

APPROVAL SHEET

Lead Free Ferrite Beads Series

Customer : 福懋
Approval No : 013SZ-940145
Issue Date : 2005/05/18

Customer Approval :

WALSIN Technology Corp.

Authorized By : Chen-yuan Su

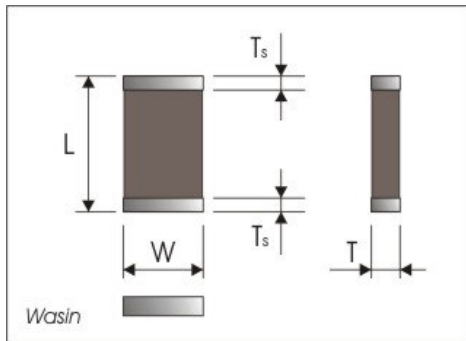
FEATURES

1. Monolithic structure yields high reliability.
2. Standard chip size suitable for SMT assembly
3. Magnetic shield prevents cross talk
4. Lead (Pb) free.

APPLICATIONS

EMI suppression for digital equipment such as Personal computer, Note book, ADSL, Modem, LCD monitor, camcorder,...etc.

DIMENSIONS



Unit : mm

CHIP SIZE	1005 Series	1608 Series	201209 Series	201212 Series	321611 Series	321616 Series	3225 Series	4532 Series
L	1.00 ± 0.10	1.60 ± 0.20	2.00±0.20	2.00±0.20	3.20±0.20	3.20±0.20	3.20 ± 0.20	4.5 ± 0.3
W	0.50 ± 0.10	0.80 ± 0.15	1.25±0.20	1.25±0.20	1.60±0.20	1.60±0.20	2.50 ± 0.20	3.2 ± 0.2
T	0.50 ± 0.10	0.80 ± 0.15	0.85±0.20	1.25±0.20	1.10±0.20	1.60±0.20	1.30 ± 0.20	1.5 ± 0.2
Ts	0.25 ± 0.10	0.40 ± 0.20	0.50±0.20	0.50±0.20	0.70±0.30	0.70±0.30	0.70 ± 0.30	0.70 ± 0.30

MARKING

No marking

ORDERING CODE

WB	1608	08	B	101	Q	L	T	02
Product	Size	Thickness	Material	Impedance	Tolerance	Current	Packing	Rated Current
Bead	LxW (mm)	05=0.5 mm	A	R10=0.10	K=±10%	N=Normal	T=Taped	01 ≤ 100mA
	1.0x0.5 mm	08=0.8 mm	B	1R0=1.0	M=±20%	S=High current		02 ≤ 200mA
	1.6x0.8 mm	09=0.85 mm	C	100=10	Q=±25%	L=Lead Free		20 ≤ 2000mA
	2.0x1.25 mm	11=1.1 mm	D	101=100				60 ≤ 6000mA
	3.2x1.6 mm	12=1.25 mm	F	102=1000				
	3.2x2.5 mm	13=1.3 mm	H					
	4.5x3.2 mm	15=1.5 mm						

■ Rating

Ferrite Chip Beads (EMI Filters)

1. WB1005 (0402)

Part Number	Impedance (Ω) at 100 MHz	DC Resistance (Ω) Max.	Rated Current (mA) Max.
WB100505B260QLT03	26	0.2	300
WB100505B300QLT03	30	0.2	300
WB100505B600QLT03	60	0.3	300
WB100505B800QLT02	80	0.4	200
WB100505B101QLT02	100	0.5	200
WB100505B121QLT01	120	0.5	100
WB100505B151QLT01	150	0.6	100
WB100505B181QLT01	180	0.6	100
WB100505B221QLT01	220	0.7	100

2. WB1608 (0603)

Part Number	Impedance (Ω) at 100 MHz	DC Resistance (Ω) Max.	Rated Current (mA) Max.
WB160808 B100QLT06	10	0.1	600
WB160808 B170QLT05	17	0.1	500
WB160808 B260QLT05	26	0.1	500
WB160808 B300QLT05	30	0.1	500
WB160808 B400QLT05	40	0.2	500
WB160808 B560QLT06	56	0.15	600
WB160808 B600QLT02	60	0.2	200
WB160808 B600QLT05	60	0.1	500
WB160808 B800QLT02	80	0.2	200
WB160808 B101QLT02	100	0.25	200
WB160808 B121QLT06	120	0.25	600
WB160808 H121QLT02	120	0.3	200
WB160808 B151QLT02	150	0.3	200
WB160808 B221QLT02	220	0.40	200
WB160808 B301QLT02	300	0.40	200
WB160808 F471QLT02	470	0.50	200
WB160808 B601QLT02	600	0.50	200
WB160808 F601QLT02	600	0.65	200
WB160808 B102QLT01	1000	0.70	100

3. WB2012 (0805)

Part Number	Impedance (Ω) at 100 MHz	DC Resistance (Ω) Max.	Rated Current (mA) Max.
WB201209 F050QLT60	5	0.01	6000
WB201209 B110QLT05	11	0.1	500
WB201209 B170QLT05	17	0.1	500
WB201209 B260QLT05	26	0.1	500
WB201209 B300QLT40	30	0.02	4000
WB201209 B390QLT05	39	0.2	500
WB201209 B470QLT10	47	0.07	1000
WB201209 B600QLT30	60	0.03	3000
WB201209 B700QLT30	70	0.03	3000
WB201209 B800QLT30	80	0.03	3000
WB201209 F800QLT04	80	0.2	400
WB201209 B101QLT02	100	0.2	200
WB201209 B121QLT20	120	0.25	2000
WB201209 B151QLT02	150	0.3	200
WB201209B201QLT20	200	0.05	2000
WB201209 B221QLT30	220	0.04	3000
WB201209 B301QLT02	300	0.3	200
WB201209 B401QLT02	400	0.4	200
WB201209 B601QLT05	600	0.25	500
WB201209 F601QLT02	600	0.45	200
WB201209 B102QLT02	1000	0.5	200
WB201209 F102QLT02	1000	0.50	200
WB201209 F222QLT02	2200	0.75	150
WB201209 F252QLT02	2500	0.80	150

4. WB3216 (1206)

Part Number	Impedance (Ω) at 100 MHz	DC Resistance (Ω) Max.	Rated Current (mA) Max.
WB321611F190QLT05	19	0.1	500
WB321611A260QLT05	26	0.1	500
WB321611B310QLT60	31	0.01	6000
WB321611B500QLT30	50	0.03	3000
WB321611B600QLT05	60	0.1	500
WB321611B600QLT30	60	0.03	3000
WB321611B700QLT05	70	0.1	500
WB321611B800QLT40	80	0.02	4000

WB321611B900QLT02	90	0.2	200
WB321611B101QLT02	100	0.2	200
WB321611B121QLT40	120	0.02	4000
WB321611C601QLT02	600	0.4	200
WB321611F601QLT15	600	0.07	1500
WB321611C102QLT02	1000	0.4	200
WB321611B202QLT02	2000**	0.6	200

** Test at 30 MHz

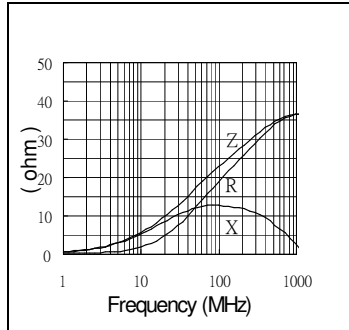
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WB322513B600QLT20	60	0.05	2000

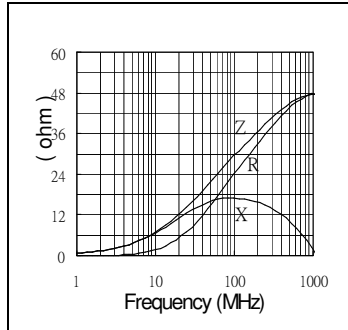
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WB453215F700QLT30	70	0.03	3000
WB453215B121QLT30	120	0.03	3000

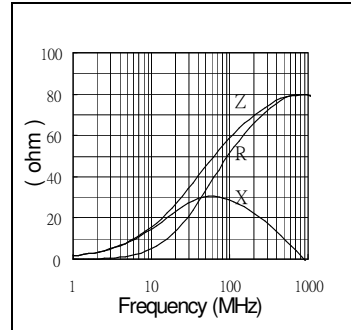
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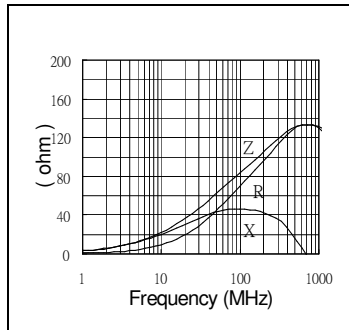
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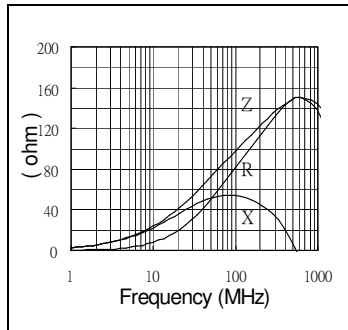
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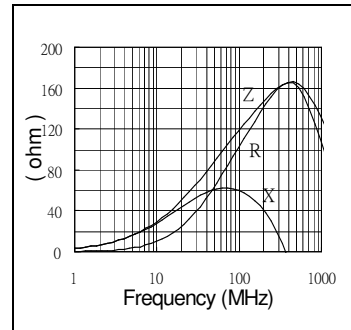
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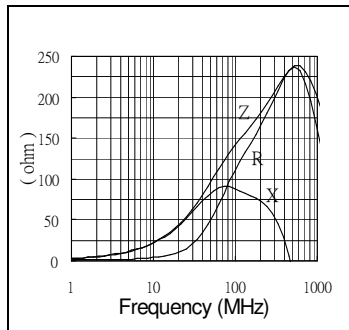
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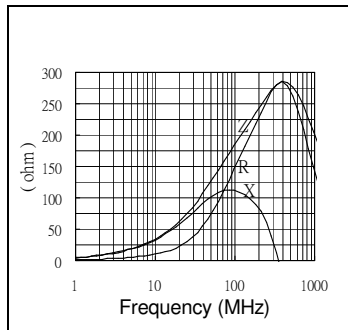
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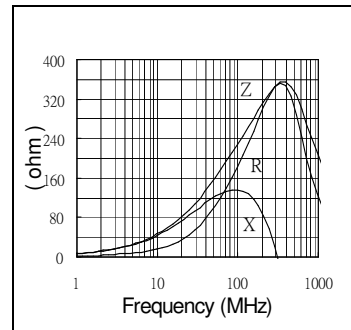
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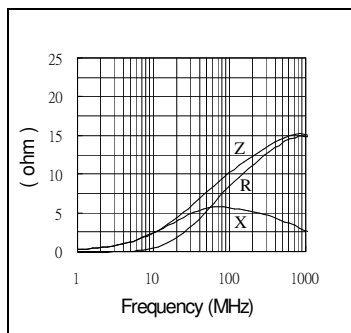


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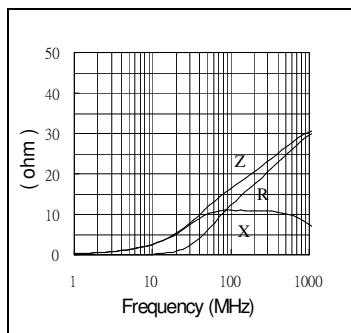




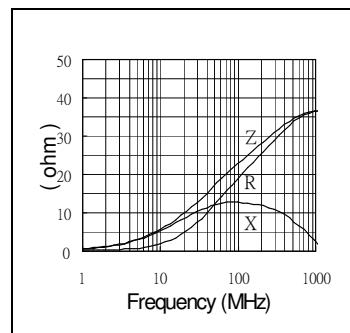
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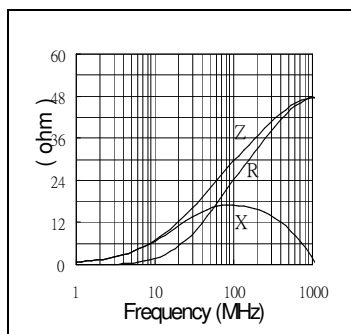
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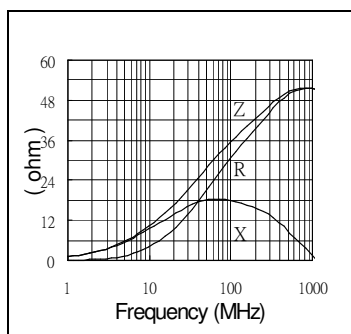
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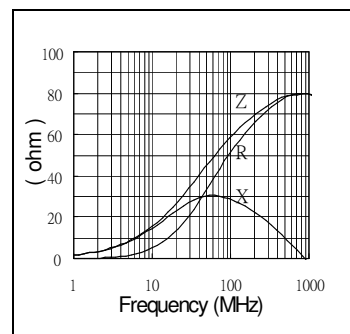
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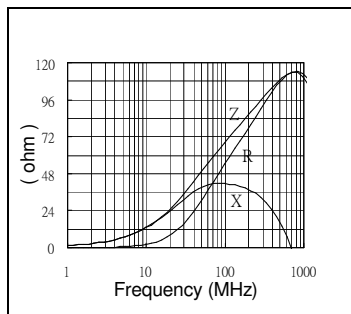
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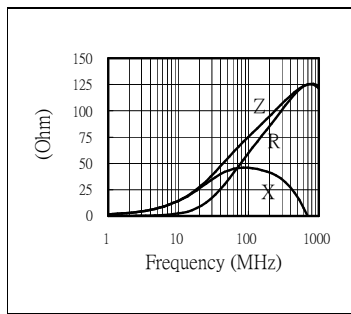
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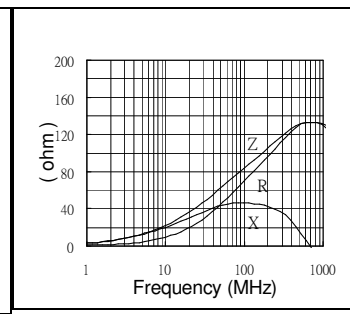
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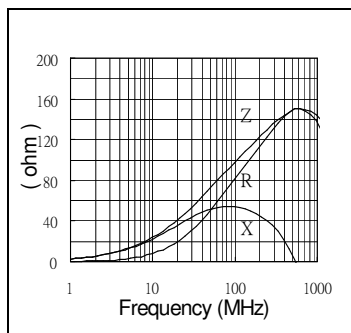
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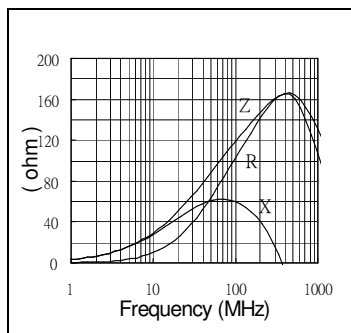
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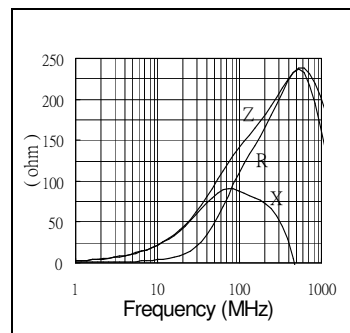
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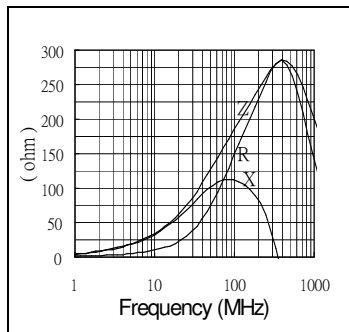


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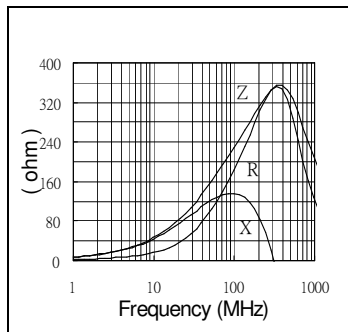




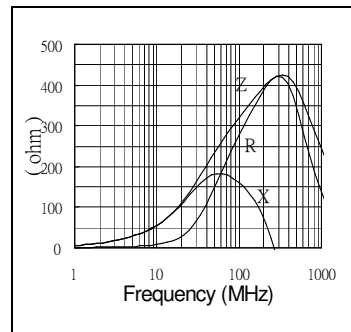
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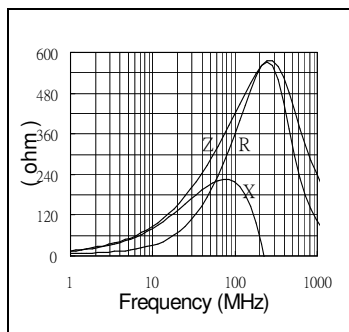
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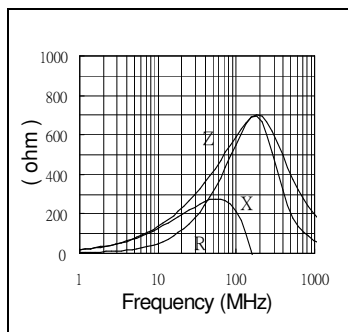
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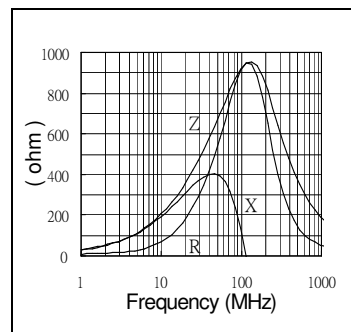
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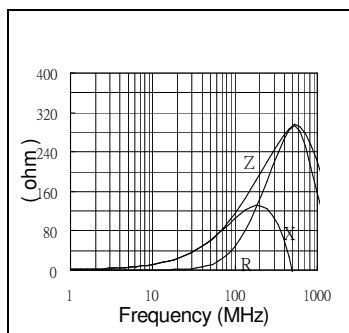
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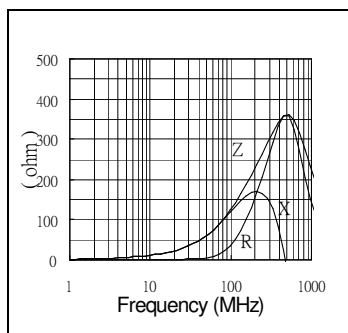
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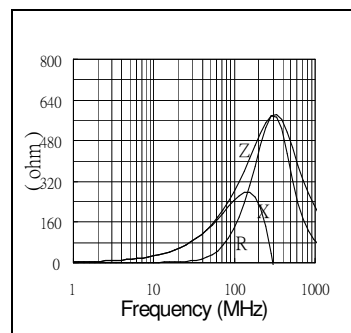
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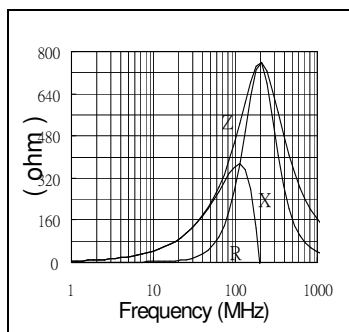
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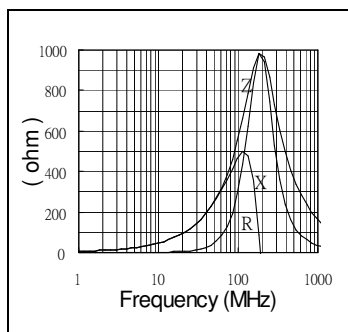
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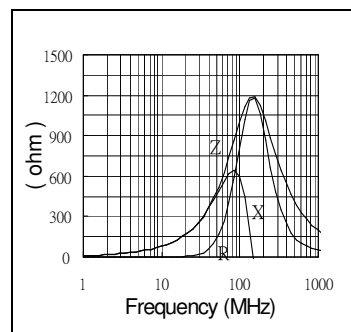
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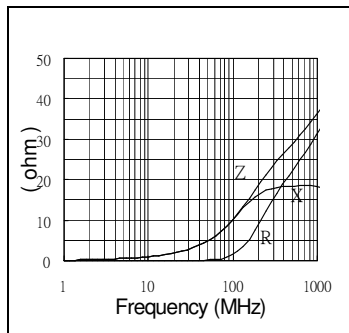
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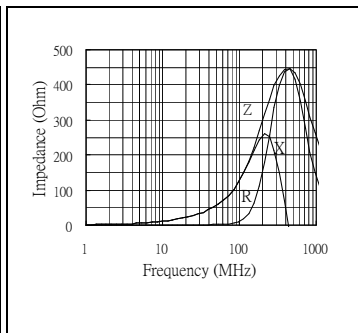
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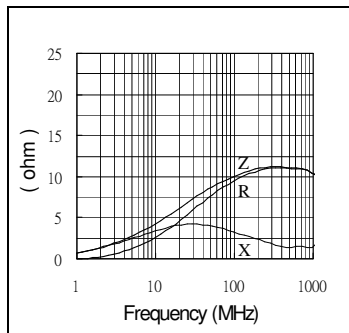
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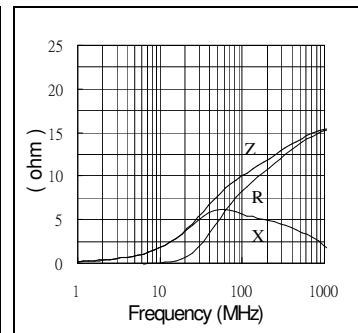
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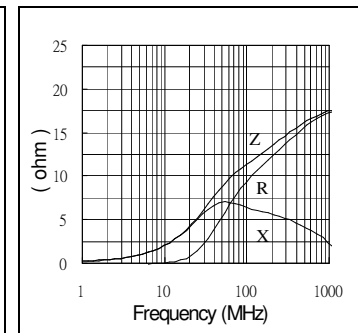
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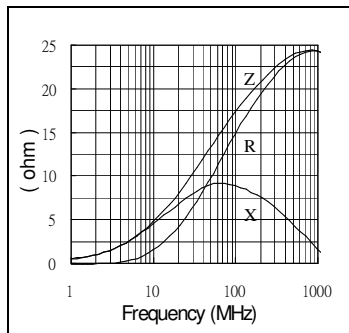
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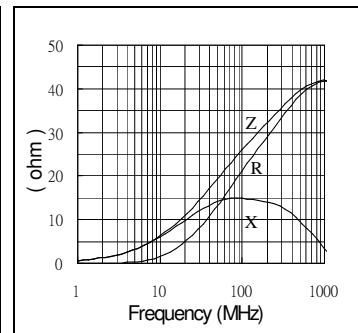
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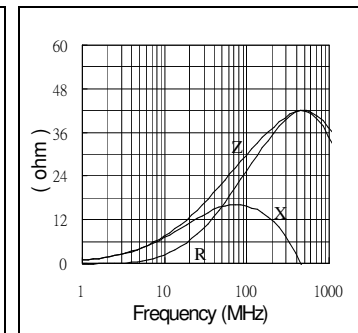
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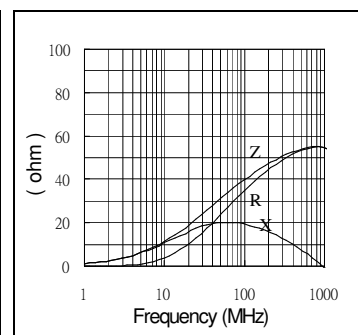
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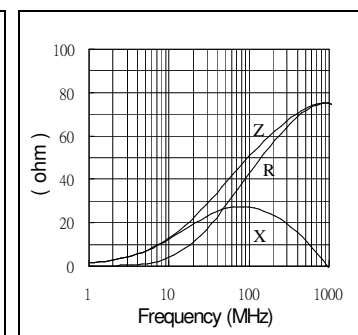
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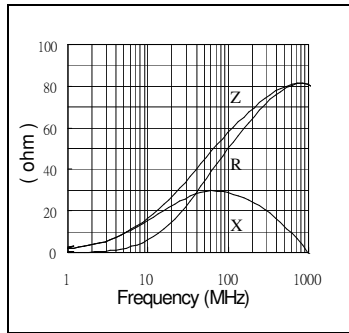
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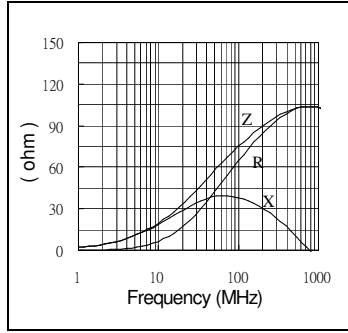
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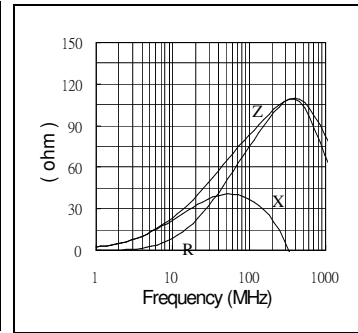
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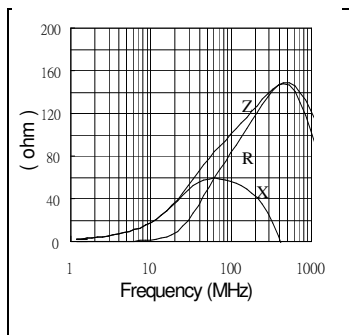
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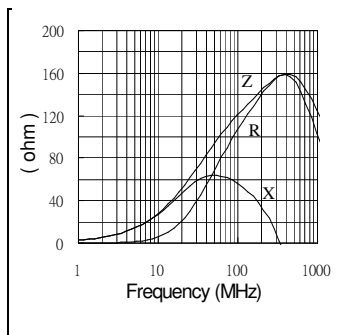
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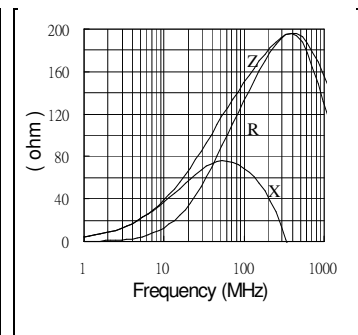
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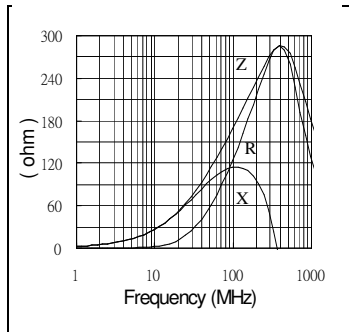
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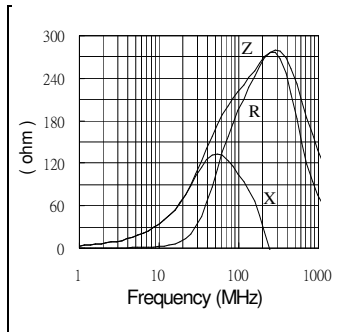
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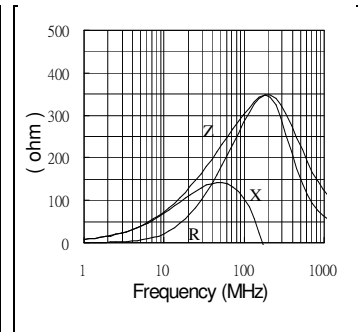
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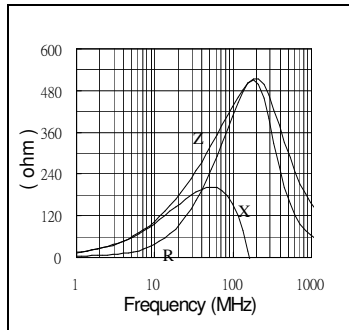
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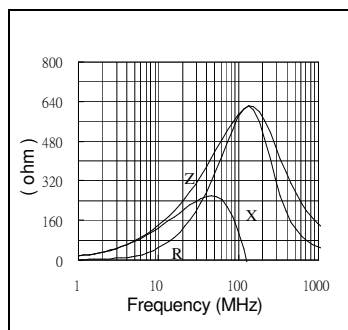
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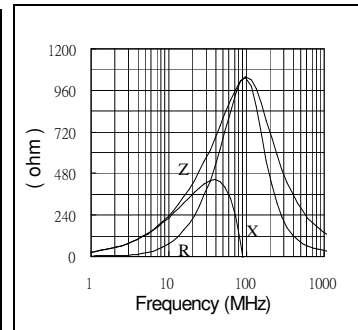
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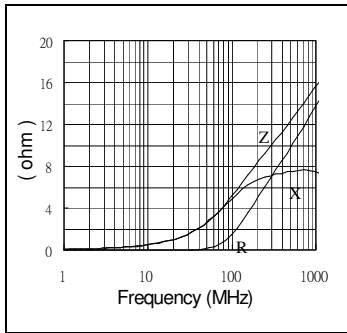
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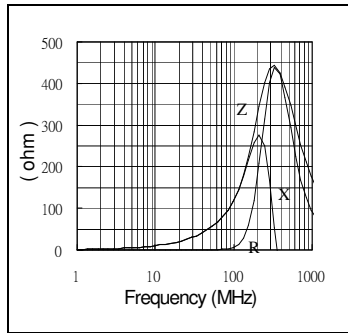
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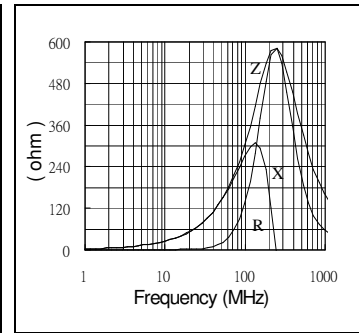
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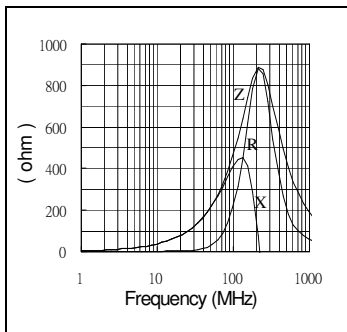
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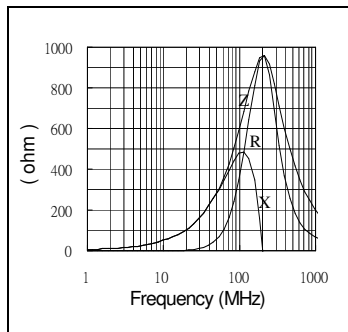
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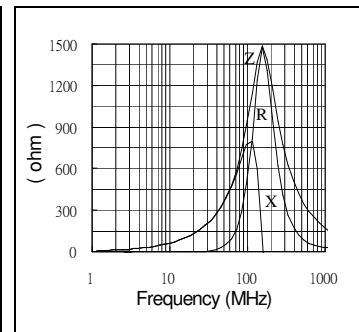
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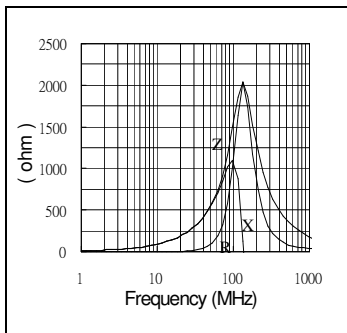
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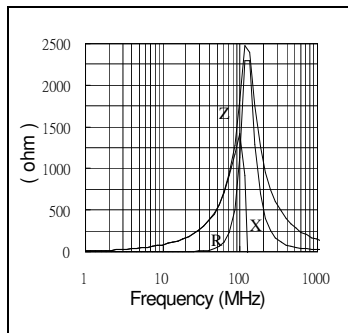
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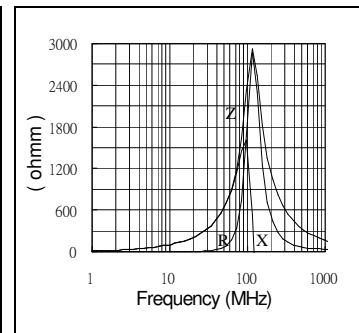
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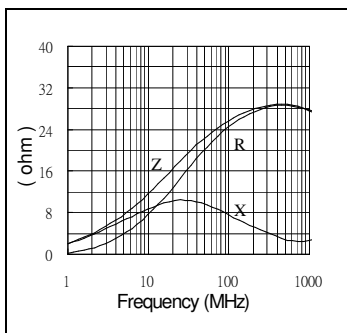
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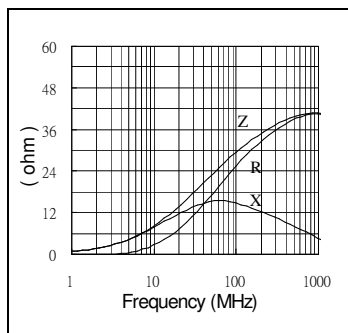
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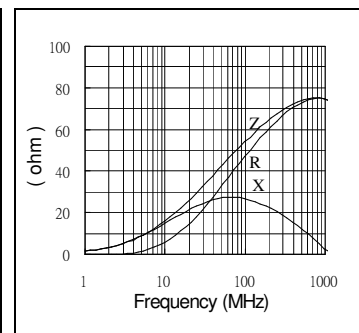
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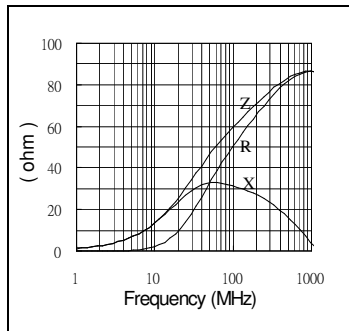
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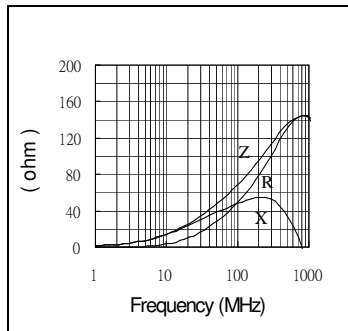
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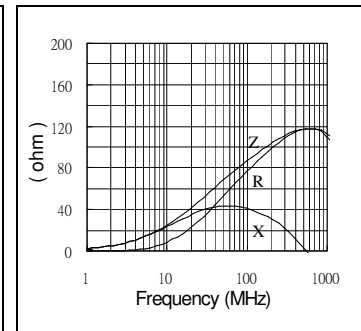
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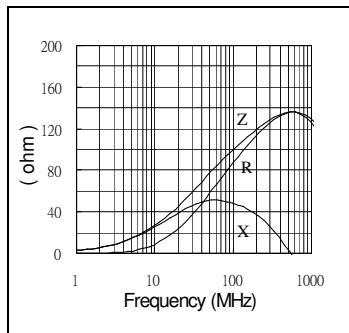
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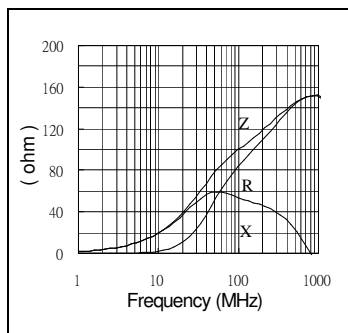
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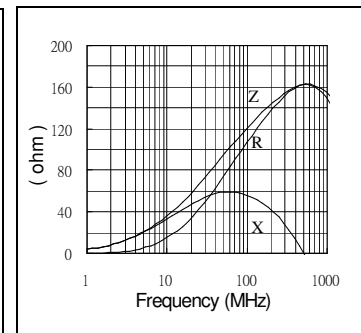
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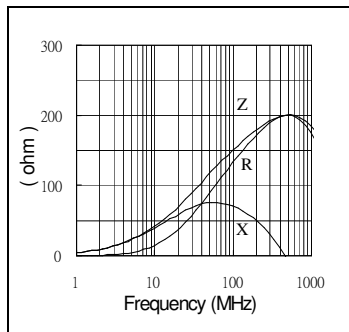
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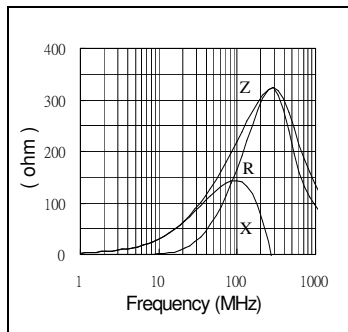
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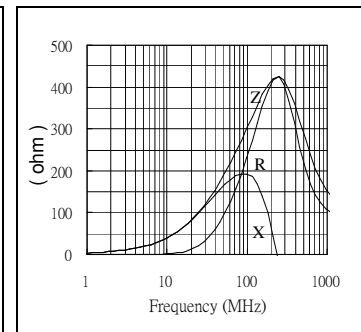
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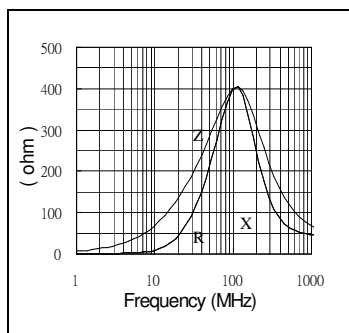
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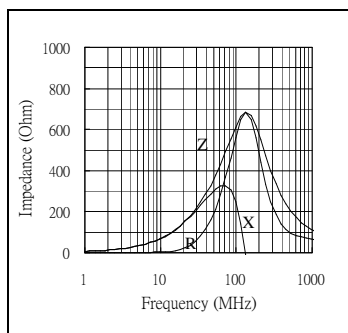
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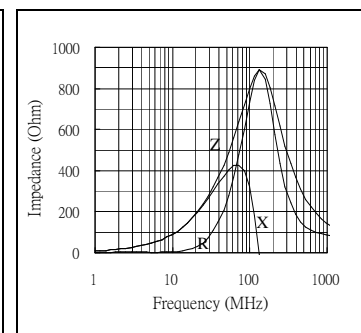
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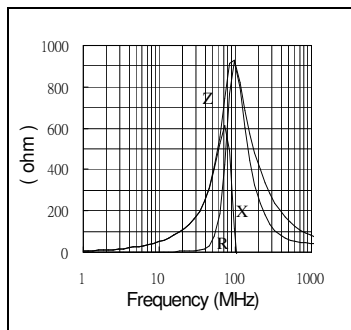


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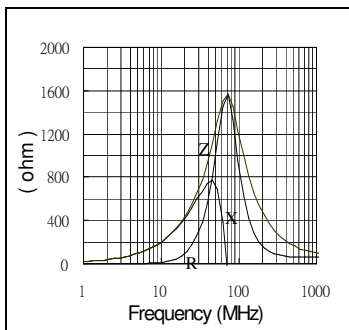




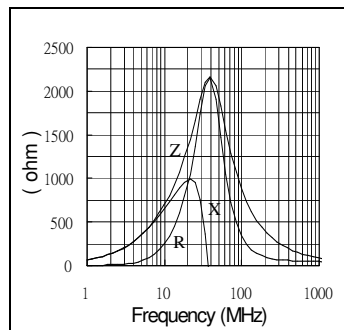
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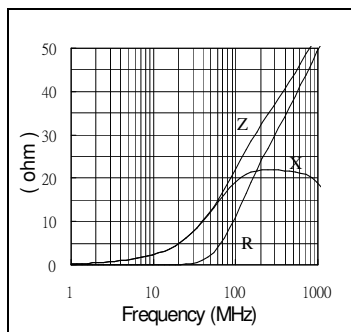
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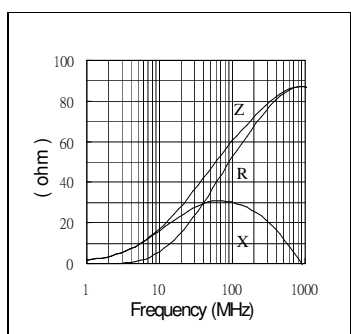
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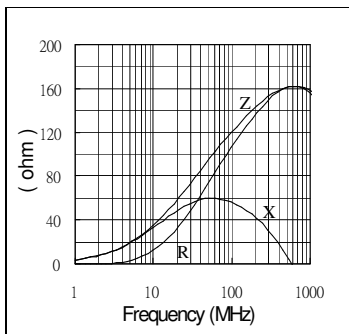
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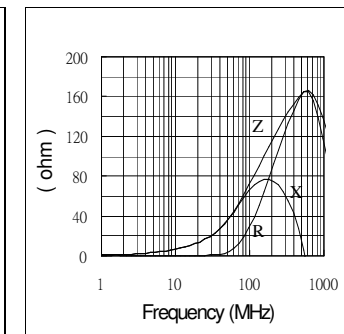
WB322513B600



WB453215B121



WB453215F700



STANDARD TESTING CONDITION

1. Unless otherwise specified
 - Temperature : 15 ~ 35°C
 - Humidity : 25%RH ~ 85%RH
 - Atmospheric pressure : 96kPa ~ 106kPa
2. In case of doubt
 - Temperature : 20±2°C
 - Humidity : 60%RH ~ 70%RH
 - Atmospheric pressure : 86kPa ~ 106kPa

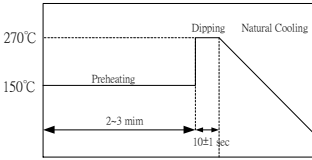
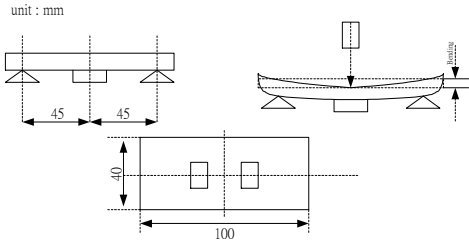
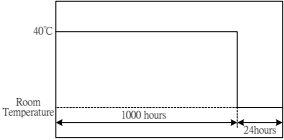
SPECIFICATION

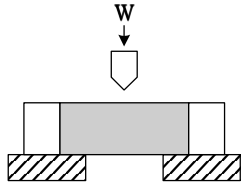
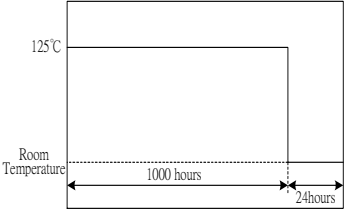
1. Electrical performance test

Test Item	Test Condition \ Test Method	Specification
1. D.C. resistance	DIGITAL MULTIMETER: Agilent 4338B	Refer to standard Electrical characteristic list
2. Impedance	IMPEDANCE ANALYZER: HP4195A or HP 4291A NETWORK 100MHz±5%,25°C	Refer to standard Electrical characteristic list
3. Rated current	TEST EQUIPMENT: Thermometer & HP6030A Applied the current to coils, the temperature rise shall not be more than 20°C	Refer to standard Electrical characteristic list

2. Reliability test

Test Item	Test Condition \ Test Method	Specification
1. Solderability	Pre-heating : 150±5°C 60sec Solder temperature:245±5°C Dipping time: 4±1 sec	95%min. coverage of all metalized area

<p>2. Resistance to soldering heat</p>	<p>Pre-heating : $150\pm 5^{\circ}\text{C}$ 60sec Solder temperature:$270\pm 5^{\circ}\text{C}$ Dipping time: 10 ± 1 sec Measurement to be made after keeping at room temperature for 24 ± 2 hours</p> 	<p>$\Delta Z \leq \pm 30\%$ DCR meet specification.</p>
<p>3.Vibration</p>	<p>Frequency:10Hz to 55 Hz to 10Hz for 1 min Total amplitude:1.5 mm Testing time: a period of 2 hrs in each of 3 mutually perpendicular direction. (total 6 hrs)</p>	<p>$\Delta Z \leq \pm 30\%$ DCR meet specification.</p>
<p>4. Flexure strength</p>	<p>After soldering a chip to a test substrate, bend the substrate by 2 mm[0.79 inches]and then return. Soldering shall be done in accordance with the recommended PC board pattern and reflow soldering.</p> 	<p>$\Delta Z \leq \pm 30\%$ DCR meet specification.</p>
<p>5. Humidity Resistance</p>	<p>Humidity:90% to 95% R.H. Temperature:$40\pm 2^{\circ}\text{C}$ Applied rated current(maximum value) Time: 1000 ± 12 hours. Measurement: After placing for 48 hours Minimum.</p> 	<p>Appearance: Ferrite shall not be damaged. $\Delta Z \leq \pm 30\%$ DCR meet specification.</p>

<p>6. Temperature cycle</p>	<table border="1" data-bbox="565 268 1024 436"> <thead> <tr> <th>Step</th> <th>Temperature(°C)</th> <th>Time(min)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-55+/-0,3</td> <td>30±3</td> </tr> <tr> <td>2</td> <td>Room temp.</td> <td>10~15</td> </tr> <tr> <td>3</td> <td>+125+/-3,0</td> <td>30±3</td> </tr> <tr> <td>4</td> <td>Room temp.</td> <td>10~15</td> </tr> </tbody> </table> <p>Cycle : 100cycles Measurement: After placing for 48±2 hours minimum.</p>	Step	Temperature(°C)	Time(min)	1	-55+/-0,3	30±3	2	Room temp.	10~15	3	+125+/-3,0	30±3	4	Room temp.	10~15	<p>Appearance: Cracking, chipping or any other defects harmful to the characteristics shall not be allowed. ΔZ ≤ ±30% DCR meet specification.</p>
Step	Temperature(°C)	Time(min)															
1	-55+/-0,3	30±3															
2	Room temp.	10~15															
3	+125+/-3,0	30±3															
4	Room temp.	10~15															
<p>7. Bonding strength</p>	<p>Applying force: 1608: W=2kgf 2012: W=2kgf 3216: W=2kgf 3225: W=3kgf 4532: W=5kgf Applying rated : 0.5mm/sec</p> 	<p>The body strength must more than standard force by W.</p>															
<p>8. Heating life</p>	<p>Temperature: 125±3°C Applied current: Rated current(maximum value) Testing time: 1000±12 hours. Measurement: After placing for 48 hours minimum.</p> 	<p>Appearance: Ferrite shall not be damaged. ΔZ ≤ ±30% DCR meet specification.</p>															
<p>9. Drop test</p>	<p>Height : 75 cm Direction : 3 directions Times : 3 times for each direction</p>	<p>Products shall be no failure after tested.</p>															
<p>10. Cold resistance</p>	<p>Temperature : -55±2°C Time : 1000 hrs</p>	<p> ΔZ ≤ ±30% DCR meet specification</p>															

PACKAGING

Paper Tape specifications (unit :mm) and Packing quantity

1. Appearance and Dimensions

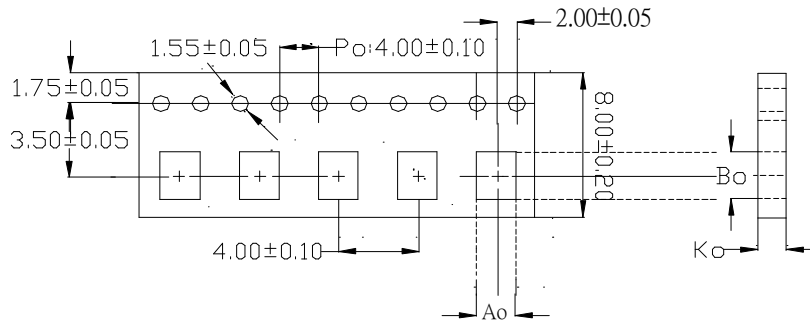
1.1 Tape Material

Chip Bead Material	WB1005 series	WB1608 series	WB2012 series	WB3216 series	WB3225 series	WB4532 series
Tape Material	Paper	Paper	Paper / Plastic	Plastic	Plastic	Plastic

1.2 Paper Tape Size Specification

Unit : mm

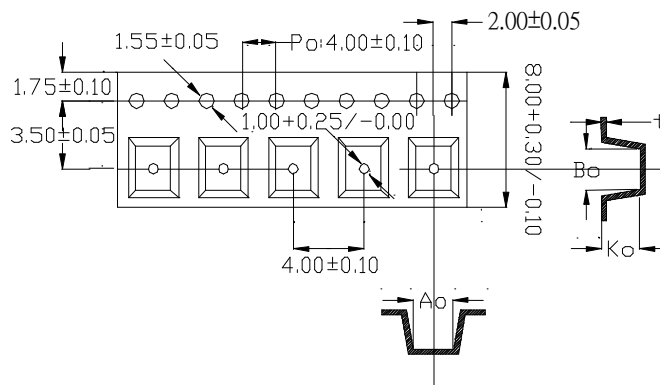
Label	WB1005 series	WB1608 series	WB2012 series
Po10	40.00±0.20	40.00±0.20	40.00±0.20
Ao	0.62±0.05	1.02±0.05	1.50±0.10
Bo	1.12±0.05	1.82±0.05	2.30±0.10
Ko	0.60±0.05	0.95±0.05	0.95±0.05



1.3 Plastic Tape Size Specification

Unit : mm

Label	WB2012 series	WB3216 series
Po10	40.00±0.20	40.00±0.20
Ao	1.42±0.10	1.90±0.10
Bo	2.23±0.10	3.50±0.10
Ko	1.03+0.05 / -0.10	1.29±0.10
t	0.25±0.10	0.30±0.20

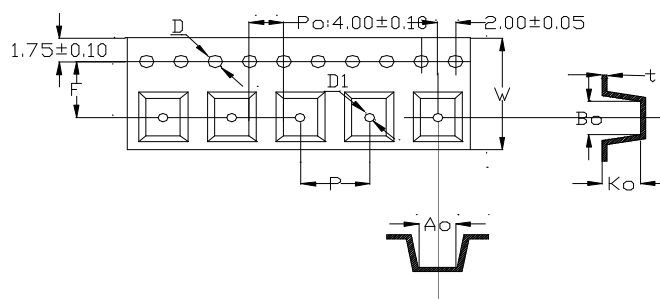




1.4 Plastic Tape Size Specification

Unit : mm

Label	WB3225 series	WB4532 series
W	8.00+0.320 -0.10	12.00+0.30 -0.10
F	4.00±0.10	8.00±0.10
P	3.50±0.05	5.50±0.05
D	1.50+0.10 -0.00	1.55±0.05
D1	1.00+0.25 -0.00	1.50+0.25 -0.00
Po10	40.00±0.20	40.00±0.20
Ao	2.64±0.10	3.58±0.10
Bo	3.38±0.10	4.95±0.10
Ko	1.55±0.10	1.55±0.10
t	0.23±0.10	0.28±0.10

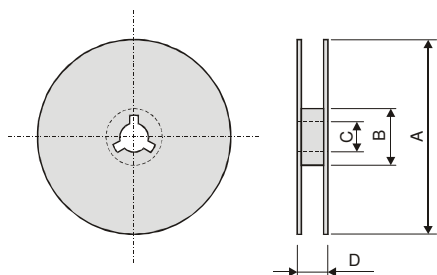


2. Taping Conditions

2.1 Standard quantity

Chip Size	Paper Tape		Plastic Tape	
	width (reel)	unit (reel)	width (reel)	unit (reel)
WB1005 series	8 mm	10 kp/reel	-	-
WB1608 series	8 mm	4 kp/reel	-	-
WB2012 series	8 mm	4 kp/reel	8 mm	4 kp/reel
WB3216 series	8 mm	3 kp/reel	8 mm	3 kp/reel
WB3225 series	-	-	8 mm	2 kp/reel
WB4532 series	-	-	8 mm	1 kp/reel

2.2 Reel dimensions



Symbol	A	B	C	D
Dimension	Φ178.0±2.0	Φ60.0±1.0	13.0±0.2	9.0±0.5

SOLDERING CONDITION

Typical examples of soldering processes that provide reliable joints without any damage are given in Fig 3.

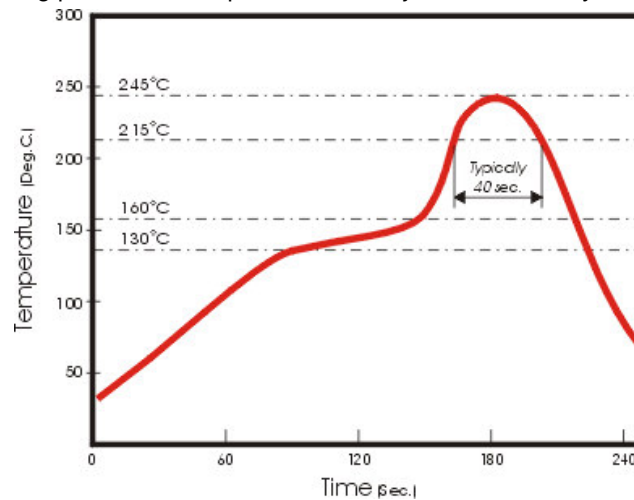


Fig 3. Infrared soldering profile

CAUTION OF HANDLING

Limitation of Applications

Please contact us before using our products for the applications listed below which require especially high reliability for the prevention of defects, which might directly cause damage to the third party's life, body or property.

- (1) Aircraft equipment
- (2) Aerospace equipment
- (3) Undersea equipment
- (4) Medical equipment
- (5) Disaster prevention / crime prevention equipment
- (6) Traffic signal equipment
- (7) Transportation equipment (vehicles, trains, ships, etc.)
- (8) Applications of similar complexity and /or reliability requirements to the applications listed in the above.

Storage condition

- (1) Products should be used in 6 months from the day of WALSIN outgoing inspection, which can be confirmed.
- (2) Storage environment condition.
 - Products should be storage in the warehouse on the following conditions.
 - Temperature : -10 to +40°C
 - Humidity : 30 to 70% relative humidity
 - Don't keep products in corrosive gases such as sulfur. Chlorine gas or acid or it may cause oxidization of electrode, resulting in poor solderability.
 - Products should be storage on the palette for the prevention of the influence from humidity, dust and son on.
 - Products should be storage in the warehouse without heat shock, vibration, direct sunlight and so on.
 - Products should be storage under the airtight packaged condition.