增 益 实 业

零 件 承 认 书

PASS

客户名称：

客户料号：**A-6-9007-2-3**

规格描述：**FBMA-11-201209-401A20 0805**

增益料号：HCB2012KF-401T20

日　　期：

版　　本：A

增益签核：

制订	审核	核准
张翔	刘业明	柯文学

客户签核：

工程	审核	核准

东莞市增益实业有限公司
地址：东莞市清溪镇三星路1号
电话：0769-87321000
传真：0769-87891229

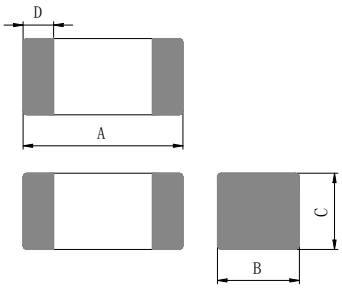
物料类型：	贴片电感
日　　期：	
版　　本：	A

High Current Ferrite Chip Bead(Lead Free) HCB2012KF-401T20

1.Features

1.Monolithic inorganic material construction.
2.Low DC resistance structure of electrode to prevent wasteful electric power consumption.
3.Closed magnetic circuit avoids crosstalk.
4.Suitable for flow and reflow soldering.
5.Shapes and dimensions follow E.I.A. spec.
6.Available in various sizes.
7.Excellent solderability and heat resistance.
8.High reliability.
9.This component is compliant with RoHS legislation and also support lead-free soldering.

2.Dimensions



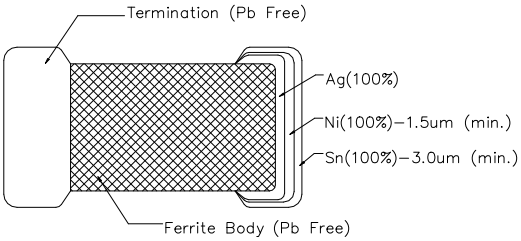
Chip Size	
A	2.00±0.20
B	1.25±0.20
C	0.85±0.20
D	0.50±0.30

Units: mm

3.Part Numbering

HCB	2012	KF	-	401	T	30
A	B	C		D	E	F

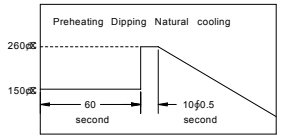
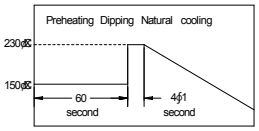
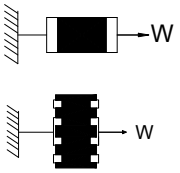
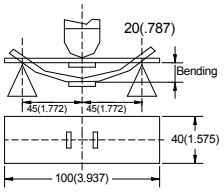
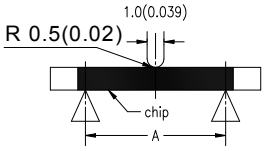
A: Series
B: Dimension L x W
C: Material Lead Free Material
D: Impedance 501=500Ω
E: Packaging T=Taping and Reel, B=Bulk(Bags)
F: Rated Current 30=3000mA



4.Specification

Tai-Tech Part Number	Impedance (Ω)	Test Frequency (Hz)	DC Resistance (Ω) max.	Rated Current (mA)
HCB2012KF-401T20	400±25%	60mV/100M	0.10	3000

5. Reliability and Test Condition

Item	Performance										Test Condition
Series No.	FCB	FCM	HCB	HPB	HFB	FCA	FCI	FHI	FCH	HCI	--
Operating Temperature	-55~+125℃						-40~+85℃				--
Storage Temperature	-55~+125℃						-40~+85℃				--
Impedance (Z)	Refer to standard electrical characteristics list										HP4291A, HP4287A+16092A
Inductance (Ls)											
Q Factor											
DC Resistance											HP4338B
Rated Current											**
Temperature Rise Test	30℃ max. (△T)										1. Applied the allowed DC current. 2. Temperature measured by digital surface thermometer.
Solder heat Resistance	Appearance: No significant abnormality. Impedance change: Within ± 30%.						No mechanical damage. Remaining terminal electrode:70% min.				Preheat: 150℃,60sec. Solder: Sn-Ag3.0-Cu0.5 Solder tamperature: 260±5℃ Flux for lead free: rosin Dip time: 10±0.5sec. 
Solderability	More than 90% of the terminal electrode should be covered with solder.										Preheat: 150℃,60sec. Solder: Sn-Ag3.0-Cu0.5 Solder tamperature: 230±5℃ Flux for lead free: rosin Dip time: 4±1sec.
Terminal strength	The terminal electrode and the dielectric must not be damaged by the forces applied on the right conditions.										For FCB FCM HCB HPB HFB FCI FHI FCH HCI: Size Force (Kfg) Time(sec) 1005 0.2 1608 0.5 2012 0.6 3216 1.0 >25 3225 1.0 4516 1.0 4532 1.5 5750 2.0 For FCA: Size Force (Kfg) Time(sec) 3216 0.5 >25
Flexture strength	The terminal electrode and the dielectric must not be damaged by the forces applied on the right conditions.										Solder a chip on a test substrate, bend the substrate by 2mm (0.079in)and return.
Bending Strength	The ferrite should not be damaged by Forces applied on the right condition.										Size / mm(inches) / P-Kgf 1608 / 0.80(0.033) / 0.3 2012 / 1.40(0.055) / 1.0 FCA3216 / 2.00(0.079) / 1.5 3216 3225 / 2.00(0.079) / 2.5 4516 4532 5750 / 2.70(0.106) / 2.5
Random Vibration Test	Appearance: Cracking, shipping and any other defects harmful to the characteristics should not be allowed. Impedance: within±30%										Frequency: 10-55-10Hz for 1 min. Amplitude: 1.52mm Directions and times: X, Y, Z directions for 2 hours. A period of 2 hours in each of 3 mutually perpendicular directions (Total 6 hours).
Drop	Drop 10 times on a concrete floor from a height of 75cm										a: No mechanical damage b: Impedance change: ±30%

<table>
<tr><th>Item</th><th>Performace</th><th>Test Condition</th></tr>
<tr><td>Loading at High Temperature</td><td rowspan="2">Appearance: no damage.

Impedance: within±30%of initial value.
Inductance: within±10%of initial value.
Q: within±30%of initial value. (FCI FHI FCH)
Q: within±20%of initial value. (HCI)</td><td>Temperature: 125±5℃(bead),85±5℃(inductor)
Applied current: rated current.
Duration: 500±12hrs.
Measured at room temperature after placing for 2 to 3hrs.</td></tr>
<tr><td>Humidity</td><td>Humidity: 90~95%RH.
Temperature: 40±2℃.
Temperature: 60±2℃.(HCI)
Duration: 500±12hrs.
Measured at room temperature after placing for 2 to 3hrs.</td></tr>
<tr><td>Thermal shock</td><td>Appearance: no damage.

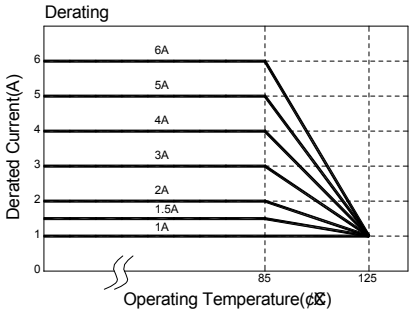
Impedance: within±30%of initial value.
Inductance: within±10%of initial value.
Q: within±30%of initial value.
(FCI FHI FCH)
Q: within±20%of initial value.
(HCI)

For Bead：<table><tr><th>Phase</th><th>Temperature(℃)</th><th>Time(min.)</th></tr><tr><td>1</td><td>-55±2℃</td><td>30±3</td></tr><tr><td>2</td><td>+125±5℃</td><td>30±3</td></tr></table>Measured: 5 times

For Inductor：<table><tr><th>Phase</th><th>Temperature(℃)</th><th>Time(min.)</th></tr><tr><td>1</td><td>-40±2℃</td><td>30±3</td></tr><tr><td>2</td><td>+85±5℃</td><td>30±3</td></tr></table>Measured: 100 times</td><td>For FCB FCM HCB HPB HFB FCA：
Condition for 1 cycle
Step1: -55±2℃ 30±3 min.
Step2: +125±5℃ 30±3 min.
Number of cycles: 5
For FCI FHI FCH HCI：
Condition for 1 cycle
Step1: -40±2℃ 30±3 min.
Step2: +85±5℃ 30±3 min.
Number of cycles: 100
Measured at room temperature after placing for 2 to 3 hrs.</td></tr>
<tr><td>Low temperature storage test</td><td>Temperature: -55±2℃.
Duration: 500±12hrs.
Measured at room temperature after placing for 2 to 3hrs.</td></tr>
<tr><td>Drop</td><td colspan="2">Drop 10 times on a concrete floor from a height of 75cm</td><td>a: No mechanical damage
b: Impedance change: ±30%</td></tr>
</table>

**Derating Curve

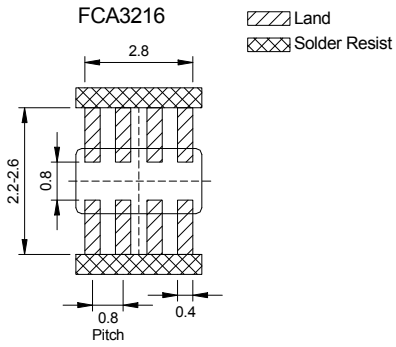
For the ferrite chip bead which withstanding current over 1.5A, as the operating temperature over 85℃, the derating current information is necessary to consider with. For the detail derating of current, please refer to the Derated Current vs. Operating Temperature curve.

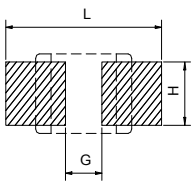


6.Soldering and Mounting

6-1. Recommended PC Board Pattern

Chip Size						Land Patterns For Reflow Soldering		
Series	**Type**	**A(mm)**	**B(mm)**	**C(mm)**	**D(mm)**	**L(mm)**	**G(mm)**	**H(mm)**
FCB	1005	1.0±0.10	0.50±0.10	0.50±0.10	0.25±0.10	2.10	0.50	0.55
FCM	1608	1.6±0.15	0.80±0.15	0.80±0.15	0.30±0.20	2.60	0.60	0.80
HCB	2012	2.0±0.20	1.25±0.20	0.85±0.20	0.50±0.30	3.00	1.00	1.00
HPB		2.0±0.20	1.25±0.20	1.25±0.20	0.50±0.30			
HFB	2520	2.5±0.20	2.00±0.20	1.60±0.20	0.50±0.30	3.90	1.50	1.50
FCI	3216	3.2±0.20	1.60±0.20	1.10±0.20	0.50±0.30	4.40	2.20	1.40
FHI	3225	3.2±0.20	2.50±0.20	1.30±0.20	0.50±0.30	4.40	2.20	3.40
FCH	4516	4.5±0.20	1.60±0.20	1.60±0.20	0.50±0.30	5.70	2.70	1.40
HCI	4532	4.5±0.20	3.20±0.20	1.50±0.20	0.50±0.30	5.90	2.57	4.22
UHI	5750	5.7±0.20	5.00±0.30	1.80±0.20	0.50±0.30	8.00	4.00	5.80





PC board should be designed so that products are not sufficient under mechanical stress as warping the board.
Products shall be positioned in the sideway direction against the mechanical stress to prevent failure.

6-2. Soldering

Mildly activated rosin fluxes are preferred. The minimum amount of solder can lead to damage from the stresses caused by the difference in coefficients of expansion between solder, chip and substrate. The terminations are suitable for all wave and re-flow soldering systems. If hand soldering cannot be avoided, the preferred technique is the utilization of hot air soldering tools.

6-2.1 Lead Free Solder re-flow:

Recommended temperature profiles for lead free re-flow soldering in Figure 1.

6-2.2 Solder Wave:

Wave soldering is perhaps the most rigorous of surface mount soldering processes due to the steep rise in temperature seen by the circuit when immersed in the molten solder wave , typical at 230℃. Due to the risk of thermal damage to products, wave soldering of large size products is discouraged. Recommended temperature profile for wave soldering is shown in Figure 2.

6-2.3 Soldering Iron(Figure 3):

Products attachment with a soldering iron is discouraged due to the inherent process control limitations. In the event that a soldering iron must be employed the following precautions are recommended.

Note： • Preheat circuit and products to 150℃ • Never contact the ceramic with the iron tip • Use a 20 watt soldering iron with tip diameter of 1.0mm
• 350℃ tip temperature for Ferrite chip bead (max) • 1.0mm tip diameter (max) • Limit soldering time to 3 sec.

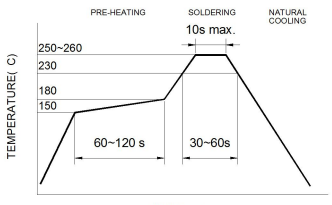


Figure 1. Re-flow Soldering(Lead Free)

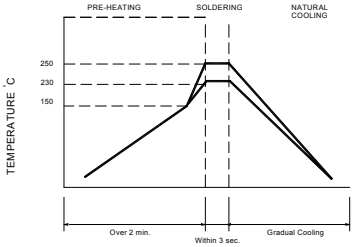


Figure 2. Wave Soldering

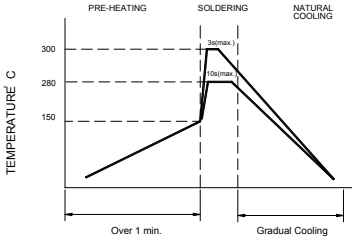
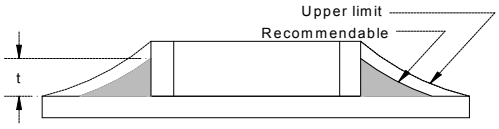


Figure 3. Hand Soldering

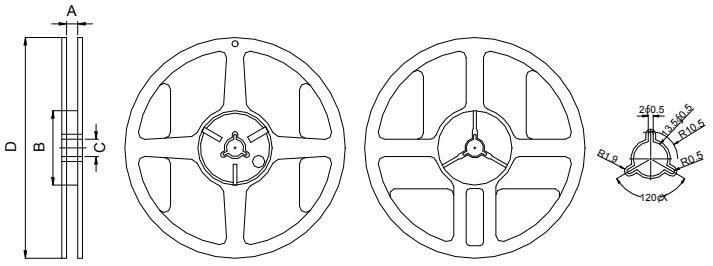
6-2.4 Solder Volume:

Accordingly increasing the solder volume, the mechanical stress to product is also increased. Exceeding solder volume may cause the failure of mechanical or electrical performance. Solder shall be used not to be exceed as shown in right side:



7.Packaging Information

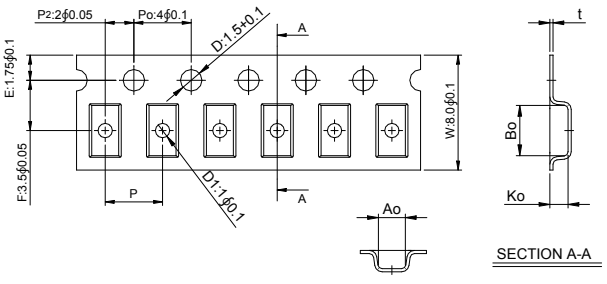
7-1. Reel Dimension



7"x8mm 7"x12mm

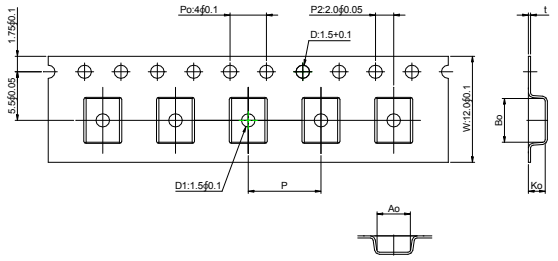
Type	A(mm)	B(mm)	C(mm)	D(mm)
7"x8mm	9.0±0.5	60±2	13.5±0.5	178±2
7"x12mm	13.5±0.5	60±2	13.5±0.5	178±2

7-2.1 Tape Dimension / 8mm



Series	Size	Bo(mm)	Ao(mm)	Ko(mm)	P(mm)	t(mm)	D1(mm)
FCB,FCM	100505	1.12±0.05	0.67±0.05	0.54±0.05	2.0±0.1	0.23±0.05	none
HCB,HPB	160808	1.80±0.10	1.01±0.10	1.02±0.10	4.0±0.1	0.22±0.05	none
HFB	201209	2.25±0.10	1.42±0.10	1.04±0.10	4.0±0.1	0.22±0.05	1.0±0.1
FCI	201212	2.35±0.10	1.50±0.10	1.45±0.10	4.0±0.1	0.22±0.05	1.0±0.1
FHI, FCH	321611	3.50±0.10	1.88±0.10	1.27±0.10	4.0±0.1	0.22±0.05	1.0±0.1
HCI	322513	3.42±0.10	2.77±0.10	1.55±0.10	4.0±0.1	0.22±0.05	1.0±0.1
FCA	321609	3.40±0.10	1.77±0.10	1.04±0.1	4.0±0.10	0.22±0.05	1.0±0.1

7-2.2 Tape Dimension / 12mm

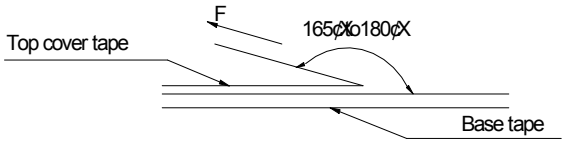


Series	Size	Bo(mm)	Ao(mm)	Ko(mm)	P(mm)	t(mm)	D1(mm)
FCB,	451616	4.95±0.1	1.93±0.1	1.93±0.1	4.0±0.1	0.24±0.05	1.5±0.1
HCB.FCM	453215	4.95±0.1	3.66±0.1	1.85±0.1	8.0±0.1	0.24±0.05	1.5±0.1
FCI	575018	6.10±0.1	5.40±0.1	2.00±0.1	8.0±0.1	0.30±0.05	1.5±0.1

7-3. Packaging Quantity

Chip Size	575018	453215	451616	322513	321611	201212	201209	160808	100505
Chip / Reel	1000	1000	2000	2500	3000	2000	4000	4000	10000
Inner box	4000	4000	8000	12500	15000	10000	20000	20000	50000
Middle box	20000	20000	40000	62500	75000	50000	100000	100000	250000
Carton	40000	40000	80000	125000	150000	100000	200000	200000	500000
Bulk (Bags)	7000	12000	20000	30000	50000	100000	150000	200000	300000

7-4. Tearing Off Force



The force for tearing off cover tape is 15 to 60 grams in the arrow direction under the following conditions.

Room Temp. (℃)	Room Humidity (%)	Room atm (hPa)	Tearing Speed mm/min
5~35	45~85	860~1060	300

Application Notice

・Storage Conditions

To maintain the solderability of terminal electrodes:

1. Temperature and humidity conditions: -10~ 40℃ and 30~70% RH.
2. Recommended products should be used within 6 months from the time of delivery.
3. The packaging material should be kept where no chlorine or sulfur exists in the air.

・Transportation

1.Products should be handled with care to avoid damage or contamination from perspiration and skin oils.

2. The use of tweezers or vacuum pick up is strongly recommended for individual components.
3. Bulk handling should ensure that abrasion and mechanical shock are minimized.

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