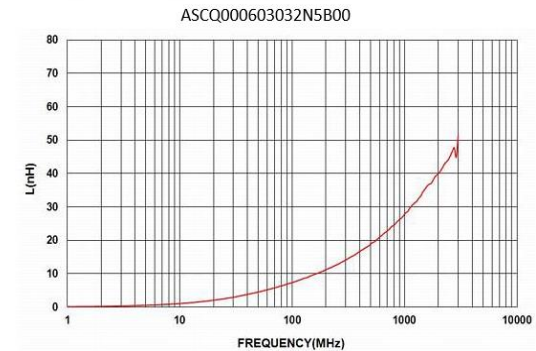
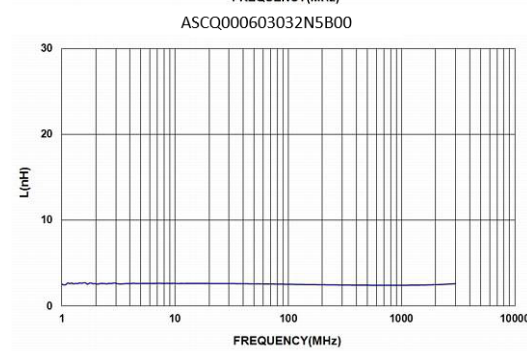
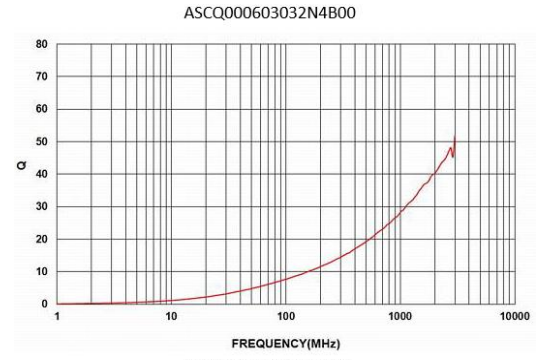
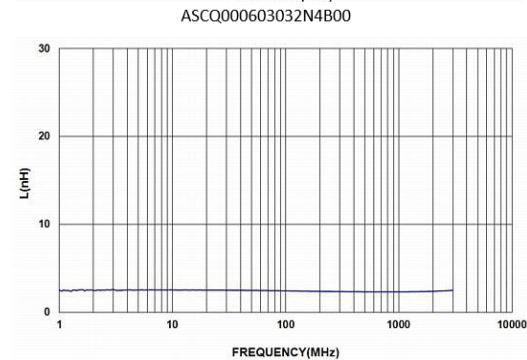
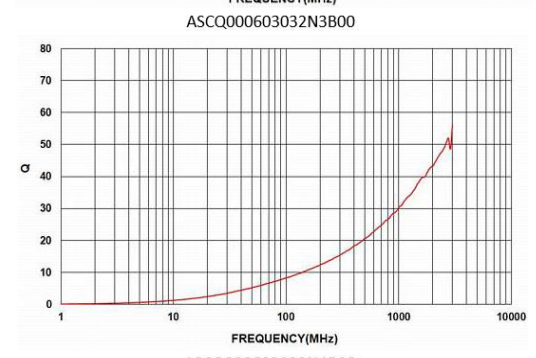
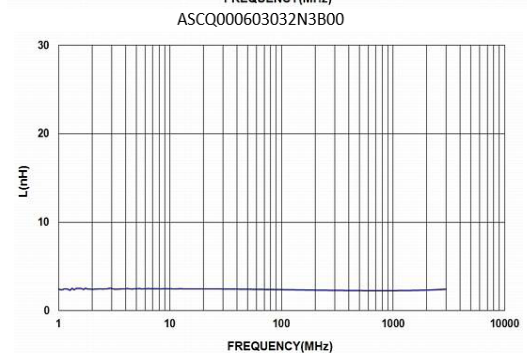
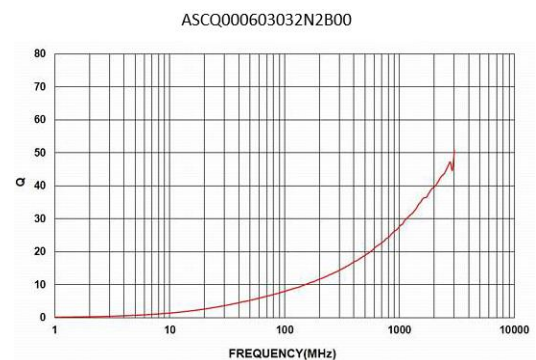
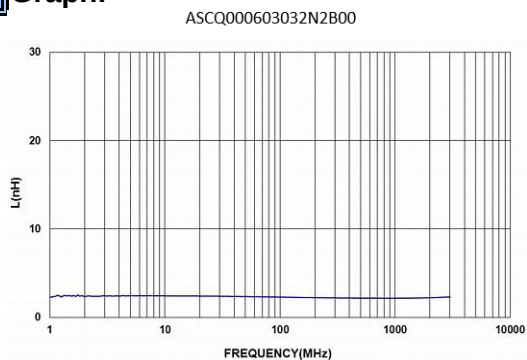
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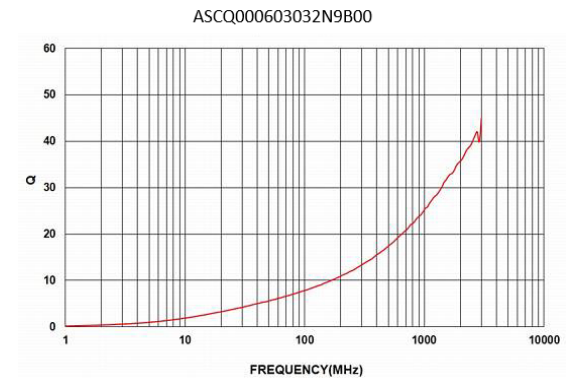
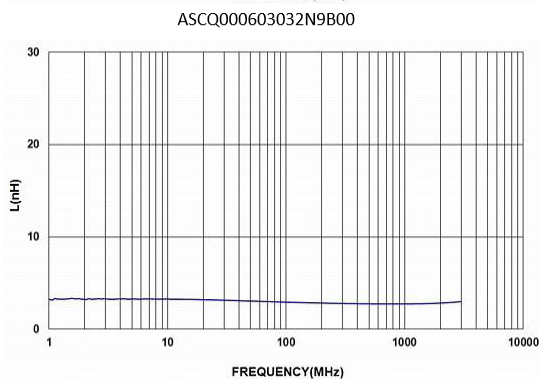
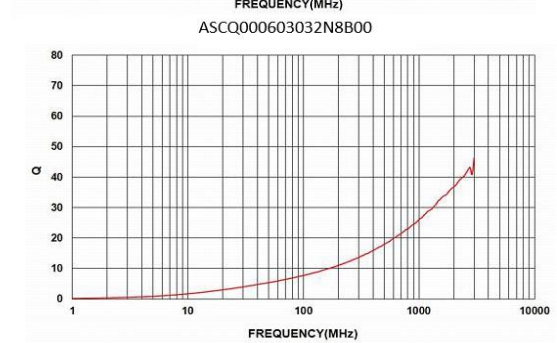
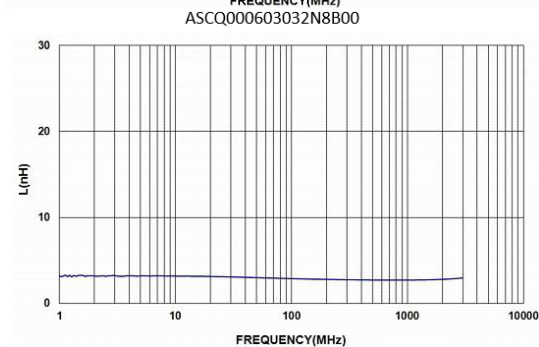
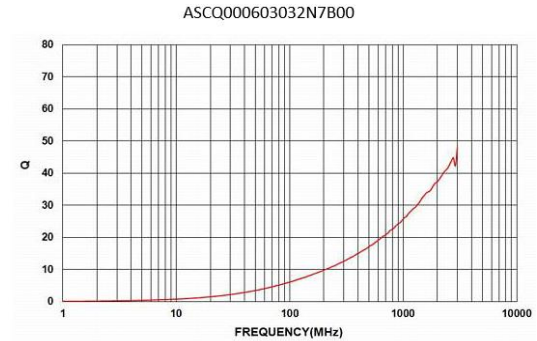
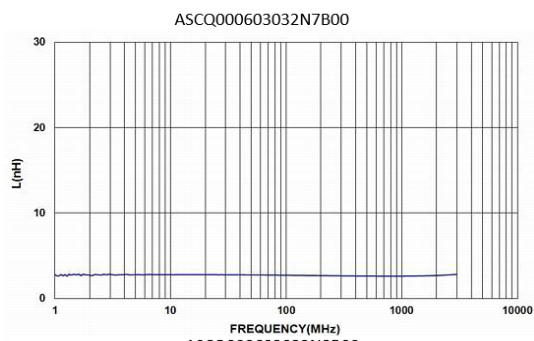
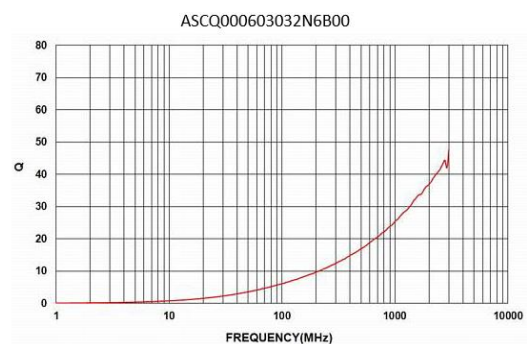
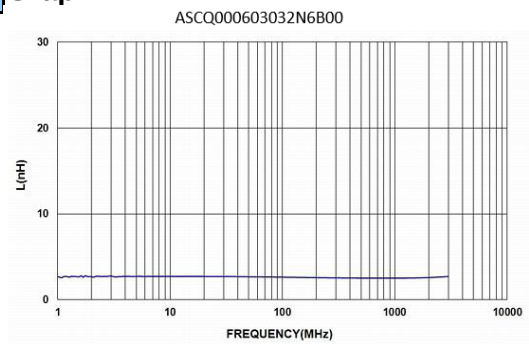
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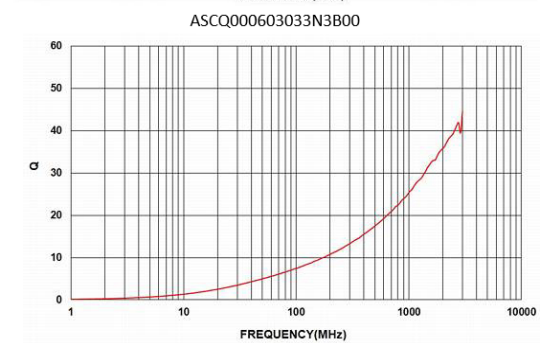
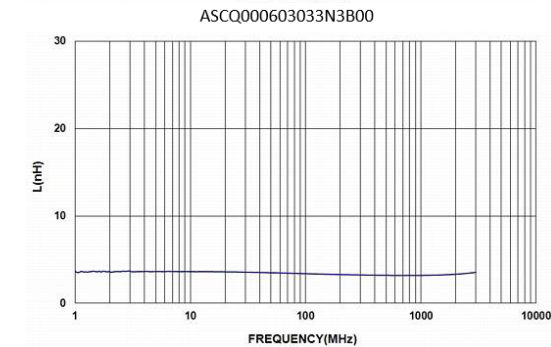
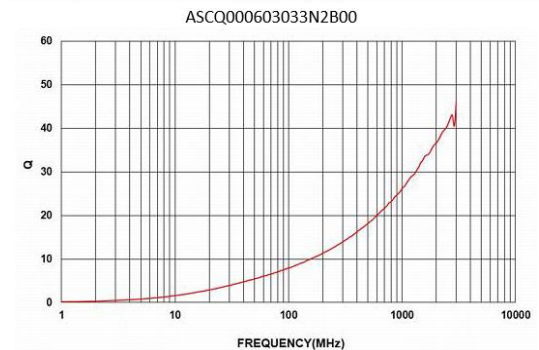
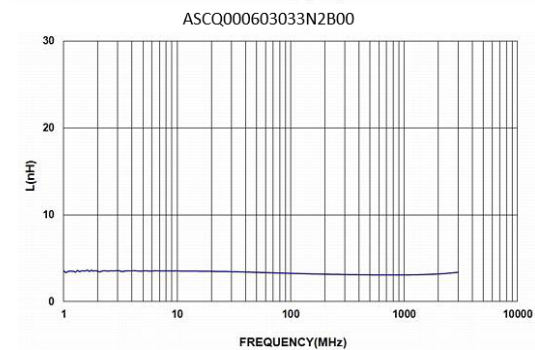
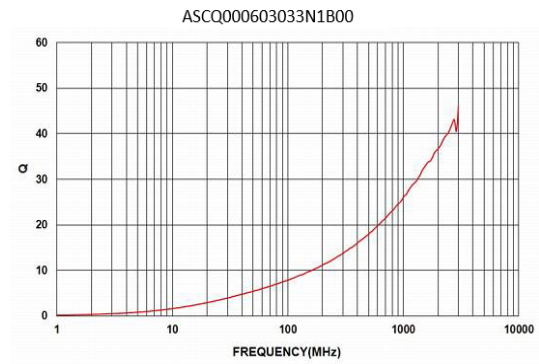
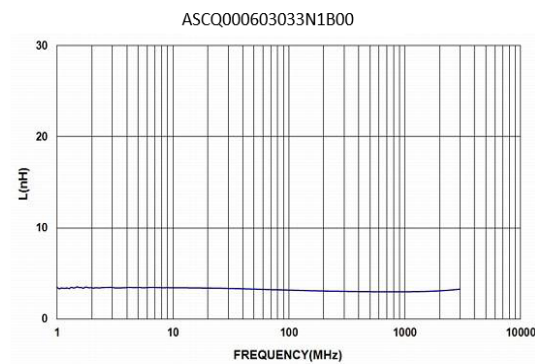
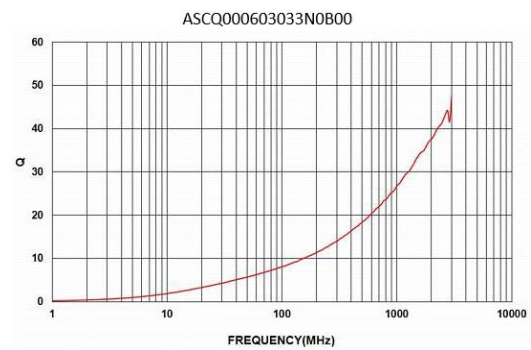
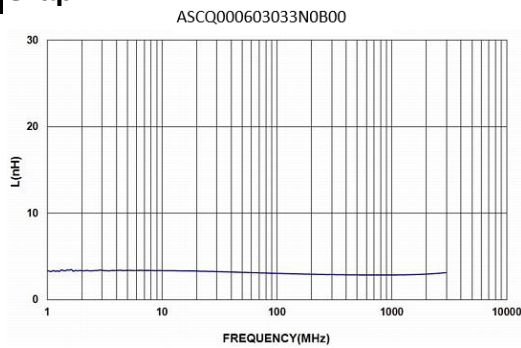
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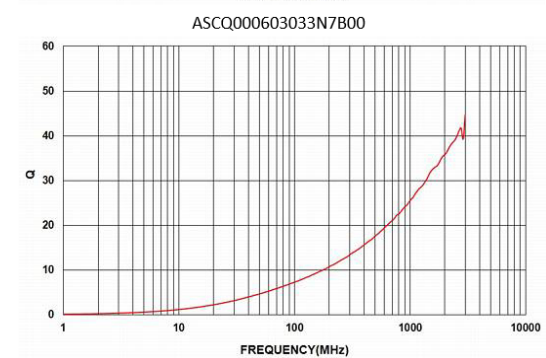
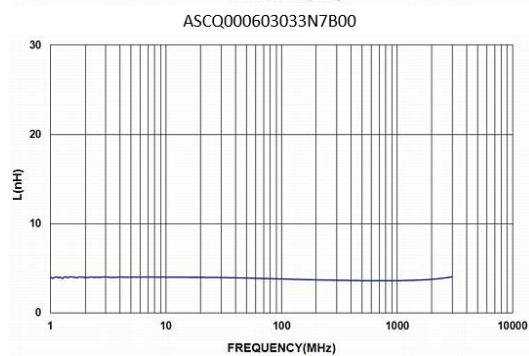
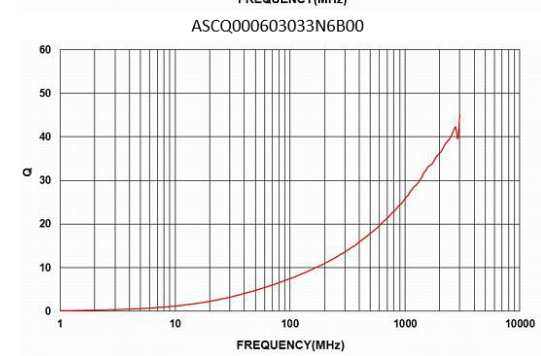
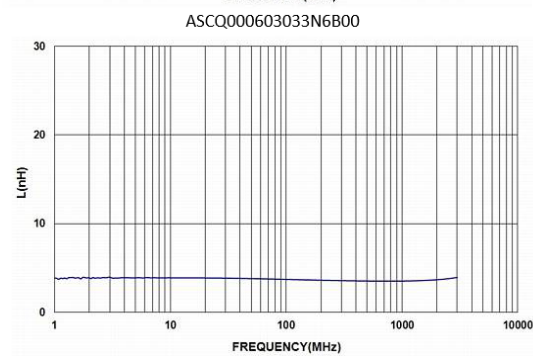
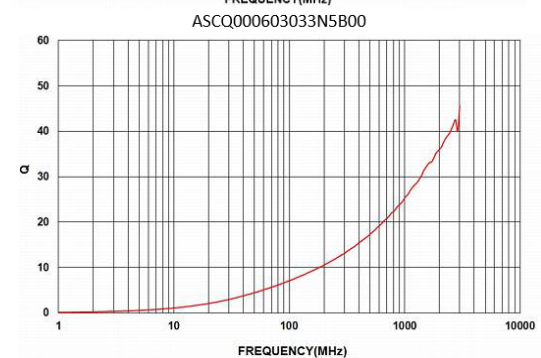
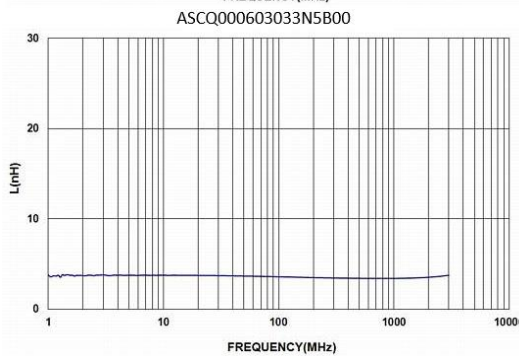
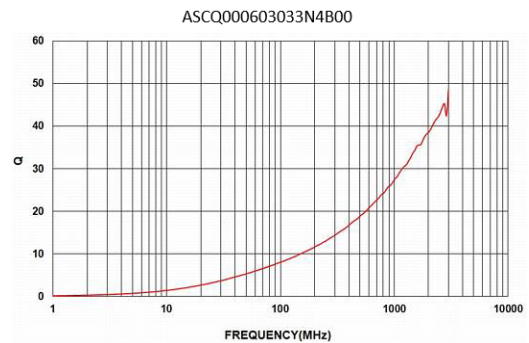
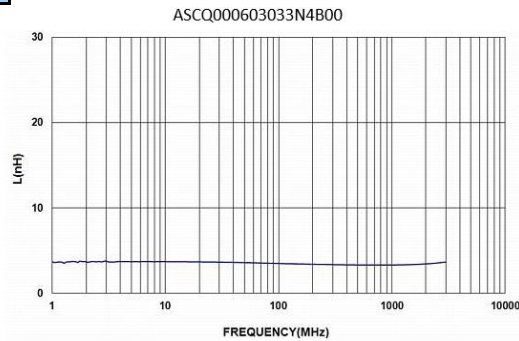
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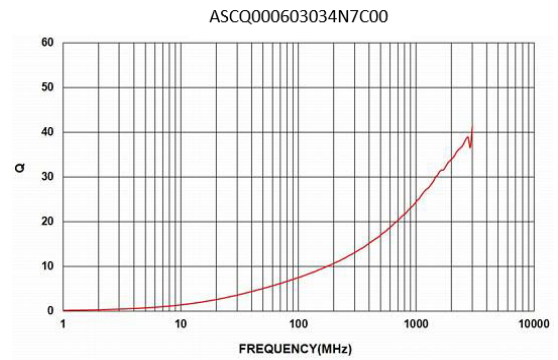
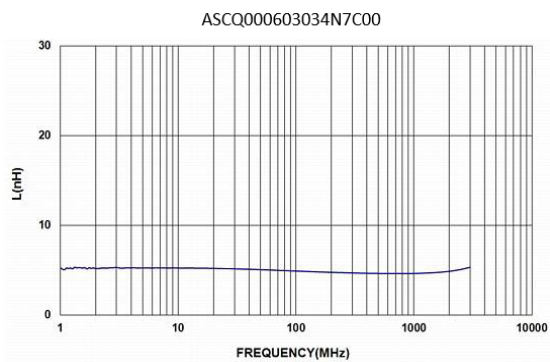
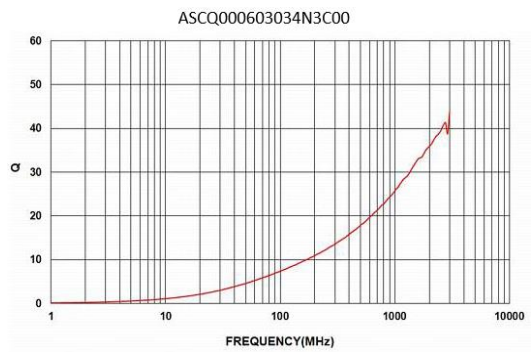
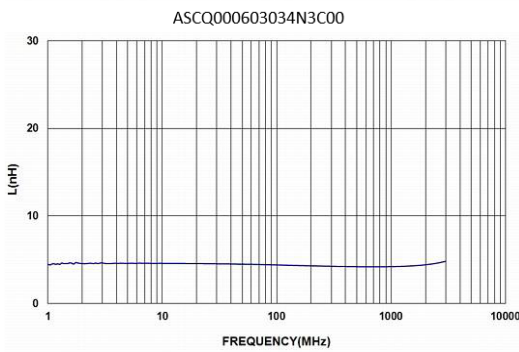
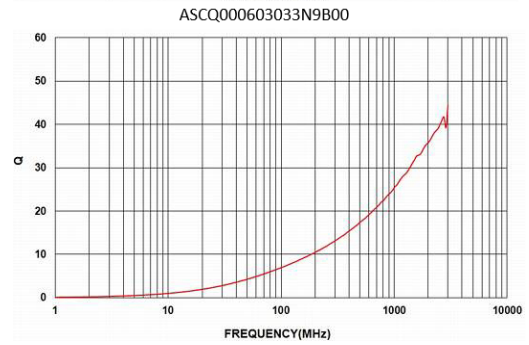
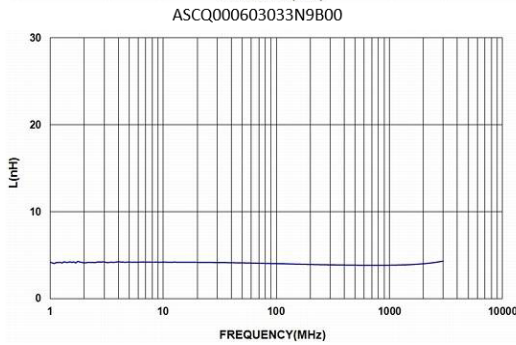
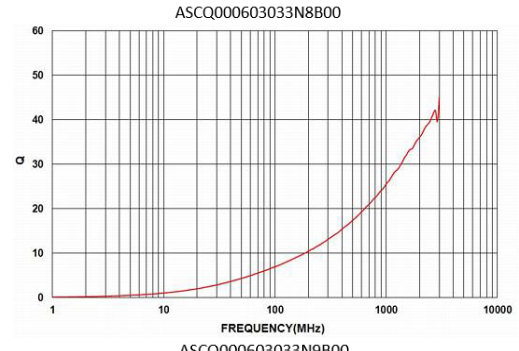
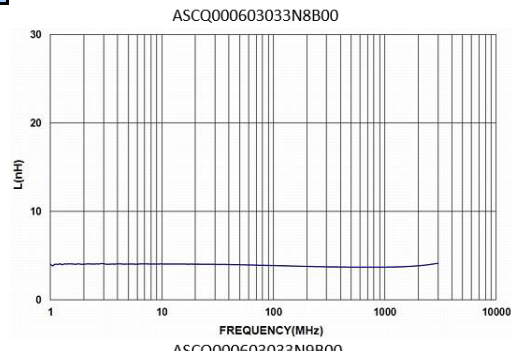
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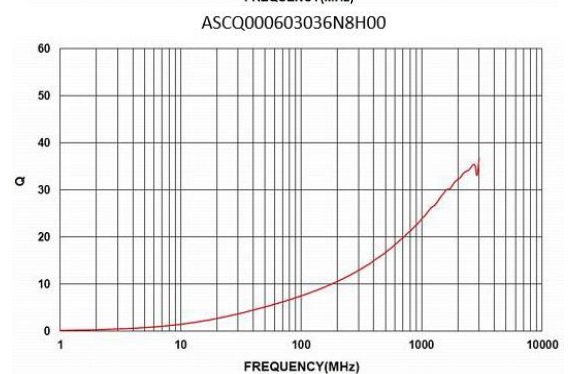
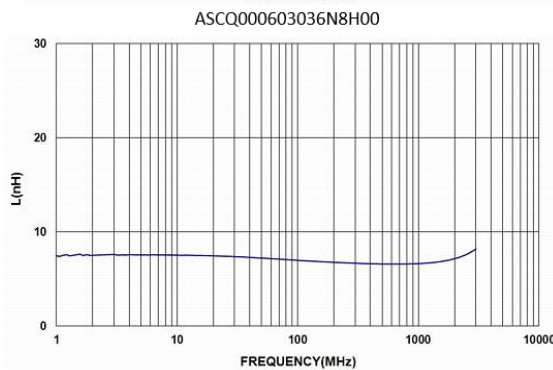
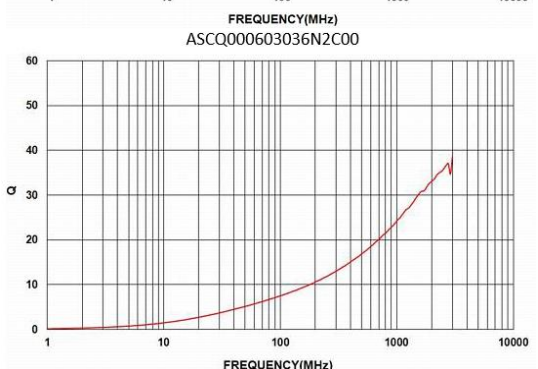
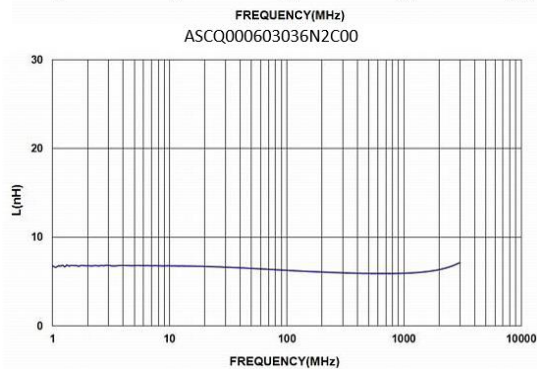
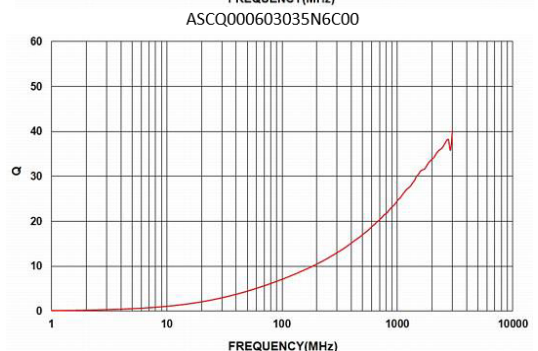
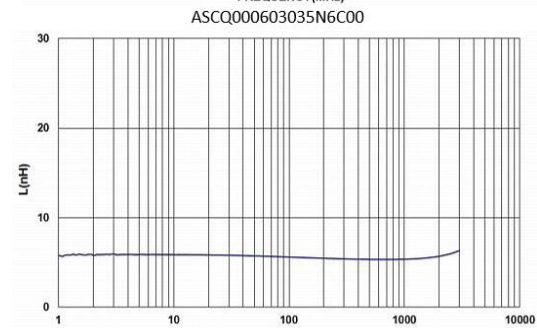
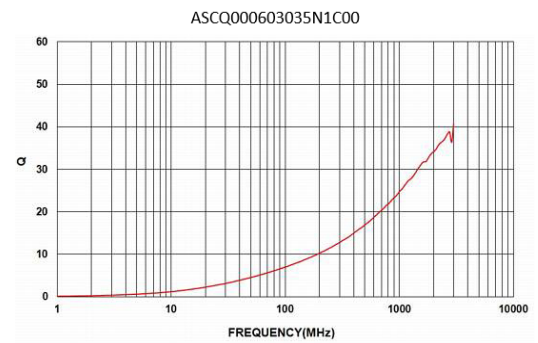
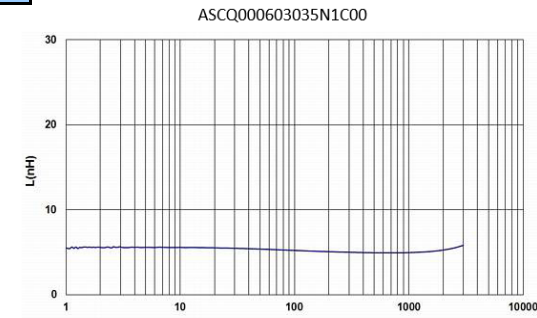
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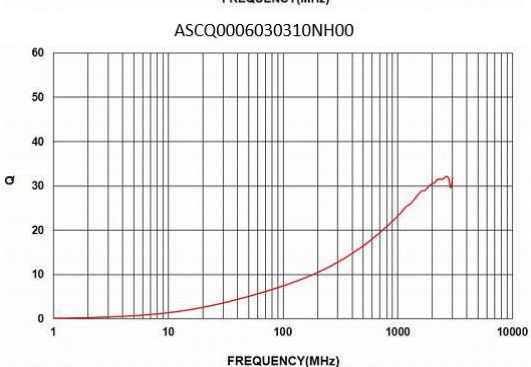
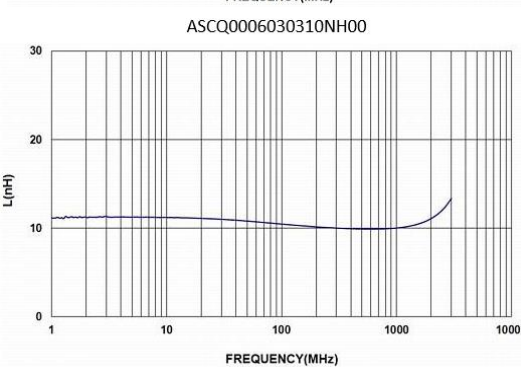
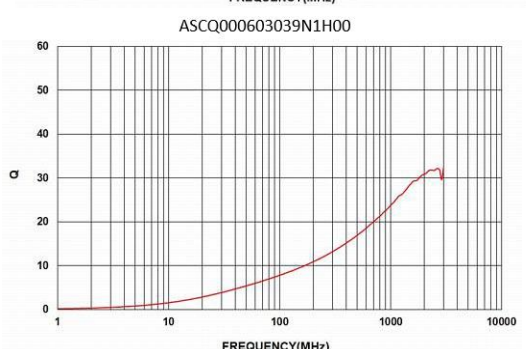
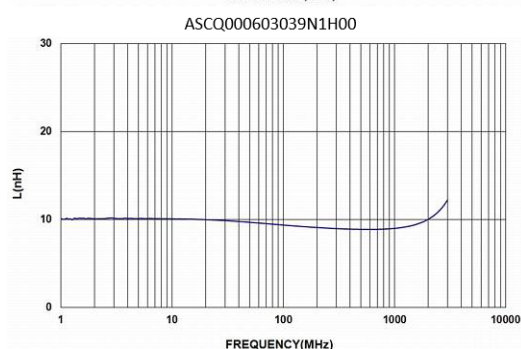
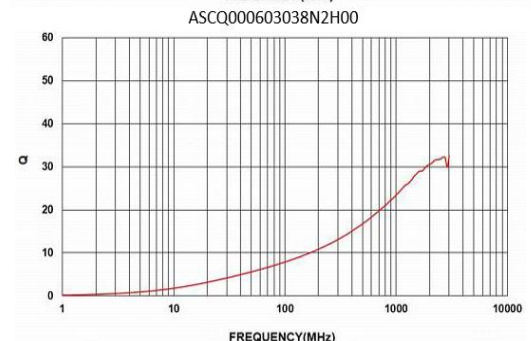
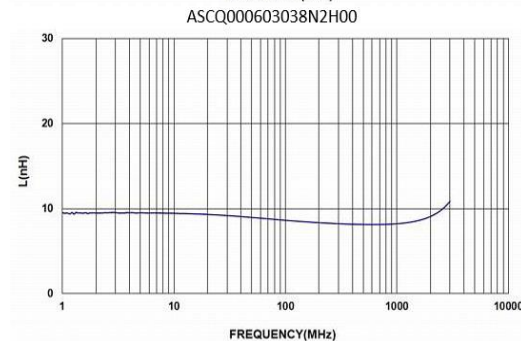
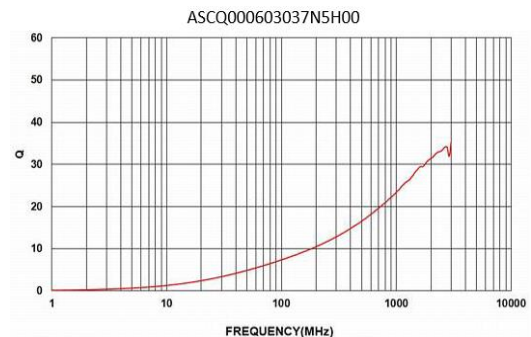
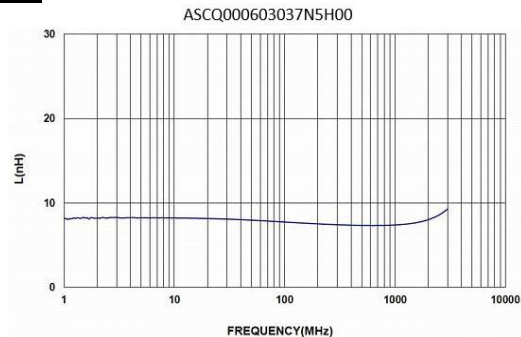
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