

1 Scope

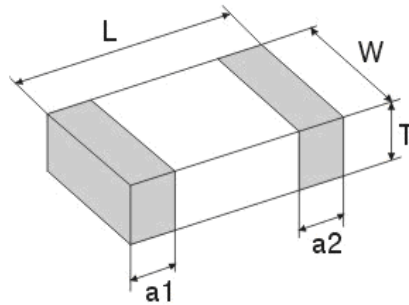
This specification applies to the HDLB series of multilayer chip large current bead.

2 Product Identification

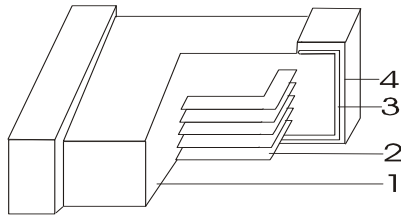
<u>HDLB</u>	<u>2012</u>	<u>M</u>	<u>121</u>	<u>T</u>	<u>2R0</u>	<u>-LF</u>
①	②	③	④	⑤	⑥	⑦

- ① Product Symbol (HDLB:)
- ② Dimensions
- ③ Material Code
- ④ Impedance Value
- ⑤ Packaging Style (B: Bulk; T: Tape & Reel)
- ⑥ Rated Current (1R5:1500m A、2R0: 2000mA)
- ⑦ Lead Free

3 Appearance, Dimensions and Material



Type	Dimensions (mm) [inch]			
	L	W	T	a1, a2
1005 [0402]	1.00±0.15 [0.04±0.006]	0.50±0.15 [0.02±0.006]	0.50±0.15 [0.02±0.006]	0.25±0.10 [0.01±0.004]
1608 [0603]	1.60±0.15 [0.063±0.006]	0.80±0.15 [0.031±0.006]	0.80±0.15 [0.031±0.006]	0.30±0.20 [0.012±0.008]
2012 [0805]	2.00±0.20 [0.079±0.008]	1.25±0.20 [0.049±0.008]	0.85±0.20 [0.033±0.008]	0.50±0.30 [0.02±0.012]
3216 [1206]	3.20±0.20 [0.126±0.008]	1.60±0.20 [0.063±0.008]	1.10±0.30 [0.043±0.012]	0.50±0.30 [0.02±0.012]



	Composition	Material	Supplier
1	Base Material	Ferrite	Japan
2	Internal Conductor	Ag	Japan
3	Terminal Electrode	Ag	Japan
4	Terminal Electrode	Ni-Sn	USA

4 Testing Conditions

<Unless otherwise specified>

Temperature: Ordinary Temperature(5 to 35 °C)

Humidity: Ordinary Humidity (25 to 85% RH)

<In case of doubt>

Temperature: 20 ±2°C

Humidity: 60 to 75% RH

Atmospheric Pressure: 86 to 106 kPa

5 Rating

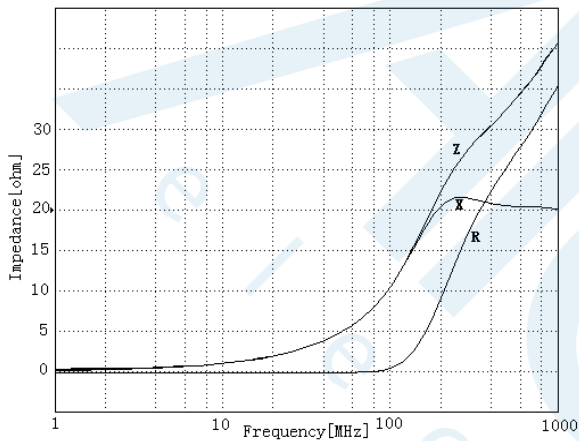
Operating Temperature Range : -55 to +125°C

Storage Temperature Range : -55 to +125°C

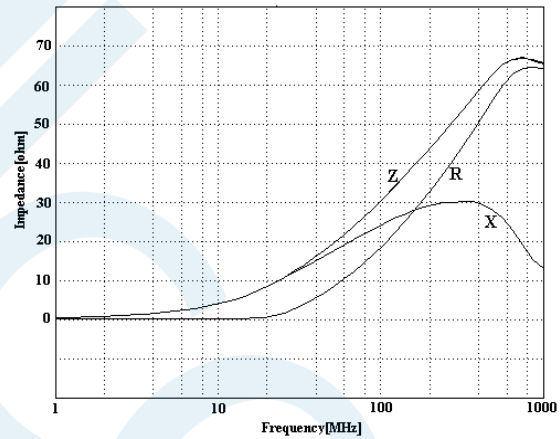
1005 Series

Part No.	Impedance (Ω) $\pm 25\%$	Z Test Freq. (MHz)	RDC (Ω) /max	Ir(mA) /max
HDLB1005M110T2R0	11	100	0.05	2000
HDLB 1005M310T1R5	31	100	0.06	1500
HDLB 1005M600T1R5	60	100	0.13	1500
HDLB 1005M121T1R2	120	100	0.16	1200
HDLB 1005M221T1R0	220	100	0.30	1000
HDLB 1005M301T1R0	300	100	0.35	1000

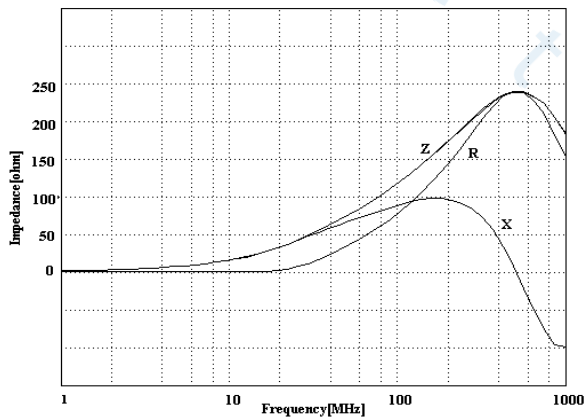
HDLB1005M110T



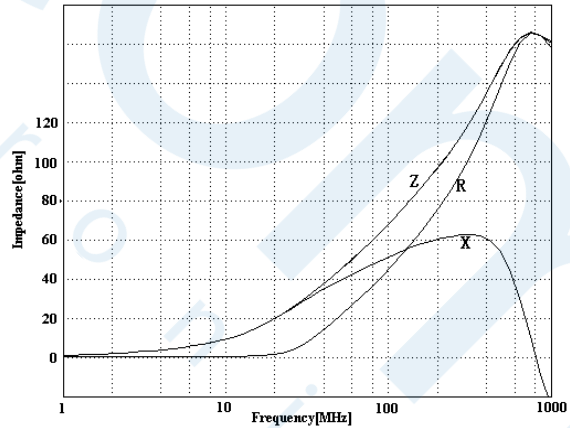
HDLB 1005M310T



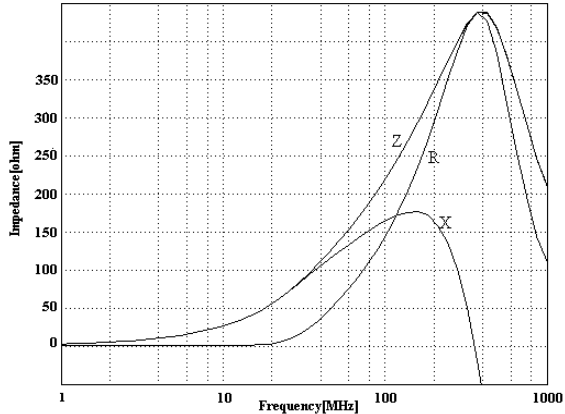
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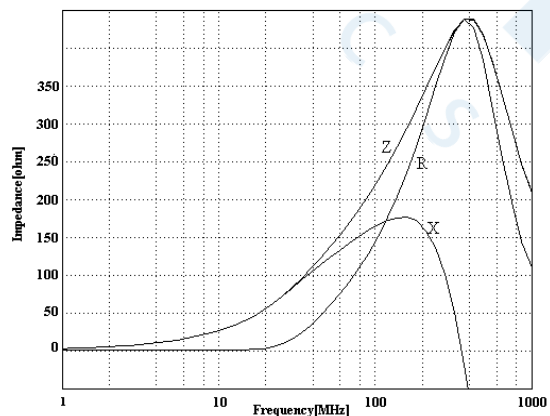
HDLB 1005M600T



HDLB 1005M221T



HDLB 1005M301T

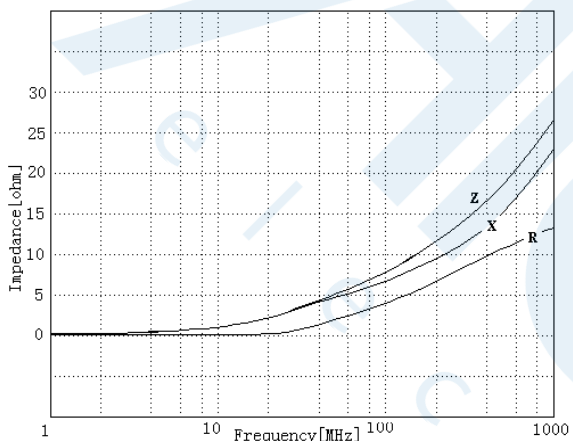




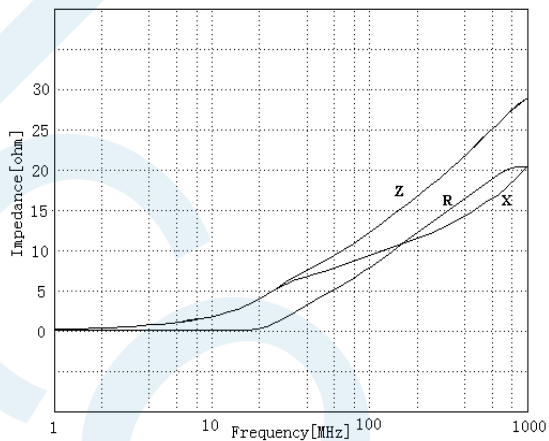
1608 Series

Part No.	Impedance(Ω) $\pm 25\%$	Z Test Freq. (MHz)	RDC(Ω) /max	Ir(mA) /max
HDLB1608 M070T2R0	7	100	0.03	2000
HDLB1608 M110T2R0	11	100	0.03	2000
HDLB1608 M310T1R5	31	100	0.05	1500
HDLB1608 M600T1R5	60	100	0.08	1500
HDLB1608 M121T1R2	120	100	0.10	1200
HDLB1608 M221T1R0	220	100	0.15	1000
HDLB1608 M301T1R0	300	100	0.30	1000
HDLB1608 M501T0R8	500	100	0.30	800
HDLB1608 M601T0R8	600	100	0.35	800

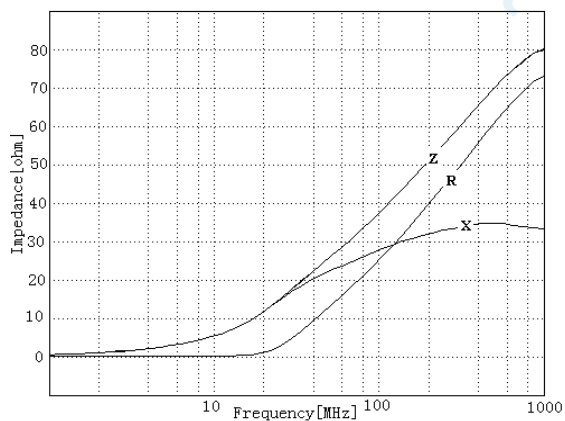
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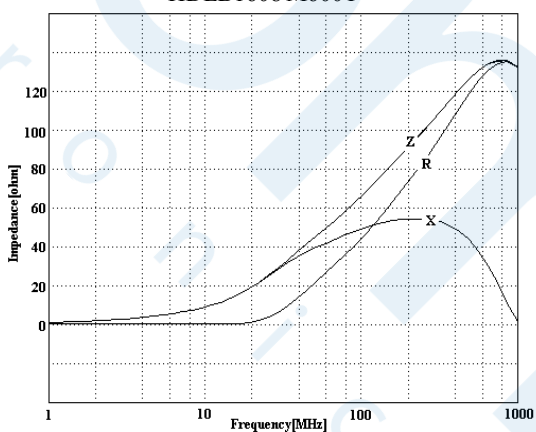
HDLB1608 M110T



HDLB1608 M310T

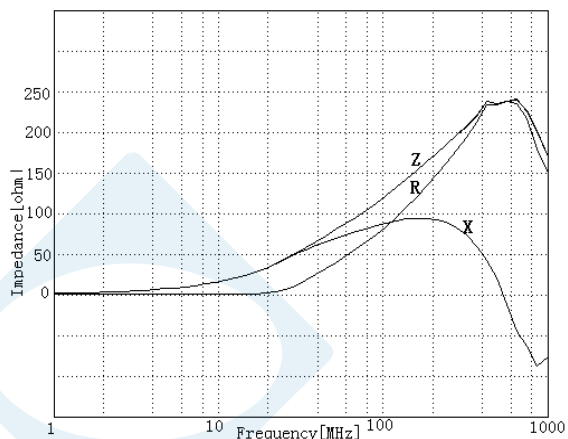


HDLB1608 M600T

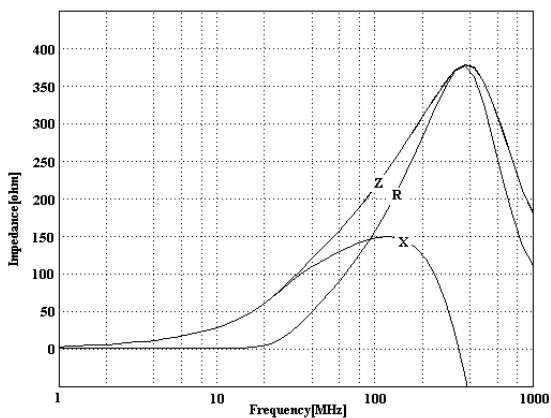




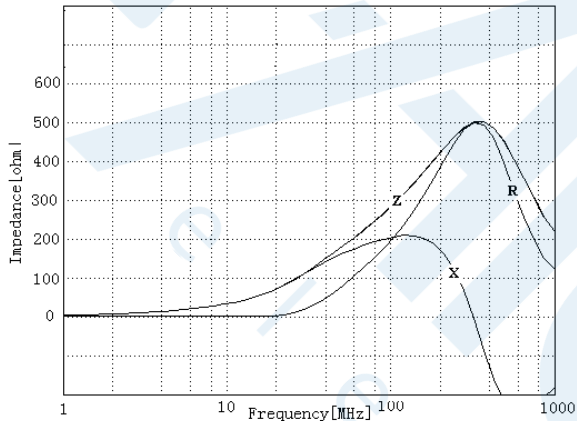
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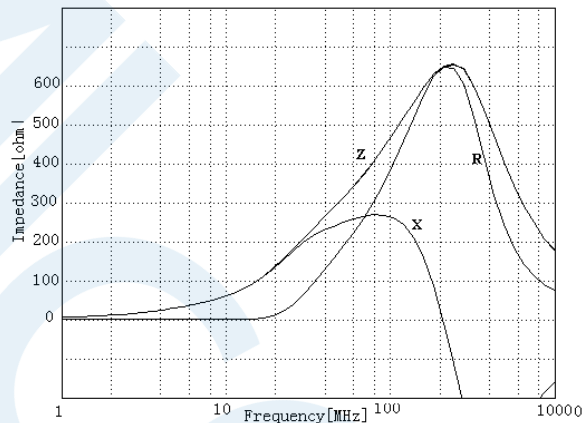
HDLB1608 M221T



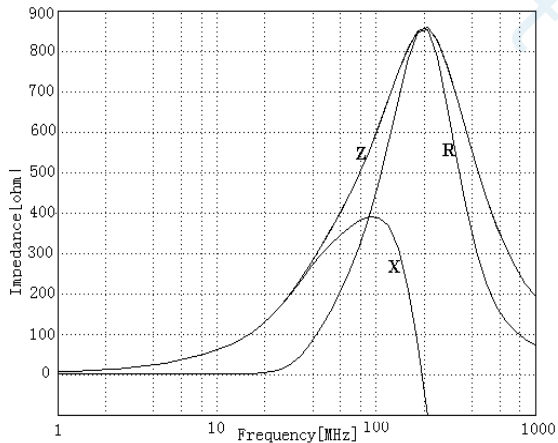
HDLB1608 M301T



HDLB1608 M501T



HDLB1608 M601T

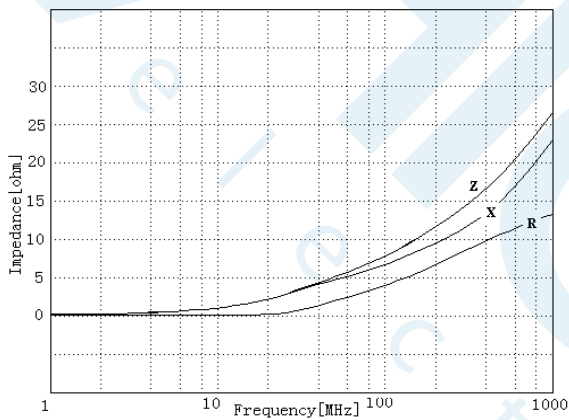




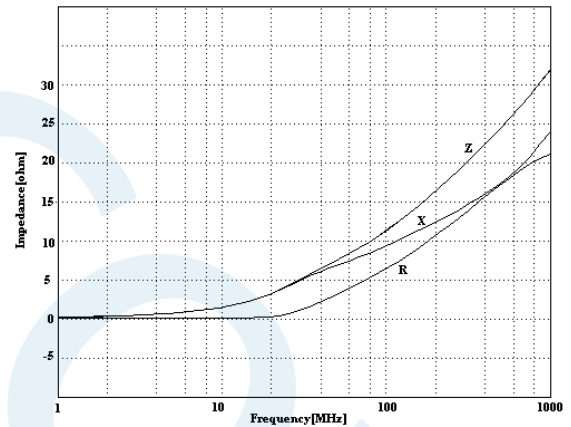
2012 Series

Part No.	Impedance (Ω) \pm 25%	Z Test Freq. (MHz)	RDC (Ω) /max	Ir(mA) /max
HDLB2012 M070T4R0	7	100	0.02	4000
HDLB2012 M110T3R0	11	100	0.02	3000
HDLB2012 M310T3R0	31	100	0.03	3000
HDLB2012 M600T3R0	60	100	0.05	3000
HDLB2012 M101T2R0	100	100	0.08	2000
HDLB2012 M121T2R0	120	100	0.10	2000
HDLB2012 M221T2R0	220	100	0.17	2000
HDLB2012 M301T1R5	300	100	0.20	1500
HDLB2012 M601T1R2	600	100	0.25	1200
HDLB2012 M102T1R0	1000	100	0.30	1000

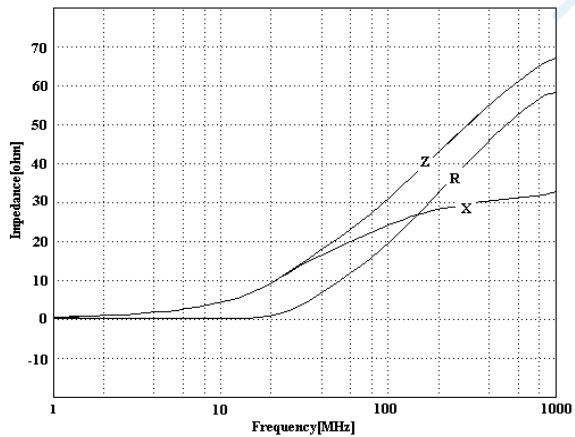
HDLB2012 M070T



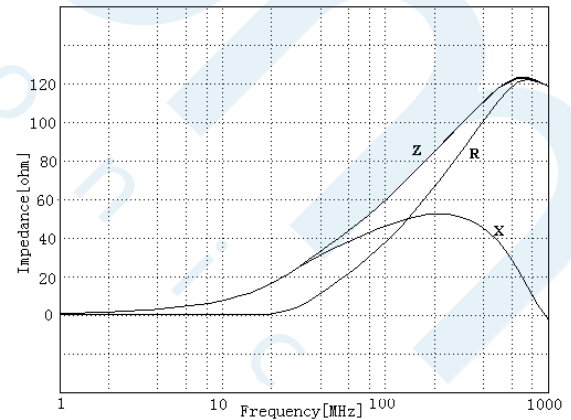
HDLB2012 M110T



HDLB2012 M310T

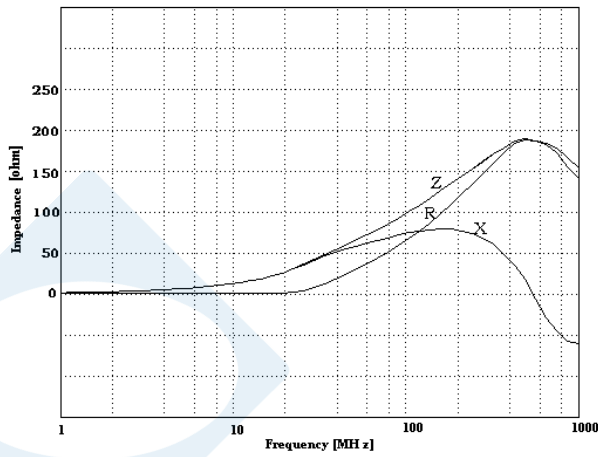


HDLB2012 M600T

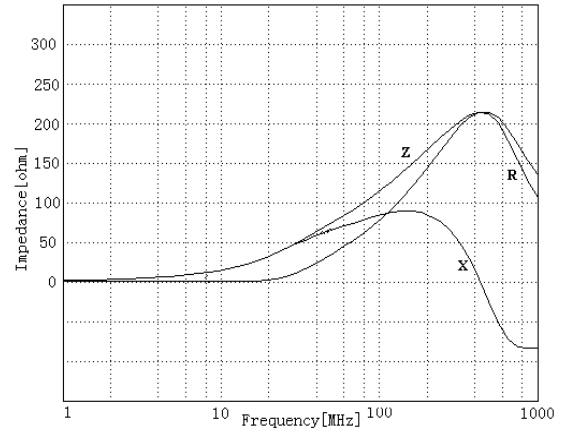




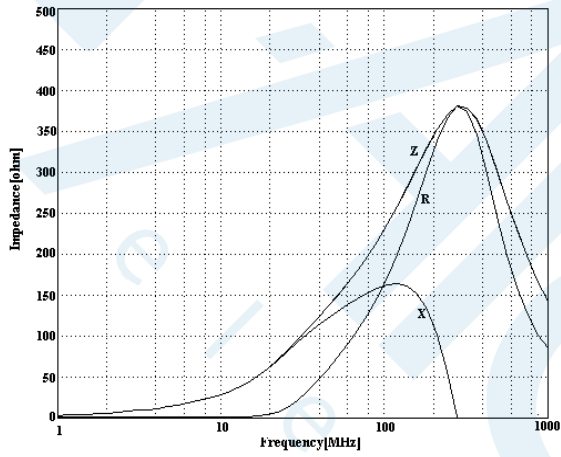
HDLB2012M101T



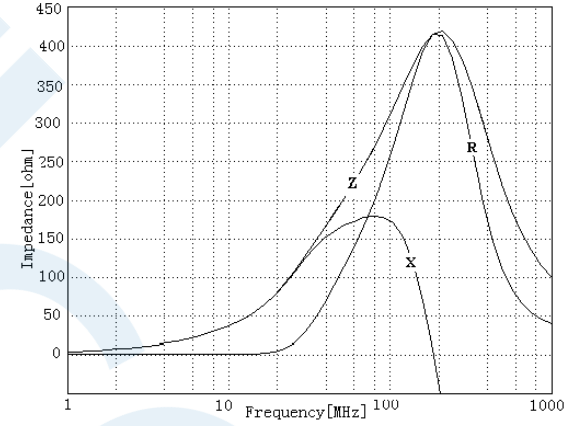
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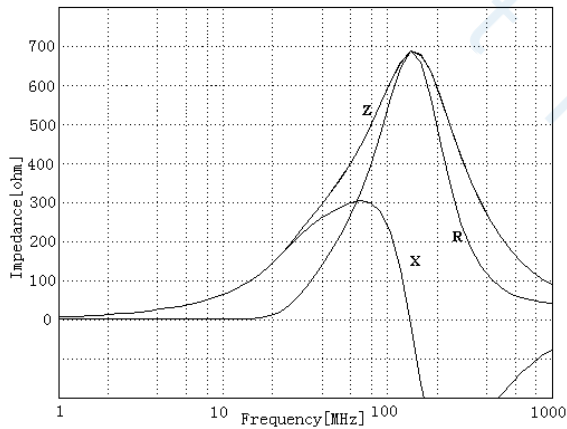
HDLB2012M221T



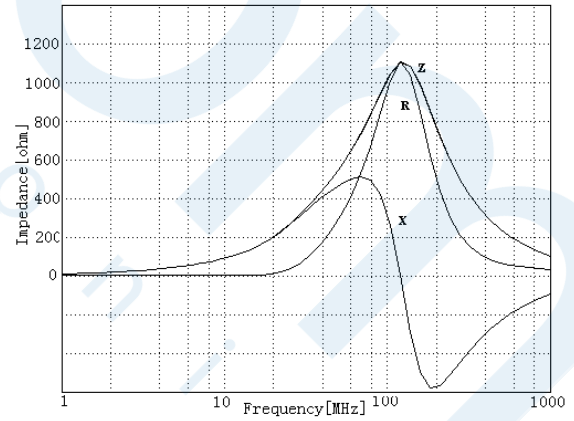
HDLB2012M301T



HDLB2012M601T



HDLB2012M102T

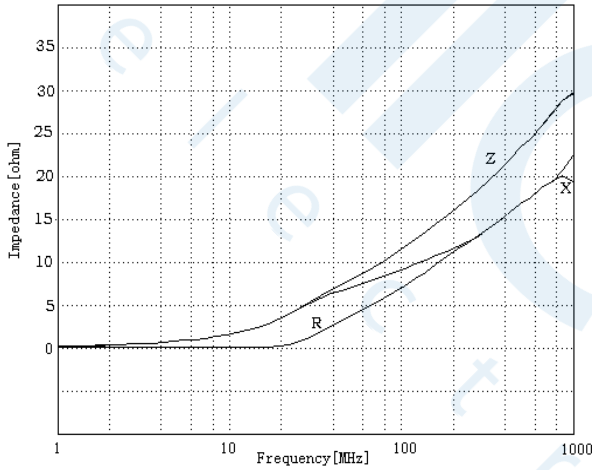




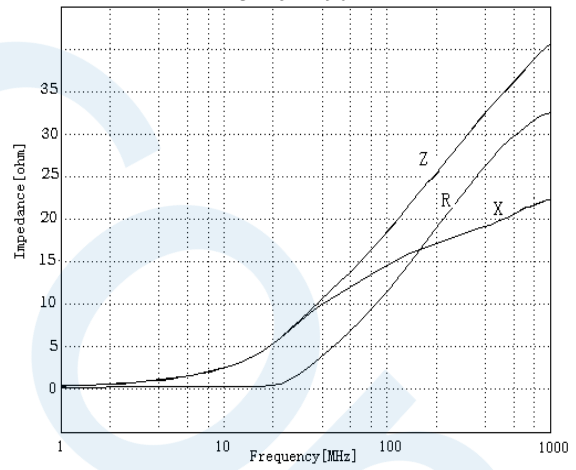
3216 Series

Part No.	Impedance (Ω) $\pm 25\%$	Z Test Freq. (MHz)	RDC (Ω) /max	Ir(mA) /max
HDLB3216 M110T4R0	11	100	0.02	4000
HDLB3216 M190T4R0	19	100	0.02	4000
HDLB3216 M260T4R0	26	100	0.02	4000
HDLB3216 M310T4R0	31	100	0.02	4000
HDLB3216 M700T3R0	70	100	0.05	3000
HDLB3216 M121T3R0	120	100	0.05	3000
HDLB3216 M181T2R5	180	100	0.10	2500
HDLB3216 M221T2R5	220	100	0.10	2500
HDLB3216 M301T2R2	300	100	0.15	2200
HDLB3216 M601T2R0	600	100	0.20	2000
HDLB3216 M102T1R5	1000	100	0.30	1500
HDLB3216 M152TT1R0	1500	50	0.35	1000
HDLB3216 M202TT0R7	2000	50	0.45	700

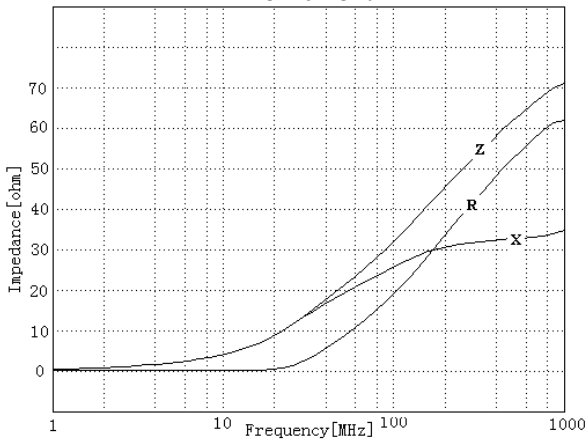
HDLB3216 M110T



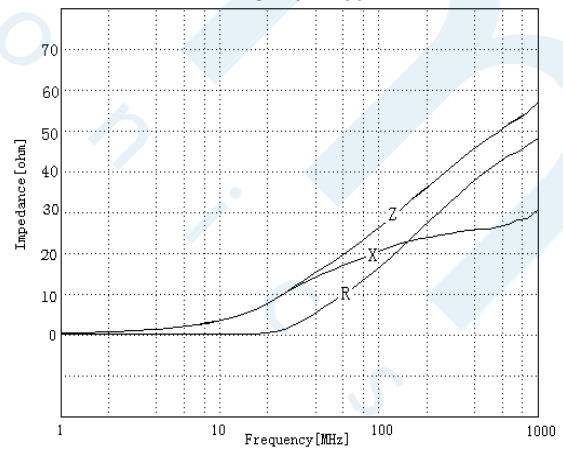
HDLB3216 M190T



HDLB3216 M310T

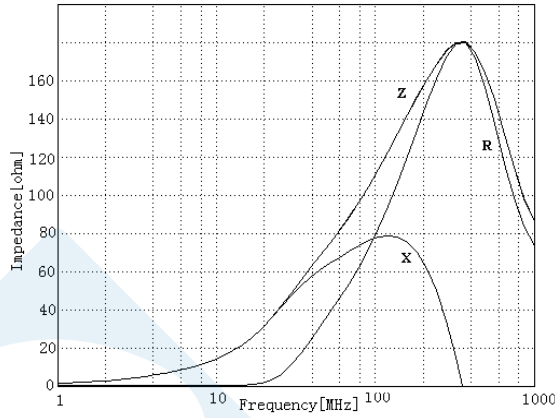


HDLB3216 M260T

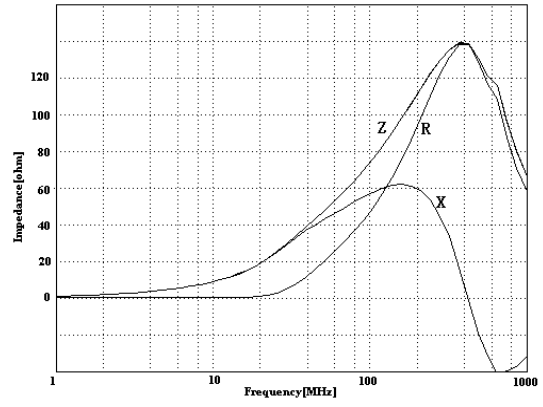




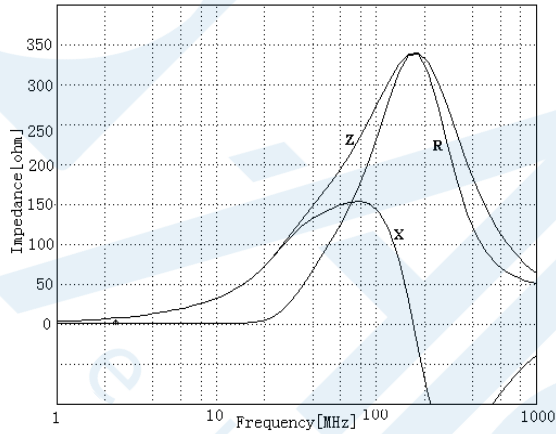
HDLB3216M121T



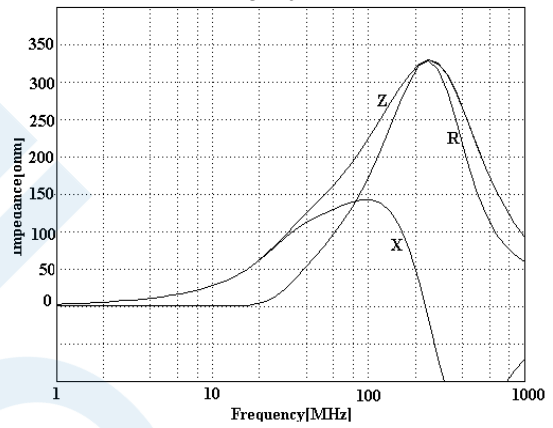
HDLB3216M700T



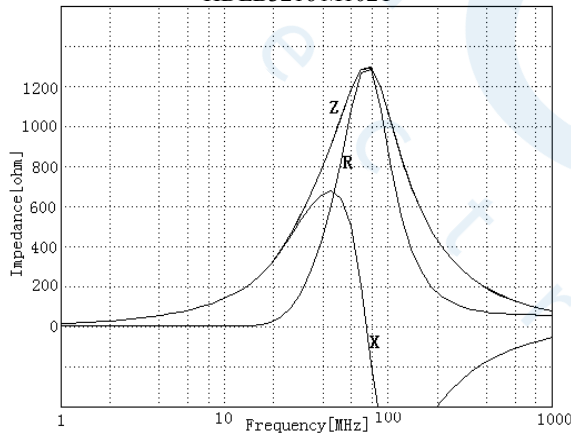
HDLB3216M301T



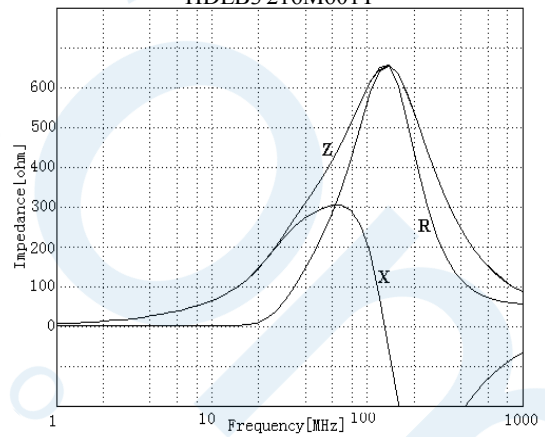
HDLB3216M221T



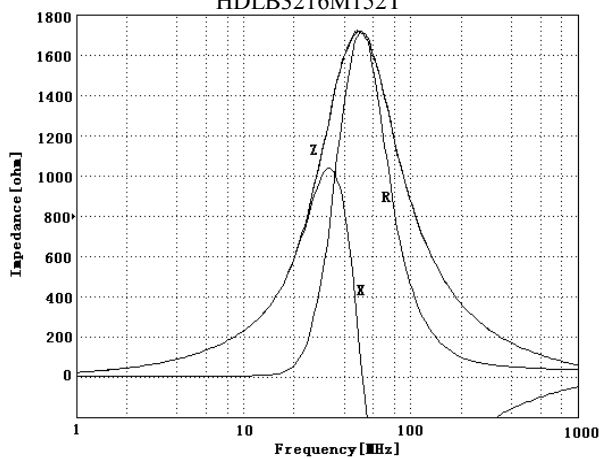
HDLB3216M102T



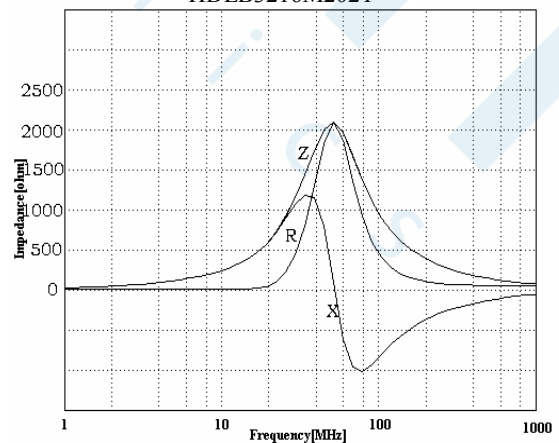
HDLB3216M601T



HDLB3216M152T



HDLB3216M202T





6 Electrical Performance

6.1 Impedance

Impedance shall meet item 5 when measured on the condition of Table 1.

Table 1

Measuring Equipment	Impedance analyzer HP4291 or equivalent
Measuring Frequency	(see item 5)
Measuring signal level	50mV

6.2 DC Resistance

D.C Resistance shall meet item 5 when measured on the condition of Table 2.

Table 2

Measuring Equipment	LCR Meter HP4263A or equivalent
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6.3 Rated current

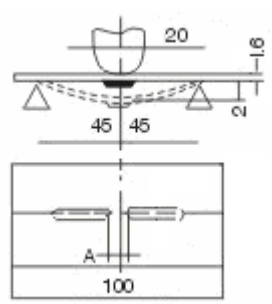
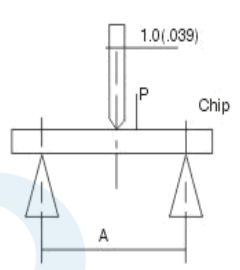
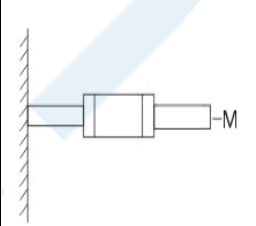
Chip surface temperature rise just 40°C against chip surface temperature when the allowable current (which is mentioned in item 5) is applied.

Table 3

Measuring Equipment	Electric Power Supplier, Electric Current Meter, Thermometer
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7 Reliable Performance

NO.	Item	Specifications	Test Methods															
1	Solder-Ability	More than 90% of termination should be covered with new solder.	Solder : Sn Temperature : 255°C+5°C/-0°C Flux : rosin Duration : 3.5±0.5s															
2	Leaching Resistance	More than 75% of termination Should be covered with new solder.	Solder : Sn Temperature : 270°C+2°C/-0°C Flux : rosin Duration : 10±0.5s															
3	Bending Strength	No mechanical damage should be noticed	When the board curve to 2mm(0.079 inches) <table border="1"> <thead> <tr> <th>Size</th> <th>A(mm)</th> </tr> </thead> <tbody> <tr> <td>1005</td> <td>0.5</td> </tr> <tr> <td>1608</td> <td>0.7</td> </tr> <tr> <td>2012</td> <td>1.0</td> </tr> <tr> <td>3216</td> <td>1.0</td> </tr> </tbody> </table> 	Size	A(mm)	1005	0.5	1608	0.7	2012	1.0	3216	1.0					
Size	A(mm)																	
1005	0.5																	
1608	0.7																	
2012	1.0																	
3216	1.0																	
4	Body Strength	No mechanical damage should be noticed	Applied specified pull strength in axial direction <table border="1"> <thead> <tr> <th>Size</th> <th>A/mm</th> <th>P/N</th> </tr> </thead> <tbody> <tr> <td>1005</td> <td>0.7</td> <td>4.9</td> </tr> <tr> <td>1608</td> <td>1.0</td> <td>4.9</td> </tr> <tr> <td>2012</td> <td>1.4</td> <td>9.8</td> </tr> <tr> <td>3216</td> <td>1.4</td> <td>9.8</td> </tr> </tbody> </table> 	Size	A/mm	P/N	1005	0.7	4.9	1608	1.0	4.9	2012	1.4	9.8	3216	1.4	9.8
Size	A/mm	P/N																
1005	0.7	4.9																
1608	1.0	4.9																
2012	1.4	9.8																
3216	1.4	9.8																
5	Terminal Strength	The terminal and body should be no damage	Applied specified pull strength in axial <table border="1"> <thead> <tr> <th>Size</th> <th>Pull Strength</th> <th>Time (s)</th> </tr> </thead> <tbody> <tr> <td>1005</td> <td>3 N</td> <td>5±1</td> </tr> <tr> <td>1608</td> <td>5 N</td> <td>5±1</td> </tr> <tr> <td>2012</td> <td>10 N</td> <td>5±1</td> </tr> <tr> <td>3216</td> <td>10 N</td> <td>5±1</td> </tr> </tbody> </table> 	Size	Pull Strength	Time (s)	1005	3 N	5±1	1608	5 N	5±1	2012	10 N	5±1	3216	10 N	5±1
Size	Pull Strength	Time (s)																
1005	3 N	5±1																
1608	5 N	5±1																
2012	10 N	5±1																
3216	10 N	5±1																



NO.	Item	Specifications	Test Methods
6	Drop		Drop 10 times on a concrete floor from a height of 1m.
7	Vibration		Frequency : 10 to 55Hz Amplitude : 1.52mm Direction and time : X, Y and Z directions for 2 hours each.
8	Humidity resistance		a. Test condition Temp. : 60±2 °C Humidity : 90%~95% Test time : 1000 h b. Measurement method : The component should be stabilized at normal condition for 24 hours before test.
9	High temperature resistance	1.No mechanical damage shall be noticed 2.Impedance shall be within ±20% of the initial value	a. Test condition Applied rated current Temp. : 125±2°C Test time : 1000 h b. Measurement method : The component should be stabilized at normal condition for 24 hours before test.
10	Low temperature resistance		a. Test condition Temp. : -55±2°C Test time : 1000 h b. Measurement method : The component should be stabilized at normal condition for 24 hours before test.
11	Thermal shock		a. Test condition 1) Temp. : -55°C, time: 30±3min 2) Temp. : +125°C, time : 30±3min 100 cycles b. Measurement method : The component should be stabilized at normal condition for 24 hours before test.



8 Recommended Soldering Conditions

Product can be applied to flow and reflow soldering.

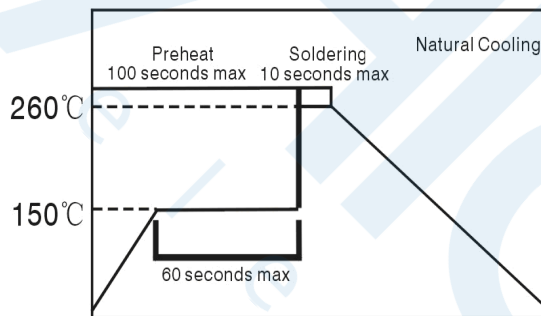
(1) Flux, Solder

- ① Use rosin-based flux. Don't use highly acidic flux with halide content exceeding 0.2wt% (chlorine conversion value).
- ② Use Sn solder.

(2) Flow soldering conditions

① Pre-heating should be in such a way that the temperature difference between solder and product surface is limited to 150°C max. Cooling into solvent after soldering also should be in such a way that temperature difference is limited to 100°C max. Unwrought pre-heating may cause cracks on the product, resulting in the deterioration of products quality.

② Standard soldering profile.



Pre-heating	150°C, 1 minute min
Peak	260°C, 10 seconds max

(3) Reflow soldering conditions

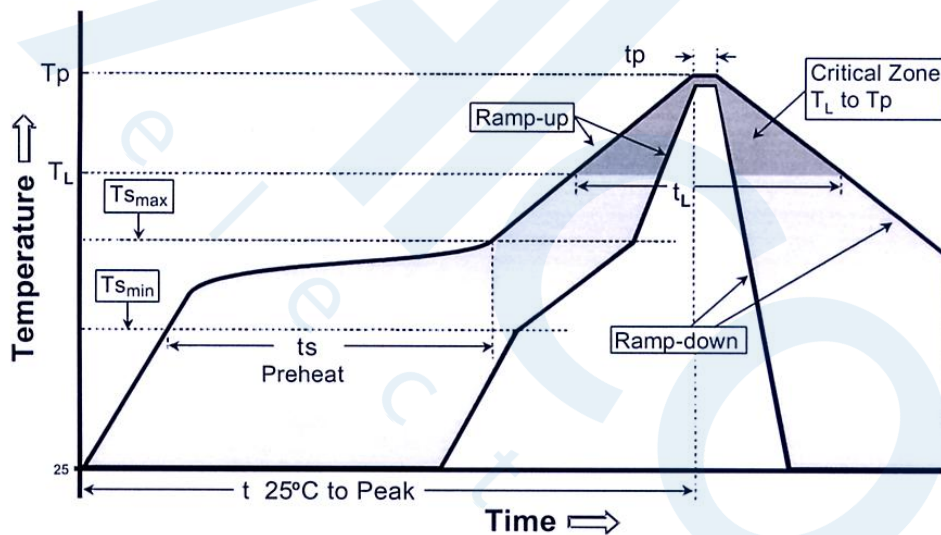
Profile Feature	Lead-Free Assembly
Average Ramp-Up Rate (T _{smax} to T _p)	3°C /second max.
Preheat <ul style="list-style-type: none"> - Temperature Min (T_{smin}) - Temperature Max (T_{smax}) - Time (t_{smin} to t_{smax}) min to t_{smax}) 	150 °C 200 °C 60-180 seconds



Profile Feature	Lead-Free Assembly
Time maintained above: Temperature (TL) Time (tL)	217 °C 60-150 seconds
Peak/Classification Temperature (Tp) Peak/Classification Time (Tp)	260 °C 3-4 seconds
Time within 5 °C of actual Peak Temperature (tp)	20-40 seconds
Ramp-Down Rate	6°C/second max.
Time 25 °C to Peak Temperature	8 minutes max.

Note 1: All temperatures refer to topside of the package, measured on the package body surface.

Standard soldering profile



(4) Reworking with soldering iron

The following conditions must be strictly followed when using a soldering iron.

Pre-heating	150°C, 1 minute
Tip temperature	350°C max
Soldering iron output	80w max
End of soldering iron	φ 1mm max
Soldering time	3 seconds max



9 Cleaning Conditions

Products shall be cleaned on the following conditions.

- (1) Cleaning temperature shall be limited to 60°C max.(40°C max for fluoride and alcohol type cleaner.)
- (2) Ultrasonic cleaning shall comply with the following conditions with avoiding the resonance phenomenon at the mounted products and P.C.B.

Power : 20W/t max

Frequency: 40 kHz

Time : 5 minutes max

- (3) Cleaner

- a) Alternative cleaner

Isopropyl alcohol (IPA) HCFC -225

- b) Aqueous agent

Surface Active Agent Type (CLEANTHROUGH 750H)

Hydrocarbon Type (TECHNOCLEANER 335)

Higher Alcohol Type (PINE ALPHA ST -100S)

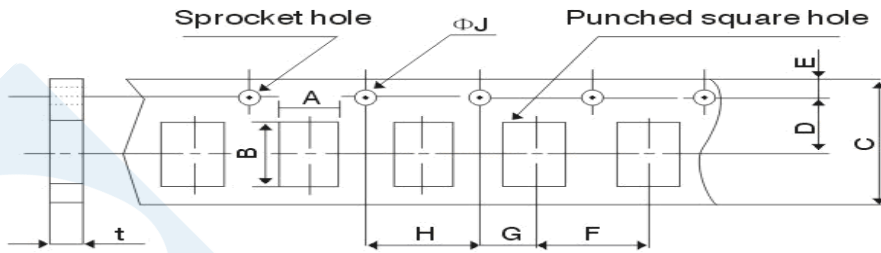
Alkali Saponification Type (*AQUACLEANER 240)

- (4) There shall be no residual flux and residual cleaner after cleaning. In the case of using aqueous agent, products shall be dried completely after rinse with de-ionized water in order to remove the cleaner.
- (5) Other cleaning Please contact us.

10 Packaging

(1) Dimensions of Tape:

Paper / Embossed carrier tape:

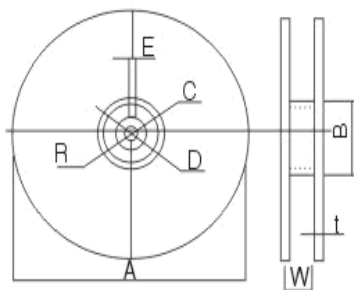


Type	3216		2012		1608	1005	0603
T*	1.1±0.3		0.85±0.2	1.25±0.2	0.8±0.15	0.5±0.15	0.3±0.05
	Paper carrier tape	Embossed carrier tape	Paper carrier tape	Embossed carrier tape	Paper carrier tape	Paper carrier tape	Paper carrier tape
A	2.0±0.2	2.0±0.2	1.5±0.15	1.5±0.15	1.05±0.15	0.65±0.10	0.4±0.05
B	3.6±0.2	3.6±0.2	2.5±0.2	2.5±0.2	1.9±0.15	1.15±0.10	0.7±0.05
C	8.0±0.3	8.0±0.3	8.0±0.3	8.0±0.3	8.0±0.3	8.0±0.3	8.0±0.3
D	3.5±0.05	3.5±0.05	3.5±0.05	3.5±0.05	3.5±0.05	3.5±0.05	3.5±0.05
E	1.75±0.1	1.75±0.1	1.75±0.1	1.75±0.1	1.75±0.1	1.75±0.1	1.75±0.1
F	4.0±0.1	4.0±0.1	4.0±0.1	4.0±0.1	4.0±0.1	2.0±0.05	2.0±0.05
G	2.0±0.05	2.0±0.05	2.0±0.05	2.0±0.05	2.0±0.05	2.0±0.05	2.0±0.05
H	4.0±0.1	4.0±0.1	4.0±0.1	4.0±0.1	4.0±0.1	4.0±0.1	4.0±0.1
ΦJ	1.5+0.1/-0	1.5+0.1/-0	1.5+0.1/-0	1.5+0.1/-0	1.5+0.1/-0	1.5+0.1/-0	1.5+0.1/-0
t(max)	1.1±0.05	2.0±0.05	1.1±0.05	1.0±0.05	1.0±0.05	0.8±0.05	0.55±0.05

T*: Product thickness

(2) Dimensions of Reel

Unit: mm



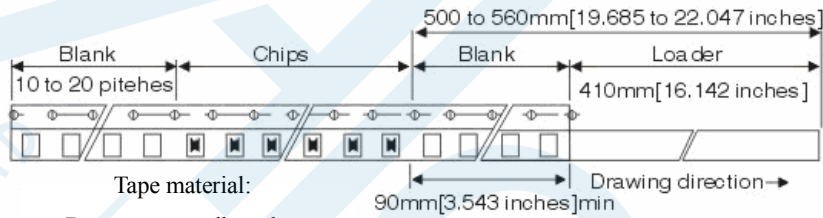
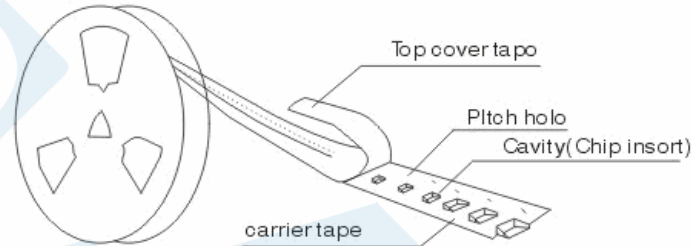
Reel material: PS (Polystyrene)

A	178±2
B	60±2
C	13.0±0.5
D	21.0±0.8
E	2.0±0.5
W	10.0±1.15
t	1.2±0.2
R	1.0±0.25

(3) Pulling strength of tapes

Carrier tape	10N or more (1kgf or more)
Cover tape	5N or more (0.5kgf or more)

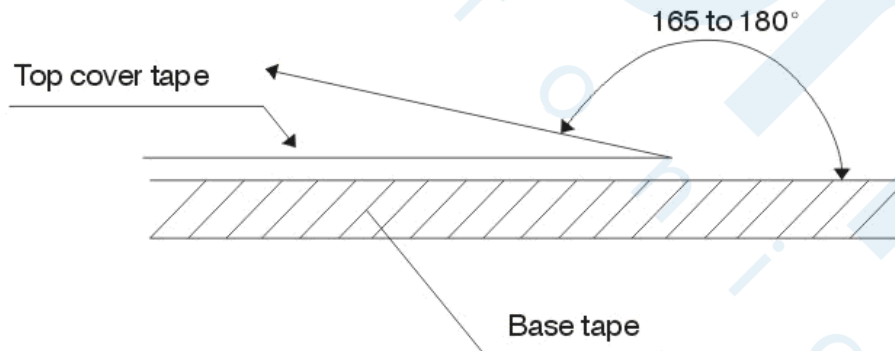
(4) Taping figure and drawing direction



Tape material:
 Base tape: cardboard
 Cover tape: polyethylene

(5) Peeling strength of cover tape

Cover tape	0.3~0.7N (30gf~70gf)
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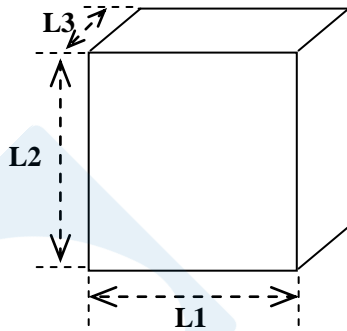
Test condition:

- 1) peel angle: 165°~180° vs. carrier tape.
- 2) peel speed: 300 mm/min±10%.



(6) Box and case dimensions

Unit: mm



Type	L1	L2	L3
Box	180±2	180±2	75±1
Box	180±2	180±2	120±2
Case	400±2	400±2	200±2

A 6 reels in a box.

B 10 boxes in a case.

(7) Packaging quantities

Type	Thickness(mm)	Bulk	Tape and reel
3216	1.10±0.30	----	3000pcs
2012	1.25±0.20	----	3000pcs
	0.85±0.20	----	4000pcs
1608	0.8±0.15	----	4000pcs
1005	0.5±0.15	----	10000pcs
0603	0.3±0.05	----	15000pcs

11 Storage

(1) Storage period

Products which inspected in over 6 months ago should be examined and used, which can be confirmed with inspection No. marked on the container. Solder ability should be checked if this period is exceeded.

(2) Storage conditions

① Products should be storage in the warehouse on the following conditions

Temperature: $\leq 40^{\circ}\text{C}$

Humidity : $\leq 70\%$ relative humidity

No rapid change on temperature and humidity

② Don't keep products in corrosive gases such as sulfur, chlorine gas or acid, or it may cause oxidization of electrode, resulting in poor solder ability.



- ③ Products should be storage on the palette for the prevention of the influence from humidity, dust and so on.
- ④ Products should be storage in the warehouse without heat shock, vibration, and direct sunlight and so on.
- ⑤ Products should be storage under the airtight packaged condition.

12 Usage of Nonflammable Material

For these materials listed below, we don't use in process.

Cd, Hg, As and its compound, PCB, etc.

PBBS, PBBOs, PBDO, PBDE, PBB.

13 Usage of ODS

For ODS listed below, we don't use in process. ODS: CCL₄, HCFC, etc. ODS.

14 Flammability Class

UL 94V-1

15 Note

This product specification guarantees the quality of our product as a single unit. Please make sure that your product is evaluated and confirmed against your specifications when our product is mounted to your product.

We cannot warrant against failure caused by any use of our product that deviates from the intended use as described in this product specification.

Please return our copy of this product specification in two month after issued date with your signature of receipt. If the copy is not returned by the date, this product specification will be deemed to have been received.