# Notice for TAIYO YUDEN products

Please read this notice before using the TAIYO YUDEN products.

## ⚠ REMINDERS

- Product information in this catalog is as of October 2013. All of the contents specified herein are subject to change without notice due to technical improvements, etc. Therefore, please check for the latest information carefully before practical application or usage of the Products.

  Please note that TAIYO YUDEN CO., LTD. shall not be responsible for any defects in products or equipment incorporating such products, which are caused under the conditions other than those specified in this catalog or individual specification.

- Please contact TAIYO YUDEN CO., LTD. for further details of product specifications as the individual specification is available.

- Please conduct validation and verification of products in actual condition of mounting and operating environment before commercial shipment of the equipment.

- All electronic components or functional modules listed in this catalog are developed, designed and intended for use in general electronics equipment.(for AV, office automation, household, office supply, information service, telecommunications, (such as mobile phone or PC) etc.). Before incorporating the components or devices into any equipment in the field such as transportation,( automotive control, train control, ship control), transportation signal, disaster prevention, medical, public information network (telephone exchange, base station) etc. which may have direct influence to harm or injure a human body, please contact TAIYO YUDEN CO., LTD. for more detail in advance.
  Do not incorporate the products into any equipment in fields such as aerospace, aviation, nuclear control, submarine system, military, etc. where higher safety and reliability are especially required.

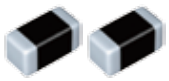
  In addition, even electronic components or functional modules that are used for the general electronic equipment, if the equipment or the electric circuit require high safety or reliability function or performances, a sufficient reliability evaluation check for safety shall be performed before commercial shipment and moreover, due consideration to install a protective circuit is strongly recommended at customer's design stage.

- The contents of this catalog are applicable to the products which are purchased from our sales offices or distributors (so called "TAIYO YUDEN's official sales channel").
  It is only applicable to the products purchased from any of TAIYO YUDEN's official sales channel.

- Please note that TAIYO YUDEN CO., LTD. shall have no responsibility for any controversies or disputes that may occur in connection with a third party's intellectual property rights and other related rights arising from your usage of products in this catalog. TAIYO YUDEN CO., LTD. grants no license for such rights.

- Caution for export
  Certain items in this catalog may require specific procedures for export according to "Foreign Exchange and Foreign Trade Control Law" of Japan, "U.S. Export Administration Regulations", and other applicable regulations. Should you have any question or inquiry on this matter, please contact our sales staff.

# CHIP BEAD INDUCTORS FOR POWER LINES (FB SERIES M TYPE)



WAVE REFLOW

## ■PARTS NUMBER

*Operating Temp. : −40〜+125℃ (Including self-generated heat)

| F | B | △ | M | J | 3 | 2 | 1 | 6 | H | S | 8 | 0 | 0 | — | T | △ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ① | | | ② | ③ | ④ | | | | ⑤ | | ⑥ | | | ⑦ | ⑧ | ⑨ |

△=Blank space

①Series name

| Code | Series name |
|---|---|
| FB | Ferrite bead |

②Shape

| Code | Shape |
|---|---|
| M | Rectangular chip |

③Characteristics

| Code | Characteristics |
|---|---|
| J | Standard |
| H | High Impedance type |

④Dimensions (L×W)

| Code | Type (inch) | Dimensions (L×W) [mm] |
|---|---|---|
| 1608 | 1608 (0603) | 1.6×0.8 |
| 2125 | 2125 (0805) | 2.0×1.25 |
| 2012 | 2012 (0805) | |
| 2016 | 2016 (0806) | 2.0×1.6 |
| 3216 | 3216 (1206) | 3.2×1.6 |
| 3225 | 3225 (1210) | 3.2×2.5 |
| 4516 | 4516 (1806) | 4.5×1.6 |
| 4525 | 4525 (1810) | 4.5×2.5 |
| 4532 | 4532 (1812) | 4.5×3.2 |

⑤Material

| Code | Material |
|---|---|
| HS | Refer to impedance curves for material differences |
| HM | |
| HL | |

⑥Nominal impedance

| Code (example) | Nominal impedance [Ω] |
|---|---|
| 330 | 33 |
| 111 | 110 |
| 132 | 1300 |

⑦Impedance tolerance

| Code | Impedance tolerance |
|---|---|
| — | ±25% |
| N | ±30% |

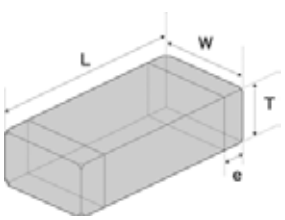
⑧Packaging

| Code | Packaging |
|---|---|
| T | Taping |

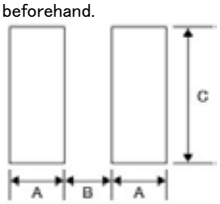
⑨Internal code

| Code | Internal code |
|---|---|
| △ | Standard |

## ■STANDARD EXTERNAL DIMENSIONS / STANDARD QUANTITY




Recommended Land Patterns
Surface Mounting
・Mounting and soldering conditions should be checked beforehand.




| Type | A | B | C |
|---|---|---|---|
| FB MJ1608 | 1.0 | 1.0 | 1.0 |
| FB MJ2125 | 1.4 | 1.2 | 1.65 |
| FB MJ3216 | 1.4 | 2.2 | 2.0 |
| FB MJ4516 | 1.75 | 3.5 | 2.0 |
| FB MH1608 | 1.0 | 1.0 | 1.0 |
| FB MH2012 | 1.4 | 1.2 | 1.65 |
| FB MH2016 | 1.4 | 1.2 | 2.0 |
| FB MH3216 | 1.4 | 2.2 | 2.0 |
| FB MH3225 | 1.4 | 2.2 | 2.9 |
| FB MH4516 | 1.75 | 3.5 | 2.0 |
| FB MH4525 | 1.75 | 3.5 | 2.9 |
| FB MH4532 | 1.75 | 3.5 | 3.7 |

Unit : mm

| Type | L | W | T | e | Standard quantity [pcs] | |
|---|---|---|---|---|---|---|
| | | | | | Paper tape | Embossed tape |
| FB MJ1608 (0603) | 1.6±0.2 (0.063±0.008) | 0.8±0.2 (0.031±0.008) | 0.8±0.2 (0.031±0.008) | 0.3±0.2 (0.012±0.008) | 4000 | — |
| FB MJ2125 (0805) | 2.0±0.2 (0.079±0.008) | 1.25±0.2 (0.049±0.008) | 0.85±0.2 (0.033±0.008) | 0.5±0.3 (0.020±0.012) | 4000 | — |
| FB MJ3216 (1206) | 3.2±0.3 (0.126±0.012) | 1.6±0.2 (0.063±0.008) | 1.1±0.2 (0.043±0.008) | 0.5±0.3 (0.020±0.012) | — | 2000 |
| FB MJ4516 (1806) | 4.5±0.3 (0.177±0.012) | 1.6±0.2 (0.063±0.008) | 1.1±0.2 (0.043±0.008) | 0.5±0.3 (0.020±0.012) | — | 2000 |
| FB MH1608 (0603) | 1.6±0.1 (0.063±0.004) | 0.8±0.1 (0.031±0.004) | 0.8±0.1 (0.031±0.004) | 0.3±0.15 (0.012±0.006) | 4000 | — |
| FB MH2012 (0805) | 2.0±0.2 (0.079±0.008) | 1.25±0.2 (0.049±0.008) | 0.85±0.2 (0.033±0.008) | 0.5±0.3 (0.020±0.012) | 4000 | — |
| FB MH2016 (0806) | 2.0±0.2 (0.079±0.008) | 1.6±0.2 (0.063±0.008) | 1.6±0.2 (0.063±0.008) | 0.5±0.3 (0.020±0.012) | — | 2000 |
| FB MH3216 (1206) | 3.2±0.3 (0.126±0.012) | 1.6±0.2 (0.063±0.008) | 1.6±0.2 (0.063±0.008) | 0.5±0.3 (0.020±0.012) | — | 2000 |
| FB MH3225 (1210) | 3.2±0.3 (0.126±0.012) | 2.5±0.3 (0.098±0.012) | 2.5±0.3 (0.098±0.012) | 0.5±0.3 (0.020±0.012) | — | 1000 |
| FB MH4516 (1806) | 4.5±0.3 (0.177±0.012) | 1.6±0.2 (0.063±0.008) | 1.6±0.2 (0.063±0.008) | 0.5±0.3 (0.020±0.012) | — | 2000 |
| FB MH4525 (1810) | 4.5±0.4 (0.177±0.016) | 2.5±0.3 (0.098±0.012) | 2.5±0.3 (0.098±0.012) | 0.9±0.6 (0.035±0.024) | — | 1000 |
| FB MH4532 (1812) | 4.5±0.4 (0.177±0.016) | 3.2±0.3 (0.126±0.012) | 3.2±0.3 (0.126±0.012) | 0.9±0.6 (0.035±0.024) | — | 2000 |

Unit : mm (inch)



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■PARTS NUMBER

Standard type

●FB MJ1608

| Parts number | EHS | Nominal impedance (Ω) | Impedance tolerance | Measuring frequency [MHz] | DC Resistance [Ω] (max.) | Rated current [A] (max.) | Thickness [mm] |
|---|---|---|---|---|---|---|---|
| FB MJ1608HS280NT | RoHS | 28 | ±30% | 100 | 0.007 | 4.0 | 0.8 ±0.2 |
| FB MJ1608HM230NT | RoHS | 23 | ±30% | 100 | 0.007 | 4.0 | 0.8 ±0.2 |

●FB MJ2125

| Parts number | EHS | Nominal impedance (Ω) | Impedance tolerance | Measuring frequency [MHz] | DC Resistance [Ω] (max.) | Rated current [A] (max.) | Thickness [mm] |
|---|---|---|---|---|---|---|---|
| FB MJ2125HS250NT | RoHS | 25 | ±30% | 100 | 0.004 | 6.0 | 0.85 ±0.2 |
| FB MJ2125HS420-T | RoHS | 42 | ±25% | 100 | 0.008 | 4.0 | 0.85 ±0.2 |
| FB MJ2125HM210NT | RoHS | 21 | ±30% | 100 | 0.004 | 6.0 | 0.85 ±0.2 |
| FB MJ2125HM330-T | RoHS | 33 | ±25% | 100 | 0.008 | 4.0 | 0.85 ±0.2 |
| FB MJ2125HL8R0NT | RoHS | 8 | ±30% | 100 | 0.008 | 4.0 | 0.85 ±0.2 |

●FB MJ3216

| Parts number | EHS | Nominal impedance (Ω) | Impedance tolerance | Measuring frequency [MHz] | DC Resistance [Ω] (max.) | Rated current [A] (max.) | Thickness [mm] |
|---|---|---|---|---|---|---|---|
| FB MJ3216HS480NT | RoHS | 48 | ±30% | 100 | 0.005 | 6.0 | 1.1 ±0.2 |
| FB MJ3216HS800-T | RoHS | 80 | ±25% | 100 | 0.010 | 4.0 | 1.1 ±0.2 |
| FB MJ3216HM380NT | RoHS | 38 | ±30% | 100 | 0.005 | 6.0 | 1.1 ±0.2 |
| FB MJ3216HM600-T | RoHS | 60 | ±25% | 100 | 0.010 | 4.0 | 1.1 ±0.2 |
| FB MJ3216HL160NT | RoHS | 16 | ±30% | 100 | 0.012 | 4.0 | 1.1 ±0.2 |

●FB MJ4516

| Parts number | EHS | Nominal impedance (Ω) | Impedance tolerance | Measuring frequency [MHz] | DC Resistance [Ω] (max.) | Rated current [A] (max.) | Thickness [mm] |
|---|---|---|---|---|---|---|---|
| FB MJ4516HS720NT | RoHS | 72 | ±30% | 100 | 0.007 | 6.0 | 1.1 ±0.2 |
| FB MJ4516HS111-T | RoHS | 110 | ±25% | 100 | 0.014 | 4.0 | 1.1 ±0.2 |
| FB MJ4516HM560NT | RoHS | 56 | ±30% | 100 | 0.007 | 6.0 | 1.1 ±0.2 |
| FB MJ4516HM900-T | RoHS | 90 | ±25% | 100 | 0.014 | 4.0 | 1.1 ±0.2 |
| FB MJ4516HL230NT | RoHS | 23 | ±30% | 100 | 0.014 | 3.5 | 1.1 ±0.2 |

High impedance type

●FB MH1608

| Parts number | EHS | Nominal impedance (Ω) | Impedance tolerance | Measuring frequency [MHz] | DC Resistance [Ω] (max.) | Rated current [A] (max.) | Thickness [mm] |
|---|---|---|---|---|---|---|---|
| FB MH1608HM470-T | RoHS | 47 | ±25% | 100 | 0.020 | 3.5 | 0.8 ±0.1 |
| FB MH1608HM600-T | RoHS | 60 | ±25% | 100 | 0.025 | 3.0 | 0.8 ±0.1 |
| FB MH1608HM101-T | RoHS | 100 | ±25% | 100 | 0.035 | 2.5 | 0.8 ±0.1 |
| FB MH1608HM151-T | RoHS | 150 | ±25% | 100 | 0.050 | 2.1 | 0.8 ±0.1 |
| FB MH1608HM221-T | RoHS | 220 | ±25% | 100 | 0.070 | 1.8 | 0.8 ±0.1 |
| FB MH1608HM331-T | RoHS | 330 | ±25% | 100 | 0.130 | 1.2 | 0.8 ±0.1 |
| FB MH1608HM471-T | RoHS | 470 | ±25% | 100 | 0.150 | 1.0 | 0.8 ±0.1 |
| FB MH1608HM601-T | RoHS | 600 | ±25% | 100 | 0.170 | 0.9 | 0.8 ±0.1 |
| FB MH1608HM102-T | RoHS | 1000 | ±25% | 100 | 0.350 | 0.6 | 0.8 ±0.1 |
| FB MH1608HL300-T | RoHS | 30 | ±25% | 100 | 0.028 | 2.6 | 0.8 ±0.1 |
| FB MH1608HL600-T | RoHS | 60 | ±25% | 100 | 0.045 | 2.1 | 0.8 ±0.1 |
| FB MH1608HL121-T | RoHS | 120 | ±25% | 100 | 0.130 | 1.2 | 0.8 ±0.1 |
| FB MH1608HL221-T | RoHS | 220 | ±25% | 100 | 0.170 | 0.9 | 0.8 ±0.1 |
| FB MH1608HL331-T | RoHS | 330 | ±25% | 100 | 0.210 | 0.8 | 0.8 ±0.1 |
| FB MH1608HL471-T | RoHS | 470 | ±25% | 100 | 0.350 | 0.6 | 0.8 ±0.1 |
| FB MH1608HL601-T | RoHS | 600 | ±25% | 100 | 0.450 | 0.5 | 0.8 ±0.1 |

●FB MH2012

| Parts number | EHS | Nominal impedance (Ω) | Impedance tolerance | Measuring frequency [MHz] | DC Resistance [Ω] (max.) | Rated current [A] (max.) | Thickness [mm] |
|---|---|---|---|---|---|---|---|
| FB MH2012HM800-T | RoHS | 80 | ±25% | 100 | 0.025 | 2.7 | 0.85 ±0.2 |
| FB MH2012HM121-T | RoHS | 120 | ±25% | 100 | 0.032 | 2.5 | 0.85 ±0.2 |
| FB MH2012HM221-T | RoHS | 220 | ±25% | 100 | 0.060 | 2.0 | 0.85 ±0.2 |
| FB MH2012HM331-T | RoHS | 330 | ±25% | 100 | 0.080 | 1.8 | 0.85 ±0.2 |

●FB MH2016

| Parts number | EHS | Nominal impedance (Ω) | Impedance tolerance | Measuring frequency [MHz] | DC Resistance [Ω] (max.) | Rated current [A] (max.) | Thickness [mm] |
|---|---|---|---|---|---|---|---|
| FB MH2016HM121NT | RoHS | 120 | ±30% | 100 | 0.015 | 4.5 | 1.6 ±0.2 |
| FB MH2016HM251NT | RoHS | 250 | ±30% | 100 | 0.050 | 2.0 | 1.6 ±0.2 |

●FB MH3216

| Parts number | EHS | Nominal impedance (Ω) | Impedance tolerance | Measuring frequency [MHz] | DC Resistance [Ω] (max.) | Rated current [A] (max.) | Thickness [mm] |
|---|---|---|---|---|---|---|---|
| FB MH3216HM221NT | RoHS | 220 | ±30% | 100 | 0.020 | 4.0 | 1.6 ±0.2 |
| FB MH3216HM501NT | RoHS | 500 | ±30% | 100 | 0.070 | 2.0 | 1.6 ±0.2 |

●FB MH3225

| Parts number | EHS | Nominal impedance (Ω) | Impedance tolerance | Measuring frequency [MHz] | DC Resistance [Ω] (max.) | Rated current [A] (max.) | Thickness [mm] |
|---|---|---|---|---|---|---|---|
| FB MH3225HM601NT | RoHS | 600 | ±30% | 100 | 0.042 | 3.0 | 2.5 ±0.3 |
| FB MH3225HM102NT | RoHS | 1000 | ±30% | 100 | 0.100 | 2.0 | 2.5 ±0.3 |
| FB MH3225HM202NT | RoHS | 2000 | ±30% | 100 | 0.130 | 1.2 | 2.5 ±0.3 |

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## ■PARTS NUMBER

### ●FB MH4516

| Parts number | EHS | Nominal impedance (Ω) | Impedance tolerance | Measuring frequency [MHz] | DC Resistance [Ω] (max.) | Rated current [A] (max.) | Thickness [mm] |
|---|---|---|---|---|---|---|---|
| FB MH4516HM851NT | RoHS | 850 | ±30% | 100 | 0.100 | 1.5 | 1.6 ±0.2 |

### ●FB MH4525

| Parts number | EHS | Nominal impedance (Ω) | Impedance tolerance | Measuring frequency [MHz] | DC Resistance [Ω] (max.) | Rated current [A] (max.) | Thickness [mm] |
|---|---|---|---|---|---|---|---|
| FB MH4525HM102NT | RoHS | 1000 | ±30% | 100 | 0.060 | 3.0 | 2.5 ±0.3 |
| FB MH4525HM162NT | RoHS | 1600 | ±30% | 100 | 0.130 | 2.0 | 2.5 ±0.3 |

### ●FB MH4532

| Parts number | EHS | Nominal impedance (Ω) | Impedance tolerance | Measuring frequency [MHz] | DC Resistance [Ω] (max.) | Rated current [A] (max.) | Thickness [mm] |
|---|---|---|---|---|---|---|---|
| FB MH4532HM681-T | RoHS | 680 | ±25% | 100 | 0.028 | 4.0 | 3.2 ±0.3 |
| FB MH4532HM132-T | RoHS | 1300 | ±25% | 100 | 0.060 | 3.0 | 3.2 ±0.3 |
| FB MH4532HM202-T | RoHS | 2000 | ±25% | 100 | 0.130 | 1.3 | 3.2 ±0.3 |

### ●High current type

| Parts number | EHS | Nominal impedance (Ω) | Impedance tolerance | Measuring frequency [MHz] | DC Resistance [Ω] (max.) | Rated current [A] (max.) | Thickness [mm] |
|---|---|---|---|---|---|---|---|
| FB MJ1608HS220NTR | RoHS | 22 | ±30% | 100 | 0.004 | 7.5 | 0.8 ±0.2 |
| FB MJ1608HS280NTR | RoHS | 28 | ±30% | 100 | 0.006 | 6.0 | 0.8 ±0.2 |
| FB MJ1608HM180NTR | RoHS | 18 | ±30% | 100 | 0.004 | 7.5 | 0.8 ±0.2 |
| FB MJ1608HM230NTR | RoHS | 23 | ±30% | 100 | 0.006 | 6.0 | 0.8 ±0.2 |



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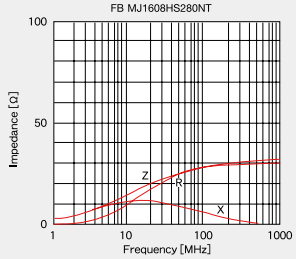
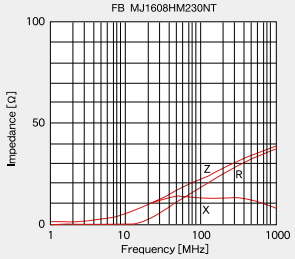
## ELECTRICAL CHARACTERISTICS

### FB MJ1608

FB MJ1608HS280NT

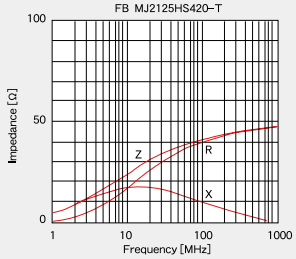



FB MJ1608HM230NT

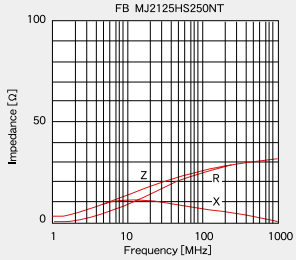



### FB MJ2125

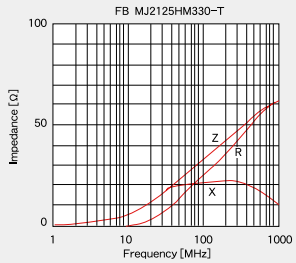
FB MJ2125HS420-T



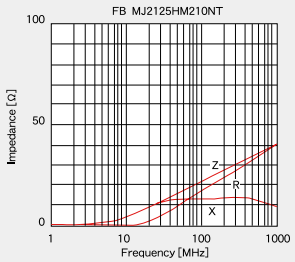

FB MJ2125HS250NT



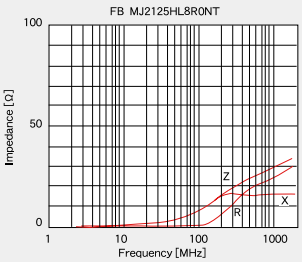

FB MJ2125HM330-T




FB MJ2125HM210NT

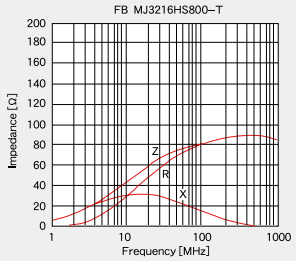



FB MJ2125HL8R0NT

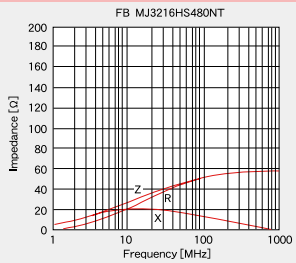



### FB MJ3216

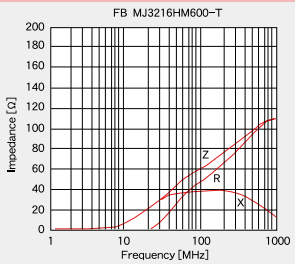
FB MJ3216HS800-T



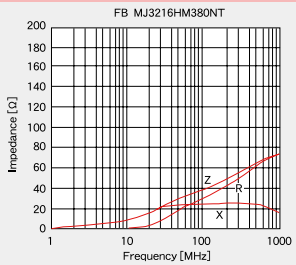

FB MJ3216HS480NT



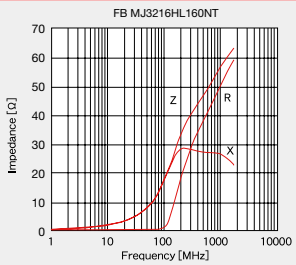

FB MJ3216HM600-T




FB MJ3216HM380NT

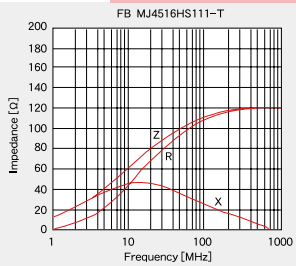



FB MJ3216HL160NT




### FB MJ4516

FB MJ4516HS111-T

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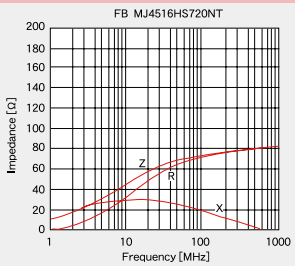
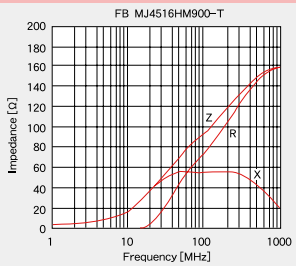
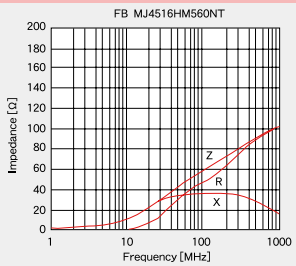



FB MJ4516HM900-T




FB MJ4516HM560NT

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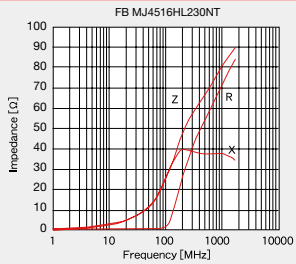


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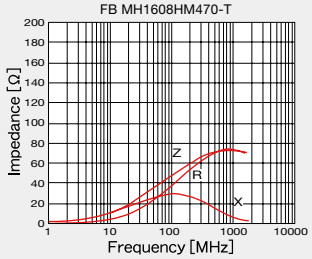
## ELECTRICAL CHARACTERISTICS

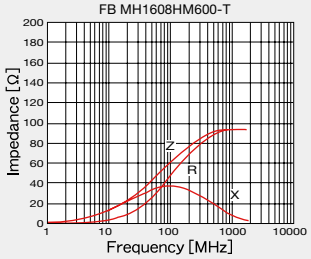
Standard type

### FB MH1608

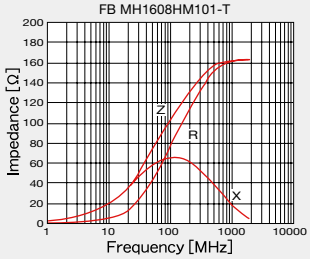
FB MH1608HM470-T



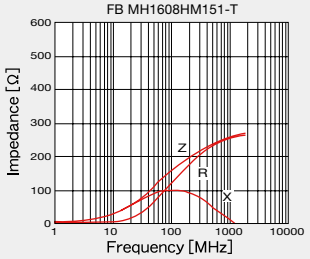

FB MH1608HM600-T



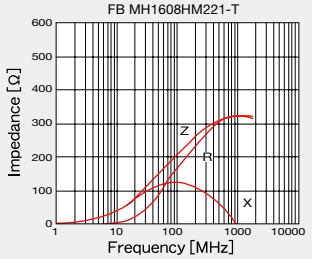

FB MH1608HM101-T



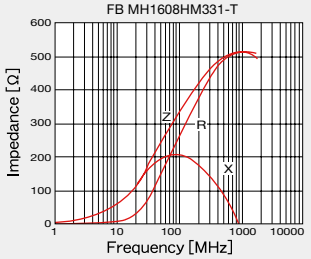

FB MH1608HM151-T




FB MH1608HM221-T




FB MH1608HM331-T

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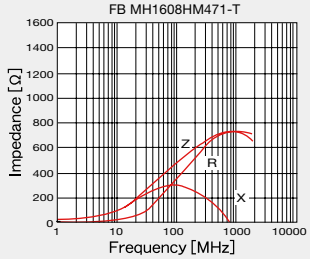


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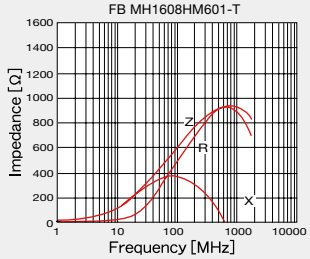
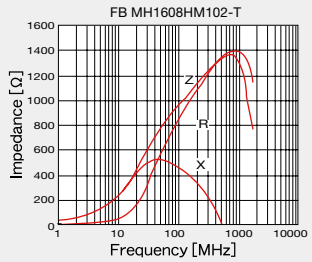
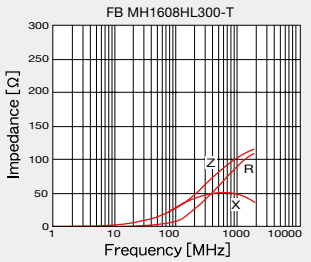


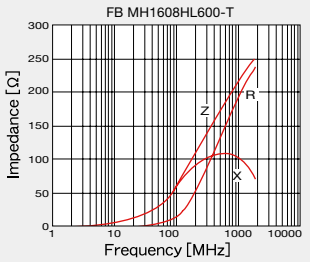

FB MH1608HM102-T




FB MH1608HL300-T




FB MH1608HL600-T

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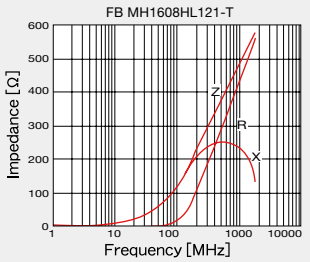


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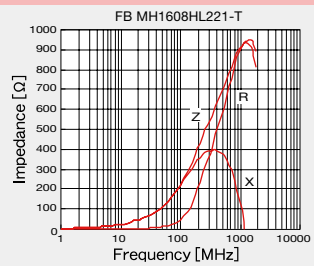


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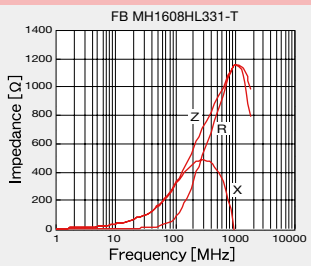
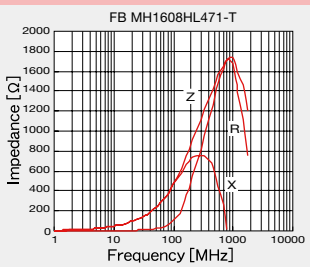



FB MH1608HL471-T

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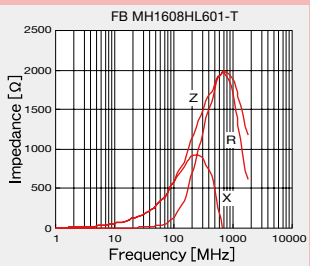
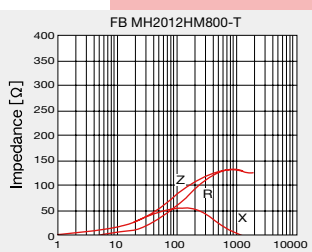
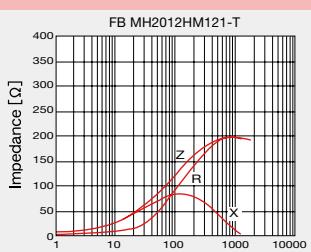



### FBMH2012

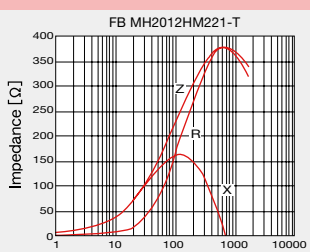
FB MH2012HM800-T




FB MH2012HM121-T




FB MH2012HM221-T

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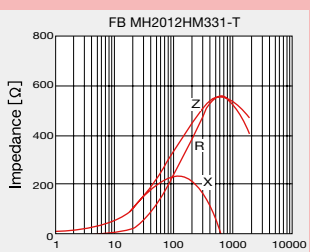
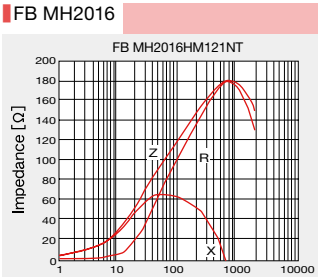
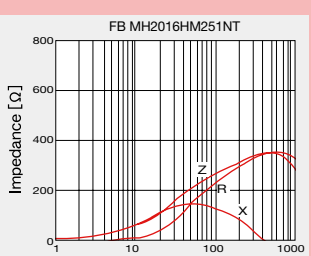



### FB MH2016

FB MH2016HM121NT

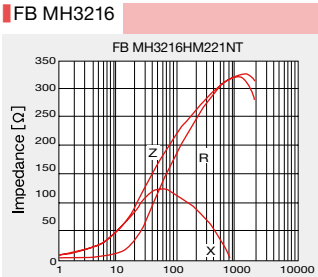



FB MH2016HM251NT

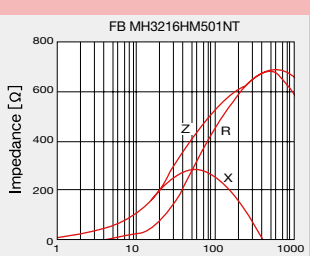



### FB MH3216

FB MH3216HM221NT




FB MH3216HM501NT

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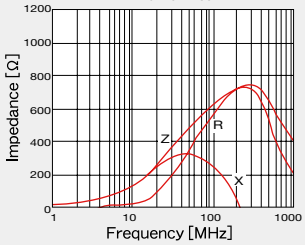
## ELECTRICAL CHARACTERISTICS

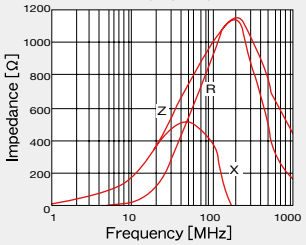
Standard type

### FB MH3225

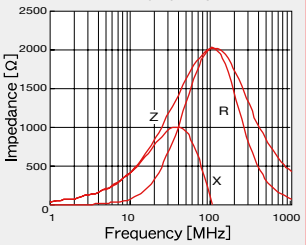
FB MH3225HM601NT




FB MH3225HM102NT

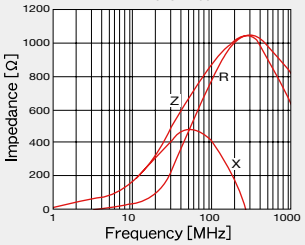



FB MH3225HM202NT



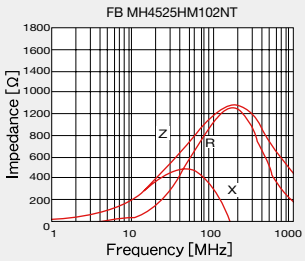

### FB MH4516

FB MH4516HM851NT

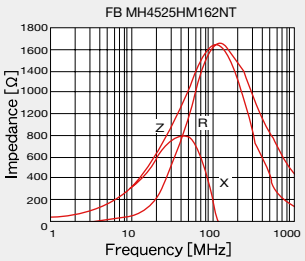



### FB MH4525

FB MH4525HM102NT

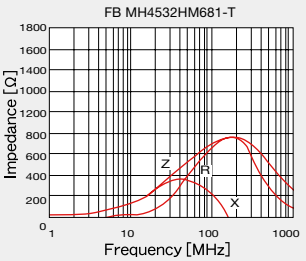



FB MH4525HM162NT

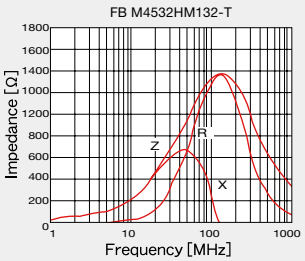



### FB MH4532

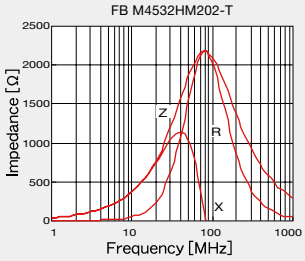
FB MH4532HM681-T




FB M4532HM132-T

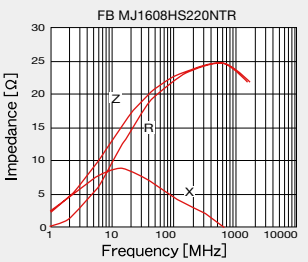



FB M4532HM202-T

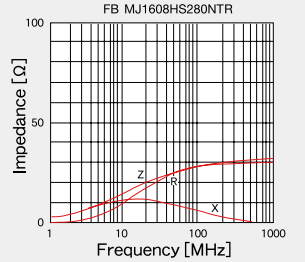



### High current type

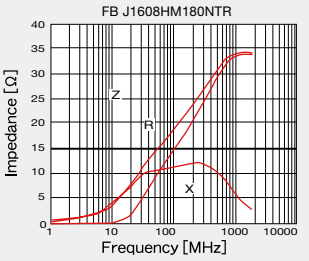
FB MJ1608HS220NTR



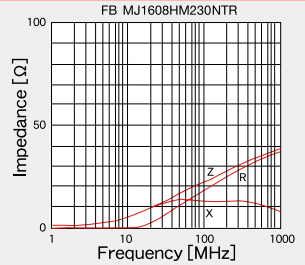

FB MJ1608HS280NTR




FB J1608HM180NTR




FB MJ1608HM230NTR

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# CHIP BEAD INDUCTORS FOR POWER LINES (FB SERIES M TYPE)

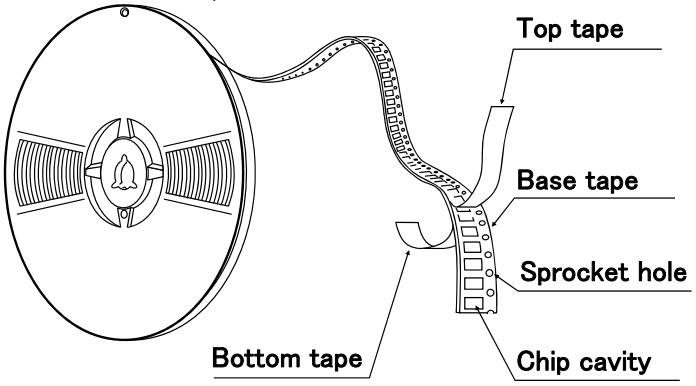
## ■PACKAGING

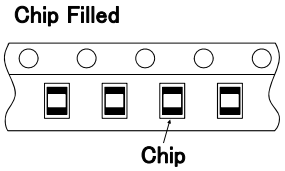
### ①Minimum Quantity

| Type | Standard Quantity [pcs] | |
|---|---|---|
| | Paper Tape | Embossed Tape |
| 1608 (0603) | 4000 | — |
| 2125 (0805) | 4000 | — |
| 2012 (0805) | 4000 | — |
| 2016 (0806) | — | 2000 |
| 3216 (1206) | — | 2000 |
| 3225 (1210) | — | 1000 |
| 4516 (1806) | — | 2000 |
| 4525 (1810) | — | 1000 |
| 4532 (1812) | — | 2000 |

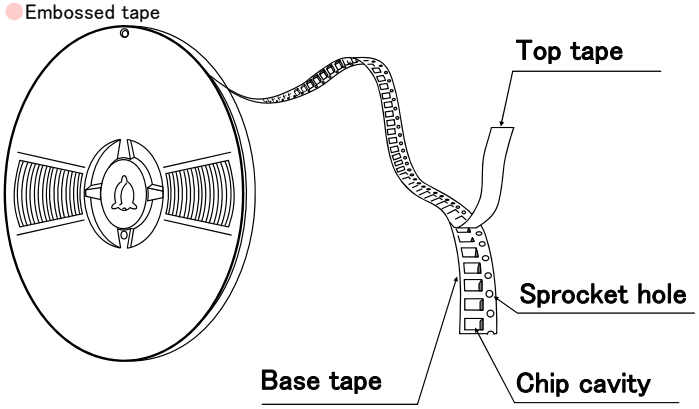
### ②Tape Material

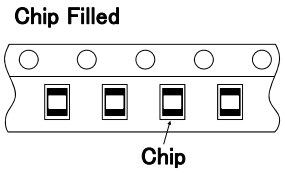
●Card board carrier tape



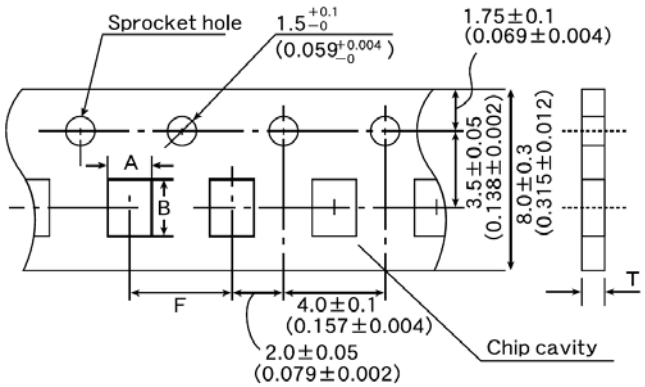

●Embossed tape




### ③Taping Dimensions

●Paper tape (0.315 inches wide)





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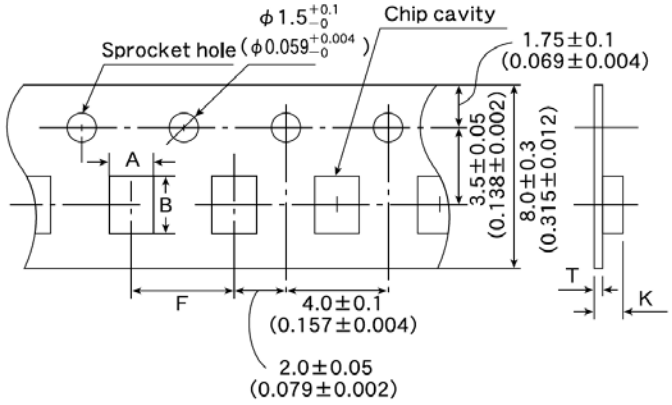
| Type | Chip Cavity | | Insertion Pitch | Tape Thickness |
|---|---|---|---|---|
| | A | B | F | T |
| FBMJ1608<br>FBMH1608<br>(0603) | 1.0±0.2<br>(0.039±0.008) | 1.8±0.2<br>(0.071±0.008) | 4.0±0.2<br>(0.157±0.008) | 1.1max<br>(0.043max) |
| FBMJ2125<br>FBMH2012<br>(0805) | 1.5±0.2<br>(0.059±0.008) | 2.3±0.2<br>(0.091±0.008) | 4.0±0.2<br>(0.157±0.008) | 1.1max<br>(0.043max) |

Unit : mm(inch)

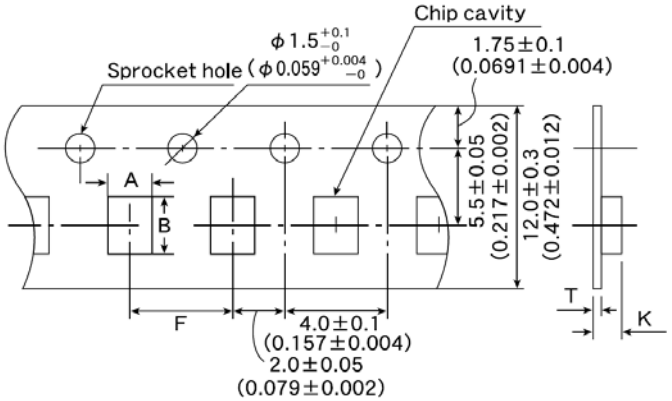
●Embossed tape (0.315 inches wide)




| Type | Chip Cavity | | Insertion Pitch | Tape Thickness | |
|---|---|---|---|---|---|
| | A | B | F | K | T |
| FBMH2016<br>(0806) | 1.8±0.2<br>(0.071±0.008) | 2.2±0.2<br>(0.087±0.008) | 4.0±0.2<br>(0.157±0.008) | 2.6max<br>(0.102max) | 0.6max<br>(0.024max) |
| FBMJ3216<br>(1206) | 1.9±0.2<br>(0.075±0.008) | 3.5±0.2<br>(0.138±0.008) | 4.0±0.2<br>(0.157±0.008) | 1.5max<br>(0.059max) | 0.3max<br>(0.012max) |
| FBMH3216<br>(1206) | 1.9±0.2<br>(0.075±0.008) | 3.5±0.2<br>(0.138±0.008) | 4.0±0.2<br>(0.157±0.008) | 2.6max<br>(0.102max) | 0.6max<br>(0.024max) |
| FBMH3225<br>(1210) | 2.8±0.2<br>(0.110±0.008) | 3.5±0.2<br>(0.138±0.008) | 4.0±0.2<br>(0.157±0.008) | 4.0max<br>(0.157max) | 0.6max<br>(0.024max) |

Unit : mm(inch)

●Embossed tape (0.472 inches wide)

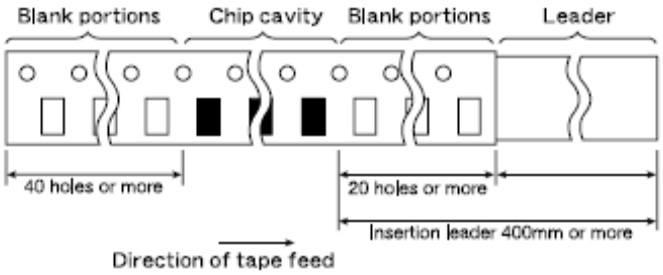



| Type | Chip Cavity | | Insertion Pitch | Tape Thickness | |
|---|---|---|---|---|---|
| | A | B | F | K | T |
| FBMJ4516<br>(1806) | 1.9±0.2<br>(0.075±0.008) | 4.9±0.2<br>(0.193±0.008) | 4.0±0.2<br>(0.157±0.008) | 1.5max<br>(0.059max) | 0.3max<br>(0.012max) |
| FBMH4516<br>(1806) | 1.9±0.2<br>(0.075±0.008) | 4.9±0.2<br>(0.193±0.008) | 4.0±0.2<br>(0.157±0.008) | 2.6max<br>(0.102max) | 0.6max<br>(0.024max) |
| FBMH4525<br>(1810) | 2.9±0.2<br>(0.114±0.008) | 4.9±0.2<br>(0.193±0.008) | 4.0±0.2<br>(0.157±0.008) | 4.0max<br>(0.157max) | 0.6max<br>(0.024max) |
| FBMH4532<br>(1812) | 3.6±0.2<br>(0.142±0.008) | 4.9±0.2<br>(0.193±0.008) | 8.0±0.2<br>(0.315±0.008) | 4.0max<br>(0.157max) | 0.6max<br>(0.024max) |

Unit : mm(inch)

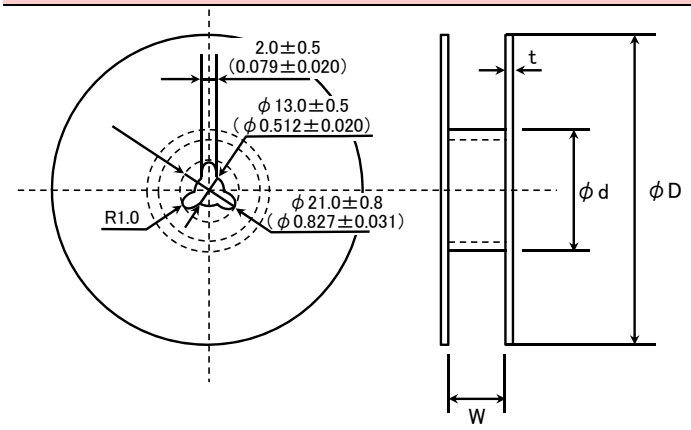

▸ This catalog contains the typical specification only due to the limitation of space. When you consider the purchase of our products, please check our specification.
For details of each product (characteristics graph, reliability information, precautions for use, and so on), see our Web site (http://www.ty-top.com/) .

## ④Leader and Blank portion




Insertion leader is 400 mm or more (including 20 empty cavities)
Empty cavities at end of reel: 40 holes or more

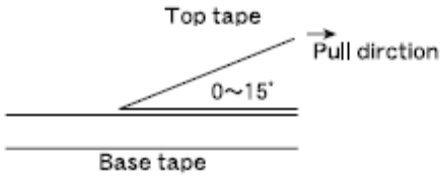
## ⑤Reel size




| Type | φD | φd | W | t |
|---|---|---|---|---|
| FBMJ1608 | 180+0/−3<br>(7.09+0/−0.118 ) | 60+1/−0<br>(2.36+0.039/−0 ) | 10.0±1.5<br>(0.394±0.059) | 2.5max<br>(0.098max) |
| FBMJ2125 | | | | |
| FBMJ3216 | | | | |
| FBMJ4516 | | | 14.0±1.5<br>(0.551±0.059) | |
| FBMH1608 | | | 10.0±1.5<br>(0.394±0.059) | |
| FBMH2012 | | | | |
| FBMH2016 | | | | |
| FBMH3216 | | | | |
| FBMH3225 | | | | |
| FBMH4516 | | | 14.0±1.5<br>(0.551±0.059) | |
| FBMH4525 | | | | |
| FBMH4532 | 330±2.0<br>(12.99±0.080) | 100±1.0<br>(3.94±0.039) | 14.0±2.0<br>(0.551±0.080) | 3.0max<br>(1.181max) |

Unit : mm(inch)

## ⑥Top tape strength




The top tape requires a peel-off force of 0.1 to 0.7N in the direction of the arrow as illustrated below.

# CHIP BEAD INDUCTORS FOR POWER LINE (FB SERIES M TYPE)

■RELIABILITY DATA

| 1. Operating Temperature Range | |
|---|---|
| Specified Value | −40℃～＋125℃<br>Including self-generated heat |

| 2. Storage Temperature Range | |
|---|---|
| Specified Value | −40℃～＋85℃ |
| Test Methods and Remarks | *Note: −5 to ＋40℃ in taped packaging |

| 3. Impedance | |
|---|---|
| Specified Value | Within the specified tolerance |
| Test Methods and Remarks | Measuring equipment : Impedance analyzer (HP4291A) or its equivalent<br>Measuring frequency : 100±1 MHz |

| 4. DC Resistance | |
|---|---|
| Specified Value | Within the specified range |
| Test Methods and Remarks | Four-terminal method<br>Measuring equipment : Milliohm High-Tester 3226 (Hioki Denki) or its equivalent |

| 5. Rated Current | |
|---|---|
| Specified Value | Within the specified range |

| 6. Vibration | |
|---|---|
| Specified Value | Appearance : No significant abnormality<br>Impedance change : Within ±30% of the initial value |
| Test Methods and Remarks | According to JIS C 0040.<br>Vibration type : A<br>Time : 2 hrs each in X,Y, and Z directions Total: 6 hrs<br>Frequency range : 10 to 55 to 10Hz (/min.)<br>Amplitude : 1.5 mm (shall not exceed acceleration 196m/s$^2$)<br>Mounting method : Soldering onto PC board |

| 7. Solderability | |
|---|---|
| Specified Value | 90% or more of immersed surface of terminal electrode shall be covered with fresh solder. |
| Test Methods and Remarks | Solder temperature : 230±5℃<br>Immersion time : 4±1 sec.<br>Preconditioning : Immersion into flux.<br>Immersion and Removal speed : 25mm/sec. |

| 8. Resistance to Soldering Heat | |
|---|---|
| Specified Value | Appearance : No significant abnormality<br>Impedance change : Within ±30% of the initial value |
| Test Methods and Remarks | Preheating : 150℃ for 3 min.<br>Resistance to Soldering Heat : 260±5℃<br>Duration : 10±0.5 sec.<br>Preconditioning : Immersion into flux.<br>Immersion and Removal speed : 25mm/sec.<br>Recovery : 2 to 3 hrs of recovery under the standard condition after the test. |

## 9. Thermal Shock

| | |
|---|---|
| Specified Value | Appearance : No significant abnormality<br>Impedance change : Within＋50/－10% of the initial value |
| Test Methods and Remarks | According to JIS C 0025.<br>Conditions for 1 cycle |

| Step | Temperature (℃) | Duration (min.) |
|---|---|---|
| 1 | －40±3℃ | 30±3 |
| 2 | Room Temperature | Within 3 |
| 3 | 85±2℃ | 30±3 |
| 4 | Room Temperature | Within 3 |

Number of cycles : 100
Mounting method : Soldering onto PC board
Recovery : 2 to 3 hrs of recovery under the standard condition after the removal from test chamber.

## 10. Resistance to Humidity (steady state)

| | |
|---|---|
| Specified Value | Appearances : No significant abnormality<br>Impedance change : Within ±30% of the initial value |
| Test Methods and Remarks | Temperature : 40±2℃<br>Humidity : 90 to 95% RH<br>Duration : 500＋24/－0<br>Mounting method : Soldering onto PC board<br>Recovery : 2 to 3 hrs of recovery under the standard condition after the removal from test chamber. |

## 11. Loading under Damp Heat

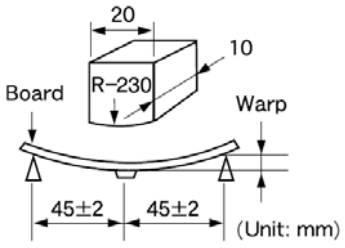
| | |
|---|---|
| Specified Value | Appearance : No significant abnormality<br>Impedance change : Within ±30% of the initial value |
| Test Methods and Remarks | Temperature : 40±2℃<br>Humidity : 90 to 95%RH<br>Applied current : Rated current<br>Duration : 500＋24/－0 hrs<br>Mounting method : Soldering onto PC board<br>Recovery : 2 to 3hrs of recovery under the standard condition after the removal from test chamber. |

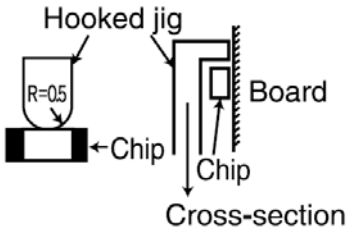
## 12. High Temperature Loading Test

| | |
|---|---|
| Specified Value | Appearance : No significant abnormality<br>Impedance change : Within ±30% of the initial value |
| Test Methods and Remarks | Temperature : 85±2℃<br>Duration : 500＋24/－0 hrs<br>Applied current : Rated current<br>Mounting method : Soldering onto PC board<br>Recovery : 2 to 3 hrs of recovery under the standard condition after the removal from test chamber. |

## 13. Bending Strength

| | |
|---|---|
| Specified Value | Appearance : No mechanical damage. |
| Test Methods and Remarks | Warp : 2mm<br>Testing board : Glass epoxy-resin substrate<br>Thickness : 0.8mm |



| 14. Adhesion of Electrode | |
|---|---|
| Specified Value | No separation or indication of separation of electrode. |
| Test Methods and Remarks | Applied force : 5N<br>Duration : 10 sec.<br>  |

Note on standard condition: "standard condition" referred to herein is defined as follows:
5 to 35℃ of temperature, 45 to 85% relative humidity and 86 to 106kPa of air pressure.
When there are questions concerning measurement results:
In order to provide correlation data, the test shall be conducted under condition of 20±2℃ of temperature, 60 to 70% relative humidity and 86 to 106kPa of air pressure. Unless otherwise specified, all the tests are conducted under the "standard condition."

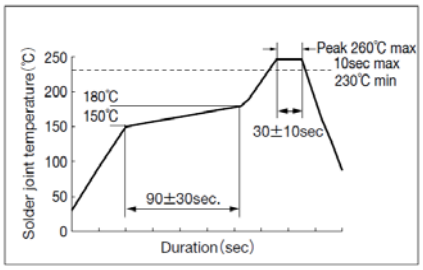
# CHIP BEAD INDUCTORS FOR POWER LINE (FB SERIES M TYPE)

## ■PRECAUTIONS

| 1. Circuit Design | |
|---|---|
| Precautions | ◆Operating environment<br>1. The products described in this specification are intended for use in general electronic equipment, (office supply equipment, telecommunications systems, measuring equipment, and household equipment). They are not intended for use in mission-critical equipment or systems requiring special quality and high reliability (traffic systems, safety equipment, aerospace systems, nuclear control systems and medical equipment including life-support systems,) where product failure might result in loss of life, injury or damage. For such uses, contact TAIYO YUDEN Sales Department in advance.<br>◆Rated current<br>1. Rated current of this product is shown in this catalogue, but please be sure to have the base board designed with adequate inspection in case of the generation of heat becomes high within the rated current range when the base board is in high resistance or in bad heating conditions. |

| 2. PCB Design | |
|---|---|
| Precautions | ◆Land pattern design<br>1. Please refer to a recommended land pattern. |

| 3. Considerations for automatic placement | |
|---|---|
| Precautions | ◆Adjustment of mounting machine<br>1. Excessive impact load should not be imposed on the products when mounting onto the PC boards.<br>2. Mounting and soldering conditions should be checked beforehand. |
| Technical considerations | ◆Adjustment of mounting machine<br>1. When installing products, care should be taken not to apply distortion stress as it may deform the products. |

| 4. Soldering | |
|---|---|
| Precautions | ◆Wave soldering<br>1. Please refer to the specifications in the catalog for a wave soldering.<br>◆Reflow soldering<br>1. Please contact any of our offices for a reflow soldering, and refer to the recommended condition specified.<br>◆Lead free soldering<br>1. When using products with lead free soldering, we request to use them after confirming adhesion, temperature of resistance to soldering heat, etc. sufficiently.<br>◆Preheating when soldering<br>Heating : The temperature difference between soldering and remaining heat should not be greater than 150℃.<br>Cooling : The temperature difference between the components and cleaning process should not be greater than 100℃.<br>◆Recommended conditions for using a soldering iron<br>Put the soldering iron on the land-pattern.<br>Soldering iron's temperature – Below 350℃<br>Duration – 3 seconds or less<br>The soldering iron should not directly touch the inductor. |
| Technical considerations | ◆Wave, Reflow, Lead free soldering<br>1. If products are used beyond the range of the recommended conditions, heat stresses may deform the products, and consequently degrade the reliability of the products.<br>【Recommended reflow condition】<br>  <br><br>◆Preheating when soldering<br>1. There is a case that products get damaged by a heat shock.<br>◆Recommended conditions for using a soldering iron<br>1. If products are used beyond the range of the recommended conditions, heat stresses may deform the products, and consequently degrade the reliability of the products. |

| 5. Handling | |
|---|---|
| Precautions | ◆Handling<br>1. Keep the inductors away from all magnets and magnetic objects.<br>◆Setting PC boards<br>1. When setting a chip mounted base board, please make sure that there is no residual stress to the chip by distortion in the board or at screw part.<br>◆Breakaway PC boards (splitting along perforations)<br>1. When splitting the PC board after mounting inductors, care should be taken not to give any stresses of deflection or twisting to the board.<br>2. Board separation should not be done manually, but by using the appropriate devices.<br>◆Mechanical considerations<br>1. Please do not give the inductors any excessive mechanical shocks. |
| Technical considerations | ◆Handling<br>1. There is a case that a characteristic varies with magnetic influence.<br>◆Setting PC boards<br>1. There is a case that a characteristic varies with residual stress.<br>◆Breakaway PC boards (splitting along perforations)<br>1. Planning pattern configurations and the position of products should be carefully performed to minimize stress.<br>◆Mechanical considerations<br>1. There is a case to be damaged by a mechanical shock. |

| 6. Storage conditions | |
|---|---|
| Precautions | ◆Storage<br>1. To maintain the solderability of terminal electrodes and to keep the packing material in good condition, temperature and humidity in the storage area should be controlled.<br>・Recommended conditions<br>Ambient temperature 0～40℃<br>Humidity Below 70% RH<br>The ambient temperature must be kept below 30℃. Even under ideal storage conditions, solderability of products electrodes may decrease as time passes.<br>For this reason, inductors should be used within 6 months from the time of delivery. |
| Technical considerations | ◆Storage<br>1. Under a high temperature and humidity environment, problems such as reduced solderability caused by oxidation of terminal electrodes and deterioration of taping/packaging materials may take place. |