

有关本公司产品的注意事项

请务必在使用本公司产品目录之前阅读。

⚠ 注意事项

■ 本产品目录中记载的内容是至2013年10月的内容。本产品目录记载的内容由于产品的改良等原因发生变更时，恕不另行通知。在您订购我司产品之前请确认最新的产品信息。

当您计划在本产品目录记载内容，或是《交货规格书》的规定范围以外使用我司产品时，由于使用我司产品引起的该应用设备的瑕疵我司将不承担任何责任。

■ 有关详细的产品规格我们准备有《交货规格书》，请向我司咨询相关事宜。

■ 在您使用我司产品时，请务必进行应用设备实装状态以及应用产品实际使用环境下的测评。

■ 本产品目录中记载的电子元器件，电路产品等产品适用于一般电子设备。

『AV设备，OA设备，家电及办公设备，信息/通讯设备（手机，电脑等）』

当您计划把本产品目录中记载的产品使用于可能会危及第三方生命安全的应用设备时，请务必提前与我公司取得联系，针对产品信息加以确认。

【运输用设备（火车控制设备，船舶控制设备等），交通用信号设备，防灾设备，医疗用设备，公共性高的信息通信设备等（电话程控交换机，电话，无线电，电视信号等基地局）】

另外，请不要在要求高度安全性，可靠性的应用设备上使用本产品目录中记载的产品。【航天设备，航空设备，核控制设备，用于海底的设备，军事设备等】

同时，应用于安全性，可靠性要求较高的一般电子设备/电路时，请充分进行安全性测评，必要时请在设计过程中追加保护电路。

■ 本产品目录中所记载的内容适用于通过我司营业所，销售子公司，销售代理店（即正规销售渠道）购买的我司产品。通过其他渠道购买的我司产品不在适用范围之内。

■ 由于使用本产品目录记载的产品引起的有关第三方知识产权的冲突，我司概不负责。本产品目录不代表相关权利的实施许诺。

■ 有关出口的注意事项

本产品目录中记载的产品中，部分产品在出口时会被归为“外汇及外贸管理法，美国出口管理法规”的管制货物，请及时实施相关手续，依据相关法律法规进行出口。需确认时，可向我司咨询。

电源用片状磁珠电感器 (FB 系列M 型)

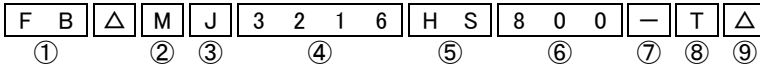


波峰焊

回流焊

■ 型号标示法

※使用温度范围: -40~+125°C (包含产品本身发热)



Δ = 空格

① 类型

代码	类型
FB	铁氧体磁珠电感器

② 外型

代码	外型
M	矩形

③ 特性

代码	特性
J	标准品
H	高阻抗品

④ 尺寸(L×W)

代码	外型 (inch)	尺寸(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

⑤ 材料

代码	材料
HS	材料不同时, 阻抗值也有所变化。
HM	
HL	

⑥ 标称阻抗值

代码(例)	标称阻抗值 [Ω]
330	33
111	110
132	1300

⑦ 阻抗值公差

代码	公差
-	±25%
N	±30%

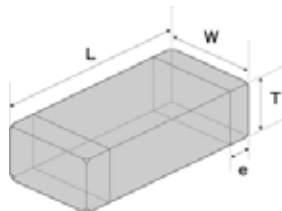
⑧ 包装

代码	包装
T	卷盘带装

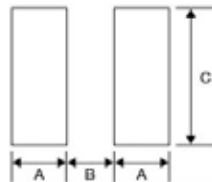
⑨ 本公司管理记号

代码	本公司管理记号
Δ	标准品

■ 标准外型尺寸 / 标准数量



推荐焊盘图案
实装上的注意
· 请确认实装状态后使用。



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

单位: mm

Type	L	W	T	e	标准数量 [pcs]	
					纸带	压纹带
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

单位: mm (inch)

▶ 本产品目录根据版面大小, 仅记载了代表性产品规格, 若考虑使用本公司产品时, 请确认供货规格型号明细表中的详细规格。有关各商品的详细信息(特性图、可靠性信息、使用时的注意事项等), 请参阅本公司网站(<http://www.ty-top.com/>)。

■型号一览

标准品

●FB MJ1608

型号	EHS	阻抗值 (Ω)	阻抗值公差	测试频率 [MHz]	直流电阻 [Ω] (max.)	额定电流 [A] (max.)	厚度 [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

型号	EHS	阻抗值 (Ω)	阻抗值公差	测试频率 [MHz]	直流电阻 [Ω] (max.)	额定电流 [A] (max.)	厚度 [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

型号	EHS	阻抗值 (Ω)	阻抗值公差	测试频率 [MHz]	直流电阻 [Ω] (max.)	额定电流 [A] (max.)	厚度 [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

型号	EHS	阻抗值 (Ω)	阻抗值公差	测试频率 [MHz]	直流电阻 [Ω] (max.)	额定电流 [A] (max.)	厚度 [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

高阻抗品

●FB MH1608

型号	EHS	阻抗值 (Ω)	阻抗值公差	测试频率 [MHz]	直流电阻 [Ω] (max.)	额定电流 [A] (max.)	厚度 [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

型号	EHS	阻抗值 (Ω)	阻抗值公差	测试频率 [MHz]	直流电阻 [Ω] (max.)	额定电流 [A] (max.)	厚度 [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

型号	EHS	阻抗值 (Ω)	阻抗值公差	测试频率 [MHz]	直流电阻 [Ω] (max.)	额定电流 [A] (max.)	厚度 [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

型号	EHS	阻抗值 (Ω)	阻抗值公差	测试频率 [MHz]	直流电阻 [Ω] (max.)	额定电流 [A] (max.)	厚度 [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

型号	EHS	阻抗值 (Ω)	阻抗值公差	测试频率 [MHz]	直流电阻 [Ω] (max.)	额定电流 [A] (max.)	厚度 [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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■型号一览

●FB MH4516

型号	EHS	阻抗值 (Ω)	阻抗值公差	测试频率 [MHz]	直流电阻 [Ω](max.)	额定电流 [A](max.)	厚度 [mm]
FB MH4516HM851NT	RoHS	850	±30%	100	0.100	1.5	1.6 ±0.2

●FB MH4525

型号	EHS	阻抗值 (Ω)	阻抗值公差	测试频率 [MHz]	直流电阻 [Ω](max.)	额定电流 [A](max.)	厚度 [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

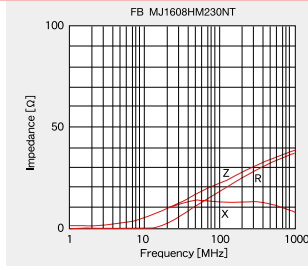
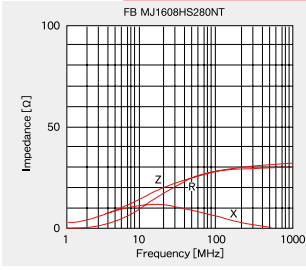
●FB MH4532

型号	EHS	阻抗值 (Ω)	阻抗值公差	测试频率 [MHz]	直流电阻 [Ω](max.)	额定电流 [A](max.)	厚度 [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

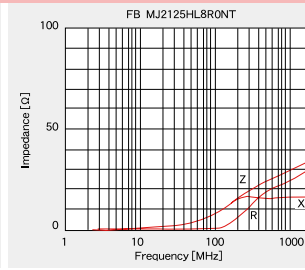
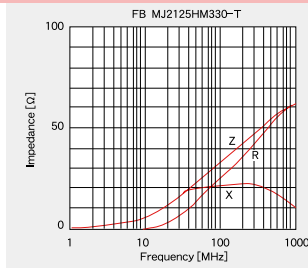
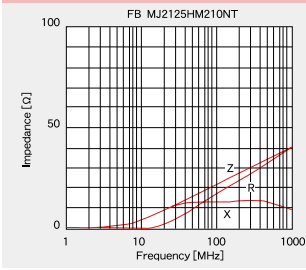
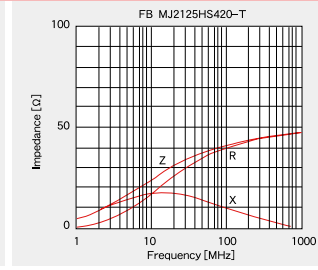
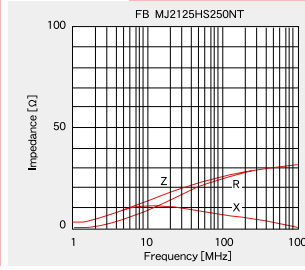
●大电流型

型号	EHS	阻抗值 (Ω)	阻抗值公差	测试频率 [MHz]	直流电阻 [Ω](max.)	额定电流 [A](max.)	厚度 [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

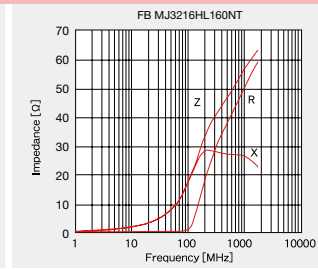
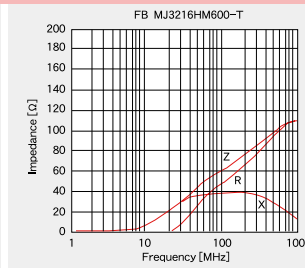
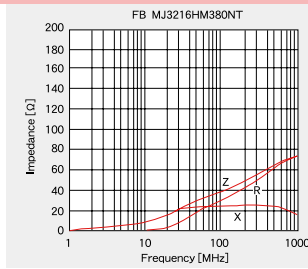
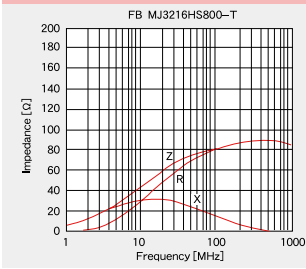
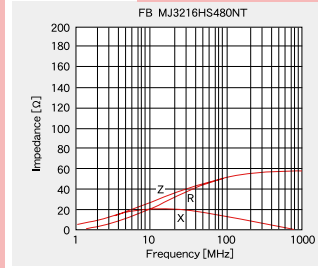
■ FB MJ1608



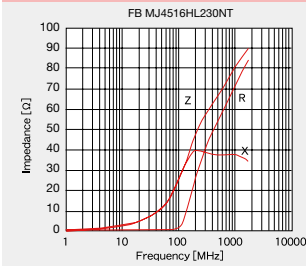
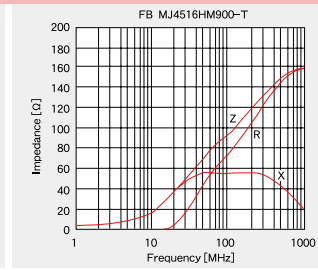
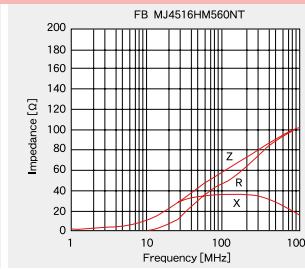
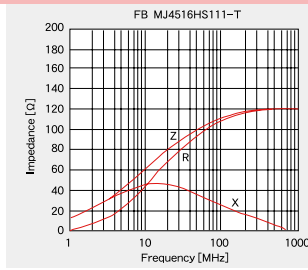
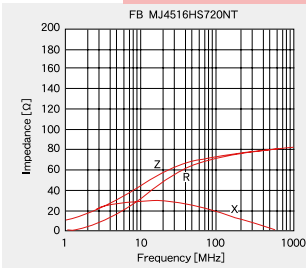
■ FB MJ2125



■ FB MJ3216



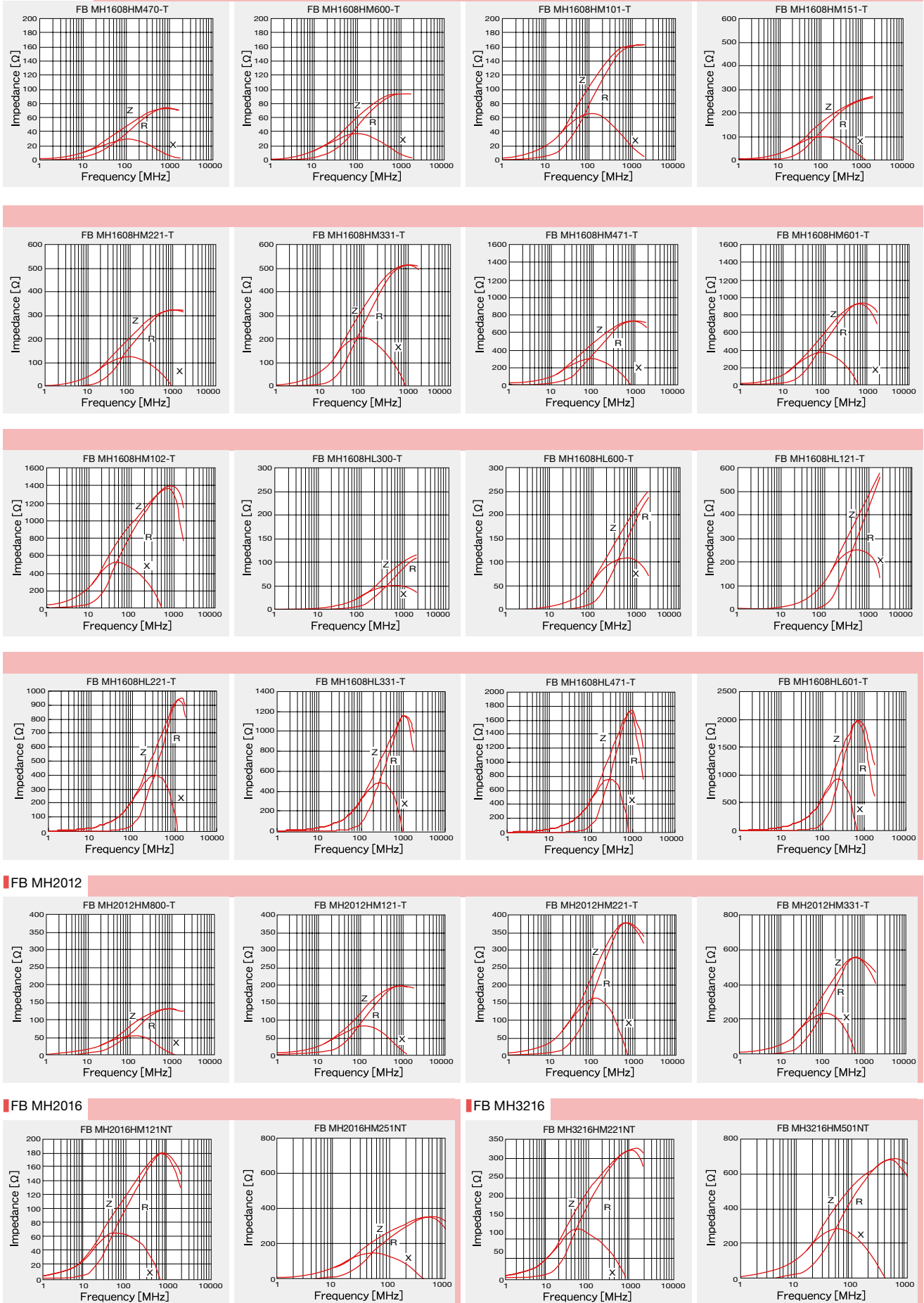
■ FB MJ4516



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高阻抗品

■ FB MH1608

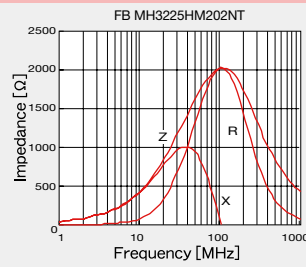
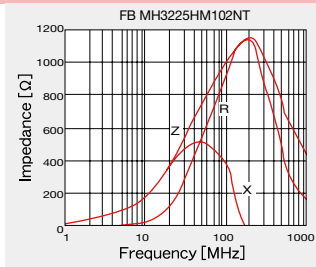
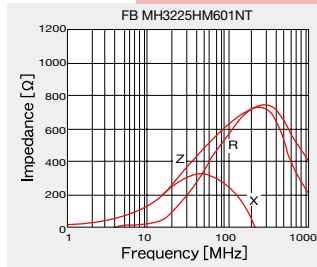


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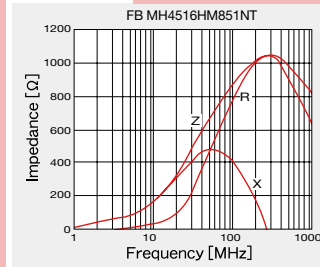
■ 特性图

高阻抗品

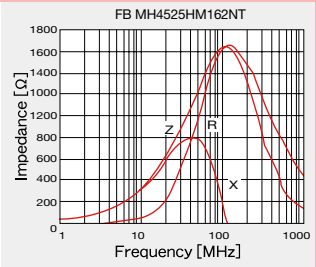
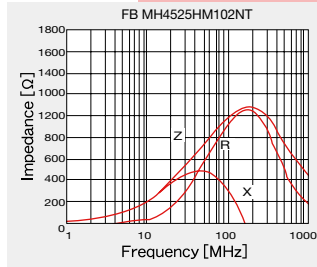
■ FB MH3225



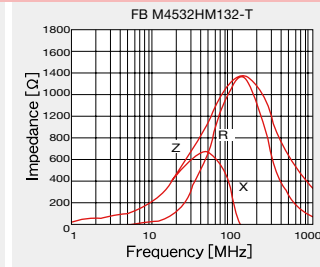
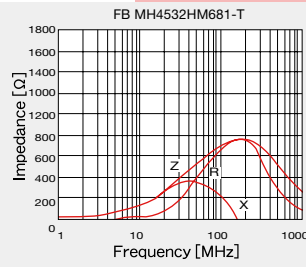
■ FB MH4516



■ FB MH4525

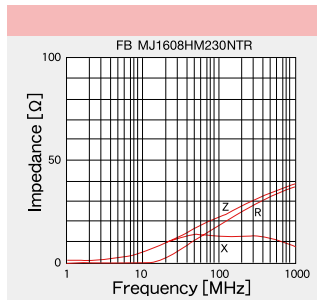
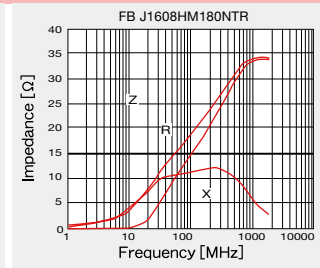
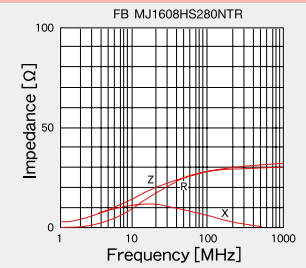
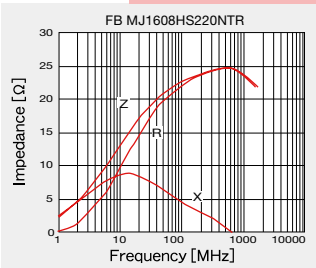
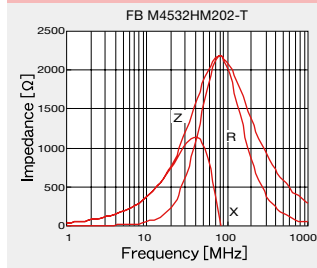


■ FB MH4532



EMI抑制元件
铁氧体磁珠电感器

■ 大电流型



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

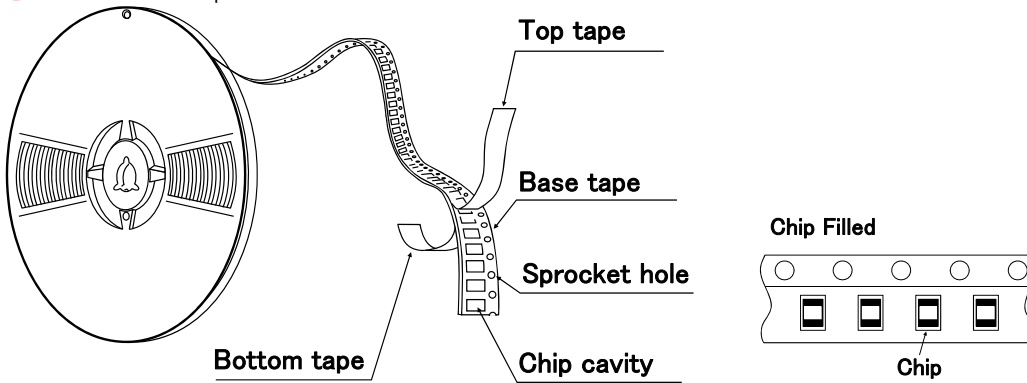
PACKAGING

① Minimum Quantity

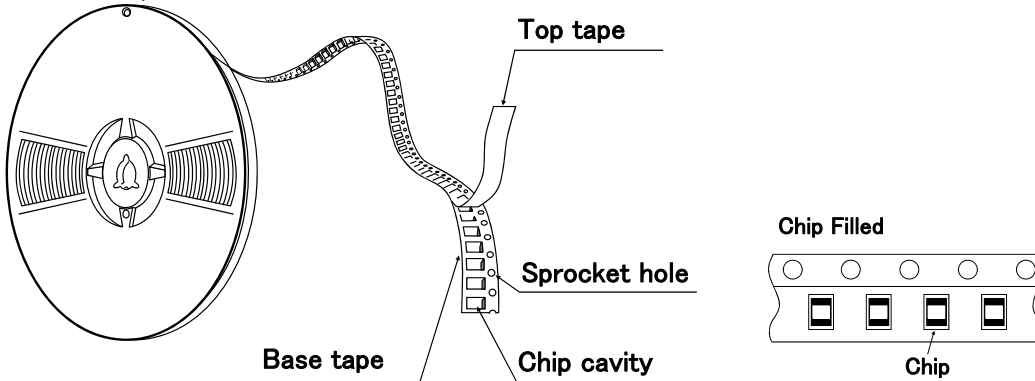
Type	Standard Quantity [pcs]	
	Paper Tape	Embossed Tape
1608 (0603)	4000	—
2125 (0805)	4000	—
2012 (0805)	4000	—
2016 (0806)	—	2000
3216 (1206)	—	2000
3225 (1210)	—	1000
4516 (1806)	—	2000
4525 (1810)	—	1000
4532 (1812)	—	2000

② Tape Material

● Card board carrier tape

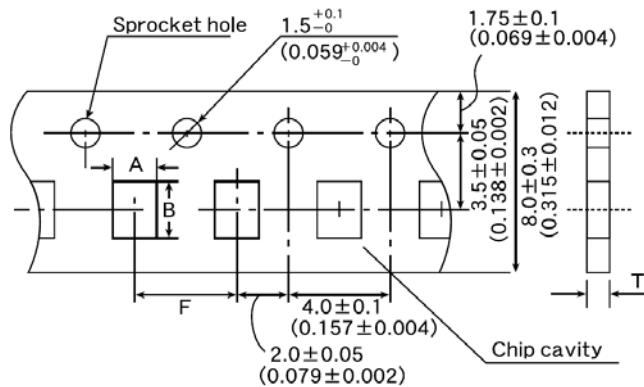


● Embossed tape



③ Taping Dimensions

● Paper tape (0.315 inches wide)



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

Unit : mm (inch)

● Embossed tape (0.315 inches wide)



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

Unit : mm (inch)

● Embossed tape (0.472 inches wide)

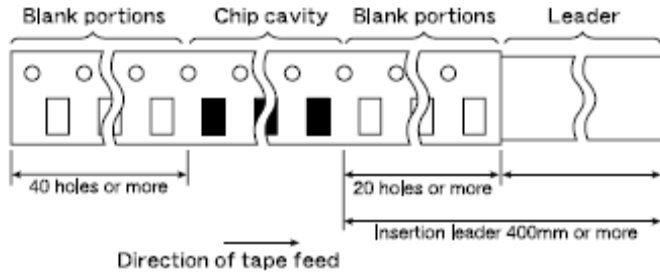


Type	Chip Cavity		Insertion Pitch	Tape Thickness	
	A	B	F	K	T
FBMJ4516 (1806)	1.9±0.2 (0.075±0.008)	4.9±0.2 (0.193±0.008)	4.0±0.2 (0.157±0.008)	1.5max (0.059max)	0.3max (0.012max)
FBMH4516 (1806)	1.9±0.2 (0.075±0.008)	4.9±0.2 (0.193±0.008)	4.0±0.2 (0.157±0.008)	2.6max (0.102max)	0.6max (0.024max)
FBMH4525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

Unit : mm (inch)

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④ Leader and Blank portion



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

⑤ Reel size



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

Unit : mm (inch)

⑥ Top 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°C ~ +125°C Including self-generated heat

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

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

4. DC Resistance	
Specified Value	Within the specified range
Test Methods and Remarks	Four-terminal method 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 Impedance change : Within ±30% of the initial value
Test Methods and Remarks	According to JIS C 0040. Vibration type : A Time : 2 hrs each in X,Y, and Z directions Total: 6 hrs Frequency range : 10 to 55 to 10Hz (/min.) Amplitude : 1.5 mm (shall not exceed acceleration 196m/s ²) 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°C Immersion time : 4±1 sec. Preconditioning : Immersion into flux. Immersion and Removal speed : 25mm/sec.

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

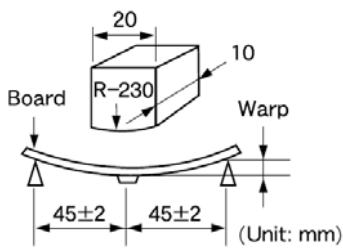
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9. Thermal Shock															
Specified Value	Appearance : No significant abnormality Impedance change : Within +50/−10% of the initial value														
Test Methods and Remarks	According to JIS C 0025. Conditions for 1 cycle														
	<table border="1"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Duration (min.)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>−40±3°C</td> <td>30±3</td> </tr> <tr> <td>2</td> <td>Room Temperature</td> <td>Within 3</td> </tr> <tr> <td>3</td> <td>85±2°C</td> <td>30±3</td> </tr> <tr> <td>4</td> <td>Room Temperature</td> <td>Within 3</td> </tr> </tbody> </table>	Step	Temperature (°C)	Duration (min.)	1	−40±3°C	30±3	2	Room Temperature	Within 3	3	85±2°C	30±3	4	Room Temperature
Step	Temperature (°C)	Duration (min.)													
1	−40±3°C	30±3													
2	Room Temperature	Within 3													
3	85±2°C	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 Impedance change : Within ±30% of the initial value
Test Methods and Remarks	Temperature : 40±2°C Humidity : 90 to 95% RH Duration : 500+24/−0 Mounting method : Soldering onto PC board 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 Impedance change : Within ±30% of the initial value
Test Methods and Remarks	Temperature : 40±2°C Humidity : 90 to 95%RH Applied current : Rated current Duration : 500+24/−0 hrs Mounting method : Soldering onto PC board 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 Impedance change : Within ±30% of the initial value
Test Methods and Remarks	Temperature : 85±2°C Duration : 500+24/−0 hrs Applied current : Rated current Mounting method : Soldering onto PC board 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	<p>Warp : 2mm Testing board : Glass epoxy-resin substrate Thickness : 0.8mm</p>  <p>(Unit: mm)</p>

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14. Adhesion of Electrode

Specified Value	No separation or indication of separation of electrode.
Test Methods and Remarks	<p>Applied force : 5N Duration : 10 sec.</p> 

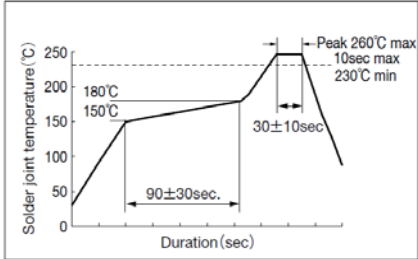
Note on standard condition: "standard condition" referred to herein is defined as follows:
5 to 35°C of temperature, 45 to 85% relative humidity and 86 to 106kPa of air pressure.

When there are questions concerning measurement results:

In order to provide correlation data, the test shall be conducted under condition of $20 \pm 2^\circ\text{C}$ 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	<ul style="list-style-type: none"> ◆ Operating environment <ol style="list-style-type: none"> 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. ◆ Rated current <ol style="list-style-type: none"> 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	<ul style="list-style-type: none"> ◆ Land pattern design <ol style="list-style-type: none"> 1. Please refer to a recommended land pattern.
3. Considerations for automatic placement	
Precautions	<ul style="list-style-type: none"> ◆ Adjustment of mounting machine <ol style="list-style-type: none"> 1. Excessive impact load should not be imposed on the products when mounting onto the PC boards. 2. Mounting and soldering conditions should be checked beforehand.
Technical considerations	<ul style="list-style-type: none"> ◆ Adjustment of mounting machine <ol style="list-style-type: none"> 1. When installing products, care should be taken not to apply distortion stress as it may deform the products.
4. Soldering	
Precautions	<ul style="list-style-type: none"> ◆ Wave soldering <ol style="list-style-type: none"> 1. Please refer to the specifications in the catalog for a wave soldering. ◆ Reflow soldering <ol style="list-style-type: none"> 1. Please contact any of our offices for a reflow soldering, and refer to the recommended condition specified. ◆ Lead free soldering <ol style="list-style-type: none"> 1. When using products with lead free soldering, we request to use them after confirming adhesion, temperature of resistance to soldering heat, etc. sufficiently. ◆ Preheating when soldering <p>Heating : The temperature difference between soldering and remaining heat should not be greater than 150°C.</p> <p>Cooling : The temperature difference between the components and cleaning process should not be greater than 100°C.</p> ◆ Recommended conditions for using a soldering iron <p>Put the soldering iron on the land-pattern.</p> <p>Soldering iron's temperature – Below 350°C</p> <p>Duration – 3 seconds or less</p> <p>The soldering iron should not directly touch the inductor.</p>
Technical considerations	<ul style="list-style-type: none"> ◆ Wave, Reflow, Lead free soldering <ol style="list-style-type: none"> 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. <p>【Recommended reflow condition】</p>  ◆ Preheating when soldering <ol style="list-style-type: none"> 1. There is a case that products get damaged by a heat shock. ◆ Recommended conditions for using a soldering iron <ol style="list-style-type: none"> 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.

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5. Handling	
Precautions	<ul style="list-style-type: none"> ◆ Handling <ol style="list-style-type: none"> 1. Keep the inductors away from all magnets and magnetic objects. ◆ Setting PC boards <ol style="list-style-type: none"> 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. ◆ Breakaway PC boards (splitting along perforations) <ol style="list-style-type: none"> 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. 2. Board separation should not be done manually, but by using the appropriate devices. ◆ Mechanical considerations <ol style="list-style-type: none"> 1. Please do not give the inductors any excessive mechanical shocks.
Technical considerations	<ul style="list-style-type: none"> ◆ Handling <ol style="list-style-type: none"> 1. There is a case that a characteristic varies with magnetic influence. ◆ Setting PC boards <ol style="list-style-type: none"> 1. There is a case that a characteristic varies with residual stress. ◆ Breakaway PC boards (splitting along perforations) <ol style="list-style-type: none"> 1. Planning pattern configurations and the position of products should be carefully performed to minimize stress. ◆ Mechanical considerations <ol style="list-style-type: none"> 1. There is a case to be damaged by a mechanical shock.
6. Storage conditions	
Precautions	<ul style="list-style-type: none"> ◆ Storage <ol style="list-style-type: none"> 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. <ul style="list-style-type: none"> • Recommended conditions <ul style="list-style-type: none"> Ambient temperature 0~40°C Humidity Below 70% RH <p>The ambient temperature must be kept below 30°C. Even under ideal storage conditions, solderability of products electrodes may decrease as time passes. For this reason, inductors should be used within 6 months from the time of delivery.</p>
Technical considerations	<ul style="list-style-type: none"> ◆ Storage <ol style="list-style-type: none"> 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.