High Current Ferrite Chip Inductor (Lead Free) CPI201610HF -Series

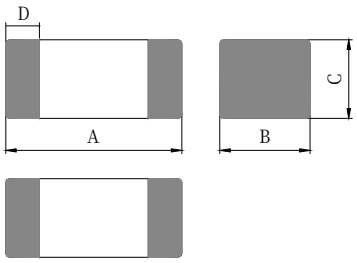
1.Features

1. 2.0x1.6 mm and 1 mm in height (very compact size): CAE and fine printing technology made this compact size possible
2. Stable minimum DC resistance in the class.
3. High speed mounting: Using SMT mounter makes less than a second mounting possible.
4. Excellent mounting strength by SMD chip making.
5. Reduced noise over 2/3 of coil inductor by optimal design of CAD

Completely lead-free product and support lead-free solder.

Halogen-free Pb-free Certificate Green Partner

2. Dimensions

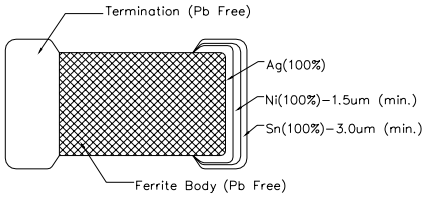


Chip Size				
Series	A(mm)	B(mm)	C(mm)	D(mm)
201610	2.0±0.3	1.6±0.2	1.0 max	0.5±0.3

3. Part Numbering

CPI	201610	H	F	-	2R2	M	-	1A2
A	B	C	D		E	F		G

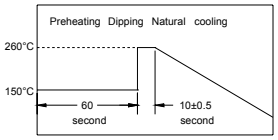
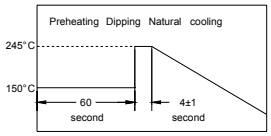
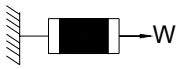
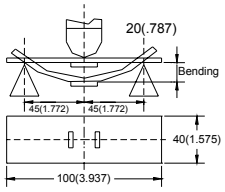
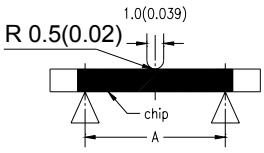
A: Series
B: Dimension L x W
C: Category Code
D: Material Lead Free Material
E: Inductance 2R2=2.2uH
F: Inductance Tolerance M=±20%
G: Rated Current 1A2=1200mA



4.Specification

Tai-Tech Part Number	Inductance(uH)	Test Frequency (MHz)	Rated Current (mA) max.	DCR (Ω	SRF (MHz) min.
CPI201610HF-1R0M-1A3	1.0±20%	1	1300	0.12±30%	110
CPI201610HF-1R5M-1A3	1.5±20%	1	1300	0.12±30%	75
CPI201610HF-2R2M-1A2	2.2±20%	1	1200	0.14±30%	70
CPI201610HF-3R3M-1A0	3.3±20%	1	1000	0.18±30%	50
CPI201610HF-4R7M-0A9	4.7±20%	1	900	0.23±30%	40

5. Reliability and Test Condition

Item	Performance	Test Condition
Operating Temperature	-40~+105℃ (Including self-temperature rise)	--
Transportation Storage Temperature	-40~+105℃	For long storage conditions, please see the Application Notice
Inductance (Ls)	Refer to standard electrical characteristics list	Agilent4291 Agilent E4991 Agilent4287 Agilent16192
DC Resistance		Agilent 4338
Rated Current		DC Power Supply Over Rated Current requirements, there will be some risk
Temperature Rise Test	Rated Current < 1A ΔT 20℃Max Rated Current ≧ 1A ΔT 40℃Max	1. Applied the allowed DC current. 2. Temperature measured by digital surface thermometer.
Solder heat Resistance	Appearance: No significant abnormality. Inductance change: Within ± 10%. No mechanical damage. Remaining terminal electrode:75% min.	Preheat: 150℃,60sec. Solder: Sn-Cu0.5 Solder temperature: 260±5℃ Flux for lead free: ROL0 Dip time: 10±0.5sec. 
Solderability	More than 95% of the terminal electrode should be covered with solder. 	Preheat: 150℃,60sec. Solder: Sn-Cu0.5 Solder temperature: 245±5℃ Flux for lead free: ROL0 Dip time: 4±1sec.
Terminal strength	The terminal electrode and the dielectric must not be damaged by the forces applied on the right conditions. 	Size Force (Kgf) Time(sec) 2016 0.6 >30
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. The duration of the applied forces shall be 60 (+ 5) Sec.
Bending Strength	The ferrite should not be damaged by Forces applied on the right condition. 	Size | mm(inches) | P-Kgf 2016 | 1.40(0.055) | 1.0
Random Vibration Test	Appearance: Cracking, chipping and any other defects harmful to the characteristics should not be allowed. Inductance: within±10%	Frequency: 10-55-10Hz for 15 min. Amplitude: 1.52mm Directions and times: X, Y, Z directions for 15 min.. This cycle shall be performed 12 times in each of three mutually perpendicular directions (Total 9hours).
Drop	a: No mechanical damage b: Inductance change: ：within±10%	Drop 10 times on a concrete floor from a height of 75cm

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

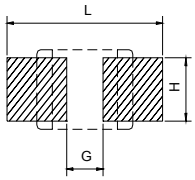
Inductance: within±10%of initial value.</td><td>Temperature: 105±2℃
Applied current: rated current.
Duration: 1008±12hrs.
Measured at room temperature after placing for 2 to 3hrs.</td></tr>
<tr><td>Humidity</td><td>Humidity: 90~95%RH.
Temperature: 40±2℃.
Duration: 504±8hrs.
Measured at room temperature after placing for 2 to 3hrs.</td></tr>
<tr><td>Thermal shock</td><td>Appearance: no damage.

Inductance: within±10%of initial value.
<table><tr><th>Phase</th><th>Temperature(℃)</th><th>Time(min.)</th></tr><tr><td>1</td><td>-40±2℃</td><td>30±5</td></tr><tr><td>2</td><td>room temp.</td><td>≦0.5</td></tr><tr><td>3</td><td>+105±2℃</td><td>30±5</td></tr></table>Measured: 500 times</td><td>Condition for 1 cycle
Step1: -40±2℃ 30±5 min.
Step2: +105±2℃ 30±5 min.
Number of cycles: 500
Measured at room temperature after placing for 2 to 3 hrs.</td></tr>
<tr><td>Low temperature storage test</td><td></td><td>Temperature: -40±2℃.
Duration: 500±8hrs.
Measured at room temperature after placing for 2 to 3hrs.</td></tr>
</table>

6.Soldering and Mounting

6-1. Recommended PC Board Pattern

Chip Size						Land Patterns For Reflow Soldering		
Serie	**Type**	**A(mm)**	**B(mm)**	**C(mm)**	**D(mm)**	**L(mm)**	**G(mm)**	**H(mm)**
CPI	201610	2.0±0.3	1.6±0.20	1.0 max..	0.5±0.30	3.00	1.00	1.60



PC board should be designed so that products can prevent damage from mechanical stress when 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 terminations are suitable for re-flow soldering systems. If hand soldering cannot be avoided, the preferred technique is the utilization of hot air soldering tools.
Note.

If wave soldering is used ,there will be some risk.
Re-flow soldering temperatures below 240 degrees, there will be non-wetting risk

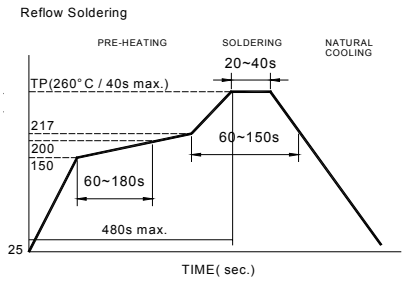
6-2.1 Lead Free Solder re-flow:

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

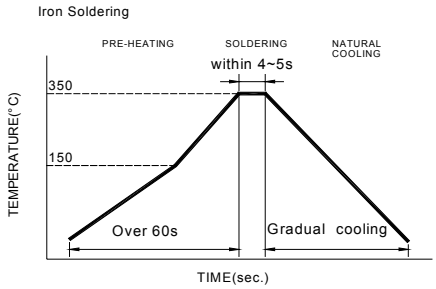
6-2.2 Soldering Iron:

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. for Iron Soldering in Figure 2.

- 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 (max)
- 1.0mm tip diameter (max)
- Limit soldering time to 4~5sec.



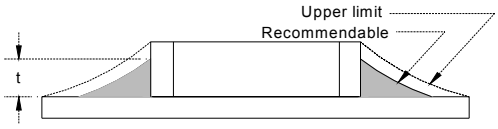
Reflow times: 3 times max
Fig.1



Iron Soldering times：1 times max
Fig.2

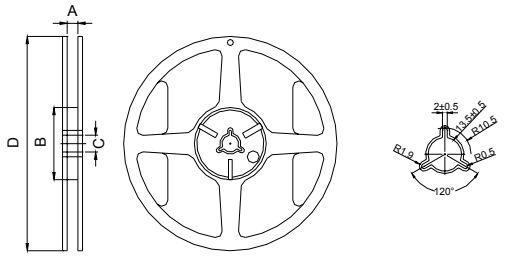
6-2.3 Solder Volume:

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:
Minimum fillet height = soldering thickness + 25% product height



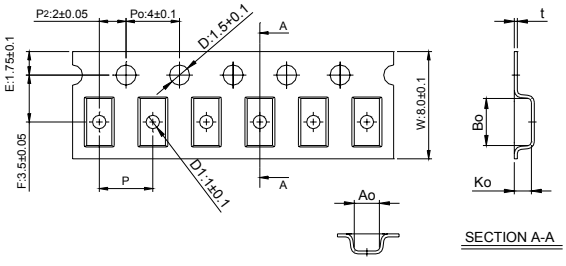
7. Packaging Information

7-1. Reel Dimension



Type	A(mm)	B(mm)	C(mm)	D(mm)
7"x8mm	9±0.5	60±2	13.5±0.5	178±2

7-2 Tape Dimension / 8mm

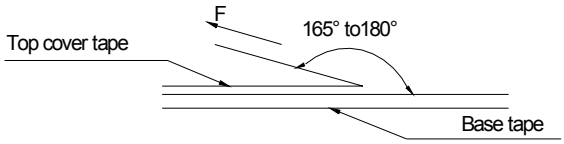


Size	P(mm)	Bo(mm)	Ao(mm)	Ko(mm)	t(mm)
201610	4.0±0.1	2.40±0.20	1.95±0.15	1.45max.	0.30max.

7-3. Packaging Quantity

Chip size	201610
Reel	3000
Inner box	15000
Middle box	75000
Carton	150000

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 solder ability of terminal electrodes:

1. TAI-TECH products meet IPC/JEDEC J-STD-020D standard-MSL, level 1.
2. Temperature and humidity conditions: -10~ 40℃ and 30~70% RH.
3. Recommended products should be used within 6 months from the time of delivery.
4. 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.

Typical Inductance v.s. Frequency Curve